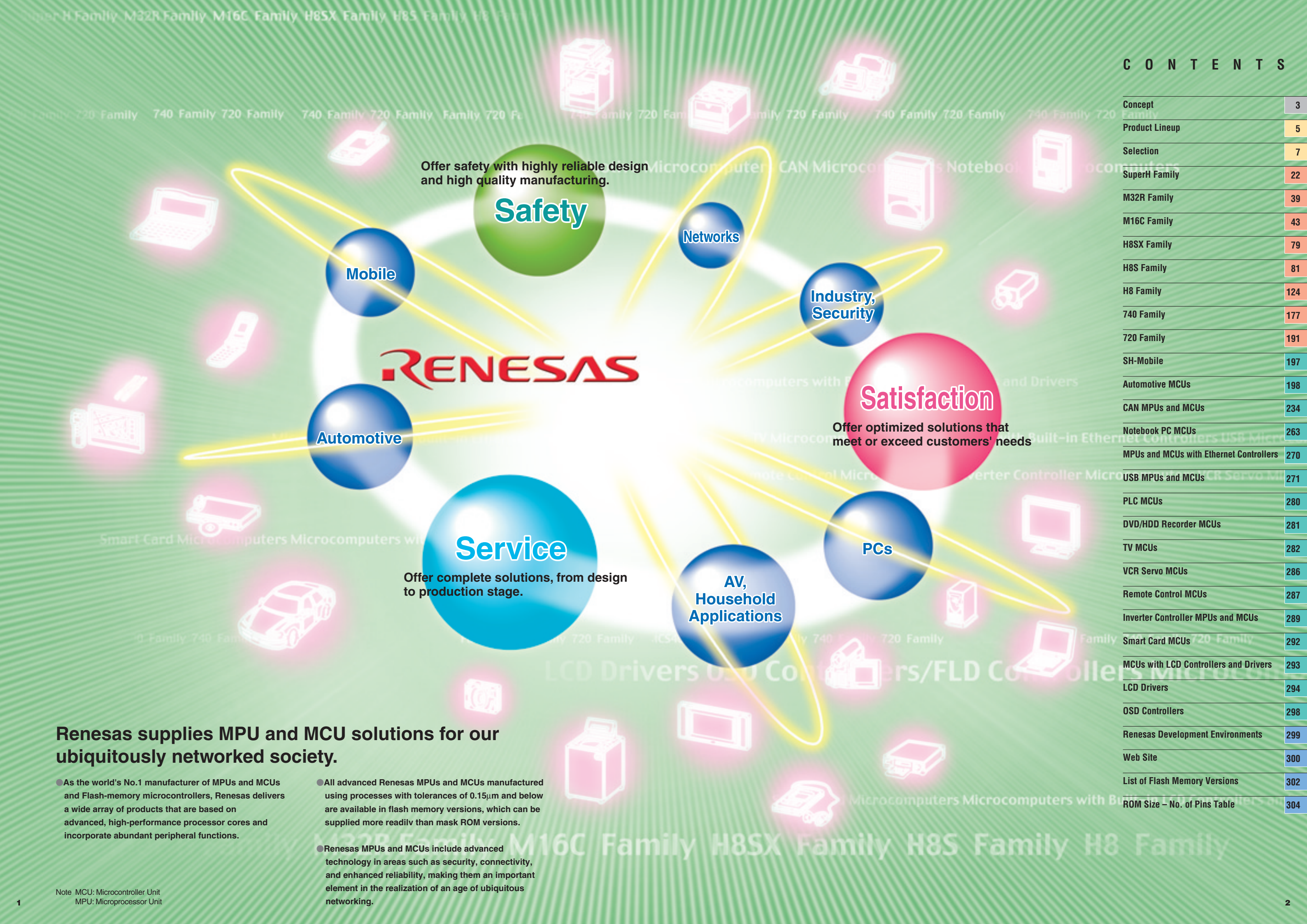


2005.5

Everywhere you imagine. **RENESAS**

Renesas MPU & MCU General Catalog





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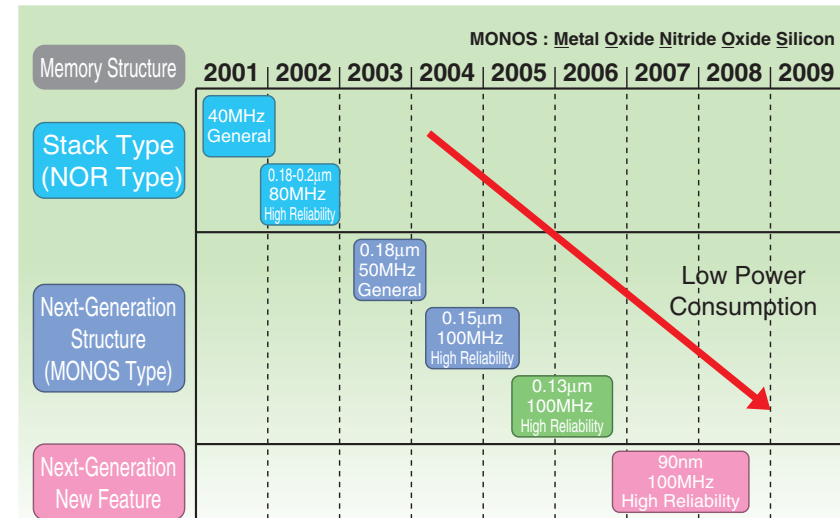
Renesas supplies MPU and MCU solutions for our ubiquitously networked society.

- As the world's No.1 manufacturer of MPUs and MCUs and Flash-memory microcontrollers, Renesas delivers a wide array of products that are based on advanced, high-performance processor cores and incorporate abundant peripheral functions.
- All advanced Renesas MPUs and MCUs manufactured using processes with tolerances of 0.15μm and below are available in flash memory versions, which can be supplied more readily than mask ROM versions.
- Renesas MPUs and MCUs include advanced technology in areas such as security, connectivity, and enhanced reliability, making them an important element in the realization of an age of ubiquitous networking.

Note MCU: Microcontroller Unit
MPU: Microprocessor Unit

Technology Roadmap for MCUs with On-Chip Flash Memory

Technology Roadmap: from Stack type to MONOS type



Two development strategies:

■ Pursuing advanced MONOS-type flash technology

To boost performance and decrease power consumption

■ Enhancing mainstream stack-type flash technology

To support popular products and legacy systems

Benefits of MCUs with embedded flash memory:

■ Faster system development

ROM mask TAT eliminated

■ Lower product design expenses

No ROM mask management; faster debug cycles

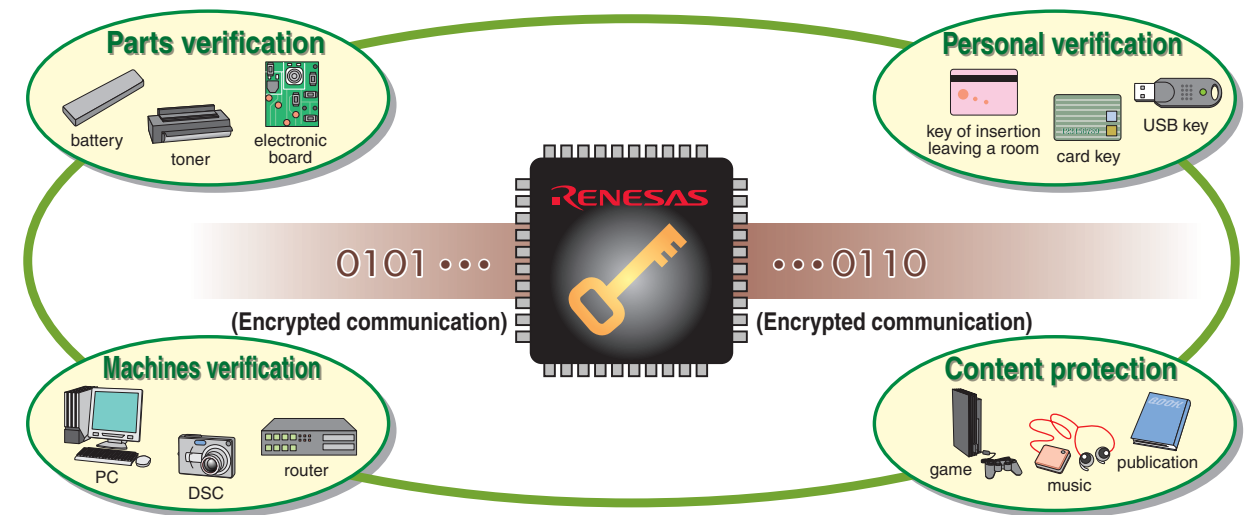
■ Increased production flexibility

Small quantities of multiple product versions implemented by software

■ Easier upgrades in the field

Application code, system parameters reprogrammable via line, network, etc.

Secure Authentication MPU and MCU



Offers a secure authentication system by original protocol code communication. Secures "Safety" in all areas of business activity.

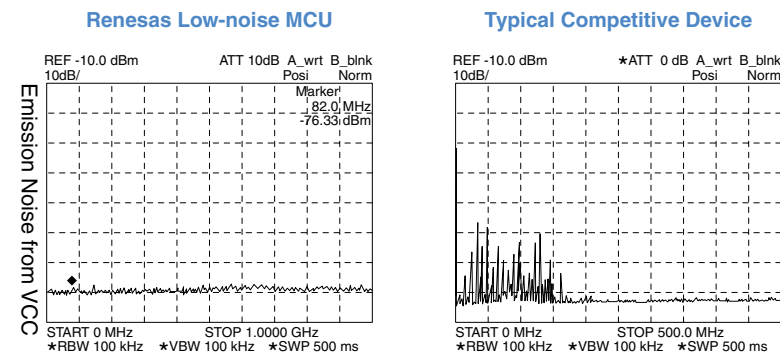
A variety of solutions and approaches to meet a broad range of requirements

Reducing Electromagnetic Interference

Ultra-low EMI MCU

To reduce unwanted noise emissions some Renesas microcontrollers use special design techniques, such as:

- Optimized arrangement of power supply and ground pins
- Optimized oscillator drive



Offering MPUs and MCUs Tailored to Specific Applications

MPUs and MCUs Lineup

8-Bit

- ▶ 7600 Series
- ▶ 38000 Series
- ▶ 740/7450/7470 Series
- ▶ 7200 Series
- ▶ H8/300 Series
- ▶ H8/300L Super Low Power Series

4-Bit

- ▶ 4500 Series
- ▶ 720 Series

16-Bit

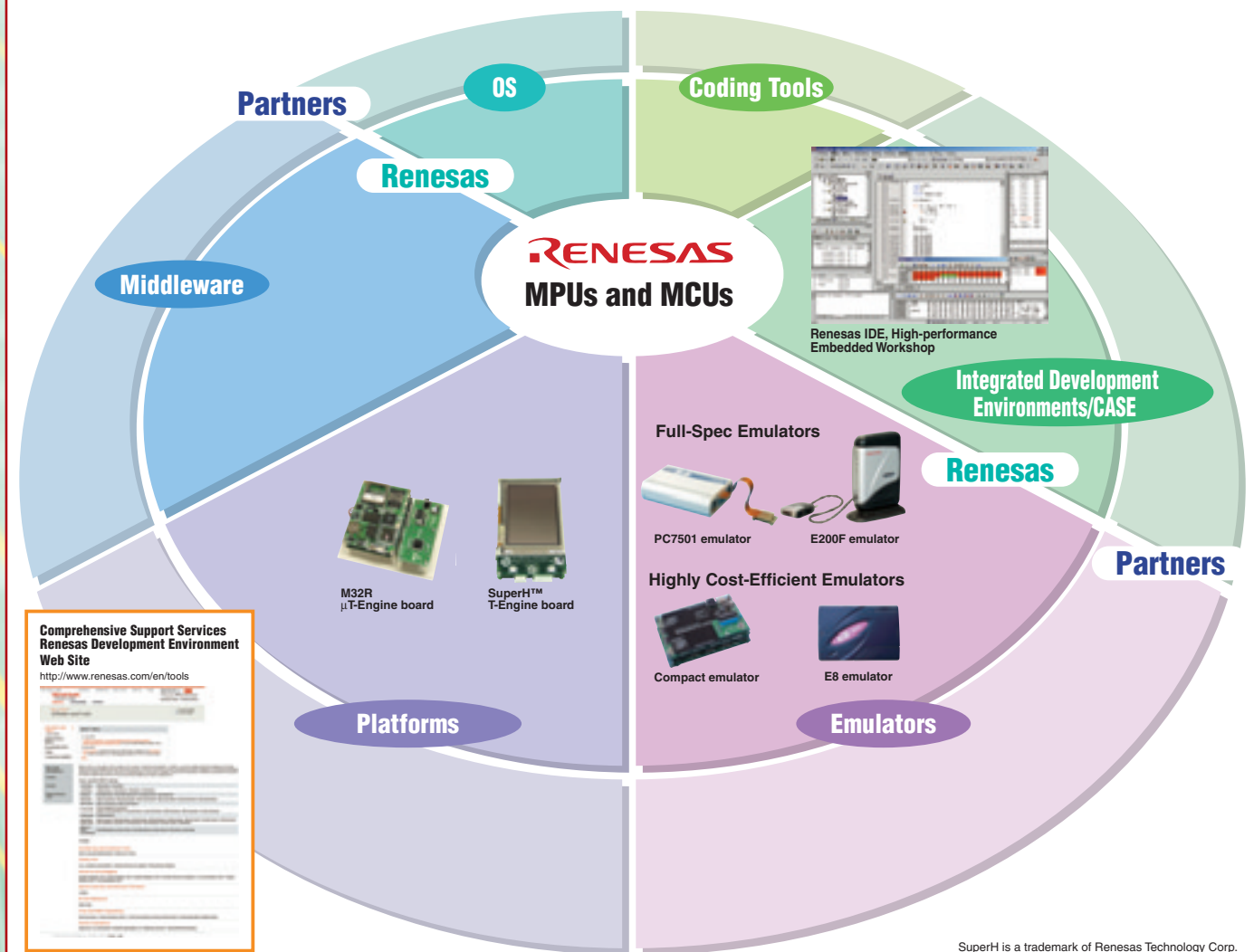
- ▶ M16C Family
- ▶ H8S Family
- ▶ H8/300H Series
- ▶ H8/300H Super Low Power Series
- ▶ Tiny H8/300H Tiny Series
- ▶ R8C/Tiny Series
- ▶ M16C/Tiny Series

32-Bit

- ▶ SuperH Family
- ▶ M32R Family
- ▶ SH-Mobile
- ▶ H8SX Family
- ▶ Tiny SH/Tiny Series*

	bits		
CAN/LIN MCU	8	16	32
USB Device	8		32
TV MCU	8	16	
VCR/DVD MCU		16	32
LCD MCU	4	8	16
PLC MCU			16
OSD Controller			★ New product

Development Environments from Renesas and Partners



SuperH is a trademark of Renesas Technology Corp.

SuperH™ Family	SH7780 Series	SH7780
	SH7750 Series	SH7760 SH7751R SH7751 SH7750S SH7750R
	SH7700 Series	SH7729R SH7727 SH7720 SH7712 SH7710 SH7709S SH7706 SH7705
	SH7641 Series	SH7641
	SH7606 Series	SH7606
	SH7200 Series	SH7206
	SH-Ether Series	SH7712 SH7710 SH7619 SH7618 SH7616 SH7615
	SH7146 Series	SH7149 SH7146
	SH7144 Series	SH7145 SH7144
	SH7125 Series	SH7125 SH7124
	SH7080 Series	SH7086 SH7085 SH7084 SH7083
	SH7060 Series	SH7065
	SH7050 Series	SH7058 SH7055 SH7051 SH7050
	SH7047 Series	SH7109 SH7107 SH7105 SH7049 SH7047
	SH7046 Series	SH7148 SH7108 SH7106 SH7104 SH7101 SH7048 SH7046
	SH7040 Series	SH7045 SH7044 SH7043 SH7042 SH7041 SH7040
	SH7030 Series	SH7034B SH7034 SH7032
	SH7020 Series	SH7021 SH7020
	SH7010 Series	SH7018 SH7017 SH7016 SH7014 SH7011

M32R Family	M32R/ECU Series	32196 32192 32186 32176 32173 32172
-------------	-----------------	-------------------------------------

MPUs and MCUs

M16C Family	M32C/90 Series	M32C/95 M32C/94
	M32C/80 Series	M32C/88 M32C/87 M32C/86 M32C/85 M32C/84 M32C/83 M32C/82 M32C/81 M32C/80
	M16C/80 Series	M16C/80
	M16C/60 Series	M16C/62P M16C/62N M16C/62M M16C/62A M16C/6V M16C/6S M16C/6N M16C/6K M16C/6H
	M16C/30 Series	M16C/30P M16C/30L M16C/30
	M16C/20 Series	M16C/24
	M16C/Tiny Series	M16C/29 M16C/28 M16C/26A M16C/26
	M16C/10 Series	M16C/10 M16C/1N
	R8C/Tiny Series	R8C/25 R8C/24 R8C/23 R8C/22 R8C/21 R8C/20 R8C/19 R8C/18 R8C/17 R8C/16 R8C/15 R8C/14 R8C/13 R8C/12 R8C/11 R8C/10

H8SX Family	H8SX/1600 Series	H8SX/1650
	H8SX/1500 Series	H8SX/1580 H8SX/1520

H8S Family	H8S/2600 Series	H8S/2678R H8S/2678 H8S/2668 H8S/2655 H8S/2649 H8S/2648 H8S/2646 H8S/2643 H8S/2639 H8S/2638 H8S/2636 H8S/2635 H8S/2633 H8S/2630 H8S/2628 H8S/2615 H8S/2612
	H8S/2500 Series	H8S/2556 H8S/2552 H8S/2506
	H8S/2400 Series	H8S/2437
	H8S/2300 Series	H8S/2398 H8S/2378 H8S/2368 H8S/2357 H8S/2355 H8S/2350 H8S/2345 H8S/2339 H8S/2338 H8S/2329 H8S/2328 H8S/2319 H8S/2318
	H8S/2200 Series	H8S/2282 H8S/2268 H8S/2258 H8S/2245 H8S/2239 H8S/2238B H8S/2238R H8S/2237 H8S/2227 H8S/2218 H8S/2215 H8S/2214 H8S/2212
	H8S/2100 Series	H8S/2199 H8S/2194 H8S/2189 H8S/2172 H8S/2168 H8S/2158 H8S/2148 H8S/2144 H8S/2140B H8S/2138 H8S/2134 H8S/2128 H8S/2124 H8S/2114 H8S/2111B H8S/2110B
	H8S Super Low Power Series	H8S/2264

H8 Family	H8/300H Series	H8/3069R H8/3068 H8/3067 H8/3062 H8/3052B H8/3048B H8/3048 H8/3042 H8/3039 H8/3035 H8/3032 H8/3029 H8/3028 H8/3024 H8/3022 H8/3008 H8/3006 H8/3004 H8/3003 H8/3002 H8/3001
	H8/300H Tiny Series	H8/36912G H8/36902G H8/36087 H8/36077 H8/36064G H8/36057 H8/36049 H8/36037 H8/36024 H8/36014 H8/3694 H8/3687 H8/3672 H8/3664
	H8/300H Super Low Power Series	H8/38602R H8/38086R H8/38076R
	H8/300L Super Low Power Series	H8/38347 H8/38327 H8/38124 H8/38104 H8/38024R H8/38024S H8/38024 H8/38004 H8/38002S H8/3887 H8/3867 H8/3847R H8/3847S H8/3827R H8/3827S H8/3802
	H8/300L Series	H8/3977R H8/3947 H8/3927 H8/3877N H8/3877 H8/3857 H8/3854 H8/3834 H8/3814 H8/3724 H8/3714 H8/3657 H8/3644 H8/3637 H8/3627 H8/3614

SuperH Family	
M32R Family	
M16C Family	
H8SX Family	
H8S Family	
H8 Family	
740 Family	
720 Family	

LINE UP

740 Family	7600 Series	7643 7641 7632 7630
	38000 Series	38K2 38K0 38C8 38C5 38C2 38C1 3886 3885 3883 3882 3851 3850 3826 3823 3822 3804 3803
	740 Series	7560 7547 7546 7545 7544 7542 7540 7534 7517 7516 7512
	7200 Series	7280 7220 7160 7150
720 Family	4500 Series	4570 4556 4554 4553 4552 4524 4519 4518 4509 4508 4507 4506 4502 4501
	720 Series	4283 4282

Application Specific MCUs

SH-Mobile	PLC (Power Line Communication) MCUs	Smart Card MCUs
Automotive MCUs	DVD/HDD Recorder MCUs	MCUs with LCD Controllers and Drivers
CAN MPUs and MCUs	TV MCUs	LCD Drivers
Notebook PC MCUs	VCR Servo MCUs	OSD Controllers
MPUs and MCUs with Ethernet Controllers	Remote Control MCUs	
USB MPUs and MCUs	Inverter Controller MPUs and MCUs	

☐ **SuperH™ Family**

¹ More than 2 analog values are A/D converted simultaneously. ² ZTAT (on-chip PROM) ³ 3.3 V I/O, discrete on-chip power supply ⁴ Optional mask ROM version available
⁵ CPU is applicable for 3.3V, 5V I/O ⁶ Support subset. Support coverage varies depending on products. ⁷ I/O: 3.3V, another power supply is used internally and for the DDR ⁸ Synchronous serial communications unit

★ : New product ★★ : Under development

- ☐ M32R Family
- ☐ M16C Family

[illegible][illegible]

More than 2 analog values are A/D converted simultaneously. ² Synchronous serial communications unit ³ Under investigation

★ : New product ★★ : Under development

[illegible]

★ : New product ★★ : Under development

[illegible]

★ : New product ★★ : Under development

H8 Family

[illegible]

¹ More than 2 analog values are A/D converted simultaneously. ² Synchronous serial communications unit

★ : New product ★★ : Under development

[illegible]

★ : New product ★★ : Under development

[illegible]

★ : New product ★★ : Under development

Application Matrix

☐ SuperH™ Family
☐ M32R Family

Family	Series	Group	AV/Home Use				Computer Related				Automotive (Supported Products Available)				Note				
			Audio	Video	Household Appliances	Amusement	Computers	Storage Systems	Imaging	Display	Engine	Pedestrian Safety	Body/Chassis Systems	Navigation/Information	Car Audio	Mobile	Network	Industry/Security	
SuperH™	SH7780	SH7780**	○	○	○	○									●		●	○	
	SH7750	SH7760	○	○	○	○									●			○	Telematics/Handheld Terminals
		SH7751R	○	○	○	●									●		●	○	Gateways/Routers/Pachinko Machines
		SH7751	○	○	○	○									●		○	○	
		SH7750S	○	○	○	○									●		○	○	Image Processing/Pachinko Machines
		SH7750R	○	○	○	●									●		●	○	Image Processing/Pachinko Machines
	SH7700	SH7729R	○	○	○	○											●	○	Communications Equipment/Printers/Multifunction Peripherals/Fax
		SH7727	○	○	○	○											●	○	Communications Equipment/Telephones/Printers
		SH7720*	○	○	○	○										●	○	○	Mobile Phones/IP Phones/Printers
		SH7712*	○	○	○	○											●	○	Gateways/Routers/VOIP-Tas
		SH7710	○	○	○	○											●	○	Gateways/Routers/VOIP-Tas
		SH7709S	○	○	○	○											●	○	Printers/Multifunction Peripherals/Fax/Electronic Musical Instruments
		SH7706	○	○	○	○											●	○	Printers/DVD Recorders/Barcode Readers
		SH7705	○	○	○	○										●	●	○	Mobile Phones/Video Printers/Digital Still Cameras/Digital Video Cameras
	SH7641	SH7641*	○	○	○				○									○	
	SH7606	SH7606*																	
	SH7200	SH7206																	
	SH-Ether	SH7619**	●	●	●	○											●	○	
		SH7618	●	●	●	○											●	○	
		SH7616	○	○	○	○											●	○	
		SH7615	○	○	○	○											●	○	Ethernet Controllers (Digital AV Equipment/Printers/ Security Cameras)
		SH7612*	○	○	○	○											●	○	
		SH7710	○	○	○	○											●	○	
	SH7146	SH7149**			●													●	
		SH7146**			●													●	
	SH7144	SH7145	○	○	○	○			○	○							○	●	
		SH7144	○	○	○	○			○	○							○	●	
	SH7125	SH7125**		○	●												○	●	
		SH7124**		○	●	○											○	●	
	SH7080	SH7086**	○	○	○	○			○	○							○	●	
		SH7085**	○	○	○	○			○	○							○	●	
		SH7084**	○	○	○	○			○	○							○	●	
		SH7083**	○	○	○	○			○	○							○	●	
	SH7060	SH7065		○														○	
	SH7050	SH7058	○	○	○	○			○	○	●	○	●	○	○	○	○	○	Automotive Engine Control/CAN Applications
		SH7055	○	○	○	○			○	○	●	○	●	○	○	○	○	○	Automotive Engine Control/CAN Applications
		SH7051	○	○	○	○			○	○	●	○	●	○	○	○	○	○	Automotive Engine Control/CAN Applications
		SH7050	○	○	○	○			○	○	●	○	●	○	○	○	○	○	Automotive Engine Control/CAN Applications
	SH7047	SH7109*			●														
		SH7107*			●														
		SH7105*			●														
		SH7049	○	○	○	○					●	●					●	○	Automotive Electric Power Steering/CAN Applications
		SH7047	○	○	●	○					●	●					●	○	Automotive Electric Power Steering/CAN Applications
		SH7106*			●														
	SH7046	SH7148	○	○	○	○											●	○	Appliance Motor Control for Air Conditioners, Etc./Industrial Motor Control
		SH7108*			●														
		SH7106*			●														
		SH7104*			●														
		SH7101	○	○	○	○											●	○	Appliance Motor Control for Air Conditioners, Etc./Industrial Motor Control
		SH7048	○	○	●	○											●	○	
	SH7040	SH7046	○	○	●	○											●	○	
		SH7045	○	○	○				○	○							○	○	
		SH7044	○	○	○				○	○							○	○	
		SH7043	○	○	○				○	○							○	○	
		SH7042	○	○	○				○	○							○	○	
		SH7041	○	○	○				○	○							○	○	
	SH7030	SH7040	○	○	○				○	○							○	○	
		SH7034B	○	○	○	○											○	○	
		SH7034	○	○	○	○											○	○	
		SH7032	○	○	○												○	○	
	SH7020	SH7021	○	○	○	○											○	○	
		SH7020	○	○	○	○											○	○	
	SH7010	SH7018	○	○	○	○		○	○	○							○	○	
		SH7017	○	○	○	○											○	○	
		SH7016	○	○	○	○											○	○	
		SH7014	○	○	○	○											○	○	
		SH7011	○	○	○	○		○									○	○	
M32R	M32R/ECU	32196**									○	●	●					○	
		32192**									○	●	●					○	
		32186**									○	●	●					○	
		32176									○	●	●					○	
		32173									○	●	●					○	
		32172									○	●	●					○	

● : It is best suited. ○ : It is suited.

★ : New product ★★ : Under development

- ☐ M16C Family
☐ H8SX Family
☐ H8S Family

Family	Series	Group	AV/Home Use				Computer Related				Automotive (Supported Products Available)				Note					
			Audio	Video	Household Appliances	Amusement	Computers	Storage Systems	Imaging	Display	Engine	Pedestrian Safety	Body/Chassis Systems	Navigation/Information		Car Audio	Mobile	Network	Industry/Security	
M16C	M32C/90	M32C/95**	●	○	●	○	○	○	○	○	○	●	●	○	●	○	●	●		
		M32C/94**	●	○	●	○	○	○	○	○	○	●	●	○	●	○	●	●		
	M32C/80	M32C/88**	●	○	●	○	○	○	○	○	○	●	●	○	●	○	●	●		
		M32C/87**	●	○	●	○	○	○	○	○	○	●	●	○	●	○	●	●	Large-Capacity Flash Memory	
		M32C/86*	●	○	●	○	○	○	○	○	○	●	●	○	●	○	●	●		
		M32C/85	●	○	●	○	○	○	○	○	○	●	●	○	●	○	●	●		
		M32C/84	●	○	●	○	○	○	○	○	○	●	●	○	●	○	●	●		
		M32C/83	●	○	●	○	○	○	○	○	○	●	●	○	●	○	●	●		
		M32C/82	●	○	●	○	○	○	○	○	○	●	●	○	●	○	●	●		
		M32C/81	●	○	●	○	○	○	○	○	○	●	●	○	●	○	●	●		
		M32C/80	●	○	○	●	○	○	○	○	○	○	○	○	○	○	○	○		
	M16C/80	M16C/80	○	○	○	○	○	○	○	○	●	●	○	○	○	○	○	●		
	M16C/60	M16C/6V	○	●				●						○	○			●	○	
		M16C/6S*	○		○												●	○		
		M16C/6N										●	●	○	●		●	●		
		M16C/6K					●													
		M16C/6H		●				●						○						
		M16C/62P	●	○	○	○	○	○	○	○		●	●		●	○	○	○	●	
		M16C/62N	●	○	○	○	○	○	○	○				○	●	○	○	○	●	
		M16C/62M	●	○	○	○	○	○	○	○				○	●	○	○	○	●	
		M16C/62A	●	○	○	○	○	○	○	○		●	●		○	○	○	○	●	
	M16C/30	M16C/30P**	●	○	○	○									○	○	○	○	○	
		M16C/30L	●	○	○	○										○	○	○	○	
		M16C/30	●	○	○	○									●	○	○	○	○	
	M16C/20	M16C/24	●			○	●	●	○										○	
	M16C/Tiny	M16C/29**			○		○				○	○	●	●	○	○		●	●	
		M16C/28*		○	●	○	○				○	○	●	●		○			○	
		M16C/26A**		○	●	○	○				○	○	●	●					○	
		M16C/26		○	●	○	○								○				○	
	M16C/10	M16C/1N										●	●				●	●		
		M16C/10			●							●	●					○		
	R8C/Tiny	R8C/25**		○	○	●	○			○				○	○	○	○	○	●	Motor Applications/Photocopiers/Page Printers
		R8C/24**		○	●	●	○			○				○	○	○	○	○	●	Motor Applications/Photocopiers/Page Printers
		R8C/23**												○	○	○	○	○	○	
		R8C/22**										●	●	○	●		●	●	○	
		R8C/21**										●	●	○	●		●	●	○	
		R8C/20**										●	●	○	●		●	●	○	
		R8C/19**		○	●	●	○		○					○	○	○	○	○	●	Motor Applications/Photocopiers/Page Printers
		R8C/18**		○	●	●	○		○					○	○	○	○	○	●	Motor Applications/Photocopiers/Page Printers
		R8C/17*		○	●	●	○		○					○	○	○	○	○	●	Motor Applications/Photocopiers/Page Printers
		R8C/16*		○	●	●	○		○					○	○	○	○	○	●	Motor Applications/Photocopiers/Page Printers
		R8C/15*		○	●	●	○		○					○	○	○	○	○	●	Motor Applications/Photocopiers/Page Printers
		R8C/14*		○	●	●	○		○					○	○	○	○	○	●	Motor Applications/Photocopiers/Page Printers
		R8C/13		○	●	●	○		○					○	○	○	○	○	●	Motor Applications/Photocopiers/Page Printers
		R8C/12		○	●	●	○		○					○	○	○	○	○	●	Photocopiers/Page Printers
		R8C/11		○	●	●	○		○					○	○	○	○	○	●	Motor Applications/Photocopiers/Page Printers
		R8C/10		○	●	●	○		○					○	○	○	○	○	●	Photocopiers/Page Printers
H8SX		H8SX/1600	H8SX/1650		○		○		●	●				○			○	○	○	Computer Peripherals/Large-Capacity Flash Memory
		H8SX/1500	H8SX/1580*		○					○								○	○	
		H8SX/1520**								●	●							○		
H8S	H8S/2600	H8S/2678R		○			○	○	●									○	Printers/Computer Peripherals/Large-Capacity Flash Memory	
		H8S/2678		●			○	○	●									○		
		H8S/2668		●				○	○					○				○		
		H8S/2655							○											
		H8S/2649*										●						●	Automotive Applications	
		H8S/2648										●						●	Automotive Applications	
		H8S/2646					○					●						●	Automotive Applications	
		H8S/2643		●		○			○							○		●	Automotive Applications	
		H8S/2639										●						●	Automotive Applications	
		H8S/2638										●						●	Automotive Applications	
		H8S/2636										●						●	Automotive Applications	
		H8S/2635*										●						●		
		H8S/2633		○		○		○	●					○			○		●	
		H8S/2630										●						○	○	
		H8S/2628										●						○	○	
		H8S/2615										●						○	○	Automotive Applications
		H8S/2612										●						○	○	Automotive Applications
		H8S/2500	H8S/2556	○											○	●			○	
	H8S/2552		○											○	●			○		
	H8S/2506		○	○	○	○	○	○	○	○				○	○	○	○	○	○	
	H8S/2400	H8S/2437		●					○	●								○	Flat Panel Displays (LCD and PDP TVs/Projectors)/PC Monitors	
	H8S/2300	H8S/2398	○	○	○			○		○	●							○	○	
		H8S/2378	○	●	○	○	○		●	●							○	○	○	Flat Panel Displays (LCD and PDP TVs/Projectors)/Photocopiers
		H8S/2368	○	●	○	○	○		●	●							○	○	○	
		H8S/2357			○	○			○									○	○	
		H8S/2355							○					○				○	○	
		H8S/2350				○	○	●	○					○				○	○	
		H8S/2345				○	○		○			○	○				○	○		
		H8S/2339					○		○				○				○	○		

● : It is best suited. ○ : It is suited.

★ : New product ★★ : Under development

Application Matrix

☐ H8S Family
☐ H8 Family

Family	Series	Group	AV/Home Use				Computer Related				Automotive (Supported Products Available)				Note					
			Audio	Video	Household Appliances	Amusement	Computers	Storage Systems	Imaging	Display	Engine	Pedestrian Safety	Body/Chassis Systems	Navigation/Information		Car Audio	Mobile	Network	Industry/Security	
H8S	H8S/2300	H8S/2338																		
		H8S/2329																		
		H8S/2328																		
		H8S/2319																		
		H8S/2318																		
	H8S/2200	H8S/2282																	Automotive Applications	
		H8S/2268																	Radios/Electric Power Meters	
		H8S/2258																		
		H8S/2245																		
		H8S/2239																		
		H8S/2238R																		
		H8S/2238B																		
		H8S/2237																		
		H8S/2227																		
		H8S/2218																	ePOS Equipment/Card Readers	
		H8S/2215																	ePOS Equipment/Card Readers	
		H8S/2214																		
		H8S/2212																	ePOS Equipment/Card Readers	
		H8S/2100	H8S/2199																	
			H8S/2194																	
			H8S/2189*																	for soft IP
			H8S/2172																	Card Readers
			H8S/2168																	
	H8S/2158																			
	H8S/2148																		KBC(Key Board Controller)	
	H8S/2144																		KBC(Key Board Controller)	
	H8S/2140B																		KBC(Key Board Controller)	
	H8S/2138																		KBC(Key Board Controller)	
	H8S/2134																		Meters	
	H8S/2128																			
	H8S/2124																			
	H8S/2114																		KBC(Key Board Controller)	
	H8S/2111B																		KBC(Key Board Controller)	
	H8S/2110B																	KBC(Key Board Controller)		
	H8S Super Low Power	H8S/2264																Communications/Electric Power Meters		
H8	H8/300H	H8/3069R																		
		H8/3068																		
		H8/3067																		
		H8/3062																		
		H8/3052B																		
		H8/3048B																		
		H8/3048																		
		H8/3042																		
		H8/3039																		
		H8/3035																		
		H8/3032																		
		H8/3029																		
		H8/3028																		
		H8/3024																	Karaoke Machines	
		H8/3022																		
		H8/3008																		
		H8/3006																		
		H8/3004																		
		H8/3003																		
		H8/3002																		
		H8/3001																		
	H8/300H Tiny	H8/3694																		
		H8/36912G																		
		H8/36902G																		
		H8/3687																		
		H8/3672																		
		H8/3664																		
		H8/36087																		
		H8/36077**																		
		H8/36064G																		
		H8/36057																		
		H8/36049																		
		H8/36037																		
		H8/36024																		
		H8/36014																		
H8/300H Super Low Power	H8/38602R*																			
	H8/38086R*																	Electric Power Meters, Measuring devices		
	H8/38076R*																	DSC sub		

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Family	Series	Group	AV/Home Use				Computer Related				Automotive (Supported Products Available)						Note
			Audio	Video	Household Appliances	Amusement	Computers	Storage Systems	Imaging	Display	Engine	Pedestrian Safety	Body/Chassis Systems	Navigation/Information	Car Audio	Mobile	
H8	H8/300L Super Low Power	H8/3887															● Electric Power Meters
		H8/3867															● Electric Power Meters
		H8/38347**			●										○		● Wireless Equipment
		H8/3847S															● Electric Power Meters
		H8/3847R			●												● Electric Power Meters
		H8/38327**			●										○		● Wireless Equipment
		H8/3827S															● Wireless Equipment
		H8/3827R			●												● Electric Power Meters
		H8/38124*			●												● Electric Power Meters
		H8/38104*			●												● DSC
		H8/38024S		●													● Health Equipment
		H8/38024			●												● Health Equipment
		H8/3802			●												● RF-ID, Sensor Equipment
		H8/38004		●													
	H8/300L	H8/3977R	●														
		H8/3947	●														
		H8/3927	●														
		H8/3877N			●												● Communications/Telephony
		H8/3877			●												● Communications/Telephony
		H8/3857			●												● DOT-LCD
		H8/3854			●												● DOT-LCD
		H8/3834			●												● Electric Power Meters
		H8/3814			●												
		H8/3724	●		●												
		H8/3714	●		●												
		H8/3657			●												●
		H8/3644			●												● Telephony
		H8/3637															● Telephony
		H8/3627															
		H8/3614															●
740	7600	7643					●	○									○
		7641	○			○	●	○									○
		7632									●	●					
	38000	7630									●	●					
		38K2				●	●										○
		38K0				●	●										○
		38C8			○												
		38C5	●		●												
		38C2			●												○
		38C1			○												
		3886					●										
		3885					●										
		3883**					●										
		3882**					●										
		3851	○		○												○
		3850	○		○												○ Photocopiers/Page Printers
		3826															● Radios
		3823**	●		○												○ Compact Cameras
		3822	●		○												○ Compact Cameras
		3804			●												
		3803			●												○ Photocopiers/Page Printers
	740	7560	●		○												○ Radios
		7547**			●												
		7546**			●												
		7545**			●												Preset Remote Controls
		7544			●												
		7542			●							●					○ Photocopiers/Page Printers
		7540			○							●					○
		7534				●	●										
		7517					●										
		7516					●										
		7512*					●										
	7200	7280		●													CC Slicers
		7220		●													
		7160		●													
		7150		●													CC Slicers

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★ : New product ★★ : Under development

Application Matrix

720 Family

Family	Series	Group	AV/Home Use				Computer Related				Automotive (Supported Products Available)				Mobile	Network	Industry/Security	Note
			Audio	Video	Household Appliances	Amusement	Computers	Storage Systems	Imaging	Display	Engine	Pedestrian Safety	Body/Chassis Systems	Navigation/Information	Car Audio			
720	4500	4570	○	○	○													Preset Remote Controls
		4556			●													LCD Remote Controls
		4554			●													LCD Remote Controls
		4553			●													LCD Remote Controls
		4552			●													LCD Remote Controls
		4524			●													
		4519			●													
		4518			●													
		4509**			●													
		4508**			●													
		4507			●													
		4506			●													
		4502			●													
		4501			●													
	720	4283**	○	○	○													Single-Function Remote Controls
		4282	○	○	○													Single-Function Remote Controls

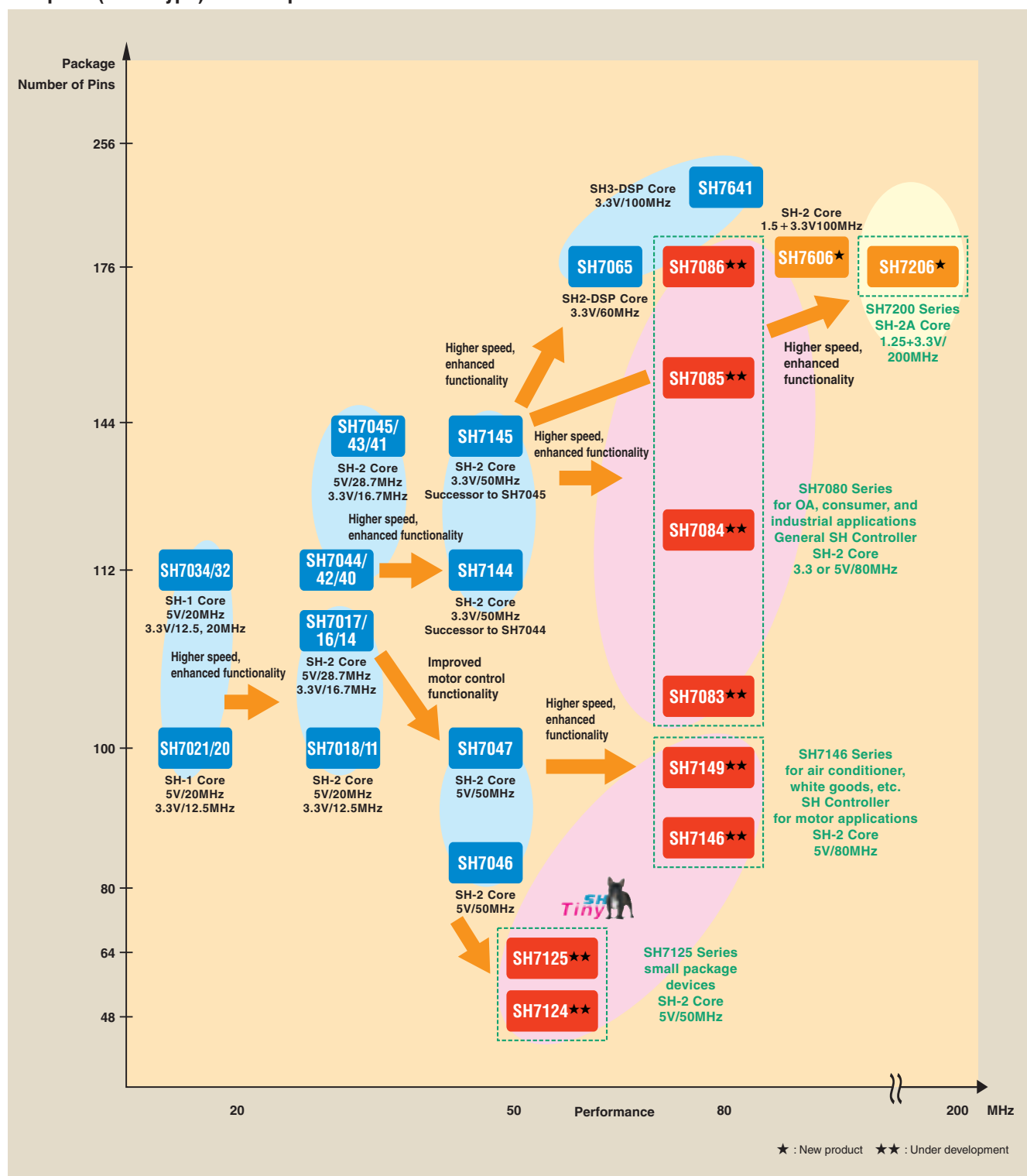
● : It is best suited. ○ : It is suited.

★ : New product ★★ : Under development

The best-known 32-bit RISC embedded MCU

MCU (microcontroller) type SuperH products are the most popular 32-bit RISC embedded MCUs, combining powerful CPU cores peripheral functions such as 16-bit multi-function timers and A/D converters, and flash memory, all integrated into a single-chip solutions that reduce system complexity.

• SuperH (MCU Type) Roadmap



- Diverse lineup of products with on-chip flash memory includes the SH7086 and others, which have a maximum operating frequency of 80MHz.
- Integration of functions such as 16-bit multi-function timers and A/D converters into a single chip enables the development of low-cost systems.
- On-chip emulator circuit allows on-the-board program debugging at up to the maximum operating frequency of the MCU.

SH7080 Series (SH-2)

- High-speed operation (80MHz)
- Large-capacity Flash memory
- Numerous peripheral functions

SH7144 Series (SH-2)

- 3.3V single power supply on-chip flash memory
- On-chip peripheral modules such as a serial interface (4-channel) that is valuable for office equipment
- On-chip debugging function

• Specifications (SH7080, SH7144 Series)

Series		SH7080										SH7144									
Group		SH7086**		SH7085**				SH7084**		SH7083**		SH7144			SH7145						
Type No.		R5F70865N80FP**	R5F70865D80FP**	R5F70855N80FP**	R5F70855D80FP**	R5F70854N80FP**	R5F70854D80FP**	R5F70844N80FP**	R5F70844D80FP**	R5F70834N80FP**	R5F70834D80FP**	HD6417144F	HD6437144xxxF	HD64F7144F	HD6417145F	HD6437145xxxF	HD64F7145F				
Memory	ROM(Bytes)	512K				256K						—		256K		—		256K			
	RAM(Bytes)	32K				16K															
	ROM Type*					F						L		M	F	L	M	F			
	Cache Memory																				
CPU	Program Security	Yes																			
	CPU	SH-2 Core																			
	Basic Instructions	62																			
	Minimum Instruction Execution Time (ns)	12.5 (@80MHz)												20 (@50MHz)							
	Dhrystone Performance	104MIPS (80MHz)												65MIPS (50MHz)							
	Multiplier	32 × 32 → 64																			
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64																			
	Barrel Shifter	—																			
	FPU	—																			
	MMU	—																			
DMA	DMAC (Channels)	4																			
	DTC/DMAC II	DTC																			
External Bus Expansion	Address Space (Bytes)	32M												16M		32M		16M			
	Bus State Controller	Wait state (1 to 15 waits, can be extended with an external signal)																			
	Bus Structure	Separate bus (8/16/32-bit)												Separate bus (8/16-bit)		Separate bus (8/16/32-bit)					
	SDRAM Controller	Yes (3.3V only)																			
	DRAM Controller	—																			
	PCI Controller	—																			
	Endian Conversion	—																			
	Host Interface	—																			
Clock	Clock Generation Circuit	1 circuit																			
	PLL	Yes																			
	RTC	—																			
	Oscillation Stop Detection	Yes																			
	Frequency Divider	—																			
	Power Save	Sleep mode, Software standby mode, Module standby mode																			
Power Supply Voltage Detection	Power-On Reset/POR	Yes												—		Yes					
A/D Converter	Resolution × Channels	10-bit × 16		10-bit × 8																	
	Sample and Hold	—																			
D/A Converter	Multi-Channel Sample and Hold	3ch		2ch														Yes		Yes	
	Resolution × Channels	—																			
Timer	8-bit	—																			
	16-bit	11 (MTU2, MTU2S, CMT)																			
	32-bit	—																			
	Prescaler	MTU2																			
	Input Capture	MTU2																			
	Output Compare	MTU2																			
	PWM Output	MTU2																			
	Event Counter	MTU2																			
	2-Phase Encoder Input	MTU2																			
3-Phase Inverter Control	MTU2																				
Watchdog Timer		Yes																			
Serial Interface	Clock Sync./ Clock Async.	SCI × 4																			
	Clock Sync. Only	—																			
	Clock Async. Only	—																			
I ² C-bus		Yes												Yes (ROMless and Mask ROM version are optional)		Yes (MASK ROM version is optional)					
Smart Card/SIM		—																			
SSU/Special Serial I/O		1																			
CAN	Channels	—																			
	Buffers	—																			
Ethernet		—																			
USB HOST		—																			
USB Function		—																			
IrDA		—																			
LCD		—																			
I/O Ports	Input Only (Numbers)	16						8				74		98							
	CMOS I/O Only (Numbers)	118		100				76		65											
	High Voltage Port (Numbers)	—																			
	N-Channel Open Drain Port (Numbers)	Yes																			
	High Current Drive Port	Yes																			
	Pull-Up Resistor	—																			
Interrupts/Sources	External	9																			
	Boundary Scan/JTAG	—																			
Debugging Function	On-Chip Debug	User debug interface/advanced user debugger												User debug interface (Flash version only), advanced user debugger (Flash version only)							
	On-Board Flash Program	Yes																			
Other Functions		ROM Correction Function		—																	
Package		FP-176E		FP-144L				FP-112E		FP-100B		FP-112B		FP-144F							
Operating Frequency/Supply Voltage		80MHz/5 or 3.3V																			
Operating Ambient Temperature (°C)		-20 to 85, -40 to 85																			
		50MHz/3.3V																			
		-20 to 75, -40 to 85																			

SH7047 Series (SH-2)

- On-chip timer (2-channel: MTU, MMT) for motor control
- On-chip CAN interface
- 5V single power supply on-chip flash memory
- On-chip debugging function

• Specifications (SH7047 Series)

Series		SH7047				
Group		SH7047	SH7049	SH7105	SH7109	SH7107
Type No.		HD64F7047F	HD6437049xxxF	HD6437105xxxF	HD6437109xxxF	HD6437107xxxF
Memory	ROM(Bytes)	256K	128K	256K	128K	256K
	RAM(Bytes)	12K	8K	—	4K	—
	ROM Type*	F	—	M	—	—
	Cache Memory	—	—	—	—	—
CPU	Program Security	—	—	Yes	—	—
	CPU	—	—	SH-2 Core	—	—
	Basic Instructions	—	—	62	—	—
	Minimum Instruction Execution Time (ns)	—	—	20 (@50MHz)	—	—
	Dhrystone Performance	—	—	65MIPS (50MHz)	—	—
	Multiplier	—	—	32 × 32 – 64	—	—
	Multiply-Accumulate Instruction	—	—	32 × 32 + 64 – 64	—	—
	Barrel Shifter	—	—	—	—	—
	FPU	—	—	—	—	—
	MMU	—	—	—	—	—
DMA	DMAC (Channels)	—	—	—	—	—
	DTC/DMAC II	DTC	—	—	—	—
External Bus Expansion	Address Space (Bytes)	—	—	256K	—	—
	Bus State Controller	—	Wait state (1 to 15 waits, can be extended with an external signal)	—	—	—
	Bus Structure	—	—	Separate bus (8-bit)	—	—
	SDRAM Controller	—	—	—	—	—
	DRAM Controller	—	—	—	—	—
	PCI Controller	—	—	—	—	—
	Endian Conversion	—	—	—	—	—
Clock	Host Interface	—	—	—	—	—
	Clock Generation Circuit	—	—	1 circuit	—	—
	PLL	—	—	Yes	—	—
	RTC	—	—	—	—	—
	Oscillation Stop Detection	—	—	Yes	—	—
	Frequency Divider	—	—	—	—	—
Power Supply	Power Save	—	—	—	—	—
	Power-On Reset/POR	—	—	—	—	—
A/D Converter	Resolution × Channels	—	—	10-bit × 8 × 2unit	—	—
	Sample and Hold	—	—	Yes	—	—
	Multi-Channel Sample and Hold	—	—	2unit	—	—
D/A Converter	Resolution × Channels	—	—	—	—	—
	8-bit	—	—	—	—	—
Timer	16-bit	—	—	7 (MTU, MMT, CMT)	—	—
	32-bit	—	—	—	—	—
	Prescaler	—	—	MTU	—	—
	Input Capture	—	—	MTU	—	—
	Output Compare	—	—	MTU	—	—
	PWM Output	—	—	MTU	—	—
	Event Counter	—	—	MTU	—	—
	2-Phase Encoder Input	—	—	MTU	—	—
	3-Phase Inverter Control	—	—	MTU, MMT	—	—
	Watchdog Timer	—	—	Yes	—	—
Serial Interface	Clock Sync./ Clock Async.	SCI × 3	—	—	SCI × 2	—
	Clock Sync. Only	—	—	—	—	—
	Clock Async. Only	—	—	—	—	—
I ² C-bus		—	—	—	—	—
Smart Card/SIM		—	—	—	—	—
SSU/Special Serial I/O		—	—	—	—	—
CAN	Channels	1	—	—	—	—
	Buffers	—	—	—	—	—
Ethernet		—	—	—	—	—
USB HOST		—	—	—	—	—
USB Function		—	—	—	—	—
IrDA		—	—	—	—	—
LCD		—	—	—	—	—
I/O Ports	Input Only (Numbers)	—	—	16	—	—
	CMOS I/O Only (Numbers)	—	—	53	—	—
	High Voltage Port (Numbers)	—	—	—	—	—
	N-Channel Open Drain Port (Numbers)	—	—	—	—	—
	High Current Drive Port	—	—	Yes	—	—
	Pull-Up Resistor	—	—	—	—	—
Interrupts(Sources)	External	—	—	5	—	—
	Boundary Scan/JTAG	—	—	—	—	—
Debugging Function	On-Chip Debug	—	—	—	—	—
	On-Board Flash Program	—	—	Yes	—	—
Other Functions		—	—	—	—	—
ROM Correction Function		—	—	—	—	—
Package		—	—	FP-100M	—	—
Operating Frequency/Supply Voltage		—	—	50MHz/5V	—	—
Operating Ambient Temperature (°C)		—	—	-20 to 75, -40 to 85	—	—

Note : The package code described is the former one. Regarding the new one, please refer to the following URL <http://www.renesas.com/en/package>

* F: F-ZTAT version, M: mask ROM version

SH7125 Series (SH-2)

- Small, low-pin-count packages (48 or 64pins)
- On-chip motor control timer (1ch)
- On-chip high-speed A/D converter (2.0μsec/ch)

• Specifications (SH7125 Series)

Series		SH7125											
Group		SH7125**								SH7124**			
Type No.		R5F71253N50FP**	R5F71253D50FP**	R5F71253N50FA**	R5F71253D50FA**	R5F71252N50FP**	R5F71252D50FP**	R5F71252N50FA**	R5F71252D50FA**	R5F71243N50FP**	R5F71243D50FP**	R5F71242N50FP**	R5F71242D50FP**
Memory	ROM(Bytes)	128K				64K				128K		64K	
	RAM(Bytes)					8K							
	ROM Type*					F							
	Cache Memory					—							
	Program Security					Yes							
CPU	CPU					SH-2 Core							
	Basic Instructions					62							
	Minimum Instruction Execution Time (ns)					20 (@50MHz)							
	Dhrystone Performance					65MIPS (50MHz)							
	Multiplier					32 × 32 – 64							
	Multiply-Accumulate Instruction					32 × 32 + 64 – 64							
	Barrel Shifter					—							
	FPU					—							
DMA	MMU					—							
	DMAC (Channels)					—							
External Bus Expansion	DTC/DMAC II					—							
	Address Space (Bytes)					—							
	Bus State Controller					—							
	Bus Structure					—							
	SDRAM Controller					—							
	DRAM Controller					—							
	PCI Controller					—							
	Endian Conversion					—							
Clock	Host Interface					—							
	Clock Generation Circuit					1 circuit							
	PLL					Yes							
	RTC					—							
	Oscillation Stop Detection					Yes							
	Frequency Divider					—							
Power Supply Voltage Detection	Power Save					Sleep mode, Software standby mode, Module standby mode							
	Power-On Reset/POR					—							
A/D Converter	Resolution × Channels					10-bit × 8							
	Sample and Hold					2							
D/A Converter	Multi-Channel Sample and Hold					—							
	Resolution × Channels					—							
Timer	8-bit					—							
	16-bit					8 (MTU2, CMT)							
	32-bit					—							
	Prescaler					MTU2							
	Input Capture					MTU2							
	Output Compare					MTU2							
	PWM Output					MTU2							
	Event Counter					MTU2							
	2-Phase Encoder Input					MTU2							
3-Phase Inverter Control					MTU2								
Watchdog Timer						Yes							
Serial Interface	Clock Sync./ Clock Async.	3								2			
	Clock Sync. Only					—							
	Clock Async. Only	—								1			
I ² C-bus						—							
Smart Card/SIM						—							
SSU/Special Serial I/O						—							
CAN	Channels					—							
	Buffers					—							
Ethernet						—							
USB HOST						—							
USB Function						—							
IrDA						—							
LCD						—							
I/O Ports	Input Only (Numbers)					8							
	CMOS I/O Only (Numbers)	37								23			
	High Voltage Port (Numbers)					—							
	N-Channel Open Drain Port (Numbers)					—							
	High Current Drive Port					Yes							
	Pull-Up Resistor					—							
Interrupts(Sources)	External	5								4			
Debugging Function	Boundary Scan/JTAG					—							
	On-Chip Debug					User debug interface							
	On-Board Flash Program					Yes							
Other Functions	ROM Correction Function					—							
Package		QFP1414-64 (0.8mm), LQFP1010-64 (0.5mm)								LQFP-48 (0.65mm)			
Operating Frequency/Supply Voltage						80MHz/5V							
Operating Ambient Temperature (°C)						-20 to 85, -40 to 85							

Note : The package code described is the former one. Regarding the new one, please refer to the following URL. <http://www.renesas.com/en/package>
 * F: F-ZTAT version

★★ : Under development

SH7060 Series (SH2-DSP)

- 3.3V, 78MIPS (60MHz) high-performance single-chip MCU
- Powerful peripheral functions

SH7606 Series (SH-2)

- System controller with good cost-performance rating
- Available as slave CPU with host I/F

SH7641 Series (SH3-DSP)

- 144K bytes of on-chip RAM, plus 16K Bytes of cache memory
- On-chip USB
- Compact package (CSP-256)

SH7200 Series (SH-2A)

- New SH-2A CPU core achieves low power consumption and high-performance (1920MIPS/W)
- 128KB large-capacity RAM and cache memory
- Enhanced on-chip peripheral functions

• Specifications (SH7060, SH7641, SH7606, SH7200 Series)

Series	SH7060		SH7641	SH7606	SH7200
Group	SH7065		SH7641	SH7606*	SH7206*
Type No.	HD64F7065F	HD6437065xxxF	HD6417641BP	HD6417606*	R5S72060W200FPV*
Memory	ROM(Bytes)	256K		—	
	RAM(Bytes)	8K	144K	4K	128K
	ROM Type*	F	M	L	
	Cache Memory	—		16K	
	Program Security		—		
CPU	CPU	SH2-DSP Core	SH3-DSP Core (MMU less)	SH-2 Core	SH-2A Core
	Basic Instructions	154	159	62	91
	Minimum Instruction Execution Time (ns)	16 (@ 60MHz)	10 (@ 100MHz)		5 (@ 200MHz)
	Dhrystone Performance	78MIPS (60MHz)	130MIPS (100MHz)		360MIPS (200MHz)
	Multiplier		32 × 32 – 64		
	Multiply-Accumulate instruction		32 × 32 + 64 – 64		
	Barrel Shifter			—	Yes
	FPU		—		
	MMU		—		
	DMA				
External Bus Expansion	DMAC (Channels)	4		—	8
	DTC/DMAC II		—		
	Address Space (Bytes)	384M		320M	512M
	Bus State Controller		Yes		
	Bus Structure	SRAM/DRAM/EDO DRAM	SRAM/DRAM	Separate bus (8/16-bit)	Separate bus (8/16/32-bit)
	SDRAM Controller	—		Yes	
	DRAM Controller	Yes			—
Clock	PCI Controller		—		
	Endian Conversion	Yes		—	
	Host Interface	—		Yes	—
	Clock Generation Circuit		1 circuit		
	PLL		Yes		
	RTC		—		
	Oscillation Stop Detection		—		
Power Supply	Frequency Divider		Yes		
	Power Save	Sleep mode, Standby mode, Module standby mode	Sleep mode, Software standby mode, Module standby mode		
	Power-On Reset/POR		—		
A/D Converter	Resolution × Channels	10-bit × 8		—	10-bit × 8
	Sample and Hold	2		—	2
	Multi-Channel Sample and Hold	—	Yes	—	Yes
D/A Converter	Resolution × Channels	8-bit × 2		—	8-bit × 2
	8-bit		—		
	16-bit	9 (TPU, CMT, MMT)	9 (MTU, CMT)	2	11 (MTU2, MTU2S, CMT)
Timer	32-bit		—		
	Prescaler	TPU	MTU	Yes	MTU2
	Input Capture	TPU	MTU	—	MTU2
	Output Compare	TPU	MTU	—	MTU2
	PWM Output	TPU	MTU	—	MTU2
	Event Counter	TPU	MTU	—	MTU2
	2-Phase Encoder Input	TPU	MTU	—	MTU2
	3-Phase Inverter Control	TPU, MMT	MTU	—	MTU2, MTU2S
	Watchdog Timer		Yes		
Serial Interface	Clock Sync./ Clock Async.		3		4
	Clock Sync. Only		—		
	Clock Async. Only		—		
I ² C-bus		—	1	—	1
Smart Card/SIM			—		
SSU/Special Serial I/O			—		
CAN	Channels		—		
	Buffers		—		
Ethernet			—		
USB HOST			—		
USB Function		—	1	—	
IrDA		Yes		—	
LCD			—		
I/O Ports	Input Only (Numbers)	8		—	8
	CMOS I/O Only (Numbers)	110	156	78	71
	High Voltage Port (Numbers)		—		
	N-Channel Open Drain Port (Numbers)	—	2	—	2
	High Current Drive Port	Yes		—	Yes
	Pull-Up Resistor		—		
Interrupts(Sources)	External		9		
Debugging Function	Boundary Scan/JTAG	—	Yes		—
	On-Chip Debug	—		Yes	
	On-Board Flash Program	Yes		—	
Other Functions	ROM Correction Function		—		
Package		FP-176	FP-176C	CSP-256	BP-176
Operating Frequency/Supply Voltage		60MHz/3.3V (some of external I/O are available at 5V)	100MHz/1.8V/3.3V	100MHz/3.3 + 1.5V	200MHz/1.25 + 3.3V
Operating Ambient Temperature (°C)		-20 to 75	-40 to 85	-20 to 75	-20 to 85

Note : The package code described is the former one. Regarding the new one, please refer to the following URL <http://www.renesas.com/en/package>
 * F: F-ZTAT version, M: mask ROM version, L: ROM-less version

★ : New product

SH7040 Series (SH-2)

- High-performance single-chip MCU employing SH-2 CPU core

- Industry's first MCU to integrate 256K bytes of single power supply flash memory and cache memory
- Powerful peripheral functions

Specifications (SH7040 Series)

Series		SH7040													
Group		SH7040		SH7041		SH7042				SH7043		SH7044		SH7045	
Type No.		HD6437040xxxF	HD6417040F	HD6437041xxxF	HD6417041F	HD6437042xxxF	HD6437042xxxX	HD6477042F	HD6477042X	HD6437043xxxF	HD6477043F	HD6437044xxxF	HD64F7044F	HD6437045xxxF	HD64F7045F
Memory	ROM(Bytes)	64K	—	64K	—	128K						256K			
	RAM(Bytes)	4K (2K)*													
	ROM Type*	M	L	M	L	M		Z		M	Z	M	F	M	F
	Cache Memory	1K													
	Program Security	—													
CPU	CPU	SH-2 Core													
	Basic Instructions	62													
	Minimum Instruction Execution Time (ns)	35 (@28.7MHz)													
	Dhrystone Performance	37MIPS (28.7MHz)													
	Multiplier	32 × 32 → 64													
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64													
	Barrel Shifter	—													
	FPU	—													
DMA	MMU	—													
	DMAC (Channels)	4													
External Bus Expansion	DTC/DMAC II	DTC													
	Address Space (Bytes)	32M													
	Bus State Controller	Wait state (1 to 15 waits, can be extended with an external signal)													
	Bus Structure	Separate bus (8/16-bit)		Separate bus (8/16/32-bit)		Separate bus (8/16-bit)				Separate bus (8/16/32-bit)		Separate bus (8/16-bit)		Separate bus (8/16/32-bit)	
	SDRAM Controller	—													
	DRAM Controller	—													
	PCI Controller	Yes													
	Endian Conversion	—													
Clock	Host Interface	—													
	Clock Generation Circuit	1 circuit													
	PLL	Yes													
	RTC	—													
	Oscillation Stop Detection	Yes													
	Frequency Divider	—													
Power Supply Voltage Detection	Power Save	Sleep mode, Software standby mode													
	Power-On Reset/POR	—													
A/D Converter	Resolution × Channels	10-bit × 8													
	Sample and Hold	2													
D/A Converter	Multi-Channel Sample and Hold	—													
	Resolution × Channels	—													
Timer	8-bit	—													
	16-bit	7 (MTU, CMT)													
	32-bit	—													
	Prescaler	MTU													
	Input Capture	MTU													
	Output Compare	MTU													
	PWM Output	MTU													
	Event Counter	MTU													
	2-Phase Encoder Input	MTU													
3-Phase Inverter Control	MTU														
Watchdog Timer		Yes													
Serial Interface	Clock Sync./ Clock Async.	2													
	Clock Sync. Only	—													
	Clock Async. Only	—													
I ² C-bus		—													
Smart Card/SIM		—													
SSU/Special Serial I/O		—													
CAN	Channels	—													
	Buffers	—													
Ethernet		—													
USB HOST		—													
USB Function		—													
IrDA		—													
LCD		—													
I/O Ports	Input Only (Numbers)	8													
	CMOS I/O Only (Numbers)	74		98		74					98		74		98
	High Voltage Port (Numbers)	—													
	N-Channel Open Drain Port (Numbers)	—													
	High Current Drive Port	Yes													
	Pull-Up Resistor	—													
Interrupts(Sources)	External	9													
Debugging Function	Boundary Scan/JTAG	—													
	On-Chip Debug	—													
	On-Board Flash Program	—										Yes			
Other Functions	ROM Correction Function	Yes													
Package		FP-112B		FP-144J, FP-144G		FP-112B				FP-144J, FP-144G		FP-112B		FP-144J, FP-144G	
Operating Frequency/Supply Voltage		28.7MHz/5.0V, 16.7MHz/3.3V													
Operating Ambient Temperature (°C)		-20 to 75, -40 to 85													

Note : The package code described is the former one. Regarding the new one, please refer to the following URL <http://www.renesas.com/en/package>

* : In using cache

* F: F-ZTAT version, M: mask ROM version, L: ROM-less version, Z: ZTAT version

SH7010 Series (SH-2)

- High-performance single-chip MCU employing SH-2 CPU core
- Powerful peripheral functions

• Specifications (SH7010 Series)

Series		SH7010				
Group		SH7011	SH7014	SH7016	SH7017	SH7018
Type No.		HD6417011X	HD6417014F	HD6437016xxxF	HD64F7017F	HD64F7018X
Memory	ROM(Bytes)	—	—	64K	128K	160K
	RAM(Bytes)	4K	3K (1K)*	—	4K (2K)*	4K
	ROM Type*	L	—	M	F	—
	Cache Memory	—	—	1K	—	—
	Program Security	—	—	—	—	—
CPU	CPU	SH-2 Core				
	Basic Instructions	62				
	Minimum Instruction Execution Time (ns)	50 (@20MHz)	—	35 (@28.7MHz)	—	50 (@20MHz)
	Dhrystone Performance	26MIPS (20MHz)	—	37MIPS (28.7MHz)	—	26MIPS (20MHz)
	Multiplier	—	—	32 × 32 → 64	—	—
	Multiply-Accumulate Instruction	—	—	32 × 32 + 64 → 64	—	—
	Barrel Shifter	—	—	—	—	—
	FPU	—	—	—	—	—
	MMU	—	—	—	—	—
	DMA (Channels)	—	—	2	—	—
External Bus Expansion	DTC/DMA2	—	—	—	—	—
	Address Space (Bytes)	16M	—	30M	—	14M
	Bus State Controller	—	—	Yes	—	—
	Bus Structure	SRAM	—	SRAM/DRAM	—	SRAM
	SDRAM Controller	—	—	—	—	—
	DRAM Controller	—	—	Yes	—	—
	PCI Controller	—	—	—	—	—
	Endian Conversion	—	—	—	—	—
Clock	Host Interface	—	—	—	—	—
	Clock Generation Circuit	—	—	1 circuit	—	—
	PLL	—	—	Yes	—	—
	RTC	—	—	—	—	—
	Oscillation Stop Detection	—	—	—	—	—
Power Supply	Frequency Divider	—	—	Yes	—	—
	Power Save	Sleep mode	—	Sleep mode, Software standby mode	—	Sleep mode
Voltage Detection	Power-On Reset/POR	—	—	—	—	—
	Resolution × Channels	10-bit × 7	—	10-bit × 8	—	—
A/D Converter	Sample and Hold	—	—	Yes	—	—
	Multi-Channel Sample and Hold	—	—	Yes	—	—
D/A Converter	Resolution × Channels	—	—	—	—	—
	8-bit	2 (T1M1, 2)	—	—	—	T1M2
Timer	16-bit	—	—	5(MTU, CMT)	—	—
	32-bit	—	—	—	—	—
	Prescaler	—	—	MTU	—	—
	Input Capture	—	—	MTU	—	—
	Output Compare	—	—	MTU	—	—
	PWM Output	—	—	MTU	—	—
	Event Counter	—	—	MTU	—	—
	2-Phase Encoder Input	—	—	MTU	—	—
	3-Phase Inverter Control	—	—	—	—	—
	Watchdog Timer	—	—	Yes	—	—
Serial Interface	Clock Sync./ Clock Async.	1	—	2	—	1
	Clock Sync. Only	—	—	—	—	—
	Clock Async. Only	—	—	—	—	—
I ² C-bus		—	—	—	—	—
Smart Card/SIM		—	—	—	—	—
SSU/Special Serial I/O		—	—	—	—	—
CAN	Channels	—	—	—	—	—
	Buffers	—	—	—	—	—
Ethernet		—	—	—	—	—
USB HOST		—	—	—	—	—
USB Function		—	—	—	—	—
IrDA		—	—	—	—	—
LCD		—	—	—	—	—
I/O Ports	Input Only (Numbers)	—	—	8	—	—
	CMOS I/O Only (Numbers)	11	35	74	—	62
	High Voltage Port (Numbers)	—	—	—	—	—
	N-Channel Open Drain Port (Numbers)	—	—	—	—	—
	High Current Drive Port	—	—	—	—	—
	Pull-Up Resistor	—	—	—	—	—
Interrupts(Sources)	External	9	—	7	—	—
	Boundary Scan/JTAG	—	—	—	—	—
Debugging Function	On-Chip Debug	—	—	—	—	—
	On-Board Flash Program	—	—	—	—	—
Other Functions	ROM Correction Function	—	—	—	Yes	Yes
	Package	FP-100B	—	FP-112	—	FP-100B
Operating Frequency/Supply Voltage		20MHz/3.3V	—	28.7MHz/5.0V	—	20MHz/3.3V (Some external I/O is 5.0V)
Operating Ambient Temperature (°C)		—	—	-20 to 75	—	—

Note : The package code described is the former one. Regarding the new one, please refer to the following URL <http://www.renesas.com/en/package>

* : In using cache

* L: ROM-less version, M: mask ROM version, F: F-ZTAT version

SH7050 Series (SH-2)

- Large capacity of on-chip flash memory (1M byte)
- Single power supply on-board programming supported
- Timers and A/D functions

Specifications (SH7050 Series)

Series		SH7050				
Group		SH7050		SH7051	SH7055	SH7058
Type No.		HD64F7050SF	HD6437050xxxF	HD64F7051F	HD64F7055S	HD64F7058F
Memory	ROM(Bytes)	128K		256K	512K	1M
	RAM(Bytes)	6K		10K	32K	48K
	ROM Type*	F	M	F		
	Cache Memory	—				
	Program Security	—				
CPU	CPU	SH-2 Core			SH-2E Core	
	Basic Instructions	62			79	
	Minimum Instruction Execution Time (ns)	50 (@20MHz)			25 (@40MHz)	12.5 (@80MHz)
	Dhrystone Performance	26MIPS (20MHz)			52MIPS (40MHz)	104MIPS (80MHz)
	Multiplier	32 × 32 → 64				
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64				
	Barrel Shifter	—				
	FPU	—			Yes	
	MMU	—				
	DMA	DMAC (Channels)	4			
	DTC/DMAC II	—				
External Bus Expansion	Address Space (Bytes)	16M				
	Bus State Controller	Yes				
	Bus Structure	SRAM				
	SDRAM Controller	—				
	DRAM Controller	—				
	PCI Controller	—				
	Endian Conversion	—				
	Host Interface	—				
Clock	Clock Generation Circuit	1 circuit				
	PLL	Yes				
	RTC	—				
	Oscillation Stop Detection	—				
	Frequency Divider	—				
	Power Save	Sleep mode, Software standby mode, Hardware standby mode				
Power Supply Voltage Detection	Power-On Reset/POR	—				
A/D Converter	Resolution × Channels	10-bit × 16			10-bit × 32	
	Sample and Hold	2ch			3ch	
D/A Converter	Multi-Channel Sample and Hold	—				
Timer	Resolution × Channels	—				
	8-bit	—				
	16-bit	34 (ATU)		63 (ATU)	65 (ATU-II)	
	32-bit	—				
	Prescaler	ATU			ATU-II	
	Input Capture	ATU			ATU-II	
	Output Compare	ATU			ATU-II	
	PWM Output	ATU			ATU-II	
	Event Counter	ATU			ATU-II	
	2-Phase Encoder Input	—				
	3-Phase Inverter Control	—				
Watchdog Timer		Yes				
Serial Interface	Clock Sync./ Clock Async.	3			5	
	Clock Sync. Only	—				
	Clock Async. Only	—				
I ² C-bus		—				
Smart Card/SIM		—				
SSU/Special Serial I/O		—				
CAN	Channels	—			2	
	Buffers	—			32	64
Ethernet		—				
USB HOST		—				
USB Function		—				
IrDA		—				
LCD		—				
I/O Ports	Input Only (Numbers)	16			—	
	CMOS I/O Only (Numbers)	102			149	
	High Voltage Port (Numbers)	—				
	N-Channel Open Drain Port (Numbers)	—				
	High Current Drive Port	—				
	Pull-Up Resistor	—				
Interrupts(Sources)	External	9				
Debugging Function	Boundary Scan/JTAG	—				
	On-Chip Debug	—				
	On-Board Flash Program	Yes				
Other Functions	ROM Correction Function	—				
Package		FP-168B			FP-256H, BP-272	
Operating Frequency/Supply Voltage		20MHz/5.0V			40MHz/3.3V (internal) (5.0V external I/O, 3.3V bus) 80MHz/3.3V (5.0V external I/O, 3.3V bus)	
Operating Ambient Temperature (°C)		-40 to 85				

Note : The package code described is the former one. Regarding the new one, please refer to the following URL <http://www.renesas.com/en/package>

* F: F-ZTAT version, M: mask ROM version

- Single-chip RISC with compact CPU core
- Good performance, small size, low-power operation
- Low-cost ROM-less version available

Note : The package code described is the former one. Regarding the new one, please refer to the following URL <http://www.renesas.com/en/package>

SH7020 Series (SH-1)

- Single-chip RISC with compact CPU core
- Good performance, small size, low-power operation
- Low-cost ROM-less version available

Specifications (SH7020 Series)

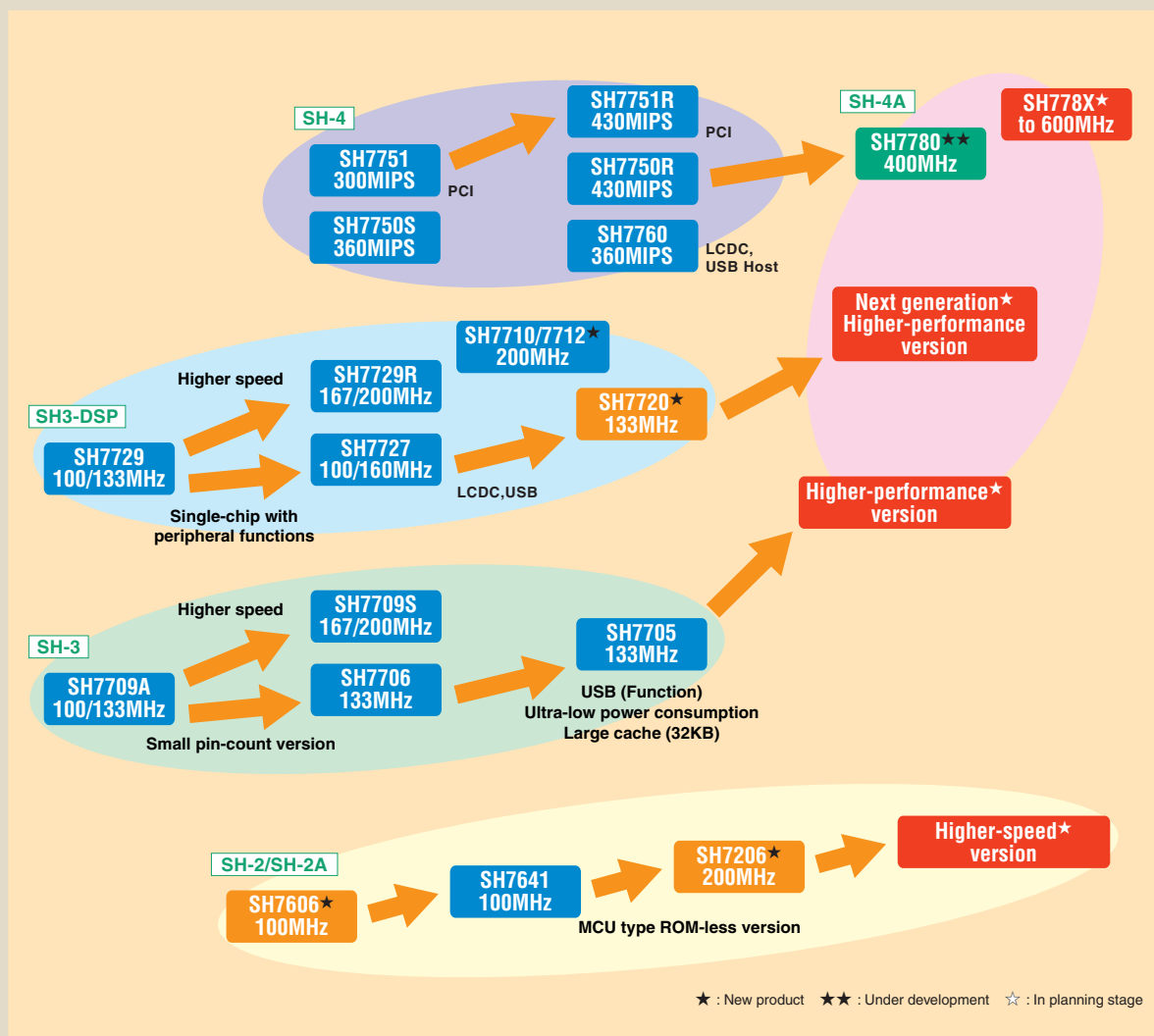
Series		SH7020			
Group		SH7020		SH7021	
Type No.		HD6417020X	HD6437020xxxX	HD6477021X	HD6437021xxxX
Memory	ROM(Bytes)	—	16K	32K	
	RAM(Bytes)			1K	
	ROM Type*	L	M	Z	M
	Cache Memory				
	Program Security				
CPU	CPU			SH-1 Core	
	Basic Instructions			56	
	Minimum Instruction Execution Time (ns)			50 (@20MHz)	
	Dhrystone Performance			26MIPS (20MHz)	
	Multiplier			16 × 16 → 32	
	Multiply-Accumulate Instruction			16 × 16 + 42 → 42	
	Barrel shifter			—	
	FPU			—	
	MMU			—	
	DMA			4	
External Bus Expansion	DTC/DMA2			—	
	Address Space (Bytes)			44M	
	Bus State Controller			Yes	
	Bus Structure			SRAM/DRAM	
	SDRAM Controller			—	
	DRAM Controller			Yes	
	PCI Controller			—	
	Endian Conversion			—	
Clock	Host Interface			—	
	Clock Generation Circuit			1 circuit	
	PLL			Yes	
	RTC			—	
	Oscillation Stop Detection			—	
	Frequency Divider			—	
Power Supply	Power Save			Sleep mode, Standby mode	
	Power-On Reset/POR			—	
A/D Converter	Resolution × Channels			—	
	Sample and Hold			—	
	Multi-Channel Sample and Hold(Note 1)			—	
D/A Converter	Resolution × Channels			—	
	8-bit			—	
Timer	16-bit			5 (ITU)	
	32-bit			—	
	Prescaler			ITU	
	Input Capture			ITU	
	Output Compare			ITU	
	PWM Output			ITU	
	Event Counter			ITU	
	2-Phase Encoder Input			ITU	
	3-Phase Inverter Control			—	
	Watchdog Timer			Yes	
Serial Interface	Clock Sync./ Clock Async.			2	
	Clock Sync. Only			—	
	Clock Async. Only			—	
I ² C-bus				—	
Smart Card/SIM				—	
SSU/Special Serial I/O				—	
CAN	Channels			—	
	Buffers			—	
Ethernet				—	
USB HOST				—	
USB Function				—	
IrDA				—	
LCD				—	
I/O Ports	Input Only (Numbers)			8	
	CMOS I/O Only (Numbers)			32	
	High Voltage Port (Numbers)			—	
	N-Channel Open Drain Port (Numbers)			—	
	High Current Drive Port			—	
	Pull-Up Resistor			—	
Interrupts(Sources)	External			9	
	Boundary Scan/JTAG			—	
Debugging Function	On-Chip Debug			—	
	On-Board Flash Program			—	
Other Functions				—	
ROM Correction Function				—	
Package				FP-100B	
Operating Frequency/Supply Voltage				20MHz/5.0V, 12.5MHz/3.3V	
Operating Ambient Temperature (°C)				-20 to 75, -40 to 85	

Note : The package code described is the former one. Regarding the new one, please refer to the following URL <http://www.renesas.com/en/package>
 * L: ROM-less version, M: mask ROM version, Z: ZTAT version

SuperH—a key device in digital household appliances and next-generation IT products

MPU (microprocessor) type SuperH products with cache memory provide superior processing power, support a wide variety of program and data types, and meet the increased performance requirements of car navigation systems, network components, digital household appliances, and more.

• SuperH (MPU type) Roadmap



SH7780 Series (SH-4A) SH7750 Series (SH-4)

- Superscalar architecture for superior performance (430 MIPS/240MHz)
- On-chip vector FPU executes four 32-bit calculations simultaneously, for 1.7 GFLOPS performance
- On-chip IEEE754 FPU support, single-precision and double-precision calculation
- On-chip memory management unit (MMU) supports various operating systems, such as Windows® CE and Linux

SH7700 Series (SH-3, SH3-DSP)

- High performance and low power consumption
- Instruction set is upward compatible with SH-1 and SH-2
- On-chip memory management unit (MMU) supports operating systems such as Windows® CE and Linux

MCU type ROMless version

• Specifications (SH7200, SH7641, SH7606, Series)

Series		SH7200	SH7641	SH7606
Group		SH7206*	SH7641	SH7606*
Type No.		R5S7206W200FPV	HD6417641BP	HD6417606
Memory	ROM(Bytes)		—	
	RAM(Bytes)	128K	144K	4K
	ROM Type*		L	
	Cache Memory		16K	
	Program Security		—	
CPU	CPU	SH-2A Core	SH3-DSP Core (MMU less)	SH-2 Core
	Basic Instructions	91	159	62
	Minimum Instruction Execution Time (ns)	5 (@200MHz)	10 (@100MHz)	
	Dhrystone Performance	360MIPS(200MHz)	130MIPS (100MHz)	
	Multiplier		32 × 32 ~ 64	
	Multiply-Accumulate Instruction		32 × 32 + 64 ~ 64	
	Barrel Shifter	Yes		—
	FPU		—	
	MMU		—	
	DMAC (Channels)	8	4	—
External Bus Expansion	DTC/DMAC II		—	
	Address Space (Bytes)	512M	384M	320M
	Bus State Controller		Yes	
	Bus Structure	Separate bus (8/16/32-bit)		Separate bus (8/16-bit)
	SDRAM Controller		Yes	
	DRAM Controller	—	Yes	—
	PCI Controller		—	
	Endian Conversion		—	
	Host Interface	—		Yes
	Clock Generation Circuit		1 circuit	
Clock	PLL		Yes	
	RTC		—	
	Oscillation Stop Detection		—	
	Frequency Divider		Yes	
	Power Save	Sleep mode, Software standby mode, Module standby mode,		
Power Supply	Power-On Reset/POR		—	
A/D Converter	Resolution × Channels	10-bit × 8		—
	Sample and Hold	Yes		—
	Multi-Channel Sample and Hold	Yes		—
D/A Converter	Resolution × Channels	8-bit × 2	—	
	8-bit		—	
	16-bit	11 (MTU2, MTU2S, CMT)	9 (MTU, CMT)	
Timer	32-bit		—	
	Prescaler	MTU2	MTU	
	Input Capture	MTU2	MTU	
	Output Compare	MTU2	MTU	
	PWM Output	MTU2	MTU	
	Event Counter	MTU2	MTU	—
	2-Phase Encoder Input	MTU2	MTU	
	3-Phase Inverter Control	MTU2, MTU2S	MTU	
	Watchdog Timer		Yes	
	Clock Sync./ Clock Async.	4	3	
Serial Interface	Clock Sync. Only		—	
	Clock Async. Only		—	
	I ² C-bus	1		—
Smart Card/SIM			—	
SSU/Special Serial I/O			—	
CAN	Channels		—	
	Buffers		—	
Ethernet			—	
USB HOST			—	
USB Function		—	1	—
IrDA			—	
LCD			—	
I/O Ports	Input Only (Numbers)	8		—
	CMOS I/O Only (Numbers)	71	156	78
	High Voltage Port (Numbers)		—	
	N-Channel Open Drain Port (Numbers)	2		—
	High Current Drive Port	Yes		—
	Pull-Up Resistor		—	
Interrupts(Sources)	External		9	
	Boundary Scan/JTAG	—	Yes	—
Debugging Function	On-Chip Debug		Yes	
	On-Board Flash Program		—	
Other Functions			—	
ROM Correction Function			—	
Package		FP-176C	BP-256	BP-176
Operating Frequency/Supply Voltage		200MHz/1.25 + 3.3V	100MHz/1.8V/3.3V	100MHz/3.3 + 1.5V
Operating Ambient Temperature (°C)		-20 to 85	-40 to 85	-20 to 75

Note : The package code described is the former one. Regarding the new one, please refer to the following URL <http://www.renesas.com/en/package>

★ : New product

* L: ROM-less version

The SH-Ether Series comprises SuperH products that have an on-chip 10/100 Ethernet controller conforming to IEEE802.3u. These devices facilitate the development of systems such as printers and network cameras that connect to Ethernet 10/100Mbps lines. Since the Ethernet controller is included in a single-chip device, high-performance compact systems with low power consumption can be realized. The SH-Ether Series is also suitable for leading-edge applications such as network consumer appliances, broadband-related devices, and IP phones.

• SH-Ether Roadmap

Roadmap focused on network functionality

200MHz operation

SH7710
(SH3-DSP)SH7712★
(SH3-DSP)Next generation★
Higher-performance
versionDual Ethernet controller
FIFO 2KB/2KB × 2 units
TSU (Transfer Switching Unit)
connects 2 MACs at high speed

Roadmap focused on cost-performance

62.5MHz

SH7615
(SH2-DSP)Ethernet controller, 1ch
FIFO 512B/512B

62.5MHz

SH7616
(SH2-DSP)Ethernet controller, 1ch
FIFO 2KB/2KB

100MHz

SH7618
(SH-2)Ethernet controller, 1ch
FIFO 256B/256B
Host I/F

125MHz

SH7619★★
(SH-2)Ethernet controller, 1ch
On-chip PHY
FIFO 512B/512B
Host I/F

★ : New product ★★ : Under development ☆ : In planning stage

• Specifications (SH-Ether Series)

Series		SH-Ether											
Group		SH7615			SH7616		SH7618	SH7619**	SH7710		SH7712*		
Type No.		HD6417615F	HD6417615ARF	HD6417615ARBP	HD6417616F	HD6417616SF	HD6417618RBP	R4S76190**	HD6417710BP	HD6417710F	HD6417712BP	HD6417712F	
Memory	ROM(Bytes)	8K						4K	16K				
	RAM(Bytes)												
	ROM Type*	L											
	Cache Memory	4K						16K	32K				
	Program Security	—											
CPU	CPU	SH2-DSP Core						SH-2 Core		SH3-DSP Core			
	Basic Instructions	65						62	160				
	Minimum Instruction Execution Time (ns)	16 (@ 62.5MHz)						10 (@ 100MHz) 8 (@ 125MHz)		5 (@ 200MHz)			
	Dhrystone Performance	81MIPS (62.5MHz)						130MIPS (100MHz) 163MIPS (125MHz)		260MIPS (200MHz)			
	Multiplier	32 × 32 — 64											
	Multiply-Accumulate Instruction	32 × 32 + 64 — 64											
	Barrel Shifter	—						Yes					
	FPU	—											
	MMU	—						Yes					
DMA	DMAC (Channels)	2						—	4	6 (2 of them are available externally)			
	DTC/DMAC II	—											
External Bus Expansion	Address Space (Bytes)	160M						320M		384M			
	Bus State Controller	SRAM/SDRAM/ DRAM/BurstROM						SRAM/SDRAM/ Byte Control SRAM/PCMCIA		SRAM/SDRAM/BurstROM/ Byte Control SRAM/PCMCIA			
	Bus Structure	Separate bus (8/16/32-bit)						Separate bus (8/16-bit)		Separate bus (8/16/32-bit)			
	SDRAM Controller	—						Yes		—			
	DRAM Controller	Yes						—		—			
	PCI Controller	—						—		—			
	Endian Conversion	Yes (CS2, CS4 area only)						—		Yes			
Clock	Host Interface	—						Yes		—			
	Clock Generation Circuit	—						1 circuit					
	PLL	—						Yes					
	RTC	—						—		Yes (not separated power supply)			
	Oscillation Stop Detection	—						—					
	Frequency Divider	—						Yes					
Power Supply Voltage Detection	Power Save	Sleep mode, Standby mode, Module standby mode						Sleep mode, Software standby mode, Module standby mode					
	Power-On Reset/POR	—						—					
A/D Converter	Resolution × Channels	—						—					
	Sample and Hold	—						—					
D/A Converter	Multi-Channel Sample and Hold	—						—					
	Resolution × Channels	—						—					
Timer	8-bit	—						—		—			
	16-bit	16-bit free-running timer × 1, timer pulse unit × 3						Compare match timer (CMT) × 2		—			
	32-bit	—						—		Timer unit × 3			
	Prescaler	TPU						—		CMT			
	Input Capture	TPU						—		—			
	Output Compare	TPU						—		—			
	PWM Output	TPU						—		—			
	Event Counter	—						—		—			
	2-Phase Encoder Input	TPU						—		—			
Watchdog Timer	3-Phase Inverter Control	—						—		—			
	Watchdog Timer	—						Yes		—			
	Serial Interface	Clock Sync./ Clock Async.	2						3		2		
Clock Sync. Only		—						—		—			
Clock Async. Only		—						—		—			
I ² C-bus		—						—		—			
Smart Card/SIM		—						—		—			
SSU/Special Serial I/O		Serial I/O × 2						—	Serial I/O × 1	Serial I/O × 2			
CAN	Channels	—						—		—			
	Buffers	—						—		—			
Ethernet		1						1 (with PHY)		2 (with Bridge)			
USB HOST		—						—		—			
USB Function		—						—		—			
IrDA		—						—		—			
LCD		—						—		—			
I/O Ports	Input Only (Numbers)	—						—		—			
	CMOS I/O Only (Numbers)	29						71		24			
	High Voltage Port (Numbers)	—						—		—			
	N-Channel Open Drain Port (Numbers)	—						—		—			
	High Current Drive Port	—						—		—			
	Pull-Up Resistor	—						—		—			
Interrupts(Sources)	External	NMI + 4 (15 levels)						9 (NMI + 8)		NMI + 4 (15 levels) or 6			
	Boundary Scan/JTAG	—						Yes		—			
Debugging Function	On-Chip Debug	—						Yes		—			
	On-Board Flash Program	—						—		—			
	ROM Correction Function	—						—		—			
Other Functions		DSP function						—		DSP function			
	Others	E-DMAC × 2						—		IP sec. accelerator		—	
		—						—		E-DMAC × 4			
Package		FP-208C		BP-240A		FP-208C		TBP-176		BP-256H	FP-256G	BP-256H	FP-256G
Operating Frequency/Supply Voltage		62.5MHz/3.3V						100MHz/3.3+1.5V 125MHz/3.3+1.8V		200MHz/1.5V (core), 3.3V (I/O)			
Operating Ambient Temperature (°C)		-20 to 75											

Note : The package code described is the former one. Regarding the new one, please refer to the following URL. <http://www.renesas.com/en/package>

* L: ROM-less version

★ : New product ★★ : Under development

M32R Family

32-bit RISC

The M32R family of 32-bit RISC MCUs was developed specifically to enable customers to incorporate high-level functionality into systems. These MCUs have a M32R CPU core, a compact design that delivers excellent performance. Devices in the M32R family are ideal solutions for applications such as general industrial and car-mounted systems, digital AV equipment, digital imaging equipment, and portable consumer products.

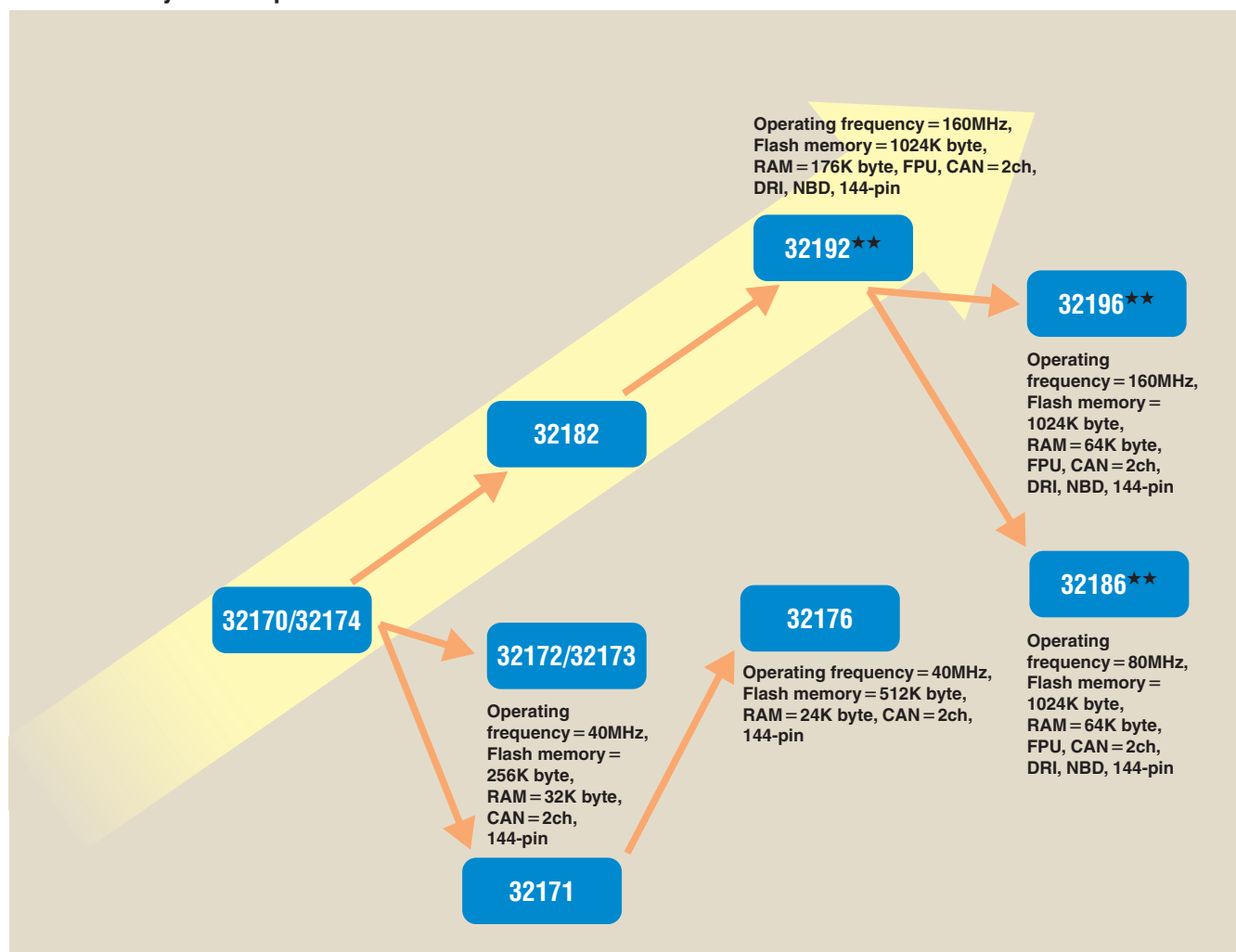
M32R Family Features

- Proprietary Renesas compact 32-bit RISC core provides excellent performance
- Most instructions are executed in a single clock cycle
- Multiple-operation instructions (load and address update, store and address update, etc.) are executed in a single clock cycle
- Both 16-bit and 32-bit instructions are used to achieve high code efficiency
- 4G bytes address area is supported
- Support for DSP function instructions (using on-chip multiply-accumulate unit) is standard

• M32R CPU Core Specifications

M32R CPU Core	Proprietary Renesas 32-Bit RISC Architecture	
	Logical address space	4G bytes
	Number of instructions	83 (16-bit/32-bit instructions)
	General-purpose registers	32-bit × 16
	Control registers	32-bit × 5
	DSP functions	Multiply-accumulate function: 32-bit × 16-bit multiplier + 56-bit accumulator
	Pipeline stages	5: Instruction fetch, decode, execution, memory access, write-back

• M32R Family Roadmap



★★ : Under development

M32R/ECU Series Features

- Large-capacity on-chip flash memory supports rapid reprogramming
- On-chip CAN controller on all series models
- Most instructions are executed in a single clock cycle (Version with fully IEEE 754-compliant FPU available)

32172 Group

32173 Group

The 32172 and 32173 groups are MCUs equipped with a D/A converter with automatic wave detection function; 2-channel, 3-phase motor control timer; 256K bytes of flash memory; 32K bytes of RAM; 2-channel CAN; 8-channel serial I/O; and enhanced communication functions. A sensor interface function for position detection is also implemented on-chip.

- Wide operating temperature range (–40°C to 125°C)
- High-speed operation and low power consumption
- Operates on 3.3V single power supply; 5V interface also possible

32176 Group

MCUs in the 32176 group maintain the functions of those in the 32171 group, while also providing improved peripheral functions such as 24K bytes of RAM, 2-channel CAN, and 4-channel serial I/O. They are compatible with a 5V single power supply and suit a wider range of applications.

Fully IEEE 754-Compliant M32R-FPU Core

• M32R-FPU Core Specifications

M32R-FPU	Proprietary Renesas 32-Bit RISC Architecture + IEEE 754-Compliant single-precision FPU	
	Logical address space	4G bytes
	Number of instructions	100 (basic instructions: 83 + FPU: 12, extended: 5 instructions)/6 addressing
	General-purpose registers	32-bit × 16
	Control registers	32-bit × 6 (common: 5 + FPU: 1)
	DSP functions	Multiply-accumulate function: 32-bit × 16-bit multiplier + 56-bit accumulator
	FPU functions	• Support for 5 exceptions Invalid operation, divide by zero, overflow, underflow, precision error • 4 rounding modes (nearest value, 0 direction, + infinity direction, – infinity direction) • Multiply-Accumulate (FMADD) and difference-of-products (FMSUB) instructions suitable for FFT butterfly computation
	Pipeline stages	6 : Instruction fetch, decode, execute1, execute2, memory access, write-back

32186 Group (Under Development)

The 32186 group MCUs have the fully IEEE754-compliant M32R-FPU core and run at 80MHz for fast operation. They offer 1M byte of flash memory, 64K bytes of RAM, 2-channel CAN expanded to 32 slots, and a new on-chip DRI* (direct RAM interface). These peripheral functions are all contained in a compact package that is pin compatible with the 32176 group. The MCUs can operate over a wide temperature range and are ideally suited to applications that require high precision and high reliability.

32192 Group (Under Development)

The 32192 group MCUs have the fully IEEE754-compliant M32R-FPU core and run at 160 MHz for very fast operation. Devices in the group offer 1M byte of flash memory, 176K bytes of RAM, 2-channel CAN expanded to 32 slots, and a new on-chip DRI* (direct RAM interface). These peripheral functions are all contained in a compact package that is pin compatible with devices in the 32176 group. Products in the 32192 group can operate over a wide temperature range and are ideally suited to applications that require high precision and high reliability.

32196 Group (Under Development)

The 32196 group includes MCUs with the fully IEEE754-compliant M32R-FPU core that run at 160 MHz for very fast operation. These devices offer 1M byte of flash memory, 64K bytes of RAM, 2-channel CAN expanded to 32 slots, and a new on-chip DRI* (direct RAM interface). These peripheral functions are all contained in a compact package that is pin compatible with devices in the 32176 group. Members of the 32196 group can operate over a wide temperature range and are optimized for applications that require high precision and high reliability.

* DRI: In applications that utilize image data, the direct RAM interface module allows large amounts of external data to be transferred rapidly to on-chip RAM without the need to stop the CPU.

• Specifications (M32R/ECU Series)

Group		32172	32173	32176						32186**	32192**				32196**		
Type No.		M32172F2VFP	M32173F2VFP	M32176F2VFP	M32176F2TFP	M32176F3VFP	M32176F3TFP	M32176F4VFP	M32176F4TFP	M32186F8VFP**	M32192F8VFP**	M32192F8UFP**	M32192F8TFP**	M32196F8VFP**	M32196F8UFP**	M32196F8TFP**	
Memory	ROM(Bytes)	256K			384K		512K			1M							
	RAM(Bytes)	16K	32K	24K						64K	176K				64K		
	ROM Type*	F															
	Data Flash	—			Yes (Option)						—						
	Program Security	Flash memory protecting ID, Protecting by FP pin, Protecting by FENTRY bit, Protecting by lock bit															
CPU	CPU	M32R core								M32R-FPU core (on-chip single-precision FPU)							
	Basic Instructions	83								100							
	Minimum Instruction Execution Time (ns)	25 (@40MHz), 31.25 (@32MHz)		TFP:25 (@40MHz), VFP:31.25 (@32MHz)						12.5 (@80MHz)	7.8125 (@128MHz)	6.25 (@160MHz)		7.8125 (@128MHz)	6.25 (@160MHz)		
	Multiplier	16 × 32 → 48															
	Multiply-Accumulate Instruction	16 × 32 + 56 → 56															
	Barrel Shifter	Yes															
	FPU	—								Yes							
	DMA	DMAC (Channels) ¹	10														
External Bus Expansion	Address Space (Bytes)	2M								31M							
	External Bus Interface	Wait controller (1 to 4 wait cycles inserted + prolonged by external WAIT signal input)								Wait controller (0 to 15 wait cycles inserted + prolonged by external WAIT signal input)							
	Bus Structure	Separate bus (16-bit)															
Clock	Clock Generation Circuit	2 circuits (Oscillation Circuit, PLL)															
	PLL	Yes (4-multiplier)								Yes (8-multiplier)							
	Oscillation Stop Detection	—		Yes						Yes							
A/D Converter	Resolution × Channels	10-bit × 32 ⁴		10-bit × 16													
	Sample and Hold	—		Yes													
D/A Converter	Multi-Channel Sample and Hold	—								Yes (synchronous sampling function)							
	Resolution × Channels	8-bit × 2 ³		—													
Timer	16-bit	TOM × 16, TMS × 4, TID × 2, TPD × 4, TEP × 4		TOP × 11, TIO × 10, TMS × 8						TOP × 11, TIO × 10, TMS × 8, TID × 2							
	24-bit	—								TOU × 16							
	32-bit	TML × 4		TML × 8													
	Prescaler	Yes															
	Input Capture	TMS, TML, TPD		TMS, TML													
	PWM Output	TOM		TIO						TIO, TOU							
	Event Counter	TID, TEP		—						TID							
	2-Phase Encoder Input	TID		—						TID							
	3-Phase Inverter Control	TOM		—						TOU							
Serial Interface	Clock Sync./ Clock Async.	4 (SIO0, SIO1, SIO4, SIO5)		2 (SIO0, SIO1)						4 (SIO0, SIO1, SIO4, SIO5)							
	Clock Async. Only	4 (SIO2, SIO3, SIO6, SIO7)		2 (SIO2, SIO3)													
CAN	Channels	2 (Ver.2.0B active)															
	Buffers(Each channel)	16 (transmit / receive buffers)								32 (transmit / receive buffers)							
I/O Ports	Input Only (Numbers)	17		1 (Input level switch function)						1 (Input level switch function, Output drive performance switch function, Noise canceller control function)							
	CMOS I/O Only (Numbers)	81		95 (Input level switch function)						96 (Input level switch function, Output drive performance switch function, Noise canceller control function)							
Interrupts(Sources)	External	17		11						27							
Debugging Function	Boundary Scan/JTAG	Yes															
	On-Chip Debug	Yes (Scalable debugging interface, Real-Time Debugger)								Yes (Scalable debugging interface, Real-Time Debugger, Non-Break-Debug)							
	On-Board Flash Program	Yes															
Other Functions	Direct RAM Interface	—								Yes							
Package		144-pin LQFP															
Operating Frequency/Supply Voltage		3.3V single or 3.3 and 5.0V dual-power-supply		3.3V or 5.0V single-power-supply						3.3 V single, 5.0 V single, or 3.3 and 5.0 V dual-power-supply	TFP:3.3V single, 5.0V single or 3.3 and 5.0V dual-power-supply, UFP:3.3V single or 3.3 and 5.0V dual-power-supply, VFP:3.3V single or 3.3 and 5.0V dual-power-supply,						
Operating Ambient Temperature (°C)		-40 to 85 (@40MHz), -40 to 125 (@32MHz)		TFP:-40 to 85 (@40MHz), VFP:-40 to 125 (@32MHz)						-40 to 125	TFP:-40 to 85 (@160MHz), UFP:-40 to 105 (@160MHz), VFP:-40 to 125 (@128MHz)						

¹ Only transfers to on-chip RAM and the on-chip peripheral I/O area are supported. Transfers to on-chip ROM or the external expansion area are not supported.

★ ★ : Under development

² Continuous operation at temperatures exceeding 85° C cannot be guaranteed. Customers considering applications where the operating temperature exceeds 85° C are requested to consult with Renesas.

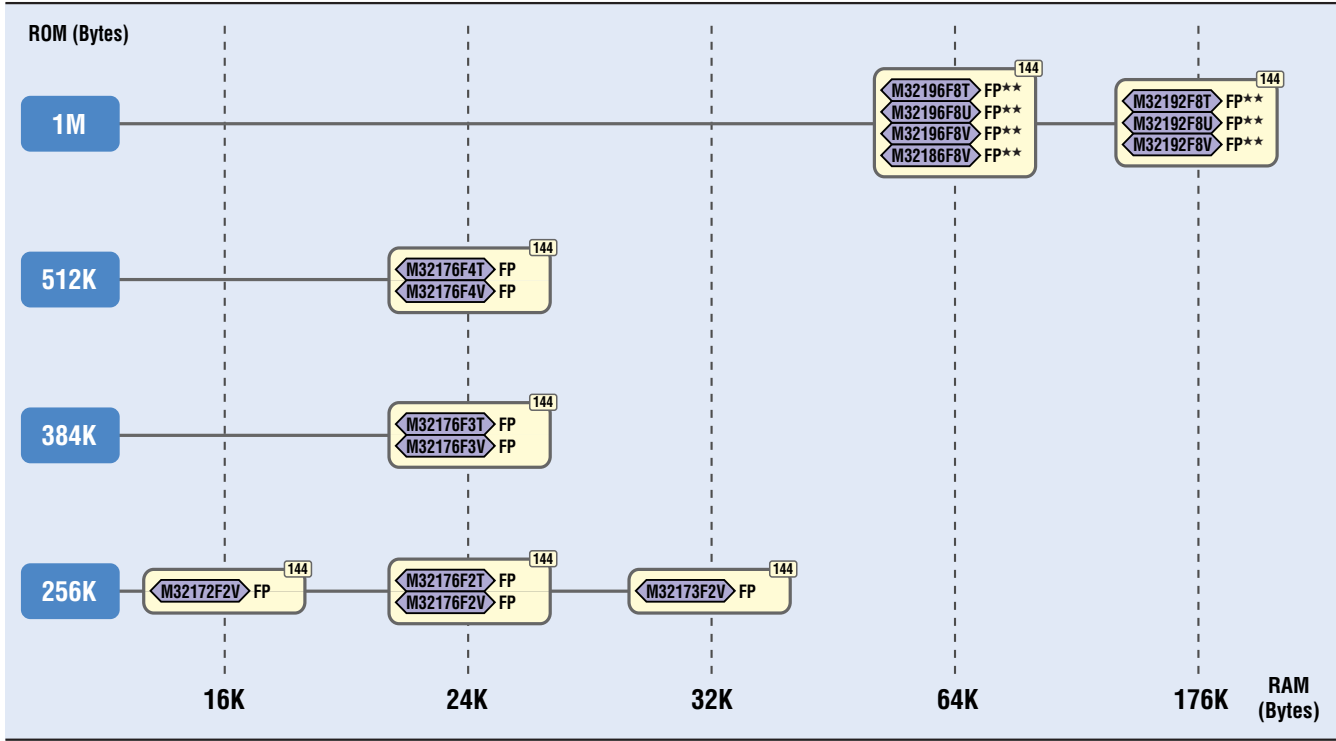
³ Of these, one channel includes an automatic wave detection function.

* The A-D Converter has 12 channels of dedicated analog input pins and 20 other channels of analog input pins which are shared with input/output ports or internal peripheral I/O input/output pins

* F: Flash memory version

• Memory Capacity (ROM/RAM) (M32R/ECU Series)

144-pin



The F in M3xxxFx indicates the flash memory version.

Package			Lead Pitch (mm)
144-pin	FP	144-pin LQFP (PLQP0144KA-A(144P6Q-A))	0.5

★★ : Under development
 * It is an old package code inside ()

M16C Family

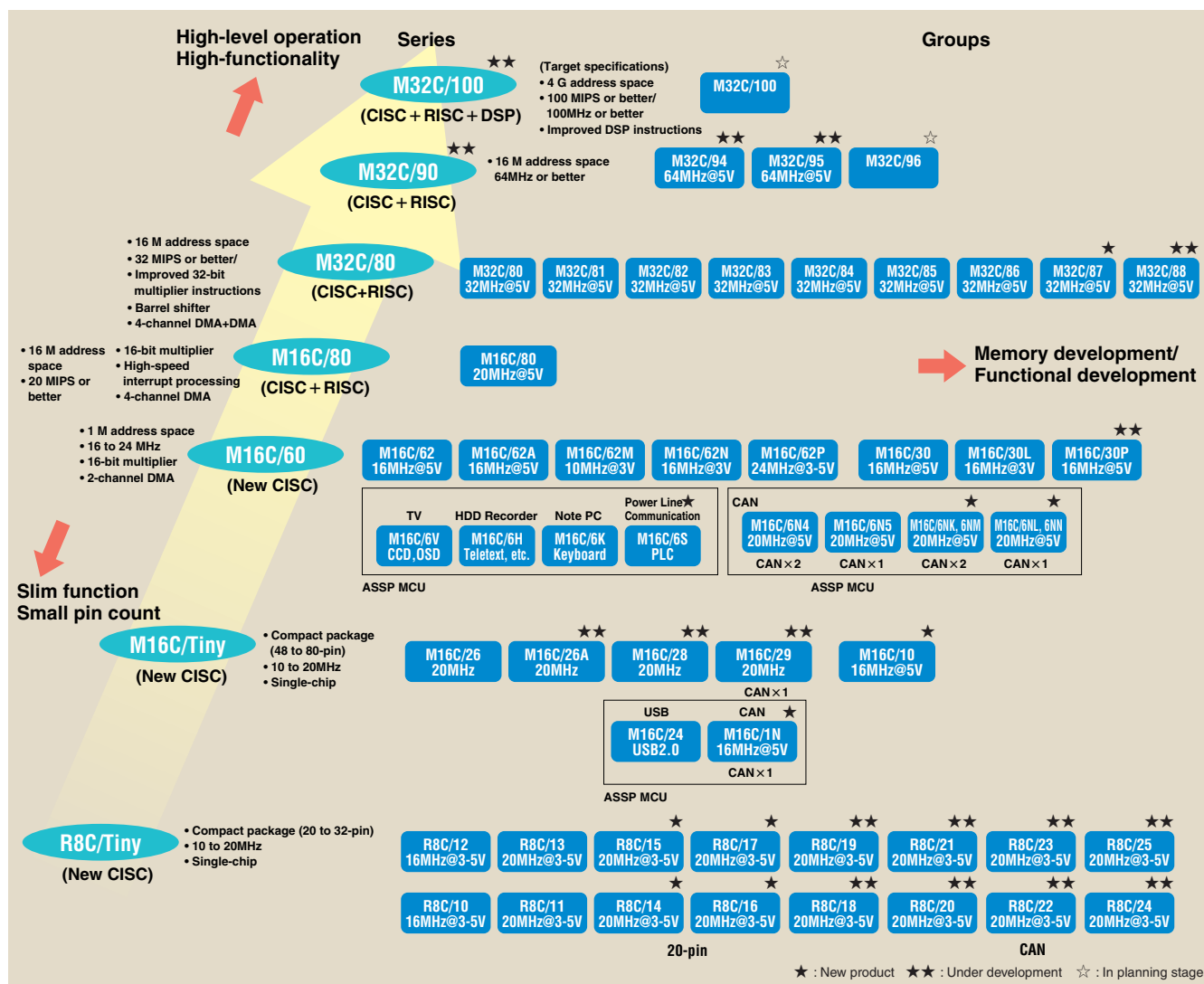
32/16-bit CISC

The M16C family of MCUs meets current and future embedded system needs. Fully suitable for C programming, the devices provide high memory efficiency and low power consumption, together with low noise emission and improved noise immunity. They are guaranteed to operate at high temperatures and include a built-in program correction function that can be used as a countermeasure against system problems occurring in the market.

M16C Family Features

- **Excellent C programming efficiency**
Extremely high programming object efficiency allows C language programs to achieve the smallest possible object size.
- **High-speed processing**
Many instructions are executed in one cycle and the reduction in instruction execution cycles lets CPU deliver higher throughput.
- **Low-voltage operation and ultra-low power consumption**
The low-voltage operation and ultra-low power consumption of the M16C family match those of previous Renesas MCUs.
- **Powerful instructions**
An on-chip multiplier provides high-speed multiplication, and more flexible addressing and improved bit-manipulation instructions enhance memory-to-memory operations.
- **Large address space**
The M16C/60 series, M16C/30 series, M16C/20 series, M16C/Tiny series, M16C/10 series, and R8C/Tiny series support a 1M byte address space. The M32C/80 series and M16C/80 series support a 16M byte address space.
- **High-functionality on-chip peripherals**
Ample memory, DMAC, etc., on-chip make the M16C family suitable for a broad range of applications.
- **Low noise emission**
Enhanced countermeasures have been implemented to reduce noise emission.
- **Measures to prevent malfunctions**
The M16C family provides greater immunity against external noise.
- **Program correction function**
External E²PROM can be used when performing program debugging.
- **Wide-ranging development environment**
Compact, high-performance emulators and complete software tools are available.

• M16C Family Roadmap



- **Broad Range of Applications**

Digital audio	Low electromagnetic interference, large RAM capacity
Mobile phones/telephones	Ultra-low power consumption, program efficiency, processing capabilities
Household appliances	High-functionality peripherals
Cameras	Ultra-low power consumption, processing capabilities
PC-related products	Low power consumption, low electromagnetic susceptibility, peripherals, on-chip flash memory

Automotive	Low electromagnetic susceptibility, low electromagnetic interference, low power consumption, processing capabilities
Memory devices	Processing capabilities, low power consumption, on-chip flash memory
VCRs, TVs	Peripherals, low electromagnetic interference, low power consumption
Wireless data terminals	Ultra-low power consumption, ultra-low electromagnetic interference
General industrial equipment	Processing capabilities, low electromagnetic susceptibility, peripherals, on-chip flash memory

M32C/80 Series Features

- The M32C/80 series MCUs are upward code compatible with M16C/80 devices and include high-speed versions (32MHz at 5V) for easy performance upgrades
- Enhanced 32-bit operating instructions, including sum-of-products operation for DSP function, provide three times the processing capabilities of MCUs in the M16C/62 Group
- Peripheral functions on various models include CAN, LIN, enhanced A/D, and DMAC functions; 2 peripheral power supplies; and high-level data link controllers
- An input-capture timer and an output-comparison timer aid the design of sensor applications, motor controllers, etc.

- **M32C/80 Series CPU Overview**

Performance	Machine cycles	31.2ns (5V at 32MHz)
	Address space	16M bytes
Number of Instructions	108	
Registers	General-purpose registers : 16-bit $\times 4 \times 2$ banks 24-bit $\times 4 \times 2$ banks Dedicated registers: 16-bit $\times 1$, 24-bit $\times 4$ High-speed interrupt registers and DMAC-related registers are implemented.	

M32C/80 Group
M32C/81 Group
M32C/82 Group
M32C/83 Group

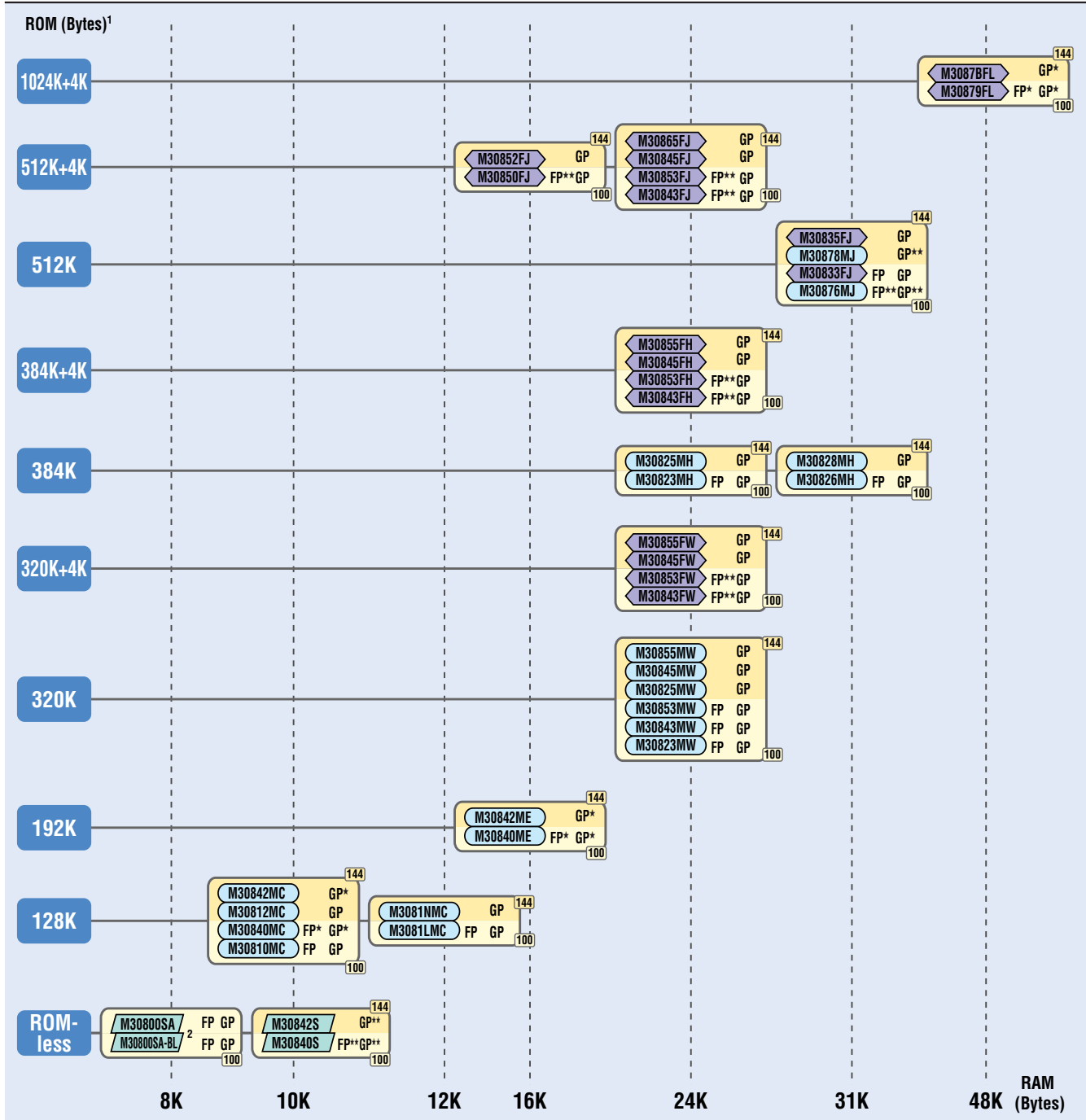
M32C/84 Group
M32C/85 Group
M32C/86 Group
M32C/87 Group (New Product)

M32C/88 Group* (Under development)
M32C/94 Group* (Under development)
M32C/95 Group* (Under development)

* : Refer to the CAN MPUs and MCUs section.

Memory Capacity (ROM/RAM) (M32C/80 Series)

144-pin 100-pin



- The M in M3xxxxMx indicates the mask ROM version.
- The F in M3xxxxFx indicates the flash memory version.
- The S in M3xxxxSx indicates the ROM-less version.

¹ "+4K" refers to data flash memory
² ROM-less version with on-chip boot loader function

Package				Lead Pitch (mm)
100-pin	FP	100-pin	QFP (PRQP0100JB-A(100P6S-A))	0.65
	GP	100-pin	LQFP (PLQP0100KB-A(100P6Q-A))	0.5
144-pin	GP	144-pin	LQFP (PLQP0144KA-A(144P6Q-A))	0.5

★ : New product ★★ : Under development
* It is an old package code inside ()

M16C/80 Series Features

- M16C/80 MCUs inherit the features of M16C/62A devices and can operate at speeds up to 20MHz
- A 16M byte address space accommodates applications that use mass memory (image processors, etc.)
- All memory space can be operated by all commands, and software development is also easy
- Enhanced 32-bit operating instructions, including sum-of-products operation for DSP function, provide three times the processing capabilities of MCUs in the M16C/62 Group
- Interrupt response speed is very fast (250ns with 20MHz clock), to help safeguard critical real-time embedded systems

• M16C/80 Series CPU Overview

Performance	Machine cycles	50ns (5V at 20MHz)
	Address space	16M bytes
Number of Instructions	106	
Registers	Data registers : 16-bit $\times 4 \times 2$ banks Address registers : 24-bit $\times 4 \times 2$ banks Dedicated registers : 16-bit $\times 1$, 24-bit $\times 4$ High-speed interrupt registers and DMAC-related registers are implemented.	

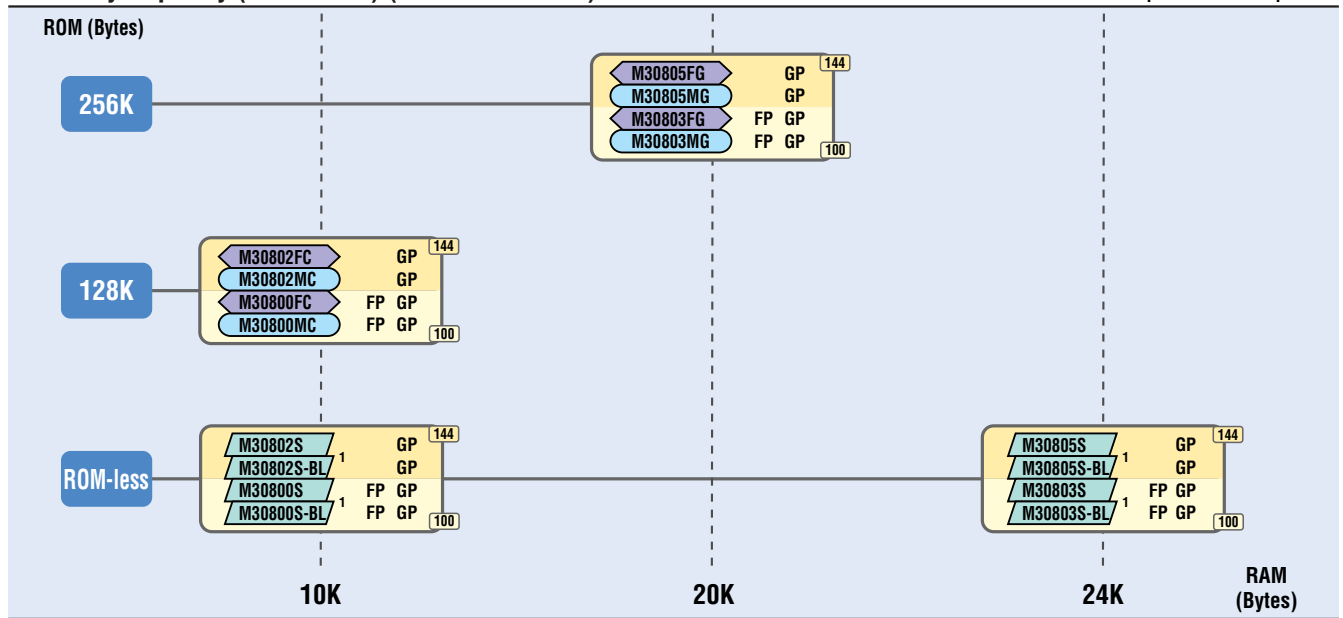
• Specifications (M16C/80 Series)

Group		M16C/80																							
Type No.			(Note1)		(Note1)		(Note1)		(Note1)							(Note1)		(Note1)							
		M30800SFP	M30800SFP-BL	M30800SGP	M30800SGP-BL	M30803SFP	M30803SFP-BL	M30803SGP	M30803SGP-BL	M30800MC-XXXXP	M30800MC-XXXXP	M30800FCFP	M30800FCGP	M30803MG-XXXXP	M30803MG-XXXXP	M30803FGFP	M30803FGGP	M30802SGP	M30802SGP-BL	M30805SGP	M30805SGP-BL	M30802MC-XXXXP	M30802FCGP	M30805MG-XXXXP	M30805FGGP
Memory	ROM(Bytes)	—								128K				256K				—				128K		256K	
	RAM(Bytes)	10K				24K				10K				20K				10K		24K		10K		20K	
	ROM Type*	L								M		F		M		F		L				M		F	
	Data Flash	—																							
Program Security		ID code check function, ROM code protecting function (Only Flash memory version)																							
CPU	CPU	M16C/80 Core																							
	Basic Instructions	106																							
	Minimum Instruction Execution Time (ns)	50 (@20MHz)																							
	Multiplier	16 × 16 → 32																							
	Multiply-Accumulate Instruction	16 × 16 + 48 → 48																							
DMA	Barrel Shifter	—																							
	DMAC (Channels)	4																							
	DTC/DMAC II	—																							
External Bus Expansion	Address Space (Bytes)	16M																							
	External Bus Interface	Support for insertion of 1 to 3 wait states, Outputs 4 chip-select signals (CS0, CS1, CS2, CS3)																							
	Bus Structure	Selectable from Separate bus, Multiplex bus, Address Bus Width can be selected (8-bit/16-bit), The number of output address buses can be selected (16/20)																							
	DRAM Controller	Yes (EDO, For the first page)																							
Clock	Clock Generation Circuit	2 circuits (Main clock, Sub-clock)																							
	PLL	—																							
	Subclock	Yes																							
	On-Chip Oscillator	—																							
	Oscillation Stop Detection	—																							
	Frequency Divider	1/n (n = 1, 2, 3, 4, 6, 8, 10, 12, 14, 16)																							
	Power Save	Normal operating mode (High-Speed, Medium-Speed, Low-Speed, Low-Power Consumption), Wait mode and Stop mode																							
Power Supply	Power-On Reset/POR	—																							
Voltage Detection	Low Voltage Detection/LVD	—																							
A/D Converter	Resolution × Channels	10-bit × 10																							
	Sample and Hold	Yes																							
	Multi-Channel Sample and Hold	—																							
D/A Converter	Resolution × Channels	8-bit × 2																							
Timer	8-bit	—																							
	16-bit	timer A × 5, timer B × 6																							
	Prescaler	—																							
	Input Capture	—																							
	Output Compare	—																							
	PWM Output	5 (Timer A)																							
	Real-Time Port	—																							
	Event Counter	11 (Timer A, Timer B)																							
	2-Phase Encoder Input	Event counter two-phase pulse signal processing × 3 (Timer A2, Timer A3, Timer A4)																							
3-Phase Inverter Control	Three-Phase Motor Control Timer × 1 (Timer A4, Timer A1, Timer A2, Timer B2, Dead Time Timer)																								
Watchdog Timer		Yes																							
Serial Interface	Clock Sync./ Clock Async.	5 (UART0 to UART4)																							
	Clock Sync. Only	—																							
	Clock Async. Only	—																							
I ² C-bus		3 (UART2 to UART4)																							
IEBus		3 (UART2 to UART4)																							
Smart Card/SIM		3 (UART2 to UART4)																							
SSU/Special Serial I/O		3 (UART2 to UART4)																							
CAN	Channels	—																							
	Buffers	—																							
IrDA		—																							
CRC Calculation Circuit		1 (Based on CRC-CCITT (X ¹⁶ + X ¹² + X ⁵ + 1))																							
X/Y Converter		Yes																							
I/O Ports	Input Only (Numbers)	1																							
	CMOS I/O Only (Numbers)	45								85								81				121			
	N-Channel Open Drain Port (Numbers)	2 (P7 ₀ , P7 ₁)																							
	High Current Drive Port	—																							
	Pull-Up Resistor	Yes (Pull-up resistor can be set every four ports)																							
Interrupts(Sources)	External	8																							
Debugging Function	On-Chip Debug	Yes (Only Flash memory version)																							
	On-Board Flash Program	Yes (Only Flash memory version)																							
Other Functions	ROM Correction Function	4																							
	Others	—																							
Package		100-pin LQFP, 100-pin QFP												144-pin LQFP											
Operating Frequency/Supply Voltage		20MHz/4.2 to 5.5V, 10MHz/2.7 to 5.5V																							
Operating Ambient Temperature (°C)		-20 to 85, -40 to 85																							

¹ Built-in boot loader function ROM less version

* M: mask ROM version, F: flash memory version, L: ROM-less version

• Memory Capacity (ROM/RAM) (M16C/80 Series)

144-pin 144 100-pin 100

- M The **M** in M3xxxxMx indicates the mask ROM version.
- F The **F** in M3xxxxFx indicates the flash memory version.
- S The **S** in M3xxxxSx indicates the ROM-less version.

¹ ROM-less version with on-chip boot loader function

Package				Lead Pitch (mm)
100-pin	FP	100-pin	QFP (PRQP0100JB-A(100P6S-A))	0.65
	GP	100-pin	LQFP (PLQP0100KB-A(100P6Q-A))	0.5
144-pin	GP	144-pin	LQFP (PLQP0144KA-A(144P6Q-A))	0.5

* It is an old package code inside ()

M16C/60 Series Features

- Achieves high speed operation with low power consumption current operation
Low-power M16C/62 devices achieve a minimum execution time of 41.7ns with 24MHz clock
- Establishes the center of the popular M16C MCU family
A true workhorse for embedded systems, encompassing a broad range of devices that includes MCUs optimized for general-purpose, automotive/industrial and PC applications, among many others
- Has extensive on-chip peripheral functions
Span of built-in functions includes 11 timers, five serial interfaces, up to 24-ch A/D (M16C/62P), 2-ch D/A, 2-ch DMA, CAN, LIN, etc.
- Provides highly efficient 16-bit timers and control circuit
Simplifies design of systems for controlling 3-phase motors
- Offers a special multiple-capability serial I/O function
Provides UART/serial interface, plus connectivity to I²C bus, IEBus, SIM interface
- Offers super-low consumption current, extremely-low radiated noise, and a wide-temperature-range operation, accommodating a broad span of applications

M16C/62P Group

- Inherits features of M16C/62A, 62N and 62M groups, enabling support for many applications
- High-speed processing (24MHz@3-5V, On-chip PLL), 1.5 times speed of M16C/62A and 62N
- Can use 3V and 5V power supply, enabling the direct connection of 3V type memory to 5V type device
- Can connect with large number of devices through IEBus and I²C-bus subset supported SIO (3ch)
- Can choose a wait-cycle insertion from 0 to 3, enabling connection to slow devices
- Offers even higher reliability with enhancement of watch-dog timer, internal oscillation-stop detection circuit and new reset circuit

M16C/62A Group

- Offers super-low consumption current, extremely-low radiated noise, and wide-temperature-range operation, accommodating a broad span of applications
- Operates over a large supply voltage range: 2.7V to 5.5V
- Achieves up to 16MHz speed (4.2V to 5.5V)
- Has many on-chip peripheral functions, including 11 16-bit timers, 5-ch serial interface, 10-ch 10-bit A/D, 2-ch 8-bit D/A, and DMA
- Provides a 3-phase inverter PWM function for motor control applications
- Addresses 1M byte of memory space for data-intensive applications such as test-system probe tips
- Includes versions with up to 256KB of Flash memory with high-speed rewrite capability

• M16C/60 Series CPU Overview

Performance	Machine cycles	M16C/62P 41.7ns (24MHz)
	Address space	1M bytes
Number of instructions	91	
Registers	Data registers : 16-bit × 4 × 2 banks Address registers : 16-bit × 2 × 2 banks Dedicated registers : 16-bit × 5	

M16C/62N Group

- Provides most of the features of the M16C/62M group, including low-voltage and fast operation, with speeds up to 16MHz at 3.0V for most versions
- Includes circuit advances that achieve lower current consumption for battery powered applications (Mask ROM version draws only 12.5mA operating at 16MHz)
- Has an A/D converter that delivers high accuracy (10-bits +/- 2 LSB [VCC=3.3 V]) and high resolution in low voltage operation
- Includes a watch-dog timer (WDT) that generates a H/W reset when overflow occurs, thereby enhancing system reliability

M16C/62M Group

- Offers super-low consumption current, extremely-low radiated noise, and wide-temperature-range operation, accommodating a broad span of applications
- Operates over a supply voltage range of 2.2V to 3.6V
- Achieves up to 10MHz speed (2.7V to 3.6V)
- Has many on-chip peripheral functions, including 11 16-bit timers, 5-ch serial interface, 10-ch 10-bit A/D, 2-ch 8-bit D/A, and DMA
- Provides a 3-phase inverter PWM function for motor control applications
- Addresses 1M byte of memory space for data-intensive applications such as test-system probe tips
- Includes versions with up to 256KB of Flash memory with high-speed rewrite capability

• **Specifications (M16C/60 Series : M16C/62P Group)**

Group		M16C/62P																					
Type No.		M30622SPFP	M30622SPGP	M30620SPFP	M30620SPGP	M30622M6P-XXXFP*	M30622M6P-XXXGP*	M30622M8P-XXXFP*	M30622M8P-XXXGP*	M30622F8PFP	M30622F8PGP	M30622MAP-XXXFP	M30622MAP-XXXGP	M30620MCP-XXXFP	M30620MCP-XXXGP	M30620FCPFP	M30620FCPGP	M30622MEP-XXXFP	M30622MEP-XXXGP	M30622MGP-XXXFP	M30622MGP-XXXGP		
Memory	ROM(Bytes)	—				48K		64K		64K+4K		96K		128K		128K + 4K		192K		256K			
	RAM(Bytes)	4K		10K		4K				5K				10K				12K					
	ROM Type*	L				M				F		M				F		M					
	Data Flash	—										Block A		—				Block A		—			
	Program Security	ID code check function, ROM code protecting function (Only Flash memory version)																					
CPU	CPU	M16C/60 Core																					
	Basic Instructions	91																					
	Minimum Instruction Execution Time (ns)	41.7 (@ 24MHz)																					
	Multiplier	16 × 16 → 32																					
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32																					
DMA	Barrel Shifter	—																					
	DMAC (Channels)	2																					
External Bus Expansion	DTC/DMAC II	—																					
	Address Space (Bytes)	1M																					
	External Bus Interface	Support for insertion of 1 to 3 wait states, Outputs 4 chip-select signals (CS0, CS1, CS2, CS3), Available to 4 Mbytes by address space expansion function																					
	Bus Structure	Selectable from Separate bus, Multiplex bus, Address Bus Width can be selected (8-bit/16-bit), The number of output address buses can be selected (16/20)																					
	DRAM Controller	—																					
Clock	Clock Generation Circuit	4 circuits (Main clock, PLL, Sub-clock and On-chip oscillator)																					
	PLL	Yes																					
	Subclock	Yes																					
	On-Chip Oscillator	Yes																					
	Oscillation Stop Detection	Yes																					
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)																					
Power Supply	Power Save	Normal operating mode (High-Speed, Medium-Speed, Low-Speed, Low-Power Consumption, On-chip Oscillator, On-chip Oscillator Low-Power Consumption), Wait mode and Stop mode																					
Voltage Detection	Power-On Reset/POR	—																					
	Low Voltage Detection/LVD	Low voltage																					
A/D Converter	Resolution × Channels	10-bit × 26																					
	Sample and Hold	Yes																					
D/A Converter	Multi-Channel Sample and Hold	—																					
	Resolution × Channels	8-bit × 2																					
Timer	8-bit	—																					
	16-bit	Timer A × 5, Timer B × 6																					
	Prescaler	—																					
	Input Capture	—																					
	Output Compare	—																					
	PWM Output	5 (Timer A)																					
	Real-Time Port	—																					
	Event Counter	5 (Timer A) + 6 (Timer B)																					
	2-Phase Encoder Input	Event counter two-phase pulse signal processing × 3 (Timer A2, Timer A3, Timer A4)																					
3-Phase Inverter Control	Three-Phase Motor Control Timer × 1																						
Watchdog Timer		Yes																					
Serial Interface	Clock Sync./ Clock Async.	3 (UART0 to UART2)																					
	Clock Sync. Only	2 (SI/O3, SI/O4)																					
	Clock Async. Only	—																					
I ² C-bus		3 (UART0 to UART2)																					
IEBus		3 (UART0 to UART2)																					
Smart Card/SIM		1 (UART2)																					
SSU/Special Serial I/O		3 (UART0 to UART2:Special mode 2)																					
CAN	Channels	—																					
	Buffers	—																					
IrDA		—																					
CRC Calculation Circuit		1 (Based on CRC-CCITT (X ¹⁶ + X ¹² + X ⁵ + 1))																					
X/Y Converter		—																					
I/O Ports	Input Only (Numbers)	1																					
	CMOS I/O Only (Numbers)	85																					
	N-Channel Open Drain Port (Numbers)	2																					
	High Current Drive Port	—																					
	Pull-Up Resistor	Yes																					
Interrupts(Sources)	External	8																					
Debugging Function	On-Chip Debug	Yes (Only Flash memory version)																					
	On-Board Flash Program	Yes (Only Flash memory version)																					
Other Functions	ROM Correction Function	Address agreement × 4																					
	Others	3V, 5V interface																					
Package		100-pin LQFP, 100-pin QFP																					
Operating Frequency/Supply Voltage		24MHz/3.0 to 5.5V, 10MHz/2.7 to 5.5V																					
Operating Ambient Temperature (°C)		-20 to 85, -40 to 85																					

* M: mask ROM version, F: flash memory version, I: BOM-less version

★ : New product

• Specifications (M16C/60 Series : M16C/62P Group)

Group		M16C/62P																			
Type No.		M30624MGP-XXXXP	M30624MGP-XXXGP	M30624FGPFP	M30624FGGPG	M30622MWP-XXXXP	M30622MWP-XXXGP	M30624MWP-XXXXP	M30624MWP-XXXGP	M30626MWP-XXXXP*	M30626MWP-XXXGP**	M30622MHP-XXXXP	M30622MHP-XXXGP	M30624MHP-XXXXP	M30624MHP-XXXGP	M30626MHP-XXXXP	M30626MHP-XXXGP	M30626FHPFP	M30626FHPGP	M30626FJFPF**	M30626FJGPG**
Memory	ROM(Bytes)	256K		256K + 4K		320K						384K						384K + 4K		512K + 4K	
	RAM(Bytes)	20K				16K		24K		31K		16K		24K		31K					
	ROM Type*	M		F		M										F					
	Data Flash	—		Block A		—										Block A					
CPU	Program Security	ID code check function, ROM code protecting function (Only Flash memory version)																			
	CPU	M16C/60 Core																			
	Basic Instructions	91																			
	Minimum Instruction Execution Time (ns)	41.7 (@ 24MHz)																			
	Multiplier	16 × 16 → 32																			
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32																			
	Barrel Shifter	—																			
	DMA	DMAC (Channels)	2																		
DTC/DMAC II		—																			
External Bus Expansion	Address Space (Bytes)	1M																			
	External Bus Interface	Support for insertion of 1 to 3 wait states, Outputs 4 chip-select signals (CS0, CS1, CS2, CS3), Available to 4 Mbytes by address space expansion function																			
	Bus Structure	Selectable from Separate bus, Multiplex bus, Address Bus Width can be selected (8-bit/16-bit), The number of output address buses can be selected (12/16/20)																			
Clock	DRAM Controller	—																			
	Clock Generation Circuit	4 circuits (Main clock, PLL, Sub-clock and On-chip oscillator)																			
	PLL	Yes																			
	Subclock	Yes																			
	On-Chip Oscillator	Yes																			
	Oscillation Stop Detection	Yes																			
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)																			
	Power Save	Normal operating mode (PLL operation, High-Speed, Medium-Speed, Low-Speed, Low-Power Consumption, On-chip Oscillator, On-chip Oscillator Low-Power Consumption), Wait mode and Stop mode																			
Power Supply Voltage Detection	Power-On Reset/POR	—																			
A/D Converter	Low Voltage Detection/LVD	Low voltage																			
	Resolution × Channels	10-bit × 26																			
	Sample and Hold	Yes																			
D/A Converter	Multi-Channel Sample and Hold	—																			
	Resolution × Channels	8-bit × 2																			
Timer	8-bit	—																			
	16-bit	Timer A × 5, Timer B × 6																			
	Prescaler	—																			
	Input Capture	—																			
	Output Compare	—																			
	PWM Output	5 (Timer A)																			
	Real-Time Port	—																			
	Event Counter	5 (Timer A) + 6 (Timer B)																			
	2-Phase Encoder Input	Event counter two-phase pulse signal processing × 3 (Timer A2, Timer A3, Timer A4)																			
	3-Phase Inverter Control	Three-Phase Motor Control Timer × 1																			
Watchdog Timer		Yes																			
	Clock Sync./ Clock Async.	3 (UART0 to UART2)																			
Serial Interface	Clock Sync. Only	2 (SI/O3, SI/O4)																			
	Clock Async. Only	—																			
I ² C-bus		3 (UART0 to UART2)																			
IEBus		3 (UART0 to UART2)																			
Smart Card/SIM		1 (UART2)																			
SSU/Special Serial I/O		3 (UART0 to UART2:Special mode 2)																			
CAN	Channels	—																			
	Buffers	—																			
IrDA		—																			
CRC Calculation Circuit		1 (Based on CRC-CCITT (X ¹⁶ + X ¹² + X ⁵ + 1))																			
X/Y Converter		—																			
I/O Ports	Input Only (Numbers)	1																			
	CMOS I/O Only (Numbers)	85																			
	N-Channel Open Drain Port (Numbers)	2																			
	High Current Drive Port	—																			
	Pull-Up Resistor	Yes																			
Interrupts(Sources)	External	8																			
Debugging Function	On-Chip Debug	Yes (Only Flash memory version)																			
	On-Board Flash Program	Yes (Only Flash memory version)																			
Other Functions	ROM Correction Function	Address agreement × 4																			
	Others	3V, 5V interface																			
Package		100-pin LQFP, 100-pin QFP																			
Operating Frequency/Supply Voltage		24MHz/3.0 to 5.5V, 10MHz/2.7 to 5.5V																			
Operating Ambient Temperature (°C)		-20 to 85, -40 to 85																			

* M: mask ROM version, F: flash memory version

★ : New product ★★ : Under development

• Specifications (M16C/60 Series : M16C/62A Group)

Group		M16C/62A																
Type No.		M30623M4A-XXXGP	M30623M8A-XXXGP	M30621M8A-XXXGP	M30623MAA-XXXGP	M30621MAA-XXXGP	M30623MCA-XXXGP	M30621MCA-XXXGP	M30621FCAGP	M30625MGA-XXXGP	M30625FGAGP	M30622SAFP	M30622SAGP	M30620SAFP	M30620SAGP	M30622M4A-XXXFP	M30622M4A-XXXGP	M30622M8A-XXXFP
Memory	ROM(Bytes)	32K	64K		96K		128K			256K		—			32K		64K	
	RAM(Bytes)	3K	4K	10K	5K	10K	5K	10K		20K		3K		10K		3K		4K
	ROM Type*	M							F	M	F	L			M			
	Data Flash	—																
	Program Security	ID code check function, ROM code protecting function (Only Flash memory version)																
CPU	CPU	M16C/60 Core																
	Basic Instructions	91																
	Minimum Instruction Execution Time (ns)	62.5 (@16MHz)																
	Multiplier	16×16→32																
	Multiply-Accumulate Instruction	16×16+32→32																
DMA	Barrel Shifter	—																
	DMAC (Channels)	2																
	DTC/DMAC II	—																
External Bus Expansion	Address Space (Bytes)	1M																
	External Bus Interface	—										Support for insertion of 1 wait states, Outputs 4 chip-select signals (CS0, CS1, CS2, CS3)						
	Bus Structure	—										Selectable from Separate bus, Multiplex bus, Address Bus Width can be selected (8-bit/16-bit), The number of output address buses can be selected (16/20)						
	DRAM controller	—																
Clock	Clock Generation Circuit	2 circuits (Main clock, Sub-clock)																
	PLL	—																
	Subclock	Yes																
	On-Chip Oscillator	—																
	Oscillation Stop Detection	—																
	Frequency Divider	1/n (n=1, 2, 4, 8, 16)																
	Power Save	Normal operating mode (High-Speed, Medium-Speed, Low-Speed, Low-Power Consumption), Wait mode and Stop mode																
Power Supply	Power-On Reset/POR	—																
Voltage Detection	Low Voltage Detection/LVD	—																
	Resolution×Channels	10-bit×10																
	Sample and Hold	Yes																
A/D Converter	Multi-Channel Sample and Hold	—																
	Resolution×Channels	8-bit×2																
	8-bit	—																
Timer	16-bit	Timer A×5, Timer B×6																
	Prescaler	—																
	Input Capture	—																
	Output Compare	—																
	PWM Output	3 (Timer A)										5 (Timer A)						
	Real-Time Port	—																
	Event Counter	5 (Timer A)+6 (Timer B)																
	2-Phase Encoder Input	Event counter two-phase pulse signal processing×2 (Timer A3, Timer A4)										Event counter two-phase pulse signal processing×3 (Timer A2, Timer A3, Timer A4)						
	3-Phase Inverter Control	—										Three-Phase Motor Control Timer×1						
	Watchdog Timer	Yes																
	Serial Interface	Clock Sync./ Clock Async.	2 (UART0, UART1)										3 (UART0 to UART2)					
Clock Sync. Only		2 (SI/O3, SI/O4)																
Clock Async. Only		1 (UART2)										—						
I ² C-bus		1 (UART2)																
IEBus		1 (UART2)																
Smart Card/SIM		1 (UART2)																
SSU/Special Serial I/O		—																
CAN	Channels	—																
	Buffers	—																
IrDA		—																
CRC Calculation Circuit		1 (Based on CRC-CCITT (X ¹⁶ +X ¹² +X ⁵ +1))																
X/Y Converter		—																
I/O Ports	Input Only (Numbers)	1																
	CMOS I/O Only (Numbers)	68										85						
	N-Channel Open Drain Port (Numbers)	2																
	High Current Drive Port	—																
	Pull-Up Resistor	Yes																
Interrupts(Sources)	External	5										8						
Debugging Function	On-Chip Debug	Yes (Only Flash memory version)																
	On-Board Flash Program	Yes (Only Flash memory version)																
Other Functions	ROM Correction Function	Address agreement×2																
	Others	—																
Package		80-pin QFP										100-pin LQFP, 100-pin QFP						
Operating Frequency/Supply Voltage		16MHz/4.2 to 5.5V, 10MHz (1 wait) /2.7 to 5.5V																
Operating Ambient Temperature (°C)		-20 to 85, -40 to 85																

* M: mask ROM version, F: flash memory version, L: ROM-less version

• Specifications (M16C/60 Series : M16C/62A Group)

Group		M16C/62A																	
Type No.		M30622M8A-XXXGP	M30620M8A-XXXFP	M30620M8A-XXXGP	M30622MAA-XXXFP	M30622MAA-XXXGP	M30620MAA-XXXFP	M30620MAA-XXXGP	M30622MCA-XXXFP	M30622MCA-XXXGP	M30620MCA-XXXFP	M30620MCA-XXXGP	M30620FCAFP	M30620FCAGP	M30624MGA-XXXFP	M30624MGA-XXXGP	M30624FGAFP	M30624FGAGP	
Memory	ROM(Bytes)	64K			96K			128K						256K					
	RAM(Bytes)	4K	10K		5K		10K		5K		10K				20K				
	ROM Type*	M												F		M		F	
	Data Flash	—																	
	Program Security	ID code check function, ROM code protecting function (Only Flash memory version)																	
CPU	CPU	M16C/60 Core																	
	Basic Instructions	91																	
	Minimum Instruction Execution Time (ns)	62.5 (@16MHz)																	
	Multiplier	16×16→32																	
	Multiply-Accumulate Instruction	16×16+32→32																	
DMA	Barrel Shifter	—																	
	DMAC (Channels)	2																	
External Bus Expansion	DTC/DMAC II	—																	
	Address Space (Bytes)	1M																	
	External Bus Interface	Support for insertion of 1 wait states, Outputs 4 chip-select signals (CS0, CS1, CS2, CS3)																	
Clock	Bus Structure	Selectable from Separate bus, Multiplex bus, Address Bus Width can be selected (8-bit/16-bit), The number of output address buses can be selected (16/20)																	
	DRAM Controller	—																	
	Clock Generation Circuit	2 circuits (Main clock, Sub-clock)																	
	PLL	—																	
	Subclock	Yes																	
	On-Chip Oscillator	—																	
	Oscillation Stop Detection	—																	
Power Supply	Frequency Divider	1/n (n=1, 2, 4, 8, 16)																	
	Power Save	Normal operating mode (High-Speed, Medium-Speed, Low-Speed, Low-Power Consumption), Wait mode and Stop mode																	
Voltage Detection	Power-On Reset/POR	—																	
A/D Converter	Low Voltage Detection/LVD	—																	
	Resolution×Channels	10-bit×10																	
	Sample and Hold	Yes																	
D/A Converter	Multi-Channel Sample and Hold	—																	
	Resolution×Channels	8-bit×2																	
Timer	8-bit	—																	
	16-bit	Timer A×5, Timer B×6																	
	Prescaler	—																	
	Input Capture	—																	
	Output Compare	—																	
	PWM Output	5 (Timer A)																	
	Real-Time Port	—																	
	Event Counter	5 (Timer A)+6 (Timer B)																	
	2-Phase Encoder Input	Event counter two-phase pulse signal processing×3 (Timer A2, Timer A3, Timer A4)																	
3-Phase Inverter Control	Three-Phase Motor Control Timer×1																		
Watchdog Timer		Yes																	
Serial Interface	Clock Sync./ Clock Async.	3 (UART0 to UART2)																	
	Clock Sync. Only	2 (SI/O3, SI/O4)																	
	Clock Async. Only	—																	
I ² C-bus		1 (UART2)																	
IEBus		1 (UART2)																	
Smart Card/SIM		1 (UART2)																	
SSU/Special Serial I/O		—																	
CAN	Channels	—																	
	Buffers	—																	
IrDA		—																	
CRC Calculation Circuit		1 (Based on CRC-CCITT (X ¹⁶ +X ¹² +X ⁵ +1))																	
X/Y Converter		—																	
I/O Ports	Input Only (Numbers)	1																	
	CMOS I/O Only (Numbers)	85																	
	N-Channel Open Drain Port (Numbers)	2																	
	High Current Drive Port	—																	
	Pull-Up Resistor	Yes																	
Interrupts(Sources)	External	8																	
Debugging Function	On-Chip Debug	Yes (Only Flash memory version)																	
	On-Board Flash Program	Yes (Only Flash memory version)																	
Other Functions	ROM Correction Function	Address agreement×2																	
	Others	—																	
Package		100-pin LQFP, 100-pin QFP																	
Operating Frequency/Supply Voltage		16MHz/4.2 to 5.5V, 10MHz (1 wait)/2.7 to 5.5V																	
Operating Ambient Temperature (°C)		-20 to 85, -40 to 85																	

* M: mask ROM version, F: flash memory version

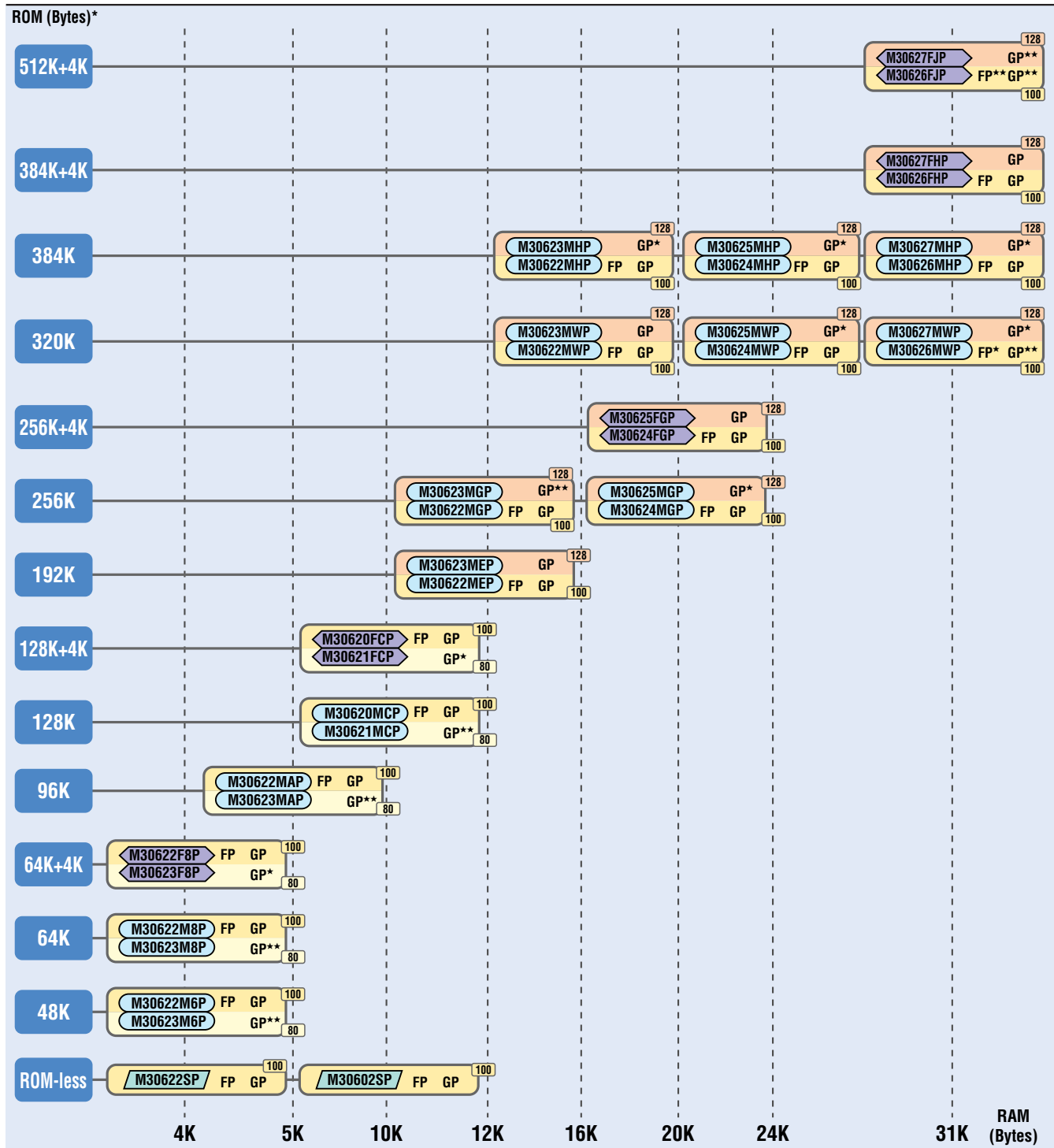
• Specifications (M16C/60 Series : M16C/62M Group)

Group		M16C/62M											
Type No.		M30621MCM-XXXGP	M30621FCMGP	M30625MGM-XXXGP	M30625FGMGP	M30620MCM-XXXFP	M30620MCM-XXXGP	M30620FCMFP	M30620FCMGP	M30624MGM-XXXFP	M30624MGM-XXXGP	M30624FGMFP	M30624FGMGP
Memory	ROM(Bytes)	128K		256K		128K				256K			
	RAM(Bytes)	10K		20K		10K				20K			
	ROM Type*	M	F	M	F	M		F		M		F	
	Data Flash	—											
	Program Security	ID code check function, ROM code protecting function (Only Flash memory version)											
CPU	CPU	M16C/60 Core											
	Basic Instructions	91											
	Minimum Instruction Execution Time (ns)	100 (@10MHz)											
	Multiplier	16×16→32											
	Multiply-Accumulate Instruction	16×16+32→32											
	Barrel Shifter	—											
DMA	DMAC (Channels)	2											
	DTC/DMAC II	—											
External Bus Expansion	Address Space (Bytes)	1M											
	External Bus Interface	—				Support for insertion of 1 wait states, Outputs 4 chip-select signals (CS0, CS1, CS2, CS3)							
	Bus Structure	—				Selectable from Separate bus, Multiplex bus, Address Bus Width can be selected (8-bit/16-bit), The number of output address buses can be selected (16/20)							
	DRAM controller	—											
Clock	Clock Generation Circuit	2 circuits (Main clock, Sub-clock)											
	PLL	—											
	Subclock	Yes											
	On-Chip Oscillator	—											
	Oscillation Stop Detection	—											
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)											
	Power Save	Normal operating mode (High-Speed, Medium-Speed, Low-Speed, Low-Power Consumption), Wait mode and Stop mode											
Power Supply Voltage Detection	Power-On Reset/POR	—											
	Low Voltage Detection/LVD	—											
A/D Converter	Resolution×Channels	10-bit×10											
	Sample and Hold	Yes											
	Multi-Channel Sample and Hold	—											
D/A Converter	Resolution×Channels	8-bit×2											
Timer	8-bit	—											
	16-bit	Timer A×5, Timer B×6											
	Prescaler	—											
	Input Capture	—											
	Output Compare	—											
	PWM Output	3 (Timer A)				5 (Timer A)							
	Real-Time Port	—											
	Event Counter	5 (Timer A) + 6 (Timer B)											
	2-Phase Encoder Input	Event counter two-phase pulse signal processing×2 (Timer A3, Timer A4)				Event counter two-phase pulse signal processing×3 (Timer A2, Timer A3, Timer A4)							
	3-Phase Inverter Control	—				Three-Phase Motor Control Timer×1							
Watchdog Timer		Yes											
Serial Interface	Clock Sync./ Clock Async.	2 (UART0, UART1)				3 (UART0 to UART2)							
	Clock Sync. Only	2 (SI/O3, SI/O4)											
	Clock Async. Only	1 (UART2)				—							
I ² C-bus		1 (UART2)											
IEBus		1 (UART2)											
Smart Card/SIM		1 (UART2)											
SSU/Special Serial I/O		—											
CAN	Channels	—											
	Buffers	—											
IrDA		—											
CRC Calculation Circuit		1 (Based on CRC-CCITT (X ¹⁶ + X ¹² + X ⁵ + 1))											
X/Y Converter		—											
I/O Ports	Input Only (Numbers)	1											
	CMOS I/O Only (Numbers)	68				85							
	N-Channel Open Drain Port (Numbers)	2											
	High Current Drive Port	—											
	Pull-Up Resistor	Yes											
Interrupts(Sources)	External	5				8							
Debugging Function	On-Chip Debug	Yes (Only Flash memory version)											
	On-Board Flash Program	Yes (Only Flash memory version)											
Other Functions	ROM Correction Function	Address agreement×2											
	Others	—											
Package		80-pin QFP				100-pin LQFP, 100-pin QFP							
Operating Frequency/Supply Voltage		10MHz/2.7 to 3.6V, 7MHz/2.4 to 3.6V, 7MHz (1 wait)/2.2 to 3.6V											
Operating Ambient Temperature (°C)		-20 to 85, -40 to 85											

* M: mask ROM version, F: flash memory version

Memory Capacity (ROM/RAM) (M16C/60 Series : M16C/62P Group)

128-pin 100-pin 80-pin



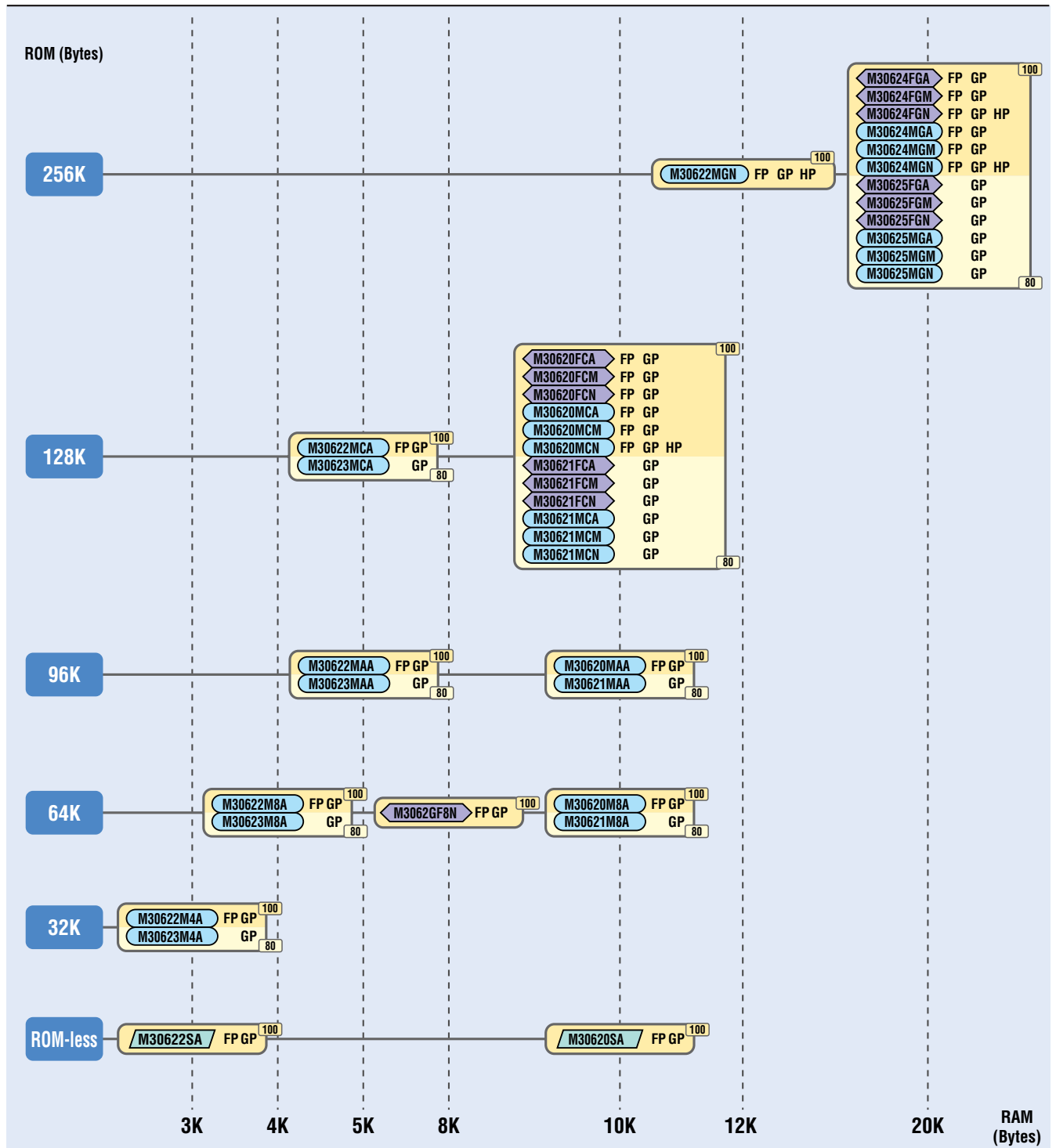
* The notation "+4K" refers to data flash memory.
Note : Refer to the Automotive MCUs section for information on M16C/60 series products for automotive applications.

Package				Lead Pitch (mm)
80-pin	GP	80-pin	QFP (PRQP0080JA-A(80P6S-A))	0.65
100-pin	FP	100-pin	QFP (PRQP0100JB-A(100P6S-A))	0.65
	GP	100-pin	LQFP (PLQP0100KB-A(100P6Q-A))	0.5
128-pin	FP	128-pin	LQFP (PLQP0128KB-A(128P6Q-A))	0.5

★ : New product ★★ : Under development
* It is an old package code inside ()

• Memory Capacity (ROM/RAM) (M16C/60 Series : M16C/62A, 62M, 62N Group)

100-pin 100 80-pin 80



- M The M in M3xxxxMx indicates the mask ROM version.
F The F in M3xxxxFx indicates the flash memory version.
S The S in M3xxxxSx indicates the ROM-less version.

Note : Refer to the Automotive MCUs section for information on M16C/60 series products for automotive applications.

Package				Lead Pitch (mm)
80-pin	GP	80-pin QFP (PRQP0080JA-A(80P6S-A))		0.65
	FP	100-pin QFP (PRQP0100JB-A(100P6S-A))		0.65
100-pin	GP	100-pin LQFP (PLQP0100KB-A(100P6Q-A))		0.5
	HP	100-pin TQFP (PTQP0100LB-A(100PFB-A))		0.4

* It is an old package code inside ()

M16C/30 Series Features

- The best choice for applications that have small memory requirements
The M16C/30 series MCUs have the features of devices in the M16C/62A, M16C/62N and M16C/62P groups and are ideal for systems that use small amounts of ROM and RAM
- Low-voltage versions operate at 2.2V
- Peripheral functions are limited to those used most often to reduce cost

M16C/30P Group (Under Development)

- MCUs in the M16C/30P Group have features similar to those in the M16C/62P Group, but offer less on-chip functionality and operate at clock frequencies up to 16MHz
- The limited set of on-chip peripherals include useful functions: 6-ch timer, 3-ch serial interface, 10-ch 10-bit A/D and 2-ch DMA
- Package choices are limited to 100-pin FP/GP types
- When used with external flash memory, the M16C/30 devices can be used in system development boards to substitute for the M16C/62P

• M16C/30 Series CPU Overview

Performance	Machine cycles	62.5ns (16MHz)
	Address space	1M bytes
Number of Instructions	91	
Registers	Data registers : 16-bit × 4 × 2 banks Address registers : 16-bit × 2 × 2 banks Dedicated registers : 16-bit × 5	

M16C/30 Group M16C/30L Group

- MCUs in the M16C/30 and M16C/20L Groups have features similar to those in the M16C/62A and M16C/62N groups, but offer less on-chip functionality
- The limited set of on-chip peripherals includes useful functions: 5-ch timer, 3-ch serial interface, 10-ch 10-bit A/D and 1-ch DMA
- 100-pin FP/GP packages accommodates memory-extension/processor modes (the MCUs can also be used in systems that need ROM-less devices)
- When used with external flash memory, the M16C/30 devices can be used in system development boards to substitute for the M16C/62A and M16C/62N
- M16C/30L MCUs operate from voltages as low as 2.4V

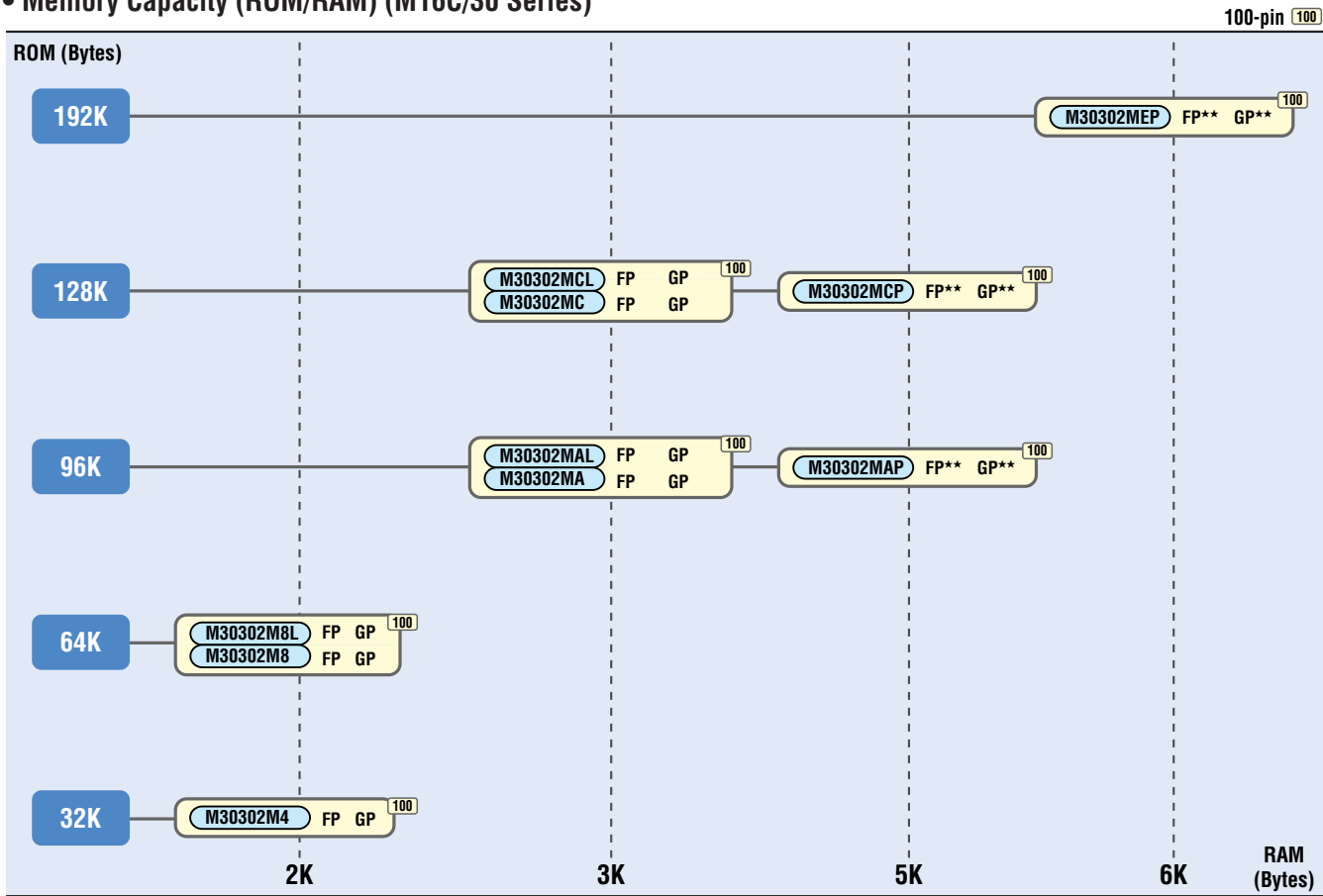
• Specifications (M16C/30 Series)

Group		M16C/30								M16C/30L						M16C/30P						
		M30302M4-XXXFP	M30302M4-XXXGP	M30302M8-XXXFP	M30302M8-XXXGP	M30302MA-XXXFP	M30302MA-XXXGP	M30302MC-XXXFP	M30302MC-XXXGP	M30302M8L-XXXFP	M30302M8L-XXXGP	M30302MAL-XXXFP	M30302MAL-XXXGP	M30302MCL-XXXFP	M30302MCL-XXXGP	M30302MAP-XXXFP**	M30302MAP-XXXGP**	M30302MCP-XXXFP**	M30302MCP-XXXGP**	M30302MEP-XXXFP**	M30302MEP-XXXGP**	
Type No.																						
Memory	ROM(Bytes)	32K		64K		96K		128K		64K		96K		128K		96K		128K		192K		
	RAM(Bytes)	2K			3K			2K			3K			5K			6K					
	ROM Type*	M																				
	Data Flash	—																				
	Program Security	—																				
CPU	CPU	M16C/60 Core																				
	Basic Instructions	91																				
	Minimum Instruction Execution Time (ns)	62.5 (@16MHz)																				
	Multiplier	16×16→32																				
	Multiply-Accumulate Instruction	16×16+32→32																				
	Barrel Shifter	—																				
DMA	DMAC (Channels)	1														2						
	DTC/DMAC II	—																				
External Bus Expansion	Address Space (Bytes)	1M																				
	External Bus Interface	Support for insertion of 1 wait states, Outputs 4 chip-select signals (CS0, CS1, CS2, CS3)														—						
	Bus Structure	Selectable from Separate bus, Multiplex bus, Address Bus Width can be selected (8-bit/16-bit), The number of output address buses can be selected (16/20)														—						
	DRAM Controller	—																				
Clock	Clock Generation Circuit	2 circuits (Main clock, Sub-clock)																				
	PLL	—																				
	Subclock	Yes																				
	On-Chip Oscillator	—																				
	Oscillation Stop Detection	—																				
	Frequency Divider	1/n (n=1, 2, 4, 8, 16)																				
	Power Save	Normal operating mode (High-Speed, Medium-Speed, Low-Speed, Low-Power Consumption), Wait mode and Stop mode																				
	Power Supply Voltage Detection	Power-On Reset/POR	—																			
Low Voltage Detection/LVD		—																				
A/D Converter	Resolution×Channels	10-bit×10														10-bit×18						
	Sample and Hold	Yes																				
D/A Converter	Multi-Channel Sample and Hold	—																				
	Resolution×Channels	—																				
Timer	8-bit	—																				
	16-bit	Timer A×3, Timer B×2														Timer A×3, Timer B×3						
	Prescaler	—																				
	Input Capture	—																				
	Output Compare	—																				
	PWM Output	3 (Timer A)																				
	Real-Time Port	—																				
	Event Counter	3 (Timer A) + 2 (Timer B)														3 (Timer A) + 3 (Timer B)						
	2-Phase Encoder Input	Event counter two-phase pulse signal processing×1 (Timer A2)																				
	3-Phase Inverter Control	—																				
Watchdog Timer		Yes																				
Serial Interface	Clock Sync./ Clock Async.	3 (UART0 to UART2)																				
	Clock Sync. Only	—																				
	Clock Async. Only	—																				
I ² C-bus		1 (UART2)														3 (UART0 to UART2)						
IEBus		1 (UART2)																				
Smart Card/SIM		1 (UART2)																				
SSU/Special Serial I/O		—														1 (UART2:Special mode 2)						
CAN	Channels	—																				
	Buffers	—																				
IrDA		—																				
CRC Calculation Circuit		—														1 (Based on CRC-CCITT (X ¹⁶ +X ¹² +X ⁵ +1))						
X/Y Converter		—																				
I/O Ports	Input Only (Numbers)	1																				
	CMOS I/O Only (Numbers)	85																				
	N-Channel Open Drain Port (Numbers)	2																				
	High Current Drive Port	—																				
	Pull-Up Resistor	Yes																				
Interrupts(Sources)	External	5														7						
Debugging Function	On-Chip Debug	—																				
	On-Board Flash Program	—																				
Other Functions	ROM Correction Function	Address agreement×2																				
	Others	—																				
Package		100-pin LQFP, 100-pin QFP																				
Operating Frequency/Supply Voltage		16MHz/4.2 to 5.5V, 10MHz (1 wait)/2.7 to 5.5V								16MHz/3.0 to 3.6V, 7MHz/2.4 to 3.6V, 7MHz (1 wait)/2.2 to 3.6V								16MHz/4.2 to 5.5V, 10MHz/2.7 to 5.5V				
Operating Ambient Temperature (°C)		-20 to 85, -40 to 85																				

* M: mask ROM version

★★ : Under development

• Memory Capacity (ROM/RAM) (M16C/30 Series)



The M in M3xxxxMx indicates the mask ROM version.

Package				Lead Pitch (mm)
100-pin	FP	100-pin	QFP (PRQP0100JB-A(100P6S-A))	0.65
	GP	100-pin	LQFP (PLQP0100KB-A(100P6Q-A))	0.5

★★ : Under development
* It is an old package code inside ()

M16C/Tiny Series Features

- M16C/60 CPU core achieves 50ns minimum instruction execution time at 20MHz maximum operating frequency
- Compact packages (from 7 × 7-mm to 12 × 12-mm) save circuit board space
- Built-in inverter control function simplifies design of systems that control 3-phase motors
- On-chip peripheral functions include reset circuit, input-capture/output-comparison function, and A/D converter with delay trigger mode

• M16C/Tiny Series CPU Overview

Performance	Machine cycles	50ns (5V at 20MHz)
	Address space	1M bytes
Number of Instructions	91	
Registers	Data registers : 16-bit × 4 × 2 banks Address registers : 16-bit × 2 × 2 banks Dedicated registers : 16-bit × 5	

M16C/26 Group

M16C/26A Group (Under Development)

- Devices operate at high speed (up to 20MHz at 5V) and have a small mounting area (7 × 7-mm 48-pin LQFP) [M16C/26A will have 42-pin SSOP]
- Maintain code and peripheral function compatibility with M16C/62P MCUs to facilitate code reuse
- Provide same timer for 3-phase motor control as M16C/62P MCUs, for controlling motors in small apparatus
- A versatile dedicated motor control function is built in and a wide range of control is possible
- Built-in reset circuit eliminates need for external components, saving space and cost
- Optional on-chip data flash memory eliminates need for external EEPROM

M16C/29 Group (Under Development)

- On-chip CAN v2.0B controller for networked embedded systems serves automotive, industrial, and automation applications
- Besides CAN, other peripheral functions are similar to M16C/28 MCUs, except A/D converter has more channels (up to 27)
- More on-chip Flash and RAM (up to 128KB/12KB)
- Optional on-chip data flash memory eliminates need for external EEPROM
- Small, low-pin-count packages (64-pin 10 × 10 mm or 80-pin 12 × 12 mm) LQFPs save board space

M16C/28 Group (Under Development)

- High-speed operation (20MHz at 5V) is possible in small mounting area
- Instruction and peripheral function compatibility is maintained from M16C/62P devices to facilitate reuse of engineering investments
- MCUs provide same timer for 3-phase motor control as M16C/62P devices, for controlling motors in small apparatus
- Input-capture and output-compare function enable more flexible signal control
- I²C bus interface has two channels for use in systems with multiple master devices
- Built-in reset circuit eliminates need for external components, saving space and cost
- Optional on-chip data flash memory eliminates need for external EEPROM

• Specifications (M16C/Tiny Series)

Group		M16C/26				M16C/26A*											
Type No.		M30262F3GP	M30262F4GP	M30262F6GP	M30262F8GP	M30260M3A-XXXGP**	M30263M3A-XXXFP**	M30260F3AGP**	M30263F3AFP**	M30260M6A-XXXGP**	M30263M6A-XXXFP**	M30260F6AGP**	M30263F6AFP**	M30260M8A-XXXGP**	M30263M8A-XXXFP**	M30260F8AGP**	M30263F8AFP**
Memory	ROM(Bytes)	24K + 4K	32K + 4K	48K + 4K	64K + 4K	24K		24K + 4K		48K		48K + 4K		64K		64K + 4K	
	RAM(Bytes)	1K		2K		1K				2K							
	ROM Type*	F				M		F		M		F		M		F	
	Data Flash	Block A, Block B				—		Block A, Block B		—		Block A, Block B		—		Block A, Block B	
Program Security		ID code check function, ROM code protecting function (Only Flash memory version)															
CPU	CPU	M16C/60 Core															
	Basic Instructions	91															
	Minimum Instruction Execution Time (ns)	50 (@20MHz)															
	Multiplier	16 × 16 → 32															
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32															
DMA	Barrel Shifter	—															
	DMAC (Channels)	2															
External Bus Expansion	DTC/DMAC II	—															
	Address Space (Bytes)	—															
	External Bus Interface	—															
	Bus Structure	—															
Clock	DRAM Controller	—															
	Clock Generation Circuit	3 circuits (Main clock, Sub-clock and On-chip oscillator)				4 circuits (Main clock, PLL, Sub-clock and On-chip oscillator)											
	PLL	—				Yes											
	Subclock	Yes															
	On-Chip Oscillator	Yes															
	Oscillation Stop Detection	Yes															
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)															
Power Supply Voltage Detection	Power-On Reset/POR	—															
	Low Voltage Detection/LVD	Low voltage															
A/D Converter	Resolution × Channels	10-bit × 8				10-bit × 12	10-bit × 10	10-bit × 12	10-bit × 10	10-bit × 12	10-bit × 10	10-bit × 12	10-bit × 10	10-bit × 12	10-bit × 10	10-bit × 12	10-bit × 10
	Sample and Hold	Yes															
D/A Converter	Multi-Channel Sample and Hold	—				Yes											
	Resolution × Channels	—															
Timer	8-bit	—															
	16-bit	Timer A × 5, Timer B × 3															
	Prescaler	—															
	Input Capture	—															
	Output Compare	—															
	PWM Output	5 (Timer A)															
	Real-Time Port	—															
	Event Counter	5 (Timer A) + 3 (Timer B)															
	2-Phase Encoder Input	Two-phase pulse signal processing × 3 (Timer A2, Timer A3, Timer A4)															
3-Phase Inverter Control	Three-Phase Motor Control Timer × 1																
Watchdog Timer		Yes															
Serial Interface	Clock Sync./ Clock Async.	3 (UART0 to UART2)				2 (UART1, UART2)	3 (UART0 to UART2)	2 (UART1, UART2)	3 (UART0 to UART2)	2 (UART1, UART2)	3 (UART0 to UART2)	2 (UART1, UART2)	3 (UART0 to UART2)	2 (UART1, UART2)	3 (UART0 to UART2)	2 (UART1, UART2)	3 (UART0 to UART2)
	Clock Sync. Only	—															
	Clock Async. Only	—															
I ² C-bus		1(UART2)															
IEBus		1(UART2)															
Smart Card/SIM		1(UART2)															
SSU/Special Serial I/O		1(UART2:Special mode 2)															
CAN	Channels	—															
	Buffers	—															
IrDA		—															
CRC Calculation Circuit		—				1 (Based on CRC-CCITT (X ¹⁶ + X ¹² + X ⁵ + 1)/CRC-16 (X ¹⁶ + X ¹⁵ + X ² + 1))											
X/Y Converter		—															
I/O Ports	Input Only (Numbers)	—															
	CMOS I/O Only (Numbers)	38				39	33	39	33	39	33	39	33	39	33	39	33
	N-Channel Open Drain Port (Numbers)	—															
	High Current Drive Port	—															
	Pull-Up Resistor	Yes															
Interrupts(Sources)	External	7				8											
Debugging Function	On-Chip Debug	Yes (Only Flash memory version)															
	On-Board Flash Program	Yes (Only Flash memory version)															
Other Functions	ROM Correction Function	Address agreement × 2															
	Others	—															
Package		48-pin LQFP				48-pin LQFP, 42-pin SSOP											
Operating Frequency/Supply Voltage		20MHz/3.0 to 5.5V 10MHz/2.7 to 5.5V															
Operating Ambient Temperature (°C)		-20 to 85				-20 to 85, -40 to 85											

* M: mask ROM version, F: flash memory version

★★ : Under development

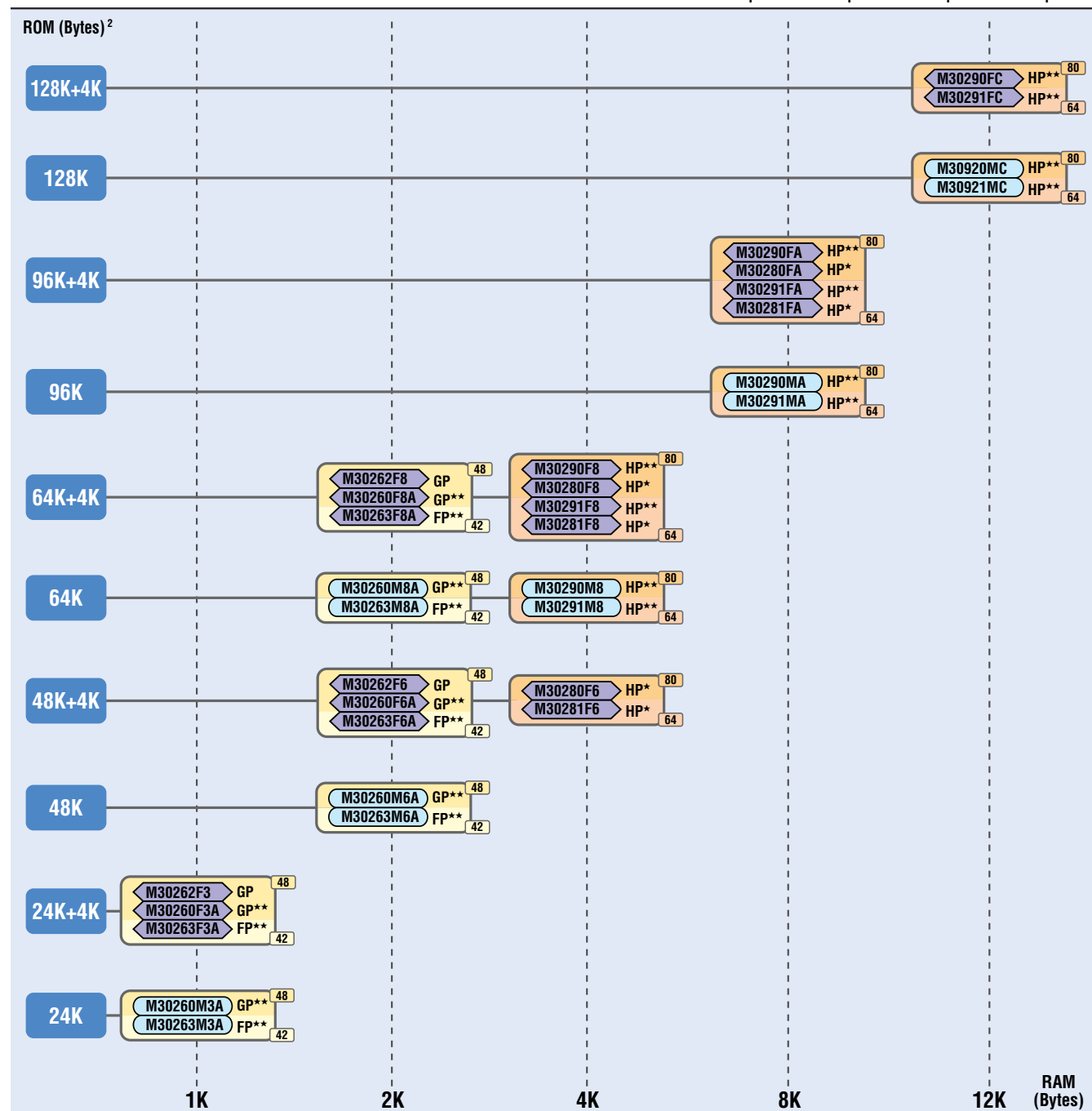
• Specifications (M16C/Tiny Series)

Group		M16C/28						M16C/29											
Type No.		M30280F6HP*	M30281F6HP*	M30280F8HP*	M30281F8HP*	M30280FAHP*	M30281FAHP*	M30290MB-XXXHP**	M30291MB-XXXHP**	M30290F8HP**	M30291F8HP**	M30290MA-XXXHP**	M30291MA-XXXHP**	M30290FAHP**	M30291FAHP**	M30290MC-XXXHP**	M30291MC-XXXHP**	M30290FCHP**	M30291FCHP**
Memory	ROM(Bytes)	48K + 4K		64K + 4K		96K + 4K		64K		64K + 4K		96K		96K + 4K		128K		128K + 4K	
	RAM(Bytes)	4K				8K		4K				8K				12K			
	ROM Type*	F						M		F		M		F		M		F	
	Data Flash	Block A, Block B						—		Block A, Block B		—		Block A, Block B		—		Block A, Block B	
Program Security		ID code check function, ROM code protecting function (Only Flash memory version)																	
CPU	CPU	M16C/60 Core																	
	Basic Instructions	91																	
	Minimum Instruction Execution Time (ns)	50 (@20MHz)																	
	Multiplier	16 × 16 → 32																	
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32																	
DMA	Barrel Shifter	—																	
	DMAC (Channels)	2																	
External Bus Expansion	DTC/DMAC II	—																	
	Address Space (Bytes)	—																	
	External Bus Interface	—																	
	Bus Structure	—																	
Clock	DRAM Controller	—																	
	Clock Generation Circuit	4 circuits (Main clock, PLL, Sub-clock and On-chip oscillator)																	
	PLL	Yes																	
	Subclock	Yes																	
	On-Chip Oscillator	Yes																	
	Oscillation Stop Detection	Yes																	
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)																	
Power Supply Voltage Detection	Power Save	Normal operating mode (PLL operation, High-Speed, Medium-Speed, Low-Speed, Low-Power Consumption, On-chip Oscillator, On-chip Oscillator Low-Power Consumption), Wait mode and Stop mode																	
	Power-On Reset/POR	—																	
A/D Converter	Low Voltage Detection/LVD	Low voltage																	
	Resolution × Channels	10-bit × 24	10-bit × 13	10-bit × 24	10-bit × 13	10-bit × 24	10-bit × 13	10-bit × 27	10-bit × 16	10-bit × 27	10-bit × 16	10-bit × 27	10-bit × 16	10-bit × 27	10-bit × 16	10-bit × 27	10-bit × 16	10-bit × 27	10-bit × 16
	Sample and Hold	Yes																	
D/A Converter	Multi-Channel Sample and Hold	Yes																	
	Resolution × Channels	—																	
Timer	8-bit	—																	
	16-bit	Timer A × 5, Timer B × 3																	
	Prescaler	—																	
	Input Capture	8 (Timer S)																	
	Output Compare	8 (Timer S)																	
	PWM Output	5 (Timer A) + 8 (Timer S)																	
	Real-Time Port	—																	
	Event Counter	5 (Timer A) + 3 (Timer B)																	
	2-Phase Encoder Input	Two-phase pulse signal processing × 4 (Timer A2, Timer A3, Timer A4, Timer S)																	
3-Phase Inverter Control	Three-Phase Motor Control Timer × 1																		
Watchdog Timer		Yes																	
Serial Interface	Clock Sync./ Clock Async.	3 (UART0 to UART2)																	
	Clock Sync. Only	2 (SI/O3, SI/O4)	1 (SI/O3)	2 (SI/O3, SI/O4)	1 (SI/O3)	2 (SI/O3, SI/O4)	1 (SI/O3)	2 (SI/O3, SI/O4)	1 (SI/O3)	2 (SI/O3, SI/O4)	1 (SI/O3)	2 (SI/O3, SI/O4)	1 (SI/O3)	2 (SI/O3, SI/O4)	1 (SI/O3)	2 (SI/O3, SI/O4)	1 (SI/O3)	2 (SI/O3, SI/O4)	1 (SI/O3)
	Clock Async. Only	—																	
I ² C-bus		2 (Multi master I ² C-bus interface, UART2)																	
IEBus		1 (UART2)																	
Smart Card/SIM		1 (UART2)																	
SSU/Special Serial I/O		1(UART2:Special mode 2)																	
CAN	Channels	—						1CAN(2.0B)											
	Buffers	—						16											
IrDA		—																	
CRC Calculation Circuit		—						1 (Based on CRC-CCITT (X ¹⁶ + X ¹² + X ⁵ + 1)/CRC-16 (X ¹⁶ + X ¹⁵ + X ² + 1))											
X/Y Converter		—																	
I/O Ports	Input Only (Numbers)	—																	
	CMOS I/O Only (Numbers)	71	55	71	55	71	55	71	55	71	55	71	55	71	55	71	55	71	55
	N-Channel Open Drain Port (Numbers)	—																	
	High Current Drive Port	—																	
	Pull-Up Resistor	Yes																	
Interrupts(Sources)	External	8																	
Debugging Function	On-Chip Debug	Yes						—		Yes		—		Yes		—		Yes	
	On-Board Flash Program	Yes						—		Yes		—		Yes		—		Yes	
Other Functions	ROM Correction Function	Address agreement × 2																	
	Others	—																	
Package		64-pin LQFP, 80-pin LQFP																	
Operating Frequency/Supply Voltage		20MHz/3.0 to 5.5V, 10MHz/2.7 to 5.5V																	
Operating Ambient Temperature (°C)		-20 to 85, -40 to 85																	

□ M16C/Tiny Series

• Memory Capacity (ROM/RAM) (M16C/Tiny Series)

80-pin 80 64-pin 64 48-pin 48 42-pin 42



Package				Lead Pitch (mm)
42-pin	FP	42-pin	SSOP (PRSP0042GA-B(42P2R-E))	0.8
48-pin	GP	48-pin	LQFP (PLQP0048KB-A(48P6Q-A))	0.5
64-pin	HP	64-pin	LQFP (PLQP0064KB-A(64P6Q-A))	0.5
80-pin	GP	80-pin	LQFP (PLQP0080KB-A(80P6Q-A))	0.5

★ : New product ★★ : Under development

* It is an old package code inside ()

M16C/10 Series Features

- MCUs use popular 16-bit M16C/60 series core that operates at up to 16MHz (4.2V to 5.5V) with low power consumption
- Small package: 32 or 48 pins with 7 × 7-mm body size
- Built-in oscillator circuit with main-clock oscillation-stop detection function can be used as a back-up clock to enhance system reliability
- Flash memory built-in
- On-chip peripheral functions simplify system designs: timers, serial interface, A/D converter, D/A converter, LED drive port

• M16C/10 Series CPU Overview

Performance	Machine cycles	62.5ns (5V at 16MHz)
	Address space	1M bytes
Number of Instructions	91	
Registers	Data registers : 16-bit × 4 × 2 banks Address registers : 16-bit × 2 × 2 banks Dedicated registers : 16-bit × 5	

M16C/10 Series

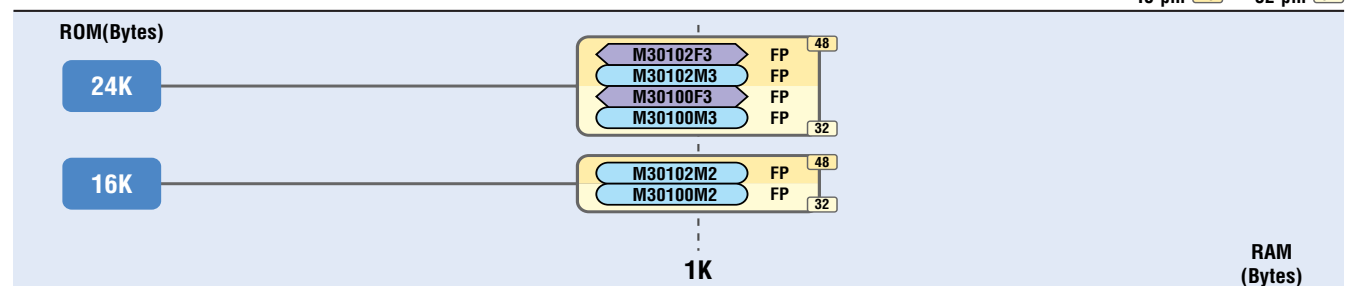
Specifications (M16C/10 Series)

Group		M16C/10					
Type No.		M30100M2-XXXFP	M30100F3FP	M30100M3-XXXFP	M30102M2-XXXFP	M30102F3FP	M30102M3-XXXFP
Memory	ROM(Bytes)	16K	24K		16K	24K	
	RAM(Bytes)	1K					
	ROM Type*	M	F	M		F	M
	Data Flash	—					
	Program Security	—					
CPU	CPU	M16C/60 Core					
	Basic Instructions	91					
	Minimum Instruction Execution Time (ns)	62.5 (@ 16MHz)					
	Multiplier	16 × 16 → 32					
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32					
DMA	Barrel Shifter	—					
	DMAC (Channels)	—					
External Bus Expansion	DTC/DMAC II	—					
	Address Space (Bytes)	—					
	External Bus Interface	—					
	Bus Structure	—					
Clock	DRAM Controller	—					
	Clock Generation Circuit	2 circuits (Main clock, On-chip oscillator)			3 circuits (Main clock, Sub-clock and On-chip oscillator)		
	PLL	—					
	Subclock	—			Yes		
	On-Chip Oscillator	—			Yes		
	Oscillation Stop Detection	Yes					
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)					
Power Save	Normal operating mode (High-Speed, Medium-Speed, Low-Speed, Low-Power Consumption, On-chip Oscillator, On-chip Oscillator Low-Power Consumption), Wait mode and Stop mode						
Power Supply	Power-On Reset/POR	—					
Voltage Detection	Low Voltage Detection/LVD	—					
	Resolution × Channels	10-bit × 12			10-bit × 14		
A/D Converter	Sample and Hold	Yes					
	Multi-Channel Sample and Hold	—					
D/A Converter	Resolution × Channels	—			8-bit × 1		
Timer	8-bit	4 (Timer 1, Timer X, Timer Y, Timer Z)					
	16-bit	1 (Timer C)					
	Prescaler	4 (Timer 1, Timer X, Timer Y, Timer Z)					
	Input Capture	1 (Timer C)					
	Output Compare	—					
	PWM Output	2 (Timer Y, Timer Z)					
	Real-Time Port	—					
	Event Counter	1 (Timer X)					
	2-Phase Encoder Input	—					
	3-Phase Inverter Control	—					
Watchdog Timer		Yes					
Serial Interface	Clock Sync./ Clock Async.	1 (UART0)			2 (UART0, UART1)		
	Clock Sync. Only	—					
	Clock Async. Only	1 (UART1)			—		
I ² C-bus		—					
IEBus		—					
Smart Card/SIM		—					
SSU/Special Serial I/O		—					
CAN	Channels	—					
	Buffers	—					
IrDA		—					
CRC Calculation Circuit		—					
X/Y Converter		—					
I/O Ports	Input Only (Numbers)	—					
	CMOS I/O Only (Numbers)	22			34		
	N-Channel Open Drain Port (Numbers)	—					
	High Current Drive Port	8					
	Pull-Up Resistor	Yes					
Interrupts(Sources)	External	4			7		
Debugging Function	On-Chip Debug	Yes (Only Flash memory version)					
	On-Board Flash Program	Yes (Only Flash memory version)					
Other Functions	ROM Correction Function	Address agreement × 2					
	Others	—					
Package		32-pin LQFP			48-pin LQFP		
Operating Frequency/Supply Voltage		16MHz/4.2 to 5.5V, 5MHz/2.7 to 5.5V					
Operating Ambient Temperature (°C)		-20 to 85					

* M: mask ROM version, F: flash memory version

Memory Capacity (ROM/RAM) (M16C/10 Series)

48-pin 48 32-pin 32



The M in M3xxxxMx indicates the mask ROM version.
The F in M3xxxxFx indicates the flash memory version.

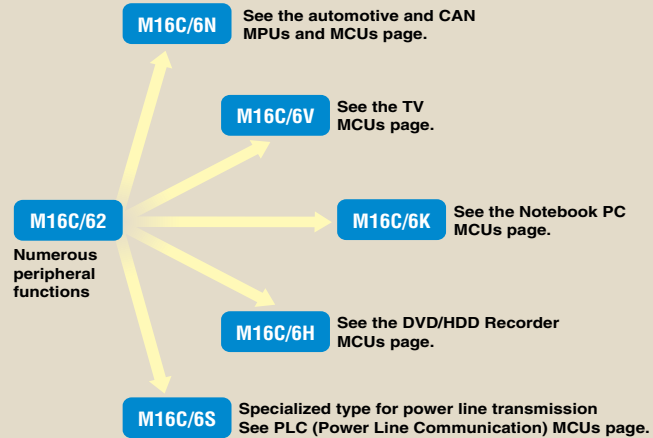
Note: Refer to the Automotive MCUs section for information on M16C/10 series products for automotive applications.

Package				Lead Pitch (mm)
32-pin	FP	32-pin	LQFP (PLQP0032GB-A(32P6U-A))	0.5
48-pin	FP	48-pin	LQFP (PLQP0048KB-A(48P6Q-A))	0.8

* It is an old package code inside ()

• M16C/60 Series Development

ASSP Development



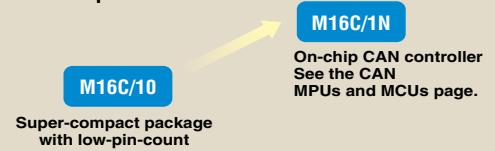
• M16C/20 Series Development

ASSP Development



• M16C/10 Series Development

ASSP Development



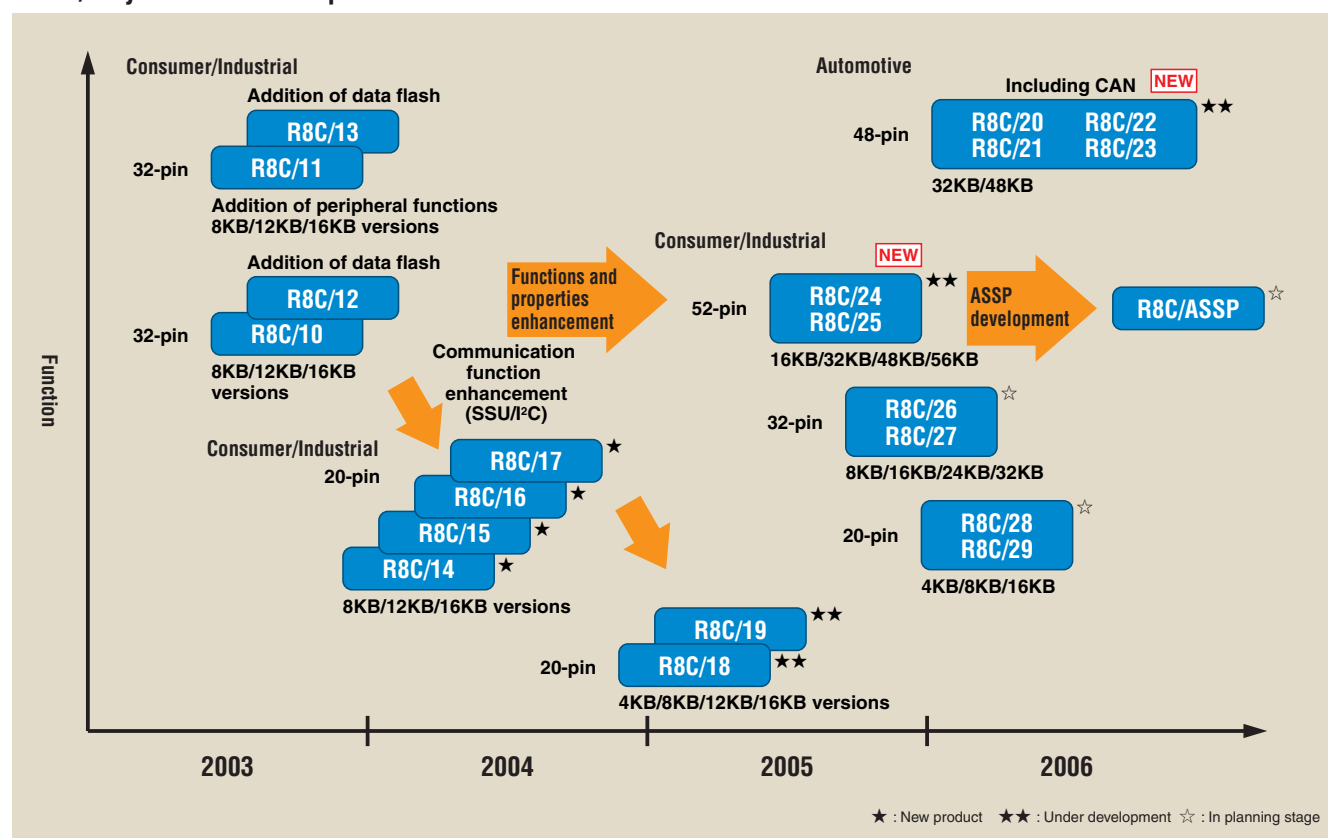
R8C/Tiny Series Features

- 16-bit MCU with built-in multiplier
Instruction compatibility with M16C/60 Series ; operates at the maximum operating frequency 20MHz (excluding R8C/10 and R8C/12)
- Small package
Small package flash MCU of 20 to 32 pins
- Built-in high-functional peripheral circuits
Built-in high-functionality peripheral circuits such as on-chip oscillator, voltage detection, power-on reset, data flash, I²C-bus and synchronous serial communication unit
- Low-cost development environment
Offer low-cost development environment such as on-chip debugger and Starter Kit

• R8C/Tiny Series CPU Overview

Performance	Machine cycles	50ns (20MHz) Except R8C/10, R8C/12
	Address space	1M bytes
Number of Instructions	89	
Registers	Data registers : 16-bit × 4 × 2 banks Address registers : 16-bit × 2 × 2 banks Dedicated registers : 16-bit × 5	

• R8C/Tiny Series Roadmap



R8C/10, R8C/12 Group

- Maximum operating frequency 16MHz, 32-pin package
- On-chip oscillator (low speed)
- Data flash (R8C/12)

R8C/11, R8C/13 Group

- Maximum operating frequency 20MHz, 32-pin package
- Voltage detection circuit, power-on reset circuit, on-chip oscillator (low speed, high speed)
- Data flash (R8C/13)

R8C/14, R8C/15 Group (New product)

- Maximum operating frequency 20MHz, 20-pin package
- Synchronous serial communication unit
- Voltage detection circuit, power-on reset circuit, on-chip oscillator (low speed, high speed)
- Data flash (R8C/15)

R8C/16, R8C/17 Group (New product)

- Maximum operating frequency 20MHz, 20-pin package
- I²C-bus interface
- Voltage detection circuit, power-on reset circuit, on-chip oscillator (low speed, high speed)
- Data flash (R8C/15)

R8C/18, R8C/19 Group (Under development)

- Maximum operating frequency 20MHz, 20-pin package
- On-chip 1-bit comparator with 4 channels
- Voltage detection circuit, power-on reset circuit, on-chip oscillator (low speed, high speed)
- Data flash (R8C/19)

R8C/20, R8C/21, R8C/22, R8C/23 Group (Under development)

* : See the Automobile MCUs page

R8C/24, R8C/25 Group (Under development)

- Upgraded version, 52-pin package
- Data flash (R8C/25)

• Specifications (R8C/Tiny Series)

Group		R8C/10					R8C/11					R8C/12					R8C/13								
Type No.		R5F21102DFP	R5F21102FP	R5F21103DFP	R5F21103FP	R5F21104DFP	R5F21104FP	R5F21112DFP	R5F21112FP	R5F21113DFP	R5F21113FP	R5F21114DFP	R5F21114FP	R5F21122DFP	R5F21122FP	R5F21123DFP	R5F21123FP	R5F21124DFP	R5F21124FP	R5F21132DFP	R5F21132FP	R5F21133DFP	R5F21133FP	R5F21134DFP	R5F21134FP
Memory	ROM(Bytes)	8K	12K	16K		8K		12K		16K		8K + 4K		12K + 4K		16K + 4K		8K + 4K		12K + 4K		16K + 4K			
	RAM(Bytes)	512	768	1K		512		768		1K		512		768		1K		512		768		1K			
	ROM Type*	F																							
	Data Flash	—													Block A, Block B										
	Program Security	ID code check function																							
CPU	CPU	R8C Core																							
	Basic Instructions	89																							
	Minimum Instruction Execution Time (ns)	62.5 (@16MHz)					50 (@20MHz)					62.5 (@16MHz)					50 (@20MHz)								
	Multiplier	16 × 16 → 32																							
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32																							
DMA	Barrel Shifter	—																							
	DMAC (Channels)	—																							
	DTC/DMAC II	—																							
External Bus Expansion	Address Space (Bytes)	—																							
	External Bus Interface	—																							
	Bus Structure	—																							
	DRAM Controller	—																							
Clock	Clock Generation Circuit	2 circuits (Main clock, On-chip oscillator)																							
	PLL	—																							
	Subclock	—																							
	On-Chip Oscillator	Low speed					Low speed, High speed					Low speed					Low speed, High speed								
	Oscillation Stop Detection	Yes																							
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)																							
	Power Save	Normal operating mode, Wait mode and Stop mode																							
	Power Supply Voltage Detection	Power-On Reset/POR	—					Yes (@Vcc = 5V ± 10%)					—					Yes (@Vcc = 5V ± 10%)							
	Low Voltage Detection/LVD	—					Voltage detection 1 (@Vcc = 5V ± 10%)					—					Voltage detection 1 (@Vcc = 5V ± 10%)								
A/D Converter	Resolution × Channels	10-bit × 8					10-bit × 12					10-bit × 8					10-bit × 12								
	Sample and Hold	Yes																							
D/A Converter	Multi-Channel Sample and Hold	—																							
	Resolution × Channels	—																							
Timer	8-bit	Timer X × 1, Timer Y × 1, Timer Z × 1																							
	16-bit	Timer C × 1																							
	Prescaler	Yes																							
	Input Capture	1 (Timer C)																							
	Output Compare	—					2 (Timer C)					—					2 (Timer C)								
	PWM Output	2 (Timer Y, Timer Z)																							
	Real-Time Port	—																							
	Event Counter	2 (Timer X, Timer Y)																							
	2-Phase Encoder Input	—																							
	3-Phase Inverter Control	—																							
	Watchdog Timer	Yes																							
Serial Interface	Clock Sync./ Clock Async.	UART0 × 1																							
	Clock Sync. Only	—																							
	Clock Async. Only	UART1 × 1																							
I ² C-bus		—																							
IEBus		—																							
Smart Card/SIM		—																							
SSU/Special Serial I/O		—																							
CAN	Channels	—																							
	Buffers	—																							
IrDA		—																							
CRC Calculation Circuit		—																							
X/Y Converter		—																							
I/O Ports	Input Only (Numbers)	2																							
	CMOS I/O Only (Numbers)	22 (contains LED drive port)																							
	N-Channel Open Drain Port (Numbers)	—																							
	High Current Drive Port	LED drive port × 8																							
	Pull-Up Resistor	Yes																							
Interrupts(Sources)	External	5 (8 levels)																							
Debugging Function	On-Chip Debug	Yes																							
	On-Board Flash Program	Yes																							
Other Functions	ROM Correction Function	Address agreement × 2																							
	Others	—																							
Package		32-pin LQFP																							
Operating Frequency/Supply Voltage		16MHz/3.0 to 5.5V, 10MHz/2.7 to 5.5V					20MHz/3.0 to 5.5V, 10MHz/2.7 to 5.5V					16MHz/3.0 to 5.5V, 10MHz/2.7 to 5.5V					20MHz/3.0 to 5.5V, 10MHz/2.7 to 5.5V								
Operating Ambient Temperature (°C)		-20 to 85, D-ver:-40 to 85																							

* F: flash memory version

• Specifications (R8C/Tiny Series)

Group		R8C/14*					R8C/15*					R8C/16*					R8C/17*								
Type No.		R5F21142DSP*	R5F21142SP*	R5F21143DSP*	R5F21143SP*	R5F21144DSP*	R5F21144SP*	R5F21152DSP*	R5F21152SP*	R5F21153DSP*	R5F21153SP*	R5F21154DSP*	R5F21154SP*	R5F21162DSP*	R5F21162SP*	R5F21163DSP*	R5F21163SP*	R5F21164DSP*	R5F21164SP*	R5F21172DSP*	R5F21172SP*	R5F21173DSP*	R5F21173SP*	R5F21174DSP*	R5F21174SP*
Memory	ROM(Bytes)	8K		12K		16K		8K + 2K		12K + 2K		16K + 2K		8K		12K		16K		8K + 2K		12K + 2K		16K + 2K	
	RAM(Bytes)	512		768		1K		512		768		1K		512		768		1K		512		768		1K	
	ROM Type*	F																							
	Data Flash	—					Block A, Block B					—					Block A, Block B								
	Program Security	ID code check function, ROM code protecting function																							
CPU	CPU	R8C Core																							
	Basic Instructions	89																							
	Minimum Instruction Execution Time (ns)	50 (@20MHz)																							
	Multiplier	16 × 16 → 32																							
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32																							
DMA	Barrel Shifter	—																							
	DMAC (Channels)	—																							
	DTC/DMAC II	—																							
External Bus Expansion	Address Space (Bytes)	—																							
	External Bus Interface	—																							
	Bus Structure	—																							
	DRAM Controller	—																							
Clock	Clock Generation Circuit	2 circuits (Main clock, On-chip oscillator)																							
	PLL	—																							
	Subclock	—																							
	On-Chip Oscillator	Low speed, High speed																							
	Oscillation Stop Detection	Yes																							
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)																							
	Power Save	Normal operating mode, Wait mode and Stop mode																							
Power Supply Voltage Detection	Power-On Reset/POR	Yes (@ Vcc = 3.0 to 5.5V)																							
	Low Voltage Detection/LVD	Voltage detection 2 (@ Vcc = 3.0 to 5.5V)																							
A/D Converter	Resolution × Channels	10-bit × 4																							
	Sample and Hold	Yes																							
D/A Converter	Multi-Channel Sample and Hold	—																							
	Resolution × Channels	—																							
Timer	8-bit	Timer X × 1, Timer Z × 1																							
	16-bit	Timer C × 1																							
	Prescaler	Yes																							
	Input Capture	1 (Timer C)																							
	Output Compare	2 (Timer C)																							
	PWM Output	1 (Timer Z)																							
	Real-Time Port	—																							
	Event Counter	1 (Timer X)																							
	2-Phase Encoder Input	—																							
3-Phase Inverter Control	—																								
Watchdog Timer		Yes																							
Serial Interface	Clock Sync./ Clock Async.	UART0 × 1																							
	Clock Sync. Only	—																							
	Clock Async. Only	—																							
I ² C-bus		—					—														IIC × 1				
IEBus		—																							
Smart Card/SIM		—																							
SSU/Special Serial I/O		SSU × 1												—											
CAN	Channels	—																							
	Buffers	—																							
IrDA		—																							
CRC Calculation Circuit		—																							
X/Y Converter		—																							
I/O Ports	Input Only (Numbers)	2																							
	CMOS I/O Only (Numbers)	13 (contains LED drive port)																							
	N-Channel Open Drain Port (Numbers)	—																							
	High Current Drive Port	LED drive port × 4																							
	Pull-Up Resistor	Yes																							
Interrupts(Sources)	External	4 (7 levels)																							
	On-Chip Debug	Yes																							
Debugging Function	On-Board Flash Program	Yes																							
	ROM Correction Function	Address agreement × 2																							
Other Functions	Others	—																							
	Package	20-pin SSOP																							
Operating Frequency/Supply Voltage		20MHz/3.0 to 5.5V, 10MHz/2.7 to 5.5V																							
Operating Ambient Temperature (°C)		-20 to 85, D-ver: -40 to 85																							

★ : New product

• Specifications (R8C/Tiny Series)

Group		R8C/18**																R8C/19**															
Type No.		R5F21181DDD**	R5F21181DD**	R5F21181DSP**	R5F21181SP**	R5F21182DDD**	R5F21182DD**	R5F21182DSP**	R5F21182SP**	R5F21183DDD**	R5F21183DD**	R5F21183DSP**	R5F21183SP**	R5F21184DDD**	R5F21184DD**	R5F21184DSP**	R5F21184SP**	R5F21191DDD**	R5F21191DD**	R5F21191DSP**	R5F21191SP**	R5F21192DDD**	R5F21192DD**	R5F21192DSP**	R5F21192SP**	R5F21193DDD**	R5F21193DD**	R5F21193DSP**	R5F21193SP**	R5F21194DDD**	R5F21194DD**	R5F21194DSP**	R5F21194SP**
Memory	ROM(Bytes)	4K		8K		12K		16K		4K + 2K		8K + 2K		12K + 2K		16K + 2K																	
	RAM(Bytes)	384		512		768		1K		384		512		768		1K																	
	ROM Type*	F																															
	Data Flash	Block A, Block B																															
CPU	Program Security	ID code check function, ROM code protecting function																															
	CPU	R8C Core																															
	Basic Instructions	89																															
	Minimum Instruction Execution Time (ns)	50 (@20MHz)																															
	Multiplier	16 × 16 ~ 32																															
	Multiply-Accumulate Instruction	16 × 16 + 32 ~ 32																															
	Barrel Shifter	—																															
	DMA	DMAC (Channels)	—																														
DTC/DMAC II		—																															
External Bus Expansion	Address Space (Bytes)	—																															
	External Bus Interface	—																															
	Bus Structure	—																															
	DRAM Controller	—																															
Clock	Clock Generation Circuit	2 circuits (Main clock, On-chip oscillator)																															
	PLL	—																															
	Subclock	—																															
	On-Chip Oscillator	Low speed, High speed																															
	Oscillation Stop Detection	Yes																															
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)																															
Power Supply Voltage Detection	Power Save	Normal operating mode, Wait mode and Stop mode																															
	Power-On Reset/POR	Yes																															
A/D Converter	Low Voltage Detection/LVD	Voltage detection 2																															
	Resolution × Channels	1-bit comparator × 4																															
D/A Converter	Sample and Hold	—																															
	Multi-Channel Sample and Hold	—																															
Timer	Resolution × Channels	—																															
	8-bit	Timer X × 1, Timer Z × 1																															
	16-bit	Timer C × 1																															
	Prescaler	Yes																															
	Input Capture	1 (Timer C)																															
	Output Compare	2 (Timer C)																															
	PWM Output	1 (Timer Z)																															
	Real-Time Port	—																															
	Event Counter	1 (Timer X)																															
	2-Phase Encoder Input	—																															
3-Phase Inverter Control	—																																
Watchdog Timer		Yes																															
Serial Interface	Clock Sync./ Clock Async.	UART0 × 1																															
	Clock Sync. Only	—																															
	Clock Async. Only	UART1 × 1																															
I ² C-bus		—																															
IEBus		—																															
Smart Card/SIM		—																															
SSU/Special Serial I/O		—																															
CAN	Channels	—																															
	Buffers	—																															
IrDA		—																															
CRC Calculation Circuit		—																															
X/Y Converter		—																															
I/O Ports	Input Only (Numbers)	3																															
	CMOS I/O Only (Numbers)	13 (contains LED drive port)																															
	N-Channel Open Drain Port (Numbers)	—																															
	High Current Drive Port	LED drive port × 4																															
Interrupts(Sources)	Pull-Up Resistor	Yes																															
	External	4 (7 levels)																															
Debugging Function	On-Chip Debug	Yes																															
	On-Board Flash Program	Yes																															
Other Functions	ROM Correction Function	Address agreement × 2																															
	Others	—																															
Package		20-pin SSOP, 20-pin SDIP																															
Operating Frequency/Supply Voltage		20MHz/3.0 to 5.5V, 10MHz/2.7 to 5.5V																															
Operating Ambient Temperature (°C)		-20 to 85, D-ver:-40 to 85																															

* F: flash memory version

★★ : Under development

• Specifications (R8C/Tiny Series)

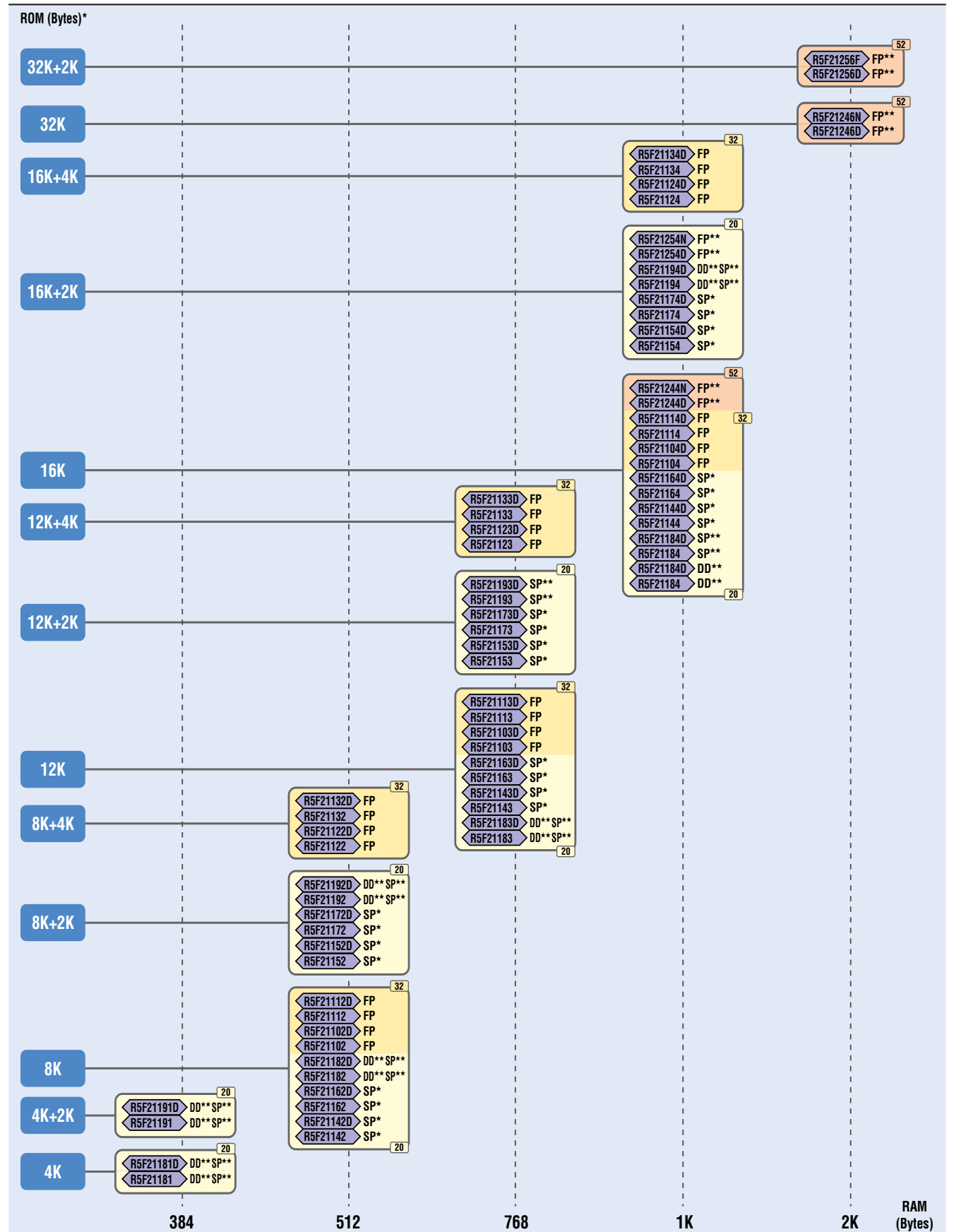
Group		R8C/24**				R8C/25**			
Type No.		R5F21244SDFP**	R5F21244SNFP**	R5F21246SDFP**	R5F21246SNFP**	R5F21254SDFP**	R5F21254SNFP**	R5F21256SDFP**	R5F21256SNFP**
Memory	ROM(Bytes)	16K		32K		16K + 2K		32K + 2K	
	RAM(Bytes)	1K		2K		1K		2K	
	ROM Type*	F							
	Data Flash	—				Block A, Block B			
CPU	Program Security	ID code check function, ROM code protecting function							
	CPU	R8C Core							
	Basic Instructions	89							
	Minimum Instruction Execution Time (ns)	50 (@20MHz)							
	Multiplier	16 × 16 → 32							
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32							
	Barrel Shifter	—							
DMA	DMAC (Channels)	—							
	DTC/DMAC II	—							
External Bus Expansion	Address Space (Bytes)	—							
	External Bus Interface	—							
	Bus Structure	—							
	DRAM Controller	—							
Clock	Clock Generating Circuit	2 circuits (Main clock, On-chip oscillator)							
	PLL	—							
	Subclock	Yes							
	On-Chip Oscillator	Low speed, High speed							
	Oscillation Stop Detection	Yes							
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)							
	Power Save	Normal operating mode, Wait mode and Stop mode							
Power Supply Voltage Detection	Power-On Reset/POR	Yes							
	Low Voltage Detection/LVD	Voltage detection 3							
A/D Converter	Resolution × Channels	10-bit × 12							
	Sample and Hold	Yes							
D/A Converter	Multi-Channel Sample and Hold	—							
	Resolution × Channels	—							
Timer	8-bit	Timer RA × 1, Timer RB × 1, Timer RE (with RTC function) × 1							
	16-bit	Timer RD × 1 (16-bit Timer 2)							
	Prescaler	Yes							
	Input Capture	2 (Timer RD)							
	Output Compare	3 (Timer RD, RE)							
	PWM Output	2 (Timer RB, RD)							
	Real-Time Port	—							
	Event Counter	1 (Timer RA)							
	2-Phase Encoder Input	—							
	3-Phase Inverter Control	1 (Timer RD)							
Watchdog Timer		Yes							
Serial Interface	Clock Sync./ Clock Async.	UART0 × 2							
	Clock Sync. Only	—							
	Clock Async. Only	—							
I ² C-bus		IIC × 1 (shared with SSU)							
IEBus		—							
Smart Card/SIM		—							
SSU/Special Serial I/O		SSU × 1 (shared with IIC)							
CAN	Channels	—							
	Buffers	—							
IrDA		—							
CRC Calculation Circuit		—							
X/Y Converter		—							
I/O Ports	Input Only (Numbers)	3							
	CMOS I/O Only (Numbers)	41(contains LED drive port)							
	N-Channel Open Drain Port (Numbers)	—							
	High Current Drive Port	LED drive port × 8							
	Pull-Up Resistor	Yes							
Interrupts(Sources)	External	5 (8 levels)							
Debugging Function	On-Chip Debug	Yes							
	On-Board Flash Program	Yes							
Other Functions	ROM Correction Function	Address agreement × 2							
	Others	LIN × 1 (sharing UART0 with Timer RA)							
Package		52-pin LQFP							
Operating Frequency/Supply Voltage		20MHz/3.0 to 5.5V, 10MHz/2.7 to 5.5V, T.B.D (/2.2 to 5.5V)							
Operating Ambient Temperature (°C)		-20 to 85, D-ver:-40 to 85							

* F: flash memory version

★★ : Under development

• Memory Capacity (ROM/RAM) (R8C/Tiny Series)

52-pin (52) 32-pin (32) 20-pin (20)



The F in M3xxxxFx indicates the flash memory version.

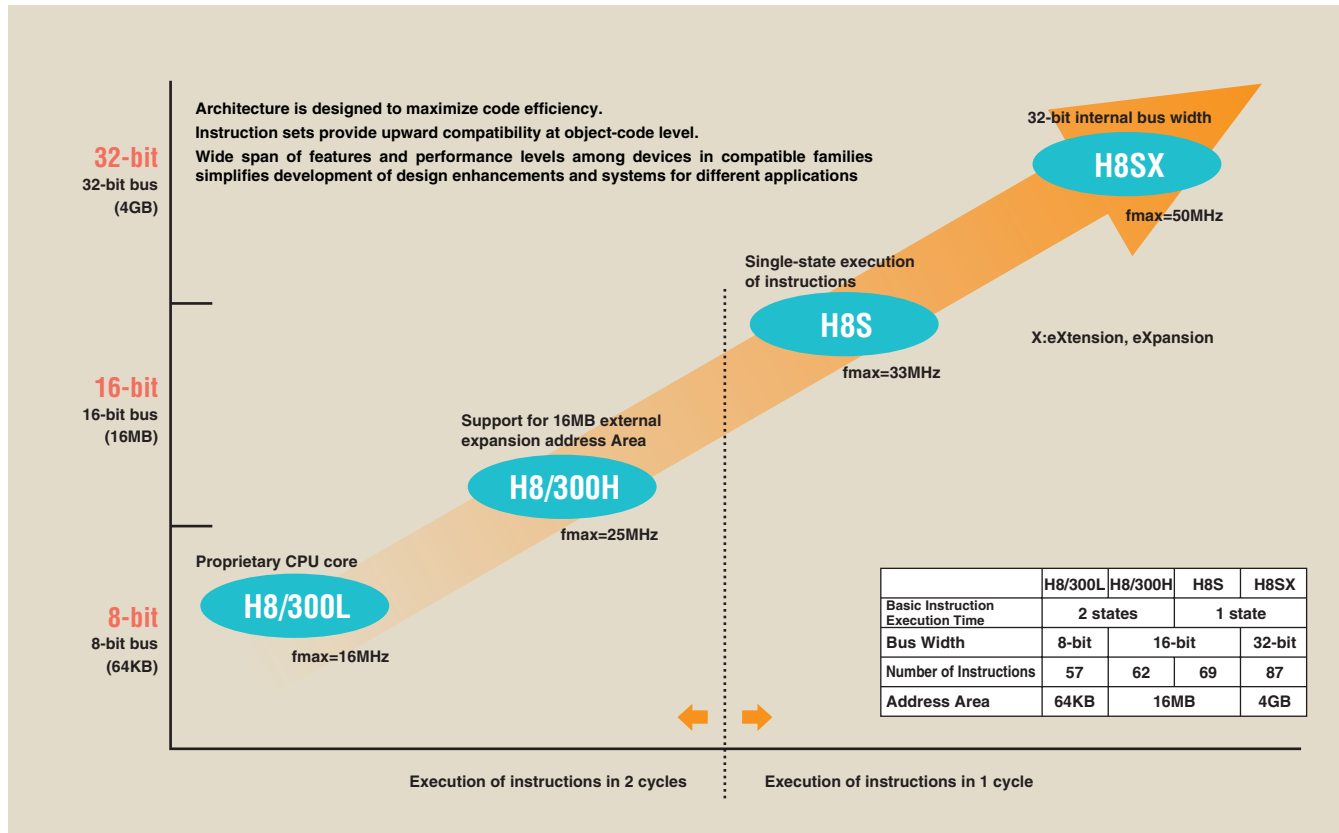
* "+2K" "+4K" refers to data flash memory

Package					Lead Pitch (mm)
20-pin	SP	20-pin	SSOP (PLSP0020JB-A(20P2F-A))		0.65
	DD	20-pin	SDIP (PLSP0020JB-A(20P4B))		1.778
32-pin	FP	32-pin	LQFP (PLQP0032GB-A(32P6U-A))		0.8
52-pin	FP	52-pin	LQFP (PLQP0052JA-A(52P6A-A))		0.65

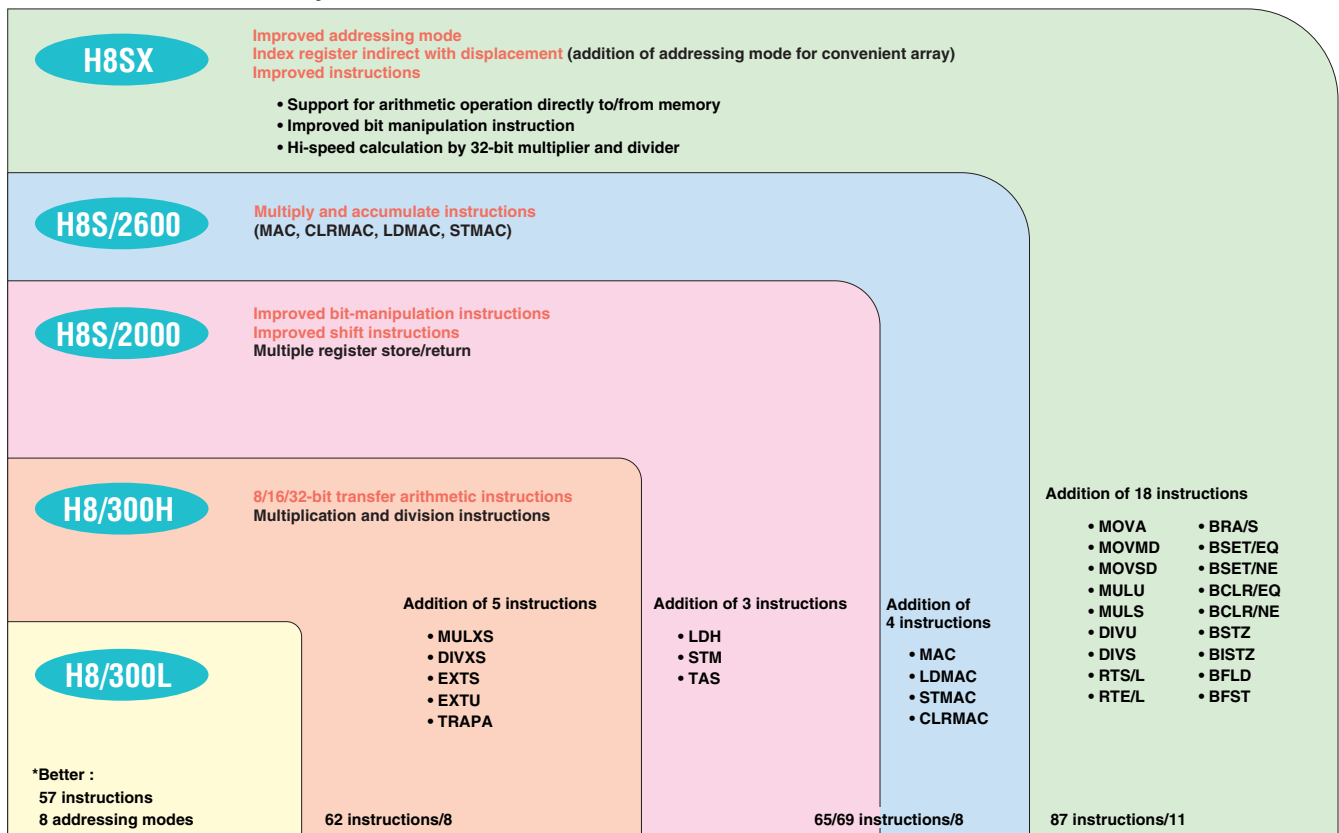
★ : New product ★★ : Under development

* It is an old package code inside ()

• H8, H8S and H8SX Roadmap



• Instruction Set Continuity



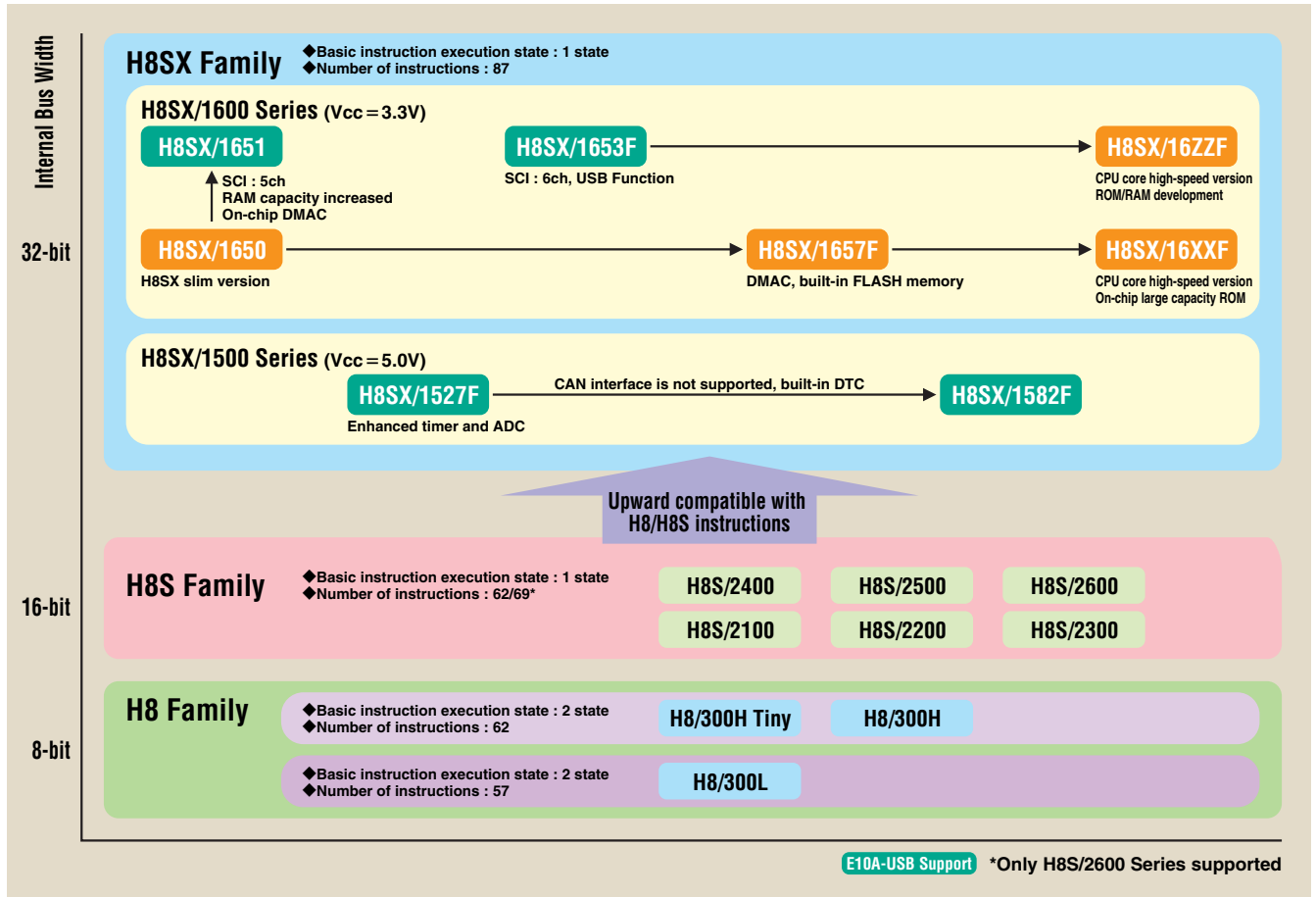
*Number of instructions/number of addressing modes

High-performance 32-bit MCUs providing upward compatibility with the H8/H8S family

H8SX Family Features

- Bus width expanded to 32bits
- Basic instructions are executed in one state for a minimum instruction execution time of 20ns when operating at 3.3V and 50MHz
- On-chip 32bits multiplier and divider boost calculation speed and accuracy
- Addition of new instructions increases code efficiency
- Addition of system control registers enhances flexibility
 - Vector-based registers for improved interrupt responsiveness
 - Short address-based registers for reduced code size and shorter fetch cycles
- Approximately three times the processing performance of earlier 16-bit MCUs
- Upward compatible with H8/H8S family at the object level

H8SX Family Roadmap



H8SX/1650 Group

- On-chip 768/384KB Flash memory (32-bit, 1-state access) (H8SX/1657, 1653F only)
- 24/40KB of on-chip RAM (32-bit, 1-state access)
- On-chip 32-bit multiplier and divider
- Low-voltage, high-speed operation (50MHz operating frequency, 3.3V)
- On-chip data/address multiplex I/O interface
- On-chip endian conversion function
- Improved data transfer function with DMAC
- Built-in data transfer controller (DTC) for highly efficient transfer of external and internal data
- On-chip timers, SCI, A/D converter, and D/A converter

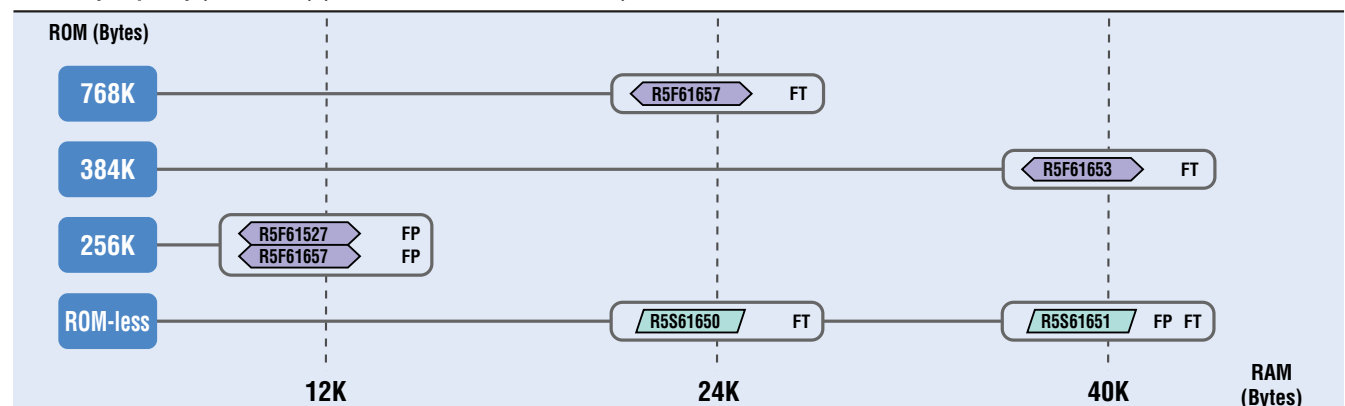
• Specifications (H8SX/1600, H8SX/1500 Series)

Group		H8SX/1650					H8SX/1520	H8SX/1580
Product No.		H8SX/1650	H8SX/1657	H8SX/1653F	H8SX/1651		H8SX/1527	H8SX/1582
Type No.		R5S61650FT	R5F61657FT	R5F61653FT	R5S61651FT	R5S61651FP	R5F61527FP	R5F61582FP
Memory	ROM(Bytes)	— 768K		384K	—		256K	
	RAM(Bytes)	24K			40K		12K	
	ROM Type*	L	F		L		F	
	Cache Memory			—				
	Program Security	—	Yes		—		Yes	
CPU	CPU	H8SX Core						
	Basic Instructions	87						
	Minimum Instruction Execution Time (ns)	28.6 (@35MHz)			20.0 (@50MHz)		25 (@40MHz)	21 (@48MHz)
	Multiplier	16 × 16 → 32						
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32						
DMA	DMAC (Channels)	—			4			
	DTC/DMAC II	DTC					—	DTC
External Bus Expansion	Address Space (Bytes)	16M						
	Bus State Controller	ROM, burst ROM, SRAM, Bytes control SRAM					—	
	Bus Structure	Separate bus (8/16-bit) / Multiplex bus (8/16-bit)					—	
	Endian Conversion	Yes					—	
Clock	Clock Generation Circuit	1 circuit (Main clock)		2 circuits (Main clock, USB)	1 circuit (Main clock)			
	PLL	Yes						
	Frequency Divider	1/n (n = 1, 2, 4, 8)						
	Power Save	Sleep mode/Full module clock/stop mode/software standby mode/hardware standby mode					Sleep mode/Full module clock/stop mode/software standby mode	
A/D Converter	Resolution × Channels	10-bit × 8					10-bit × 16	
	Sample and Hold	Yes						
	Multi-Channel Sample and Hold	—					Yes	
D/A Converter	Resolution × Channels	8-bit × 2					—	
	8-bit	4 (TMR)		8 (TMR)	4 (TMR)		—	
Timer	16-bit	6 (TPU), 1 (TMR)					12 (TPU)	
	32-bit	2 (TPU)						
	Prescaler	—					Yes	
	Input Capture	6 (TPU)					12 (TPU)	
	Output Compare	6 (TPU)					12 (TPU)	
	PWM Output	6 (TPU)					12 (TPU)	
	Programmable Pulse Generator	PPG + TPU						
	Event Counter	Yes						
	2-Phase Encoder Input	Yes						
	Watchdog Timer		Yes					
Serial Interface	Clock Sync./ Clock Async.	4			5		2	
	Clock Sync. Only						—	
	Clock Async. Only	—		2			—	
I ² C-bus		—		2			—	
Smart Card/SIM		4		6	5		2	
SSU/Special Serial I/O		—					3	
CAN	Channels	—					1	—
	Buffers	—					16	—
USB Function		—		Yes			—	
IrDA		—		Yes			—	
I/O Ports	CMOS Output Only (Numbers)	9	8		9		17	
	CMOS I/O Only (Numbers)	81	82	75	81		65	82
	N-Channel Open Drain Port (Numbers)		16	13	16		15	19
	Pull-Up Resistor		40	37	40		32	40
Interrupts(Sources)		External			13		16	17
Debugging Function	On-Chip Debug	Yes						
	On-Board Flash Program	Yes						
Package		TFP-120				FP-120B	FP-100M	FP-120B
Operating Frequency/Supply Voltage		35MHz/3.0 to 3.6V		50MHz/3.0 to 3.6V			40MHz/4.5 to 5.5V	48MHz/4.5 to 5.5V
Operating Ambient Temperature (°C)				-20 to 75			-40 to 85	-20 to 75

Note : The package code described is the former one. Regarding the new one, please refer to the following URL <http://www.renesas.com/en/package>

* L: ROM-less version, F: F-ZTAT version

• Memory Capacity (ROM/RAM) (H8SX/1600, H8SX/1500 Series)



Package	
FP	QFP (PRQP0100KB-A(FP-100M))
FP	LQFP (PLQP0120LA-A(FP-120B))
FT	TQFP (PTQP0120LA-A(TFP-120))

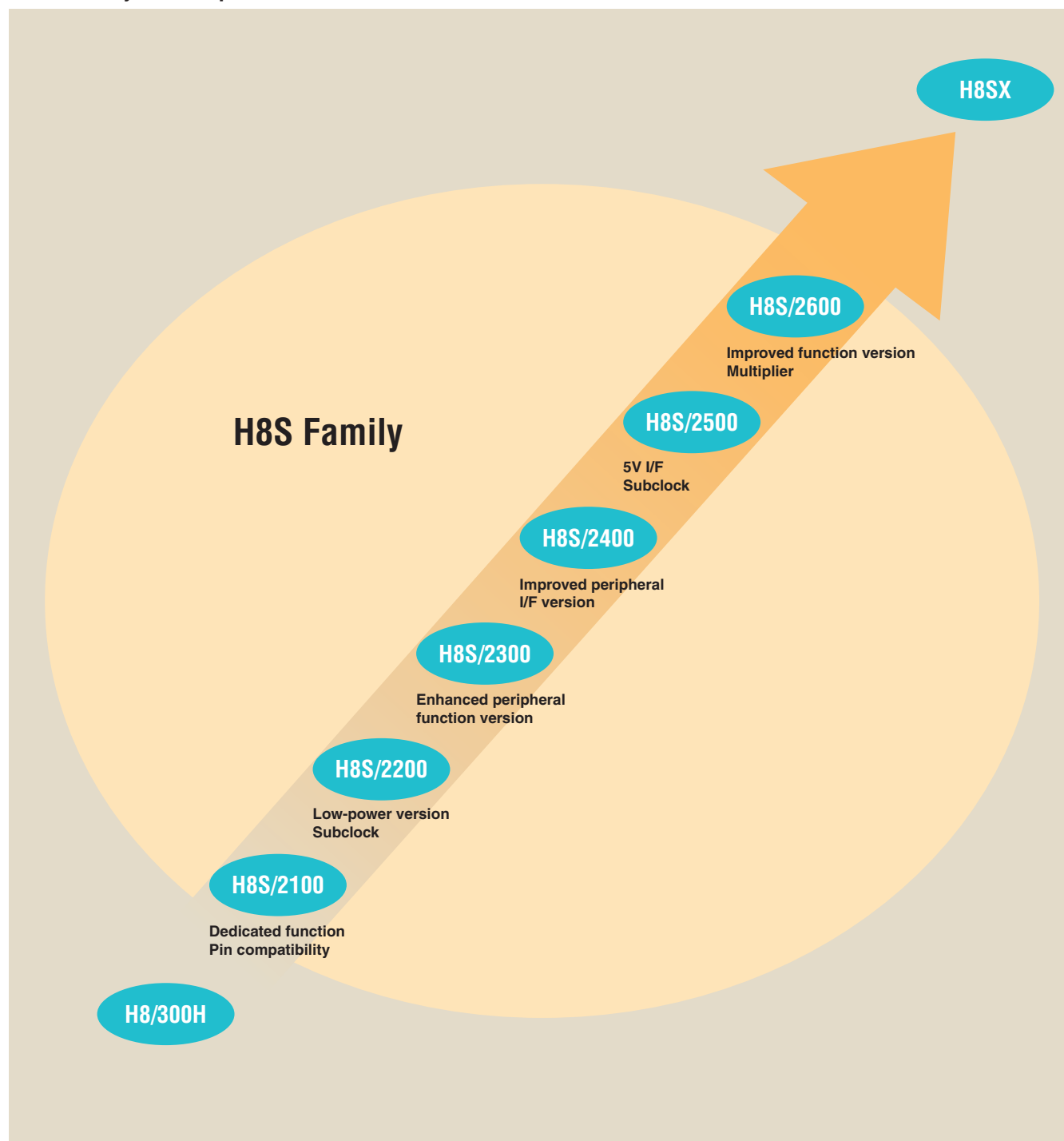
* It is an old package code inside ()

High-performance 16-bit MCUs providing upward compatibility with the H8 family

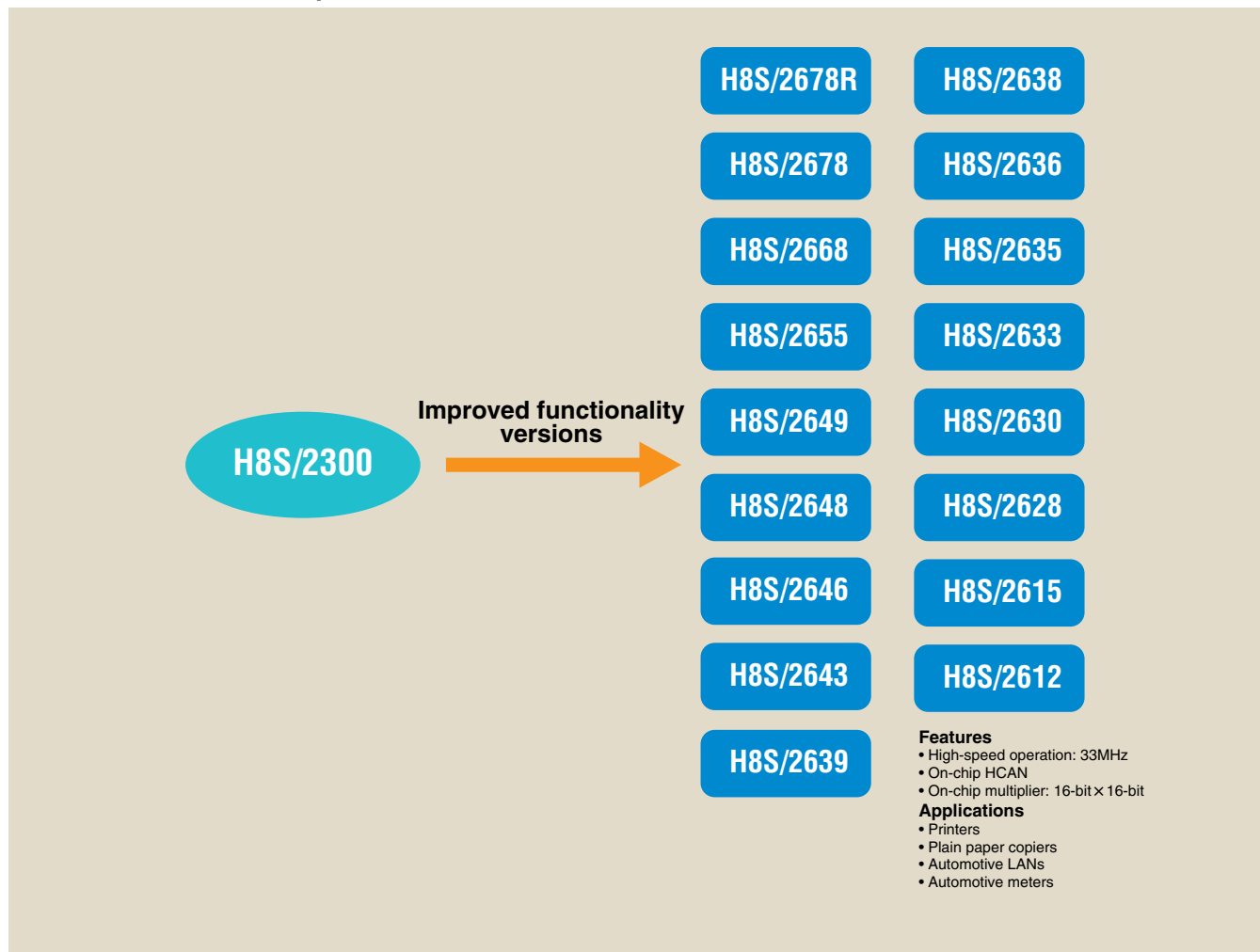
H8S Family Features

- 16-bit MCUs with static circuitry for low power
- Basic instructions are executed in one state, for a minimum instruction execution time of 30ns when operating at 3.3V and 33MHz
- Available in versions for different applications
- Low-noise versions reduce noise emission to 10 to 20dB less than conventional MCUs
- Instruction set is upward compatible with the H8/300 and H8/300H series

• H8S Family Roadmap



• H8S/2600 Series Roadmap



H8S/2636, H8S/2638, H8S/2639, H8S/2630 Group

- On-chip 2-channel CAN interface
- On-chip micro-step motor control timer
- 384K bytes of on-chip flash memory (2630)
- 256K bytes of on-chip flash memory (2638, 2639)
- On-chip I²C-bus interface (2638, 2639, 2630)
- On-chip subclock divider (2630, 2639)

H8S/2628 Group

- On-chip CAN interface
- On-chip 2-channel synchronous serial communication unit
- 24MHz operation

H8S/2678, H8S/2678R Group

- High-speed operation (33MHz, 3.3V)
- On-chip multiplier
- Improved DMAC (4 EXDMAC channels added)
- User-friendly bus controller (supports detailed wait settings for direct interface linkage)
- On-chip SDRAM interface (2678R)
- External interrupt : 17
- Multiplier oscillator (PLL) ($\times 1$, $\times 2$, $\times 4$)

Applications PPC, printer, communications devices

H8S/2646, H8S/2648 Group

- On-chip LCD controller/driver
- On-chip micro-step motor control timer
- On-chip CAN interface

H8S/2612 Group

- On-chip motor control timer (MMT)
- On-chip CAN interface
- 80-pin configuration

H8S/2668 Group

- High-speed operation (33MHz, 3.3V)
- On-chip multiplier
- 384K bytes of on-chip flash memory
- Compact peripheral functions

H8S/2655 Group

- On-chip 16 × 16-bit multiplier for high-speed multiplication and multiply and accumulate operations
- High-speed on-chip A/D converter (conversion time: 1μs in scan mode)

Note : The package code described is the former one. Regarding the new one, please refer to the following URL. <http://www.renesas.com/en/package>
 * M: mask ROM version. F: F-ZTAT version

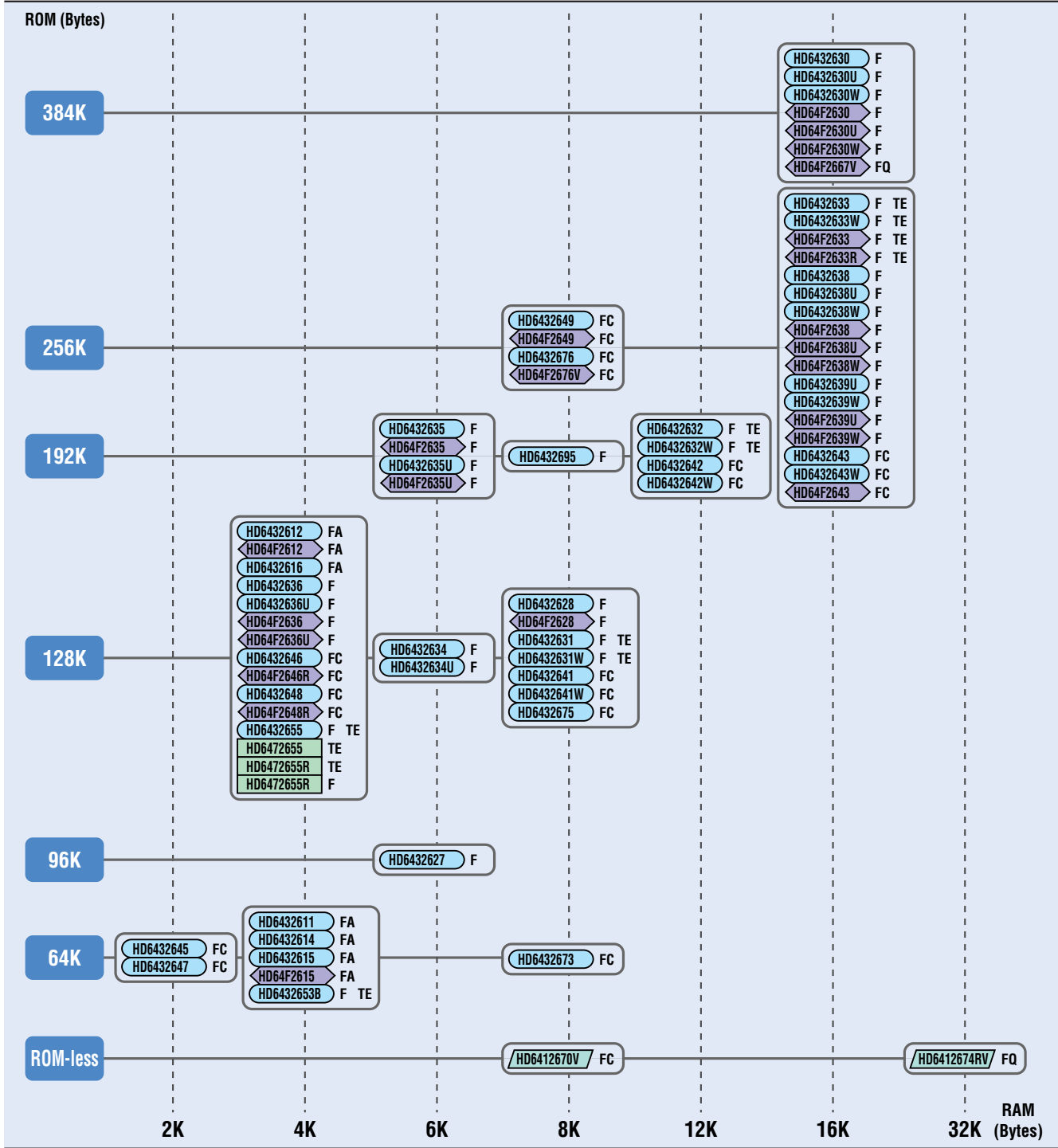
• Specifications (H8S/2600 Series)

Group		H8S/2635						H8S/2636				
Product No.		H8S/2634	H8S/2635	H8S/2635F	H8S/2634U	H8S/2635U	H8S/2635UF	H8S/2636	H8S/2636U	H8S/2636F	H8S/2636UF	
Type No.		HD6432634xxxF	HD6432635xxxF	HD64F2635F	HD6432634UxxxF	HD6432635UxxxF	HD64F2635UF	HD6432636xxxF	HD6432636UxxxF	HD64F2636F	HD64F2636UF	
Memory	ROM(Bytes)	128K	192K	128K	192K	128K						
	RAM(Bytes)	6K						4K				
	ROM Type*	M	F	M	F	M		F				
CPU	Program Security	Yes										
	CPU	H8S/2600 Core										
	Basic Instructions	69										
	Minimum Instruction Execution Time (ns)	50 (@20MHz)										
	Multiplier	16 × 16 → 32										
	Multiply-Accumulate Instruction	16 × 16 + 42 → 42										
DMA	DMAC (Channels)	—										
	EXDMAC (Channels)	—										
	DTC/DMAC II	—						DTC				
External Bus Expansion	Address Space (Bytes)	16M										
	Bus State Controller	Direct connection to SRAM and ROM is supported										
	Bus Structure	Separate bus (8/16-bit)										
	SDRAM Controller	—										
	DRAM Controller	—										
	Host Interface	—										
Clock	Clock Generation Circuit	1 circuit (Main clock)		2 circuits (Main clock, Sub-clock)								
	PLL	Yes (×1, ×2, ×4)										
	Subclock	—		Yes (128 divided frequency)		—		Yes		—		
	RTC	—		Yes(WDT for watch)		—		Yes (WDT for watch)		—		
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)		1/n (n = 1, 2, 4, 8, 16, 32, 128)		1/n (n = 1, 2, 4, 8, 16, 32)						
	Power Save	Normal operating mode, Medium-Speed mode, Sleep mode, Module stop mode, Software standby mode, Hardware standby mode		Normal operating mode, Medium-Speed mode, Sleep mode, Module stop mode, Watch mode, Sub active mode, Sub sleep mode, Software standby mode, Hardware standby mode		Normal operating mode, Medium-Speed mode, Sleep mode, Module stop mode, Software standby mode, Hardware standby mode		Normal operating mode, Medium-Speed mode, Sleep mode, Module stop mode, Watch mode, Sub active mode, Sub sleep mode, Software standby mode, Hardware standby mode		Normal operating mode, Medium-Speed mode, Sleep mode, Module stop mode, Watch mode, Sub active mode, Sub sleep mode, Software standby mode, Hardware standby mode		
	A/D Converter	Resolution × Channels	10-bit × 12									
D/A Converter	Sample and Hold	Yes										
Timer	Resolution × Channels	—						8-bit × 2				
	8-bit	—										
	16-bit	TPU × 6										
	32-bit	TPU × 2										
	Prescaler	—										
	Input Capture	6 (TPU)										
	Output Compare	6 (TPU)										
	PWM Output	8 (MMT, TPU)										
	Real-Time Port	—										
	Programmable Pulse Generator	Yes										
Watchdog Timer	Event Counter	—										
	2-Phase Encoder Input	8 (MMT, TPU)										
		Yes (×2)										
Serial Interface	Clock Sync./ Clock Async.	3										
I ² C-bus		—										
IEBus		—										
Smart Card/SIM		TPU										
SSU/Special Serial I/O		—										
CAN	Channels	—						2				
	Buffers	—						32				
USB Function		—										
LPC/ISA		—										
IrDA		—										
LCD		—										
CRC Calculation Circuit		—										
I/O Ports	Input Only (Numbers)	—						23				
	CMOS Output Only (Numbers)	—						2				
	CMOS I/O Only (Numbers)	—						72				
	High Voltage Port (Numbers)	—										
	N-Channel Open Drain Port (Numbers)	—						26				
	DTMF	—										
	High Current Drive Port	—										
	Pull-Up Resistor	—						36				
Interrupts(Sources)	NMOS Push-Pull	—										
	External	7										
	Boundary Scan/JTAG	—										
Debugging Function	On-Chip Debug	—										
	On-Board Flash Program	—	Yes	—	Yes	—		Yes (PC break)		Yes		
	ROM Correction Function	—						Yes (PC break)				
Other Functions	Others	—										
		10-bit PWM Timer (×2)										
Package		FP-128B										
Operating Frequency/Supply Voltage		20MHz/4.5 to 5.5V										
Operating Ambient Temperature (°C)		-40 to 85, -40 to 105										

Note : The package code described is the former one. Regarding the new one, please refer to the following URL <http://www.renesas.com/en/package>

* M: mask ROM version, F: F-ZTAT version

• Memory Capacity (ROM/RAM) (H8S/2600 Series)

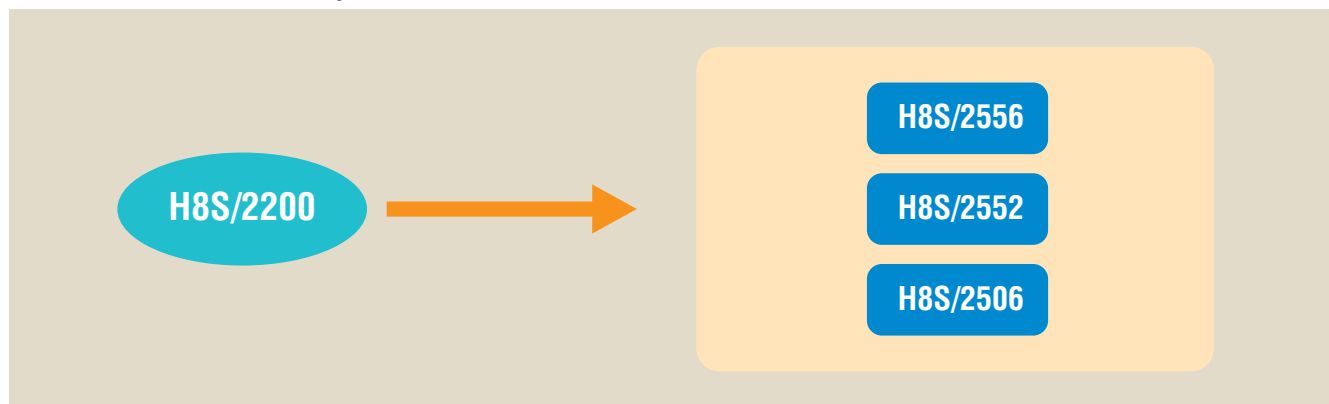


- Indicates the mask ROM version.
- Indicates the ZTAT version.
- Indicates the flash memory version.
- Indicates the ROM-less version.

Package	
F	QFP (PRQP0128KB-A(FP-128B), PRQP0100KB-A(FP-100M))
FA	QFP (PRQP0080JD-A(FP-80Q))
FC	QFP (PRQP0144KB-A(FP-144J), PRQP0144KA-A(FP-144G))
TE	TQFP (PTQP0120LA-A(TFP-120))
FQ	LQFP (PLQP0144KC-A(FP-144H))

* It is an old package code inside ()

• H8S/2500 Series Roadmap

**H8S/2556 Group**

- 512K bytes of on-chip flash memory
- On-chip CAN interface
- On-chip I²C-bus interface
- Power supply pin selectable from 3.0 to 5.5V

H8S/2552 Group

- 512K bytes of on-chip flash memory
- On-chip IEBus™ interface
- On-chip I²C-bus interface
- Power supply pin selectable from 3.0 to 5.5V

H8S/2506 Group

- 512K bytes of on-chip flash memory
- On-chip I²C-bus interface
- Power supply pin selectable from 3.0 to 5.5V

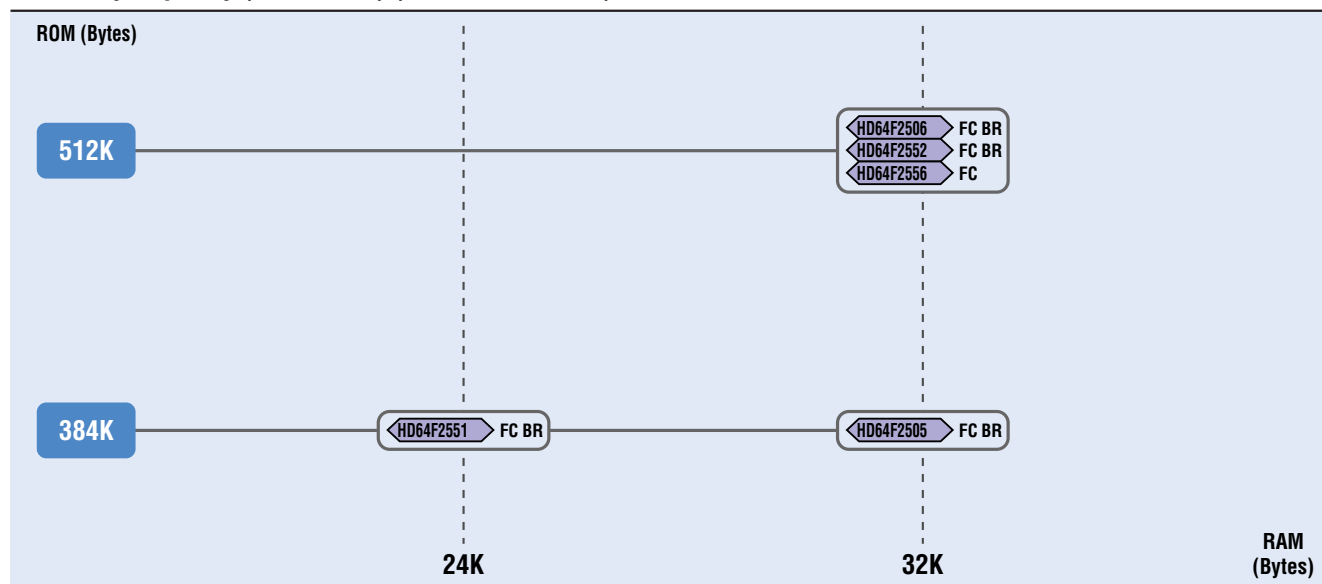
• Specifications (H8S/2500 Series)

Group		H8S/2506				H8S/2552				H8S/2556	
Product No.		H8S/2505F		H8S/2506F		H8S/2551F		H8S/2552F		H8S/2556F	
Type No.		HD64F2505FC	HD64F2505BR	HD64F2506FC	HD64F2506BR	HD64F2551FC	HD64F2551BR	HD64F2552FC	HD64F2552BR	HD64F2556FC	
Memory	ROM(Bytes)	384K		512K		384K				512K	
	RAM(Bytes)			32K		24K				32K	
	ROM Type*							F			
	Program Security							Yes			
CPU	CPU					H8S/2000 Core					
	Basic Instructions					65					
	Minimum Instruction Execution Time (ns)			38 (@26MHz)						50 (@20MHz)	
	Multiplier					—					
DMA	Multiply-Accumulate Instruction					—					
	DMAC (Channels)					—					
	EXDMAC (Channels)					—					
	DTC/DMAC II					DTC					
External Bus Expansion	Address Space (Bytes)					16M					
	Bus State Controller					Direct connection to SRAM and ROM is supported					
	Bus Structure					Separate bus (8/16-bit)					
	SDRAM Controller					—					
	DRAM Controller					—					
	Host Interface					—					
Clock	Clock Generation Circuit					2 circuits (Main clock, Sub-clock)					
	PLL					Yes (×1, ×2)					
	Subclock					Yes					
	RTC					Yes (WDT for watch)					
	Frequency Divider					1/n (n = 1, 2, 4, 8, 16, 32)					
	Power Save					Normal operating mode, Medium-Speed mode, Sleep mode, Module stop mode, Watch mode, Software standby mode, Hardware standby mode					
A/D Converter	Resolution × Channels					10-bit × 16					
D/A Converter	Sample and Hold					Yes					
	Resolution × Channels					8-bit × 2					
Timer	8-bit					TMR × 4					
	16-bit					TPU × 6					
	32-bit					TPU × 2					
	Prescaler					—					
	Input Capture					6 (TPU)					
	Output Compare					6 (TPU)					
	PWM Output					6 (TPU)					
	Real-Time Port					—					
	Programmable Pulse Generator					—					
	Event Counter					—					
Watchdog Timer						6 (TPU)					
Serial Interface	Clock Sync./ Clock Async.					Yes (×2)					
	IC-bus					5					
IEBus						2					
Smart Card/SIM						Yes				—	
SSU/Special Serial I/O						1					
CAN	Channels					—				1	
	Buffers					—				16	
USB Function						—					
LPC/ISA						—					
IrDA						—					
LCD						—					
CRC Calculation Circuit						—					
I/O Ports	Input Only (Numbers)			16						17	
	CMOS Output Only (Numbers)			—						1	
	CMOS I/O Only (Numbers)			104						102	
	High Voltage Port (Numbers)					—					
	N-Channel Open Drain Port (Numbers)					10					
	DTMF					—					
	High Current Drive Port					—					
	Pull-Up Resistor					40					
Interrupts(Sources)	NMOS Push-Pull					2					
	External					9					
Debugging Function	Boundary Scan/JTAG					—					
	On-Chip Debug					—					
On-Board Flash Program						Yes					
Other Functions						Yes (PC break)					
ROM Correction Function											
Package				FP-144J, BP-176V						FP-144J	
Operating Frequency/Supply Voltage				26MHz/3.0 to 5.5V						20MHz/3.0 to 5.5V	
Operating Ambient Temperature (°C)				-20 to 75, -40 to 85						-40 to 85	

Note : The package code described is the former one. Regarding the new one, please refer to the following URL <http://www.renesas.com/en/package>

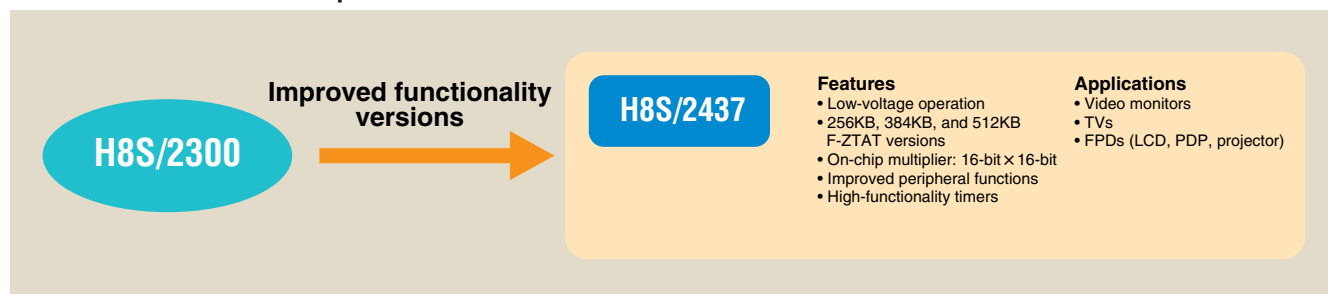
* F: F-ZTAT version

• Memory Capacity (ROM/RAM) (H8S/2500 Series)



* It is an old package code inside ()

• H8S/2400 Series Roadmap



H8S/2437 Group Features

- Incorporates H8S/2600 core (16-bit CPU)
- Low-voltage operation
- 512K bytes, 384K bytes, or 256K bytes of 3.3V single power supply on-chip flash memory
- On-chip data/address multiplex I/O interface
- On-chip debug functions
- On-chip I²C-bus : DDC2B/C-compliant (triple-slave address/multi-slave address compatible)
5V tolerant (plug-and-play-compliant)
- On-chip multiplier for high-speed multiplication and multiply and accumulate operations
- On-chip sync processors : Sync measurement, sync separation
Sync determination counter (for determining synchronization and polarity)

Applications Video monitors, TVs, FPDs (LCD, PDP, projector)

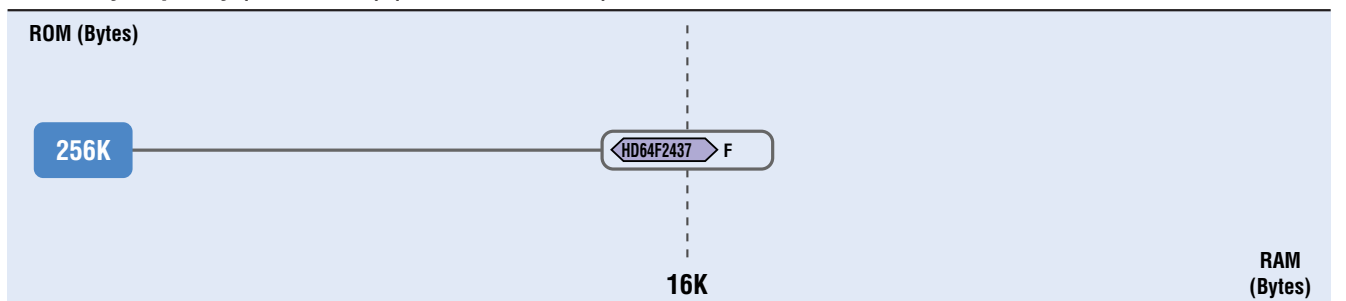
• Specifications (H8S/2400 Series)

Group		H8S/2437
Product No.		H8S/2437F
Type No.		HD64F2437F
Memory	ROM(Bytes)	256K
	RAM(Bytes)	16K
	ROM Type*	F
	Program Security	Yes
CPU	CPU	H8S/2600 Core
	Basic Instructions	69
	Minimum Instruction Execution Time (ns)	50 (@20MHz)
	Multiplier	16×16→32
	Multiply-Accumulate Instruction	16×16+42→42
DMA	DMAC (Channels)	—
	EXDMAC (Channels)	—
	DTC/DMAC II	—
External Bus Expansion	Address Space (Bytes)	16M
	Bus State Controller	Direct connection to SRAM and ROM is supported
	Bus Structure	Separate, Multiplex bus (8/16-bit)
	SDRAM Controller	—
	DRAM Controller	—
Clock	Host Interface	—
	Clock Generation Circuit	1 circuit (Main clock)
	PLL	—
	Subclock	—
	RTC	—
	Frequency Divider	1/n (n = 1, 2, 4)
A/D Converter	Resolution × Channels	10-bit × 16
	Sample and Hold	Yes
D/A Converter	Resolution × Channels	—
	—	—
Timer	8-bit	TMR × 4
	16-bit	FRT × 2, TPU × 3
	32-bit	TPU × 2
	Prescaler	—
	Input Capture	TPU × 3, FRT × 2, 8 bit timer (TMR)
	Output Compare	TPU × 3, FRT × 2, 8 bit timer × 4
	PWM Output	PWM × 8, PWMX × 2, TPU × 3
	Real-Time Port	—
	Programmable Pulse Generator	—
	Event Counter	—
	2-Phase Encoder Input	TPU × 3
Watchdog Timer		Yes (×3)
Serial Interface Clock Sync./ Clock Async.		5
I ² C-bus		Yes (×4)
IEBus		—
Smart Card/SIM		—
SSU/Special Serial I/O		—
CAN	Channels	—
	Buffers	—
USB Function		—
LPC/ISA		—
IrDA		—
LCD		—
CRC Calculation Circuit		—
I/O Ports	Input Only (Numbers)	17
	CMOS Output Only (Numbers)	—
	CMOS I/O Only (Numbers)	85
	High Voltage Port (Numbers)	—
	N-Channel Open Drain Port (Numbers)	8
	DTMF	—
	High Current Drive Port	—
	Pull-Up Resistor	32
	NMOS Push-Pull	8
Interrupts(Sources)	External	9
	Boundary Scan/JTAG	—
Debugging Function	On-Chip Debug	Yes (E10A)
	On-Board Flash Program	Yes
	ROM Correction Function	—
Other Functions		Mounted duty measurement circuit
Package		FP-128B
Operating Frequency/Supply Voltage		20MHz/3.0 to 3.6V
Operating Ambient Temperature (°C)		-20 to 75

Note : The package code described is the former one. Regarding the new one, please refer to the following URL <http://www.renesas.com/en/package>

* F: F-ZTAT version

• Memory Capacity (ROM/RAM) (H8S/2400 Series)

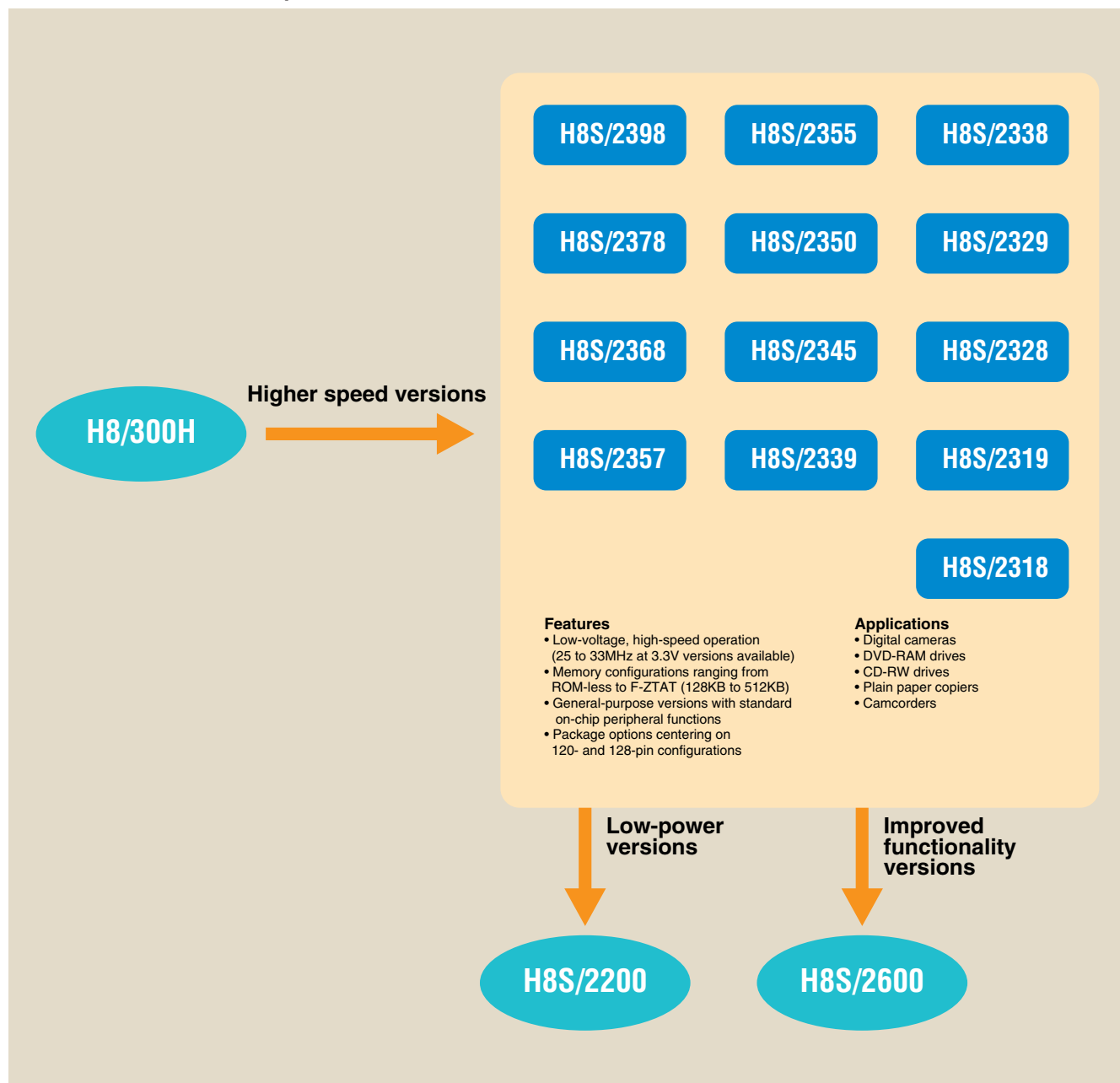


Indicates the flash memory version.

Package	
F	QFP (PRQP0128KB-A(FP-128B))

* It is an old package code inside ()

• H8S/2300 Series Roadmap



H8S/2319, H8S/2318 Group

- 512K bytes, 384K bytes, 256K bytes, or 128K bytes of 3.3V single power supply on-chip flash memory
- Versions are pin-compatible with the H8S/2345 groups (H8S/2319 has EMLE pin)
- Low-voltage, high-speed operation (25MHz, 3.3V)
- On-chip debug functions (H8S/2319EF)

H8S/2339, H8S/2338 Group

- 384K bytes or 256K bytes of 3.3V single power supply on-chip flash memory
- High-pin-count (144-pin) package
- Low-voltage, high-speed operation (25MHz, 3.3V)
- On-chip debug functions

H8S/2350 Group

- 5V ROM-less version
- H8S standard 120- and 128-pin versions
- High-speed operation (20MHz, 5V)

H8S/2378, H8S/2368 Group

- 384K bytes of 3.3V single power supply on-chip flash memory
- Low-voltage, high-speed operation (33MHz, 3.3V)
- Improved peripheral functions: 5-channel serial I/O (I²C-bus×2 channels), 16-channel A/D converter, etc.
- On-chip debug functions (H8S/2378F, H8S/2378RF, H8S/2377F, H8S/2377RF, H8S/2367F)
- On-chip SDRAM interface (H8S/2373R, H8S/2375R, H8S/2377R, H8S/2378R)

H8S/2329, H8S/2328 Group

- 512K bytes, 384K bytes, or 256K bytes of 3.3V single power supply on-chip flash memory
- Versions that are pin-compatible with the H8S/2357 groups (H8S/2329 has EMLE pin)
- Low-voltage, high-speed operation (25MHz, 3.3V)
- On-chip debug functions (H8S/2329EF)

H8S/2345 Group

- H8S/2355 group 100-pin version
- On-chip high-functionality timers, A/D converter, and D/A converter

H8S/2355, H8S/2357 Group

- 128K bytes of 5V single power supply on-chip flash memory (H8S/2357F)
- H8S standard 120- and 128-pin versions
- High-speed operation (20MHz, 5V)

H8S/2398 Group

- 256K bytes of 5V single power supply on-chip flash memory (H8S/2398F)
- 5V ROM-less versions (H8S/2390, H8S/2392, H8S/2394)
- High-speed operation (20MHz, 5V, internal operation at 3.3V)
- Versions that are pin-compatible with H8S/2398 and H8S/2357 groups (H8S/2398 group has VCL internal voltage pull-down pin)

• Specifications (H8S/2300 Series)

Group		H8S/2345																															
Product No.		H8S/2340				H8S/2341				H8S/2343				H8S/2344				H8S/2345				H8S/2345				H8S/2345F							
Type No.		HD6412340F	HD6412340FA	HD6412340TE	HD6412340TF	HD6432341xxxF	HD6432341xxxFA	HD6432341xxxTE	HD6432341xxxTF	HD6432343xxxF	HD6432343xxxFA	HD6432343xxxTE	HD6432343xxxTF	HD6432344xxxF	HD6432344xxxFA	HD6432344xxxTE	HD6432344xxxTF	HD6432345xxxF	HD6432345xxxFA	HD6432345xxxTE	HD6432345xxxTF	HD6472345F	HD6472345FA	HD6472345TE	HD6472345TF	HD64F2345F	HD64F2345FA	HD64F2345TE	HD64F2345TF				
Memory	ROM(Bytes)	—				32K				64K				96K				128K															
	RAM(Bytes)	—				2K				—				4K				—															
	ROM Type*	L				—				M				—				Z				F											
	Program Security	—				—				Yes				—																			
CPU	CPU	H8S/2000 Core																															
	Basic Instructions	65																															
	Minimum Instruction Execution Time (ns)	50 (@20MHz)																															
	Multiplier	—																															
DMA	Multiply-Accumulate Instruction	—																															
	DMAC (Channels)	—																															
	EXDMAC (Channels)	—																															
	DTC/DMAC II	DTC																															
External Bus Expansion	Address Space (Bytes)	16M																															
	Bus State Controller	Direct connection to SRAM and ROM is supported																															
	Bus Structure	Separate bus (8/16-bit)																															
	SDRAM Controller	—																															
	DRAM Controller	—																															
	Host Interface	—																															
Clock	Clock Generation Circuit	1 circuit (Main clock)																															
	PLL	—																															
	Subclock	—																															
	RTC	—																															
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)																															
	Power Save	Normal operating mode, Medium-Speed mode, Sleep mode, Module stop mode, Software standby mode, Hardware standby mode																															
A/D Converter	Resolution × Channels	10-bit × 8																															
D/A Converter	Sample and Hold	Yes																															
	Resolution × Channels	8-bit × 2																															
Timer	8-bit	TMR0, 1 × 2																															
	16-bit	TPU × 6																															
	32-bit	TPU × 2																															
	Prescaler	—																															
	Input Capture	6 (TPU)																															
	Output Compare	6 (TPU)																															
	PWM Output	6 (TPU)																															
	Real-Time Port	—																															
	Programmable Pulse Generator	—																															
	Event Counter	—																															
Watchdog Timer	2-Phase Encoder Input	6 (TPU)																															
	—	Yes																															
Serial Interface	Clock Sync./ Clock Async.	2																															
IC-bus	—	—																															
IEBus	—	—																															
Smart Card/SIM	—	1																															
SSU/Special Serial I/O	—	Multi processor communication function																															
CAN	Channels	—																															
	Buffers	—																															
USB Function	—	—																															
LPC/ISA	—	—																															
IrDA	—	—																															
LCD	—	—																															
CRC Calculation Circuit	—	—																															
I/O Ports	Input Only (Numbers)	8																															
	CMOS Output Only (Numbers)	—																															
	CMOS I/O Only (Numbers)	71																															
	High Voltage Port (Numbers)	71																															
	N-Channel Open Drain Port (Numbers)	10																															
	DTMF	—																															
	High Current Drive Port	LED drive port × 28																															
	Pull-Up Resistor	36																															
Interrupts(Sources)	NMOS Push-Pull	—																															
	External	9																															
Debugging Function	Boundary Scan/JTAG	—																															
	On-Chip Debug	—																															
Other Functions	On-Board Flash Program	—																				Yes											
	ROM Correction Function	—																															
Package	—	TFP-100B, TFP-100G, FP-100A, FP-100B																															
Operating Frequency/Supply Voltage	—	20MHz/4.4 to 5.5V, 10MHz/2.7 to 5.5V																															
Operating Ambient Temperature (°C)	—	-20 to 75, -40 to 85																															

Note : The package code described is the former one. Regarding the new one, please refer to the following URL <http://www.renesas.com/en/package>
 * L: ROM-less version, M: mask ROM version, Z: ZTAT version, F: F-ZTAT version

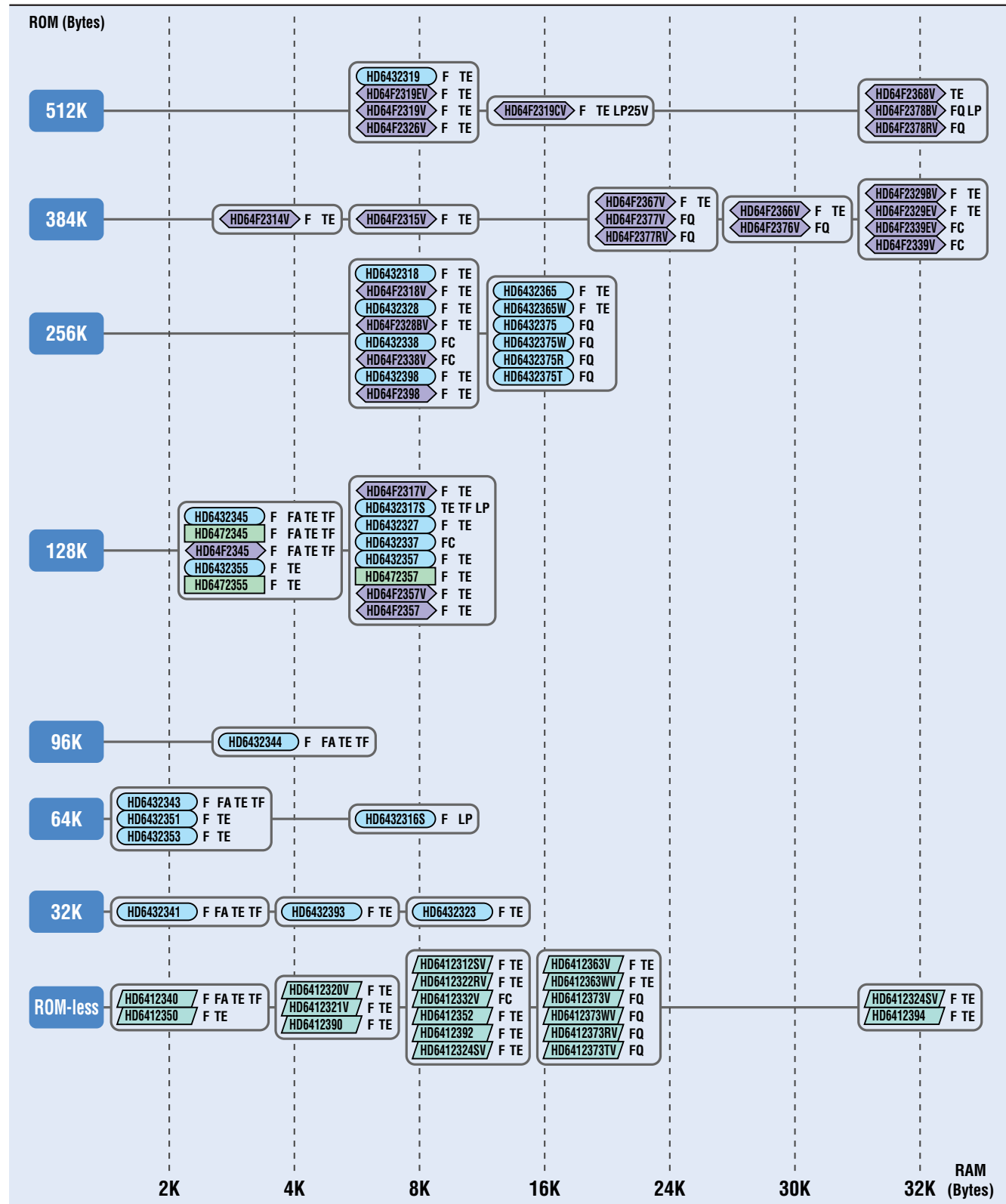
• Specifications (H8S/2300 Series)

Group		H8S/2398									
Product No.		H8S/2390		H8S/2392		H8S/2394		H8S/2398		H8S/2398F	
Type No.		HD6412390F	HD6412390TE	HD6412392F	HD6412392TE	HD6412394F	HD6412394TE	HD6432398xxxF	HD6432398xxTE	HD64F2398F	HD64F2398TE
Memory	ROM(Bytes)	—						256K			
	RAM(Bytes)	4K		8K		32K		8K			
	ROM Type*	L						M		F	
	Program Security	—						Yes			
CPU	CPU	H8S/2000 Core									
	Basic Instructions	65									
	Minimum Instruction Execution Time (ns)	50 (@20MHz)									
	Multiplier	—									
DMA	Multiply-Accumulate Instruction	—									
	DMAC (Channels)	4									
	EXDMAC (Channels)	—									
	DTC/DMAC II	DTC									
External Bus Expansion	Address Space (Bytes)	16M									
	Bus State Controller	Direct connection to SRAM, DRAM, ROM, burst ROM is supported									
	Bus Structure	Separate bus (8/16-bit)									
	SDRAM Controller	—									
	DRAM Controller	Yes									
Clock	Host Interface	—									
	Clock Generation Circuit	1 circuit (Main clock)									
	PLL	—									
	Subclock	—									
	RTC	—									
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)									
	Power Save	Medium-Speed mode, Sleep mode, Module stop mode, Software standby mode, Hardware standby mode									
A/D Converter	Resolution x Channels	10-bit x 8									
D/A Converter	Sample and Hold	Yes									
	Resolution x Channels	8-bit x 2									
Timer	8-bit	TMR x 2									
	16-bit	TPU x 6									
	32-bit	TPU x 2									
	Prescaler	—									
	Input Capture	6 (TPU)									
	Output Compare	6 (TPU)									
	PWM Output	TPU									
	Real-Time Port	—									
	Programmable Pulse Generator	PPG + TPU									
	Event Counter	TPU, TMR									
	2-Phase Encoder Input	TPU									
Watchdog Timer		Yes									
Serial Interface	Clock Sync./ Clock Async.	3									
IC-bus		—									
IEBus		—									
Smart Card/SIM		1									
SSU/Special Serial I/O		Multi processor communication function									
CAN	Channels	—									
	Buffers	—									
USB Function		—									
LPC/ISA		—									
IrDA		—									
LCD		—									
CRC Calculation Circuit		—									
I/O Ports	Input Only (Numbers)	8									
	CMOS Output Only (Numbers)	—									
	CMOS I/O Only (Numbers)	87									
	High Voltage Port (Numbers)	—									
	N-Channel Open Drain Port (Numbers)	6								14	
	DTMF	—									
	High Current Drive Port	—									
	Pull-Up Resistor	—								40	
Interrupts(Sources)	NMOS Push-Pull	—									
	External	9									
Debugging Function	Boundary Scan/JTAG	—									
	On-Chip Debug	—									
	On-Board Flash Program	—								Yes	
Other Functions	ROM Correction Function	—									
Package		TFP-120, FP-128B									
Operating Frequency/Supply Voltage		20MHz/4.5 to 5.5V									
Operating Ambient Temperature (°C)		-20 to 75, -40 to 85									

Note : The package code described is the former one. Regarding the new one, please refer to the following URL <http://www.renesas.com/en/package>

* L: ROM-less version, M: mask ROM version, F: F-ZTAT version

• Memory Capacity (ROM/RAM) (H8S/2300 Series)

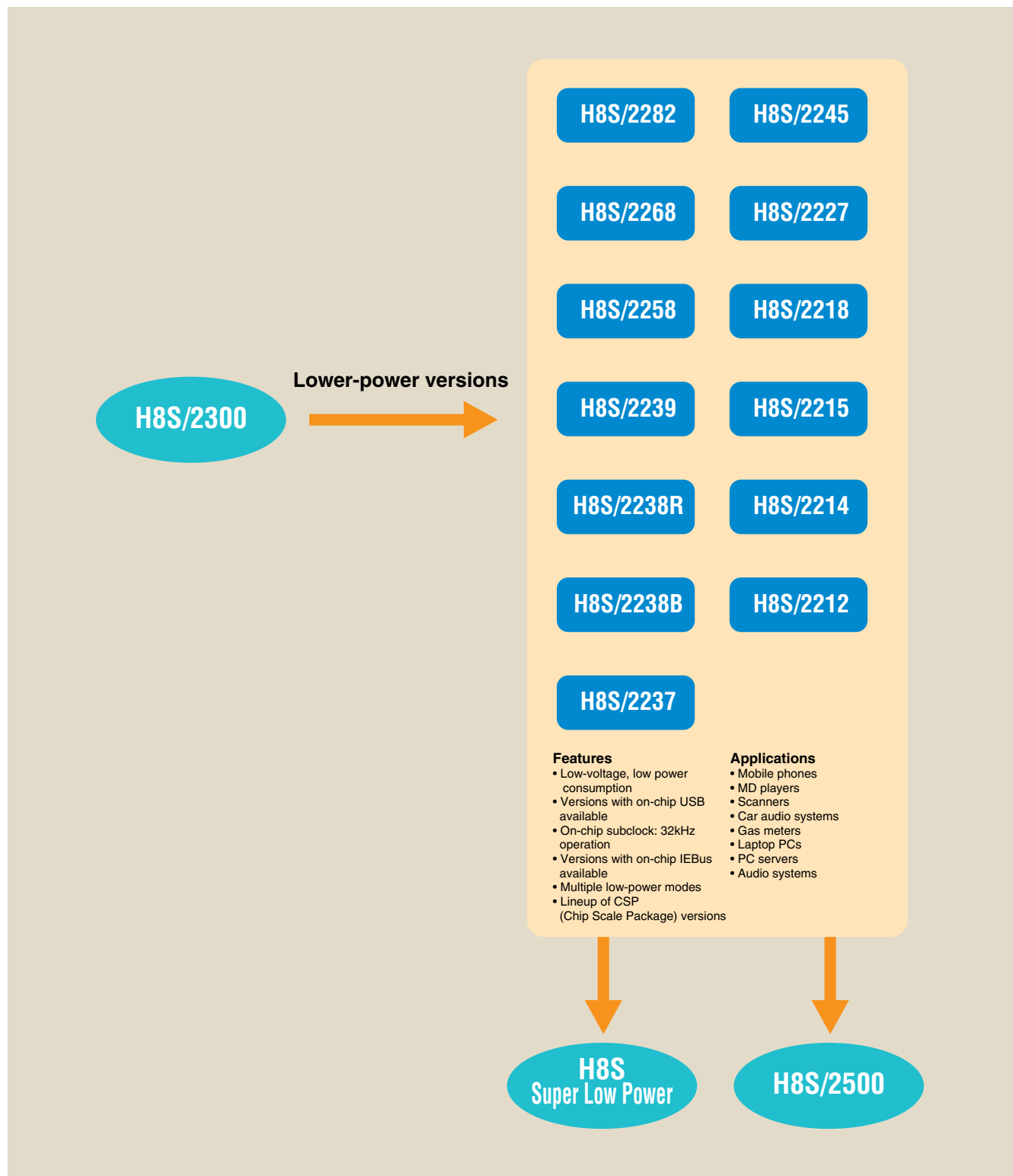


- Indicates the mask ROM version.
- Indicates the ZTAT version.
- Indicates the flash memory version.
- Indicates the ROM-less version.

Package	
F	QFP (PRQP0100KA-A(FP-100B), PRQP0128KB-A(FP-128B))
FC	QFP (PRQP0144KA-A(FP-144G))
FA	QFP (PRQP0100JE-B(FP-100A))
TE	TQFP (PTQP0100KA-A(TFP-100B), PTQP0120LA-A(TFP-120))
FQ	LQFP (FP-144H)
LP25V	TLP (TLP-113V)
LP	(LGA-145)

* It is an old package code inside ()

• H8S/2200 Series Roadmap



H8S/2212, H8S/2214, H8S/2215, H8S/2218 Group

- On-chip SCI, DMAC, and DTC for high-speed data transfer
- On-chip USB interface (H8S/2215, H8S/2212, H8S/2218)
- Compact package
- Flash memory programming via USB supported (H8S/2215, H8S/2212, H8S/2218)

H8S/2239, H8S/2238B, H8S/2238R Group

- 2.2V low-voltage operation (H8S/2238R–H8S/2239)
- On-chip I²C-bus interface
- On-chip 384K bytes flash memory (H8S/2239)

H8S/2245 Group

- A single-chip MCU with 128K bytes of on-chip ROM and 8K bytes of on-chip RAM
- 32kHz external clock operation

H8S/2227, H8S/2237 Group

- A single-chip MCU with 128K bytes of on-chip ROM and 16K bytes of on-chip RAM
- 32kHz external clock operation

H8S/2258 Group

- On-chip IEBus™ and I²C-bus interfaces
- On-chip 256K bytes flash memory

H8S/2282 Group

- On-chip CAN interface
- On-chip subclock divider

• Specifications (H8S/2200 Series)

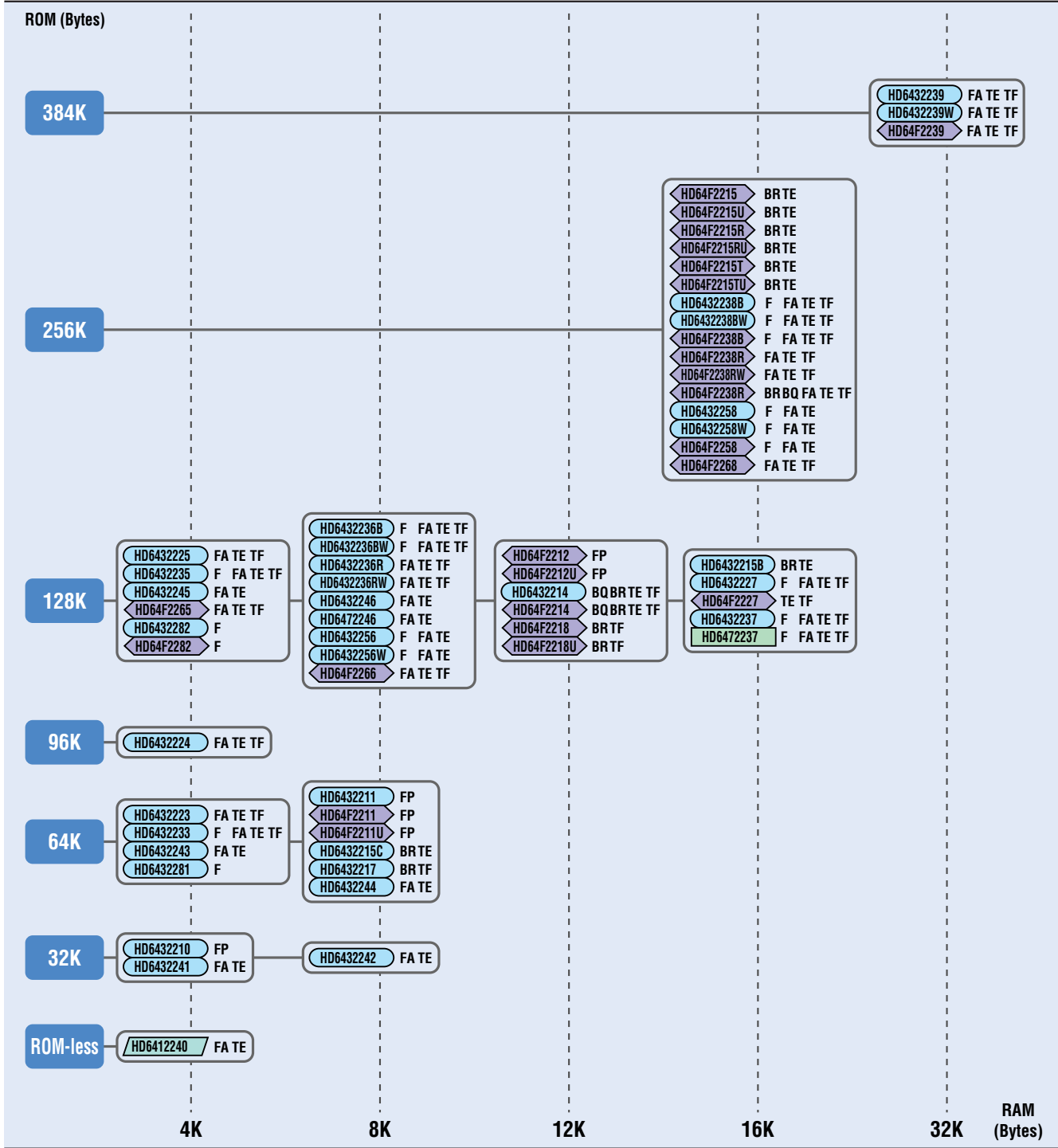
Group		H8S/2212						H8S/2214							
Product No.		H8S/2210	H8S/2211	H8S/2211F	H8S/2211UF	H8S/2212F	H8S/2212UF	H8S/2214				H8S/2214F			
Type No.		HD6432210xxxFP	HD6432211xxxFP	HD64F2211FP	HD64F2211UFP	HD64F2212FP	HD64F2212UFP	HD6432214xxxBQ	HD6432214xxxBR	HD6432214xxxTE	HD6432214xxxTF	HD64F2214BQ	HD64F2214BR	HD64F2214TE	HD64F2214TF
Memory	ROM(Bytes)	32K	64K				128K								
	RAM(Bytes)	4K	8K				12K								
	ROM Type*	M		F		M				F					
	Program Security	Yes													
CPU	CPU	H8S/2000 Core													
	Basic Instructions	65													
	Minimum Instruction Execution Time (ns)	42 (@24MHz)						63 (@24MHz)							
	Multiplier	—													
DMA	Multiply-Accumulate Instruction	—													
	DMAC (Channels)	6													
	EXDMAC (Channels)	—													
	DTC/DMAC II	—						DTC							
External Bus Expansion	Address Space (Bytes)	16M						Direct connection to SRAM and ROM is supported							
	Bus State Controller	—						Separate bus (8/16-bit)							
	Bus Structure	—						—							
	SDRAM Controller	—						—							
	DRAM Controller	—						—							
	Host Interface	—						—							
Clock	Clock Generation Circuit	3 circuits (Main clock, Sub-clock, USB-clock)						1 circuit (Main clock)							
	PLL	Yes (USB: ×2, ×3)						—							
	Subclock	Yes						—							
	RTC	RTC						—							
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)													
	Power Save	Normal operating mode, Medium-Speed mode, Sleep mode, Module stop mode, Watch mode, Sub active mode, Sub sleep mode, Software standby mode, Hardware standby mode						Normal operating mode, Medium-Speed mode, Sleep mode, Module stop mode, Software standby mode, Hardware standby mode							
A/D Converter	Resolution × Channels	10-bit × 6						—							
D/A Converter	Sample and Hold	Yes						—							
	Resolution × Channels	—						8-bit × 1							
Timer	8-bit	—													
	16-bit	TPU × 3													
	32-bit	TPU × 2													
	Prescaler	—													
	Input Capture	3 (TPU)													
	Output Compare	3 (TPU)													
	PWM Output	3 (TPU)													
	Real-Time Port	Yes (RTC)						—							
	Programmable Pulse Generator	—													
	Event Counter	—													
	2-Phase Encoder Input	3 (TPU)													
Watchdog Timer		Yes													
Serial Interface	Clock Sync./ Clock Async.	2						3							
I ² C-bus		—													
IEBus		—													
Smart Card/SIM		1						—							
SSU/Special Serial I/O		—													
CAN	Channels	—													
	Buffers	—													
USB Function		Yes						—							
LPC/ISA		—													
IrDA		—													
LCD		—													
CRC Calculation Circuit		—													
I/O Ports	Input Only (Numbers)	21						18							
	CMOS Output Only (Numbers)	3						—							
	CMOS I/O Only (Numbers)	37						72							
	High Voltage Port (Numbers)	—													
	N-Channel Open Drain Port (Numbers)	4						11							
	DTMF	—													
	High Current Drive Port	—													
Pull-Up Resistor	11						36								
Interrupts(Sources)	NMOS Push-Pull	—													
	External	7						9							
Debugging Function	Boundary Scan/JTAG	—													
	On-Chip Debug	Yes (E10A)						—							
Other Functions	On-Board Flash Program	—	Yes				—				Yes				
	ROM Correction Function	—													
	Others	SCI0 for high-speed UART													
Package		FP-64E						TFP-100B, TFP-100G, BP-112, TBP-112A							
Operating Frequency/Supply Voltage		When using USB: 24MHz/3.0 to 3.6V When not using USB: 24MHz/3.0 to 3.6V 16MHz/2.7 to 3.6V 6MHz/2.4 to 3.6V	When using USB:24MHz/3.0 to 3.6V When not using USB:24MHz/3.0 to 3.6V 16MHz/2.7 to 3.6V				16MHz/2.7 to 3.6V								
Operating Ambient Temperature (°C)		-20 to 75, -40 to 85													

Note : The package code described is the former one. Regarding the new one, please refer to the following URL <http://www.renesas.com/en/package>

* M: mask ROM version, F: F-ZTAT version

* L: ROM-less version; M: mask ROM version; Z: ZTAT version; F: F-ZTAT version

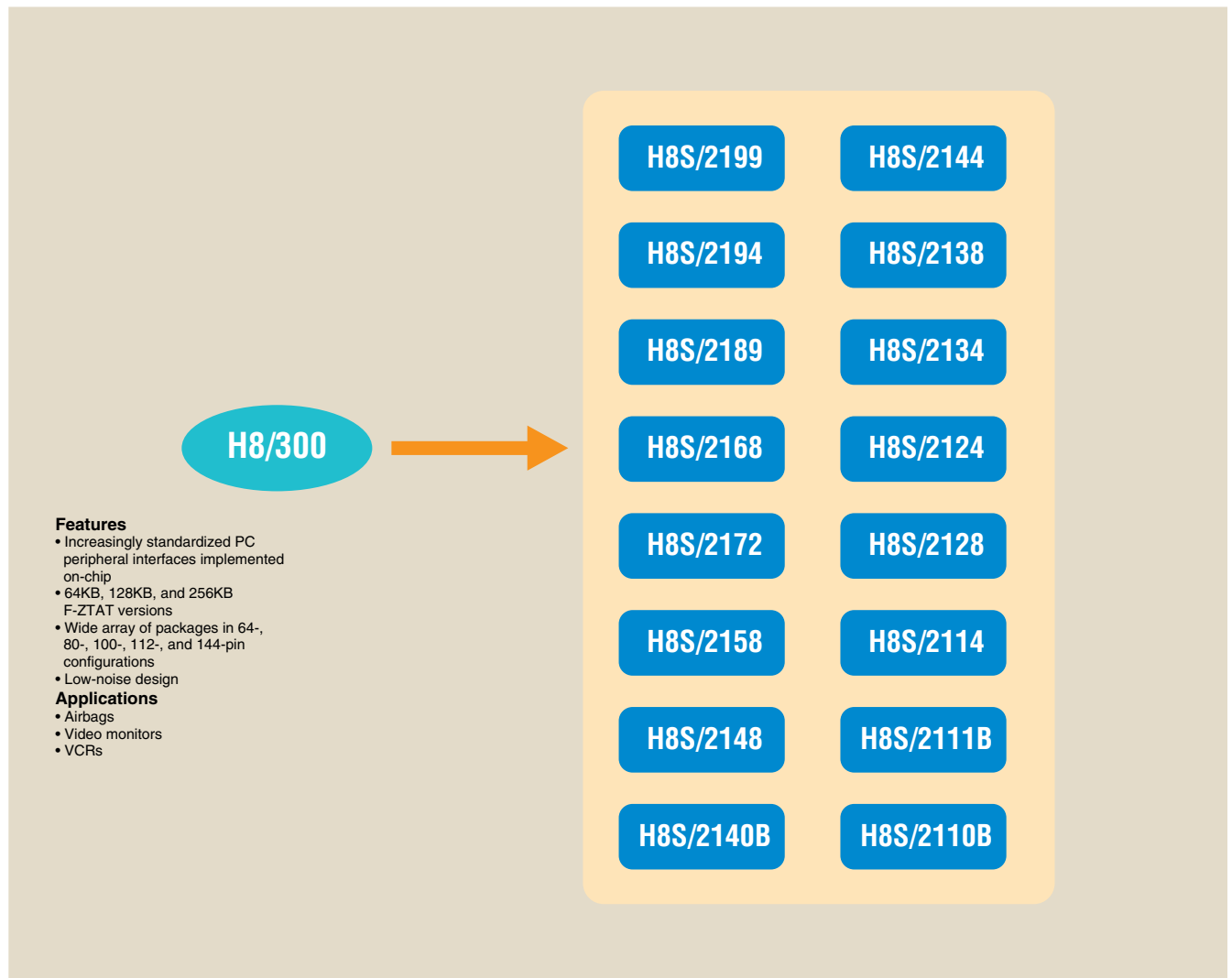
• Memory Capacity (ROM/RAM) (H8S/2200 Series)



Package	
F	QFP (PRQP0100JE-B(FP-100A))
FA	QFP (PRQP0100KA-A(FP-100B))
FP	LQFP (PLQP0064KC-A(FP-64E))
TE	TQFP (PTQP0100KA-A(TFP-100B), PTQP0100LC-A(TFP-100G), PTQP0120LA-A(TFP-120))
TF	TQFP (PTQP0100LC-A(TFP-100G))
BQ	TFBGA (TTBG0112GA-A(TBP-112A))
BR	LFBGA (PLBG0112GA-A(BP-112))

* It is an old package code inside ()

• H8S/2100 Series Roadmap



H8S/2110B Group

- Single power supply on-chip flash memory
- On-chip LPC interface
- Provides optimized versions of the peripheral functions of the H8S/2140B group

H8S/2114 Group

- On-chip 1M byte Flash memory
- On-chip LPC interface
- On-chip emulator (E10A) support

H8S/2134, H8S/2138 Group

- Lineup includes versions with single power supply on-chip flash memory
- Upward compatible with the H8/3337Y group
- Enhances the functions of the H8/300 series and supports a subclock operating mode

H8S/2144 Group

- Lineup includes versions with single power supply on-chip flash memory
- Upward compatible with the H8S/3437 group
- Enhances the functions of the H8/300 series and supports a subclock operating mode

H8S/2158 Group

- On-chip MultiMediaCard™ interface
- On-chip USB function
- On-chip encryption processor
- 256K bytes of on-chip flash memory
- On-chip emulator (E10A) support

H8S/2172 Group

- On-chip USB 2.0 function (high-speed capability)
- Low-voltage, high-speed operation (3V, 33 MHz)
- 256K bytes of on-chip ROM and 32K bytes of RAM
- On-chip emulator (E10A) support
- On-chip Memory Stick PRO interface
- Copyright protection function

H8S/2199 Group

- Support for high-performance hardware for VCR control
- Support for 8-color OSD color display
- On-chip data slicer function
- Lineup includes versions with single power supply on-chip flash memory

H8S/2111B Group

- Single power supply on-chip flash memory
- On-chip LPC interface
- Provides optimized versions of the functions of H8S/2160B

H8S/2124, H8S/2128 Group

- Lineup includes versions with single power supply on-chip flash memory
- Upward compatible with the H8/3297 group
- Enhances the functions of the H8/300 series and supports a subclock operating mode

H8S/2140B Group

- Lineup includes versions with single power supply on-chip flash memory
- H8S/2148 group implements extended functions
- 256K bytes of on-chip flash memory H8S/2145BF

H8S/2148 Group

- Lineup includes versions with single power supply on-chip flash memory
- Upward compatible with the H8S/3437 group
- Enhances the functions of the H8/300 series and supports a subclock operating mode

H8S/2168 Group

- On-chip LPC interface
- On-chip I²C-bus
- Low-voltage, high-speed operation (3V, 33MHz)
- On-chip large-capacity RAM (40KB)

H8S/2194 Group

- Support for high-performance hardware for VCR control
- Lineup includes versions with single power supply on-chip flash memory

• Specifications (H8S/2100 Series)

Group		H8S/2110B		H8S/2111B		H8S/2114	H8S/2124					
Product No.		H8S/2110BF		H8S/2111B-BF	H8S/2111B-CF	H8S/2114F	H8S/2120			H8S/2122		
Type No.		HD64F2110BFA	HD64F2110BVE	HD64F2111BVBTE	HD64F2111BVBCTE	RMF2114VTE	HD6432120xxxFA	HD6432120xxxPS	HD6432120xxxTF	HD6432122xxxFA	HD6432122xxxPS	HD6432122xxxTF
Memory	ROM(Bytes)	64K				1M	32K			64K		
	RAM(Bytes)	2K		3K		8K	2K					
	ROM Type*	F					M					
	Program Security											
CPU	CPU	H8S/2000 Core										
	Basic Instructions	65										
	Minimum Instruction Execution Time (ns)	100 (@10MHz)				100 (@10MHz), 50 (@20MHz)						
	Multiplier	—										
DMA	Multiply-Accumulate Instruction	—										
	DMAC (Channels)	—										
	EXDMAC (Channels)	—										
	DTC/DMAC II	—				DTC (85 channels)		—				
External Bus Expansion	Address Space (Bytes)	16M										
	Bus State Controller	—				Direct connection to SRAM and ROM is supported						
	Bus Structure	—				Separate bus (8-bit)						
	SDRAM Controller	—										
	DRAM Controller	—										
Clock	Host Interface	LPC				—						
	Clock Generation Circuit	1 circuit (System clock)										
	PLL	—										
	Subclock	—										
	RTC	—										
A/D Converter	Resolution × Channels	—		10-bit × 8				10-bit × 8 (expanded A/D input), 10-bit × 8				
	Sample and Hold	—						Yes				
	Resolution × Channels	—										
	8-bit	4 (TMR0, 1, X, Y)		6 (TMR0, 1, X, Y, A, B)		4 (TMR0, 1, X, Y)		3 (TMR0, 1, Y)				
	16-bit	1 (FRT)				4 (FRT, TPU)		1 (FRT)				
Timer	32-bit	—										
	Prescaler	Yes										
	Input Capture	4 (shared with 16-bit timer)		5 (shared with 16-bit timer)		8 (shared with 16-bit timer)		3 (FRT)				
	Output Compare	6 (shared with 16-bit timer)		8 (shared with 16-bit timer)		14 (shared with 6-bit timer)		4 (shared with 16-bit timer)				
	PWM Output	2 (PWMX)		2 (PWMX), 8-bit × 8		—						
	Real-Time Port	—										
	Programmable Pulse Generator	—										
	Event Counter	—										
	2-Phase Encoder Input	—				Yes		—				
	Watchdog Timer	Yes (×2)										
Serial Interface	Clock Sync./ Clock Async.	1				2						
FC-bus		2				—						
IEBus		—										
Smart Card/SIM		—				1		—				
SSU/Special Serial I/O		—										
CAN	Channels	—										
	Buffers	—										
USB Function		—										
LPC/ISA		Yes				—						
IrDA		—				Yes		—				
LCD		—										
CRC Calculation Circuit		—										
I/O Ports	Input Only (Numbers)	9				8		9				
	CMOS Output Only (Numbers)	—										
	CMOS I/O Only (Numbers)	69		101		85		43				
	High Voltage Port (Numbers)	—										
	N-Channel Open Drain Port (Numbers)	—										
	DTMF	—										
	High Current Drive Port	10		14		24						
	Pull-Up Resistor	48		80		78		24				
Interrupts(Sources)	NMOS Push-Pull	4		12		20		—				
	External	9				17		4				
	Boundary Scan/JTAG	—				Yes		—				
Debugging Function	On-Chip Debug	—				Yes		—				
	On-Board Flash Program	Yes										
Other Functions	ROM Correction Function	—										
Package		FP-100B, TFP-100B		TFP-144		DP-64S, FP-64A, TFP-80C						
Operating Frequency/Supply Voltage		10MHz/3.0 to 3.6V				20MHz/3.0 to 3.6V		20MHz/4.5 to 5.5V, 16MHz/4.0 to 5.5V, 10MHz/2.7 to 5.5V				
Operating Ambient Temperature (°C)		-20 to 75				-20 to 75, -40 to 85, -40 to 110, -40 to 125						

Note : The package code described is the former one. Regarding the new one, please refer to the following URL <http://www.renesas.com/en/package>

* F: F-ZTAT version, M: mask ROM version

• Specifications (H8S/2100 Series)

Group		H8S/2128																										
Product No.		H8S/2126R						H8S/2127R						H8S/2128F		H8S/2127S				H8S/2128S								
Type No.		HD6432126RWxxxFA	HD6432126RWxxxPS	HD6432126RWxxxTF	HD6432126RxxxFA	HD6432126RxxxPS	HD6432126RxxxTF	HD6432127RWxxxFA	HD6432127RWxxxPS	HD6432127RWxxxTF	HD6432127RxxxFA	HD6432127RxxxPS	HD6432127RxxxTF	HD64F2128FA	HD64F2128PS	HD64F2128TF	HD6432127SWxxxFA	HD6432127SWxxxPS	HD6432127SWxxxTF	HD6432127SxxxFA	HD6432127SxxxPS	HD6432127SxxxTF	HD6432128SWxxxFA	HD6432128SWxxxPS	HD6432128SWxxxTF	HD6432128SxxxFA	HD6432128SxxxPS	HD6432128SxxxTF
Memory	ROM(Bytes)	32K						64K						128K		64K				128K								
	RAM(Bytes)	2K						4K						2K				4K										
	ROM Type*	M						F						M				4K										
	Program Security	—						Yes						—				—										
CPU	CPU	H8S/2000 Core																										
	Basic Instructions	65																										
	Minimum Instruction Execution Time (ns)	100 (@10MHz), 50 (@20MHz)														50 (@20MHz)												
	Multiplier	—																										
DMA	Multiply-Accumulate Instruction	—																										
	DMAC (Channels)	—																										
	EXDMAC (Channels)	—																										
	DTC/DMAC II	DTC (85 channels)																										
External Bus Expansion	Address Space (Bytes)	16M																										
	Bus State Controller	Direct connection to SRAM and ROM is supported																										
	Bus Structure	Separate bus (8-bit)																										
	SDRAM Controller	—																										
Clock	DRAM Controller	—																										
	Host Interface	—																										
	Clock Generation Circuit	1 circuit (System clock)																										
	PLL	—																										
A/D Converter	Subclock	—																										
	RTC	—																										
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)																										
	Power Save	Medium-Speed mode, Sub active mode, Sleep mode, Sub sleep mode, Watch mode, Software standby mode, Hardware standby mode, Module stop mode																										
A/D Converter	Resolution × Channels	10-bit × 8, 10-bit × 8 (expanded A/D input)																										
D/A Converter	Sample and Hold	Yes																										
Timer	Resolution × Channels	—																										
	8-bit	4 (TMR0, 1, X, Y)																										
	16-bit	1 (FRT)																										
	32-bit	—																										
	Prescaler	Yes																										
	Input Capture	4 (shared with 16-bit timer)																										
	Output Compare	5 (shared with 16-bit timer)																										
	PWM Output	PWMX × 2, PWM × 16																										
	Real-Time Port	—																										
	Programmable Pulse Generator	—																										
Event Counter	—																											
2-Phase Encoder Input	—																											
Watchdog Timer		Yes (× 2)																										
Serial Interface	Clock Sync./ Clock Async.	2																										
I ² C-bus		2																										
IEBus		—																										
Smart Card/SIM		—																										
SSU/Special Serial I/O		—																										
CAN	Channels	—																										
	Buffers	—																										
USB Function		—																										
LPC/ISA		—																										
IrDA		—																										
LCD		—																										
CRC Calculation Circuit		—																										
I/O Ports	Input Only (Numbers)	9																										
	CMOS Output Only (Numbers)	—																										
	CMOS I/O Only (Numbers)	41																										
	High Voltage Port (Numbers)	—																										
	N-Channel Open Drain Port (Numbers)	2																										
	DTMF	—																										
	High Current Drive Port	4																										
	Pull-Up Resistor	24																										
	NMOS Push-Pull	2																										
Interrupts(Sources)	External	4																										
Debugging Function	Boundary Scan/JTAG	—																										
	On-Chip Debug	—																										
	On-Board Flash Program	—						Yes		—																		
Other Functions	ROM Correction Function	—																										
Package		DP-64S, FP-64A, TFP-80C																										
Operating Frequency/Supply Voltage		20MHz/4.5 to 5.5V 16MHz/4.0 to 5.5V 10MHz/2.7 to 5.5V												20MHz/4.5 to 5.5V 16MHz/4.0 to 5.5V 10MHz/3.0 to 3.6V		20MHz/4.5 to 5.5V 16MHz/4.0 to 5.5V												
Operating Ambient Temperature (°C)		-20 to 75, -40 to 85, -40 to 110																										

• Specifications (H8S/2100 Series)

Group		H8S/2134												H8S/2138													
Product No.		H8S/2130		H8S/2132		H8S/2132RF		H8S/2133S		H8S/2134AF		H8S/2134F		H8S/2134S		H8S/2137S				H8S/2138S				H8S/2138AF		H8S/2138F	
Type No.		HD6432130xxxFA HD6432130xxxTF		HD6432132xxxFA HD6432132xxxTF		HD64F2132RFA HD64F2132RTF		HD6432133SxxxFA HD6432133SxxxTF		HD64F2134ATF		HD64F2134AFA HD64F2134FA HD64F2134TF		HD6432134SxxxFA HD6432134SxxxTF		HD6432137SWxxxFA HD6432137SWxxxTF HD6432137SxxxFA HD6432137SxxxTF				HD6432138SWxxxFA HD6432138SWxxxTF HD6432138SxxxFA HD6432138SxxxTF				HD64F2138AFA HD64F2138ATF		HD64F2138FA HD64F2138TF	
Memory	ROM(Bytes)	32K		64K				96K		128K						64K				128K							
	RAM(Bytes)	2K						4K						2K				4K									
	ROM Type*	M		F		M		F				M				F											
	Program Security	—		Yes		—		Yes				—				Yes											
CPU	CPU	H8S/2000 Core																									
	Basic Instructions	65																									
	Minimum Instruction Execution Time (ns)	100 (@10MHz), 50 (@20MHz)																									
DMA	Multiplier	—																									
	Multiply-Accumulate Instruction	—																									
	DMAC (Channels)	—																									
	EXDMAC (Channels)	—																									
External Bus Expansion	DTC/DMAC II	—												DTC (85 channels)													
	Address Space (Bytes)	16M												—													
	Bus State Controller	Direct connection to SRAM and ROM is supported																									
	Bus Structure	Separate bus (8-bit)																									
	SDRAM Controller	—																									
	DRAM Controller	—																									
Clock	Host Interface	—												ISA													
	Clock Generating Circuit	1 circuit (System clock)																									
	PLL	—																									
	Subclock	—																									
	RTC	—																									
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)																									
	Power Save	Medium-Speed mode, Sub active mode, Sleep mode, Sub sleep mode, Watch mode, Software standby mode, Hardware standby mode, Module stop mode																									
A/D Converter	Resolution × Channels	10-bit × 8, 10-bit × 8 (expanded A/D input)																									
D/A Converter	Sample and Hold	Yes																									
	Resolution × Channels	8-bit × 2												—													
Timer	8-bit	3 (TMR0, 1, Y)												4 (TMR0, 1, X, Y)													
	16-bit	—												1 (FRT)													
	32-bit	—												—													
	Prescaler	—												Yes													
	Input Capture	3 (FRT)												4 (shared with 16-bit timer)													
	Output Compare	4 (shared with 16-bit timer)												5 (shared with 16-bit timer)													
	PWM Output	PWMX × 2												PWMX × 2, PWM × 16													
	Real-Time Port	—												—													
	Programmable Pulse Generator	—												—													
	Event Counter	—												—													
Watchdog Timer	2-Phase Encoder Input	—												—													
	Yes (× 2)	—												—													
Serial Interface	Clock Sync./ Clock Async.	3												—													
FC-bus		—												2													
IEBus		—												—													
Smart Card/SIM		—												—													
SSU/Special Serial I/O		—												—													
CAN	Channels	—												—													
	Buffers	—												—													
USB Function		—												—													
LPC/ISA		—												Yes													
IrDA		—												Yes													
LCD		—												—													
CRC Calculation Circuit		—												—													
I/O Ports	Input Only (Numbers)	9												—													
	CMOS Output Only (Numbers)	—												—													
	CMOS I/O Only (Numbers)	57												55													
	High Voltage Port (Numbers)	—												—													
	N-Channel Open Drain Port (Numbers)	—												2													
	DTMF	—												—													
	High Current Drive Port	24												4													
Interrupts(Sources)	Pull-Up Resistor	24												—													
	NMOS Push-Pull	—												2													
	External	9												—													
Debugging Function	Boundary Scan/JTAG	—												—													
	On-Chip Debug	—												—													
Other Functions	On-Board Flash Program	—		Yes		—		Yes				—				—				Yes							
	ROM Correction Function	—																									
Package		FP-80A, TFP-80C																									
Operating Frequency/Supply Voltage		20MHz/4.5 to 5.5V 16MHz/4.0 to 5.5V 10MHz/2.7 to 5.5V		20MHz/ 4.5 to 5.5V 16MHz/ 4.0 to 5.5V 10MHz/ 3.0 to 5.5V		20MHz/4.5 to 5.5V 16MHz/4.0 to 5.5V 10MHz/2.7 to 3.6V		20MHz/ 4.5 to 5.5V 16MHz/ 4.0 to 5.5V 10MHz/ 3.0 to 5.5V		20MHz/4.5 to 5.5V 16MHz/4.0 to 5.5V 10MHz/2.7 to 3.6V				20MHz/4.5 to 5.5V 16MHz/4.0 to 5.5V 10MHz/2.7 to 3.6V				20MHz/ 4.5 to 5.5V 16MHz/ 4.0 to 5.5V 10MHz/ 3.0 to 5.5V									
	Operating Ambient Temperature (°C)	-20 to 75, -40 to 85, -40 to 110																									

Note : The package code described is the former one. Regarding the new one, please refer to the following URL <http://www.renesas.com/en/package>
 * M: mask ROM version, F: F-ZTAT version

• Specifications (H8S/2100 Series)

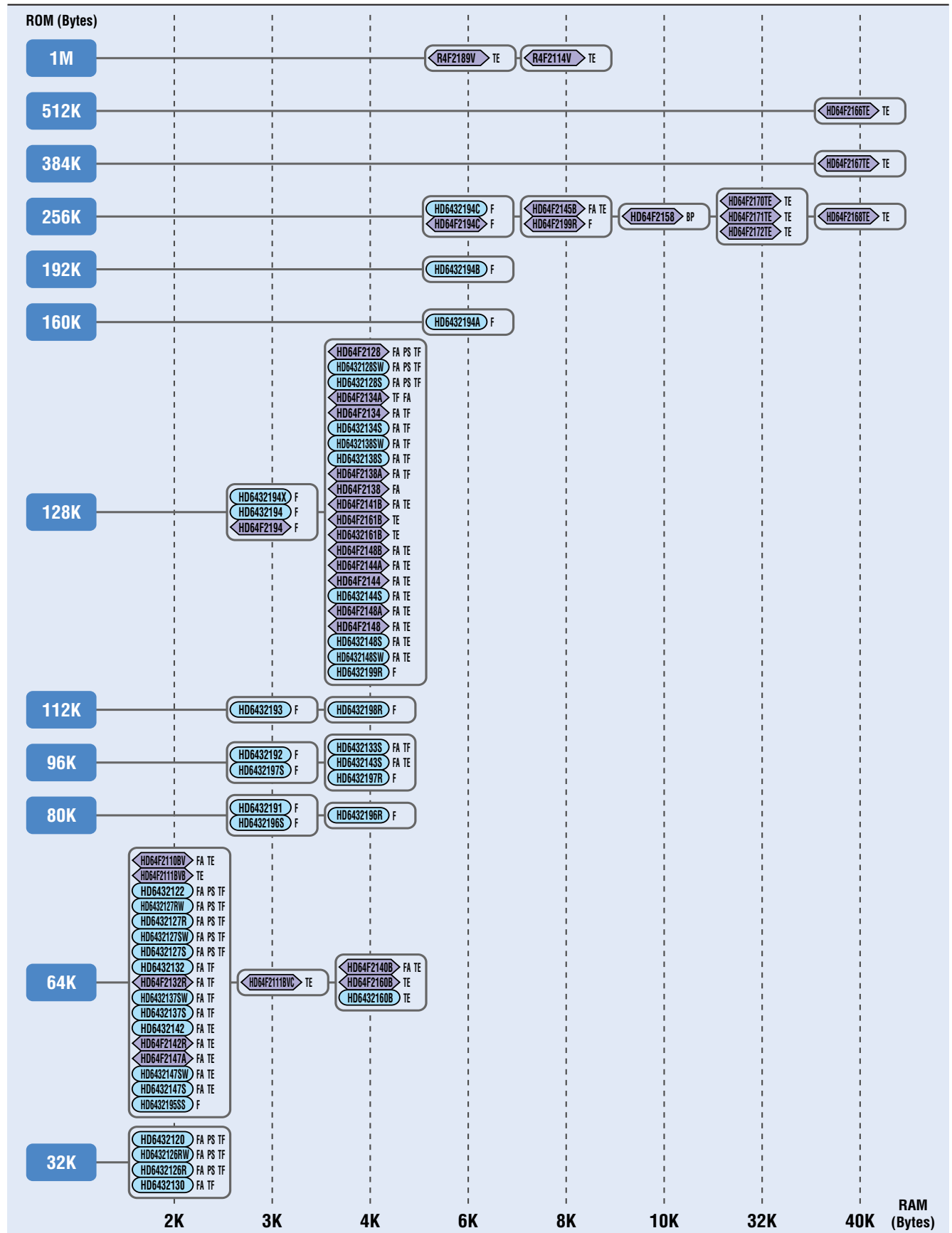
Group		H8S/2140B												H8S/2144															
Product No.		H8S/2140BF		H8S/2141BF		H8S/2160B		H8S/2161B		H8S/2145BF		H8S/2148BF		H8S/2142		H8S/2142RF		H8S/2143S		H8S/2144AF		H8S/2144F		H8S/2144S					
Type No.		HD64F2140BFA	HD64F2140BTE	HD64F2141BFA	HD64F2141BTE	HD6432160BxxxTE	HD64F2160BTE	HD6432161BxxxTE	HD64F2161BTE	HD64F2145BFA	HD64F2145BTE	HD64F2148BFA	HD64F2148BTE	HD6432142xxxFA	HD6432142xxxTE	HD64F2142RFA	HD64F2142RTE	HD6432143SxxxFA	HD6432143SxxxTE	HD64F2144AFA	HD64F2144ATE	HD64F2144FA	HD64F2144TE	HD6432144SxxxFA	HD6432144SxxxTE				
Memory	ROM(Bytes)	64K		128K		64K		128K		256K		128K		64K		2K		96K		128K									
	RAM(Bytes)	4K												8K		4K								4K					
	ROM Type*	F				M		F		M				F		M		F				M							
	Program Security	Yes														M		F		M		F		M					
CPU	CPU	H8S/2000 Core																											
	Basic Instructions	65																											
	Minimum Instruction Execution Time (ns)	100 (@10MHz)												100 (@10MHz), 50 (@20MHz)															
	Multiplier	—																											
	Multiply-Accumulate Instruction	—																											
DMA	DMAC (Channels)	—																											
	EXDMAC (Channels)	—																											
	DTC/DMAC II	DTC (85 channels)												—															
External Bus Expansion	Address Space (Bytes)	16M																											
	Bus State Controller	Direct connection to SRAM and ROM is supported																											
	Bus Structure	Separate bus (8-bit)																											
	SDRAM Controller	—																											
	DRAM Controller	—																											
Clock	Host Interface	LPC/ISA												—															
	Clock Generation Circuit	1 circuit (System clock)																											
	PLL	—																											
	Subclock	—																											
	RTC	—																											
A/D Converter	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)																											
	Power Save	Medium-Speed mode, Sub active mode, Sleep mode, Sub sleep mode, Watch mode, Software standby mode, Hardware standby mode, Module stop mode																											
	Resolution × Channels	10-bit × 8, 10-bit × 16 (expanded A/D input)																											
	Sample and Hold	Yes																											
	Resolution × Channels	8-bit × 2												3 (TMR0, 1, Y)															
Timer	8-bit	4 (TMR0, 1, X, Y)												—															
	16-bit	—												1(FRT)															
	32-bit	—												—															
	Prescaler	—												Yes															
	Input Capture	4 (shared with 16-bit timer)												3 (FRT)															
	Output Compare	5 (shared with 16-bit timer)												4 (shared with 16-bit timer)															
	PWM Output	PWMX × 2, PWM × 16												PWMX × 2															
	Real-Time Port	—																											
	Programmable Pulse Generator	—																											
	Event Counter	—																											
2-Phase Encoder Input		—																											
Watchdog Timer		Yes (× 2)																											
Serial Interface		3																											
I ² C-bus		2												—															
IEBus		—																											
Smart Card/SIM		—																											
SSU/Special Serial I/O		—																											
CAN	Channels	—																											
	Buffers	—																											
USB Function		—																											
LPC/ISA		Yes												—															
IrDA		Yes												—															
LCD		—																											
CRC Calculation Circuit		—																											
I/O Ports	Input Only (Numbers)	9																											
	CMOS Output Only (Numbers)	—																											
	CMOS I/O Only (Numbers)	69				109				69				73															
	High Voltage Port (Numbers)	—																											
	N-Channel Open Drain Port (Numbers)	—																											
	DTMF	—																											
	High Current Drive Port	10												4															
	Pull-Up Resistor	32				64				32				48															
	NMOS Push-Pull	4												—															
Interrupts(Sources)	External	31												9															
	Boundary Scan/JTAG	—																											
Debugging Function	On-Chip Debug	—																											
	On-Board Flash Program	Yes												—		Yes		—		Yes		—							
Other Functions		ROM Correction Function																											
Package		FP-100B, TFP-100B				TFP-144				FP-100B, TFP-100B																			
Operating Frequency/Supply Voltage		10MHz/2.7 to 3.6V								20MHz/4.5 to 5.5V 16MHz/4.0 to 5.5V 10MHz/2.7 to 3.6V				20MHz/4.5 to 5.5V 16MHz/4.0 to 5.5V 10MHz/2.7 to 5.5V				20MHz/4.5 to 5.5V 16MHz/4.0 to 5.5V 10MHz/2.7 to 3.6V				20MHz/4.5 to 5.5V 16MHz/4.0 to 5.5V 10MHz/3.0 to 5.5V				20MHz/4.5 to 5.5V 16MHz/4.0 to 5.5V 10MHz/2.7 to 3.6V			
Operating Ambient Temperature (°C)		-20 to 75								-20 to 75, -40 to 85								-20 to 75, -40 to 85, -40 to 110											

• Specifications (H8S/2100 Series)

Group		H8S/2148												H8S/2158	H8S/2168			H8S/2172			H8S/2189*			
Product No.		H8S/2147S				H8S/2147AF		H8S/2148AF		H8S/2148F		H8S/2148S				H8S/2158F	H8S/2166F	H8S/2167F	H8S/2168F	H8S/2170F	H8S/2171F	H8S/2172F	H8S/2189*	
Type No.		HD6432147SWxxxFA	HD6432147SWxxxTE	HD6432147SxxxFA	HD6432147SxxxTE	HD64F2147AFA	HD64F2147ATE	HD64F2148AFA	HD64F2148ATE	HD64F2148FA	HD64F2148TE	HD6432148SxxxFA	HD6432148SxxxTE	HD6432148SWxxxFA	HD6432148SWxxxTE	HD64F2158FP	HD64F2166TE	HD64F2167TE	HD64F2168TE	HD64F2170TE	HD64F2171TE	HD64F2172TE	RMF2189YTE*	
Memory	ROM(Bytes)	64K					128K					256K		512K	384K	256K		1M						
	RAM(Bytes)	2K					4K					10K		40K		32K		6K						
	ROM Type*	M		F			M		M		F		F					6K						
	Program Security	—		Yes			—		—		Yes		F					—						
CPU	CPU	H8S/2000 Core																						
	Basic Instructions	65																						
	Minimum Instruction Execution Time (ns)	100 (@10MHz), 50 (@20MHz)												40 (@25MHz)		30 (@33MHz)			50 (@20MHz)					
	Multiplier	—																						
DMA	Multiply-Accumulate Instruction	—																						
	DMAC (Channels)	—																						
	EXDMAC (Channels)	—																						
	DTC/DMAC II	DTC (85 channels)																		—		—		
External Bus Expansion	Address Space (Bytes)	16M																						
	Bus State Controller	Direct connection to SRAM and ROM is supported															ROM, SRAM			—				
	Bus Structure	Separate bus (8/16-bit)															Separate bus, Multiplex bus (16-bit)			Separate bus (8/16-bit)			—	
	SDRAM Controller	—																						
	DRAM Controller	—																						
	Host Interface	ISA															—		LPC			—		
Clock	Clock Generation Circuit	1 circuit (System clock)															7 (Oscillator, PLL multiplier, system clock selector, middle speed divider, bus master clock selector, sub clock input circuit, sub clock wave generator)			1 circuit (System clock)				
	PLL	—															Yes			—				
	Subclock	—																						
	RTC	—																						
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)																						
	Power Save	Medium-Speed mode, Sub active mode, Sleep mode, Sub sleep mode, Watch mode, Software standby mode, Hardware standby mode, Module stop mode																		Sleep mode, Module stop mode, Software standby mode, Hardware standby mode		Medium-Speed mode, Sub active mode, Sleep mode, Sub sleep mode, Watch mode, Software standby mode, Hardware standby mode, Module stop mode		
A/D Converter	Resolution× Channels	10-bit×8, 10-bit×16 (expanded A/D input)												10-bit×8, 10-bit×8 (expanded A/D input)		10-bit×8		—		10-bit×8				
	Sample and Hold	Yes												—		—		Yes						
D/A Converter	Resolution× Channels	8-bit×2												4(TMR0, 1, X, Y)		TMR (2)		4 (TMR0, 1, X, Y)						
	8-bit	4 (FRT)												TMR is available.		4 (FRT, TPU)								
Timer	16-bit	—												—		—		—						
	32-bit	—												—		—		—						
	Prescaler	Yes												—		—		Yes						
	Input Capture	4 (shared with 16-bit timer)												—		—		8 (shared with 16-bit timer)						
	Output Compare	5(shared with 16-bit timer)												2 (shared with 16-bit timer)		—		14 (shared with 16-bit timer)						
	PWM Output	PWMX×2, PWM×16												8-bit PWM (PWM)×16, 14-bit PWM (PWMX)×4		—		PWMX×2, PWM×8						
	Real-Time Port	—												—		—		—						
	Programmable Pulse Generator	—												—		—		—						
Event Counter	—												FRT, TMR0, TMR1, TMRX, TMRV		—		—							
	2-Phase Encoder Input	—												—		—		Yes						
Watchdog Timer	2												—		1		2							
Serial Interface	Clock Sync./ Clock Async.	3												—		—		2						
I ² C-bus	2												6		—		2							
IEBus		—												—		—		—						
Smart Card/SIM		—												1		—		1						
SSU/Special Serial I/O		—												—		—		—						
CAN	Channels	—												—		—		—						
	Buffers	—												—		—		—						
USB Function		—												Yes		—		Yes (USB2.0)		—				
LPC/ISA		Yes												—		Yes		—						
IrDA		Yes												—		Yes		—		Yes				
LCD		—												—		—		—		—				
CRC Calculation Circuit		—												Yes		—		—						
I/O Ports	Input Only (Numbers)	9												8		9		—		9				
	CMOS Output Only (Numbers)	—												—		—		—		—				
	CMOS I/O Only (Numbers)	71												60		106 (general input/output)		76		85				
	High Voltage Port (Numbers)	—												—		—		—		—				
	N-Channel Open Drain Port (Numbers)	2												4		—		—		—				
	DTMF	—												—		—		—		—				
	High Current Drive Port	14												4		—		—		14				
Interrupts(Sources)	Pull-Up Resistor	48												34		On-chip input pull-up MOS×46		—		78				
	NMOS Push-Pull	2												4		NMOS push-pull output×16		—		20				
	External	9												17		9		17						
	Boundary Scan/JTAG	—												Yes		—		—		Yes				
Debugging Function	On-Chip Debug	—												—		Yes		—		Yes				
	On-Board Flash Program	—		Yes			—		—		—		Yes		—		—							
Other Functions	ROM Correction Function	—																						
	Others	—												—		—		Memory/Stick I/F		—				
Package		FP-100B, TFP-100B												TBP-112		TFP-144		TFP-100B		TFP-144				
Operating Frequency/Supply Voltage		20MHz/4.5 to 5.5V 16MHz/4.0 to 5.5V 10MHz/2.7 to 3.6V		20MHz/4.5 to 5.5V 10MHz/3.0 to 3.6V	20MHz/4.5 to 5.5V 16MHz/4.0 to 5.5V 10MHz/2.7 to 3.6V		20MHz/4.5 to 5.5V 16MHz/4.0 to 5.5V 10MHz/3.0 to 5.5V	20MHz/4.5 to 5.5V 16MHz/4.0 to 5.5V 10MHz/2.7 to 3.6V		25MHz/3.0 to 3.6V 20MHz/2.7 to 3.6V		33MHz/ 3.0 to 3.6V		20MHz/2.7 to 3.6V		20MHz/ 3.0 to 3.6V								
Operating Ambient Temperature (°C)		-20 to 75, -40 to 85, -40 to 110												-20 to 75, -40 to 85		-20 to 75		-20 to 75, -40 to 85		-20 to 75				

* M: mask ROM version, E: E-ZTAT version

Memory Capacity (ROM/RAM) (H8S/2100 Series)



Package	
F	QFP (PRQP0112JA-A(FP-112))
FA	QFP (PRQP0064GB-A(FP-64A), PRQP0080JB-A(FP-80A), PRQP0100KA-A(FP-100B))
TE	TQFP (PTQP0100KA-A(TFP-100B), PTQP0144LC-A(TFP-144))
TF	TQFP (PTQP0080KC-A(TFP-80C))
PS	DIP (PRDP0064BB-A(DP-64S))
BP	TFBGA (TBP-112)

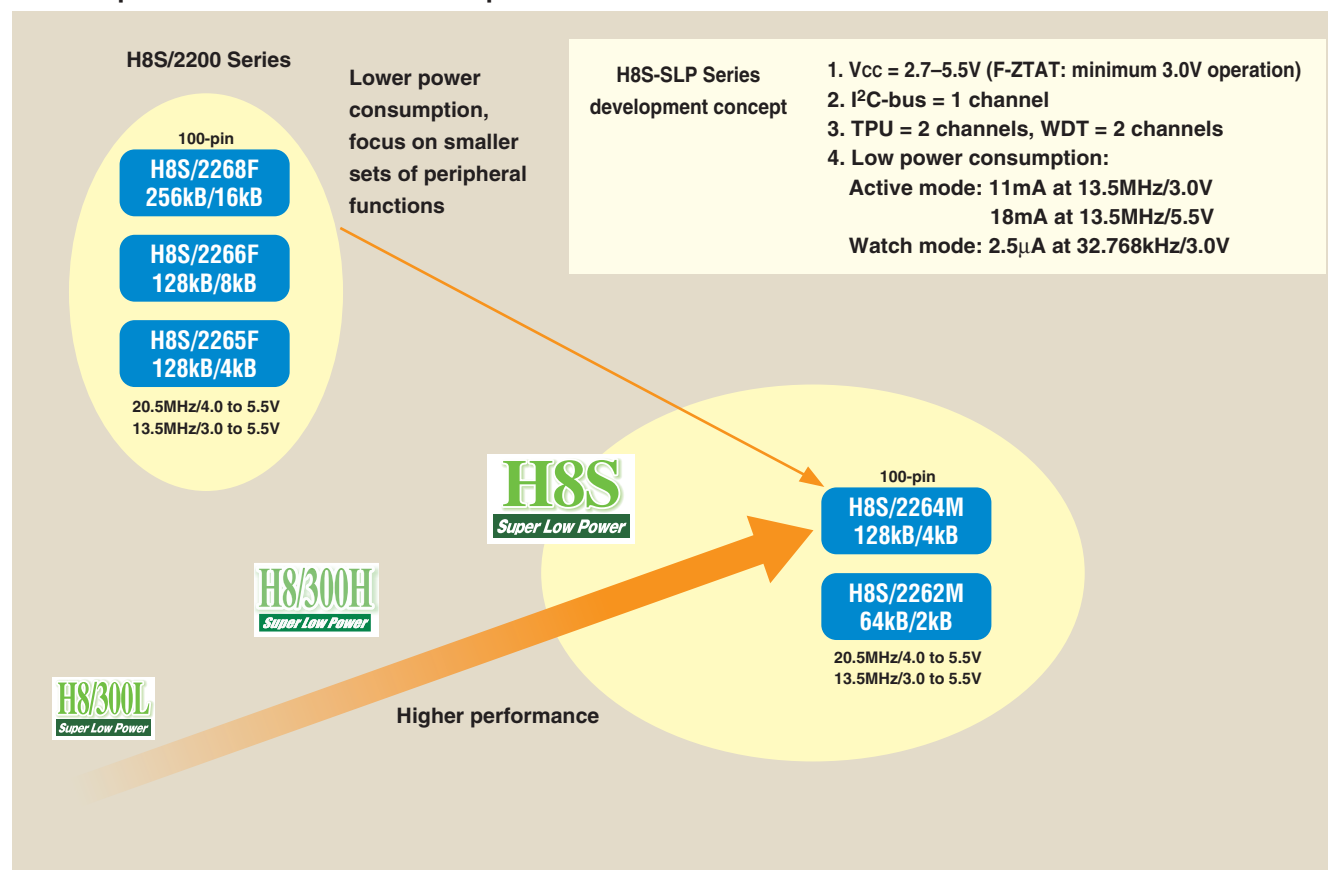
* It is an old package code inside ()

Single-chip 16-bit MCUs for measuring devices and communications equipment

H8S Super Low Power Series Features

- High-performance MCUs that consume very little power
- Improved processing speed (1:1 oscillator; basic instructions executed in 1 state)
- 16MB linear address space
- Employs 16-bit H8S/2000 CPU with proven track record in a wide range of applications
- Upward compatible with the H8/300L and H8/300H Super Low Power series
- Supports debugging using full emulator
- Peripheral functions for a wide range of requirements (Single power supply flash memory, I²C-bus, 10-bit A/D converter, serial interface, multi-function timer)

• H8S Super Low Power Series Roadmap



100-pin package, high-performance, super-low power consumption

H8S/2264 Group

- Pin-compatible with H8S/2268 group
- World-class low-power MCUs
- LCD controller/driver, 40SEG × 4COM
- Lineup includes versions with 128K bytes of ROM and 4K bytes of RAM
- On-chip high-speed serial functionality (asynchronous transmission: 720k bps)
- 100-pin QFP package

Applications Measuring devices, communications equipment

H8S Family

32/16-bit CISC

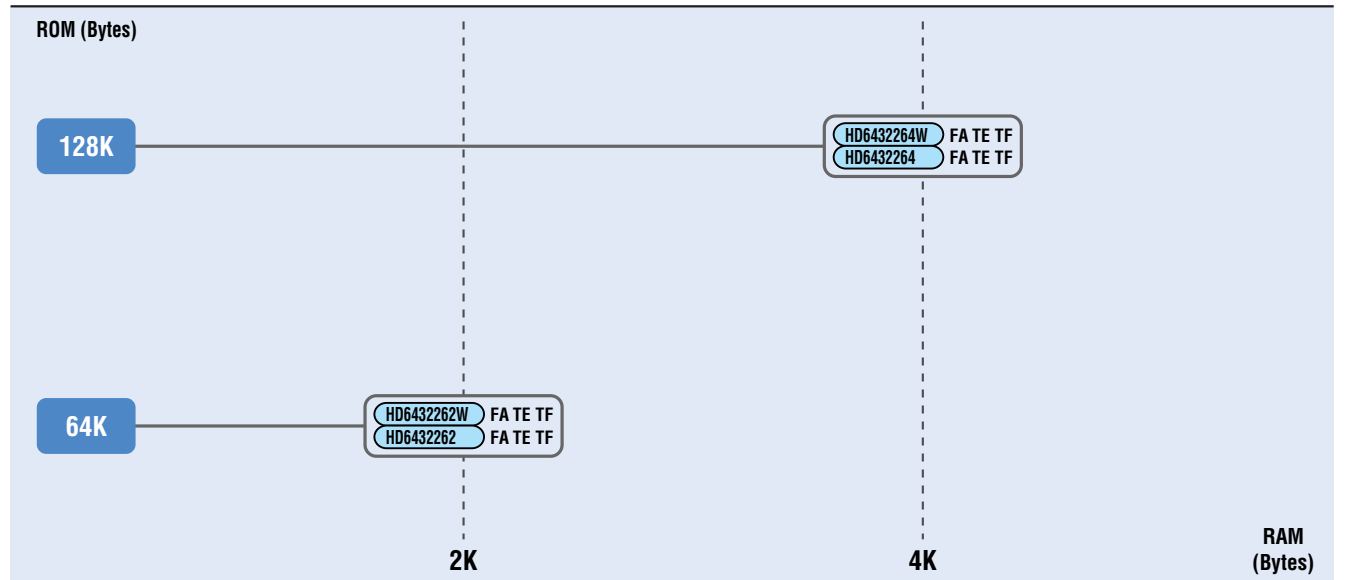
□ H8S Super Low Power Series

• Specifications (H8S Super Low Power Series)

Group		H8S/2264											
Product No.		H8S/2262						H8S/2264					
Type No.		HD6432262WxxxFA	HD6432262WxxxTE	HD6432262WxxxTF	HD6432262xxxFA	HD6432262xxxTE	HD6432262xxxTF	HD6432264WxxxFA	HD6432264WxxxTE	HD6432264WxxxTF	HD6432264xxxFA	HD6432264xxxTE	HD6432264xxxTF
Memory	ROM(Bytes)	64K						128K					
	RAM(Bytes)	2K						4K					
	ROM Type*	M											
CPU	CPU	H8S/2000 Core											
	Basic Instructions	65											
	Minimum Instruction Execution Time (ns)	48.8 (@ 20.5MHz)											
External Bus Expansion	Address Space (Bytes)	16M byte											
	Bus State Controller	Yes											
	Bus Structure	Address, Data separate bus											
Clock	Clock Generation Circuit	2 circuits (Main clock, Sub-clock)											
	Subclock	Yes											
	Frequency Divider	Medium-speed clock divider											
	Power Save	Medium-Speed mode, Sub active mode, Sleep mode, Sub sleep mode, Watch mode, Module stop mode, Software standby mode, Hardware standby mode											
A/D Converter	Resolution × Channels	10-bit × 10											
	Sample and Hold	Yes											
Timer	8-bit	TMR × 2											
	16-bit	TPU × 2											
	Input Capture	1 (shared with 16-bit timer)											
	PWM Output	TPU × 2											
3-Phase Inverter Control		TPU											
Watchdog Timer		Yes (× 2)											
Serial Interface		3											
I ² C-bus		1											
Smart Card/SIM		1											
LCD		40SEG × 4COM											
I/O Ports	Input Only (Numbers)	11											
	CMOS I/O Only (Numbers)	59											
	High Current Drive Port	P7 × 10mA											
	Pull-Up Resistor	P34, P35											
Interrupts(Sources)	NMOS Push-Pull	P34, P35											
	External	13											
Package		FP-100B (14 × 14mm, 0.5mm pitch)						TFP-100B (14 × 14mm, 0.5mm pitch) TFP-100G (12 × 12mm, 0.4mm pitch)					
Operating Frequency/Supply Voltage		20.5MHz/4.0 to 5.5V, 13.5MHz/2.7 to 5.5V											
Operating Ambient Temperature (°C)		-20 to 75, -40 to 85											

* M: mask ROM version

• Memory Capacity (ROM/RAM) (H8S Super Low Power Series)



Indicates the mask ROM version.

Package	
FA	QFP (PRQP0100KA-A(FP-100B))
TE	TQFP (PTQP0100KA-A(TFP-100B))
TF	TQFP (PTQP0100LC-A(TFP-100G))

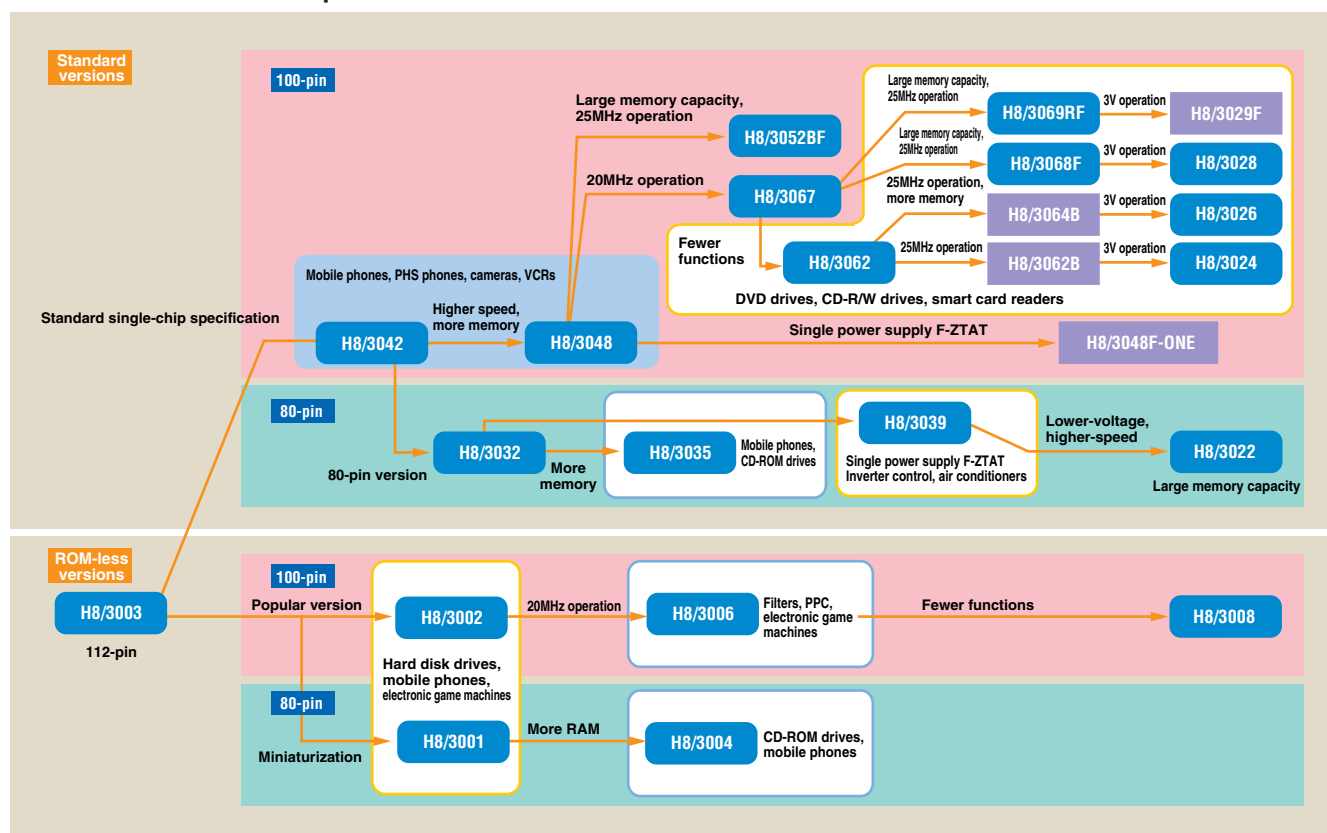
* It is an old package code inside ()

Suitable for applications such as office equipment and mobile devices

H8/300H Series Features

- 16-bit CPU for efficient handling of large data capacity
 - Maximum operating frequency of 25MHz, minimum instruction execution time of 80ns
 - Linear address area of 16M bytes
 - Numerous general-purpose registers (16-bit × 16)
- Simplified and optimized instruction set is upwardly compatible with H8/300
 - 8-, 16-, and 32-bit data transfer, arithmetic instructions: 32 ± 32 (80ns)
 - Signed multiply and divide instructions: 16×16 (0.96μs), $32 \div 16$ (0.96μs)

• H8/300H Series Roadmap



0.18μm single power supply F-ZTAT MCUs

H8/3069RF

- 512K bytes of on-chip flash memory and 16K bytes of on-chip RAM
- On-chip user boot function enables reprogramming of on-chip flash ROM via a variety of communication methods (ATAPI, CAN, USB interface, etc.)
- Address map function provides fast access to an external DSP

Applications Optical storage devices such as CD-R/W drives, combination (CD-R/W + DVD-ROM) drives, and DVD-RAM drives

H8/3001 Group

- ROM-less 80-pin QFP type MCU
- Permits very compact systems

H8/3004 Group

- ROM-less 80-pin MCU, pin-compatible with H8/3032 group
- 2 or 4K bytes of on-chip RAM

H8/3032 Group

- On-chip multifunction timer and A/D converter
- High-performance 80-pin MCU suitable for motor control

H8/3022 Group

- Pin-compatible with the H8/3039 group
- Low voltage and high-speed operation (18MHz/3V)

H8/3067 Group

- High-speed MCU with numerous on-chip peripheral functions
- Burst ROM interface and DRAM high-speed page mode support

H8/3024 Group

- 3V version of the H8/3062 group
- High-speed MCU with maximum operating frequency of 25MHz (3V)

H8/3002 Group

- Smaller version of the H8/3003 in a compact 100-pin package
- Suitable for compact systems

H8/3006 Group

- ROM-less 100-pin MCU, pin-compatible with the H8/3067 group
- On-chip DMA controller

H8/3035 Group

- Pin-compatible with the H8/3032 group
- 256K bytes of on-chip ROM (H8/3035)

H8/3042 Group

- Many ROM configurations available
- On-chip multi-function timer, A/D and D/A converters, and DMA controller

H8/3048 Group

- Numerous on-chip peripheral functions
- Suitable for battery-powered devices due to reduced power consumption

**H8/3022F, H8/3024F,
H8/3026F, H8/3028F,
H8/3029F, H8/3039F,
H8/3048F-ONE, H8/3052BF,
H8/3062BF, H8/3064BF,
H8/3067RF, H8/3068F,
H8/3069RF**

- Single power supply on-chip flash memory
- F-ZTAT MCU with support for on-board programming
- E10T support (H8/3048F-ONE) (H8/3029F (under development))

H8/3003 Group

- On-chip DMA controller for rapid processing of large amounts of data
- Bus control function enables direct connection to various types of memory

H8/3008 Group

- ROM-less 100-pin MCU, pin-compatible with H8/3062 group
- High-speed MCU with maximum operating frequency of 25MHz (5V, 3V)

H8/3039 Group

- 80-pin version with 2 SCI channels on-chip
- Suitable for use in mobile phones, due to compact package and low power consumption

H8/3062 Group

- Slim version of the H8/3067 group
- Operating frequency raised to 25MHz/5V (H8/3062BF, H8/3064BF)

H8/3052B Group

- 512K bytes of on-chip flash memory

• Specifications (H8/300H Series)

Group		H8/3001		H8/3002		H8/3003				H8/3004				H8/3006							
Product No.		H8/3001		H8/3002		H8/3003				H8/3004		H8/3005		H8/3006		H8/3007					
Type No.		HD6413001F	HD6413001TF	HD6413002F	HD6413002FP	HD6413002TF	HD6413003RF	HD6413003TF	HD6413003RTE	HD6413003TTE	HD6413004F	HD6413004TE	HD6413005F	HD6413005TE	HD6413006F	HD6413006FP	HD6413006TE	HD6413007F	HD6413007FP	HD6413007TE	
Memory	ROM(Bytes)	—										2K		4K	2K		4K				
	RAM(Bytes)	512										2K		4K	2K		4K				
	ROM Type*	L																			
	Program Security	—																			
CPU	CPU	H8/300H Core																			
	Basic Instructions	62																			
	Minimum Instruction Execution Time (ns)	111 (@18MHz)		118 (@17MHz)		125 (@16MHz)				111 (@18MHz)				100 (@20MHz)							
DMA	DMAC (Channels)	—		4		8				—				4							
External Bus expansion	Address Space (Bytes)	16M																			
	Bus State Controller	ROM/SRAM		ROM/SRAM/DRAM						ROM/SRAM				ROM/burst ROM/SRAM/DRAM							
	Bus Structure	Separate bus (8/16-bit)																			
	DRAM Controller	—		Yes						—				Yes							
	Clock	Clock Generation Circuit	1 circuit (Main clock)																		
Frequency Divider		—				1/n (n = 1, 2)				—				1/n (n = 1, 2, 4, 8)							
Power Save		Sleep mode, Software standby mode, Hardware standby mode												Sleep mode, Module standby function, Software standby mode, Hardware standby mode							
A/D Converter	Resolution×Channels	10-bit×4		10-bit×8																	
D/A Converter	Sample and Hold	Yes																			
	Resolution×Channels	—														8-bit×2					
Timer	8-bit	—																			
	16-bit											5 (ITU)									
	Input Capture											5 (ITU)									
	Output Compare											5 (ITU)									
	PWM Output											ITU									
	Programmable Pulse Generator											ITU									
	Event Counter											ITU									
	2-Phase Encoder Input											ITU									
	3-Phase Inverter Control											ITU									
Watchdog Timer		—		Yes (×1)																	
Serial Interface	Clock Sync./ Clock Async.	1		2						1				3							
Smart Card/SIM		—																			
I/O Ports	Input Only (Numbers)	4		8						11				12							
	CMOS I/O Only (Numbers)	28		38		50				21		35									
	High Current Drive Port	32		28		32				28		20									
	Pull-Up Resistor	8				12				—		8									
Interrupts(Sources)	External	4		7		9				6		7									
Debugging Function	On-Chip Debug	—																			
	On-Board Flash Program	—																			
Package		TFP-80C, FP-80A		TFP-100B, FP-100A, FP-100B		FP-112, TFP-120				TFP-80C, FP-80A				TFP-100B, FP-100A, FP-100B							
Operating Frequency/Supply Voltage		18MHz/4.5 to 5.5V 13MHz/3.0 to 5.5V 8MHz/2.7 to 5.5V		17MHz/4.5 to 5.5V 10MHz/3.0 to 5.5V 8MHz/2.7 to 5.5V		16MHz/4.5 to 5.5V 10MHz/3.0 to 5.5V 8MHz/2.7 to 5.5V				18MHz/4.5 to 5.5V 10MHz/3.0 to 5.5V 8MHz/2.7 to 5.5V				20MHz/4.5 to 5.5V 13MHz/3.0 to 5.5V 10MHz/2.7 to 5.5V							
Operating Ambient Temperature (°C)		-20 to 75, -40 to 85																			

* L: ROM-less version

• Specifications (H8/300H Series)

Group		H8/3008			H8/3032						H8/3035									
Product No.		H8/3008			H8/3030		H8/3031		H8/3032		H8/3032		H8/3033		H8/3034		H8/3035			
Type No.		HD6413008F	HD6413008FP	HD6413008TE	HD6433030SxxxF	HD6433030SxxxTF	HD6433031SxxxF	HD6433031SxxxTF	HD6433032SxxxF	HD6433032SxxxTF	HD6473032F	HD6473032TF	HD6433033xxxF	HD6433033xxxTE	HD6433034xxxF	HD6433034xxxTE	HD6433035xxxF	HD6433035xxxTE	HD6473035F	HD6473035TE
Memory	ROM(Bytes)	—			16K		32K		64K		128K				256K					
	RAM(Bytes)	4K			512		1K		2K		4K									
	ROM Type*	L			M						Z		M				Z			
	Program Security	—			Yes															
CPU	CPU	H8/300H Core																		
	Basic Instructions	62																		
	Minimum Instruction Execution Time (ns)	100 (@ 20MHz)			111 (@ 18MHz)															
DMA	DMAC (Channels)	—																		
External Bus Expansion	Address Space (Bytes)	16M																		
	Bus State Controller	ROM/SRAM																		
	Bus Structure	Separate bus (8/16-bit)																		
	DRAM Controller	—																		
Clock	Clock Generation Circuit	1 circuit (Main clock)																		
	Frequency Divider	1/n (n = 1, 2, 4, 8)			—															
	Power Save	Sleep mode, Module standby function, Software standby mode, Hardware standby mode			Sleep mode, Software standby mode, Hardware standby mode															
A/D Converter	Resolution × Channels	10-bit × 8																		
	Sample and Hold	Yes																		
D/A Converter	Resolution × Channels	8-bit × 2			—															
Timer	8-bit	4			—															
	16-bit	3 (16-bit Timer), 2 (available by 8-bit Timer)			5 (ITU)															
	Input Capture	3 (16-bit Timer), 4 (8-bit Timer)			5 (ITU)															
	Output Compare	3 (16-bit Timer), 4 (8-bit Timer)			5 (ITU)															
	PWM Output	16-bit Timer, 8-bit Timer			ITU															
	Programmable Pulse Generator	TPC + 16-bit Timer			ITU															
	Event Counter	16-bit Timer, 8-bit Timer			ITU															
	2-Phase Encoder Input	16-bit Timer			ITU															
	3-Phase Inverter Control	—			ITU															
Watchdog Timer		Yes																		
Serial Interface	Clock Sync./ Clock Async.	2			1															
Smart Card/SIM		1			—															
I/O Ports	Input Only (Numbers)	12			8															
	CMOS I/O Only (Numbers)	35			55															
	High Current Drive Port	20			28															
	Pull-Up Resistor	8			12															
Interrupts(Sources)	External	7			6															
Debugging Function	On-Chip Debug	—																		
	On-Board Flash Program	—																		
Package		TFP-100B, FP-100A, FP-100B			TFP-80C, FP-80A															
Operating Frequency/Supply Voltage		25MHz/4.5 to 5.5V 25MHz/3.0 to 5.36V			18MHz/4.5 to 5.5V 10MHz/3.0 to 5.5V 8MHz/2.7 to 5.5V															
Operating Ambient Temperature (°C)		-20 to 75, -40 to 85																		

* L: ROM-less version, M: mask ROM version, Z: ZTAT version,

• Specifications (H8/300H Series)

Group		H8/3039										H8/3022							
Product No.		H8/3036		H8/3037		H8/3038		H8/3039		H8/3039F		H8/3020		H8/3021		H8/3022		H8/3022F	
		HD6433036xxxF	HD6433036xxxTE	HD6433037xxxF	HD6433037xxxTE	HD6433038xxxF	HD6433038xxxTE	HD6433039xxxF	HD6433039xxxTE	HD64F3039F	HD64F3039TE	HD6433020xxxF	HD6433020xxxTE	HD6433021xxxF	HD6433021xxxTE	HD6433022xxxF	HD6433022xxxTE	HD64F3022F	HD64F3022TE
Type No.																			
Memory	ROM(Bytes)	16K		32K		64K		128K				192K		256K					
	RAM(Bytes)	512		1K		2K		4K				8K							
	ROM Type*	M								F		M				F			
	Program Security	Yes																	
CPU	CPU	H8/300H Core																	
	Basic Instructions	62																	
	Minimum Instruction Execution Time (ns)	111 (@18MHz)																	
	DMA	DMAC (Channels)	—																
External Bus Expansion	Address Space (Bytes)	16M																	
	Bus State Controller	ROM/SRAM																	
	Bus Structure	Separate bus (8/16-bit)																	
	DRAM Controller	—																	
Clock	Clock Generation Circuit	1 circuit (Main clock)																	
	Frequency Divider	1/n (n = 1, 2, 4, 8)																	
	Power Save	Sleep mode, Module standby function, Software standby mode, Hardware standby mode																	
A/D Converter	Resolution × Channels	10-bit × 8																	
	Sample and Hold	Yes																	
D/A Converter	Resolution × Channels	—																	
	8-bit	—																	
Timer	16-bit	5 (ITU)																	
	Input Capture	5 (ITU)																	
	Output Compare	5 (ITU)																	
	PWM Output	ITU																	
	Programmable Pulse Generator	ITU																	
	Event Counter	ITU																	
	2-Phase Encoder Input	ITU																	
	3-Phase Inverter Control	ITU																	
Watchdog Timer		Yes																	
Serial Interface Clock Sync./ Clock Async.		2																	
Smart Card/SIM		1																	
I/O Ports	Input Only (Numbers)	8																	
	CMOS I/O Only (Numbers)	55																	
	High Current Drive Port	28																	
	Pull-Up Resistor	12																	
Interrupts(Sources)		5																	
Debugging Function	On-Chip Debug	—																	
	On-Board Flash Program	—								Yes		—				Yes			
Package		TFP-80C, FP-80A																	
Operating Frequency/Supply Voltage		18MHz/4.5 to 5.5V 10MHz/3.0 to 5.5V 8MHz/2.7 to 5.5V								18MHz/4.5 to 5.5V 10MHz/3.0 to 5.5V		18MHz/3.0 to 3.6V							
Operating Ambient Temperature (°C)		-20 to 75, -40 to 85										-20 to 75							

* M: mask ROM version, Z: ZTAT version

• Specifications (H8/300H Series)

Group		H8/3042												H8/3048														
Product No.		H8/3040			H8/3041			H8/3042			H8/3042			H8/3044			H8/3045			H8/3047			H8/3048			H8/3048F		
		HD6433040SxxxF	HD6433040SxxxFP	HD6433040SxxxTF	HD6433041SxxxF	HD6433041SxxxFP	HD6433041SxxxTF	HD6433042SxxxF	HD6433042SxxxFP	HD6433042SxxxTF	HD6473042F	HD6473042FP	HD6473042TF	HD6433044SxxxF	HD6433044SxxxTF	HD6433045SxxxF	HD6433045SxxxTF	HD6433047SxxxF	HD6433047SxxxTF	HD6433048SxxxF	HD6433048SxxxTF	HD6473048F	HD6473048TF	HD64F3048F	HD64F3048TF			
Type No.																												
Memory	ROM(Bytes)	32K			48K			64K			32K			64K			96K			128K								
	RAM(Bytes)	2K																										
	ROM Type*	M						Z			M									Z						F		
	Program Security	Yes																										
CPU	CPU	H8/300H Core																										
	Basic Instructions	62																										
	Minimum Instruction Execution Time (ns)	118 (@17MHz)												111 (@18MHz)														
DMA	DMAC (Channels)	4												111 (@18MHz)														
External Bus Expansion	Address Space (Bytes)	16M																										
	Bus State Controller	ROM/SRAM												ROM/SRAM/DRAM														
	Bus Structure	Separate bus (8/16-bit)																										
	DRAM Controller	Yes																										
Clock	Clock Generation Circuit	1 circuit (Main clock)																										
	Frequency Divider	—												1/n (n = 1, 2, 4, 8)														
	Power Save	Sleep mode, Software standby mode, Hardware standby mode												Sleep mode, Module standby function, Software standby mode, Hardware standby mode														
A/D Converter	Resolution × Channels	10-bit × 8																										
	Sample and Hold	Yes																										
D/A Converter	Resolution × Channels	8-bit × 2																										
Timer	8-bit	—																										
	16-bit	5 (ITU)																										
	Input Capture	5 (ITU)																										
	Output Compare	5 (ITU)																										
	PWM Output	ITU																										
	Programmable Pulse Generator	ITU																										
	Event Counter	ITU																										
	2-Phase Encoder Input	ITU																										
3-Phase Inverter Control	ITU																											
Watchdog Timer		Yes																										
Serial Interface Clock Sync./ Clock Async.		2																										
Smart Card/SIM		—												1														
I/O Ports	Input Only (Numbers)	8																										
	CMOS I/O Only (Numbers)	70																										
	High Current Drive Port	28																										
	Pull-Up Resistor	20																										
Interrupts(Sources)	External	7																										
Debugging Function	On-Chip Debug	—																										
	On-Board Flash Program	—																						Yes				
Package		TFP-100B, FP-100A, FP-100B												TFP-100B, FP-100B														
Operating Frequency/Supply Voltage		16MHz/4.5 to 5.5V 10MHz/3.0 to 5.5V 8MHz/2.7 to 5.5V												18MHz/4.5 to 5.5V 13MHz/3.15 to 5.5V 8MHz/2.7 to 5.5V										16MHz/4.5 to 5.5V 8MHz/2.7 to 5.5V				
Operating Ambient Temperature (°C)		-20 to 75, -40 to 85																										

* F: F-ZTAT version, M: mask ROM version, Z: ZTAT version

• Specifications (H8/300H Series)

Group		H8/3048B		H8/3052B		H8/3024						H8/3028		H8/3029													
Product No.		H8/3048F-ONE		H8/3048B		H8/3052BF		H8/3024		H8/3024F		H8/3026		H8/3026F		H8/3028		H8/3028F		H8/3029F							
Type No.		HD64F3048BF	HD64F3048BTE	HD6433048BxxxF	HD6433048BxxxTE	HD64F3052BF	HD64F3052BTF	HD6433024xxxF	HD6433024xxxFP	HD6433024xxxTE	HD64F3024F	HD64F3024FP	HD64F3024TE	HD6433026xxxF	HD6433026xxxFP	HD6433026xxxTE	HD64F3028F	HD64F3028FP	HD64F3028TE	HD6433028xxxF	HD6433028xxxTE	HD64F3028F	HD64F3028TE	HD64F3029F	HD64F3029TE		
Memory	ROM(Bytes)	128K		512K		128K		128K		256K		384K		512K													
	RAM(Bytes)	4K		8K		4K		8K		16K																	
	ROM Type*	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F											
	Program Security	Yes																									
CPU	CPU	H8/300H Core																									
	Basic Instructions	62																									
	Minimum Instruction Execution Time (ns)	80 (@25MHz)																									
	DMAC (Channels)	4				—				—				4													
DMA	Address Space (Bytes)	16M																									
	Bus State Controller	ROM/SRAM/DRAM						ROM/SRAM						ROM/burst ROM/ SRAM/DRAM													
	Bus Structure	Separate bus (8/16-bit)																									
	DRAM Controller	Yes						—						Yes													
Clock	Clock Generation Circuit	1 circuit (Main clock)																									
	Frequency Divider	1/n (n = 1, 2, 4, 8)																									
	Power Save	Sleep mode, Module standby function, Software standby mode, Hardware standby mode																									
A/D Converter	Resolution × Channels	10-bit × 8																									
D/A Converter	Sample and Hold	Yes																									
	Resolution × Channels	TMR × 2																									
Timer	8-bit	—						4 (TMR0, 1, 2, 3)																			
	16-bit	5 (ITU)						3 (16-bit Timer), 2 (available by 8-bit Timer)																			
	Input Capture	5 (ITU)						3 (16-bit Timer), 4 (8-bit Timer)																			
	Output Compare	5 (ITU)						3 (16-bit Timer), 4 (8-bit Timer)																			
	PWM Output	ITU						16-bit Timer, 8-bit Timer																			
	Programmable Pulse Generator	TPC + ITU						TPC + 16-bit Timer																			
	Event Counter	ITU						16-bit Timer, 8-bit Timer																			
	2-Phase Encoder Input	ITU						16-bit Timer																			
	3-Phase Inverter Control	ITU						—																			
Watchdog Timer		Yes																									
Serial Interface	Clock Sync./ Clock Async.	2												3													
Smart Card/SIM		1																									
I/O Ports	Input Only (Numbers)	8				9																					
	CMOS I/O Only (Numbers)	70																									
	High Current Drive Port	28						20																			
	Pull-Up Resistor	20																									
Interrupts(Sources)	External	7																									
Debugging Function	On-Chip Debug	Yes	—																							Yes	
	On-Board Flash Program	Yes	—	Yes	—		Yes	—		Yes	—		Yes	—		Yes											
Package		TFP-100B, FP-100B						TFP-100B, FP-100A, FP-100B						TFP-100B, FP-100B						TFP-100B, FP-100A, FP-100B							
Operating Frequency/Supply Voltage		25MHz/ 4.5 to 5.5V 25MHz/ 3.0 to 3.6V				25MHz/ 4.5 to 5.5V				25MHz/3.0 to 3.6V																	
Operating Ambient Temperature (°C)		-20 to 75, -40 to 85																									

* F: F-ZTAT version, M: mask ROM version

• Specifications (H8/300H Series)

Group		H8/3062																													
Product No.		H8/3060			H8/3061			H8/3062			H8/3062RF			H8/3060B			H8/3061B			H8/3062B			H8/3064B			H8/3062BF			H8/3064BF		
		HD6433060xxxF	HD6433060xxxFP	HD6433060xxxTE	HD6433061xxxF	HD6433061xxxFP	HD6433061xxxTE	HD6433062xxxF	HD6433062xxxFP	HD6433062xxxTE	HD64F3062RF	HD64F3062RFP	HD64F3062RTE	HD6433060BxxxF	HD6433060BxxxFP	HD6433060BxxxTE	HD6433061BxxxF	HD6433061BxxxFP	HD6433061BxxxTE	HD6433062BxxxF	HD6433062BxxxFP	HD6433062BxxxTE	HD6433064BxxxF	HD6433064BxxxFP	HD6433064BxxxTE	HD64F3062BF	HD64F3062BFP	HD64F3062BTE	HD64F3064BF	HD64F3064BFP	HD64F3064BTE
Type No.																															
Memory	ROM(Bytes)	64K			96K			128K			64K			96K			128K			256K			128K			256K					
	RAM(Bytes)	2K						4K			2K			4K			8K			4K			8K								
	ROM Type*	M									F			M									F								
	Program Security	Yes									—			Yes																	
CPU	CPU	H8/300H Core																													
	Basic Instructions	62																													
	Minimum Instruction Execution Time (ns)	100 (@20MHz)												80 (@25MHz)																	
DMA	DMAC (Channels)	—																													
External Bus Expansion	Address Space (Bytes)	16M																													
	Bus State Controller	ROM/SRAM																													
	Bus Structure	Separate bus (8/16-bit)																													
	DRAM Controller	—																													
Clock	Clock Generation Circuit	1 circuit (Main clock)																													
	Frequency Divider	1/n (n = 1, 2, 4, 8)																													
	Power Save	Sleep mode, Module standby function, Software standby mode, Hardware standby mode																													
A/D Converter	Resolution × Channels	10-bit × 8																													
	Sample and Hold	Yes																													
D/A Converter	Resolution × Channels	8-bit × 2																													
Timer	8-bit	4 (TMR0, 1, 2, 3)																													
	16-bit	3 (16-bit Timer), 2 (available by 8-bit Timer)																													
	Input Capture	3 (16-bit Timer), 4 (8-bit Timer)																													
	Output Compare	3 (16-bit Timer), 4 (8-bit Timer)																													
	PWM Output	16-bit Timer, 8-bit Timer																													
	Programmable Pulse Generator	TPC + 16-bit Timer																													
	Event Counter	16-bit Timer, 8-bit Timer																													
	2-Phase Encoder Input	16-bit Timer																													
	3-Phase Inverter Control	—																													
Watchdog Timer		1																													
Serial Interface	Clock Sync./ Clock Async.	2																													
Smart Card/SIM		1																													
I/O Ports	Input Only (Numbers)	9																													
	CMOS I/O Only (Numbers)	70																													
	High Current Drive Port	20																													
	Pull-Up Resistor	20																													
Interrupts(Sources)	External	7																													
Debugging Function	On-Chip Debug	—																													
	On-Board Flash Program	—									Yes			—									Yes								
Package		TFP-100B, FP-100A, FP-100B																													
Operating Frequency/Supply Voltage		20MHz/4.5 to 5.5V 13MHz/3.0 to 5.5V 10MHz/2.7 to 5.5V												25MHz/4.5 to 5.5V																	
Operating Ambient Temperature (°C)		-20 to 75, -40 to 85																													

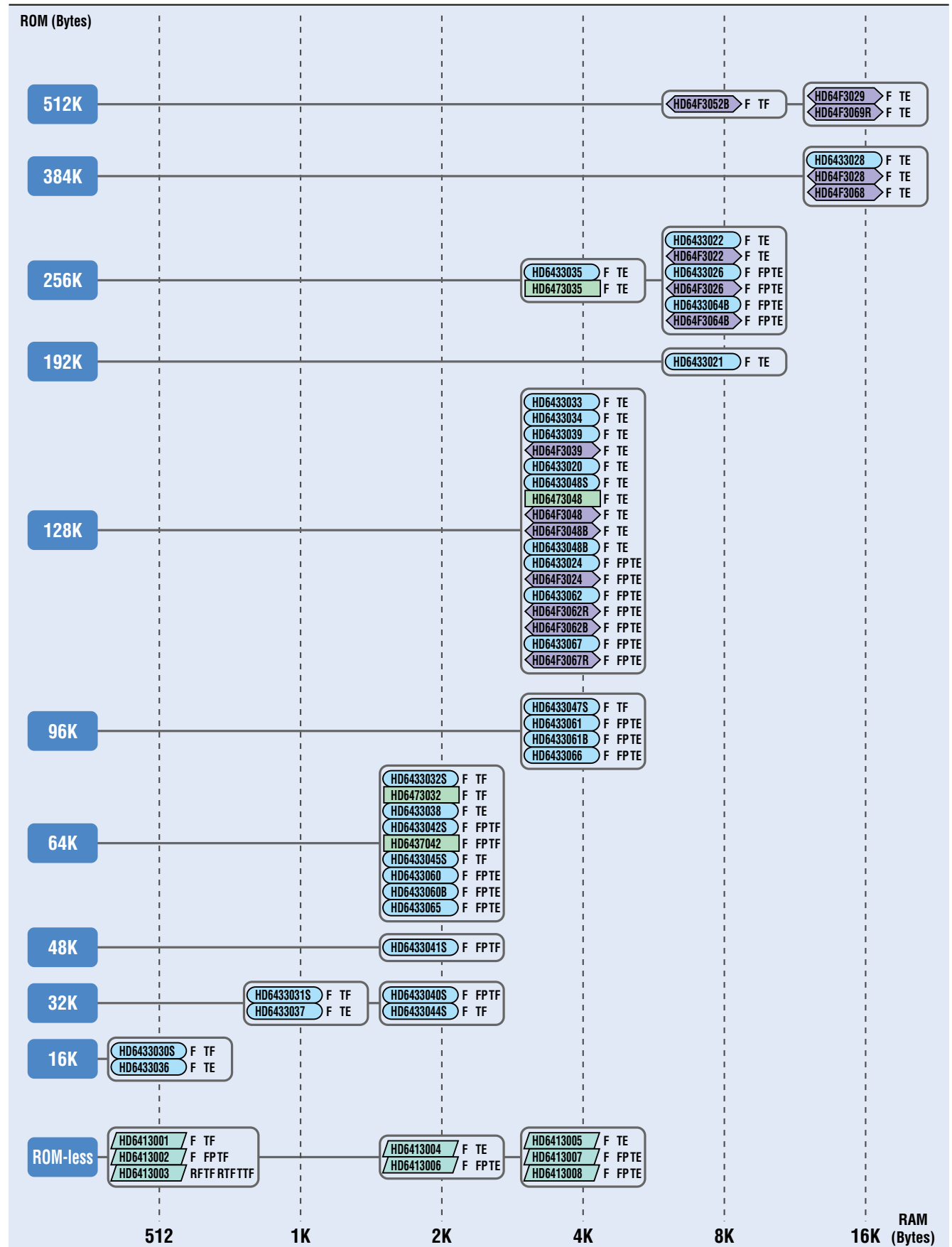
* F: F-ZTAT version, M: mask ROM version

• Specifications (H8/300H Series)

Group		H8/3067												H8/3068		H8/3069R	
Product No.		H8/3065			H8/3066			H8/3067			H8/3067RF			H8/3068F		H8/3069RF	
Type No.		HD6433065xxxF	HD6433065xxxFP	HD6433065xxxTE	HD6433066xxxF	HD6433066xxxFP	HD6433066xxxTE	HD6433067xxxF	HD6433067xxxFP	HD6433067xxxTE	HD64F3067RF	HD64F3067RFP	HD64F3067RTE	HD64F3068F	HD64F3068TE	HD64F3069RF	HD64F3069RTE
Memory	ROM(Bytes)	64K			96K			128K						384K		512K	
	RAM(Bytes)	2K						4K								16K	
	ROM Type*	M						F									
	Program Security	Yes						—						Yes			
CPU	CPU	H8/300H Core															
	Basic Instructions	62															
	Minimum Instruction Execution Time (ns)	100 (@20MHz)												80 (@20MHz)			
DMA	DMAC (Channels)	4															
External Bus Expansion	Address Space (Bytes)	16M															
	Bus State Controller	ROM/burst ROM/SRAM/DRAM															
	Bus Structure	Separate bus (8/16-bit)															
	DRAM Controller	Yes															
Clock	Clock Generation Circuit	1 circuit (Main clock)															
	Frequency Divider	1/n (n = 1, 2, 4, 8)															
	Power Save	Sleep mode, Module standby function, Software standby mode, Hardware standby mode															
A/D Converter	Resolution × Channels	10-bit × 8															
	Sample and Hold	Yes															
D/A Converter	Resolution × Channels	8-bit × 2															
Timer	8-bit	4 (TMR0, 1, 2, 3)															
	16-bit	3 (16-bit Timer), 2 (available by 8-bit Timer)															
	Input Capture	3 (16-bit Timer), 4 (8-bit Timer)															
	Output Compare	3 (16-bit Timer), 4 (8-bit Timer)															
	PWM Output	16-bit Timer, 8-bit Timer															
	Programmable Pulse Generator	TPC + 16-bit Timer															
	Event Counter	16-bit Timer, 8-bit Timer															
	2-Phase Encoder Input	16-bit Timer															
	3-Phase Inverter Control	—															
Watchdog Timer		1															
Serial Interface	Clock Sync./ Clock Async.	3															
Smart Card/SIM		1															
I/O Ports	Input Only (Numbers)	9															
	CMOS I/O Only (Numbers)	70															
	High Current Drive Port	20															
	Pull-Up Resistor	20															
Interrupts(Sources)	External	7															
Debugging Function	On-Chip Debug	—															
	On-Board Flash Program	—															
Package		TFP-100B, FP-100A, FP-100B												Yes			
Operating Frequency/Supply Voltage		20MHz/4.5 to 5.5V 13MHz/3.0 to 5.5V 10MHz/2.7 to 5.5V												25MHz/4.5 to 5.5V			
Operating Ambient Temperature (°C)		-20 to 75, -40 to 85															

* F: F-ZTAT version, M: mask ROM version

Memory Capacity (ROM/RAM) (H8/300H Series)



- Indicates the mask ROM version.
- Indicates the ZTAT version.
- Indicates the flash memory version.
- Indicates the ROM-less version.

Package	
F	QFP (PRQP0080JB-A (FP-80A), PRQP0100KA-A (FP-100B))
FP	QFP (PRQP0100JE-B (FP-100A))
TF	TQFP (PTQP0080KC-A (TFP-80C), PTQP0100KA-A (TFP-100B), PTQP0120LA-A (TFP-120))
TE	TQFP (PTQP0080KC-A (TFP-80C), PTQP0100KA-A (TFP-100B), PTQP0120LA-A (TFP-120))

* It is an old package code inside ()

□ H8/300H Tiny Series

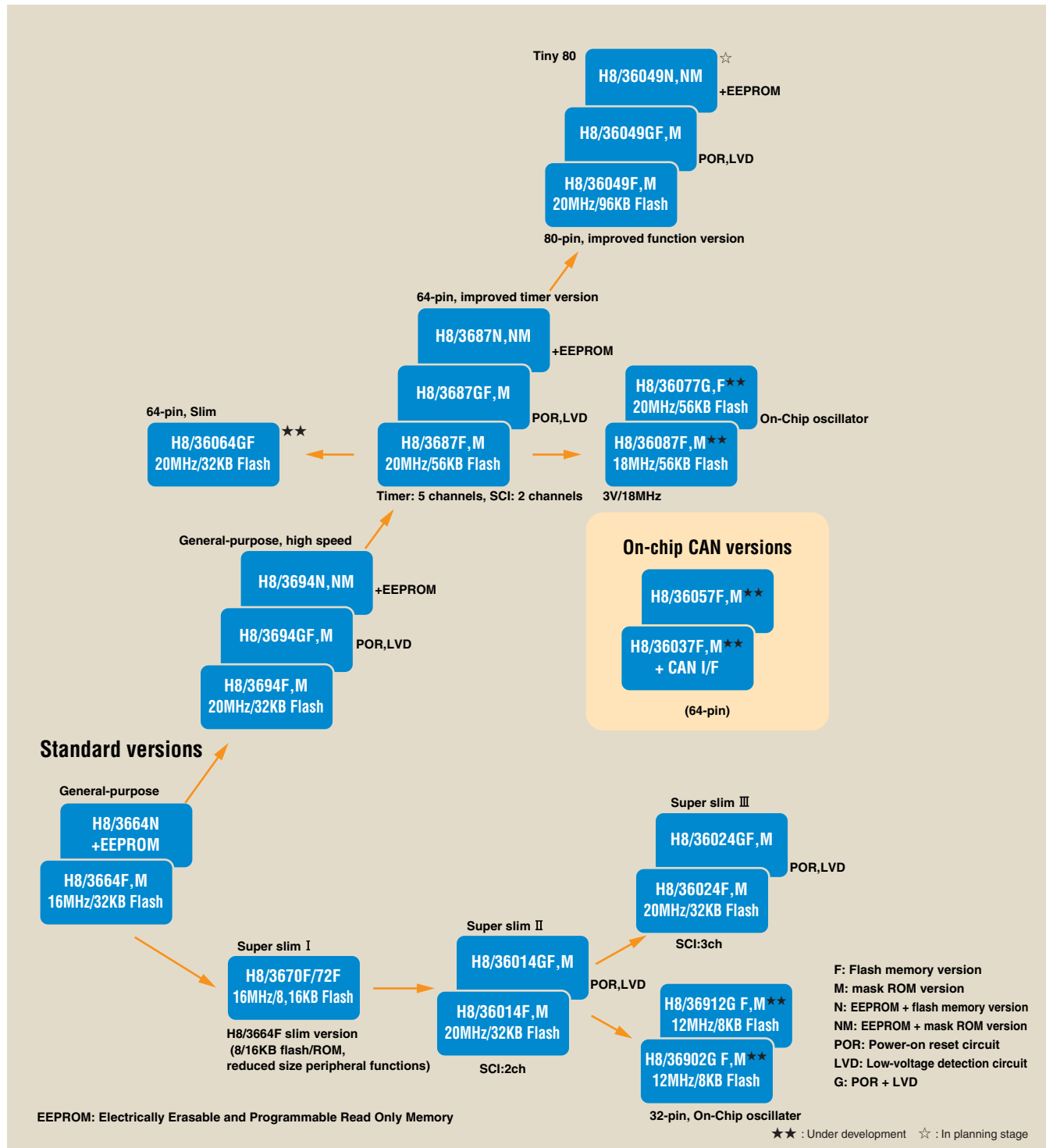
MCUs designed for compact systems and shorter development cycles in a wide range of fields

H8/300H Tiny Series Features

- Employs 16-bit H8/300H CPU with proven track record in a wide span of applications
 - Maximum operating frequency of 20MHz, minimum instruction execution time of 100ns
- Small package (10mm × 10mm, 7mm × 7mm) eases design of compact systems

- On-board debugging function allows program debugging with the MCU mounted in the system, simplifying development and adjustment and reducing the overall time required for product development
- Peripheral functions for a variety of requirements
 - Flash memory, I²C-bus, 10-bit A/D converter, serial interface, multifunction timer, etc.

• H8/300H Tiny Series Roadmap



H8/3664, H8/3664N Group

- Single power supply on-chip F-ZTAT
- On-chip I²C-bus interface
- On-chip emulator (E10T, E7) support
- Compact package (7mm × 7mm)

H8/3672 Group

- On-chip low-capacity F-ZTAT (16K bytes, 8K bytes)
- Slim version of the H8/3664 group
- On-chip emulator (E10T, E7) support

H8/3687 Group

- Single power supply on-chip F-ZTAT
- On-chip I²C-bus interface
- On-chip emulator (E10T, E7) support
- On-chip power-on reset and low-voltage detection circuits

H8/36087 Group

- Single power supply on-chip F-ZTAT
- On-chip I²C-bus interface
- On-chip emulator (E7) support
- 3V/20MHz operation version of H8/3687 group

H8/36024 Group

- Capabilities of the H8/36014 plus improved communication functions
- SCI interface: 3 channels
- On-chip emulator (E10T, E7) support
- On-chip power-on reset and low-voltage detection circuits

H8/36037, H8/36057 Group

- TinyHCAN: 1 channel
- Synchronous serial communication unit: 1 channel
- On-chip subsystem timer (subtimer): RC oscillator operation
- On-chip power-on reset and low-voltage detection circuits

H8/3694 Group

- Single power supply on-chip F-ZTAT
- On-chip I²C-bus interface
- On-chip emulator (E10T, E7) support
- Compact package (7mm × 7mm)
- On-chip power-on reset and low-voltage detection circuits

H8/36014 Group

- Single power supply on-chip F-ZTAT
- On-chip SCI interface: 2 channels
- On-chip emulator (E10T, E7) support
- On-chip power-on reset and low-voltage detection circuits

H8/36064G Group

- Single power supply on-chip F-ZTAT (32KB)
- On-chip I²C-bus interface
- On-chip emulator (E7) support
- On-chip power-on reset and low-voltage detection circuits

H8/36049 Group

- Single power supply on-chip F-ZTAT
- Numerous peripheral functions (on-chip RTC, timer B1, timer V, and timer W (all 1 channel); timer W: 2 channels; SCI: 3 channels; 14-bit PWM: 1 channel)
- On-chip emulator (E10T, E7) support
- On-chip power-on reset and low-voltage detection circuits

H8/36902G, H8/36912G Group

- High-accuracy on-chip oscillator
- On-chip power-on reset and low-voltage detection circuits
- 32-pin version
- On-chip emulator (E7) support

• Specifications (H8/300H Tiny Series)

Group		H8/36014																														
Product No.		H8/36010						H8/36011						H8/36012						H8/36012F												
Type No.		HD6436010GxxxFP	HD6436010GxxxFT	HD6436010GxxxFX	HD6436010GxxxFY	HD6436010xxxFP	HD6436010xxxFX	HD6436010xxxFY	HD6436011GxxxFP	HD6436011GxxxFT	HD6436011GxxxFX	HD6436011GxxxFY	HD6436011xxxFP	HD6436011xxxFT	HD6436011xxxFX	HD6436011xxxFY	HD6436012GxxxFP	HD6436012GxxxFT	HD6436012GxxxFX	HD6436012GxxxFY	HD6436012xxxFP	HD6436012xxxFT	HD6436012xxxFX	HD6436012xxxFY	HD6436012GFP	HD64F36012GFT	HD64F36012GFX	HD64F36012GFY	HD64F36012FP	HD64F36012FT	HD64F36012EX	HD64F36012EY
Memory	ROM(Bytes)	8K						12K						16K																		
	RAM(Bytes)	512												2K																		
	EEPROM(Bytes)	—												—																		
	ROM Type*	M												F																		
	Program Security	—																														
CPU	CPU	H8/300H Core																														
	Basic Instructions	62																														
	Minimum Instruction Execution Time (ns)	100 (@20MHz)																														
Clock	Clock Generation Circuit	1 circuit (System clock)																														
	PLL	—																														
	Subclock	—																														
	On-Chip Oscillator	—																														
	Oscillation Stop Detection	—																														
	Frequency Divider	1/n (n = 1, 8, 16, 32, 64)																														
	Power Save	Support 3 power save modes and module standby function, system clock divider. Standby mode, Sleep mode, Sub sleep mode																														
Power Supply	Power-On Reset/POR	Yes (option)																														
Voltage Detection	Low Voltage Detection/LVD	Yes (option)																														
A/D Converter	Resolution × Channels	10-bit × 4																														
	Sample and Hold	Yes																														
Timer	8-bit	Timer V × 1																														
	16-bit	Timer W × 1																														
	Prescaler	Timer V, Timer W																														
	Input Capture	Timer W																														
	Output Compare	Timer V, Timer W																														
	PWM Output	Timer V, Timer W																														
	Event Counter	—																														
	3-Phase Inverter Control	—																														
Watchdog Timer		Yes (selectable internal oscillator)																														
Serial Interface	Clock Sync./ Clock Async.	2																														
I ² C-bus		—																														
SSU/Special Serial I/O		—																														
CAN	Channels	—																														
	Buffers	—																														
I/O Ports	Input Only (Numbers)	4																														
	CMOS I/O Only (Numbers)	30																														
	High Current Drive Port	5																														
	Pull-Up Resistor	13																														
	NMOS Push-Pull	—																														
Interrupts(Sources)	External	9																														
Debugging Function	On-Chip Debug	Yes																														
	On-Board Flash Program	Yes																														
Other Functions	ROM Correction Function	Yes																														
Package		FP-48B, FP-64E, FP-48F, TNP-48																														
Operating Frequency/Supply Voltage		1 to 10MHz/2.7 to 5.5V												1 to 20MHz/4.0 to 5.5V										1 to 10MHz/3.0 to 5.5V								
Operating Ambient Temperature (°C)		-20 to 75, -40 to 85, -40 to 105																														

* F: F-ZTAT version. M: mask ROM version

* F: F-ZTAT version. M: mask ROM version

• Specifications (H8/300H Tiny Series)

Group		H8/36024																																						
Product No.		H8/36022				H8/36022F				H8/36023				H8/36024				H8/36024F																						
Type No.		HD64336022GxxxFP	HD64336022GxxxFT	HD64336022GxxxFX	HD64336022GxxxFY	HD64336022xxxrFT	HD64336022xxxrFX	HD64336022xxxrFY	HD64F36022GxxxFP	HD64F36022GxxxFT	HD64F36022GxxxFX	HD64F36022GxxxFY	HD64F36022xxxrFP	HD64F36022xxxrFT	HD64F36022xxxrFX	HD64F36022xxxrFY	HD64336023GxxxFP	HD64336023GxxxFT	HD64336023GxxxFX	HD64336023GxxxFY	HD64336023xxxrFP	HD64336023xxxrFT	HD64336023xxxrFX	HD64336023xxxrFY	HD64336024GxxxFP	HD64336024GxxxFT	HD64336024GxxxFX	HD64336024GxxxFY	HD64336024xxxrFP	HD64336024xxxrFT	HD64336024xxxrFX	HD64336024xxxrFY	HD64F36024GFP	HD64F36024GFT	HD64F36024GFY	HD64F36024GFY	HD64F36024FP	HD64F36024FT	HD64F36024FX	HD64F36024FY
Memory	ROM(Bytes)	16K																24K				32K																		
	RAM(Bytes)	512				2K				1K				2K																										
	EEPROM(Bytes)									—																														
	ROM Type*	M				F				—				M				F																						
CPU	Program Security	—																																						
	CPU	H8/300H Core																																						
	Basic Instructions	62																																						
Clock	Minimum Instruction Execution Time (ns)	100 (@20MHz)																																						
	Clock Generation Circuit	1 circuit (System clock)																																						
	PLL	—																																						
	Subclock	—																																						
	On-Chip Oscillator	—																																						
	Oscillation Stop Detection	—																																						
	Frequency Divider	1/n (n = 1, 8, 16, 32, 64)																																						
Power Supply	Power-On Reset/POR	Support 3 power save modes and module standby function, system clock divider.																																						
	Voltage Detection	Standby mode, Sleep mode, Sub sleep mode																																						
A/D Converter	Resolution × Channels	Yes (option)																																						
	Sample and Hold	Yes (option)																																						
Timer	8-bit	10-bit × 4																																						
	16-bit	Yes																																						
	Prescaler	Timer V × 1																																						
	Input Capture	Timer W × 1																																						
	Output Compare	Timer V, Timer W																																						
	PWM Output	Timer W																																						
	Event Counter	Timer V, Timer W																																						
Watchdog Timer	3-Phase Inverter Control	Timer V, Timer W																																						
		—																																						
Serial Interface	Clock Sync./ Clock Async.	Yes (selectable internal oscillator)																																						
	I ² C-bus	3																																						
SSU/Special Serial I/O		—																																						
		—																																						
CAN	Channels	—																																						
	Buffers	—																																						
I/O Ports	Input Only (Numbers)	4																																						
	CMOS I/O Only (Numbers)	30																																						
	High Current Drive Port	5																																						
	Pull-Up Resistor	13																																						
	NMOS Push-Pull	—																																						
Interrupts(Sources)	External	9																																						
	On-Chip Debug	Yes																																						
Debugging Function	On-Board Flash Program	Yes																																						
	ROM Correction Function	Yes																																						
Package		FP-48B, FP-64E, FP-48F, TNP-48																																						
Operating Frequency/Supply Voltage		1 to 10MHz/ 2.7 to 5.5V				1 to 10MHz/ 3.0 to 5.5V				1 to 10MHz/ 2.7 to 5.5V				1 to 10MHz/ 3.0 to 5.5V																										
		1 to 20MHz/ 4.0 to 5.5V				1 to 20MHz/ 4.0 to 5.5V				1 to 20MHz/ 4.0 to 5.5V				1 to 20MHz/ 4.0 to 5.5V																										
Operating Ambient Temperature (°C)		-20 to 75, -40 to 85, -40 to 105																																						

* F: F-ZTAT version, M: mask BOM version

• Specifications (H8/300H Tiny Series)

Group		H8/36037																															
Product No.		H8/36032				H8/36033				H8/36034				H8/36034F				H8/36035				H8/36036				H8/36037				H8/36037F			
Type No.		HD6436032GxxxFZ	HD6436032GxxxH	HD6436032xxxFZ	HD6436032xxxH	HD6436033GxxxFZ	HD6436033GxxxH	HD6436033xxxFZ	HD6436033xxxH	HD6436034GxxxFZ	HD6436034GxxxH	HD6436034xxxFZ	HD6436034xxxH	HD64F36034GFZ	HD64F36034GH	HD64F36034FZ	HD64F36034H	HD6436035GxxxFZ	HD6436035GxxxH	HD6436035xxxFZ	HD6436035xxxH	HD6436036GxxxFZ	HD6436036GxxxH	HD6436036xxxFZ	HD6436036xxxH	HD6436037GxxxFZ	HD6436037GxxxH	HD6436037xxxFZ	HD6436037xxxH	HD64F36037GFZ	HD64F36037GH	HD64F36037FZ	HD64F36037H
Memory	ROM(Bytes)	16K				24K				32K				2K				40K				48K				56K				3K			
	RAM(Bytes)	1K																															
	EEPROM(Bytes)																																
	ROM Type*					M				F								M								F							
	Program Security																																
CPU	CPU	H8/300H Core																															
	Basic Instructions	62																															
	Minimum Instruction Execution Time (ns)	100 (@20MHz)																															
Clock	Clock Generating Circuit	2 (system clock circuit, on-chip sub clock oscillator)																															
	PLL	—																															
	Subclock	Yes																															
	On-Chip Oscillator	—																															
	Oscillation Stop Detection	—																															
	Frequency Divider	1/n (n = 1, 8, 16, 32, 64)																															
	Power Save	Support 4 power save modes and module standby function, system clock divider. Standby mode, Sub active mode (when using on-chip oscillation sub clock) Sleep mode, Sub sleep mode (when using on-chip oscillation sub clock)																															
Power Supply	Power-On Reset/POR	Yes (option)																															
Voltage Detection	Low Voltage Detection/LVD	Yes (option)																															
A/D Converter	Resolution × Channels	10-bit × 8																															
	Sample and Hold	Yes																															
Timer	8-bit	Timer B1 × 1, Timer V × 1, Sub-timer × 1																															
	16-bit	Timer Z × 1																															
	Prescaler	Timer B1, Timer V, Sub-timer, Timer Z																															
	Input Capture	Timer Z																															
	Output Compare	Timer V, Timer Z																															
	PWM Output	Timer V, Timer Z																															
	Event Counter	Timer B1																															
	3-Phase Inverter Control	Timer Z																															
Watchdog Timer		Yes (selectable internal oscillator)																															
Serial Interface	Clock Sync./ Clock Async.	1																															
I ² C-bus		—																															
SSU/Special Serial I/O		2																															
CAN	Channels	1																															
	Buffers	4																															
I/O Ports	Input Only (Numbers)	8																															
	CMOS I/O Only (Numbers)	45																															
	High Current Drive Port	8																															
	Pull-Up Resistor	13																															
	NMOS Push-Pull	—																															
Interrupts(Sources)	External	11																															
Debugging Function	On-Chip Debug	Yes																															
	On-Board Flash Program	Yes																															
Other Functions	ROM Correction Function	Yes																															
Package		FP-64K, FP-64A																															
Operating Frequency/Supply Voltage		1 to 10MHz/ 2.7 to 5.5V 1 to 20MHz/ 4.0 to 5.5V								1 to 10MHz/ 3.0 to 5.5V 1 to 20MHz/ 4.0 to 5.5V								1 to 10MHz/ 2.7 to 5.5V 1 to 20MHz/ 4.0 to 5.5V				1 to 10MHz/ 3.0 to 5.5V 1 to 20MHz/ 4.0 to 5.5V											
Operating Ambient Temperature (°C)		-20 to 75, -40 to 85, -40 to 105, -40 to 125																															

* F: F-ZTAT version, M: mask ROM version

• Specifications (H8/300H Tiny Series)

Group		H8/36057														H8/36049										
Product No.		H8/36054				H8/36054F				H8/36057				H8/36057F				H8/36047		H8/36048		H8/36049		H8/36049F		
Type No.		HD4336054GxxFZ	HD4336054GxxH	HD4336054LxxFZ	HD4336054LxxH	HD4336054GFZ	HD4336054GH	HD4336054FZ	HD4336054H	HD4336057GxxFZ	HD4336057GxxH	HD4336057LxxFZ	HD4336057LxxH	HD4336057GFZ	HD4336057GH	HD4336057FZ	HD4336057H	HD4336047GxxH	HD4336047LxxH	HD4336048GxxH	HD4336048LxxH	HD4336049GxxH	HD4336049LxxH	HD4336049GH	HD4336049H	
Memory	ROM(Bytes)	32K				2K				56K				3K				64K		80K		96K				
	RAM(Bytes)																					4K				
	EEPROM(Bytes)									—																
	ROM Type*	M				F				M				F				M				F				
CPU	Program Security	Yes																								
	CPU	H8/300H Core																								
	Basic Instructions	62																								
	Minimum Instruction Execution Time (ns)	100 (@20MHz)																								
Clock	Clock Generation Circuit	2 (system clock circuit, on-chip sub clock oscillator)																								
	PLL	—																								
	Subclock	Yes																								
	On-Chip Oscillator	—																								
	Oscillation Stop Detection	—																								
	Frequency Divider	1/n (n = 1, 8, 16, 32, 64)																								
	Power Save		Support 4 power save modes and module standby function, system clock divider.												Support 4 power save modes and module standby function, system clock divider.											
			Standby mode,												Standby mode,											
			Sub active mode (when using on-chip oscillation sub clock)												Sub active mode (when using sub clock at 32kHz)											
		Sleep mode,												Sleep mode,												
Power Supply	Power-On Reset/POR	Yes (option)																								
Voltage Detection	Low Voltage Detection/LVD	Yes (option)																								
A/D Converter	Resolution × Channels	10-bit × 8																								
	Sample and Hold	Yes																								
Timer	8-bit	Timer B1 × 1, Timer V × 1, Sub-timer × 1												RTC × 1, Timer B1 × 1, Timer V × 1												
	16-bit	Timer Z × 1												Timer W × 1, Timer Z × 1												
	Prescaler	Timer B1, Timer V, Sub-timer, Timer Z												RTC, Timer B1, Timer V, Timer W, Timer Z												
	Input Capture	Timer Z												Timer W, Timer Z												
	Output Compare	Timer V, Timer Z												Timer V, Timer W, Timer Z												
	PWM Output	Timer V, Timer Z												14-bit PWM, Timer V, Timer W, Timer Z												
	Event Counter																									
	3-Phase Inverter Control																									
Watchdog Timer		Timer B1 Timer Z																								
Serial Interface	Clock Sync./ Clock Async.	Yes (selectable internal oscillator)																								
I ² C-bus		2												3												
SSU/Special Serial I/O		—												1												
CAN	Channels	2												—												
	Buffers	1												—												
I/O Ports	Input Only (Numbers)	4												—												
	CMOS I/O Only (Numbers)	8																								
	High Current Drive Port	45												59												
	Pull-Up Resistor	8												13												
	NMOS Push-Pull	—												13												
Interrupts(Sources)	External	—												2												
Debugging Function	On-Chip Debug	11																								
	On-Board Flash Program	Yes												Yes												
Other Functions	ROM Correction Function	Yes												Yes												
Package		FP-64K, FP-64A												FP-80A												
Operating Frequency/Supply Voltage		1 to 10MHz/ 2.7 to 5.5V				1 to 10MHz/ 3.0 to 5.5V				1 to 10MHz/ 2.7 to 5.5V				1 to 10MHz/ 3.0 to 5.5V				1 to 10MHz/ 2.7 to 5.5V				1 to 10MHz/ 3.0 to 5.5V				
		1 to 20MHz/ 4.0 to 5.5V				1 to 20MHz/ 4.0 to 5.5V				1 to 20MHz/ 4.0 to 5.5V				1 to 20MHz/ 4.0 to 5.5V				1 to 20MHz/ 4.0 to 5.5V				1 to 20MHz/ 4.0 to 5.5V				
Operating Ambient Temperature (°C)		-20 to 75, -40 to 85, -40 to 105, -40 to 125												-20 to 75, -40 to 85												

* F: F-ZTAT version. M: mask ROM version

• Specifications (H8/300H Tiny Series)

Group		H8/36064G			H8/36077**		H8/36087													
Product No.		H8/36064GF			H8/36077F		H8/36082	H8/36083	H8/36084	H8/36085	H8/36086	H8/36087	H8/36087F							
Type No.		HD64F36064GFP	HD64F36064GFZ	HD64F36064GH	HD64F36077GFZ	HD64F36077GFH	HD64336082xxxFP	HD64336082xxxH	HD64336083xxxFP	HD64336083xxxH	HD64336084xxxFP	HD64336084xxxH	HD64336085xxxFP	HD64336085xxxH	HD64336086xxxFP	HD64336086xxxH	HD64336087xxxFP	HD64336087xxxH	HD64F36087FP	HD64F36087H
Memory	ROM(Bytes)	32K			56K		16K		24K		32K		40K		48K		56K			
	RAM(Bytes)	2K			4K						3K						4K			
	EEPROM(Bytes)						—													
	ROM Type*				F						M						F			
CPU	Program security						Yes													
	CPU						H8/300H Core													
	Basic Instructions						62													
Clock	Minimum Instruction Execution Time (ns)	100 (@20MHz)									111 (@18MHz)									
	Clock Generation Circuit	1 (system clock circuit)			3 (system clock circuit, sub clock circuit, on-chip oscillator)						2 (system clock circuit, sub clock circuit)									
	PLL						—													
	Subclock	—							Yes											
	On-Chip Oscillator	—			High-speed						—									
	Oscillation Stop Detection	—			Yes						—									
	Frequency Divider						1/n (n = 1, 8, 16, 32, 64)													
	Power Save	Support 3 power save modes and module standby function, system clock divider. Standby mode, Sleep mode, Sub sleep mode					Support 4 power save modes and module standby function, system clock divider. Standby mode, Sub active mode (when using sub clock at 32kHz) Sleep mode, Sub sleep mode (when using sub clock at 32kHz)													
Power Supply Voltage Detection	Power-On Reset/POR	Yes (option)									—									
A/D Converter	Low Voltage Detection/LVD	Yes (option)									—									
	Resolution × Channels						10-bit × 8													
Timer	Sample and Hold						Yes													
	8-bit	Timer B1 × 1, Timer V × 1					RTC × 1, Timer B1 × 1, Timer V × 1													
	16-bit						Timer Z × 1													
	Prescaler	Timer B1, Timer V, Timer Z					RTC, Timer B1, Timer V, Timer Z													
	Input Capture						Timer Z													
	Output Compare						Timer V, Timer Z													
	PWM Output						14-bit PWM, Timer V, Timer Z													
	Event Counter						Timer B1													
3-Phase Inverter Control							Timer Z													
Watchdog Timer							Yes (selectable internal oscillator)													
Serial Interface		Clock Sync./ Clock Async.					2													
I ² C-bus							1													
SSU/Special Serial I/O							—													
CAN	Channels						—													
	Buffers						—													
I/O Ports	Input Only (Numbers)						8													
	CMOS I/O Only (Numbers)	45			47						45									
	High Current Drive Port						8													
	Pull-Up Resistor						13													
NMOS Push-Pull							2													
Interrupts(Sources)	External						11													
Debugging Function	On-Chip Debug						Yes													
	On-Board Flash Program						Yes													
Other Functions	ROM Correction Function						Yes													
Package		FP-64K, FP-64A, FP-64E			FP-64K, FP-64A						FP-64E, FP-64A									
Operating Frequency/Supply Voltage		1 to 10MHz/3.0 to 5.5V 1 to 20MHz/4.0 to 5.5V			4 to 20MHz/ 4.5 to 5.5V						4 to 18MHz/3.0 to 3.6V									
Operating Ambient Temperature (°C)							-20 to 75, -40 to 85													

* F: F-ZTAT version, M: mask ROM version

★★ : Under development

• Specifications (H8/300H Tiny Series)

Group		H8/3664														
Product No.		H8/3660					H8/3661					H8/3662				
Type No.		HD6433660xxxFP	HD6433660xxxFX	HD6433660xxxFY	HD6433660xxxH	HD6433660xxxBP	HD6433661xxxFP	HD6433661xxxFX	HD6433661xxxFY	HD6433661xxxH	HD6433661xxxBP	HD6433662xxxFP	HD6433662xxxFX	HD6433662xxxFY	HD6433662xxxH	HD6433662xxxBP
		8K					12K					16K				
Memory	ROM(Bytes)															
	RAM(Bytes)						512									
	EEPROM(Bytes)															
	ROM Type*						M									
							Yes									
CPU							H8/300H Core									
							62									
							125 (@16MHz)									
Clock	Clock Generation Circuit						2 (system clock circuit, sub clock circuit)									
	PLL						—									
	Subclock						Yes									
	On-Chip Oscillator						—									
							—									
							1/n (n = 1, 8, 16, 32, 64)									
							Support 4 power save modes and module standby function, system clock divider.									
							Standby mode, Sub active mode (when using sub clock at 32kHz), Sleep mode, Sub sleep mode (when using sub clock at 32kHz)									
Power Supply																
Voltage Detection							—									
A/D Converter							10-bit × 8 (DP-42S:4)									
							Yes									
Timer	8-bit						Timer A × 1, Timer V × 1									
	16-bit						Timer W × 1									
	Prescaler						Timer A, Timer V									
	Input Capture						Timer W									
	Output Compare						Timer V, Timer W									
	PWM Output						Timer V, Timer W									
	Event Counter						—									
	3-Phase Inverter Control						—									
Watchdog Timer							Yes (selectable internal oscillator)									
Serial Interface							Clock Sync./ Clock Async.									
I ² C-bus							1									
SSU/Special Serial I/O							—									
CAN	Channels						—									
	Buffers						—									
I/O Ports	Input Only (Numbers)						8									
	CMOS I/O Only (Numbers)						29									
	High Current Drive Port						8									
	Pull-Up Resistor						13									
	NMOS Push-Pull						2									
Interrupts(Sources)							External									
							11									
Debugging Function							On-Chip Debug									
							On-Board Flash Program									
Other Functions							ROM Correction Function									
							Yes									
Package							DP-42S, FP-48B, FP-64E, FP-64A, FP-48F									
Operating Frequency/Supply Voltage							1 to 10MHz/2.7 to 5.5V, 1 to 16MHz/4.0 to 5.5V									
Operating Ambient Temperature (°C)							-20 to 75, -40 to 85									

* M: mask ROM version

• Specifications (H8/300H Tiny Series)

Group		H8/3664										H8/3672								
Product No.		H8/3664					H8/3664F					H8/3664N			H8/3670F			H8/3672F		
Type No.		HD6433664xxxFP	HD6433664xxxFX	HD6433664xxxFY	HD6433664xxxH	HD6433664xxxBP	HD64F3664FP	HD64F3664FX	HD64F3664FY	HD64F3664H	HD64F3664BP	HD64N3664FP	HD64F3670FP	HD64F3670FX	HD64F3670FY	HD64F3672FP	HD64F3672FX	HD64F3672FY		
Memory	ROM(Bytes)	32K										2K			8K			16K		
	RAM(Bytes)	1K										2K								
	EEPROM(Bytes)	—										512			—					
	ROM Type*	M										F								
	Program Security	Yes													—					
CPU	CPU	H8/300H Core																		
	Basic Instructions	62																		
	Minimum Instruction Execution Time (ns)	125 (@16MHz)																		
Clock	Clock Generation Circuit	2 (system clock circuit, sub clock circuit)										1 (system clock circuit)								
	PLL	—																		
	Subclock	Yes										—								
	On-Chip Oscillator	—																		
	Oscillation Stop Detection	—																		
	Frequency Divider	1/n (n = 1, 8, 16, 32, 64)																		
	Power Save	Support 4 power save modes and module standby function, system clock divider. Standby mode, Sub active mode (when using sub clock at 32kHz) Sleep mode, Sub sleep mode (when using sub clock at 32kHz)										Support 3 power save modes and module standby function, system clock divider. Standby mode, Sleep mode, Sub sleep mode								
Power Supply	Power-On Reset/POR	—																		
Voltage Detection	Low Voltage Detection/LVD	—																		
A/D Converter	Resolution × Channels	10-bit × 8 (DP-42S:4)										10-bit × 4								
	Sample and Hold	Yes																		
Timer	8-bit	Timer A × 1, Timer V × 1										Timer V × 1								
	16-bit	Timer W × 1																		
	Prescaler	Timer A, Timer V										Timer V, Timer W								
	Input Capture	Timer W																		
	Output Compare	Timer V, Timer W																		
	PWM Output	Timer V, Timer W																		
	Event Counter	—																		
	3-Phase Inverter Control	—																		
Watchdog Timer	Yes (selectable internal oscillator)																			
Serial Interface	Clock Sync./ Clock Async.	1										—								
I ² C-bus		1																		
SSU/Special	Serial I/O	—																		
CAN	Channels	—																		
	Buffers	—																		
I/O Ports	Input Only (Numbers)	8					27					4			26					
	CMOS I/O Only (Numbers)	29										5								
	High Current Drive Port	8					13													
	Pull-Up Resistor																			
Interrupts(Sources)	NMOS Push-Pull	2										—								
	External	11										9								
Debugging Function	On-Chip Debug	Yes																		
	On-Board Flash Program	Yes																		
Other Functions	ROM Correction Function	Yes																		
Package		DP-42S, FP-48B, FP-64E, FP-64A, FP-48F										FP-64E			FP-48B, FP-64E, FP-48F					
Operating Frequency/Supply Voltage		1 to 10MHz/2.7 to 5.5V, 1 to 16MHz/4.0 to 5.5V										1 to 10MHz/3.0 to 5.5V, 1 to 16MHz/4.0 to 5.5V								
Operating Ambient Temperature (°C)		-20 to 75, -40 to 85																		

* F: Flash memory version, M: mask ROM version

• Specifications (H8/300H Tiny Series)

Group		H8/3687																																					
Product No.		H8/3682		H8/3683		H8/3684		H8/3684F		H8/3685		H8/3686		H8/3687		H8/3687F		H8/3687N																					
Type No.		HD6433682GxxxFP	HD6433682GxxxH	HD6433682xxxFP	HD6433682xxxH	HD6433683GxxxFP	HD6433683GxxxH	HD6433683xxxFP	HD6433683xxxH	HD6433684GxxxFP	HD6433684GxxxH	HD6433684xxxFP	HD6433684xxxH	HD64F3684GFP	HD64F3684GH	HD64F3684FP	HD64F3684H	HD6433685GxxxFP	HD6433685GxxxH	HD6433685xxxFP	HD6433685xxxH	HD6433686GxxxFP	HD6433686GxxxH	HD6433686xxxFP	HD6433686xxxH	HD6433687GxxxFP	HD6433687GxxxH	HD6433687xxxFP	HD6433687xxxH	HD64F3687GFP	HD64F3687GH	HD64F3687FP	HD64F3687H	HD6483687GFP	HD64N3687GFP				
Memory	ROM(Bytes)	16K		24K		32K				40K		48K																				56K				3K		4K	
	RAM(Bytes)			3K						4K																				4K				3K		4K			
	EEPROM(Bytes)																																			512			
	ROM Type*			M						F																				F				M		F			
CPU	Program Security	Yes																																					
	CPU	H8/300H Core																																					
	Basic Instructions	62																																					
Clock	Minimum Instruction Execution Time (ns)	100 (@20MHz)																																					
	Clock Generation Circuit	2 (system clock circuit, sub clock circuit)																																					
	PLL	—																																					
	Subclock	Yes																																					
	On-Chip Oscillator	—																																					
	Oscillation Stop Detection	—																																					
	Frequency Divider	1/n (n = 1, 8, 16, 32, 64)																																					
	Power Save	Support 4 power save modes and module standby function, system clock divider. Standby mode, Sub active mode (when using sub clock at 32kHz) Sleep mode, Sub sleep mode (when using sub clock at 32kHz)																																					
Power Supply	Power-On Reset/POR	Yes (option)																																					
Voltage Detection	Low Voltage Detection/LVD	Yes (option)																																					
A/D Converter	Resolution × Channels	10-bit × 8																																					
	Sample and Hold	Yes																																					
Timer	8-bit	RTC × 1, Timer B1 × 1, Timer V × 1																																					
	16-bit	Timer Z × 1																																					
	Prescaler	RTC, Timer B1, Timer V, Timer Z																																					
	Input Capture	Timer Z																																					
	Output Compare	Timer Z, Timer V																																					
	PWM Output	14-bit PWM, Timer Z, Timer V																																					
	Event Counter	Timer B1																																					
	3-Phase Inverter Control	Timer Z																																					
Watchdog Timer		Yes (selectable internal oscillator)																																					
Serial Interface Clock Sync./ Clock Async.		2																																					
I ² C-bus		1																																					
SSU/Special Serial I/O		—																																					
CAN	Channels	—																																					
	Buffers	—																																					
I/O Ports	Input Only (Numbers)	8																																					
	CMOS I/O Only (Numbers)	45																																					
	High Current Drive Port																																						
	Pull-Up Resistor	8																																					
	NMOS Push-Pull	13																																					
Interrupts(Sources)	External	2																																					
Debugging Function	On-Chip Debug	11																																					
	On-Board Flash Program	Yes																																					
Other Functions	ROM Correction Function	Yes																																					
Package		FP-64E, FP-64A																																					
Operating Frequency/Supply Voltage		1 to 10MHz/ 2.7 to 5.5V 1 to 20MHz/ 4.0 to 5.5V				1 to 10MHz/ 3.0 to 5.5V 1 to 20MHz/ 4.0 to 5.5V				1 to 10MHz/ 2.7 to 5.5V 1 to 20MHz/ 4.0 to 5.5V				1 to 10MHz/ 3.0 to 5.5V 1 to 20MHz/ 4.0 to 5.5V				1 to 10MHz/ 2.7 to 5.5V 1 to 20MHz/ 4.0 to 5.5V				1 to 10MHz/ 3.0 to 5.5V 1 to 20MHz/ 4.0 to 5.5V				1 to 10MHz/ 2.7 to 5.5V 1 to 20MHz/ 4.0 to 5.5V		1 to 10MHz/ 2.7 to 5.5V 1 to 20MHz/ 4.0 to 5.5V		1 to 10MHz/ 2.7 to 5.5V 1 to 20MHz/ 4.0 to 5.5V		1 to 10MHz/ 2.7 to 5.5V 1 to 20MHz/ 4.0 to 5.5V							
Operating Ambient Temperature (°C)		-20 to 75, -40 to 85, -40 to 105, -40 to 125																																					

• Specifications (H8/300H Tiny Series)

Group		H8/36902G										H8/36912G													
Product No.		H8/36900			H8/36901			H8/36902			H8/36902F			H8/36911			H8/36912			H8/36912F					
Type No.		HD64336900GxxxFH	HD64336900GxxxP	HD64336900GxxxTP	HD64336901GxxxFH	HD64336901GxxxP	HD64336901GxxxTP	HD64336902GxxxFH	HD64336902GxxxP	HD64336902GxxxTP	HD64F36902GFH	HD64F36902GP	HD64F36902GTP	HD64336911GxxxFH	HD64336911GxxxP	HD64336911GxxxTP	HD64336912GxxxFH	HD64336912GxxxP	HD64336912GxxxTP	HD64F36912GFH	HD64F36912GP	HD64F36912GTP			
Memory	ROM(Bytes)	2K			4K			8K						4K			8K								
	RAM(Bytes)	256						512			1.5K			256			512			1.5K					
	EEPROM(Bytes)	—																							
	ROM Type*	M										F			M						F				
	Program Security	—																							
CPU	CPU	H8/300H Core																							
	Basic Instructions	62																							
	Minimum Instruction Execution Time (ns)	167 (@ 12MHz)																							
Clock	Clock Generation Circuit	2 (system clock circuit, sub clock circuit)																							
	PLL	—																							
	Subclock	—																							
	On-Chip Oscillator	Yes																							
	Oscillation Stop Detection	—																							
	Frequency Divider	1/n (n = 1, 8, 16, 32, 64)																							
	Power Save	Support 3 power save modes and module standby function, system clock divider. Standby mode, Sleep mode, Sub sleep mode																							
Power Supply	Power-On Reset/POR	Yes (option)																							
Voltage Detection	Low Voltage Detection/LVD	Yes (option)																							
A/D Converter	Resolution × Channels	10-bit × 4																							
	Sample and Hold	Yes																							
Timer	8-bit	Timer V × 1										Timer B1 × 1, Timer V × 1													
	16-bit	Timer W × 1										Timer B1 × 1, Timer V × 1													
	Prescaler	Timer V, Timer W										Timer B1, Timer V, Timer W													
	Input Capture	Timer W																							
	Output Compare	Timer V, Timer W																							
	PWM Output	Timer V, Timer W																							
	Event Counter	—										Timer B1													
	3-Phase Inverter Control	—																							
Watchdog Timer		Yes (selectable internal oscillator)																							
Serial Interface	Clock Sync./ Clock Async.	—										1													
I ² C-bus		—										1													
SSU/Special Serial I/O		—																							
CAN	Channels	—																							
	Buffers	—																							
I/O Ports	Input Only (Numbers)	4																							
	CMOS I/O Only (Numbers)	18																							
	High Current Drive Port	5																							
	Pull-Up Resistor	3																							
	NMOS Push-Pull	2																							
Interrupts(Sources)	External	4																							
Debugging Function	On-Chip Debug	Yes																							
	On-Board Flash Program	Yes																							
Other Functions	ROM Correction Function	Yes																							
Package		FP-32A, FP-32D, DP-32S																							
Operating Frequency/Supply Voltage		2 to 12MHz/ 2.7 to 5.5V										2 to 12MHz/ 3.0 to 5.5V										1 to 12MHz/ 2.7 to 5.5V		1 to 12MHz/ 3.0 to 5.5V	
Operating Ambient Temperature (°C)		-20 to 75, -40 to 85																							

* F: F-ZTAT version, M: mask ROM version

• Specifications (H8/300H Tiny Series)

Group		H8/3694																			
Product No.		H8/3690								H8/3691								H8/3692			
Type No.		HD6433690GxxxFP	HD6433690GxxxFX	HD6433690GxxxFY	HD6433690GxxxH	HD6433690GxxxFT	HD6433690GxxxFP	HD6433690GxxxFX	HD6433690GxxxFY	HD6433690GxxxH	HD6433690GxxxFT	HD6433691GxxxFP	HD6433691GxxxFX	HD6433691GxxxFY	HD6433691GxxxH	HD6433691GxxxFT	HD6433692GxxxFP	HD6433692GxxxFX	HD6433692GxxxFY	HD6433692GxxxH	HD6433692GxxxFT
Memory	ROM(Bytes)	8K								12K								16K			
	RAM(Bytes)									512											
	EEPROM(Bytes)									—											
	ROM Type*									M											
	Program Security									Yes											
CPU	CPU									H8/300H Core											
	Basic Instructions									62											
	Minimum Instruction Execution Time (ns)									100 (@20MHz)											
Clock	Clock Generation Circuit									2 (system clock circuit, sub clock circuit)											
	PLL									—											
	Subclock									Yes											
	On-Chip Oscillator									—											
	Oscillation Stop Detection									—											
	Frequency Divider									1/n (n = 1, 8, 16, 32, 64)											
Power Supply	Power-On Reset/POR									Support 4 power save modes and module standby function, system clock divider.											
	Low Voltage Detection/LVD									Standby mode, Sub active mode (when using sub clock at 32kHz), Sleep mode, Sub sleep mode (when using sub clock at 32kHz)											
A/D Converter	Resolution × Channels									Yes (option)											
	Sample and Hold									Yes (option)											
Timer	8-bit									Timer A × 1, Timer B1 × 1, Timer V × 1											
	16-bit									Timer W × 1											
	Prescaler									Timer A, Timer B1, Timer V, Timer W											
	Input Capture									Timer W											
	Output Compare									Timer W											
	PWM Output									Timer V, Timer W											
	Event Counter									Timer B1											
	3-Phase Inverter Control									—											
Watchdog Timer										Yes (selectable internal oscillator)											
Serial Interface		Clock Sync./ Clock Async.								1											
I ² C-bus										1											
SSU/Special Serial I/O										—											
CAN	Channels									—											
	Buffers									—											
I/O Ports	Input Only (Numbers)									8											
	CMOS I/O Only (Numbers)									29											
	High Current Drive Port									8											
	Pull-Up Resistor									13											
	NMOS Push-Pull									2											
Interrupts(Sources)		External								11											
Debugging Function		On-Chip Debug								Yes											
		On-Board Flash Program								Yes											
Other Functions		ROM Correction Function								Yes											
Package										FP-48B, FP-64E, FP-64A, FP-48F, TNP-48											
Operating Frequency/Supply Voltage										1 to 10MHz/2.7 to 5.5V, 1 to 20MHz/4.0 to 5.5V											
Operating Ambient Temperature (°C)										-20 to 75, -40 to 85, -40 to 105, -40 to 125											

* M: mask ROM version

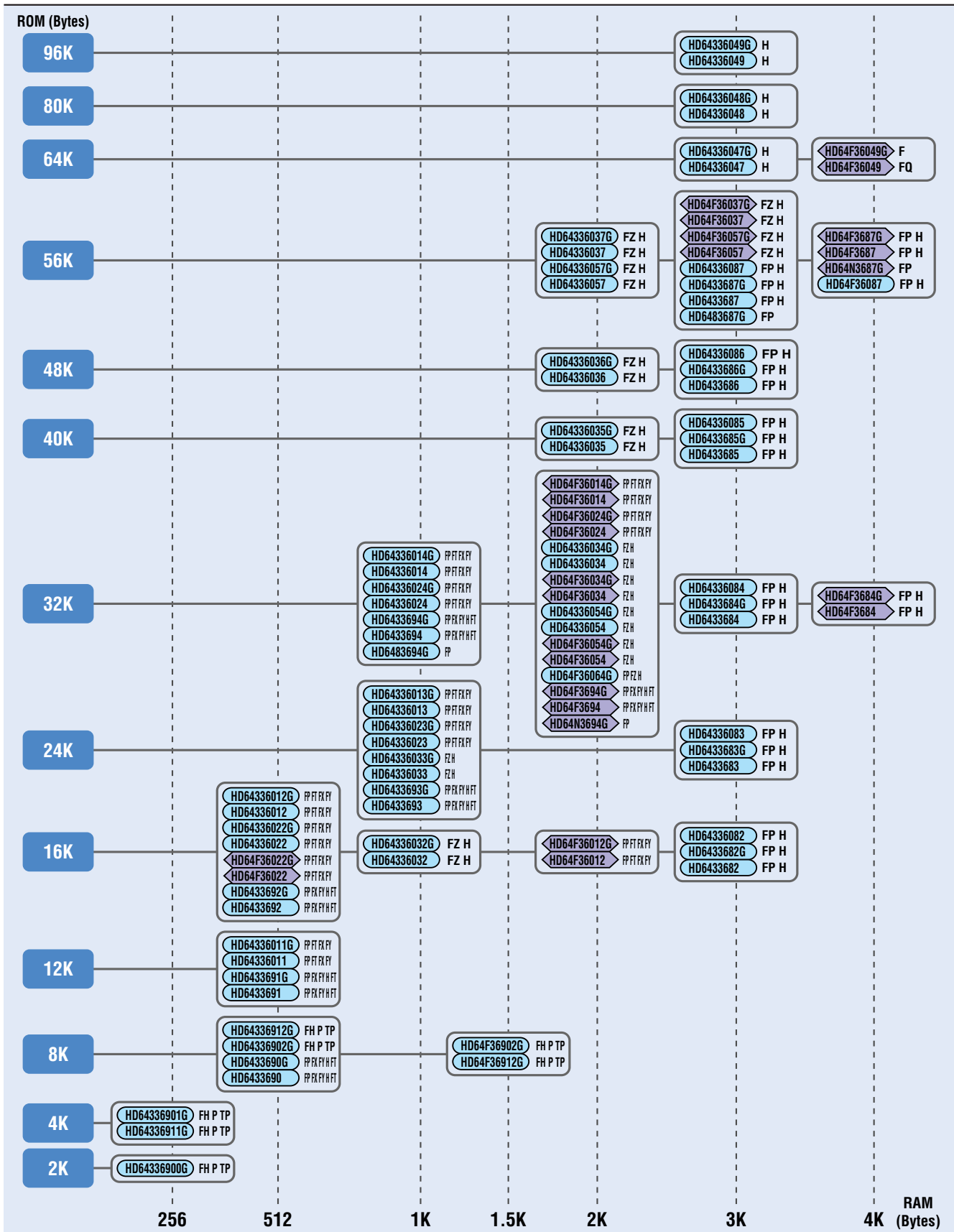
• Specifications (H8/300H Tiny Series)

Group		H8/3694																													
Product No.		H8/3693						H8/3694						H8/3694F						H8/3694N											
Type No.		HD6433693GxxxFP	HD6433693GxxxFX	HD6433693GxxxFY	HD6433693GxxxH	HD6433693GxxxFT	HD6433693xxxFP	HD6433693xxxFX	HD6433693xxxFY	HD6433693xxxH	HD6433693xxxFT	HD6433694GxxxFP	HD6433694GxxxFX	HD6433694GxxxFY	HD6433694GxxxH	HD6433694GxxxFT	HD64F3694GFP	HD64F3694GFX	HD64F3694GFY	HD64F3694GH	HD64F3694GFT	HD64F3694FP	HD64F3694FX	HD64F3694FY	HD64F3694H	HD64F3694FT	HD64N3694GFP	HD64N3694GFP			
Memory	ROM(Bytes)	24K						1K						32K																	
	RAM(Bytes)																														
	EEPROM(Bytes)													—														512			
	ROM Type*							M												F								M		F	
	Program Security							Yes												F											
CPU	CPU	H8/300H Core																													
	Basic Instructions	62																													
Clock	Minimum Instruction Execution Time (ns)	100 (@20MHz)																													
	Clock Generation Circuit	2 (system clock circuit, sub clock circuit)																													
	PLL	—																													
	Subclock	Yes																													
	On-Chip Oscillator	—																													
	Oscillation Stop Detection	—																													
	Frequency Divider	1/n (n = 1, 8, 16, 32, 64)																													
Power Supply	Power-On Reset/POR	Yes (option)																													
	Voltage Detection	Yes (option)																													
A/D Converter	Resolution × Channels	10-bit × 8																													
	Sample and Hold	Yes																													
Timer	8-bit	Timer A × 1, Timer B1 × 1, Timer V × 1																													
	16-bit	Timer W × 1																													
	Prescaler	Timer A, Timer B1, Timer V, Timer W																													
	Input Capture	Timer W																													
	Output Compare	Timer W																													
	PWM Output	Timer V, Timer W																													
	Event Counter	Timer B1																													
Watchdog Timer	3-Phase Inverter Control	—																													
		Yes (selectable internal oscillator)																													
Serial Interface	Clock Sync./ Clock Async.	1																													
	I ² C-bus	1																													
SSU/Special Serial I/O		—																													
		—																													
CAN	Channels	—																													
	Buffers	—																													
I/O Ports	Input Only (Numbers)	8																													
	CMOS I/O Only (Numbers)	29																													
	High Current Drive Port	8																													
	Pull-Up Resistor	13																													
	NMOS Push-Pull	2																													
Interrupts(Sources)	External	11																													
Debugging Function	On-Chip Debug	Yes																													
	On-Board Flash Program	Yes																													
Other Functions	ROM Correction Function	Yes																													
Package		FP-48B, FP-64E, FP-64A, FP-48F, TNP-48																													
Operating Frequency/Supply Voltage		1 to 10MHz/ 2.7 to 5.5V 1 to 20MHz/ 4.0 to 5.5V												1 to 10MHz/ 3.0 to 5.5V 1 to 20MHz/ 4.0 to 5.5V						1 to 10MHz/ 2.7 to 5.5V 1 to 20MHz/ 4.0 to 5.5V		1 to 10MHz/ 3.0 to 5.5V 1 to 20MHz/ 4.0 to 5.5V									
Operating Ambient Temperature (°C)		-20 to 75, -40 to 85, -40 to 105, -40 to 125																													

* F: F-ZTAT version, M: mask ROM version

□ H8/300H Tiny Series

• Memory Capacity (ROM/RAM) (H8/300H Tiny Series)



Indicates the mask ROM version.
Indicates the flash memory version.

Package		
H	QFP	(PRGP0064GB-A (FP-64A))
FH	QFP	(FP-32A)
FP	LQFP	(PLQP0064KC-A (FP-64E))
FZ	LQFP	(PLQP0064KB-A (FP-64K))
FX	LQFP	(PLQP0048KC-A (FP-48B))
FY	LQFP	(PLQP0048JA-A (FP-48F))
P	SOP	(PRSP0032DC-A (FP-32D))
TP	DIP	(DP-32S)
FT	VQFN	(PVQN0048KA-A (TNP-48))

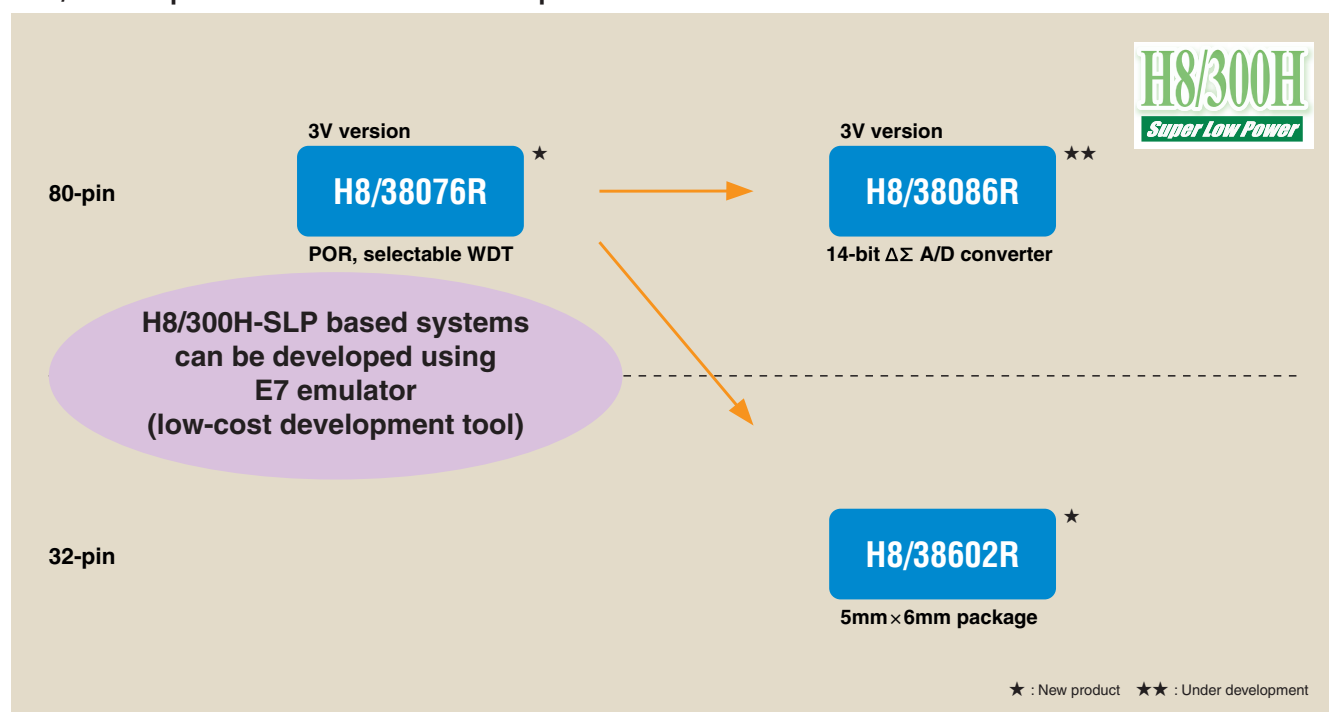
* It is an old package code inside ()

16-bit single-chip MCUs designed for health and beauty equipment and digital consumer products

H8/300H Super Low Power Series Features

- Low power consumption and low-voltage operation
- 1.8V operation, on-chip Flash memory (in some devices)
- Employs 16-bit H8/300H CPU with proven track record in a wide range of applications
- Upward compatible with H8/300L Super Low Power series
- Small package (7mm TLP-85V) makes it easier to design compact systems
- On-board debugging function allows program debugging with the MCU mounted in the system, simplifying development and adjustment and reducing the overall time required for product development
- Peripheral functions for a variety of requirements
Single power supply flash memory, I²C-bus, 10-bit A/D converter, serial interface, multifunction timer, etc.

• H8/300H Super Low Power Series Roadmap



80-pin, super-low-power, multifunction MCUs

H8/38086R, H8/38076R Groups

- 1.8V operation on-chip flash memory
- World class low-power MCUs
- Much shorter oscillator stabilization time than previous models
- On-board debugging function
- Small package (7mm × 7mm)
- Reduced electromagnetic noise emission and improved noise immunity

Applications Health and beauty equipment, digital consumer products, mobile phones

32-pin, small super-low-power, MCUs

H8/38602R Group

- 1.8V operation on-chip flash memory
- World class low-power MCUs
- Much shorter oscillator stabilization time than previous models
- On-board debugging function
- Small package (QFN 5 × 6mm)
- On-chip oscillator, power-on reset
- On-chip voltage comparator

□ H8/300H Super Low Power Series

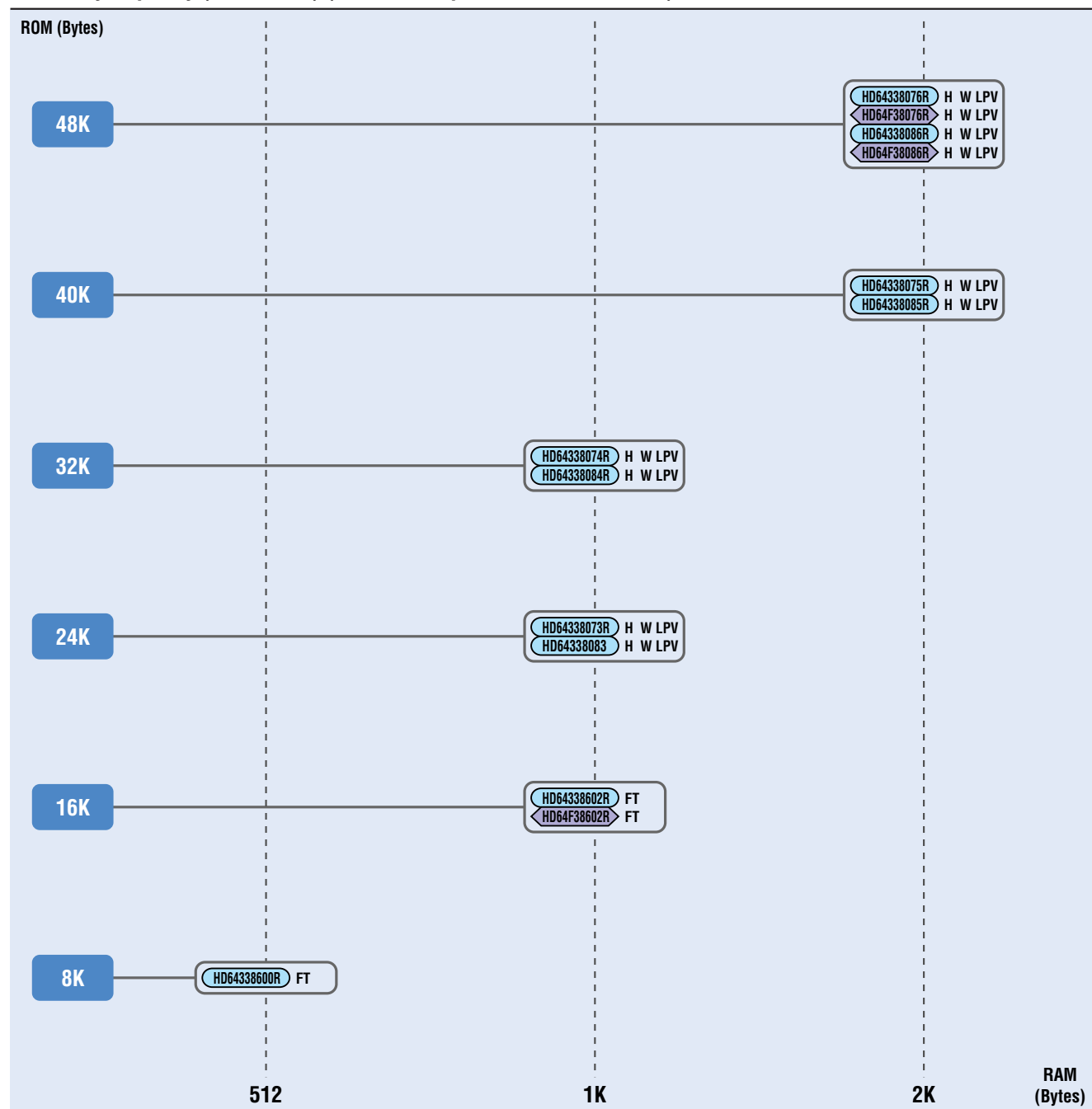
• Specifications (H8/300H Super Low Power Series)

Group		H8/38076R*												H8/38086R*						H8/38602R																																																																																
Product No.		H8/38073R**			H8/38074R**			H8/38075R**			H8/38076R**			H8/38076RF*			H8/38083R**			H8/38084R**			H8/38085R**			H8/38086R**			H8/38086RF*			H8/38600R**			H8/38602R**			H8/38602RF*																																																														
Type No.		HD6438073RxxxH			HD6438073RxxxW			HD6438073RxxxLPV			HD6438074RxxxH			HD6438074RxxxW			HD6438074RxxxLPV			HD6438075RxxxH			HD6438075RxxxW			HD6438075RxxxLPV			HD6438076RxxxH			HD6438076RxxxW			HD6438076RxxxLPV			HD64F38076RHH			HD64F38076RHW			HD64F38076RxxxLPV			HD6438083RxxxH			HD6438083RxxxW			HD6438083RxxxLPV			HD6438084RxxxH			HD6438084RxxxW			HD6438084RxxxLPV			HD6438085RxxxH			HD6438085RxxxW			HD6438085RxxxLPV			HD6438086RxxxH			HD6438086RxxxW			HD6438086RxxxLPV			HD64F38086RHH			HD64F38086RHW			HD64F38086RxxxLPV			HD6438600RxxxFT			HD6438602RxxxFT			HD64F38602RFT		
Memory	ROM(Bytes)	24K			32K			40K			48K			24K			32K			40K			48K			8K			16K																																																																							
	RAM(Bytes)	1K						2K						1K						2K						512						1K																																																																				
	ROM Type*	M						F						M						F						M						F																																																																				
CPU	CPU	H8/300H Core																																																																																																		
	Basic Instructions	62																																																																																																		
	Minimum Instruction Execution Time (ns)	200 (@10MHz)																																																																																																		
Clock	Clock Generation Circuit	2 circuits (system clock generator, PLL, sub clock generator)																																																																																																		
	Subclock	Yes																																																																																																		
	RTC	Yes																																																																																																		
	On-Chip Oscillator	Yes (Mask only)																								Yes																																																																										
	Frequency Divider	Yes																																																																																																		
	Power Save	Active (Medium) mode, Sub Active mode, Sleep (High-speed) mode, Sleep (Medium) mode, Sub sleep mode, Watch mode, Standby mode, Module standby mode																																																																																																		
Power Supply Voltage Detection	Power-On Reset/POR	Yes																																																																																																		
A/D Converter	Resolution×Channels	10-bit×8												10-bit×3, 14-bit×∠Σ×2												10-bit×6																																																																										
	Sample and Hold	Yes																																																																																																		
Timer	8-bit	RTC×1																								RTC×1, Timer B1×1																																																																										
	14-bit	14-bit PWM×2																																																																																																		
	16-bit	Timer F×1, TPU×2, AEC×1																																																																																																		
	Input Capture	TPU																																																																																																		
	Output Compare	TPU, Timer F																																																																																																		
	PWM Output	TPU, 14-bit PWM																																																																																																		
	Event Counter	TPU, AEC																																																																																																		
Watchdog Timer		Yes (on-chip internal clock oscillation circuit, can be used as interval timer)																																																																																																		
Serial Interface	Clock Sync./ Clock Async.	SCI3_1×1, SCI3_2×1																								SCI3×1																																																																										
	Clock Sync.	IIC2×1, SCI4×1																								IIC2×1, SSU×1																																																																										
I ² C-bus Interface		1																																																																																																		
SSU/Special Serial I/O		—																								SSU×1																																																																										
IrDA		Yes (SCI3_1×1)																								SCI3×1																																																																										
LCD		32seg×4com, On-chip average voltage circuit for LCD																																																																																																		
I/O Ports	Input Only (Numbers)	8												5												6																																																																										
	CMOS I/O Only (Numbers)	55												56												17																																																																										
	High Current Drive Port	4																								3																																																																										
	Pull-Up Resistor	Yes																																																																																																		
Interrupts(Sources)	External	14																								3																																																																										
Debugging Function	On-Chip Debug	Address break, Yes (Can be used with E7, E8 emulator)																								Yes (Can be used with E7, E8 emulator)																																																																										
	On-Board Flash Program	Yes																																																																																																		
Other Functions	Comparator	—																														Yes																																																																				
	Timer for Watch Counter	RTC×1																																																																																																		
Package		TLP-85V, TFP-80C, FP-80A																								TNP-32 (5×6mm)																																																																										
Operating Frequency/Supply Voltage		4.2MHz/1.8 to 3.6V, 10MHz/2.7 to 3.6V																																																																																																		
Operating Ambient Temperature (°C)		-20 to 75, -40 to 85																																																																																																		

* F: F-ZTAT version, M: mask ROM version

★ : New product ★★ : Under development

• Memory Capacity (ROM/RAM) (H8/300H Super Low Power Series)



Indicates the mask ROM version.

Indicates the flash memory version.

Package	
FT	VQFN (PVQN0032KA-A (TNP-32))
H	QFP (PRQP0080JB-A (FP-80A))
LPV	TFLGA (PTLG0085JA-A (TLP-85V))
W	TQFP (PTQP0080KC-A (TFP-80C))

* It is an old package code inside ()

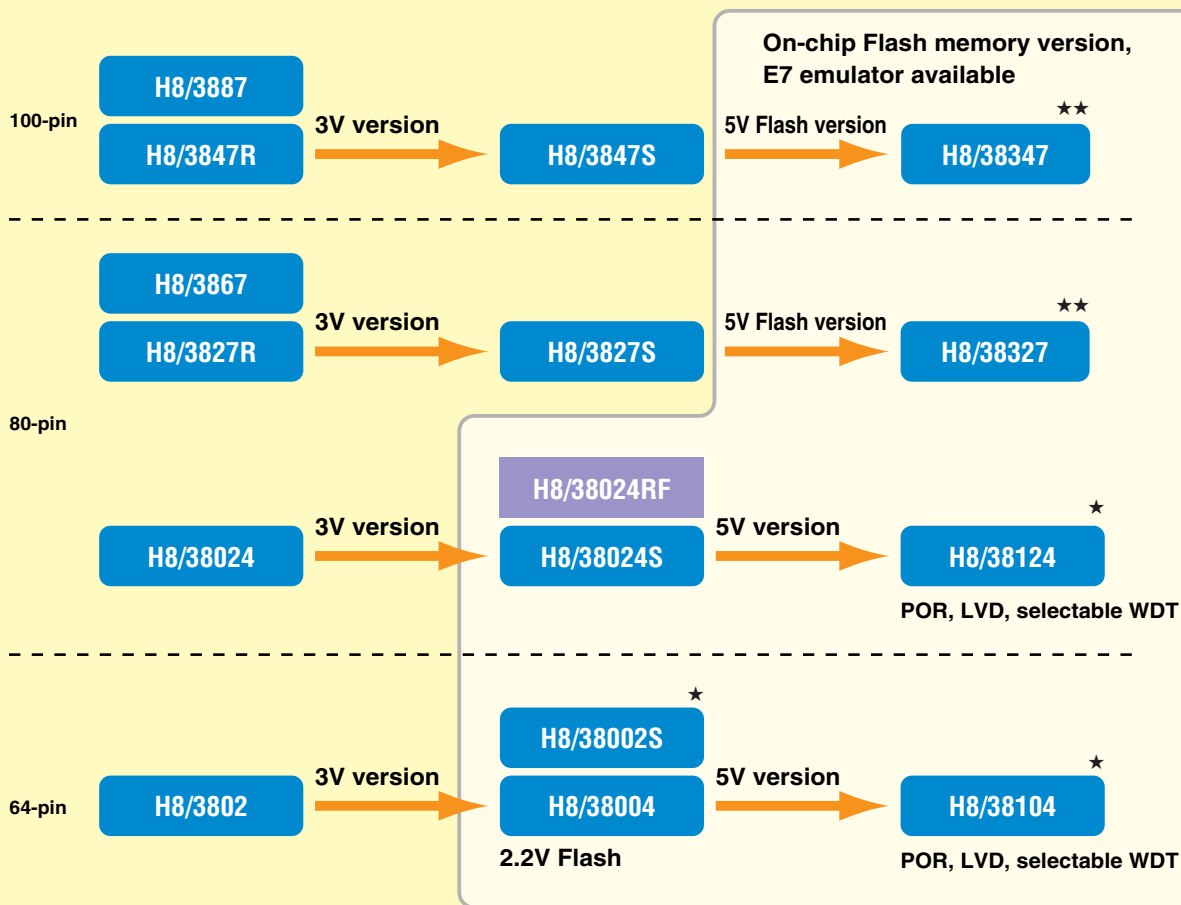
8-bit single-chip MCUs designed for consumer products and communications equipment

H8/300L Super Low Power Series Features

- Low power consumption and low-voltage operation
- Employs the H8/300L CPU
- Complete instruction set compatibility with the H8/300 CPU, allowing effective utilization of software resources
 - Minimum instruction execution time: 0.4μs (f = 10MHz)
 - 8-bit and 16-bit addition and subtraction: 0.4μs
 - 8-bit × 8-bit multiplication: 2.8μs
 - 16-bit ÷ 8-bit division: 2.8μs
- On-chip peripheral functions suitable for the consumer product and communications equipment fields
 - LCD controller/driver
 - Flash memory
 - Power-on reset, low-voltage detection circuit
 - On-chip debugger

• H8/300L Super Low Power Series Roadmap

For LCD control and general control applications



★ : New product ★★ : Under development

H8/3802 Group

- 64-pin MCU with super-low power requirements
- 1.8V operation, on-chip 10-bit A/D converter
- On-chip 25mA large current ports and 7V large voltage ports

64-pin, 5V Super Low Power**H8/38104 Group**

- On-chip flash memory and 5V operation
- World-class low-power MCUs
- Power-on reset
- Low-voltage detector
- Selectable WDT
- Reduced electromagnetic noise and improved noise immunity

Applications White goods, portable communication devices, health and beauty equipment, power meters

80-pin, 5V Super Low Power**H8/38124 Group**

- On-chip flash memory and 5V operation
- World-class low-power MCUs
- Power-on reset
- Low-voltage detector
- Selectable WDT
- Reduced electromagnetic noise and improved noise immunity

Applications White goods, portable communication devices, health and beauty equipment, power meters

H8/3827R, H8/3847R Group

- Super low power, high-speed MCUs
- 1.8V operation, on-chip 10-bit A/D converter
- High-speed operation: 1.8V/4MHz (external), 5V/16MHz (external) (ZTAT® and mask ROM versions)

H8/38327, H8/38347 Group

- Successor to H8/3827R, H8/3847R group
- 5V/16MHz (external) high-speed operation
- Incorporates on-chip debug function (E7)

Slim 64-pin MCUs with super low power requirements
H8/38004 Group

- First in the Super Low Power series with on-chip flash memory and 2.2V operation
- World-class low-power MCUs
- Oscillator stabilization time reduced to 1/1,000 that of previous models
- Reduced electromagnetic noise emission and improved noise immunity

Applications General battery powered devices (communication devices, health and beauty equipment, digital consumer products)

Slim 80-pin MCUs with super low power requirements**H8/38024 Group**

- On-chip flash memory
- World-class low-power MCUs
- Oscillator stabilization time reduced to 1/1,000 that of previous models
- On-chip 25mA large-current ports
- On-chip 7V high-voltage ports
- Reduced electromagnetic noise emission and improved noise immunity

Applications White goods, portable communication devices, health and beauty equipment

H8/3887, H8/3867 Group

- World-class low-power MCUs
- 1.8V operation, on-chip 10-bit A/D converter
- Module standby function
- LCD voltage pull-up circuit (5V fixed voltage)

□ H8/300L Super Low Power Series

• Specifications (H8/300L Super Low Power Series)

Group		H8/3802												H8/38004															
Product No.		H8/3800		H8/3801		H8/3802		H8/3802		H8/38000		H8/38001		H8/38002		H8/38002F		H8/38003		H8/38004		H8/38004F							
Type No.		HD6433800xxxFP	HD6433800xxxH	HD6433800xxxP	HD6433801xxxFP	HD6433801xxxH	HD6433801xxxP	HD6433802FP	HD6433802xxxH	HD6433802xxxP	HD6473802FP	HD6473802H	HD6473802P	HD64338000xxxFP	HD64338000xxxH	HD64338001xxxFP	HD64338001xxxH	HD64338002xxxFP	HD64338002xxxH	HD64F38002FP	HD64F38002H	HD64338003xxxFP	HD64338003xxxH	HD64338004xxxFP	HD64338004xxxH	HD64F38004FP	HD64F38004H		
Memory	ROM(Bytes)	8K		12K				16K						8K		12K		16K				24K				32K			
	RAM(Bytes)	512								1K				512								1K							
	ROM Type*	M								Z				M				F				M				F			
CPU	CPU	H8/300L Core																											
	Basic Instructions	57																											
	Minimum Instruction Execution Time (ns)	250 (@ 8.0MHz)												400 (@ 5.0MHz)															
Clock	Clock Generation Circuit	2																											
	Subclock	Yes																											
	On-Chip Oscillator	—																											
	Frequency Divider	1/n (n = 16, 32, 64, 128)																											
	Power Save	Medium Speed mode, Sleep mode, Sub Active mode, Sub Sleep mode, Watch mode, Standby mode, Module Standby function																											
Power Supply Voltage Detection	Power-On Reset/POR	—																											
	Low Voltage Detection/LVD	—																											
A/D Converter	Resolution × Channels	10-bit × 4																											
	Sample and Hold	Yes																											
Timer	8-bit	Timer A																											
	16-bit	Timer F, AEC																											
	Input Capture	—																											
	Output Compare	Timer F																											
	PWM Output	10-bit PWM × 2																											
	Event Counter	Timer F, AEC																											
Watchdog Timer		—												Yes															
Serial Interface	Clock Sync./ Clock Async.	SCI3 × 1																											
	Clock Sync. Only	—																											
LCD		25seg × 4com																											
I/O Ports	Input Only (Numbers)	5																											
	CMOS I/O Only (Numbers)	39																											
	High Voltage Port (Numbers)	7V × 7												—															
	N-Channel Open Drain Port (Numbers)													6															
	High Current Drive Port	13												6															
Pull-Up Resistor		23																											
Interrupts(Sources)	External	11																											
Debugging Function	On-Chip Debug	—												Yes (Flash memory version only)															
	On-Board Flash Program	—												Yes (Flash memory version only)															
Package		DP-64S, FP-64E, FP-64A, Chip												FP-64E, FP-64A, Chip															
Operating Frequency/Supply Voltage		2MHz /1.8 to 5.5V 5MHz /2.7 to 5.5V 8MHz /4.5 to 5.5V												Flash ROM version 2MHz/ 2.2 to 3.6V 5MHz /2.7 to 3.6V Mask ROM version 2MHz /1.8 to 3.6V 5MHz /2.7 to 3.6V															
Operating Ambient Temperature (°C)		-20 to 75, -40 to 85																											

* F: F-ZTAT version, M: mask ROM version, Z: ZTAT version

• Specifications (H8/300L Super Low Power Series)

Group		H8/38002S*						H8/38104*													
Product No.		H8/38000S*		H8/38001S*		H8/38002S*		H8/38100*		H8/38101*		H8/38102*		H8/38102F*		H8/38103*		H8/38104*		H8/38104F*	
Type No.		HD64338000SxxxFZ HD64338000SxxxH		HD64338001SxxxFZ HD64338001SxxxH		HD64338002SxxxFZ HD64338002SxxxH		HD64338100xxxFP HD64338100xxxH		HD64338101xxxFP HD64338101xxxH		HD64338102xxxFP HD64338102xxxH		HD64F38102FP HD64F38102H		HD64338103xxxFP HD64338103xxxH		HD64338104xxxFP HD64338104xxxH		HD64F38104FP HD64F38104H	
Memory	ROM(Bytes)	8K		12K		16K		8K		12K		16K				24K		32K			
	RAM(Bytes)	512																			
	ROM Type*	M										F		M				F			
CPU	CPU	H8/300L Core																			
	Basic Instructions	57																			
	Minimum Instruction Execution Time (ns)	400 (@5.0MHz)						200 (@10.0MHz)													
Clock	Clock Generation Circuit	2						3													
	Subclock	Yes																			
	On-Chip Oscillator	—						Yes													
	Frequency Divider	1/n (n = 16, 32, 64, 128)																			
	Power Save	Medium Speed mode, Sleep mode, Sub Active mode, Sub Sleep mode, Watch mode, Standby mode, Module Standby function																			
Power Supply Voltage Detection	Power-On Reset/POR	—						Yes													
	Low Voltage Detection/LVD	—						Yes													
A/D Converter	Resolution × Channels	10-bit × 4																			
	Sample and Hold	Yes																			
Timer	8-bit	Timer A																			
	16-bit	Timer F, AEC																			
	Input Capture	—																			
	Output Compare	Timer F																			
	PWM Output	10-bit PWM × 2, AEC																			
	Event Counter	Timer F, AEC																			
Watchdog Timer		Yes																			
Serial Interface	Clock Sync./ Clock Async.	SCI3 × 1																			
	Clock Sync. Only	—																			
LCD		25seg × 4com																			
I/O Ports	Input Only (Numbers)	5																			
	CMOS I/O Only (Numbers)	39																			
	High Voltage Port (Numbers)	—																			
	N-Channel Open Drain Port (Numbers)	6						5													
	High Current Drive Port	6						12													
	Pull-Up Resistor	23																			
Interrupts(Sources)	External	11																			
Debugging Function	On-Chip Debug	Using H8/38004F						Yes (Flash memory version only)													
	On-Board Flash Program	—						Yes (Flash memory version only)													
Package		FP-64K, FP-64A						FP-64E, FP-64A													
Operating Frequency/Supply Voltage		2MHz /1.8 to 3.6V 5MHz /2.7 to 3.6V						10MHz /2.7 to 5.5V													
Operating Ambient Temperature (°C)		-20 to 75, -40 to 85																			

* F: F-ZTAT version, M: mask ROM version

★ : New product

□ H8/300L Super Low Power Series

• Specifications (H8/300L Super Low Power Series)

Group		H8/38024																		H8/38024R					
Product No.		H8/38020			H8/38021			H8/38022			H8/38023			H8/38024			H8/38024R								
Type No.		HD64338020xxxF	HD64338020xxxH	HD64338020xxxW	HD64338021xxxF	HD64338021xxxH	HD64338021xxxW	HD64338022xxxF	HD64338022xxxH	HD64338022xxxW	HD64338023xxxF	HD64338023xxxH	HD64338023xxxW	HD64338024xxxF	HD64338024xxxH	HD64338024xxxW	HD64738024F	HD64738024H	HD64738024W	HD64F38024RLPV	HD64F38024RH	HD64F38024RW			
Memory	ROM(Bytes)	8K			12K			16K			24K			32K											
	RAM(Bytes)	512												1K											
	ROM Type*	M												Z			F								
CPU	CPU	H8/300L Core																							
	Basic Instructions	57																							
	Minimum Instruction Execution Time (ns)	250 (@8.0MHz)																		400 (@5.0MHz)					
Clock	Clock Generation Circuit	2																							
	Subclock	Yes																							
	On-Chip Oscillator	—																							
	Frequency Divider	1/n (n = 16, 32, 64, 128)																							
	Power Save	Medium Speed mode, Sleep mode, Sub Active mode, Sub Sleep mode, Watch mode, Standby mode, Module Standby function																							
Power Supply Voltage Detection	Power-On Reset/POR	—																							
	Low Voltage Detection/LVD	—																							
A/D Converter	Resolution × Channels	10-bit × 8																							
	Sample and Hold	Yes																							
Timer	8-bit	Timer A, Timer C, Timer G																							
	16-bit	Timer F, AEC																							
	Input Capture	Timer G																							
	Output Compare	Timer F																							
	PWM Output	10-bit PWM × 2																							
	Event Counter	Timer C, Timer F, AEC																							
Watchdog Timer		Yes																							
Serial Interface	Clock Sync./ Clock Async.	SCI3 × 1																							
	Clock Sync. Only	—																							
LCD		32seg × 4com																							
I/O Ports	Input Only (Numbers)	9																							
	CMOS I/O Only (Numbers)	51																							
	High Voltage Port (Numbers)	7V × 7																							
	N-Channel Open Drain Port (Numbers)	7																							
	High Current Drive Port	14																		6					
	Pull-Up Resistor																								
Interrupts(Sources)	External	13																							
Debugging Function	On-Chip Debug	—																		Yes (Flash memory version only)					
	On-Board Flash Program	—																		Yes (Flash memory version only)					
Package		TFP-80C, FP-80A, FP-80B, Chip																			TLP-85V TFP-80C FP-80A chip				
Operating Frequency/Supply Voltage		2MHz/1.8 to 5.5V 5MHz/2.7 to 5.5V 8MHz/4.5 to 5.5V																			5MHz /2.7 to 3.6V				
Operating Ambient Temperature (°C)		-20 to 75, -40 to 85																							

* F: F-ZTAT version. M: mask BOM version. Z: ZTAT version

• Specifications (H8/300L Super Low Power Series)

Group		H8/38024S												H8/38124*																																																																																																							
Product No.		H8/38020S				H8/38021S				H8/38022S				H8/38023S				H8/38024S				H8/38120*				H8/38121*				H8/38122*				H8/38122F*				H8/38123*				H8/38124*				H8/38124F*																																																																							
Type No.		HD64338020SxxxLPV				HD64338020SxxxH				HD64338020SxxxW				HD64338021SxxxLPV				HD64338021SxxxH				HD64338021SxxxW				HD64338022SxxxLPV				HD64338022SxxxH				HD64338022SxxxW				HD64338023SxxxLPV				HD64338023SxxxH				HD64338023SxxxW				HD64338024SxxxLPV				HD64338024SxxxH				HD64338024SxxxW				HD64338120xxxH				HD64338120xxxW				HD64338121xxxH				HD64338121xxxW				HD64338122xxxH				HD64338122xxxW				HD64F38122H				HD64F38122W				HD64338123xxxH				HD64338123xxxW				HD64338124xxxH				HD64338124xxxW				HD64F38124H				HD64F38124W			
Memory	ROM(Bytes)	8K				12K				16K				24K				32K				8K				12K				16K				24K				32K																																																																															
	RAM(Bytes)	512																1K																512																1K																																																																			
	ROM Type*	M																F																M																F																																																																			
CPU	CPU	H8/300L Core																																																																																																																			
	Basic Instructions	57																																																																																																																			
	Minimum Instruction Execution Time (ns)	400 (@5.0MHz)																200 (@10.0MHz)																																																																																																			
Clock	Clock Generation Circuit	2																3																																																																																																			
	Subclock	Yes																																																																																																																			
	On-Chip Oscillator	—																Yes																																																																																																			
	Frequency Divider	1/n (n = 16, 32, 64, 128)																																																																																																																			
	Power Save	Medium Speed mode, Sleep mode, Sub Active mode, Sub Sleep mode, Watch mode, Standby mode, Module Standby function																																																																																																																			
Power Supply Voltage Detection	Power-On Reset/POR	—																Yes																																																																																																			
	Low Voltage Detection/LVD	—																Yes																																																																																																			
A/D Converter	Resolution×Channels	10-bit×8																																																																																																																			
	Sample and Hold	Yes																																																																																																																			
Timer	8-bit	Timer A, Timer C, Timer G																																																																																																																			
	16-bit	Timer F, AEC																																																																																																																			
	Input Capture	Timer G																																																																																																																			
	Output Compare	Timer F																																																																																																																			
	PWM Output	10-bit PWM×2																10-bit PWM×2, AEC																																																																																																			
	Event Counter	Timer C, Timer F, AEC																																																																																																																			
Watchdog Timer		Yes																																																																																																																			
Serial Interface	Clock Sync./ Clock Async.	SCI3×1																																																																																																																			
	Clock Sync. Only	—																																																																																																																			
LCD		32seg×4com																																																																																																																			
I/O Ports	Input Only (Numbers)	9																50																																																																																																			
	CMOS I/O Only (Numbers)	51																—																																																																																																			
	High Voltage Port (Numbers)	—																7																																																																																																			
	N-Channel Open Drain Port (Numbers)	7																14																																																																																																			
	High Current Drive Port	6																—																																																																																																			
	Pull-Up Resistor	28																13																																																																																																			
Interrupts(Sources)	External	13																																																																																																																			
Debugging Function	On-Chip Debug	Using H8/38024RF																Yes (Flash memory version only)																																																																																																			
	On-Board Flash Program	—																Yes (Flash memory version only)																																																																																																			
Package		TLP-85V, TFP-80C, FP-80A, Chip																TFP-80C, FP-80A																																																																																																			
Operating Frequency/Supply Voltage		2MHz /1.8 to 3.6V 5MHz /2.7 to 3.6V																10MHz /2.7 to 5.5V																																																																																																			
Operating Ambient Temperature (°C)		-20 to 75, -40 to 85																																																																																																																			

* F: F-ZTAT version, M: mask ROM version

★ : New product

□ H8/300L Super Low Power Series

• Specifications (H8/300L Super Low Power Series)

Group		H8/3867																				
Product No.		H8/3862			H8/3863			H8/3864			H8/3865			H8/3866			H8/3867			H8/3867		
Type No.		HD6433862xxxF	HD6433862xxxH	HD6433862xxxW	HD6433863xxxF	HD6433863xxxH	HD6433863xxxW	HD6433864xxxF	HD6433864xxxH	HD6433864xxxW	HD6433865xxxF	HD6433865xxxH	HD6433865xxxW	HD6433866xxxF	HD6433866xxxH	HD6433866xxxW	HD6433867xxxF	HD6433867xxxH	HD6433867xxxW	HD6473867F	HD6473867H	HD6473867W
Memory	ROM(Bytes)	16K			24K			32K			40K			48K			60K					
	RAM(Bytes)	1K						2K														
	ROM Type*	M																		Z		
CPU	CPU	H8/300L Core																				
	Basic Instructions	57																				
	Minimum Instruction Execution Time (ns)	670 (@ 3.0MHz)																				
Clock	Clock Generation Circuit	2																				
	Subclock	Yes																				
	On-Chip Oscillator	—																				
	Frequency Divider	1/n (n = 16, 32, 64, 128)																				
	Power Save	Medium Speed mode, Sleep mode, Sub Active mode, Sub Sleep mode, Watch mode, Standby mode, Module Standby function																				
Power Supply Voltage Detection	Power-On Reset/POR	—																				
	Low Voltage Detection/LVD	—																				
A/D Converter	Resolution × Channels	10-bit × 8																				
	Sample and Hold	Yes																				
Timer	8-bit	Timer A, Timer C, Timer G																				
	16-bit	Timer F, AEC																				
	Input Capture	Timer G																				
	Output Compare	Timer F																				
	PWM Output	14-bit PWM × 1																				
	Event Counter	Timer C, Timer F, AEC																				
Watchdog Timer		Yes																				
Serial Interface	Clock Sync./ Clock Async.	SCI3 × 2																				
	Clock Sync. Only	—																				
LCD		5V supply voltage booster 32seg × 4com																				
I/O Ports	Input Only (Numbers)	9																				
	CMOS I/O Only (Numbers)	55																				
	High Voltage Port (Numbers)	—																				
	N-Channel Open Drain Port (Numbers)	—																				
	High Current Drive Port	8																				
	Pull-Up Resistor	32																				
Interrupts(Sources)	External	13																				
Debugging Function	On-Chip Debug	—																				
	On-Board Flash Program	—																				
Package		TFP-80C, FP-80A, FP-80B																				
Operating Frequency/Supply Voltage		0.5MHz /1.8 to 5.5V																				
		1.0MHz /2.2 to 5.5V																				
		1.6MHz /2.6 to 5.5V																				
		2.0MHz /3.0 to 5.5V																				
		3.0MHz /4.5 to 5.5V																				
Operating Ambient Temperature (°C)		-20 to 75, -40 to 85																				

* F: F-ZTAT version, M: mask ROM version

• Specifications (H8/300L Super Low Power Series)

Group		H8/3827R																				
Product No.		H8/3822R			H8/3823R			H8/3824R			H8/3825R			H8/3826R			H8/3827R			H8/3827R		
Type No.		HD6433822RxxxF	HD6433822RxxxH	HD6433822RxxxW	HD6433823RxxxF	HD6433823RxxxH	HD6433823RxxxW	HD6433824RxxxF	HD6433824RxxxH	HD6433824RxxxW	HD6433825RxxxF	HD6433825RxxxH	HD6433825RxxxW	HD6433826RxxxF	HD6433826RxxxH	HD6433826RxxxW	HD6433827RxxxF	HD6433827RxxxH	HD6433827RxxxW	HD6473827RF	HD6473827RH	HD6473827RW
Memory	ROM(Bytes)	16K			24K			32K			40K			48K			60K					
	RAM(Bytes)	1K						2K														
	ROM Type*	M																		Z		
CPU	CPU	H8/300L Core																				
	Basic Instructions	57																				
	Minimum Instruction Execution Time (ns)	250 (@8.0MHz)																				
Clock	Clock Generation Circuit	2																				
	Subclock	Yes																				
	On-Chip Oscillator	—																				
	Frequency Divider	1/n (n = 16, 32, 64, 128)																				
	Power Save	Medium Speed mode, Sleep mode, Sub Active mode, Sub Sleep mode, Watch mode, Standby mode, Module Standby function																				
Power Supply	Power-On Reset/POR	—																				
Voltage Detection	Low Voltage Detection/LVD	—																				
A/D Converter	Resolution × Channels	10-bit × 8																				
	Sample and Hold	Yes																				
Timer	8-bit	Timer A, Timer C, Timer G																				
	16-bit	Timer F, AEC																				
	Input Capture	Timer G																				
	Output Compare	Timer F																				
	PWM Output	14-bit PWM × 1																				
	Event Counter	Timer C, Timer F, AEC																				
Watchdog Timer		Yes																				
Serial Interface	Clock Sync./ Clock Async.	SCI3 × 2																				
	Clock Sync. Only	—																				
LCD		32seg × 4com																				
I/O Ports	Input Only (Numbers)	9																				
	CMOS I/O Only (Numbers)	55																				
	High Voltage Port (Numbers)	—																				
	N-Channel Open Drain Port (Numbers)	—																				
	High Current Drive Port	8																				
	Pull-Up Resistor	32																				
Interrupts(Sources)	External	13																				
Debugging Function	On-Chip Debug	—																				
	On-Board Flash Program	—																				
Package		TFP-80C, FP-80A, FP-80B, chip																				
Operating Frequency/Supply Voltage		2MHz /1.8 to 5.5V																				
		5MHz /2.7 to 5.5V																				
		8MHz /4.5 to 5.5V																				
Operating Ambient Temperature (°C)		-20 to 75, -40 to 85																				

* F: F-ZTAT version, M: mask ROM version

□ H8/300L Super Low Power Series

• Specifications (H8/300L Super Low Power Series)

Group		H8/3827S												H8/38327**																																			
		H8/3824S				H8/3825S				H8/3826S				H8/3827S				H8/38322**				H8/38323**				H8/38324**				H8/38324F**				H8/38325**				H8/38326**				H8/38327**				H8/38327F**			
Product No.		H8/3824S				H8/3825S				H8/3826S				H8/3827S				H8/38322**				H8/38323**				H8/38324**				H8/38324F**				H8/38325**				H8/38326**				H8/38327**				H8/38327F**			
Type No.		HD6433824SxxxF	HD6433824SxxxH	HD6433824SxxxW	HD6433825SxxxF	HD6433825SxxxH	HD6433825SxxxW	HD6433826SxxxF	HD6433826SxxxH	HD6433826SxxxW	HD6433827SxxxF	HD6433827SxxxH	HD6433827SxxxW	HD64338322SxxxH	HD64338322SxxxW	HD64338323SxxxH	HD64338323SxxxW	HD64338324SxxxH	HD64338324SxxxW	HD64F38324X	HD64F38324H	HD64338325SxxxH	HD64338325SxxxW	HD64338326SxxxH	HD64338326SxxxW	HD64338327SxxxH	HD64338327SxxxW	HD64F38327H	HD64F38327W																				
Memory	ROM(Bytes)	32K				40K				48K				60K				16K				24K				32K				40K				48K				60K											
	RAM(Bytes)	2K												1K				2K																															
	ROM Type*	M																F				M				F																							
CPU	CPU	H8/300L Core																																															
	Basic Instructions	57																																															
	Minimum Instruction Execution Time (ns)	400 (@ 5.0MHz)												250 (@ 8.0MHz)																																			
Clock	Clock Generation Circuit	2																																															
	Subclock	Yes																																															
	On-Chip Oscillator	—																																															
	Frequency Divider	1/n (n = 16, 32, 64, 128)																																															
	Power Save	Medium Speed mode, Sleep mode, Sub Active mode, Sub Sleep mode, Watch mode, Standby mode, Module Standby function																																															
Power Supply Voltage Detection	Power-On Reset/POR	—																																															
	Low Voltage Detection/LVD	—																																															
A/D Converter	Resolution × Channels	10-bit × 8																																															
	Sample and Hold	Yes																																															
Timer	8-bit	Timer A, Timer C, Timer G																																															
	16-bit	Timer F, AEC																																															
	Input Capture	Timer G																																															
	Output Compare	Timer F																																															
	PWM Output	14-bit PWM × 1																																															
	Event Counter	Timer C, Timer F, AEC																																															
Watchdog Timer		Yes																																															
Serial Interface	Clock Sync./ Clock Async.	SCI3 × 2																																															
	Clock Sync. Only	—																																															
LCD		32seg × 4com																																															
I/O Ports	Input Only (Numbers)	9																																															
	CMOS I/O Only (Numbers)	55																																															
	High Voltage Port (Numbers)	—																																															
	N-Channel Open Drain Port (Numbers)	—																																															
	High Current Drive Port	—												8																																			
	Pull-Up Resistor	32																																															
Interrupts(Sources)	External	13																																															
Debugging Function	On-Chip Debug	—												Yes (Flash memory version only)																																			
	On-Board Flash Program	—												Yes (Flash memory version only)																																			
Package		TFP-80C, FP-80A, FP-80B, chip												TFP-80C, FP-80A, chip																																			
Operating Frequency/Supply Voltage		2MHz /1.8 to 3.6V 5MHz /2.7 to 3.6V												8MHz/2.7 to 5.5V																																			
Operating Ambient Temperature (°C)		-20 to 75, -40 to 85																																															

* M: mask ROM version, Z: ZTAT version

★★ : Under development

• Specifications (H8/300L Super Low Power Series)

Group		H8/3887																											
Product No.		H8/3882				H8/3883				H8/3884				H8/3885				H8/3886				H8/3887				H8/3887			
Type No.		HD6433882xxxF	HD6433882xxxH	HD6433882xxxW	HD6433882xxxX	HD6433883xxxF	HD6433883xxxH	HD6433883xxxW	HD6433883xxxX	HD6433884xxxF	HD6433884xxxH	HD6433884xxxW	HD6433884xxxX	HD6433885xxxF	HD6433885xxxH	HD6433885xxxW	HD6433885xxxX	HD6433886xxxF	HD6433886xxxH	HD6433886xxxW	HD6433886xxxX	HD6433887xxxF	HD6433887xxxH	HD6433887xxxW	HD6433887xxxX	HD6473887F	HD6473887H	HD6473887W	HD6473887X
Memory	ROM(Bytes)	16K				24K				32K				40K				48K				60K							
	RAM(Bytes)	1K								2K																			
	ROM Type*	M																						Z					
CPU	CPU	H8/300L Core																											
	Basic Instructions	57																											
	Minimum Instruction Execution Time (ns)	670 (@3.0MHz)																											
Clock	Clock Generation Circuit	2																											
	Subclock	Yes																											
	On-Chip Oscillator	—																											
	Frequency Divider	1/n (n = 16, 32, 64, 128)																											
	Power Save	Medium Speed mode, Sleep mode, Sub Active mode, Sub Sleep mode, Watch mode, Standby mode, Module Standby function																											
Power Supply Voltage Detection	Power-On Reset/POR	—																											
	Low Voltage Detection/LVD	—																											
A/D Converter	Resolution × Channels	10-bit × 12																											
	Sample and Hold	Yes																											
Timer	8-bit	Timer A, Timer C, Timer G																											
	16-bit	Timer F, AEC																											
	Input Capture	Timer G																											
	Output Compare	Timer F																											
	PWM Output	14-bit PWM × 1																											
	Event Counter	Timer C, Timer F, AEC																											
Watchdog Timer		Yes																											
Serial Interface	Clock Sync./ Clock Async.	SCI3 × 2																											
	Clock Sync. Only	SCI1 × 1																											
LCD		5V supply voltage booster 40seg × 4com																											
I/O Ports	Input Only (Numbers)	13																											
	CMOS I/O Only (Numbers)	71																											
	High Voltage Port (Numbers)	—																											
	N-Channel Open Drain Port (Numbers)	—																											
	High Current Drive Port	16																											
	Pull-Up Resistor	32																											
Interrupts(Sources)	External	13																											
Debugging Function	On-Chip Debug	—																											
	On-Board Flash Program	—																											
Package		TFP-100B, FP-100A, TFP-100G, FP-100B																											
Operating Frequency/Supply Voltage		0.5MHz /1.8 to 5.5V																											
		1.0MHz /2.2 to 5.5V																											
		1.6MHz /2.6 to 5.5V																											
		2.0MHz /3.0 to 5.5V																											
		3.0MHz /4.5 to 5.5V																											
Operating Ambient Temperature (°C)		-20 to 75. -40 to 85																											

* M: mask BOM version, Z: ZTAT version

□ H8/300L Super Low Power Series

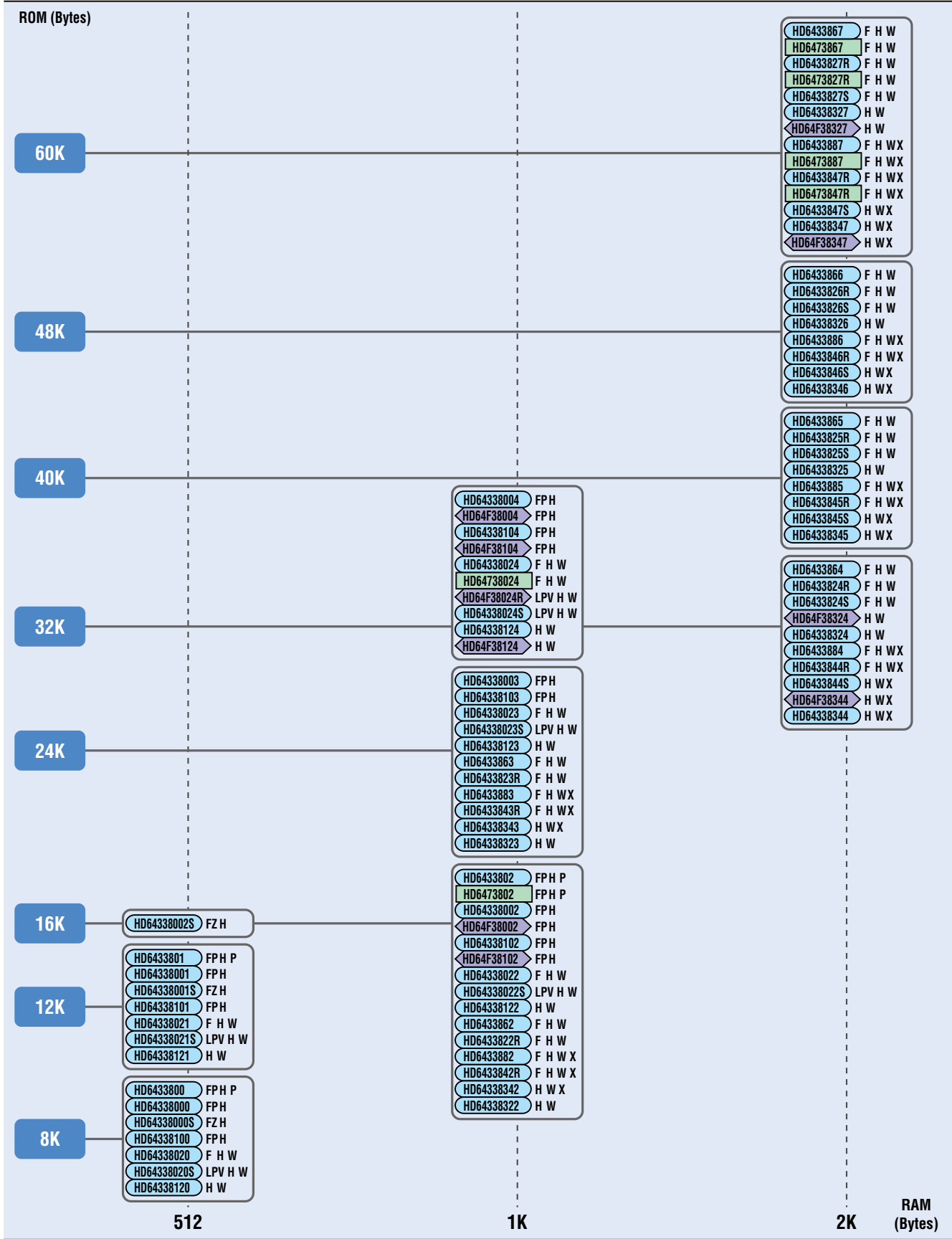
• Specifications (H8/300L Super Low Power Series)

Group		H8/3847R																											
Product No.		H8/3842R				H8/3843R				H8/3844R				H8/3845R				H8/3846R				H8/3847R				H8/3847R			
Type No.		HD6433842RxxxF	HD6433842RxxxH	HD6433842RxxxW	HD6433842RxxxX	HD6433843RxxxF	HD6433843RxxxH	HD6433843RxxxW	HD6433843RxxxX	HD6433844RxxxF	HD6433844RxxxH	HD6433844RxxxW	HD6433844RxxxX	HD6433845RxxxF	HD6433845RxxxH	HD6433845RxxxW	HD6433845RxxxX	HD6433846RxxxF	HD6433846RxxxH	HD6433846RxxxW	HD6433846RxxxX	HD6433847RxxxF	HD6433847RxxxH	HD6433847RxxxW	HD6433847RxxxX	HD6473847RF	HD6473847RH	HD6473847RW	HD6473847RX
Memory	ROM(Bytes)	16K				24K				32K				40K				48K				60K							
	RAM(Bytes)	1K								2K																			
	ROM Type*	M																								Z			
CPU	CPU	H8/300L Core																											
	Basic Instructions	57																											
	Minimum Instruction Execution Time (ns)	250 (@8.0MHz)																											
Clock	Clock Generation Circuit	2																											
	Subclock	Yes																											
	On-Chip Oscillator	—																											
	Frequency Divider	1/n (n = 16, 32, 64, 128)																											
	Power Save	Medium Speed mode, Sleep mode, Sub Active mode, Sub Sleep mode, Watch mode, Standby mode, Module Standby function																											
Power Supply Voltage Detection	Power-On Reset/POR	—																											
	Low Voltage Detection/LVD	—																											
A/D Converter	Resolution × Channels	10																											
	Sample and Hold	Yes																											
Timer	8-bit	Timer A, Timer C, Timer G																											
	16-bit	Timer F, AEC																											
	Input Capture	Timer G																											
	Output Compare	Timer F																											
	PWM Output	14-bit PWM × 1																											
	Event Counter	Timer C, Timer F, AEC																											
Watchdog Timer		Yes																											
Serial Interface	Clock Sync./ Clock Async.	SCI3 × 2																											
	Clock Sync. Only	SCI1 × 1																											
LCD		40seg × 4com																											
I/O Ports	Input Only (Numbers)	13																											
	CMOS I/O Only (Numbers)	71																											
	High Voltage Port (Numbers)	—																											
	N-Channel Open Drain Port (Numbers)	—																											
	High Current Drive Port	16																											
	Pull-Up Resistor	32																											
Interrupts(Sources)	External	13																											
Debugging Function	On-Chip Debug	—																											
	On-Board Flash Program	—																											
Package		TFP-100B, FP-100A, TFP-100G, FP-100B, chip																											
Operating Frequency/Supply Voltage		2MHz /1.8 to 5.5V																											
		5MHz /2.7 to 5.5V																											
		8MHz /4.5 to 5.5V																											
Operating Ambient Temperature (°C)		-20 to 75, -40 to 85																											

* M: mask ROM version, Z: ZTAT version

★★ : Under development

• Memory Capacity (ROM/RAM) (H8/300L Super Low Power Series)



Indicates the mask ROM version.

Indicates the ZTAT version.

Indicates the flash memory version.

Package	
H	QFP (PRQP0064GB-A(FP-64A), PRQP0080JB-A(FP-80A), PRQP0100KA-A(FP-100B))
F	QFP (PRQP0080GD-B(FP-80B), PRQP0100JE-B(FP-100A))
W	TQFP (PTQP0080KC-A(TFP-80C), PTQP0100LC-A(TFP-100G))
X	TQFP (PTQP0100KA-A(TFP-100B))

Package	
FP	LQFP (PLQP0064KC-A(FP-64E))
FZ	LQFP (PLQP0064KB-A(FP-64K))
P	DIP (PRDP0064BB-A(DP-64S))
LPV	TLGA (PTLG0085JA-A(TLP-85V))

* It is an old package code inside ()

8-bit single-chip MCUs designed for consumer products and communications equipment

H8/300L Series Features

- H8/300L 8-bit CPU
- On-chip peripheral functions suitable for consumer products and communications equipment
 - Vacuum fluorescent display (VFD) controller/driver
 - LCD controller/driver
 - I²C-bus interface
- Complete instruction-set compatibility with the H8/300 CPU, allowing effective utilization of software resources
 - Minimum instruction execution time: 0.4μs (f = 10MHz)
 - 8-bit and 16-bit addition and subtraction: 0.4μs
 - 8-bit × 8-bit multiplication: 2.8μs
 - 16-bit ÷ 8-bit division: 2.8μs

• H8/300L Series Roadmap

Control applications (Consumer products such as air conditioners and refrigerators)

H8/3614

- A/D 64-pin

H8/3644

- Improved flash memory and serial specifications
- Improved electromagnetic noise immunity

80-pin

H8/3657

- 2.2V operation, improved I/O

Telephone applications

H8/3637

- On-chip DTMF, reduced electromagnetic noise emission

64-pin

H8/3627

VFD control applications (Household appliances, audio equipment, VCRs)

H8/3714

- VFD display output: 24 segments × 8 common to 16 segments × 16 common, A/D 64-pin

H8/3724

- Improved VFD display output: 28 segments × 8 common to 20 segments × 16 common

LCD control and general control applications

H8/3814

- LCD: 40 segments × 4 common
- A/D, 100-pin

H8/3837(U)

- Improved timer
- More memory

H8/3834S

- Low power consumption
- DOT-LCD
- Flash version available

100-pin

H8/3854

144-pin

H8/3857

H8/3877(U)

- Multi-tone generator
- Improved LCD: 52 segments × 4 common

H8/3877N

System control applications (Audio equipment, TVs, video monitors)

H8/3927

- A/D, D/A

H8/3947

- Improved serial specifications
- I²C-bus

System-on-chip (VCRs)

H8/3977R

- Servo controller
- OSD

H8/3614 Group

- General-purpose 64-pin MCU
- Standard model of H8/300L series

H8/3657 Group

- General-purpose 80-pin MCU
- On-chip asynchronous SCI
- 2.2V low-voltage operation

H8/3947 Group

- On-chip 2-channel I²C-bus interface
- Large on-chip memory capacity (60K bytes ROM, 2K bytes RAM)

H8/3637, H8/3627 Group

- On-chip DTMF generator
- Reduced electromagnetic noise emission

H8/3877, H8/3877N Group

- 100-pin MCUs with on-chip DTMF generator
- Multi-tone generator enables output at user-selected frequencies
- Available in LCD and LCD-less versions

H8/3977R Group

- On-chip digital servo and OSD circuits
- Implements peripheral functions needed for VCR system control on-chip

H8/3644 Group

- Numerous peripheral functions for an excellent cost to performance ratio
- On-chip asynchronous SCI, 16K, 24K, or 32K of F-ZTAT™ ROM

H8/3927 Group

- On-chip D/A and A/D converters
- Numerous on-chip timers

H8/3854, H8/3857 Group

- On-chip dot matrix type LCD controller/driver
- Lineup includes versions with low-power-consumption flash memory
- Numerous display functions (H8/3857)

• Specifications (H8/300L Series)

Group		H8/3614								H8/3627								H8/3637													
Product No.		H8/3612		H8/3613		H8/3614		H8/3614		H8/3622S		H8/3623S		H8/3624S		H8/3625		H8/3626		H8/3627		H8/3627		H8/3635S		H8/3636S		H8/3637S		H8/3637S	
Type No.		HD6433612xxxH HD6433612xxxP		HD6433613xxxH HD6433613xxxP		HD6433614xxxH HD6433614xxxP		HD6473614H HD6473614P		HD6433622SxxxFP HD6433622SxxxH		HD6433623SxxxFP HD6433623SxxxH		HD6433624SxxxFP HD6433624SxxxH		HD6433625xxxFP HD6433625xxxH		HD6433626xxxFP HD6433626xxxH		HD6433627xxxFP HD6433627xxxH		HD6473627FP HD6473627H		HD6433635SxxxF HD6433635SxxxW HD6433635SxxxX		HD6433636SxxxF HD6433636SxxxW HD6433636SxxxX		HD6433637SxxxF HD6433637SxxxW HD6433637SxxxX		HD6473637SF HD6473637SW HD6473637SX	
Memory	ROM(Bytes)	16K		24K		32K		16K		24K		32K		40K		48K		60K		40K		48K		60K							
	RAM(Bytes)	512		1K										2K										48K		60K					
	ROM Type*	M		Z		M										Z		M		Z											
CPU	CPU	H8/300L Core																													
	Basic Instructions	57																													
	Minimum Instruction Execution Time (ns)	476 (@4.2MHz)								400 (@5MHz)																					
Clock	Clock Generation Circuit	2 circuits (Main clock, Sub-clock)																													
	Subclock	Yes																													
	Frequency Divider	Yes																													
	Power Save	Sleep mode, Standby mode, Watch mode, Sub active mode								Sleep mode, Standby mode, Watch mode, Sub sleep mode, Sub active mode Active (Medium-speed) mode																					
A/D Converter	Resolution×Channels	8-bit×8								8-bit×2										8-bit×4											
	Sample and Hold	Yes																													
D/A Converter	Resolution×Channels	—																													
Timer	8-bit	5 (Timer A, B, C, D, E)								2 (Timer A, G)																					
	16-bit	—								1 (Timer F)																					
	Input Capture	—								1 (Timer G)																					
	Output Compare	—								1 (Timer F)																					
	PWM Output	—		1		—										1															
Event Counter		—																													
Watchdog Timer		—								—										1											
Serial Interface	Clock Sync./ Clock Async.	—								1										1											
	Clock Sync. Only	2																													
I ² C-bus		—																													
SSU/Special Serial I/O		—																													
LCD		—																													
VFD		—																													
OSD		—																													
I/O Ports	Input Only (Numbers)	10								3										5											
	CMOS I/O Only (Numbers)	38								50										61											
	High Voltage Port (Numbers)	—																													
	N-Channel Open Drain Port (Numbers)	6								—																					
	High Current Drive Port	—																													
	Pull-Up Resistor	—																													
Interrupts(Sources)	DTMF	—								1																					
	External	6								13																					
Debugging Function	On-Board Flash Program	—																													
Other Functions	ROM Correction Function	—																													
Package		DP-64S, FP-64A								FP-64E, FP-64A										TFP-80C, TFP-80F, FP-80B											
Operating Frequency/Supply Voltage		2.1MHz/2.7 to 5.5V 4.2MHz/4.0 to 5.5V								2.5MHz/2.2 to 5.5V 5.0MHz/2.7 to 5.5V										5.0MHz/2.7 to 5.5V											
Operating Ambient Temperature (°C)		-20 to 75																													

* M: mask ROM version, Z: ZTAT version

• Specifications (H8/300L Series)

Group		H8/3644																							
Product No.		H8/3640R			H8/3640			H8/3641R			H8/3641			H8/3642R			H8/3642			H8/3643R			H8/3643		
Type No.		HD6433640RxxxH	HD6433640RxxxP	HD6433640RxxxW	HD6433640xxxH	HD6433640xxxP	HD6433640xxxW	HD6433641RxxxH	HD6433641RxxxP	HD6433641RxxxW	HD6433641xxxH	HD6433641xxxP	HD6433641xxxW	HD6433642RxxxH	HD6433642RxxxP	HD6433642RxxxW	HD6433642xxxH	HD6433642xxxP	HD6433642xxxW	HD6433643RxxxH	HD6433643RxxxP	HD6433643RxxxW	HD6433643xxxH	HD6433643xxxP	HD6433643xxxW
Memory	ROM(Bytes)	8K						12K						16K						24K					
	RAM(Bytes)	512																		1K					
	ROM Type*	M																							
CPU	CPU	H8/300L Core																							
	Basic Instructions	57																							
	Minimum Instruction Execution Time (ns)	250 (@8MHz)																							
Clock	Clock Generation Circuit	2 circuits (Main clock, Sub-clock)																							
	Subclock	Yes																							
	Frequency Divider	Yes																							
	Power Save	Sleep (High-speed) mode, Sleep (Medium-speed) mode, Standby mode, Watch mode, Sub sleep mode, Sub active mode																							
		Active (Medium-speed) mode																							
A/D Converter	Resolution×Channels	8-bit×8																							
	Sample and Hold	Yes																							
D/A Converter	Resolution×Channels	—																							
Timer	8-bit	3 (Timer A, B1, V)																							
	16-bit	1 (Timer X)																							
	Input Capture	1 (Timer X)																							
	Output Compare	1 (Timer X)																							
	PWM Output	1																							
	Event Counter	—																							
Watchdog Timer		1																							
Serial Interface	Clock Sync./ Clock Async.	1																							
	Clock Sync. Only	1																							
I ² C-bus		—																							
SSU/Special Serial I/O		2																							
LCD		—																							
VFD		—																							
OSD		—																							
I/O Ports	Input Only (Numbers)	8																							
	CMOS I/O Only (Numbers)	45																							
	High Voltage Port (Numbers)	—																							
	N-Channel Open Drain Port (Numbers)	—																							
	High Current Drive Port	—																							
	Pull-Up Resistor	—																							
	DTMF	—																							
Interrupts(Sources)	External	12																							
Debugging Function	On-Board Flash Program	—																							
Other Functions	ROM Correction Function	—																							
Package		TFP-80C, DP-64S, FP-64A																							
Operating Frequency/Supply Voltage		5.0MHz/2.5 to 5.5V 8.0MHz/4.0 to 5.5V																							
Operating Ambient Temperature (°C)		-20 to 75																							

* M: mask ROM version

• Specifications (H8/300L Series)

Group		H8/3644																				
Product No.		H8/3644R			H8/3644			H8/3644R			H8/3644			H8/3642AF			H8/3643F			H8/3644F		
		HD6433644RxxxH	HD6433644RxxxP	HD6433644RxxxW	HD6433644xxxH	HD6433644xxxP	HD6433644xxxW	HD6473644RH	HD6473644RP	HD6473644RW	HD6473644H	HD6473644P	HD6473644W	HD64F3642AH	HD64F3642AP	HD64F3642AW	HD64F3643H	HD64F3643P	HD64F3643W	HD64F3644H	HD64F3644P	HD64F3644W
Type No.																						
Memory	ROM(Bytes)	32K												16K			24K			32K		
	RAM(Bytes)	1K																				
	ROM Type*	M						Z						F								
CPU	CPU	H8/300L Core																				
	Basic Instructions	57																				
	Minimum Instruction Execution Time (ns)	250 (@8MHz)																				
Clock	Clock Generation Circuit	2 circuits (Main clock, Sub-clock)																				
	Subclock	Yes																				
	Frequency Divider	Yes																				
	Power Save	Sleep (High-speed) mode, Sleep (Mideum-speed) mode, Standby mode, Watch mode, Sub sleep mode, Sub active mode Active (Medium-speed) mode																				
A/D Converter	Resolution×Channels	8-bit×8																				
	Sample and Hold	Yes																				
D/A Converter	Resolution×Channels	—																				
	8-bit	3 (Timer A, B1, V)																				
Timer	16-bit	1 (Timer X)																				
	Input Capture	1 (Timer X)																				
	Output Compare	1 (Timer X)																				
	PWM Output	1																				
	Event Counter	—																				
Watchdog Timer		1																				
Serial Interface	Clock Sync./ Clock Async.	1																				
	Clock Sync. Only	1																				
I ² C-bus		—																				
SSU/Special Serial I/O		2																				
LCD		—																				
VFD		—																				
OSD		—																				
I/O Ports	Input Only (Numbers)	8																				
	CMOS I/O Only (Numbers)	45																				
	High Voltage Port (Numbers)	—																				
	N-Channel Open Drain Port (Numbers)	—																				
	High Current Drive Port	—																				
	Pull-Up Resistor	—																				
	DTMF	—																				
Interrupts(Sources)	External	12																				
Debugging Function	On-Board Flash Program	—																				
Other Functions	ROM Correction Function	—																				
Package		TFP-80C, DP-64S, FP-64A																				
Operating Frequency/Supply Voltage		5.0MHz/2.5 to 5.5V 8.0MHz/4.0 to 5.5V						5.0MHz/2.5 to 5.5V						5.0MHz/2.5 to 5.5V 8.0MHz/4.0 to 5.5V								
Operating Ambient Temperature (°C)		-20 to 75																				

* F: F-ZTAT version, M: mask ROM version, Z: ZTAT version

• Specifications (H8/300L Series)

Group		H8/3657																				H8/3714														
Product No.		H8/3652		H8/3653		H8/3654		H8/3655		H8/3656		H8/3657		H8/3657		H8/3712		H8/3713		H8/3714		H8/3714														
Type No.		HD6433652xxxF	HD6433652xxxH	HD6433652xxxX	HD6433653xxxF	HD6433653xxxH	HD6433653xxxW	HD6433653xxxX	HD6433654xxxF	HD6433654xxxH	HD6433654xxxW	HD6433654xxxX	HD6433655xxxF	HD6433655xxxH	HD6433655xxxW	HD6433655xxxX	HD6433656xxxF	HD6433656xxxH	HD6433656xxxW	HD6433656xxxX	HD6433657xxxF	HD6433657xxxH	HD6433657xxxW	HD6433657xxxX	HD6473657F	HD6473657H	HD6473657W	HD6473657X	HD6433712xxxH	HD6433712xxxP	HD6433713xxxH	HD6433713xxxP	HD6433714xxxH	HD6433714xxxP	HD6473714H	HD6473714P
Memory	ROM(Bytes)	16K		24K		32K		40K		48K		60K		16K		24K		32K																		
	RAM(Bytes)	1K																				2K		384		512										
	ROM Type*	M												Z				M		Z																
CPU	CPU	H8/300L Core																																		
	Basic Instructions	57																																		
	Minimum Instruction Execution Time (ns)	400 (@5MHz)														476 (@4.2MHz)																				
Clock	Clock Generation Circuit	2 circuits (Main clock, Sub-clock)																																		
	Subclock	Yes																																		
	Frequency Divider	Yes																																		
	Power Save	Sleep (High-speed) mode, Sleep (Mideum-speed) mode, Standby mode, Watch mode, Sub sleep mode, Sub active mode														Sleep mode, Standby mode, Watch mode, Sub active mode																				
		Active (Medium-speed) mode																																		
A/D Converter	Resolution×Channels	8-bit×8																																		
	Sample and Hold	Yes																																		
D/A Converter	Resolution×Channels	—																																		
	8-bit	3 (Timer A, B1, V)														5 (Timer A, B, C, D, E)																				
Timer	16-bit	1 (Timer X)														—																				
	Input Capture	1 (Timer X)														—																				
	Output Compare	1 (Timer X)														—																				
	PWM Output	1														—																				
	Event Counter	—														—																				
Watchdog Timer		1														—																				
Serial Interface	Clock Sync./ Clock Async.	1														2																				
	Clock Sync. Only	1														—																				
I ² C-bus		—																																		
SSU/Special Serial I/O		2														—																				
LCD		—																																		
VFD		—														16dig×24seg																				
OSD		—																																		
I/O Ports	Input Only (Numbers)	8														9																				
	CMOS I/O Only (Numbers)	59														12																				
	High Voltage Port (Numbers)	—														33																				
	N-Channel Open Drain Port (Numbers)	—																																		
	High Current Drive Port	—																																		
	Pull-Up Resistor	—																																		
Interrupts(Sources)	DTMF	—																																		
	External	12														4																				
Debugging Function	On-Board Flash Program	—																																		
Other Functions	ROM Correction Function	—																																		
Package		TFP-80F, FP-80A, FP-80B		TFP-80C, TFP-80F, FP-80A, FP-80B														DP-64S, FP-64A																		
Operating Frequency/Supply Voltage		2.5MHz/2.2 to 5.5V 5.0MHz/2.7 to 5.5V														2.1MHz/2.7 to 5.5V 4.2MHz/4.0 to 5.5V																				
Operating Ambient Temperature (°C)		-20 to 75																																		

* M: mask ROM version, F: F-ZTAT version

• Specifications (H8/300L Series)

Group		H8/3724												H8/3814																							
Product No.		H8/3723		H8/3724		H8/3724		H8/3725		H8/3726		H8/3726		H8/3812		H8/3812S		H8/3812U		H8/3813		H8/3813S		H8/3813U		H8/3814		H8/3814S		H8/3814U							
Type No.		HD6433723xxxF	HD6433723xxxH	HD6433724xxxF	HD6433724xxxH	HD6473724F	HD6473724H	HD6433725xxxF	HD6433725xxxH	HD6433726xxxF	HD6433726xxxH	HD6473726F	HD6473726H	HD6433812xxxF	HD6433812xxxH	HD6433812SxxxF	HD6433812SxxxH	HD6433812SxxxX	HD6433812UxxxF	HD6433812UxxxH	HD6433813xxxF	HD6433813xxxH	HD6433813SxxxF	HD6433813SxxxH	HD6433813SxxxX	HD6433813UxxxF	HD6433813UxxxH	HD6433814xxxF	HD6433814xxxH	HD6433814SxxxF	HD6433814SxxxH	HD6433814SxxxX	HD6433814UxxxF	HD6433814UxxxH			
Memory	ROM(Bytes)	24K		32K		40K		48K		16K				24K				32K																			
	RAM(Bytes)	384		512		640		1K		512																											
	ROM Type*	M		Z		M		Z		M																											
CPU	CPU	H8/300L Core																																			
	Basic Instructions	57																		400 (@ 5.0MHz)																	
	Minimum Instruction Execution Time (ns)	476 (@ 4.2MHz)																																			
Clock	Clock Generation Circuit	2 circuits (Main clock, Sub-clock)																																			
	Subclock	Yes																																			
	Frequency Divider	—																																			
	Power Save	Sleep mode, Standby mode, Watch mode, Sub active mode																		Sleep mode, Standby mode, Watch mode, Sub sleep mode, Sub active mode Active (Medium-speed) mode																	
A/D Converter	Resolution×Channels	8-bit×8																		8-bit×12																	
	Sample and Hold																			Yes																	
D/A Converter	Resolution×Channels	—																																			
Timer	8-bit	5 (Timer A, B, C, D, E)																		2 (Timer A, G)																	
	16-bit	—																		1 (Timer F)																	
	Input Capture	—																		1 (Timer G)																	
	Output Compare	—																		1 (Timer F)																	
	PWM Output	1																		—																	
	Event Counter																			—																	
Watchdog Timer		—																																			
Serial Interface	Clock Sync./ Clock Async.	2																		—																	
	Clock Sync. Only	—																		2																	
I ² C-bus		—																																			
SSU/Special Serial I/O		—																		2																	
LCD		—																		40seg×4com																	
VFD		16dig×28seg																		—																	
OSD		—																																			
I/O Ports	Input Only (Numbers)	9																		13																	
	CMOS I/O Only (Numbers)	24																		71																	
	High Voltage Port (Numbers)	37																		—																	
	N-Channel Open Drain Port (Numbers)	—																																			
	High Current Drive Port	—																																			
	Pull-Up Resistor	—																																			
	DTMF	—																																			
Interrupts(Sources)	External	6																		13																	
Debugging Function		On-Board Flash Program																																			
Other Functions		ROM Correction Function																																			
Package		FP-80A, FP-80B																		FP-100A FP-100B	TFP-100B FP-100A FP-100B	FP-100A FP-100B	TFP-100B FP-100A FP-100B	FP-100A FP-100B	TFP-100B FP-100A FP-100B	FP-100A FP-100B											
Operating Frequency/Supply Voltage		2.1MHz/2.7 to 5.5V 4.2MHz/4.0 to 5.5V																		2.5MHz/2.7 to 5.5V 5.0MHz/4.0 to 5.5V																	
Operating Ambient Temperature (°C)		-20 to 75																																			

* M: mask ROM version, Z: ZTAT version

• Specifications (H8/300L Series)

Group		H8/3834																					
Product No.		H8/3832S		H8/3833		H8/3833S		H8/3833U		H8/3834		H8/3834S		H8/3834U		H8/3835							
		HD6433832SxxxF	HD6433832SxxxH	HD6433832SxxxX	HD6433833xxxF	HD6433833xxxH	HD6433833xxxX	HD6433833SxxxF	HD6433833SxxxH	HD6433833SxxxX	HD6433833UxxxF	HD6433833UxxxH	HD6433833UxxxX	HD6433834xxxF	HD6433834xxxH	HD6433834xxxX	HD6473834UF	HD6473834UH	HD6473834UX	HD6433835xxxF	HD6433835xxxH	HD6433835xxxX	
Type No.																							
Memory	ROM(Bytes)	16K		24K						32K						40K							
	RAM(Bytes)																					2K	
	ROM Type*	M								Z		M				Z		M					
CPU	CPU	H8/300L Core																					
	Basic Instructions	57																					
	Minimum Instruction Execution Time (ns)	400 (@5.0MHz)																					
Clock	Clock Generation Circuit	2 circuits (Main clock, Sub-clock)																					
	Subclock	Yes																					
	Frequency Divider	Yes																					
	Power Save	Sleep mode, Standby mode, Watch mode, Sub Sleep mode, Sub active mode, Active (Medium-speed) mode																					
A/D Converter	Resolution×Channels	8-bit×12																					
	Sample and Hold	Yes																					
D/A Converter	Resolution×Channels	—																					
	8-bit	4 (Timer A, B, C, G)																					
Timer	16-bit	1 (Timer F)																					
	Input Capture	1 (Timer G)																					
	Output Compare	1 (Timer F)																					
	PWM Output	1																					
	Event Counter	—																					
Watchdog Timer		—																					
Serial Interface	Clock Sync./ Clock Async.	1																					
	Clock Sync. Only	2																					
I ² C-bus		—																					
SSU/Special Serial I/O		—																					
LCD		40seg×4com																					
VFD		—																					
OSD		—																					
I/O Ports	Input Only (Numbers)	13																					
	CMOS I/O Only (Numbers)	71																					
	High Voltage Port (Numbers)	—																					
	N-Channel Open Drain Port (Numbers)	—																					
	High Current Drive Port	—																					
	Pull-Up Resistor	—																					
DTMF		—																					
Interrupts(Sources)	External	13																					
Debugging Function	On-Board Flash Program	—																					
Other Functions	ROM Correction Function	—																					
Package		TFP-100B, FP-100A, FP-100B																					
Operating Frequency/Supply Voltage		2.5MHz/2.7 to 5.5V 5.0MHz/4.0 to 5.5V																					
Operating Ambient Temperature (°C)		-20 to 75																					

* M: mask ROM version, Z: ZTAT version

• Specifications (H8/300L Series)

Group		H8/3834																													
Product No.		H8/3835S			H8/3835U			H8/3836			H8/3836S			H8/3836U			H8/3837			H8/3837S			H8/3837U			H8/3837UH					
Type No.		HD6433835SxxxF	HD6433835SxxxH	HD6433835SxxxX	HD6433835UxxxF	HD6433835UxxxH	HD6433835UxxxX	HD6433836xxxF	HD6433836xxxH	HD6433836xxxX	HD6433836SxxxF	HD6433836SxxxH	HD6433836SxxxX	HD6433836UxxxF	HD6433836UxxxH	HD6433836UxxxX	HD6433837xxxF	HD6433837xxxH	HD6433837xxxX	HD64773837F	HD64773837H	HD64773837X	HD6433837SxxxF	HD6433837SxxxH	HD6433837SxxxX	HD6433837UxxxF	HD6433837UxxxH	HD6433837UxxxX	HD64773837UF	HD64773837UH	HD64773837UX
Memory	ROM(Bytes)	40K			48K			60K																							
	RAM(Bytes)	2K																													
ROM Type*		M															Z		M			Z									
CPU	CPU	H8/300L Core																													
	Basic Instructions	57																													
	Minimum Instruction Execution Time (ns)	400 (@ 5.0MHz)																													
Clock	Clock Generation Circuit	2 circuits (Main clock, Sub-clock)																													
	Subclock	Yes																													
	Frequency Divider	Yes																													
	Power Save	Sleep mode, Standby mode, Watch mode, Sub Sleep mode, Sub active mode, Active (Medium-speed) mode																													
A/D Converter	Resolution × Channels	8-bit × 12																													
		Sample and Hold																													
D/A Converter	Resolution × Channels	—																													
	8-bit	4 (Timer A, B, C, G)																													
Timer	16-bit	1 (Timer F)																													
	Input Capture	1 (Timer G)																													
	Output Compare	1 (Timer F)																													
	PWM Output	1																													
		Event Counter																													
		—																													
Watchdog Timer		—																													
Serial Interface	Clock Sync./ Clock Async.	1																													
	Clock Sync. Only	2																													
I ² C-bus		—																													
SSU/Special Serial I/O		—																													
LCD		40seg × 4com																													
VFD		—																													
OSD		—																													
I/O Ports	Input Only (Numbers)	13																													
	CMOS I/O Only (Numbers)	71																													
	High Voltage Port (Numbers)	—																													
	N-Channel Open Drain Port (Numbers)	—																													
	High Current Drive Port	—																													
	Pull-Up Resistor	—																													
DTMF		—																													
Interrupts(Sources)	External	13																													
Debugging Function	On-Board Flash Program	—																													
Other Functions	ROM Correction Function	—																													
Package		TFP-100B, FP-100A, FP-100B																													
Operating Frequency/Supply Voltage		2.5MHz/2.7 to 5.5V 5.0MHz/4.0 to 5.5V																													
Operating Ambient Temperature (°C)		-20 to 75																													

* M: mask ROM version, Z: ZTAT version

* M: mask ROM version, Z: ZTAT version

• Specifications (H8/300L Series)

Group		H8/3927										H8/3947				H8/3977R									
Product No.		H8/3924		H8/3925		H8/3926		H8/3927		H8/3927		H8/3945	H8/3946	H8/3947	H8/3947	H8/3974R	H8/3975R	H8/3976R	H8/3977R	H8/3977R					
		HD6433924xxxF	HD6433924xxxX	HD6433925xxxF	HD6433925xxxX	HD6433926xxxF	HD6433926xxxX	HD6433927xxxF	HD6433927xxxX	HD6433927xxxF	HD6473927X	HD6433945xxxF	HD6433946xxxF	HD6433947xxxF	HD6473947F	HD6433974RxxxF	HD6433975RxxxF	HD6433976RxxxF	HD6433977RxxxF	HD6473977RF					
Type No.																									
Memory	ROM(Bytes)	32K		40K		48K		60K				40K		48K		60K		32K		40K		48K		60K	
	RAM(Bytes)	1K										2K				768		1K							
	ROM Type*	M						Z		M				Z		M				Z					
CPU	CPU	H8/300L Core																							
	Basic Instructions	57																							
	Minimum Instruction Execution Time (ns)	400 (@5.0MHz)																							
Clock	Clock Generation Circuit	2 circuits (Main clock, Sub-clock)														1 circuit									
	Subclock	Yes																							
	Frequency Divider	Yes																							
	Power Save	Sleep (High-speed) mode, Sleep (Medium-speed) mode, Standby mode, Watch mode, Sub Sleep mode, Sub active mode, Active (Medium-speed) mode										Sleep mode, Standby mode, Watch mode, Sub Sleep mode, Active mode				Sleep mode, Standby mode, Watch mode, Sub active mode									
A/D Converter	Resolution × Channels	8-bit × 8										8-bit × 12													
D/A Converter	Sample and Hold	Yes														—									
	Resolution × Channels	8-bit × 4														—									
Timer	8-bit	7 (Timer A, B1, B2, B3, C, E, V)										8-bit × 7				8-bit × 4									
	16-bit	2 (Timer X, Y)										16-bit × 1				1 (Timer X)									
	Input Capture	1 (Timer X)										1 (Timer G)				—									
	Output Compare	1 (Timer X)										1 (Timer F)				—									
	PWM Output	1										8				3									
	Event Counter											—													
Watchdog Timer		1										—													
Serial Interface	Clock Sync./ Clock Async.											—													
	Clock Sync. Only	2										1				2									
I ² C-bus		—										2				—									
SSU/Special Serial I/O		—														2									
LCD		—																							
VFD		—																							
OSD		—										—				Yes									
I/O Ports	Input Only (Numbers)	12										17				12									
	CMOS I/O Only (Numbers)	56										69				46									
	High Voltage Port (Numbers)	—										8				—									
	N-Channel Open Drain Port (Numbers)	—										8				—									
	High Current Drive Port	—																							
	Pull-Up Resistor	—																							
DTMF		—																							
Interrupts(Sources)	External	13										14				8									
Debugging Function	On-Board Flash Program	—																							
Other Functions	ROM Correction Function	—																							
Package		TFP-80F, FP-80B										FP-100A													
Operating Frequency/Supply Voltage		2.5MHz/2.5 to 5.5V 5.0MHz/4.0 to 5.5V										2.5MHz/2.7 to 5.5V 5.0MHz/4.0 to 5.5V				5.0MHz/4.0 to 5.5V									
Operating Ambient Temperature (°C)		-20 to 75																							

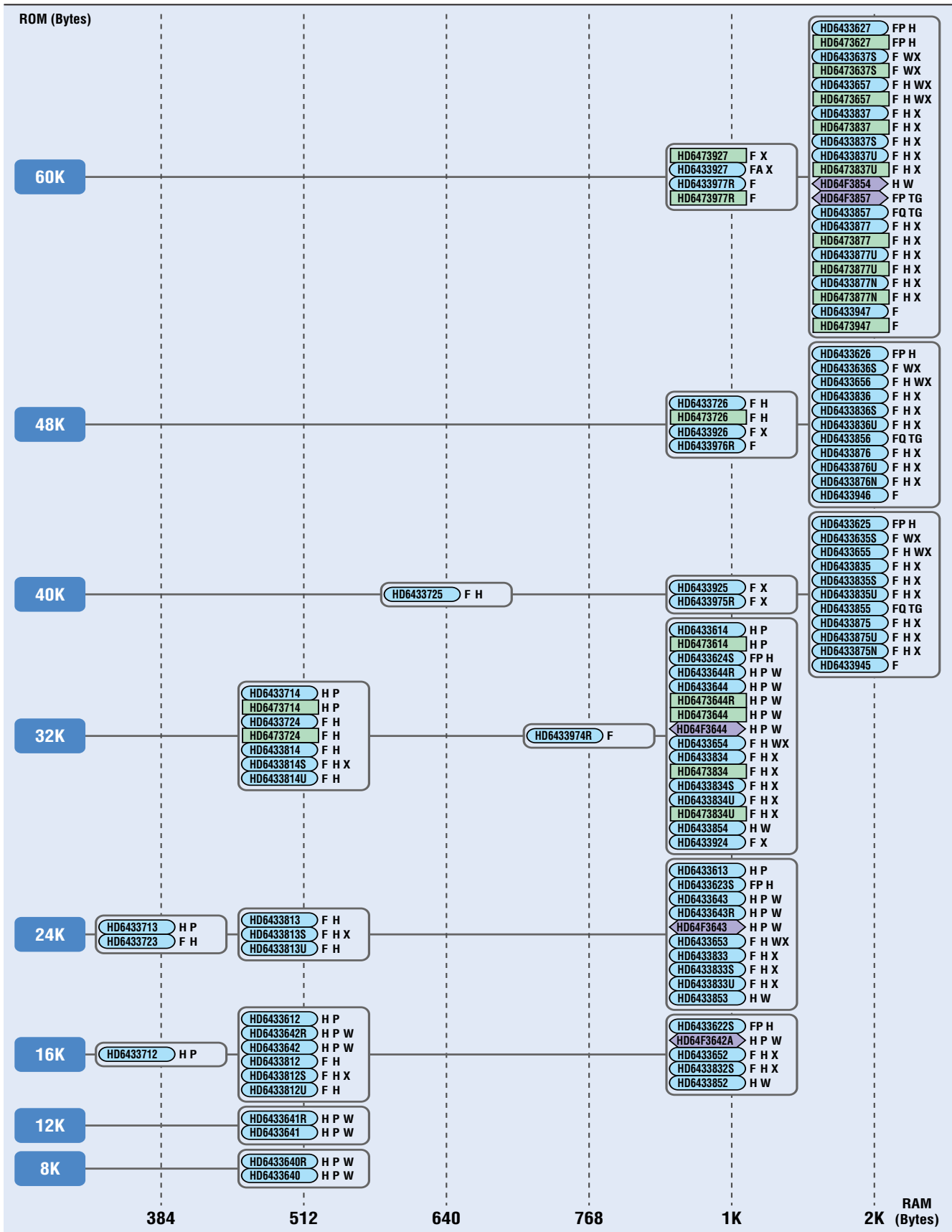
* M: mask ROM version, Z: ZTAT version

• Specifications (H8/300L Series)

Group		H8/3857								H8/3854							
Product No.		H8/3855		H8/3856		H8/3857		H8/3857F		H8/3852		H8/3853		H8/3854		H8/3854F	
		HD6433855xxxFQ	HD6433855xxxTG	HD6433856xxxFQ	HD6433856xxxTG	HD6433857xxxFQ	HD6433857xxxTG	HD64F3857FP	HD64F3857TG	HD6433852xxxH	HD6433852xxxW	HD6433853xxxH	HD6433853xxxW	HD6433854xxxH	HD6433854xxxW	HD64F3854H	HD64F3854W
Memory	ROM(Bytes)	40K		48K		60K				16K		24K		32K		60K	
	RAM(Bytes)	2K															
	ROM Type*	M						F		M						F	
CPU	CPU	H8/300 Core															
	Basic Instructions	57															
	Minimum Instruction Execution Time (ns)	400 (@5MHz)															
Clock	Clock Generation Circuit	2															
	Subclock	Yes															
	Frequency Divider	Yes															
	Power Save	Yes															
A/D Converter	Resolution×Channels	8-bit×8						8-bit×4									
D/A Converter	Sample and Hold	—															
	Resolution×Channels	—															
Timer	8-bit	Yes															
	16-bit	Yes															
	Input Capture	Yes															
	Output Compare	Yes															
	PWM Output	1 (14-bit PWM)						—									
	Event Counter	Yes (Timer B, C, F)															
Watchdog Timer		—															
Serial Interface	Clock Sync./ Clock Async.	1								—							
	Clock Sync. Only	1								—							
I ² C-bus		—															
SSU/Special Serial I/O		—															
LCD (DOT-LCD Type)		40seg×32com, 56seg×16com, 64seg×8com								40seg×16com, 40seg×8com							
VFD		—															
OSD		—															
I/O Ports	Input Only (Numbers)	9								5							
	CMOS I/O Only (Numbers)	35								24							
	High Voltage Port (Numbers)	—															
	N-Channel Open Drain Port (Numbers)	—															
	High Current Drive Port	10mA×16 (Max80mA)								10mA×8 (Max80mA)							
	Pull-Up Resistor	24								16							
DTMF	—																
Interrupts(Sources)	External	13								12							
Debugging Function	On-Board Flash Program	Yes															
Other Functions	ROM Correction Function	—															
Package		FP-144H, TFP-144								FP-100B, TFP-100G							
Operating Frequency/Supply Voltage		2.5MHz/3.0 to 5.5V 5.0MHz/4.0 to 5.5V															
Operating Ambient Temperature (°C)		-20 to 75															

* F: F-ZTAT version, M: mask ROM version

• Memory Capacity (ROM/RAM) (H8/300L Series)



Package	
H	QFP (PRQP0064GB-A (FP-64A), PRQP0080JB-A (FP-80A), PRQP0100KA-A (FP-100B))
F	QFP (PRQP0080GD-B (FP-80B), PRQP0100JE-B (FP-100A))
FP	LQFP (PLQP0064KC-A (FP-64E))
FQ	LQFP (PLQP0144KC-A (FP-144H))
TG	TQFP (PTQP0144LC-A (TFP-144))
W	TQFP (PTQP0080KC-A (TFP-80C), PTQP0100LC-A (TFP-100G))
X	TQFP (PTQP0080JA-B (TFP-80F), PTQP0100KA-A (TFP-100B))
P	DIP (PRDP0064BB-A (DP-64S))

* It is an old package code inside ()

740 Family

8-bit

The 740 family meets extensive span of system requirements through superior features such as instruction sets suitable for control applications, high-level peripheral functions, and low power consumption. It is comprised of a wide variety of MCUs with a rich array of functions for applications ranging from household appliances to industrial equipment.

740 Family Features

Proprietary 8-bit CPU core

- Broad array of functions suitable for a variety of applications
- Diverse product lineup, encompassing 32-pin to 144-pin versions
- High-level software development environment
- Pin compatibility and numerous ROM and RAM configurations
- Increased speed, enhanced peripheral functions
- Flash memory and one-time PROM versions
- Low voltage and low power consumption

QzROM series

Devices are included in the Groups shown in below.

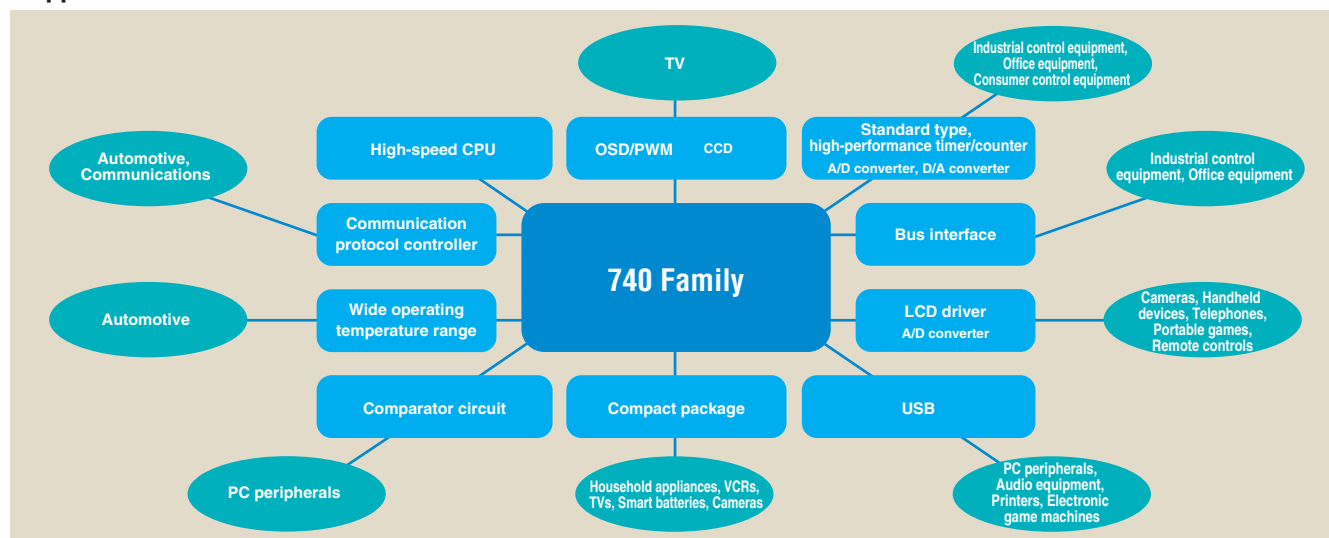
740 series	7544 group
	7545 group
	7546 group
	7547 group
38000 series	3850 group
	3823 group
	3803 group

Application Map

Field	General-purpose, low-pin-count package	General-purpose, high-pin-count package	On-chip LCD driver type	On-chip custom function type
VCR	7540 7542 7544 7545** 7546** 7547** 3850 3851 7516	3803 3804 3886	3822 3823** 38C1 38C2 38C5 38C8 7560	
Audio equipment				
Electric household appliances				
Telephones				3826
Amusement products				
Remote controls				
Cameras				38C2
Communications equipment				3826
Office equipment		3803		
Automotive	(See Automotive MCUs section.)			7630 7632 (See CAN MPUs and MCUs section.)
Notebook PCs				7512* 7516 7517* 3882* 3883* 3885 3886 (See Notebook PC MCUs section.)
PC peripherals				7534 7641 7643 38K0 38K2 (See USB MPUs and MCUs section.)
TV				(See TV MCUs section.)

Applications

★ : New product ★★ : Under development



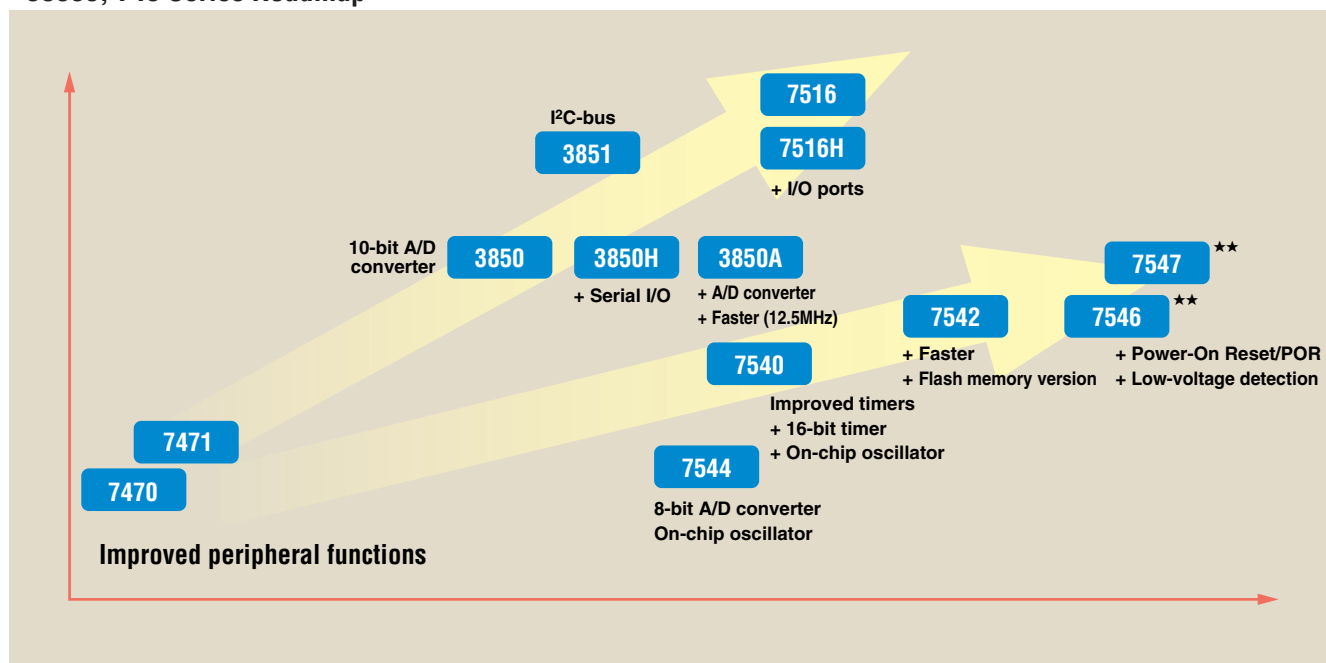
□ General-Purpose Type (Low Pin-Count Package)

The trend toward more compact and lightweight products and reduced system costs is aided by general-purpose Renesas MCUs that integrate the functions and performance of conventional 8-bit processors into smaller (low-pin-count) packages. These MCUs have on-chip serial I/O for

clock synchronous/asynchronous communication and A/D converters to transform analog signals into data for digital-signal-processors. They are ideal for use in compact electric household appliances.

Applications Remote controls, VTRs, audio equipment, household appliances, telephones, amusement products

• 38000, 740 Series Roadmap



★★ : Under development

• **Specifications (General-Purpose Type (Low Pin-Count Package):740 Series)**

Group		7540												7542												7544								
Type No.		M37540M2-XXXSP	M37540M2-XXXGP	M37540M2-XXXFP	M37540E2SP	M37540E2GP	M37540E2FP	M37540M4-XXXSP	M37540M4-XXXGP	M37540M4-XXXFP	M37540E8SP	M37540E8GP	M37540E8FP	M37542M2-XXXSP	M37542M2-XXXGP	M37542M2-XXXFP	M37542M2-XXXHP*	M37542M4-XXXSP	M37542M4-XXXGP	M37542M4-XXXFP	M37542M4-XXXHP*	M37542F8SP	M37542F8GP	M37542F8FP	M37544M2-XXXSP	M37544M2-XXXGP	M37544M2-XXXHP*	M37544G2ASP*	M37544G2AGP**	M37544G2A-XXXSP*	M37544G2A-XXXGP**			
Memory	ROM(Bytes)	8K						16K			32K			8K			16K			32K+4K			8K											
	RAM(Bytes)	384						512			768			384			512			1K			256											
	ROM Type*	M		O		M		O		M						F			M		Qz													
	Data Flash	—												ID code check function, ROM code protecting function, E/W disabled function (Only Flash memory version)														—		Yes				
CPU	CPU	740 Core																																
	Basic Instructions	71																																
	Minimum Instruction Execution Time (ns)	340												250																				
External Bus Expansion	Host Interface	—																																
Clock	Clock Generation Circuit	2 circuits (Main clock, On-chip oscillator)																																
	Subclock	—																																
	On-Chip Oscillator	Yes																																
	Oscillation Stop Detection	Yes																																
	Frequency Divider	1/n (n = 1, 2, 8)												1/n (n = 1, 2, 8, 128)																				
	Power Save	Wait mode, Stop mode, On-chip oscillator operation																																
Power Supply	Power-On Reset/POR	—																																
Voltage Detection	Low Voltage Detection/LVD	—																																
A/D Converter	Resolution × Channels	10-bit × 8 (36-pin version)												10-bit × 6(32-pin version)												8-bit × 6								
D/A Converter	Resolution × Channels	—																																
Timer	8-bit	—																																
	16-bit	Timer A × 1												Timer A × 1, Timer B × 1												Timer A × 1								
	Prescaler	Timer 1 × 1, Timer X × 1, Timer Y × 1, Timer Z × 1												Timer 1 × 1, Timer X × 1																				
	Input Capture	—												2 (also used as Timer A and B)																		—		
	Output Compare	—												4 (also used as Timer A and B)																		—		
	PWM Output	Timer Y, Timer Z												—																				
	Real-Time Port	Timer Y, Timer Z												Timer A, Timer B																		—		
	Event Counter	Timer A, Timer X												Timer X																		Timer A, Timer X		
Watchdog Timer		Yes																																
Serial Interface	Clock Sync./ Clock Async.	1 (Serial I/O1)												2 (Serial I/O1, Serial I/O2)												1 (Serial I/O1)								
	Clock Sync. Only	1 (Serial I/O2)												—																				
I ² C-bus		—																																
LPC/ISA		—																																
LCD		—																																
I/O Ports	Input Only (Numbers)	—																																
	CMOS Output Only (Numbers)	—																																
	CMOS I/O Only (Numbers)	29 (36-pin version), 25 (32-pin version)												25																				
	N-Channel Open Drain Port (Numbers)	7 (36-pin version), 5 (32-pin version)												16 (36-pin version), 14 (32-pin version)																		14		
	DTMF	—																																
	High Current Drive Port	—																																
Interrupts(Sources)	Pull-Up Resistor	16 (36-pin version), 14 (32-pin version)												14																				
	External	5 (36-pin version), 4 (32-pin version)												6																		4		
Debugging Function	On-Board Flash Program	—												Yes																		—		
	ROM Correction Function	—																																
Other Functions	Others	Key-on wakeup																																
		Permitting RC oscillation																																
Package		36-pin SSOP 32-pin LQFP 32-pin SDIP												36-pin SSOP 32-pin LQFP 32-pin SDIP 36-pin WQFN												32-pin LQFP 32-pin SDIP 36-pin WQFN								
Operating Frequency/Supply Voltage		(at Double-speed mode) 6MHz/4.5 to 5.5V (at ceramic/quartz-crystal, in high-speed mode) 8MHz/4.0 to 5.5V 4MHz/2.4 to 5.5V 2MHz/2.2 to 5.5V												(at Double-speed mode) 8MHz/4.5 to 5.5V (at ceramic/quartz-crystal, in high-speed mode) 8MHz/4.0 to 5.5V 4MHz/2.4 to 5.5V 2MHz/2.2 to 5.5V												(at Double-speed mode) 8MHz/4.5 to 5.5V (at ceramic/quartz-crystal, in high-speed mode) 8MHz/4.0 to 5.5V 4MHz/2.4 to 5.5V 2MHz/2.2 to 5.5V 8MHz/4.0 to 5.5V			(at Double-speed mode) 8MHz/4.5 to 5.5V (at ceramic/quartz-crystal, in high-speed mode) 8MHz/4.0 to 5.5V 4MHz/2.4 to 5.5V 2MHz/2.2 to 5.5V 8MHz/4.0 to 5.5V			(at Double-speed mode) 8MHz/4.5 to 5.5V (at ceramic/quartz-crystal, in high-speed mode) 8MHz/4.0 to 5.5V 4MHz/2.4 to 5.5V 2MHz/2.2 to 5.5V 8MHz/4.0 to 5.5V		
Operating Ambient Temperature (°C)		-20 to 85																																

* F: Flash memory version, M: mask ROM version, O: One-time PROM version, Qz: QzROM version

★ : New product ★★ : Under development

□ General-Purpose Type (Low Pin-Count Package):740 Series

• Specifications (General-Purpose Type (Low Pin-Count Package):740 Series)

Group		7545**						7546**										7547**			
Type No.		M37545G4-XXG4P**	M37545G4G4P**	M37545G6-XXG4P**	M37545G6G4P**	M37545G8-XXG4P**	M37545G8G4P**	M37546G2-XXG4P**	M37546G2-XXG4P**	M37546G2-XXG4P**	M37546G2-XXG4P**	M37546G2-XXG4P**	M37546G2-XXG4P**	M37546G2-XXG4P**	M37546G2-XXG4P**	M37546G2-XXG4P**	M37546G2-XXG4P**	M37547G2-XXG4P**	M37547G2-XXG4P**	M37547G2-XXG4P**	M37547G2-XXG4P**
Memory	ROM(Bytes)	16K		24K		32K		8K		16K		8K		16K		8K		8K	16K	8K	16K
	RAM(Bytes)			512				384		512		384		512		384		384	512	384	512
	ROM Type*																				
	Data Flash																				
	Program Security																				
CPU	CPU																				
	Basic Instructions																				
	Minimum Instruction Execution Time (ns)			2000																	
External Bus Expansion	Host Interface																				
Clock	Clock Generation Circuit			1 circuits (ceramic resonator, quartz-crystal oscillator)																	
	Subclock																				
	On-Chip Oscillator			—																	
	Oscillation Stop Detection			—																	
	Frequency Divider			1/n (n = 4)																	
	Power Save			Wait mode, Stop mode																	
Power Supply	Power-On Reset/POR																				
Voltage Detection	Low Voltage Detection/LVD																				
A/D Converter	Resolution × Channels			—																	
D/A Converter	Resolution × Channels																				
Timer	8-bit			Timer 2 × 1, Timer 3 × 1																	
	16-bit			—																	
	Prescaler			Timer 1 × 1																	
	Input Capture			—																	
	Output Compare			—																	
	PWM Output			—																	
	Real-Time Port			—																	
	Event Counter			—																	
Watchdog Timer																					
Serial Interface	Clock Sync./ Clock Async.			—																	
	Clock Sync. Only																				
I ² C-bus																					
LPC/ISA																					
LCD																					
I/O Ports	Input Only (Numbers)																				
	CMOS Output Only (Numbers)																				
	CMOS I/O Only (Numbers)																				
	N-Channel Open Drain Port (Numbers)			16																	
	DTMF																				
	High Current Drive Port			LED output port × 8																	
Interrupts(Sources)	External			3																	
Debugging Function	On-Board Flash Program																				
Other Functions	ROM Correction Function																				
	Others																				
Package																					
Operating Frequency/Supply Voltage																					
Operating Ambient Temperature (°C)																					

* Qz: QzROM version

★★ : Under development

• **Specifications (General-Purpose Type (Low Pin-Count Package):740, 38000 Series)**

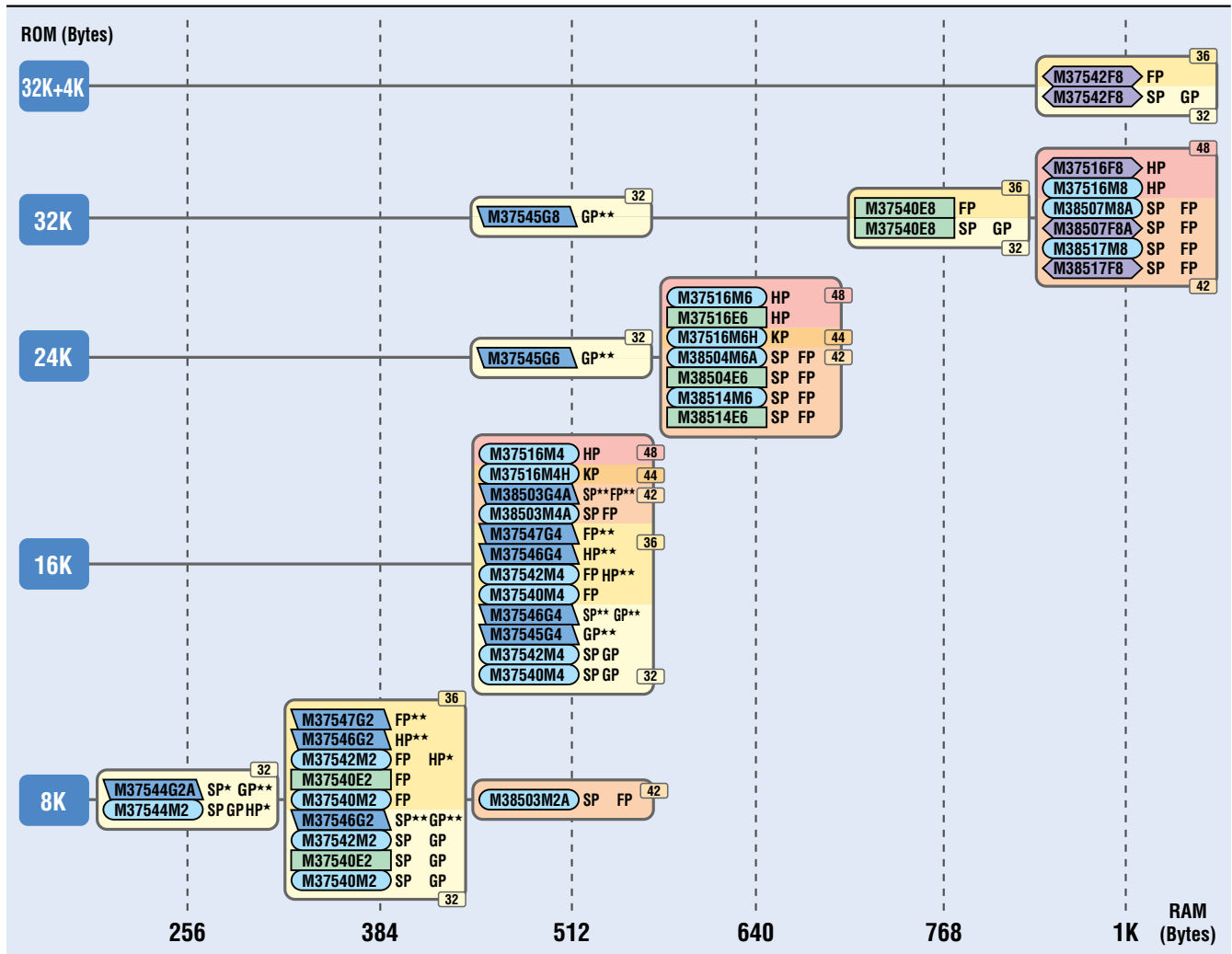
Group		3850 (H specification)		3850 (A specification)												3851						7516 (H specification)		7516											
Type No.		M38504E6SP	M38504E6FP	M38503M2A-XXXP	M38503M2A-XXFP	M38503M4A-XXXP	M38503M4A-XXFP	M38504M6A-XXXP	M38504M6A-XXFP	M38507M8A-XXXP	M38507M8A-XXFP	M38507F8ASP	M38507F8AFP	M38503G4ASP**	M38503G4AFP**	M38503G4A-XXXP**	M38503G4A-XXFP**	M38514M6-XXXP	M38514M6-XXFP	M38514E6SP	M38514E6FP	M38517M8-XXXP	M38517M8-XXFP	M38517F8SP	M38517F8FP	M37516M4H-XXXXKP	M37516M6H-XXXXKP	M37516M4-XXHP	M37516M6-XXHP	M37516E6HP	M37516M8-XXHP	M37516F8HP			
Memory	ROM(Bytes)	24K		8K	16K	24K		32K		16K							24K		32K		16K	24K	16K		24K		32K								
	RAM(Bytes)	640		512		640		1024		512						640		1024		512	640	512		640		1K									
	ROM Type*	O			M			F		Qz							M	O	M	F			M		O	M	F								
	Data Flash	—																																	
CPU	Program Security	ID code check function, ROM code protecting function (Only Flash memory version)																																	
	CPU	740 Core																																	
	Basic Instructions	71																																	
CPU	Minimum Instruction Execution Time (ns)	500 (@8MHz)		320 (@12.5MHz)											500 (@8MHz)							500													
	External Bus Expansion	—																																	
Clock	Host Interface	—																																	
	Clock Generation Circuit	2 circuits (Main clock, Sub-clock)																																	
	Subclock	Yes																																	
	On-Chip Oscillator	—																																	
	Oscillation Stop Detection	—																																	
	Frequency Divider	Main clock:1/n (n=2, 8) Sub-clock:1/n (n=2)																				1/n (n=2, 8)													
Power Supply Voltage Detection	Power Save	Wait mode, Stop mode, Low-speed mode (Sub-clock)																																	
	Power-On Reset/POR	—																																	
A/D Converter	Resolution×Channels	10-bit ×5		10-bit×9											10-bit×5							10-bit ×6		10-bit×8											
	D/A Converter	Resolution×Channels	—																																
Timer	8-bit	—																																	
	16-bit	—																																	
	Prescaler	Timer X×1, Timer Y×1, Timer 1×1, Timer 2×1																				Timer X×1, Timer Y×1													
	Input Capture	—																																	
	Output Compare	—																																	
	PWM Output	8-bit×1 (Dedicated)																																	
	Real-Time Port	—																																	
	Event Counter	Timer X, Timer Y																																	
Watchdog Timer	Yes																																		
Serial Interface	Clock Sync./ Clock Async.	1 (Serial I/O1)																																	
	Clock Sync. Only	1 (Serial I/O2)																																	
I ² C-bus		—														Yes						Yes (option)													
LPC/ISA		—																																	
LCD		—																																	
I/O Ports	Input Only (Numbers)	—																																	
	CMOS Output Only (Numbers)	—																																	
	CMOS I/O Only (Numbers)	32																					34							38					
	N-Channel Open Drain Port (Numbers)	2																					8							2					
	DTMF	—																					8							—					
	High Current Drive Port	8																																	
Interrupts(Sources)	Pull-Up Resistor	—		32											—																				
	External	6											7																						
Debugging Function	On-Board Flash Program	Yes																																	
	ROM Correction Function	—																																	
Other Functions		—																																	
	Others	—																																	
Package		42-pin SSOP, 42-pin SDIP																					44-pin QFN							48-pin LQFP					
Operating Frequency/Supply Voltage		(at High-speed mode) 8MHz/ 4.0 to 5.5V 4MHz/ 2.7 to 5.5V (at Low-speed mode) 32kHz/ 2.7 to 5.5V		(at High-speed mode) 12.5MHz/4.0 to 5.5V 6MHz/2.7 to 5.5V (at Low-speed mode) 32kHz/2.7 to 5.5V											(at High-speed mode) 12.5MHz/4.0 to 5.5V 6.0MHz/2.7 to 5.5V 2.1MHz/2.0 to 5.5V (at Medium-speed mode) 12.5MHz/2.7 to 5.5V 4.2MHz/1.8 to 5.5V (at Low-speed mode) 32kHz/1.8 to 5.5V							(at High-speed mode) 8MHz/4.0 to 5.5V 4MHz/2.7 to 5.5V (at Low-speed mode) 32kHz/2.7 to 5.5V													
Operating Ambient Temperature (°C)		-20 to 85																																	

* F: Flash memory version, M: mask ROM version, O: One-time PROM version, Qz: QzROM version

★★ : Under development

General-Purpose Type (Low Pin-Count Package):740 Series
38000 Series

Memory Capacity (ROM/RAM) (On-Chip LCD Driver Type:740,38000 Series) 48-pin 48 44-pin 44 42-pin 42 36-pin 36 32-pin 32



- The M in M3xxxxMx indicates the mask ROM version.
- The E in M3xxxxEx indicates the one-time PROM version.
- The F in M3xxxxFx indicates the flash memory version.
- The G in M3xxxxGx indicates the QzROM version.

Package			Lead Pitch (mm)
32-pin	SP	32-pin SDIP (PRDP0032BA-A(32P4B))	1.778
	GP	32-pin LQFP (PLQP0032GB-A(32P6U-A))	0.8
36-pin	FP	36-pin SSOP (PRSP0036GA-A(36P2R-A))	0.8
	HP	36-pin WQFN (PWQN0036KA-A(36P JW-A))	0.8
42-pin	SP	42-pin SDIP (PRDP0042BA-A(42P4B))	1.778
	FP	42-pin SSOP (42P2R-A/E)	0.8
44-pin	KP	44-pin QFN (44PJX-A)	0.5
48-pin	HP	48-pin LQFP (PLQP0048KB-A(48P6Q-A))	0.5

★ : New product ★★ : Under development
* It is an old package code inside ()

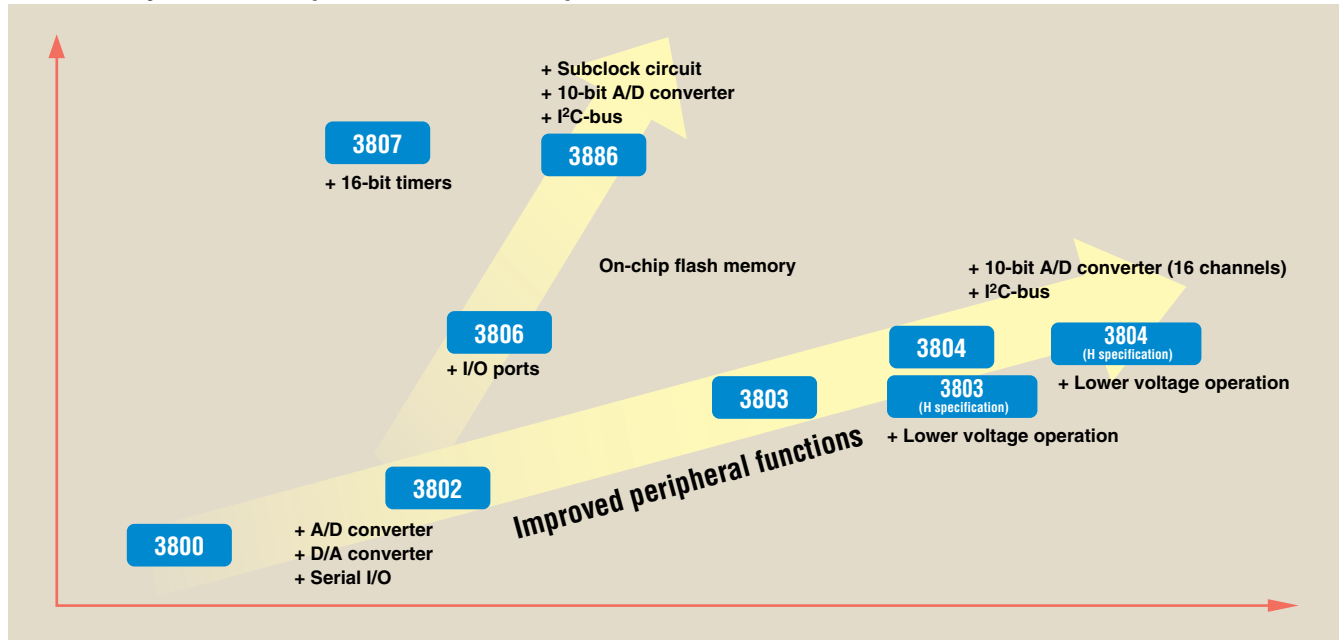
These general-purpose 64-pin through 80-pin MCUs implement standard CMOS I/O ports. They are available in a wide range of memory and package configurations and include on-chip peripheral functions such as A/D converters, D/A converters, multifunction timers, and

serial I/O functions.

Applications

Audio equipment, household appliances, telephones, amusement products, office equipment, PCs

• 740 Family General-Purpose Device Roadmap



□ General-Purpose Type (High-Pin-Count Package):38000 Serie

• Specifications (General-Purpose Type (High Pin-Count Package):38000 Series)

Group		3803			3803(H specification)																											
Type No.		M38039FFSP	M38039FFFP	M38039FFHP	M38034M4H-XXSP	M38034M4H-XXFP	M38034M4H-XXHP	M38034M4H-XXKP	M38037M6H-XXSP	M38037M6H-XXFP	M38037M6H-XXHP	M38037M6H-XXKP	M38037M8H-XXSP	M38037M8H-XXFP	M38037M8H-XXHP	M38037M8H-XXKP	M38037M8H-XXXWG**	M38039MCH-XXXSP*	M38039MCH-XXXFP*	M38039MCH-XXXHP*	M38039MCH-XXXKP*	M38039MCH-XXXWG**	M38039MFH-XXXSP*	M38039MFH-XXXFP*	M38039MFH-XXXHP*	M38039MFH-XXXKP*	M38039MFH-XXXWG**	M38039FFHSP*	M38039FFHFP*	M38039FFHHP*	M38039FFHKP*	M38039FFHWG*
Memory	ROM(Bytes)	60K			16K				24K				32K					48K					60K				56K + 4K					
	RAM(Bytes)	2048			640				1024									2048														
	ROM Type*	F											M																		F	
	Data Flash																	—													☆In planning stage	
	Program Security	ID code check function, ROM code protecting function, E/W disabled function (H specification only Flash memory version)																														
CPU	CPU	740 Core																														
	Basic Instructions	71																														
	Minimum Instruction Execution Time (ns)	240 (@16.8MHz)																														
External Bus Expansion	Host Interface	—																														
Clock	Clock Generation Circuit	2 circuits (Main clock, Sub-clock)																														
	Subclock	Yes																														
	On-Chip Oscillator	—																														
	Oscillation Stop Detection	—																														
	Frequency Divider	Main clock:1/n (n=2, 8) Sub-clock:1/n (n=2)																														
	Power Save	Wait mode, Stop mode, Low-speed mode (Sub-clock)																														
Power Supply Voltage Detection	Power-On Reset/POR	—																														
	Low Voltage Detection/LVD	—																														
A/D Converter	Resolution × Channels	10-bit × 16																														
D/A Converter	Resolution × Channels	8-bit × 2																														
Timer	8-bit	—																														
	16-bit	Timer Z × 1																														
	Prescaler	Timer X × 1, Timer Y × 1, Timer 1 × 1, Timer 2 × 1																														
	Input Capture	—																														
	Output Compare	—																														
	PWM Output	8-bit × 1 (Dedicated)																														
	Real-Time Port	Timer Z																														
	Event Counter	Timer X, Timer Y, Timer Z																														
Watchdog Timer		Yes																														
Serial Interface	Clock Sync./ Clock Async.	2 (Serial I/O1, Serial I/O3)																														
	Clock Sync. Only	1 (Serial I/O2)																														
I ² C-bus		—																														
LPC/ISA		—																														
LCD		—																														
I/O Ports	Input Only (Numbers)	—																														
	CMOS Output Only (Numbers)	—																														
	CMOS I/O Only (Numbers)	54																														
	N-Channel Open Drain Port (Numbers)	2																														
	DTMF	—																														
	High Current Drive Port	8																														
	Pull-Up Resistor	54																														
Interrupts(Sources)	External	8																														
Debugging Function	On-Board Flash Program	Yes																														
Other Functions	ROM Correction Function	—																														
	Others	—																														
Package		64-pin SDIP, 64-pin QFP, 64-pin LQFP	64-pin SDIP, 64-pin QFP, 64-pin LQFP, 64-pin FOG																													
Operating Frequency/Supply Voltage		(at High-speed mode, at Medium-speed mode) 16.8MHz/ 4.5 to 5.5V 12.5MHz/ 4.0 to 5.5V (at Low-speed mode) 32kHz/ 4.0 to 5.5V	(at High-speed mode) 16.8MHz/4.5 to 5.5V 12.5MHz/4.0 to 5.5V 8.4MHz/2.7 to 5.5V 2.1MHz/2.0 to 5.5V (at Medium-speed mode) 16.8MHz/4.5 to 5.5V 12.5MHz/2.7 to 5.5V 6.3MHz/1.8 to 5.5V (at Low-speed mode) 32kHz/1.8 to 5.5V																				(at High-speed mode) 16.8MHz/4.5 to 5.5V 12.5MHz/4.0 to 5.5V 8.4MHz/2.7 to 5.5V (at Medium-speed mode) 16.8MHz/4.5 to 5.5V 12.5MHz/2.7 to 5.5V (at Low-speed mode) 32kHz/2.7 to 5.5V									
Operating Ambient Temperature (°C)		-20 to 85																														

* F: Flash memory version, M: mask ROM version

★ : New product ★★ : Under development

• **Specifications (General-Purpose Type (High Pin-Count Package):38000 Series)**

Group		3804																3804*(H specification)				3886									
Type No.		M38044M4-XXXSP	M38044M4-XXXFP	M38044M4-XXXHP	M38047M6-XXXSP	M38047M6-XXXFP	M38047M6-XXXHP	M38047M8-XXXSP	M38047M8-XXXFP	M38047M8-XXXHP	M38049MC-XXXSP	M38049MC-XXXFP	M38049MC-XXXHP	M38049MF-XXXSP	M38049MF-XXXFP	M38049MF-XXXHP	M38049FFSP	M38049FFFP	M38049FFHP	M38049FFHSP*	M38049FFHFp*	M38049FFHHp*	M38049FFHHKp*	M38869M8A-XXXGP	M38869M8A-XXXHP	M38869MCA-XXXGP	M38869MCA-XXXHP	M38869MFA-XXXGP	M38869MFA-XXXHP	M38869FFAGP	M38869FFFAHP
Memory	ROM(Bytes)	16K		24K		32K		48K		60K		56K+4K		32K		48K		60K													
	RAM(Bytes)	640		1024										2048																	
	ROM Type*	M																F				M				F					
	Data Flash	—																☆In planning stage				—									
Program Security		ID code check function, ROM code protecting function, E/W disabled function (Only Flash memory version)																												—	
CPU	CPU	740 Core																													
	Basic Instructions	71																													
	Minimum Instruction Execution Time (ns)	240 (@16.8MHz)																								400 (@10MHz)					
External Bus Expansion	Host Interface	—																								Bus interface function					
Clock	Clock Generation Circuit	2 circuits (Main clock, Sub-clock)																													
	Subclock	Yes																													
	On-Chip Oscillator	—																													
	Oscillation Stop Detection	—																													
	Frequency Divider	Main clock:1/n (n=2, 8) Sub-clock:1/n (n=2)																													
	Power Save	Wait mode, Stop mode, Low-speed mode (Sub-clock)																													
Power Supply Voltage Detection	Power-On Reset/POR	—																													
	Low Voltage Detection/LVD	—																													
A/D Converter	Resolution×Channels	10-bit×16												10-bit×8																	
D/A Converter	Resolution×Channels	8-bit×2																													
Timer	8-bit	—																													
	16-bit	Timer Z×1												—																	
	Prescaler	Timer X×1, Timer Y×1, Timer 1×1, Timer 2×1																													
	Input Capture	—																													
	Output Compare	—																													
	PWM Output	8-bit×1 (Dedicated)												14-bit×2 (Dedicated:PWM0, PWM1)																	
	Real-Time Port	Timer Z																													
Event Counter	Timer X, Timer Y, Timer Z												Timer X, Timer Y																		
Watchdog Timer		Yes																													
Serial Interface	Clock Sync./ Clock Async.	2 (Serial I/O1, Serial I/O3)												1 (Serial I/O1)																	
	Clock Sync. Only	1 (Serial I/O2)																													
I²C-bus		Yes												Yes (option)																	
LPC/ISA		—												Yes (ISA)																	
LCD																															
I/O Ports	Input Only (Numbers)	—																													
	CMOS Output Only (Numbers)	—																													
	CMOS I/O Only (Numbers)	54												64																	
	N-Channel Open Drain Port (Numbers)	2												8																	
	DTMF	—																													
	High Current Drive Port	8																													
Pull-Up Resistor		54												8																	
Interrupts(Sources)	External	9																													
Debugging Function	On-Board Flash Program	Yes																													
Other Functions	ROM Correction Function	—																													
	Others	—																													
Package		64-pin SDIP, 64-pin QFP, 64-pin LQFP												Comparator×8																	
		80-pin QFP, 80-pin LQFP																													
Operating Frequency/Supply Voltage		(at High-speed mode) 16.8MHz/4.5 to 5.5V 12.5MHz/4.0 to 5.5V 8.4MHz/2.7 to 5.5V 2.1MHz/2.0 to 5.5V (at Medium-speed mode) 16.8MHz/4.5 to 5.5V 12.5MHz/2.7 to 5.5V 6.3MHz/1.8 to 5.5V (at Low-speed mode) 32kHz/1.8 to 5.5V												(at High-speed mode, at Medium-speed mode) 16.8MHz/ 4.5 to 5.5V 12.5MHz/ 4.0 to 5.5V (at Low-speed mode) 32kHz/ 4.0 to 5.5V				(at High-speed mode) 16.8MHz/4.5 to 5.5V 12.5MHz/4.0 to 5.5V 8.4MHz/2.7 to 5.5V (at Medium-speed mode) 16.8MHz/4.5 to 5.5V 12.5MHz/2.7 to 5.5V (at Low-speed mode) 32kHz/2.7 to 5.5V				(at High-speed mode) 10MHz/4.0 to 5.5V 4.1MHz/2.7 to 5.5V (at Low-speed mode) 32kHz/2.7 to 5.5V				(at High-speed mode) 10MHz/ 4.0 to 5.5V (at Low-speed mode) 32kHz/ 4.0 to 5.5V					
Operating Ambient Temperature (°C)		-20 to 85																													

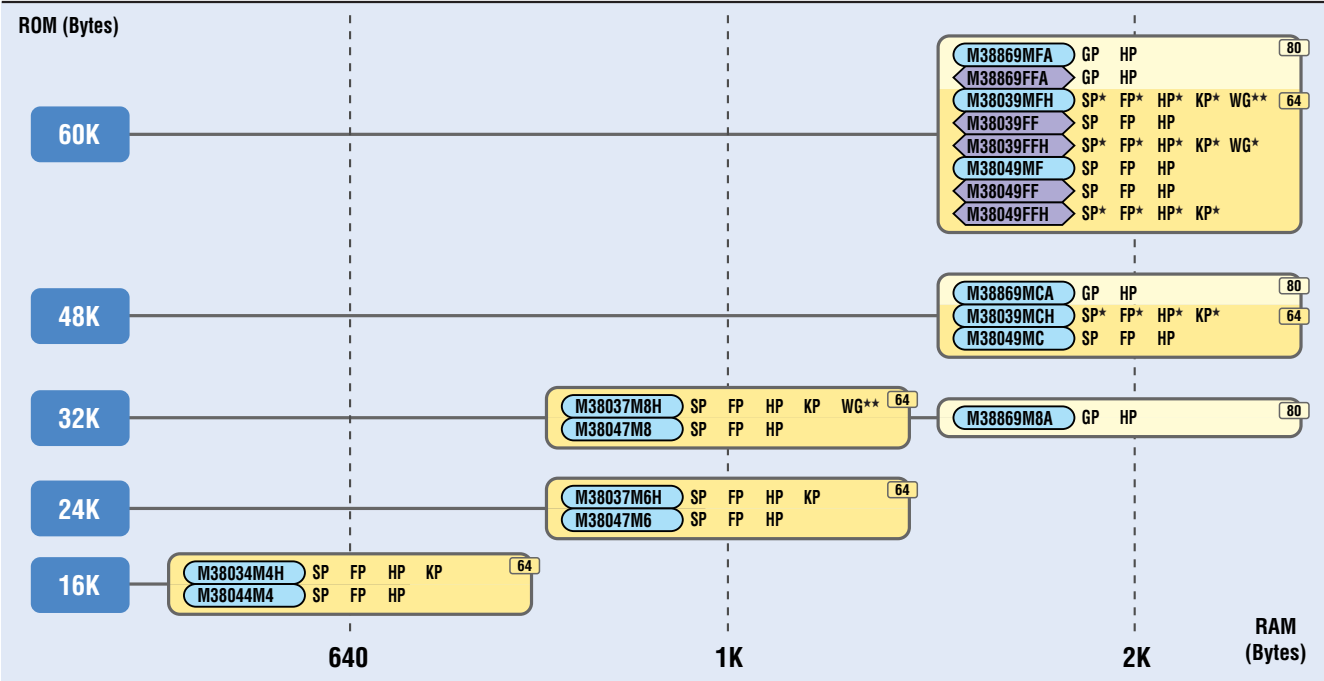
* F: Flash memory version, M: mask ROM version

★ : New product

General-Purpose Type (High-Pin-Count Package):38000 Serie

Memory Capacity (ROM/RAM) (General-purpose Type (High Pin-Count Package):38000 Series)

80-pin 64-pin



The M in M3xxxxMx indicates the mask ROM version.
The F in M3xxxxFx indicates the flash memory version.

Package				Lead Pitch (mm)
64-pin	SP	64-pin SDIP (PRDP0064BA-A(64P4B))		1.778
	FP	64-pin QFP (PRQP0064GA-A(64P6N-A))		0.8
	HP	64-pin LQFP (PLQP0064KB-A(64P6Q-A))		0.5
	KP	64-pin LQFP (PLQP0064GA-A(64P6U-A))		0.8
	WG	64-pin FLGA (PTLG0064JA-A(64F0G))		0.65
80-pin	GP	80-pin QFP (PRQP0080JA-A(80P6S-A))		0.65
	HP	80-pin LQFP (PLQP0080KB-A(80P6Q-A))		0.5

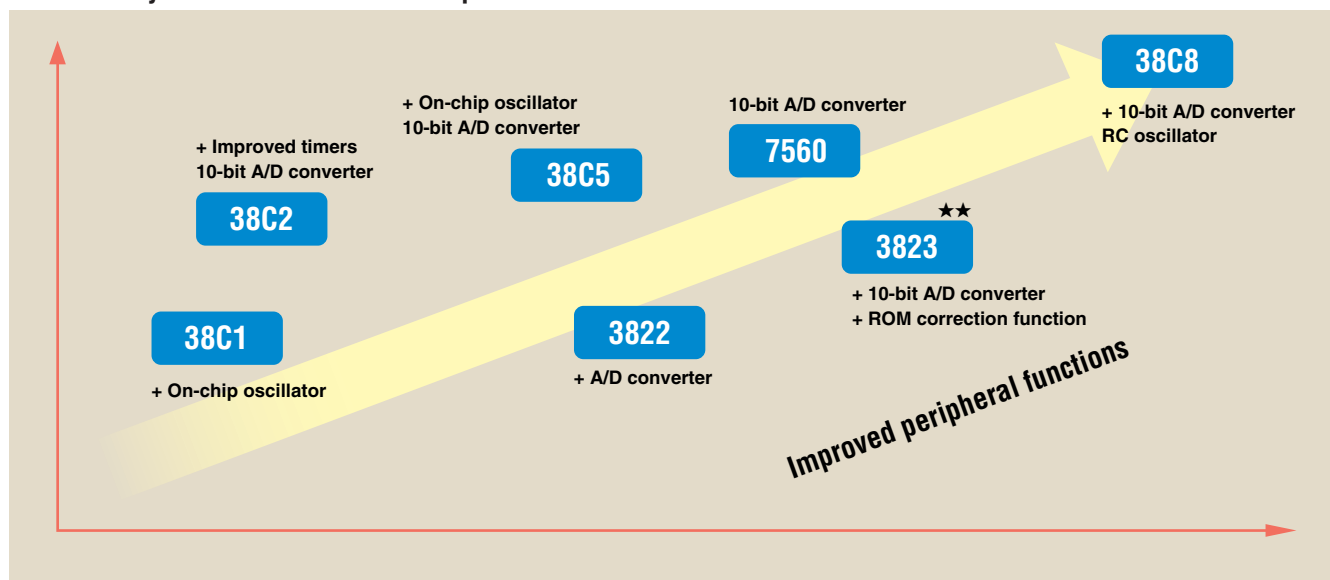
★ : New product ★★ : Under development
* It is an old package code inside ()

These MCUs include an LCD controller and driver for display applications. They are ideal for systems employing segment or dot-matrix displays. In addition, features such as a subclock oscillation circuit and key-on wakeup function help reduce power consumption, making

them well suited for use in portable equipment.

Applications Remote controls, audio equipment, electric household appliances, telephones, compact cameras, game machines

• 740 Family with LCD Driver Roadmap



★★ : Under development

□ On-Chip LCD Driver Type:38000 Serise

• Specifications (On-Chip LCD Driver Type:38000 Series)

Group		38C1						38C2						3822						3823**											
Type No.		M38C12M4-XXXXFP	M38C12M4-XXXHP	M38C13M6-XXXXFP	M38C13M6-XXXHP	M38C13E6FP	M38C13E6HP	M38C24M4A-XXFP	M38C24M4A-XXXHP	M38C24M6A-XXFP	M38C24M6A-XXXHP	M38C29MCA-XXFP	M38C29MCA-XXXHP	M38C29FFAFP	M38C29FFAHP	M38223M4A-XXFP	M38223M4A-XXHP	M38224M6A-XXFP	M38224M6A-XXHP	M38227M8A-XXFP	M38227M8A-XXHP	M38227MCA-XXFP	M38227MCA-XXXHP	M38227MCDXXXFP	M38227ECFP	M38227TECHP	M3823AGFFP**	M3823AGFHP**			
Memory	ROM(Bytes)	16K	24K					16K	24K		48K		60K				16K	24K		32K		48K					60K				
	RAM(Bytes)	384	512					640				2048				512	640				1024					2560					
	ROM Type*	M			O				M				F				M						O		Qz						
	Data Flash	—																													
	Program Security	—																										Yes			
CPU	CPU	740 Core																													
	Basic Instructions	71																													
Minimum Instruction Execution Time (ns)		500												400												500	400				
External Bus Expansion		Host Interface																													
Clock	Clock Generation Circuit	3 circuits (Main clock, Sub-clock, On-chip oscillator)						2 circuits (Main clock, Sub-clock)																						3 circuits (Main clock, Sub-clock, On-chip oscillator)	
	Subclock	Yes																													
	On-Chip Oscillator	Yes														—														Yes	
	Oscillation Stop Detection	—																													
	Frequency Divider	1/n (n = 2, 8)						1/n (n = 2, 4, 8)						1/n (n = 2, 8)																1/n (n = 2, 4, 8)	
	Power Save	High-speed mode, Medium-speed mode, Low-speed mode, On-chip oscillator mode, Wait mode, Stop mode						Divide-by-2 mode, Divide-by-4 mode, Divide-by-8 mode, Wait mode, Stop mode						High-speed mode, Medium-speed mode, Low-speed mode, Wait mode, Stop mode																Divide-by-2 mode, Divide-by-4 mode, Divide-by-8 mode, On-chip oscillator mode, Wait mode, Stop mode	
Power Supply Voltage Detection	Power-On Reset/POR	—																													
	Low Voltage Detection/LVD	—																													
A/D Converter	Resolution × Channels	8-bit × 8						10-bit × 8												8-bit × 8						10-bit × 8					
D/A Converter	Resolution × Channels	—																													
Timer	8-bit	Timer 1 × 1, Timer 2 × 1, Timer 3 × 1						Timer 1 × 1, Timer 2 × 1, Timer 3 × 1, Timer 4 × 1						Timer 1 × 1, Timer 2 × 1, Timer 3 × 1																	
	16-bit	Timer X × 1, Timer Y × 1																													
	Prescaler	—																													
	Input Capture	—																													
	Output Compare	—																													
	PWM Output	—						Timer 3, Timer 4, Timer X						—																	
	Real-Time Port	Timer X						Timer Y						Timer X																	
	Event Counter	Timer X, Timer Y																													
Watchdog Timer		—						Yes						—						—						Yes					
Serial Interface	Clock Sync./ Clock Async.	—						2												Yes						1					
	Clock Sync. Only	Yes						—																							
I ² C-bus		—																													
LPC/ISA		—																													
LCD		Segments 25, Common 4						Segments 24, Common 4						Segments 32, Common 4																	
I/O Ports	Input Only (Numbers)	8						—						5																	
	CMOS Output Only (Numbers)	—																													
	CMOS I/O Only (Numbers)	30						51						49																	
	N-Channel Open Drain Port (Numbers)	—																													
	DTMF	—																													
	High Current Drive Port	8												—																	
Pull-Up Resistor		22						51						33																	
Interrupts(Sources)	External	5						6						8																	
Debugging Function	On-Board Flash Program	—						Yes																							
Other Functions	ROM Correction Function	—																										Yes			
	Others	—																													
Package		64-pin LQFP												80-pin QFP, 80-pin LQFP														80-pin LQFP			
Operating Frequency/Supply Voltage		1.8 to 5.5V		2.2 to 5.5V		1.8 to 5.5V				2.5 to 5.5V		1.8 to 5.5V												3.0 to 5.5V		2.5 to 5.5V		1.8 to 5.5V			
Operating Ambient Temperature (°C)		-20 to 85																						-40 to 85		-20 to 85					

740 Family

8-bit

☐ On-Chip LCD Driver Type:740 Serise
38000 Serise

• Specifications (On-Chip LCD Driver Type:740, 38000 Series)

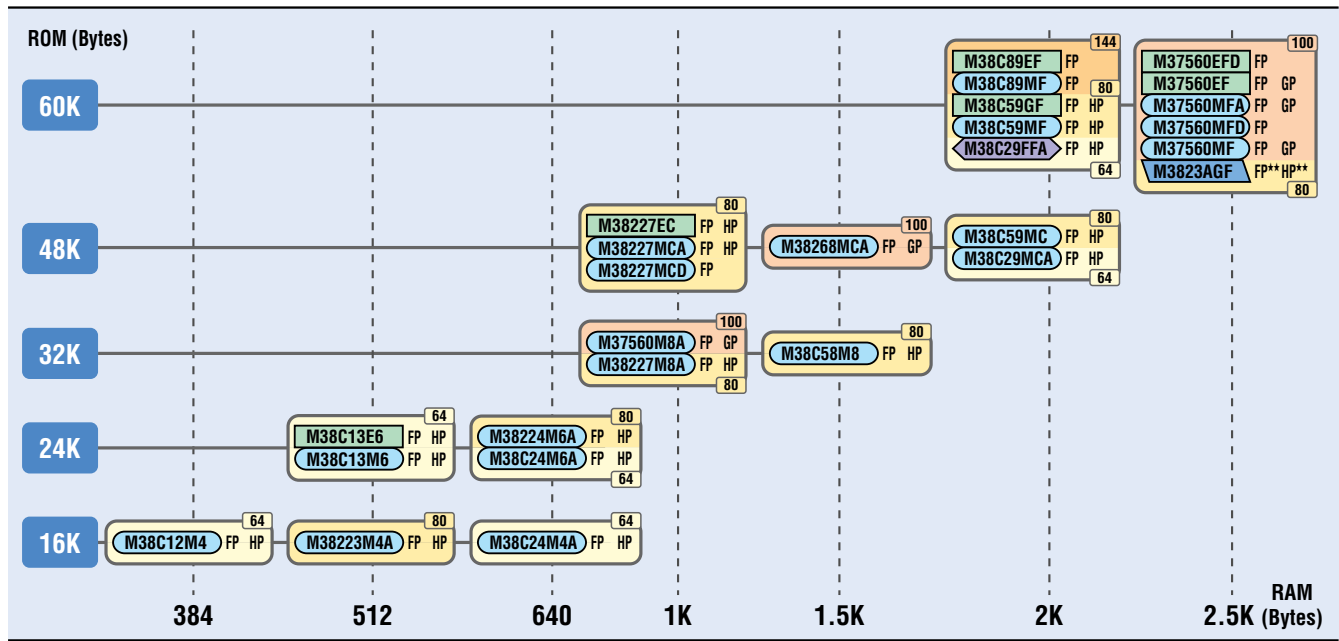
Group		38C5								7560								38C8		3826					
Type No.		M38C58M8-XXXFP	M38C58M8-XXXHP	M38C59MC-XXXFP	M38C59MC-XXXHP	M38C59MF-XXXFP	M38C59MF-XXXHP	M38C59GFFP	M38C59GFHP	M37560M8A-XXXFP	M37560M8A-XXXGP	M37560MFA-XXXFP	M37560MFA-XXXGP	M37560MFD-XXXFP	M37560EFDFFP	M37560EFPF	M37560EFGP	M38C89MF-XXXFP	M38C89EFPF	M38268MCA-XXXFP	M38268MCA-XXXGP	M3826AMFA-XXXFP	M3826AMFA-XXXGP	M3826AEFPF	M3826AEFGP
Memory	ROM(Bytes)	32K	48K	60K		60K		32K	60K								48K		60K						
	RAM(Bytes)	1536	2048				1024		2560				2048		1536		2560								
	ROM Type*	M				O		M				O		M	O	M		O							
	Data Flash	—																							
	Program Security	—																							
CPU	CPU	740 Core																							
	Basic Instructions	71																							
	Minimum Instruction Execution Time (ns)	320								500															
External Bus Expansion	Host Interface	—																							
Clock	Clock Generation Circuit	3 circuits (Main clock, Sub-clock, On-chip oscillator)								2 circuits (Main clock, Sub-clock)															
	Subclock	Yes																							
	On-Chip Oscillator	Yes								—															
	Oscillation Stop Detection	—																							
	Frequency Divider	1/n (n = 2, 8)																							
	Power Save	High-speed mode, Medium-speed mode, Low-speed mode, On-chip oscillator mode, Wait mode, Stop mode								High-speed mode, Medium-speed mode, Low-speed mode, Wait mode, Stop mode															
Power Supply Voltage Detection	Power-On Reset/POR	—																							
	Low Voltage Detection/LVD	—																							
A/D Converter	Resolution × Channels	—								10-bit × 8								—		8-bit × 8					
D/A Converter	Resolution × Channels	—								8-bit × 2								—		8-bit × 2					
Timer	8-bit	Timer 1 × 1, Timer 2 × 1, Timer 3 × 1, Timer 4 × 1								Timer 1 × 1, Timer 2 × 1, Timer 3 × 1															
	16-bit	Timer X × 1, Timer Y × 1																							
	Prescaler	—																							
	Input Capture	—																							
	Output Compare	—																							
	PWM Output	Timer 3, Timer 4, Timer X								—															
	Real-Time Port	Timer Y								Timer X								—		Timer X					
	Event Counter	Timer X, Timer Y																							
Watchdog Timer		Yes																—		Yes					
Serial Interface	Clock Sync./ Clock Async.	Yes																—		1					
	Clock Sync. Only	Yes																—		1					
I ² C-bus		—																							
LPC/ISA		—																							
LCD		Segments 36, Common 4 or Segments 32, Common 8								Segments 40, Common 4								Segments 68, Common 16 or Segments 52, Common 32		Segments 40, Common 4					
I/O Ports	Input Only (Numbers)	2								1								—		1					
	CMOS Output Only (Numbers)	—								8								—		8					
	CMOS I/O Only (Numbers)	59								55								35		55					
	N-Channel Open Drain Port (Numbers)	—								—								—		8					
	DTMF	—								—								—		Yes					
	High Current Drive Port	6								—								—		—					
Interrupts(Sources)	Pull-Up Resistor	59								47								—		47					
	External	6								7								5		7					
	Debugging Function	On-Board Flash Program																							
Other Functions	ROM Correction Function	—																							
	Others	—																							
Package		80-pin LQFP								100-pin QFP, 100-pin LQFP								144-pin QFP		100-pin QFP, 100-pin LQFP					
Operating Frequency/Supply Voltage		1.8 to 5.5V				1.8 to 3.6V				1.8 to 5.5V				3.0 to 5.5V				2.5 to 5.5V				1.8 to 5.5V		2.5 to 5.5V	
Operating Ambient Temperature (°C)		-20 to 85												-40 to 85				-20 to 85							

*

On-Chip LCD Driver Type:740 Serie
38000 Serie

Memory Capacity (ROM/RAM) (On-Chip LCD Driver Type:740,38000 Series)

144-pin 100-pin 80-pin 64-pin



- The M in M3xxxxMx indicates the mask ROM version.
- The E in M3xxxxEx indicates the one-time PROM version.
- The EPROM version is for evaluation purposes.
- The F in M3xxxxFx indicates the flash memory version.
- The G in M3xxxxGx indicates the QzROM version.

Package			Lead Pitch (mm)
64-pin	FP	64-pin LQFP (PLQP0064GA-A(64P6U-A))	0.8
	HP	64-pin LQFP (PLQP0064KB-A(64P6Q-A))	0.5
80-pin	FP	80-pin QFP (PRQP0080GB-A(80P6N-A))	0.8
	HP	80-pin LQFP (PLQP0080GA-A(80P6U-A))	0.8
100-pin	FP	100-pin QFP (PRQP0100JB-A(100P6S-A))	0.65
	GP	100-pin LQFP (PLQP0100KB-A(100P6Q-A))	0.5
144-pin	FP	144-pin LQFP (PLQP0144KA-A(144P6Q-A))	0.5

★★ : Under development
The FP package of the 38C5 group is the 80P6U-A.
* It is an old package code inside ()

720 Family

4-bit

The 4-bit 4500 and 720 series MCUs are categorized into the following three types.

- General-purpose MCUs used to control a variety of equipment
4501, 4502, 4506, 4507, 4508, 4509, 4518, 4519 (on-chip 10-bit A/D converter version), 4570
- MCUs with on-chip LCD drivers for driving LCD panels
4524, 4552, 4553, 4554, 4556
- Remote control MCUs that output carrier waves of various types (Refer to the Remote Control section for details.)
These 4-bit MCUs have low voltage requirements and low power consumption, making them suitable for applications such as remote controls, compact electric household appliances, PC peripherals, and battery chargers. On-chip peripheral functions reduce the overall number of component parts required. In addition, one-time PROM versions, including 20-pin packages, are available.

4500, 720 Series Features

- 10-bit* instruction set with high ROM code efficiency.
* 9-bit on the 720 series
- Compact package.
- High-performance peripheral functions (watchdog timer, voltage drop detection circuit, etc.).
- One-time PROM versions available.
- Development support tools for Microsoft Windows* (4500 series).
* Microsoft Windows is a registered trademark of Microsoft Corporation in the U.S.A. and other countries.

Applications

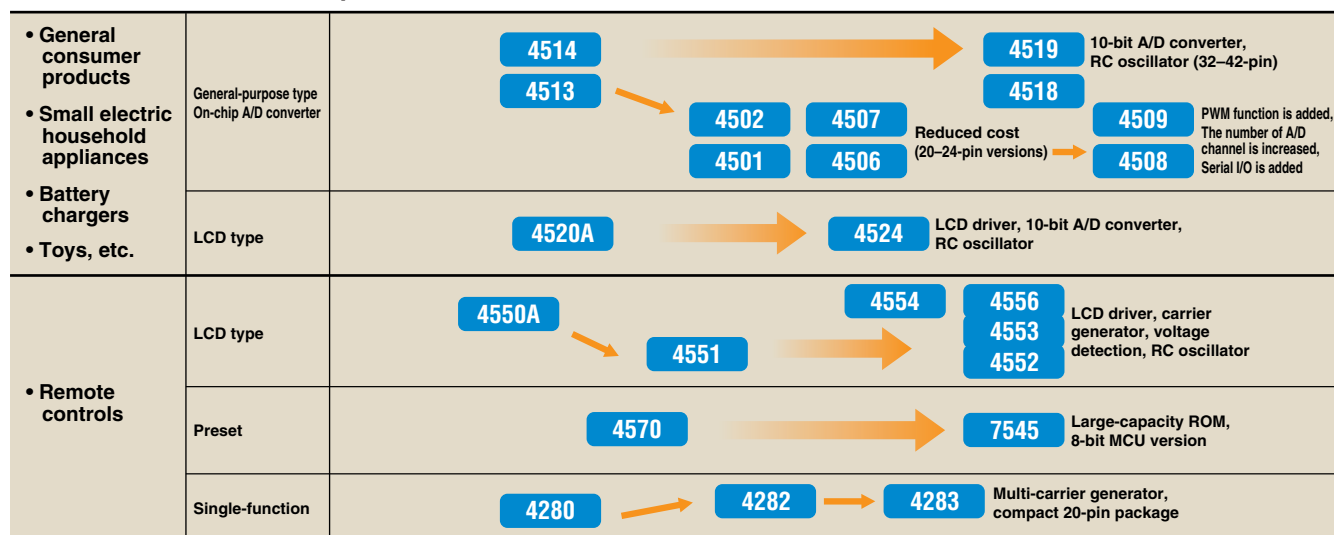
Remote controls, small electric household appliances, input devices for PCs and game machines, battery chargers

QzROM Series

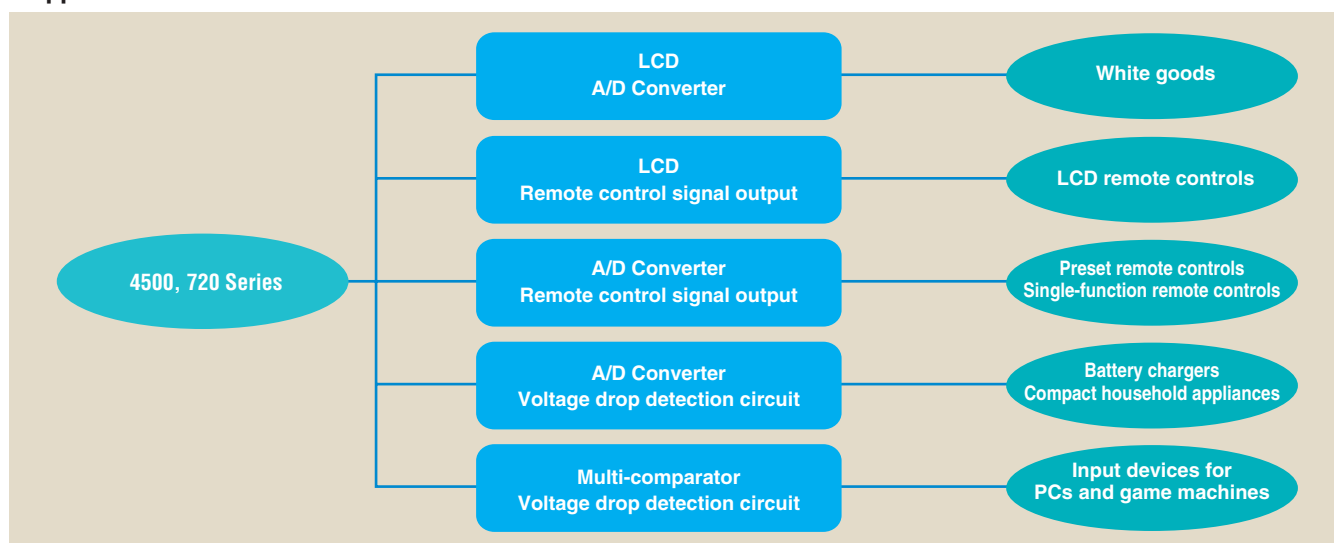
It appeared in the Group shown in below.

*740 Family	
*720 Family	
4500 Series	4508 Group
	4509 Group
720 Series	4283 Group

4500, 720 Series Roadmap



Applicable Fields



□ General-Purpose Type:4500 Series

• Specifications (4500 Series)

Group		4501			4502			4506			4507			4508**				4509**					
Type No.		M34501M2-XXXXFP	M34501M4-XXXXFP	M34501E4FP	M34502M2-XXXXFP	M34502M4-XXXXFP	M34502E4FP	M34506M2-XXXXFP	M34506M4-XXXXFP	M34506E4FP	M34507M2-XXXXFP	M34507M4-XXXXFP	M34507E4FP	M34508G4-XXXXFP**	M34508G4H-XXXXFP**	M34508G4FP**	M34508G4HFP**	M34509G4-XXXXFP**	M34509G4H-XXXXFP**	M34509G4FP**	M34509G4HFP**		
Memory	ROM(Word × 10-bit)	2048	4096		2048	4096		2048	4096		2048	4096											
	RAM(Word × 4-bit)	128	256		128	256		128	256		128	256											
	ROM Type*	M		O	M		O	M		O	M		O	Qz									
Program Security		—																		Yes			
CPU	Basic Instructions	111			113			110			112			132	133	132	133	135	136	135	136		
	Minimum Instruction Execution Time (ns)	680 (@4.4MHz)																					
Clock	Clock Generation Circuit	3 circuits (Ceramic resonator, RC oscillator, On-chip oscillator)																					
	Subclock	—																					
	On-Chip Oscillator	Yes																					
	Frequency Divider	1/n (n = 1, 2, 4, 8)																					
	Power Save	RAM backup mode																					
Power Supply	Power-On Reset/POR	Yes						—						Yes		—	Yes	—	Yes	—	Yes	—	
Voltage Detection	Low Voltage Detection/LVD	Low voltage detection circuit × 1						—						Low voltage detection circuit × 1		—	Low voltage detection circuit × 1	—	Low voltage detection circuit × 1	—	Low voltage detection circuit × 1		
A/D Converter	Resolution × Channels	10-bit × 2			10-bit × 4			10-bit × 2			10-bit × 4			10-bit × 4				10-bit × 6					
Timer	8-bit	Timer 1 × 1, Timer 2 × 1																					
	10-bit	—																					
	16-bit	—																					
	Prescaler	Yes																					
	PWM Output	—												Timer 1, Timer 2									
Event Counter	Timer 2												Timer 1, Timer 2										
Watchdog Timer		Yes																					
Serial Interface	Clock Sync. Only	—												Yes									
LCD		—																					
I/O Ports	Input Only (Numbers)	—																					
	CMOS Output Only (Numbers)	—																					
	CMOS I/O Only (Numbers)	—												14				18					
	N-Channel Open Drain Port (Numbers)	14 (including 2 port that can handle 12V/2)				18 (including 2 port that can handle 12V/4)				14				18				—					
	High Current Drive Port	Drives LED directly (port D)																					
Pull-Up Resistor	12																						
	1																						
Interrupts(Sources)	External																						
Other Functions	Others	—																					
Package		20-pin SSOP			24-pin SSOP			20-pin SSOP			24-pin SSOP			20-pin SSOP				24-pin SSOP					
Operating Frequency/Supply Voltage		2.7 to 5.5V						2.0 to 5.5V															
Operating Ambient Temperature (°C)		-20 to 85																					

* M: mask ROM version, O: One-time PROM version, Qz: Qz ROM version

★★ : Under development

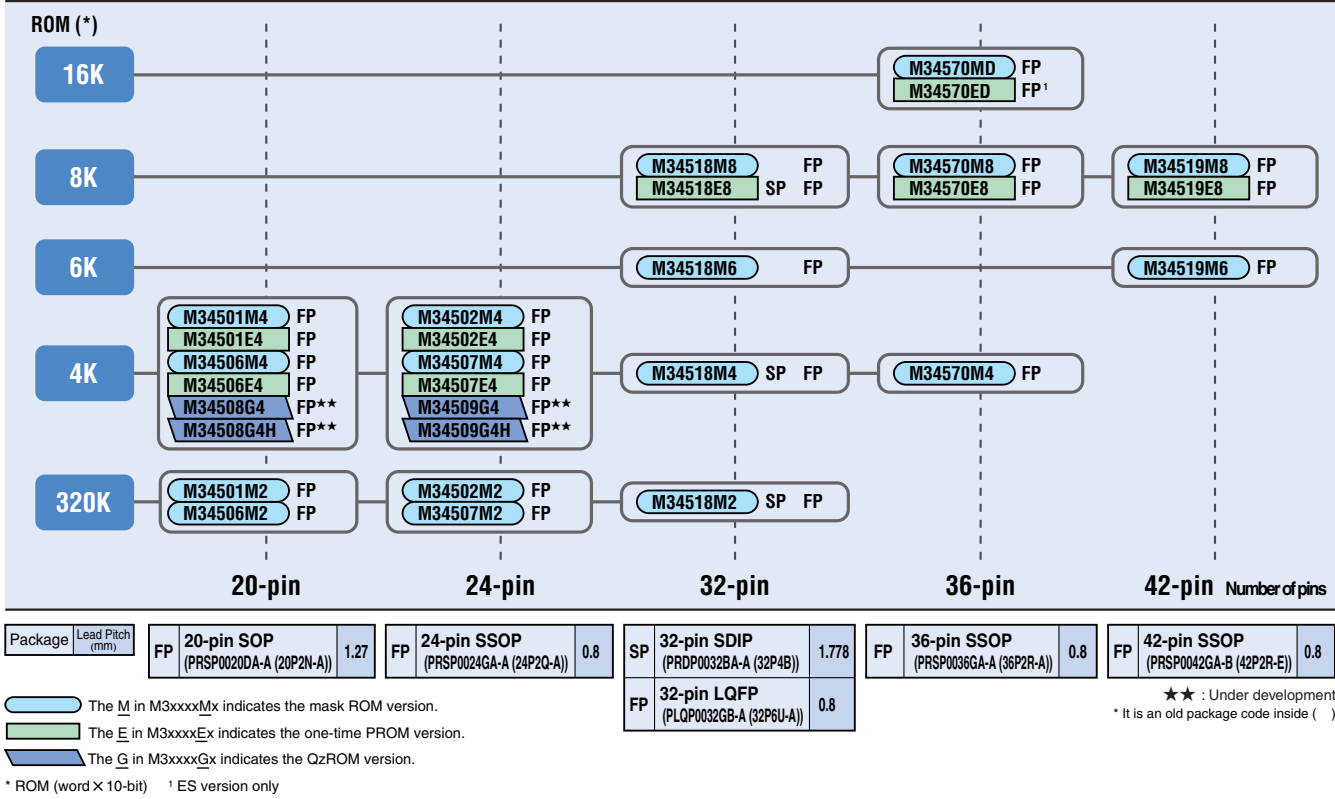
• Specifications (4500 Series)

Group		4518								4519			4570					
Type No.		M34518M2-XXXXSP	M34518M2-XXXXFP	M34518M4-XXXXSP	M34518M4-XXXXFP	M34518M6-XXXXFP	M34518M8-XXXXFP	M34518E8SP	M34518E8FP	M34519M6-XXXXFP	M34519M8-XXXXFP	M34519E8FP	M34570M4-XXXXFP	M34570M8-XXXXFP	M34570E8FP	M34570MD-XXXXFP	M34570EDFP	
Memory	ROM(Word×10-bit)	2048	4096		6144	8192				6144	8192		4096	8192		16384		
	RAM(Word×4-bit)	256				384					128							
	ROM Type*	M						O		M		O		M		O		
	Program Security	—																
CPU	Basic Instructions	148								153				99				
	Minimum Instruction Execution Time (ns)	500 (@6MHz)												1500 (@2MHz)				
Clock	Clock Generation Circuit	4 circuits (Ceramic resonator, RC oscillator, Quartz-crystal, On-chip oscillator)												1 circuit (Ceramic resonator)				
	Subclock	—																
	On-Chip Oscillator	Yes												—				
	Frequency Divider	1/n (n = 1, 2, 4, 8)												1/n (n = 1, 4)				
	Power Save	RAM backup mode																
Power Supply Voltage Detection	Power-On Reset/POR	Yes																
	Low Voltage Detection/LVD	Low voltage detection circuit×1																
A/D Converter	Resolution×Channels	10-bit×4								10-bit×8				—				
Timer	8-bit	Timer 1×1, Timer 2×1, Timer 3×1, Timer 4×1												Timer 2×1, Timer 3×1				
	10-bit	—												Timer 1×1				
	16-bit	—																
	Prescaler	Yes																
	PWM Output	Timer 4												—				
	Event Counter	Timer 1, Timer 3												—				
Watchdog Timer		Yes																
Serial Interface	Clock Sync. Only	Yes												—				
LCD		—																
I/O Ports	Input Only (Numbers)	—												6				
	CMOS Output Only (Numbers)	—												1				
	CMOS I/O Only (Numbers)	16								20				—				
	N-Channel Open Drain Port (Numbers)	9								15				22				
	High Current Drive Port	Drives LED directly (port D)																
	Pull-Up Resistor	8												12				
Interrupts(Sources)	External	2												1				
Other Functions	Others	—																
Package		32-pin SDIP, 32-pin LQFP								42-pin SSOP				36-pin SSOP				
Operating Frequency/Supply Voltage		1.8 to 5.5V						2.5 to 5.5V		1.8 to 5.5V		2.5 to 5.5V	2.0 to 5.5V		2.5 to 5.5V	2.0 to 5.5V	2.5 to 5.5V	
Operating Ambient Temperature (°C)		-20 to 85												-20 to 70				

* M: mask ROM version, O: One-time PROM version

General-Purpose Type:4500 Series

Memory Capacity (ROM/RAM) (4500 Series)



• Specifications (4500 Series)

Group		4524				4552						4553					
Type No.		M34524M8-XXFP	M34524MC-XXFP	M34524EDFP	M34552M4-XXFP	M34552M4H-XXFP	M34552M8-XXFP	M34552M8H-XXFP	M34552G8FP*	M34552G8HFP*	M34553M4-XXFP	M34553M4H-XXFP	M34553M8-XXFP	M34553M8H-XXFP	M34553G8FP*	M34553G8HFP*	
Memory	ROM(Word×10-bit)	8192	12288	16384	4096		8192				4096		8192				
	RAM(Word×4-bit)	512			288												
	ROM Type*	M		O	M				O		M			O			
	Program Security	—															
CPU	Basic Instructions	159			123	124	123	124	123	124	123	124	123	124	123	124	
	Minimum Instruction Execution Time (ns)	500 (@6MHz)							680 (@4.4MHz)		500 (@6MHz)				680 (@4.4MHz)		
Clock	Clock Generation Circuit	4 circuits (Ceramic resonator, RC oscillator, Sub-clock and On-chip oscillator)															
	Subclock/RTC	quartz-crystal oscillator															
	On-Chip Oscillator	Yes															
	Frequency Divider	1/n (n=1, 2, 4, 8)															
	Power Save	at On-chip oscillator oscillation, RAM backup mode															
Power Supply Voltage Detection	Power-On Reset/POR	Yes															
	Low Voltage Detection/LVD	Low voltage detection circuit×1			—	Low voltage detection circuit×1	—	Low voltage detection circuit×1	—	Low voltage detection circuit×1	—	Low voltage detection circuit×1	—	Low voltage detection circuit×1	—	Low voltage detection circuit×1	
A/D Converter	Resolution×Channels	10-bit×8			—												
Timer	8-bit	Timer 1×1, Timer 2×1, Timer 3×1, Timer 4×1			Timer 1×1, Timer 2×1												
	10-bit	—															
	16-bit	Timer 5×1			Timer 3×1												
	Prescaler	Yes															
	PWM Output	Timer 4			Timer 2												
	Event Counter	Timer 1, Timer 3			Timer 1												
Watchdog Timer		Yes															
Serial Interface	Clock Sync. Only	Yes			—												
LCD		Segments 20, Common 4			Segments 28, Common 4					Segments 29, Common 4							
I/O Ports	Input Only (Numbers)	—															
	CMOS Output Only (Numbers)	1															
	CMOS I/O Only (Numbers)	20			18												
	N-Channel Open Drain Port (Numbers)	10			2												
	High Current Drive Port	Drive LED directly (port D)															
	Pull-Up Resistor	8															
Interrupts(Sources)	External	2			1												
Other Functions	Others	Carrier wave generation															
Package		64-pin QFP			48-pin QFP						48-pin LQFP						
Operating Frequency/Supply Voltage		2.0 to 5.5V		2.5 to 5.5V	1.8 to 5.5V			1.8 to 3.6V		1.8 to 5.5V				1.8 to 3.6V			
Operating Ambient Temperature (°C)		-20 to 85															

* M: mask ROM version, O: One-time PROM version

★ : New product

□ On-Chip LCD Driver Type:4500 Series

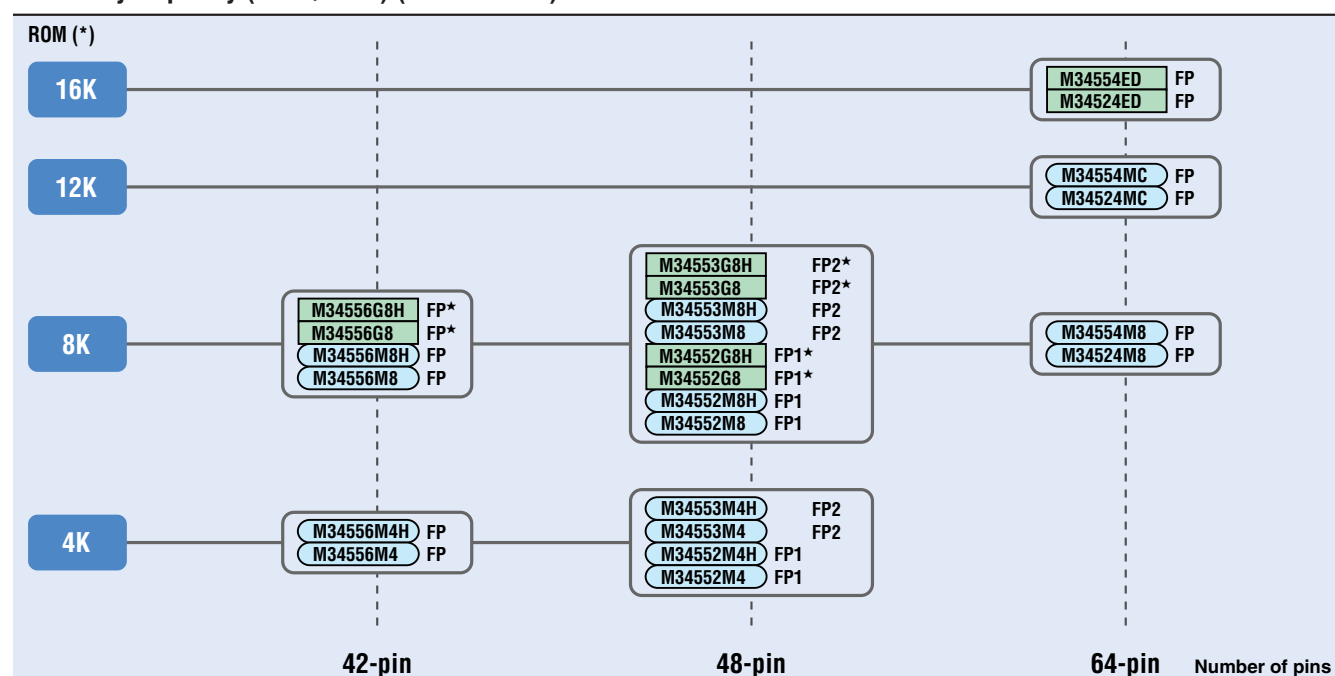
• Specifications (4500 Series)

Group		4554			4556					
Type No.		M34554M8-XXXFP	M34554MC-XXXFP	M34554EDFP	M34556M4-XXXFP	M34556M4H-XXXFP	M34556M8-XXXFP	M34556M8H-XXXFP	M34556G8FP*	M34556G8HFP*
Memory	ROM(Word×10-bit)	8192	12288	16384	4096		8192			
	RAM(Word×4-bit)	512			288					
	ROM Type*	M		O	M				O	
	Program Security	—								
CPU	Basic Instructions	136			123	124	123	124	123	124
	Minimum Instruction Execution Time (ns)	500 (@6MHz)							680 (@4.4MHz)	
Clock	Clock Generation Circuit	4 circuits (Ceramic resonator, RC oscillator, Sub-clock and On-chip oscillator)								
	Subclock/RTC	quartz-crystal oscillator								
	On-Chip Oscillator	Yes								
	Frequency Divider	1/n (n = 1, 2, 4, 8)								
	Power Save	at On-chip oscillator oscillation, RAM backup mode								
Power Supply Voltage Detection	Power-On Reset/POR	Yes								
	Low Voltage Detection/LVD	Low voltage detection circuit×1			—	Low voltage detection circuit×1	—	Low voltage detection circuit×1	—	Low voltage detection circuit×1
A/D Converter	Resolution×Channels	—								
Timer	8-bit	Timer 1×1, Timer 2×1, Timer 3×1, Timer 4×1			Timer 1×1, Timer 2×1					
	10-bit				—					
	16-bit	Timer 5×1			Timer 3×1					
	Prescaler				Yes					
	PWM Output	Timer 4			Timer 2					
	Event Counter	Timer 1, Timer 3			Timer 1					
Watchdog Timer		Yes								
Serial Interface	Clock Sync. Only	—								
LCD		Segments 32, Common 4			Segments 23, Common 4					
I/O Ports	Input Only (Numbers)	8			—					
	CMOS Output Only (Numbers)				1					
	CMOS I/O Only (Numbers)	16			18					
	N-Channel Open Drain Port (Numbers)				2					
	High Current Drive Port	Drives LED directly (port D)								
					8					
Interrupts(Sources)	External	2			1					
Other Functions	Others	—								
Package		64-pin QFP			42-pin SSOP					
Operating Frequency/Supply Voltage		2.0 to 5.5V		2.5 to 5.5V	1.8 to 5.5V				1.8 to 3.6V	
Operating Ambient Temperature (°C)		-20 to 85								

* M: mask ROM version, O: One-time PROM version

★ : New product

• Memory Capacity (ROM/RAM) (4500 Series)



Package	Lead Pitch (mm)	FP	42-pin SSOP (42P2R-A)	0.8
---------	-----------------	----	-----------------------	-----

FP1	48-pin QFP (48P6S-A)	0.65
FP2	48-pin LQFP PLQP0048KB-A (48P6Q-A)	0.5

FP	64-pin QFP PRQP0064GA-A (64P6N-A)	0.8
----	-----------------------------------	-----

The M in M3xxxxMx indicates the mask ROM version.

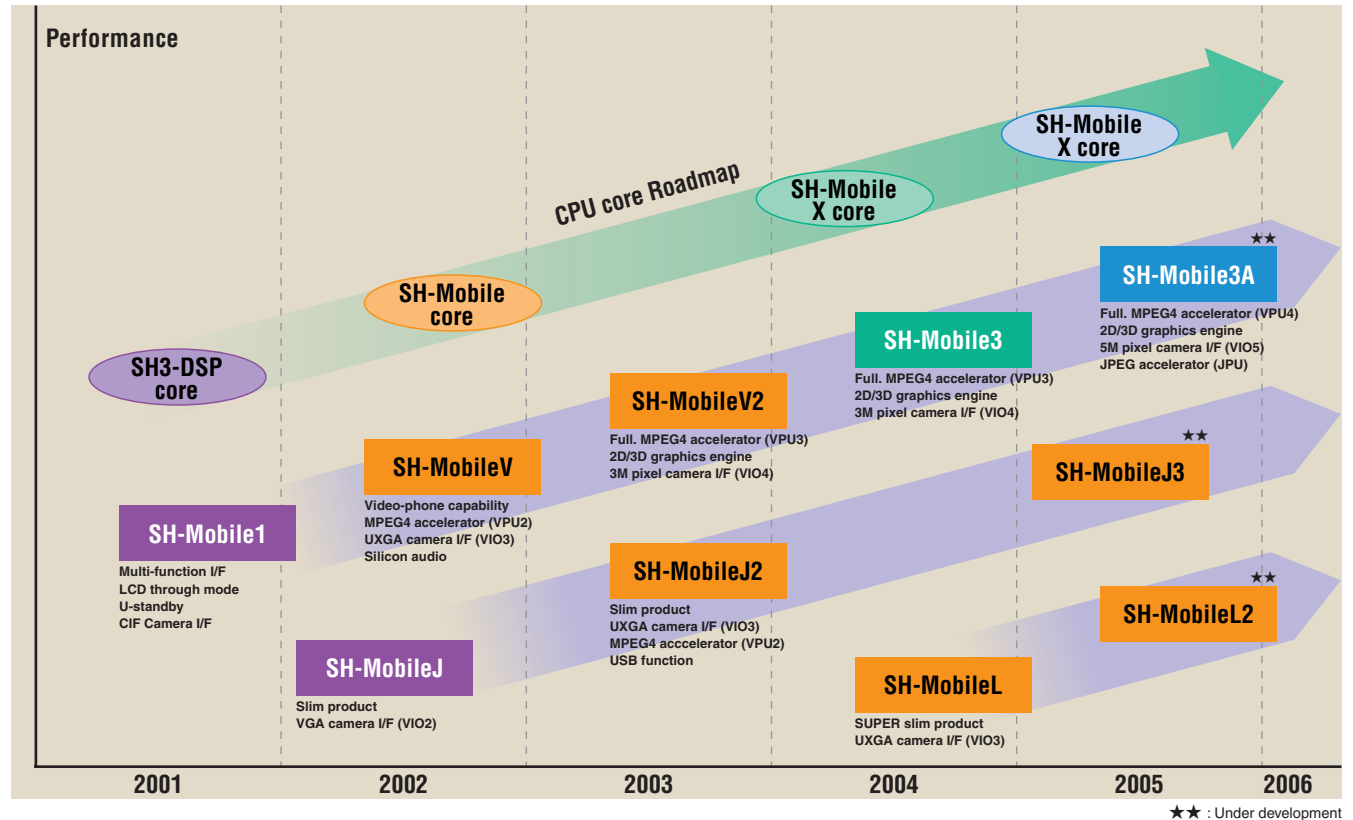
The E in M3xxxxEx indicates the one-time PROM version.

* ROM (word × 10-bit)

★ : New product

SH-Mobile application processors are optimized to handle the digital audio and video functions of multimedia mobile phone systems, interfacing seamlessly to the baseband LSIs. They integrate features such as accelerators, camera interfaces, and large memory capacity and deliver high-speed processing to meet the requirements of the next generation of high-functionality applications. SH-Mobile devices are destined to become the de facto standard for application processors in markets worldwide.

• SH-Mobile Roadmap



• Specifications (SH-Mobile)

Series	SH-Mobile				
	SH-MobileL	SH-MobileJ2	SH-MobileV	SH-MobileV2	SH-Mobile3
Type No.	HD6417322BP120	HD6417316BP120	HD6417300BL133	HD6417310BP133	R8A73180BG
CPU Core	SH3-DSP				
Power Supply Voltage	Internal: 1.4 to 1.6V, external: 2.7 to 3.6V, 1.65 to 1.95V	Internal: 1.4 to 1.6V, external: 2.7 to 3.3V, 1.65 to 1.95V		Internal: 1.4 to 1.6V, external: 2.5 to 3.3V, 1.65 to 1.95V	Internal: 1.1 to 1.3V, external: 2.5 to 3.3V, 1.65 to 1.95V
Operating Frequency	120MHz		133MHz		216MHz
Processing Performance	156MIPS		173MIPS		389MIPS
On-Chip RAM (Bytes)	32K		128K	192K	256K
Cache Memory (Bytes)	32K				64K
X/Y Memory (Bytes)	16K				
Peripheral Functions	- Dedicated interface (baseband LSI connections, others) - Video I/O - I²C-bus interface - Serial communication interface - Serial communication interface with FIFO - Asynchronous serial interface	- Dedicated interface (baseband LSI connections, others) - NAND/AND flash memory interface - Video I/O - I²C-bus interface - Key scan interface - Serial communication interface - Serial communication interface with FIFO - Asynchronous serial interface - Sound interface - MPEG4 accelerator - USB function	- Dedicated interface (baseband LSI connections, others) - NAND/AND flash memory interface - Video I/O - Sound interface - SIM card interface - Key scan interface - I²C-bus interface - Serial communication interface - Serial communication interface with FIFO - Asynchronous serial interface - MPEG4 accelerator	- Dedicated interface (baseband LSI connections, others) - NAND/AND flash memory interface - Video I/O - I²C-bus interface - Key scan interface - Serial communication interface - Serial communication interface with FIFO - Asynchronous serial interface - Sound interface - MPEG4 accelerator - USB function 2D/3D graphics engine - TFT color Liquid crystal controller	
Package	281-pin CSP (9mm×11mm, 0.5mm pin pitch)	256-pin CSP (11mm×11mm, 0.5mm pin pitch)		408-pin CSP (12mm×12mm, 0.5mm pin pitch)	409-pin CSP (12mm×12mm, 0.5mm pin pitch)

Automotive MCUs

The number of MCUs in automobiles is rising steadily. They are for example, in automotive engines, airbag systems, antilock braking systems, and body control systems. A diverse array of MCU products, from 8-bit to 32-bit models has been developed by Renesas specifically for electronic automotive systems. All of these MCUs are guaranteed to operate at temperatures ranging from -40°C to 85°C. Versions with a guaranteed operating temperature range of -40°C to 125°C and suitable for use in engine compartments are also available. The automotive MCU lineup includes a large number of package options and advanced on-chip peripheral functions. There are devices to match just about any application and design requirement.

• Specifications (SH7050 Series)

Series		SH7050				
Group		SH7050		SH7051	SH7055	SH7058
Type No.		HD64F7050SF	HD6437050xxxF	HD64F7051F	HD64F7055S	HD64F7058F
Memory	ROM(Bytes)	128K		256K	512K	1M
	RAM(Bytes)	6K		10K	32K	48K
	Data Flash			—		
	ROM Type*	F	M	F		
	Cache Memory			—		
	Program Security			—		
CPU	CPU	SH-2 Core			SH-2E Core	
	Basic Instructions	62			79	
	Minimum Instruction Execution Time (ns)	50 (@20MHz)			25 (@40MHz)	12.5 (@80MHz)
	Dhrystone Performance	26MIPS (20MHz)			52MIPS (40MHz)	104MIPS (80MHz)
	Multiplier				32 × 32 - 64	
	Multiply-Accumulate Instruction				32 × 32 + 64 - 64	
	Barrel Shifter				—	
	FPU	—			Yes	
	MMU				—	
DMA	DMAC (Channels)				4	
	DTC/DMAC II				—	
External Bus Expansion	Address Space (Bytes)				16M	
	Bus State Controller				Yes	
	Bus Structure				SRAM	
	SDRAM Controller				—	
	DRAM Controller				—	
	PCI Controller				—	
	Endian Conversion				—	
	Host Interface				—	
Clock	Clock Generation Circuit				1 circuit	
	PLL				Yes	
	RTC				—	
	Oscillation Stop Detection				—	
	Frequency Divider				—	
	Power Save	Sleep mode, Software standby mode, Hardware standby mode				
Power Supply Voltage Detection	Power-On Reset/POR	—				
A/D Converter	Resolution × Channels	10-bit × 16			10-bit × 32	
	Sample and Hold	2ch			3ch	
D/A Converter	Multi-Channel Sample and Hold				—	
	Resolution × Channels				—	
Timer	8-bit				—	
	16-bit	34 (ATU)			63 (ATU)	65 (ATU-II)
	32-bit				—	
	Prescaler	ATU			ATU-II	
	Input Capture	ATU			ATU-II	
	Output Compare	ATU			ATU-II	
	PWM Output	ATU			ATU-II	
	Event Counter	ATU			ATU-II	
	2-Phase Encoder Input				—	
3-Phase Inverter Control				—		
Watchdog Timer					Yes	
Serial Interface	Clock Sync./ Clock Async.	3			5	
	Clock Sync. Only				—	
	Clock Async. Only				—	
I ² C-bus		—				
Smart Card/SIM		—				
SSU/Special Serial I/O		—				
CAN	Channels	—			2	
	Buffers	—			32	64
Ethernet		—				
USB HOST		—				
USB Function		—				
IrDA		—				
LCD		—				
I/O Ports	Input Only (Numbers)	16			—	
	CMOS I/O Only (Numbers)	102			149	
	High Voltage Port (Numbers)				—	
	N-Channel Open Drain Port (Numbers)				—	
	High Current Drive Port				—	
	Pull-Up Resistor				—	
Interrupts(Sources)	External				9	
Debugging Function	Boundary Scan/JTAG				—	
	On-Chip Debug				—	
	On-Board Flash Program				Yes	
Other Functions	ROM Correction Function				—	
Package		FP-168B			FP-256H, BP-272	
Operating Frequency/Supply Voltage		20MHz/5.0V			40MHz/3.3V (internal) 5.0V external I/O, 3.3V bus	
Operating Ambient Temperature (°C)		-40 to 85				

Note : The package code described is the former one. Regarding the new one, please refer to the following URL <http://www.renesas.com/en/package>

* F: F-ZTAT version, M: mask ROM version

• Specifications (SH7047 Series)

Series		SH7047				
Group		SH7047	SH7049	SH7105	SH7109	SH7107
Type No.		HD64F7047F	HD6437049xxxF	HD6437105xxxF	HD6437109xxxF	HD6437107xxxF
Memory	ROM(Bytes)	256K	128K	256K	128K	256K
	RAM(Bytes)	12K	8K		4K	
	ROM Type*	F		M		
	Cache Memory			—		
	Program Security			Yes		
CPU	CPU			SH-2 Core		
	Basic Instructions			62		
	Minimum Instruction Execution Time (ns)			20 (@50MHz)		
	Dhrystone Performance			65MIPS (50MHz)		
	Multiplier			32 × 32 ~ 64		
	Multiply-Accumulate Instruction			32 × 32 + 64 ~ 64		
	Barrel Shifter			—		
	FPU			—		
	MMU			—		
DMA	DMAC (Channels)			—		
	DTC/DMAC II	DTC		—		
External Bus Expansion	Address Space (Bytes)			256K		
	Bus State Controller		Wait state (1 to 15 wait, can be extended with an external signal)			
	Bus Structure			Separate bus (8-bit)		
	SDRAM Controller			—		
	DRAM Controller			—		
	PCI Controller			—		
	Endian Conversion			—		
Clock	Host Interface			—		
	Clock Generation Circuit			1 circuit		
	PLL			Yes		
	RTC			—		
	Oscillation Stop Detection			Yes		
	Frequency Divider			—		
Power Save			Sleep mode, Software standby mode, Module standby mode			
Power Supply Voltage Detection	Power-On Reset/POR			—		
A/D Converter	Resolution × Channels			10-bit × 8 × 2unit		
	Sample and Hold			Yes		
	Multi-Channel Sample and Hold			2unit		
D/A Converter	Resolution × Channels			—		
	8-bit			—		
Timer	16-bit			7 (MTU, MMT, CMT)		
	32-bit			—		
	Prescaler			MTU		
	Input Capture			MTU		
	Output Compare			MTU		
	PWM Output			MTU		
	Event Counter			MTU		
	2-Phase Encoder Input			MTU		
	3-Phase Inverter Control			MTU, MMT		
Watchdog Timer				Yes		
Serial Interface	Clock Sync./ Clock Async.	SCI × 3			SCI × 2	
	Clock Sync. Only			—		
	Clock Async. Only			—		
I ² C-bus				—		
Smart Card/SIM				—		
SSU/Special Serial I/O				—		
CAN	Channels	1			—	
	Buffers			—		
Ethernet				—		
USB HOST				—		
USB Function				—		
IrDA				—		
LCD				—		
I/O Ports	Input Only (Numbers)			16		
	CMOS I/O Only (Numbers)			53		
	High Voltage Port (Numbers)			—		
	I ² -Channel Open Drain Port (Numbers)			—		
	High Current Drive Port			Yes		
Interrupts(Sources)	Pull-Up Resistor			—		
	External			5		
Debugging Function	Boundary Scan/JTAG			—		
	On-Chip Debug			—		
Other Functions	On-Board Flash Program			Yes		
	ROM Correction Function			—		
Package				FP-100M		
Operating Frequency/Supply Voltage				50MHz/5V (@50MHz)		
Operating Ambient Temperature (°C)				-20 to 75, -40 to 85		

Note : The package code described is the former one. Regarding the new one, please refer to the following URL <http://www.renesas.com/en/package>

* F: F-ZTAT version, M: mask ROM version

• Specifications (M32R/ECU Series)

Group		32172	32173	32176						32186**	32192**			32196**			
Type No.		M32172F2VFP	M32173F2VFP	M32176F2VFP	M32176F2TFP	M32176F3VFP	M32176F3TFP	M32176F4VFP	M32176F4TFP	M32186F8VFP**	M32192F8VFP**	M32192F8UFP**	M32192F8TFP**	M32196F8VFP**	M32196F8UFP**	M32196F8TFP**	
Memory	ROM(Bytes)	256K			384K		512K			1M							
	RAM(Bytes)	16K	32K	24K						64K	176K			64K			
	ROM Type*	F															
	Data Flash	—			Yes (Option)						—						
	Program Security	Flash memory protecting ID, Protecting by FP pin, Protecting by FENTRY bit, Protecting by lock bit															
CPU	CPU	M32R core								M32R-FPU core (on-chip single-precision FPU)							
	Basic Instructions	83								100							
	Minimum Instruction Execution Time (ns)	25 (@40MHz), 31.25 (@32MHz)		TFP:25 (@40MHz), VFP:31.25 (@32MHz)						12.5 (@80MHz)	7.8125 (@128MHz)	6.25 (@160MHz)		7.8125 (@128MHz)	6.25 (@160MHz)		
	Multiplier	16 × 32 → 48															
	Multiply-Accumulate Instruction	16 × 32 + 56 → 56															
	Barrel Shifter	Yes															
	FPU	—								Yes							
DMA	DMAC (Channels) ¹	10															
External Bus Expansion	Address Space (Bytes)	2M								31M							
	External Bus Interface	Wait controller (1 to 4 wait cycles inserted + prolonged by external WAIT signal input)								Wait controller (0 to 15 wait cycles inserted + prolonged by external WAIT signal input)							
	Bus Structure	Separate bus (16-bit)															
Clock	Clock Generation Circuit	2 circuits (Oscillation Circuit, PLL)															
	PLL	Yes (4-multiplier)								Yes (8-multiplier)							
	Oscillation Stop Detection	—			Yes												
A/D Converter	Resolution × Channels	10-bit × 32 ⁴			10-bit × 16												
	Sample and Hold	—			Yes												
	Multi-Channel Sample and Hold	—								Yes (synchronous sampling function)							
D/A Converter	Resolution × Channels	8-bit × 2 ³			—												
Timer	16-bit	TOM × 16, TMS × 4, TID × 2, TPD × 4, TEP × 4		TOP × 11, TIO × 10, TMS × 8						TOP × 11, TIO × 10, TMS × 8, TID × 2							
	24-bit	—								TOU × 16							
	32-bit	TML × 4		TML × 8													
	Prescaler	Yes															
	Input Capture	TMS, TML, TPD		TMS, TML													
	PWM Output	TOM			TIO					TIO, TOU							
	Event Counter	TID, TEP			—					TID							
	2-Phase Encoder Input	TID			—					TID							
	3-Phase Inverter Control	TOM			—					TOU							
Serial Interface	Clock Sync./ Clock Async.	4 (SIO0, SIO1, SIO4, SIO5)			2 (SIO0, SIO1)						4 (SIO0, SIO1, SIO4, SIO5)						
	Clock Async. Only	4 (SIO2, SIO3, SIO6, SIO7)			2 (SIO2, SIO3)												
CAN	Channels	2 (Ver.2.0B active)															
	Buffers(Each channel)	16 (transmit / receive buffers)								32 (transmit / receive buffers)							
I/O Ports	Input Only (Numbers)	17		1 (Input level switch function)						1 (Input level switch function, Output drive performance switch function, Noise canceller control function)							
	CMOS I/O Only (Numbers)	81		95 (Input level switch function)						96 (Input level switch function, Output drive performance switch function, Noise canceller control function)							
Interrupts(Sources)	External	17		11						27							
Debugging Function	Boundary Scan/JTAG	Yes															
	On-Chip Debug	Yes (Scalable debugging interface, Real-Time Debugger)								Yes (Scalable debugging interface, Real-Time Debugger, Non-Break-Debug)							
	On-Board Flash Program	Yes															
Other Functions	Direct RAM Interface	—								Yes							
Package		144-pin LQFP															
Operating Frequency/Supply Voltage		3.3V single or 3.3 and 5.0V dual-power-supply		3.3V or 5.0V single-power-supply						3.3 V single, 5.0 V single, or 3.3 and 5.0 V dual-power-supply	TFP:3.3V single, 5.0V single or 3.3 and 5.0V dual-power-supply, UFP:3.3V single or 3.3 and 5.0V dual-power-supply, VFP:3.3V single or 3.3 and 5.0V dual-power-supply,						
Operating Ambient Temperature (°C)		-40 to 85 (@40MHz), -40 to 125 (@32MHz)		TFP:-40 to 85 (@40MHz), VFP:-40 to 125 (@32MHz)						-40 to 125	TFP:-40 to 85 (@160MHz), UFP:-40 to 105 (@160MHz), VFP:-40 to 125 (@128MHz)						

¹ Only transfers to on-chip RAM and the on-chip peripheral I/O area are supported. Transfers to on-chip ROM or the external expansion area are not supported. ★★ : Under development

² Continuous operation at temperatures exceeding 85° C cannot be guaranteed. Customers considering applications where the operating temperature exceeds 85° C are requested to consult with Renesas.

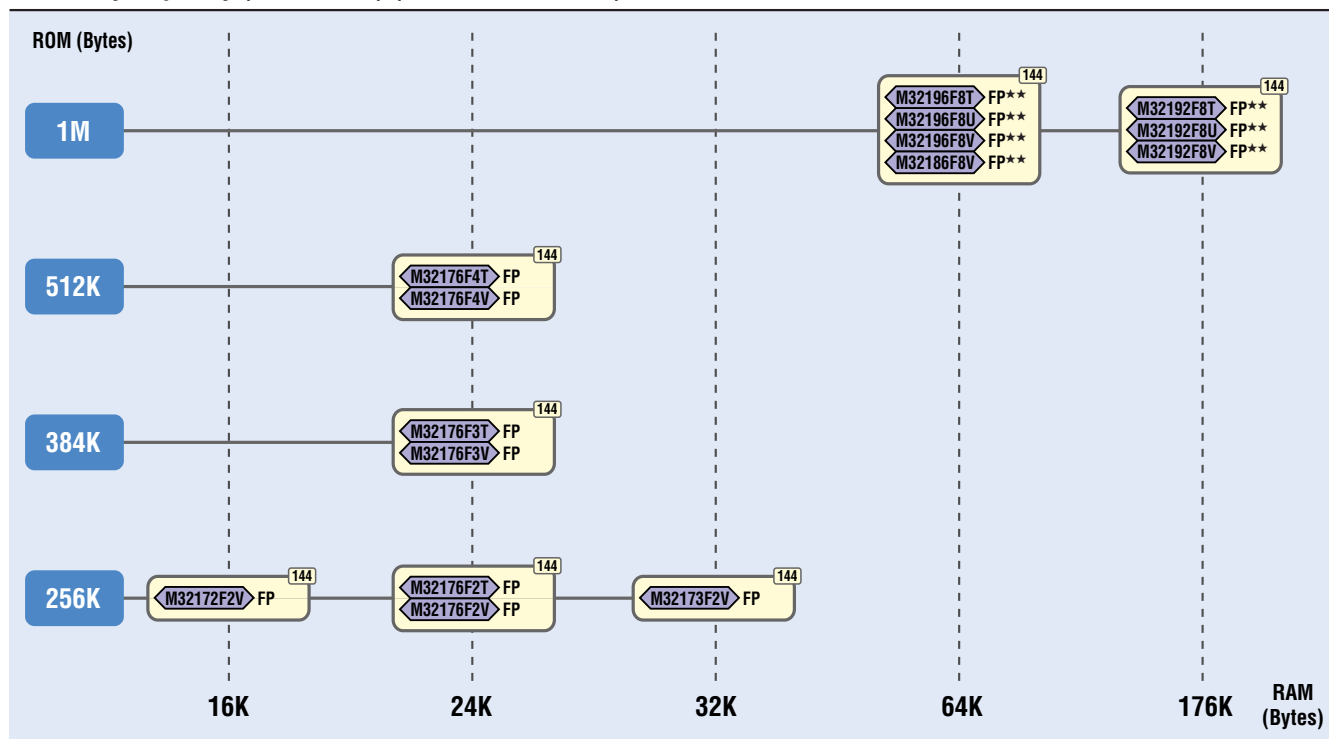
³ Of these, one channel includes an automatic wave detection function.

* The A-D Converter has 12 channels of dedicated analog input pins and 20 other channels of analog input pins which are shared with input/output ports or internal peripheral I/O input/output pins

* F: Flash memory version

• Memory Capacity (ROM/RAM) (M32R/ECU Series)

144-pin (144)



The F in M3xxxxF_x indicates the flash memory version.

Package			Lead Pitch (mm)
144-pin	FP	144-pin LQFP (PLQP0144KA-A(144P6Q-A))	0.5

★★ : Under development

* It is an old package code inside ()

• Specifications (M32C/90, M32C/80 Series)

Group		M32C/81						M32C/83		M32C/84*										
Type No.		M30810MCT-XXXFP	M30810MCT-XXXGP	M30812MCT-XXXGP	M30810MCV-XXXFP	M30810MCV-XXXGP	M30812MCV-XXXGP	M30833FJTGP	M30833FJVGP	M30840MCT-XXXGP**	M30842MCT-XXXGP**	M30843FHTGP**	M30845FHTGP**	M30843FHUGP*	M30845FHUGP**	M30843FJTGP*	M30845FJTGP**	M30843FJUGP**	M30845FJUGP**	
Memory	ROM(Bytes)	128K						512K		128K		384K + 4K				512K + 4K				
	RAM(Bytes)	10K						31K		10K		24K								
	ROM Type*	M						F		M		F								
	Data Flash	—										Yes								
	Program Security	ID code check function, ROM code protecting function (Only Flash memory version)																		
CPU	CPU	M32C/80 Core																		
	Basic Instructions	108																		
	Minimum Instruction Execution Time (ns)	31.3 (@32MHz)																		
	Multiplier	16×16→32																		
	Multiply-Accumulate Instruction	16×16+48→48																		
	Barrel Shifter	Yes																		
DMA	DMAC (Channels)	4																		
	DTC/DMAC II	DMAC II (Starts by all peripheral interrupt factors)																		
Clock	Clock Generation Circuit	4 circuits (Main clock, PLL, Sub-clock and On-chip oscillator)																		
	PLL	Yes																		
	Subclock	Yes																		
	On-Chip Oscillator	Yes																		
	Oscillation Stop Detection	Yes																		
	Frequency Divider	1/n (n=1, 2, 3, 4, 6, 8, 10, 12, 14, 16)																		
	Power Save	Normal operating mode (High-Speed, Medium-Speed, Low-Speed, Low-Power Consumption, On-chip Oscillator, On-chip Oscillator Low-Power Consumption), Wait mode and Stop mode																		
A/D Converter	Resolution×Channels	10-bit×26	10-bit×34	10-bit×26	10-bit×34	10-bit×26 (2 circuits)	10-bit×26	10-bit×34	10-bit×26	10-bit×34	10-bit×26	10-bit×34	10-bit×26	10-bit×34	10-bit×26	10-bit×34	10-bit×26	10-bit×34		
	Sample and Hold	Yes																		
D/A Converter	Multi-Channel Sample and Hold	—						Yes		—										
	Resolution×Channels	8-bit×2																		
Timer	16-bit	Timer A×5, Timer B×6																		
	Input Capture	5	12	5	12	5	8													
	Output Compare	8	20	8	20	10	8													
	PWM Output	5 (Timer A) + 8 (intelligent I/O)	5 (Timer A) + 20 (intelligent I/O)	5 (Timer A) + 8 (intelligent I/O)	5 (Timer A) + 20 (intelligent I/O)	5 (Timer A) + 10 (intelligent I/O)	5 (Timer A) + 8 (intelligent I/O)													
	Real-Time Port	3 (intelligent I/O)	8 (intelligent I/O)	3 (intelligent I/O)	8 (intelligent I/O)	4 (intelligent I/O)	—													
	Event Counter	11 (Timer A, Timer B)																		
	2-Phase Encoder Input	Event counter two-phase pulse signal processing×3 (Timer A2, Timer A3, Timer A4) + 2 (intelligent I/O)																		
3-Phase Inverter Control		Three-Phase Motor Control Timer×1 (Timer A4, Timer A1,Timer A2, Timer B2, Dead Time Timer)																		
Watchdog Timer		Yes																		
Serial Interface	Clock Sync./ Clock Async.	5 (UART0 to UART4) + 2 (intelligent I/O)								5 (UART0 to UART4) + 2 (intelligent I/O) ¹										
I ² C-bus		5 (UART0 to UART4)																		
IEBus		5 (UART0 to UART4) + 1 (intelligent I/O)								5 (UART0 to UART4)										
Smart Card/SIM		5 (UART0 to UART4)																		
SSU/Special Serial I/O		5 (UART0 to UART4)																		
CAN	Channels	1 (CAN2.0B)																		
	Buffers	16																		
CRC Calculation Circuit		1 (Based on CRC-CCITT)																		
X/Y Converter		Yes																		
I/O Ports	Input Only (Numbers)	1																		
	CMOS I/O Only (Numbers)	85	121	85	121	85	121	85	121	85	121	85	121	85	121	85	121			
	N-Channel Open Drain Port (Numbers)	2 (P7_0, P7_1)																		
	Pull-Up Resistor	Yes (Pull-up resistor can be set every four ports)																		
Interrupts(Sources)	External	8																		
Debugging Function	On-Chip Debug	Yes (Only Flash memory version)																		
	On-Board Flash Program	Yes (Only Flash memory version)																		
Other Functions	ROM Correction Function	4								8										
	Others	—																		
Package		100-pin QFP, 100-pin LQFP, 144-pin LQFP						100-pin LQFP		100-pin LQFP, 144-pin LQFP										
Operating Frequency/Supply Voltage		32MHz/4.2 to 5.5V																		
Operating Ambient Temperature (°C)		-40 to 85			-40 to 125			-40 to 85	-40 to 125	-40 to 85			-40 to 105			-40 to 85		-40 to 105		

¹ Clock Async. (UART) of intelligent I/O is 1 channel

* M: mask ROM version, F: flash memory version

★ : New product ★★ : Under development

• Specifications (M32C/90, M32C/80 Series)

Group		M32C/85*												M32C/86**		M32C/88**						M32C/94**						M32C/95**						
Type No.		M30853FWTGP*	M30855FWTGP**	M30853FWUGP**	M30855FWUGP*	M30853FHTGP*	M30855FHTGP*	M30853FHUGP**	M30855FHUGP**	M30853FJTGP**	M30855FJTGP**	M30853FJUGP**	M30855FJUGP**	M30865FJTGP**	M30880FWTGP**	M30882FWTGP**	M30880FHTGP**	M30882FHTGP**	M30880FJTGP**	M30882FJTGP**	M30940FHTGP**	M30942FHTGP**	M30943FJTGP**	M30945FJTGP**	M30946FKTGP**	M30948FKTGP**	M30950FHTGP**	M30952FHTGP**	M30953FJTGP**	M30955FJTGP**	M30955FKTGP**			
Memory	ROM(Bytes)	320K + 4K				384K + 4K				512K + 4K					320K + 4K	384K + 4K	512K + 4K	384K + 4K	512K + 4K	32K	40K	24K	32K	40K	24K	32K	40K	24K	32K	40K	24K	32K	40K	
	RAM(Bytes)	24K								24K					18K				24K		32K	40K	24K	32K	40K	24K	32K	40K	24K	32K	40K	24K	32K	40K
	ROM Type*	F																																
	Data Flash	Yes																																
	Program Security	ID code check function, ROM code protecting function																																
CPU	CPU	M32C/80 Core																		M32C/80 double speed CPU core														
	Basic Instructions	108																																
	Minimum Instruction Execution Time (ns)	31.3 (@32MHz)																		15.6 (@64MHz)														
	Multiplier	16 × 16 → 32																																
	Multiply-Accumulate Instruction	16 × 16 + 48 → 48																																
DMA	Barrel Shifter	Yes																																
	DMAC (Channels)	4																																
Clock	DTC/DMAC II	DMAC II (Starts by all peripheral interrupt factors)																																
	Clock Generation Circuit	4 circuits (Main clock, PLL, Sub-clock and On-chip oscillator)																																
	PLL	Yes																																
	Subclock	Yes																																
	On-Chip Oscillator	Yes																																
	Oscillation Stop Detection	Yes																																
	Frequency Divider	1/n (n = 1, 2, 3, 4, 6, 8, 10, 12, 14, 16)																																
A/D Converter	Power Save	Normal operating mode (High-Speed, Medium-Speed, Low-Speed, Low-Power Consumption, On-chip Oscillator, On-chip Oscillator Low-Power Consumption), Wait mode and Stop mode																																
	Resolution × Channels	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34			
	Sample and Hold	Yes																																
D/A Converter	Multi-channel Sample and Hold	—																																
	Resolution × Channels	8-bit × 2																																
Timer	16-bit	Timer A × 5, Timer B × 6																																
	Input Capture	8																		16														
	Output Compare	8																		16														
	PWM Output	5 (Timer A) + 8 (intelligent I/O)																		5 (Timer A) + 16 (intelligent I/O)														
	Real-Time Port	—																																
	Event Counter	11 (Timer A, Timer B)																																
	2-Phase Encoder Input	Event counter two-phase pulse signal processing × 3 (Timer A2, Timer A3, Timer A4) + 1 (intelligent I/O)																		Event counter two-phase pulse signal processing × 3 (Timer A2, Timer A3, Timer A4) + 2 (intelligent I/O)														
	3-Phase Inverter Control	Three-Phase Motor Control Timer × 1 (Timer A4, Timer A1, Timer A2, Timer B2, Dead Time Timer)																																
Watchdog Timer		Yes																																
Serial Interface	Clock Sync./ Clock Async.	5 (UART0 to UART4) + 2 (intelligent I/O) ¹																		7 (UART0 to UART6) ²														
I ² C-bus		5 (UART0 to UART4)																																
IEBus		5 (UART0 to UART4)																																
Smart Card/SIM		5 (UART0 to UART4)																																
SSU/Special Serial I/O		5 (UART0 to UART4)																																
CAN	Channels	2 (CAN2.0B)												3 (CAN2.0B)				2 (CAN2.0B)				3 (CAN2.0B)												
	Buffers	16												3 (16) or 1 (16) + 1 (32)				1 (16) + 1 (32)				2 (16) + 1 (32)												
CRC Calculation Circuit		1 (Based on CRC-CCITT)																																
X/Y Converter		Yes																																
I/O Ports	Input Only (Numbers)	1																																
	CMOS I/O Only (Numbers)	85	121	85	121	85	121	85	121	85	121	85	121	85	121	85	121	85	121	85	121	85	121	85	121	85	121	85	121	85	121			
	N-Channel Open Drain Port (Numbers)	2 (P7_0, P7_1)																																
	Pull-Up Resistor	Yes (Pull-up resistor can be set every four ports)																																
Interrupts(Sources)	External	8																		11 8 11 8 11 8 11 8 11 8 11 8 11 8 11														
Debugging Function	On-Chip Debug	Yes																																
	On-Board Flash Program	Yes																																
Other Functions	ROM Correction Function	8																																
	Others	—												Two-phase stepping controller				—																
Package		100-pin LQFP, 144-pin LQFP												144-pin LQFP				100-pin LQFP, 144-pin LQFP																
Operating Frequency/Supply Voltage		32MHz/4.2 to 5.5V																		64MHz/4.2 to 5.5V														
Operating Ambient Temperature (°C)		-40 to 85																		-40 to 85														

¹ Clock Async. (UART) of intelligent I/O is 1 channel

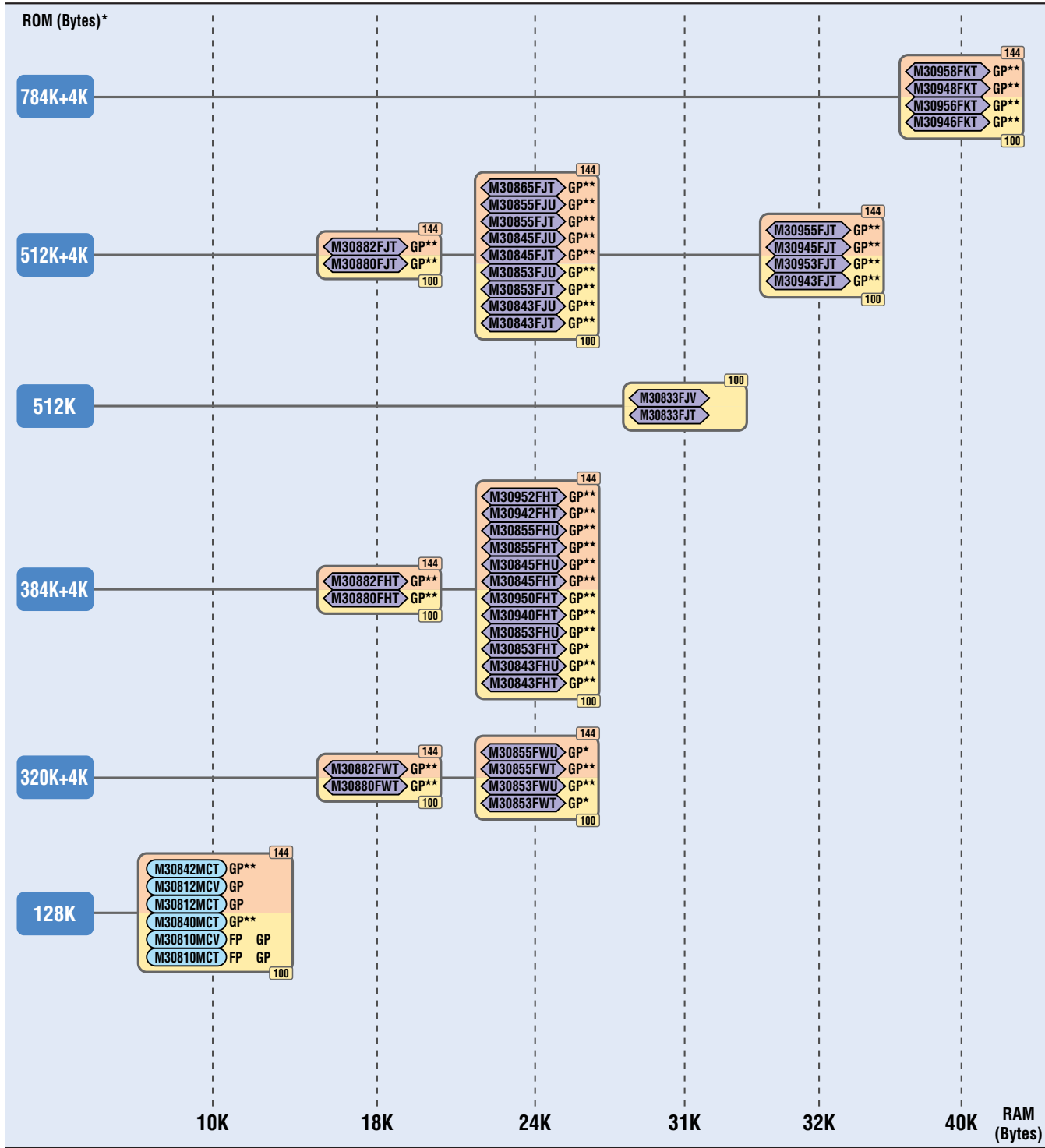
² At 100-pin version, Clock Sync. Serial : 6 channel Clock Async. Serial (UART) : 7 channel

* F: Flash memory version.

★ : New product ★★ : Under development

• Memory Capacity (ROM/RAM) (M32C/90, M32C/80 Series)

144-pin 144 100-pin 100



The M in M3xxxxMx indicates the mask ROM version.
The F in M3xxxxFx indicates the flash memory version.
* The notation "+4K" refers to data flash memory.

Package			Lead Pitch (mm)
100-pin	FP	100-pin QFP (PRQP0100JB-A(100P6S-A))	0.65
	GP	100-pin LQFP (PLQP0100KB-A(100P6Q-A))	0.5
144-pin	GP	144-pin LQFP (PLQP0144KA-A(144P6Q-A))	0.5

★ : New product ★★ : Under development
* It is an old package code inside ()

• Specifications (M16C/60 Series)

Group		M16C/62P* (16C/62PT)													
Type No.		M3062CM6T-XXXFP*	M3062CM6T-XXXGP*	M3062CM8T-XXXFP*	M3062CM8T-XXXGP*	M3062CF8TGP*	M3062CF8TGP*	M3062CMAT-XXXFP*	M3062CMAT-XXXGP*	M3062AMCT-XXXFP*	M3062AMCT-XXXGP*	M3062AMCV-XXXFP**	M3062AMCV-XXXGP**	M3062AFCTGP*	M3062AFCTGP*
Memory	ROM(Bytes)	48K		64K		64K + 4K		96K		128K				128K + 4K	
	RAM(Bytes)			4K				5K				10K			
	ROM Type*		M			F				M				F	
	Data Flash		—			Yes				—				Yes	
	Program Security	ID code check function, ROM code protecting function (Only Flash memory version)													
CPU	CPU	M16C/60 Core													
	Basic Instructions	91													
	Minimum Instruction Execution Time (ns)	41.7 (@24MHz)													
	Multiplier	16 × 16 → 32													
	Multiply-Accumulate Instruction	16 × 16 + 48 → 48													
DMA	DMAC (Channels)	2													
External Bus Expansion	Address Space (Bytes)	—													
	External Bus Interface	—													
	Bus Structure	—													
Clock	Clock Generation Circuit	4 circuits (Main clock, PLL, Sub-clock and On-chip oscillator)													
	PLL	Yes													
	Subclock	Yes													
	On-Chip Oscillator	Yes													
	Oscillation Stop Detection	Yes													
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)													
Power Supply	Power Save	Normal operating mode, Wait mode, Stop mode, Low-Power Consumption mode													
	Low Voltage Detection/LVD	—													
A/D Converter	Resolution × Channels	10-bit × 26													
D/A Converter	Sample and Hold	Yes													
	Resolution × Channels	8-bit × 2													
Timer	16-bit	Timer A × 5, Timer B × 6													
	Input Capture	—													
	Output Compare	—													
	PWM Output	5 (Timer A)													
	Event Counter	11 (Timer A, Timer B)													
	2-Phase Encoder Input	Event counter two-phase pulse signal processing × 3 (Timer A2, Timer A3, Timer A4)													
	3-Phase Inverter Control	Three-Phase Motor Control Timer × 1 (Timer A4, Timer A1, Timer A2, Timer B2, Dead Time Timer)													
Watchdog Timer		Yes													
Serial Interface	Clock Sync./ Clock Async.	3 (UART0 to UART2)													
	Clock Sync. Only	2 (SI/O4, SI/O3)													
	Clock Async. Only	—													
I ² C-bus		3 (UART0 to UART2)													
IEBus		3 (UART0 to UART2)													
Smart Card/SIM		1 (UART2)													
SSU/Special Serial I/O		3 (UART0 to UART2)													
CAN	Channels	—													
	Buffers	—													
CRC Calculation Circuit		1 (Based on CRC-CCITT)													
I/O Ports	Input Only (Numbers)	1													
	CMOS I/O Only (Numbers)	85													
	N-Channel Open Drain Port (Numbers)	2 (P7_0, P7_1)													
	Pull-Up Resistor	Yes													
Interrupts(Sources)	External	8													
Debugging Function	On-Chip Debug	Yes (Only Flash memory version)													
	On-Board Flash Program	Yes (Only Flash memory version)													
Other Functions	ROM Correction Function	Address agreement × 4													
Package		100-pin QFP, 100-pin LQFP													
Operating Frequency/Supply Voltage		24MHz/4.0 to 5.5V													
Operating Ambient Temperature (°C)		T-ver:-40 to 85, V-ver:-40 to 125													

* M: mask ROM version, F: flash memory version

★ : New product ★★ : Under development

• Specifications (M16C/60 Series)

Group		M16C/62A(M16C/62T)																									
Type No.		M30623M4T-XXXGP	M30623M8T-XXXGP	M30623M8V-XXXGP	M30623MCT-XXXGP	M30623MCV-XXXGP	M30623ECT-XXXGP	M30623ECTGP	M30623ECV-XXXGP	M30623ECVGP	M30621FCTGP	M30621FCUGP	M30622M8T-XXXFP	M30622M8V-XXXFP	M30622MCT-XXXFP	M30622MCV-XXXFP	M30622ECT-XXXFP	M30622ECTFP	M30622ECV-XXXFP	M30622ECVFP	M30620FCT-XXXFP	M30620FCTFP	M30620FCUFP	M30624FGU-XXXFP	M30624FGUFP	M30624FGT-XXXGP	M30624FGTGP
Memory	ROM(Bytes)	32K	64K	128K								64K	128K								256K						
	RAM(Bytes)	3K	4K	5K				10K		4K	5K				10K		20K										
	ROM Type*	M			O			F		M			O			F											
	Data Flash	—																									
	Program Security	ID code check function, ROM code protecting function (Only Flash memory version)																									
CPU	CPU	M16C/60 Core																									
	Basic Instructions	91																									
	Minimum Instruction Execution Time (ns)	62.5 (@16MHz)																									
	Multiplier	16×16→32																									
	Multiply-Accumulate Instruction	16×16+32→32																									
DMA	DMAC (Channels)	2																									
External Bus Expansion	Address Space (Bytes)	—																									
	External Bus Interface	1 wait, CS×4																									
	Bus Structure	—																									
Clock	Clock Generation Circuit	2 circuits (Main clock, Sub-clock)																									
	PLL	—																									
	Subclock	Yes																									
	On-Chip Oscillator	—																									
	Oscillation Stop Detection	—																									
	Frequency Divider	1/n (n=1, 2, 4, 8, 16)																									
	Power Save	Normal operating mode, Wait mode, Stop mode, Low-Power Consumption mode																									
Power Supply Voltage Detection	Low Voltage Detection/LVD	—																									
A/D Converter	Resolution×Channels	10-bit×10																									
	Sample and Hold	Yes																									
D/A Converter	Resolution×Channels	8-bit×2																									
Timer	16-bit	Timer A×5, Timer B×6																									
	Input Capture	—																									
	Output Compare	—																									
	PWM Output	5 (Timer A)																									
	Event Counter	11 (Timer A, Timer B)																									
	2-Phase Encoder Input	Event counter two-phase pulse signal processing×3 (Timer A2, Timer A3, Timer A4)																									
	3-Phase Inverter Control	Three-Phase Motor Control Timer×1 (Timer A, Timer B)																									
Watchdog Timer		Yes																									
Serial Interface	Clock Sync./ Clock Async.	2 (UART0, UART1)										3 (UART0 to UART2)															
	Clock Sync. Only	—										2 (SI/03, SI/04)															
	Clock Async. Only	1 (UART2)										—															
I ² C-bus		1 (UART2)																									
IEBus		1 (UART2)																									
Smart Card/SIM		1 (UART2)																									
SSU/Special Serial I/O		—																									
CAN	Channels	—																									
	Buffers	—																									
CRC Calculation Circuit		1 (Based on CRC-CCITT)																									
I/O Ports	Input Only (Numbers)	1																									
	CMOS I/O Only (Numbers)	68										85															
	N-Channel Open Drain Port (Numbers)	2 (P7_0, P7_1)																									
	Pull-Up Resistor	Yes																									
Interrupts(Sources)	External	5										8															
Debugging Function	On-Chip Debug	Yes																									
	On-Board Flash Program	Yes																									
Other Functions	ROM Correction Function	Address agreement×2																									
Package		80-pin QFP										100-pin QFP, 100-pin LQFP															
Operating Frequency/Supply Voltage		16MHz/4.2 to 5.5V																									
Operating Ambient Temperature (°C)		T-ver:-40 to 85, V-ver:-40 to 125																									

* M: mask ROM version, F: flash memory version, O: one-time PROM version

• Specifications (M16C/60 Series)

Group		M16C/6N4*														M16C/6N5*								M16C/6NK**					
Type No.		M306N4FCTFP*	M306N4FCTGP**	M306N4FCVFP*	M306N4FCVGP**	M306N4FGTFP*	M306N4FGTGP**	M306N4FGVFP*	M306N4FGVGP**	M306N4MCT-XXFP*	M306N4MCT-XXGFP**	M306N4MCV-XXFP*	M306N4MCV-XXGFP**	M306N4MGT-XXFP*	M306N4MGT-XXGFP**	M306N4MGV-XXFP*	M306N4MGV-XXGFP**	M306N5CTFP*	M306N5CTGP**	M306N5FCVFP*	M306N5FCVGP**	M306N5MCT-XXFP*	M306N5MCT-XXGFP**	M306N5MCV-XXFP*	M306N5MCV-XXGFP**	M306NKFHTGP**	M306NKFHVGP**	M306NKFJTGP**	M306NKFJVGPF**
Memory	ROM(Bytes)	128K + 4K			256K + 4K			128K			256K			128K + 4K			128K			384K + 4K			512K + 4K						
	RAM(Bytes)	5K			10K			5K			10K			5K			128K			31K									
	ROM Type*	F						M						F						M									
	Data Flash	Block A						—						Block A						—									
	Program Security	ID code check function, ROM code protecting function (Only Flash memory version)																											
CPU	CPU	M16C/60 Core																											
	Basic Instructions	91																											
	Minimum Instruction Execution Time (ns)	50 (@20MHz)																											
	Multiplier	16 × 16 → 32																											
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32																											
DMA	DMAC (Channels)	2																											
External Bus Expansion	Address Space (Bytes)	1M																									—		
	External Bus Interface	0 to 3 wait, CS × 4																									—		
	Bus Structure	Separate bus, Multiplex bus																									—		
Clock	Clock Generation Circuit	4 circuits (Main clock, PLL, Sub-clock and On-chip oscillator)																											
	PLL	Yes																											
	Subclock	Yes																											
	On-Chip Oscillator	Yes																											
	Oscillation Stop Detection	Yes																											
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)																											
	Power Save	Normal operating mode, Wait mode, Stop mode, Low-Power Consumption mode																											
Power Supply Voltage Detection	Low Voltage Detection/LVD	—																											
A/D Converter	Resolution × Channels	10-bit × 26																											
	Sample and Hold	Yes																											
D/A Converter	Resolution × Channels	8-bit × 2																											
	16-bit	Timer A × 5, Timer B × 6																											
Timer	Input Capture	—																											
	Output Compare	—																											
	PWM Output	5 (Timer A)																											
	Event Counter	11 (Timer A, Timer B)																											
	2-Phase Encoder Input	Event counter two-phase pulse signal processing × 3 (Timer A2, Timer A3, Timer A4)																											
	3-Phase Inverter Control	Three-Phase Motor Control Timer × 1 (Timer A4, Timer A1, Timer A2, Timer B2, Dead Time Timer)																											
	Watchdog Timer	Yes																											
Serial Interface	Clock Sync./ Clock Async.	3 (UART0 to UART2)																									—		
	Clock Sync. Only	1 (SI/O3)																									2 (SI/O4, SI/O3)		
	Clock Async. Only	—																											
I ² C-bus		3 (UART0 to UART2)																											
IEBus		3 (UART0 to UART2)																											
Smart Card/SIM		1 (UART2)																											
SSU/Special Serial I/O		3 (UART0 to UART2)																											
CAN	Channels	2 (CAN2.0B)												1 (CAN2.0B)												2 (CAN2.0B)			
	Buffers	16																											
CRC Calculation Circuit		1 (Based on CRC-CCITT)																											
I/O Ports	Input Only (Numbers)	1																											
	CMOS I/O Only (Numbers)	85																											
	N-Channel Open Drain Port (Numbers)	2 (P7_1, P9_1)																											
	Pull-Up Resistor	Yes																											
Interrupts(Sources)	External	9																											
Debugging Function	On-Chip Debug	Yes (Only Flash memory version)																											
	On-Board Flash Program	Yes (Only Flash memory version)																											
Other Functions	ROM Correction Function	Address agreement × 2																											
Package		100-pin QFP, 100-pin LQFP																											
Operating Frequency/Supply Voltage		20MHz/4.2 to 5.5V																											
Operating Ambient Temperature (°C)		T-ver:-40 to 85, V-ver:-40 to 125																											

* M: mask ROM version, F: flash memory version

★ : New product ★★ : Under development

• Specifications (M16C/60 Series)

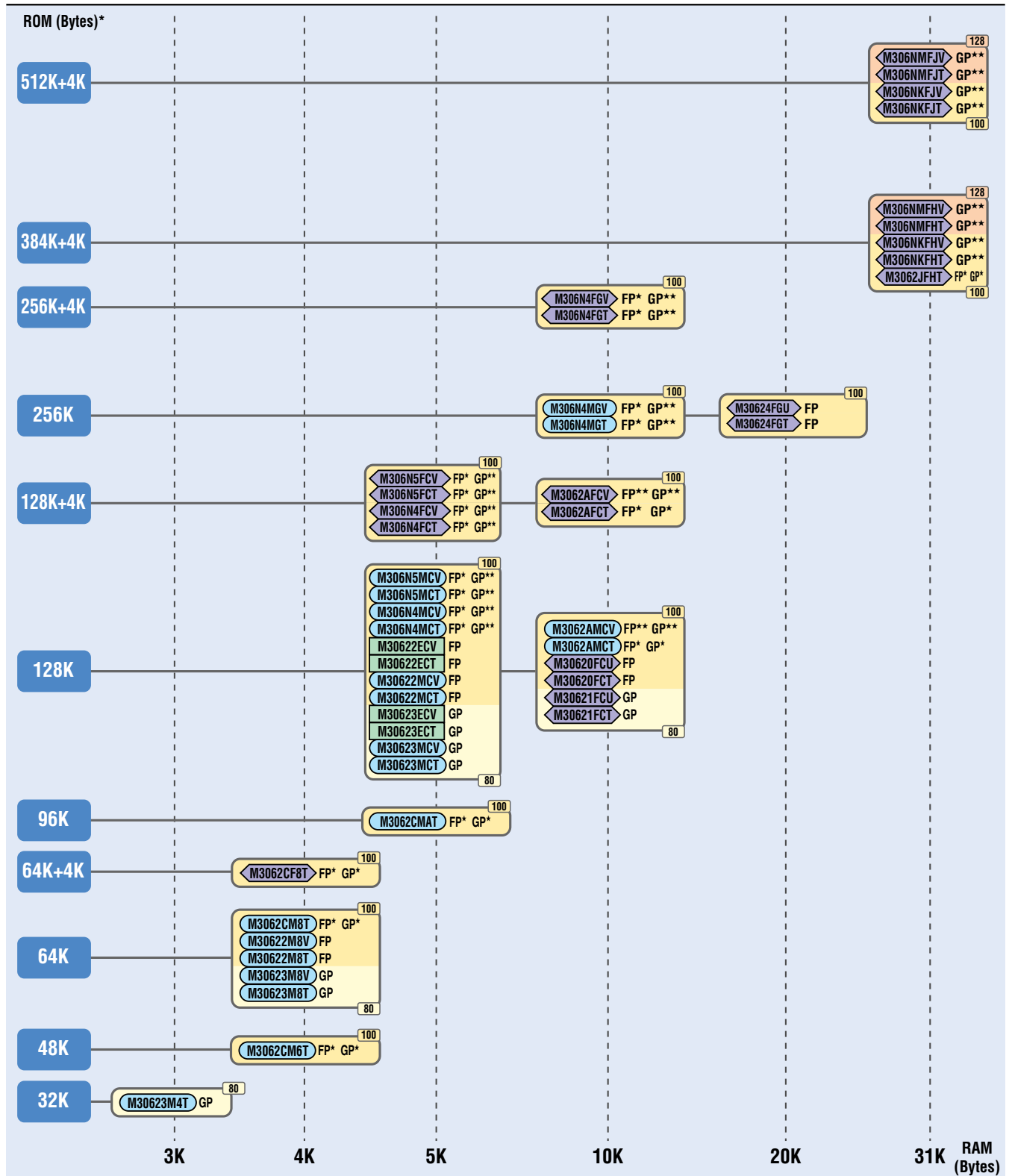
Group		M16C/6NM**			
Type No.		M306NMFHTGP**	M306NMFHVGP**	M306NMFJTGP**	M306NMFJVGp**
Memory	ROM(Bytes)	384K + 4K		512K + 4K	
	RAM(Bytes)	31K			
	ROM Type*	F			
	Data Flash	Block A			
	Program Security	ID code check function, ROM code protecting function			
CPU	CPU	M16C/60 Core			
	Basic Instructions	91			
	Minimum Instruction Execution Time (ns)	50 (@20MHz)			
	Multiplier	16×16→32			
	Multiply-Accumulate Instruction	16×16+32→32			
DMA	DMAC (Channels)	2			
External Bus Expansion	Address Space (Bytes)	—			
	External Bus Interface	—			
	Bus Structure	—			
Clock	Clock Generation Circuit	4 circuits (Main clock, PLL, Sub-clock and On-chip oscillator)			
	PLL	Yes			
	Subclock	Yes			
	On-Chip Oscillator	Yes			
	Oscillation Stop Detection	Yes			
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)			
	Power Save	Normal operating mode, Wait mode, Stop mode, Low-Power Consumption mode			
Power Supply Voltage Detection	Low Voltage Detection/LVD	—			
A/D Converter	Resolution×Channels	10-bit×26			
	Sample and Hold	Yes			
D/A Converter	Resolution×Channels	8-bit×2			
Timer	16-bit	Timer A×5, Timer B×6			
	Input Capture	—			
	Output Compare	—			
	PWM Output	5 (Timer A)			
	Event Counter	11 (Timer A, Timer B)			
	2-Phase Encoder Input	Event counter two-phase pulse signal processing×3 (Timer A2, Timer A3, Timer A4)			
	3-Phase Inverter Control	Three-Phase Motor Control Timer×1 (Timer A4, Timer A1, Timer A2, Timer B2, Dead Time Timer)			
Watchdog Timer		Yes			
Serial Interface	Clock Sync./ Clock Async.	3 (UART0 to UART2)			
	Clock Sync. Only	4 (SI/O3, SI/O4, SI/O5, SI/O6)			
	Clock Async. Only	—			
I ² C-bus		3 (UART0 to UART2)			
IEBus		3 (UART0 to UART2)			
Smart Card/SIM		1 (UART2)			
SSU/Special Serial I/O		3 (UART0 to UART2)			
CAN	Channels	2 (2.0B)			
	Buffers	16			
CRC Calculation Circuit		1 (Based on CRC-CCITT)			
I/O Ports	Input Only (Numbers)	1			
	CMOS I/O Only (Numbers)	111			
	N-Channel Open Drain Port (Numbers)	2 (P7_1, P9_1)			
	Pull-Up Resistor	Yes			
Interrupts(Sources)	External	12			
Debugging Function	On-Chip Debug	Yes (Only Flash memory version)			
	On-Board Flash Program	Yes (Only Flash memory version)			
Other Functions	ROM Correction Function	Address agreement×2			
Package		128-pin LQFP			
Operating Frequency/Supply Voltage		20MHz/4.2 to 5.5V			
Operating Ambient Temperature (°C)		T-ver:-40 to 85, V-ver:-40 to 125			

* F: flash memory version

★★ : Under development

• Memory Capacity (ROM/RAM) (M16C/60 Series)

128-pin (128) 100-pin (100) 80-pin (80)



The M in M3xxxxMx indicates the mask ROM version.

The E in M3xxxxEx indicates the one-time PROM version.

The F in M3xxxxFx indicates the flash memory version.

* The notation "+4K" refers to data flash memory.

Package				Lead Pitch (mm)
80-pin	GP	80-pin QFP (PRQP0080JA-A(80P6S-A))		0.65
100-pin	FP	100-pinQFP (PRQP0100JB-A(100P6S-A))		0.65
	GP	100-pinLQFP (PLQP0100KB-A(100P6Q-A))		0.5
144-pin	GP	100-pinLQFP (PLQP0144KA-A(144P6Q-A))		0.5

★ : New product ★★ : Under development
 * It is an old package code inside ()

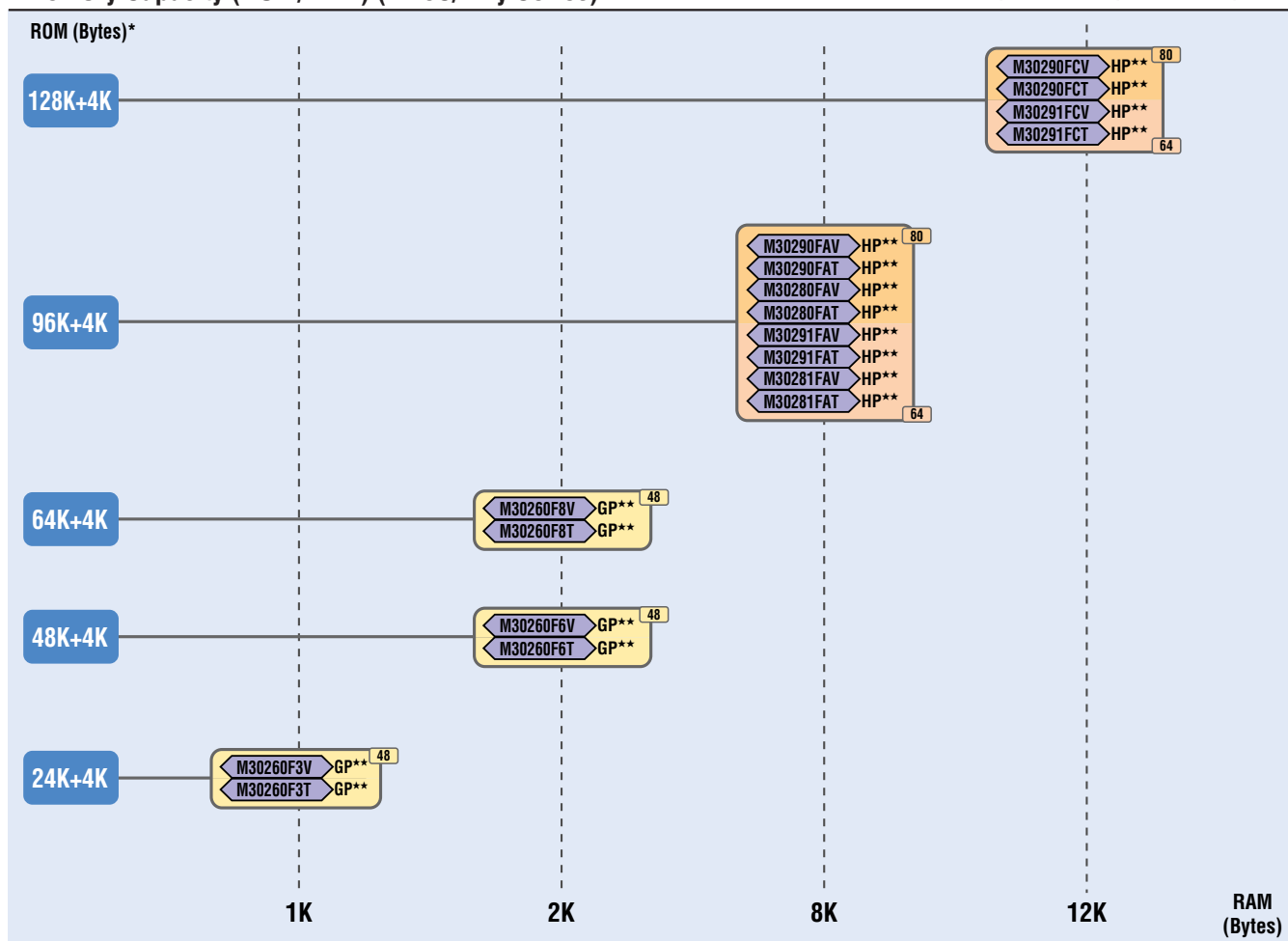
• Specifications (M16C/Tiny Series)

Group		M16C/26T**						M16C/28**				M16C/29**							
Type No.		M30260F3TGP**	M30260F3VGP**	M30260F6TGP**	M30260F6VGP**	M30260F8TGP**	M30260F8VGP**	M30280FATHP**	M30280FAVHP**	M30281FATHP**	M30281FAVHP**	M30290FATHP**	M30290FAVHP**	M30290FCTHP**	M30290FCVHP**	M30291FATHP**	M30291FAVHP**	M30291FCTHP**	M30291FCVHP**
Memory	ROM(Bytes)	24K + 4K		48K + 4K		64K + 4K		96K + 4K					128K + 4K		96K + 4K		128K + 4K		
	RAM(Bytes)	1K		2K				8K					12K		8K		12K		
	ROM Type*	F																	
	Data Flash	Block A, Block B																	
	Program Security	ID code check function, ROM code protecting function																	
CPU	CPU	M16C/60 Core																	
	Basic Instructions	91																	
	Minimum Instruction Execution Time (ns)	T-ver: 50 (@20MHz), V-ver: 62.5 (@16MHz)																	
	Multiplier	16 × 16 → 32																	
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32																	
DMA	DMAC (Channels)	2																	
Clock	Clock Generation Circuit	4 circuits (Main clock, PLL, Sub-clock and On-chip oscillator)																	
	PLL	Yes																	
	Subclock	Yes																	
	On-Chip Oscillator	1MHz/2MHz/16MHz																	
	Oscillation Stop Detection	Yes																	
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)																	
Power Supply Voltage Detection	Power Save	Normal operating mode, Wait mode, Stop mode, Low-Power Consumption mode																	
Power Supply Voltage Detection	Low Voltage Detection/LVD	—																	
A/D Converter	Resolution × Channels	10-bit × 12						10-bit × 27		10-bit × 16		10-bit × 27				10-bit × 16			
D/A Converter	Sample and Hold	Yes																	
	Resolution × Channels	—																	
Timer	16-bit	Timer A × 5, Timer B × 3																	
	Input Capture	—						8 (Timer S)											
	Output Compare	—						8 (Timer S)											
	PWM Output	5 (Timer A) + 8 (Timer S)																	
	Event Counter	8 (Timer A, Timer B)																	
	2-Phase Encoder Input	Event counter two-phase pulse signal processing × 3 (Timer A, Timer A3, Timer A4)																	
	3-Phase Inverter Control	Three-Phase Motor Control Timer × 1 (Timer A4, Timer A1, Timer A2, Timer B2, Dead Time Timer)																	
Watchdog Timer		Yes																	
Serial Interface	Clock Sync./ Clock Async.	3 (UART0 to UART2)																	
	Clock Sync. Only	—						2 (SI/O3, SI/O4)		1 (SI/O3)		2 (SI/O3, SI/O4)				1 (SI/O3)			
	Clock Async. Only	—																	
I ² C-bus		1 (UART2)						2 (Multimaster I ² C-bus interface, UART2)											
IEBus		1 (UART2)																	
Smart Card/SIM		1 (UART2)																	
SSU/Special Serial I/O		1 (UART2)																	
CAN	Channels	—										1 (CAN2.0B)							
	Buffers	—										16 (transmit / receive buffers)							
CRC Calculation Circuit		1 (Based on CRC-CCITT and CRC-16)																	
I/O Ports	Input Only (Numbers)	—																	
	CMOS I/O Only (Numbers)	39						71		55		71				55			
	N-Channel Open Drain Port (Numbers)	—																	
	Pull-Up Resistor	Yes																	
Interrupts(Sources)	External	8																	
Debugging Function	On-Chip Debug	Yes																	
	On-Board Flash Program	Yes																	
Other Functions	ROM Correction Function	Address agreement × 2																	
Package		48-pin LQFP						80-pin LQFP		64-pin LQFP		80-pin LQFP				64-pin LQFP			
Operating Frequency/Supply Voltage		T-ver:20MHz/3.0 to 5.5V, V-ver:16MHz/4.2 to 5.5V																	
Operating Ambient Temperature (°C)		T-ver:-40 to 85, V-ver:-40 to 125																	

* F: flash memory version

★★ : Under development

• Memory Capacity (ROM/RAM) (M16C/Tiny Series)

80-pin 80 64-pin 64 48-pin 48

⬡ The F in M3xxxxF_x indicates the flash memory version.

* The notation "+4K" refers to data flash memory.

Package			Lead Pitch (mm)
48-pin	GP	48-pin LQFP (PLQP0048KB-A(48P6Q-A))	0.5
64-pin	HP	64-pin LQFP (PLQP0064KB-A(64P6Q-A))	0.5
80-pin	HP	80-pin LQFP (PLQP0080KB-A(80P6Q-A))	0.5

★★ : Under development

* It is an old package code inside ()

• Specifications (M16C/10 Series)

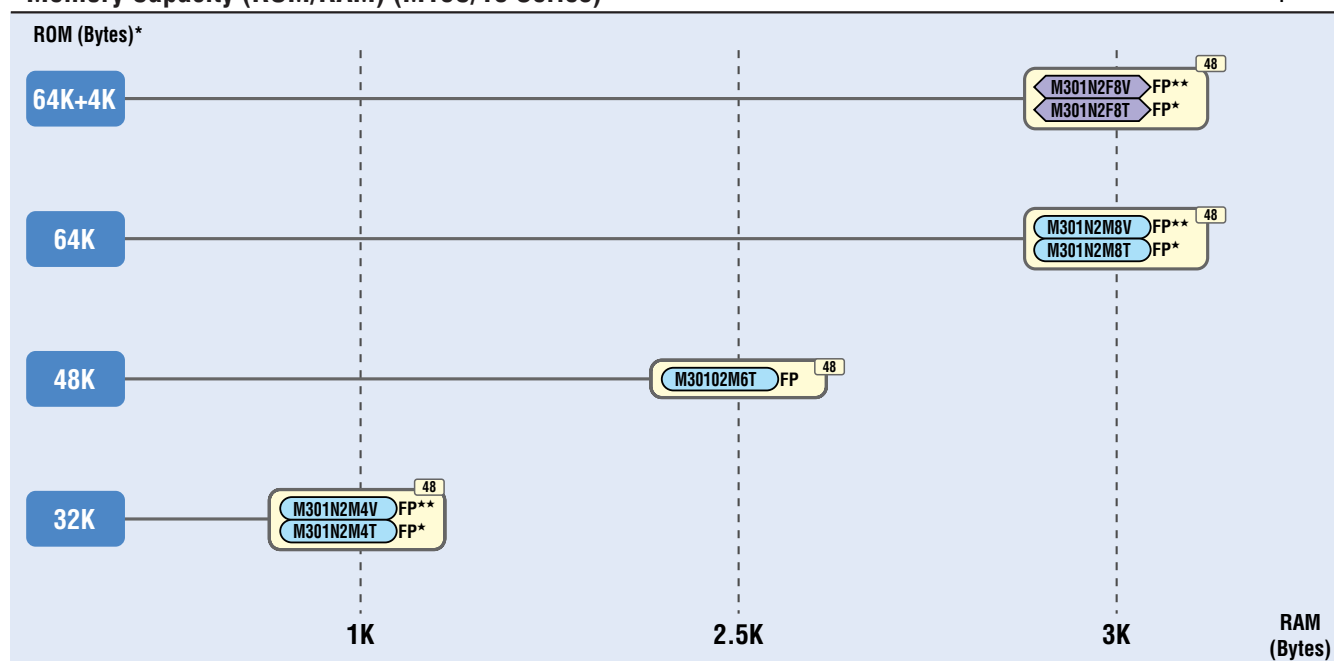
Group		M16C/1N*					
Type No.		M301N2M4T-XXXFP*	M301N2M4V-XXXFP**	M301N2M8T-XXXFP*	M301N1M8V-XXXFP**	M301N2F8TFP*	M301N2F8VFP**
Memory	ROM(Bytes)	32K		64K		64K + 4K	
	RAM(Bytes)	1K		3K			
	ROM Type*	M				F	
	Data Flash	—				Block A, Block B	
	Program Security	ID code check function, ROM code protecting function (Only Flash memory version)					—
CPU	CPU	M16C/60 Core					
	Basic Instructions	91					
	Minimum Instruction Execution Time (ns)	100 (@10MHz)	62.5 (@16MHz)				
	Multiplier	16 × 16 → 32					
DMA	Multiply-Accumulate Instruction	16 × 16 + 32 → 32					
	DMAC (Channels)	—					
Clock	Clock Generation Circuit	3 circuits (Main clock, Sub-clock and On-chip oscillator)					
	PLL	—					
	Subclock	Yes					
	On-Chip Oscillator	Yes					
	Oscillation Stop Detection	Yes					
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)					
	Power Save	Normal operating mode, Wait mode, Stop mode, Low-Power Consumption mode					
Power Supply Voltage Detection	Low Voltage Detection/LVD	—					
A/D Converter	Resolution × Channels	10-bit × 14					
	Sample and Hold	Yes					
D/A Converter	Resolution × Channels	8-bit × 1					
Timer	8-bit	4 (Timer 1, Timer X, Timer Y, Timer Z)					
	16-bit	1 (Timer C)					
	Input Capture	—					
	Output Compare	—					
	PWM Output	Timer Y, Timer Z					
	Event Counter	Timer X					
	2-Phase Encoder Input	—					
	3-Phase Inverter Control	—					
Watchdog Timer		Yes					
Serial Interface	Clock Sync./ Clock Async.	2 (UART0, UART1)					
	Clock Sync. Only	—					
	Clock Async. Only	—					
I ² C-bus		—					
IEBus		—					
Smart Card/SIM		—					
SSU/Special Serial I/O		—					
CAN	Channels	1 (CAN2.0B)					
	Buffers	16 (transmit / receive buffers)					
CRC Calculation Circuit		—					
I/O Ports	Input Only (Numbers)	—					
	CMOS I/O Only (Numbers)	37					
	N-Channel Open Drain Port (Numbers)	—					
	Pull-Up Resistor	Yes					
Interrupts(Sources)	External	8					
Debugging Function	On-Chip Debug	Yes					
	On-Board Flash Program	Yes					
Other Functions	ROM Correction Function	Address agreement × 2					
	Others	—					
Package		48-pin LQFP					
Operating Frequency/Supply Voltage		16MHz/4.2 to 5.5V					
Operating Ambient Temperature (°C)		T-ver:-40 to 85, V-ver:-40 to 125					

* M: mask ROM version, F: flash memory version

★ : New product ★★ : Under development

• Memory Capacity (ROM/RAM) (M16C/10 Series)

48-pin 48



The M in M3xxxxMx indicates the mask ROM version.
 The F in M3xxxxFx indicates the flash memory version.

* The notation "+4K" refers to data flash memory.

Package		Lead Pitch (mm)
48-pin FP	48-pin LQFP (PLQP0048KB-A(48P6Q-A))	0.5

★ : New product ★★ : Under development

* It is an old package code inside ()

• Specifications (R8C/Tiny Series)

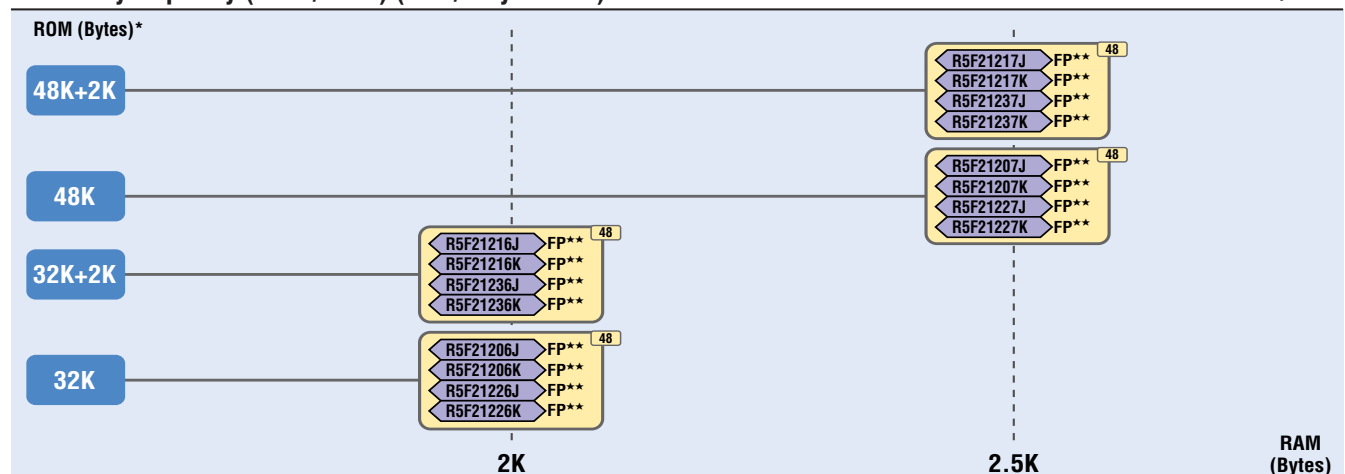
Group		R8C/20**				R8C/21**				R8C/22**				R8C/23**			
Type No.		R5F21206JFP**	R5F21206KFP**	R5F21207JFP**	R5F21207KFP**	R5F21216JFP**	R5F21216KFP**	R5F21217JFP**	R5F21217KFP**	R5F21226JFP**	R5F21226KFP**	R5F21227JFP**	R5F21227KFP**	R5F21236JFP**	R5F21236KFP**	R5F21237JFP**	R5F21237KFP**
Memory	ROM(Bytes)	32K		48K		32K + 2K		48K + 2K		32K		48K		32K + 2K		48K + 2K	
	RAM(Bytes)	2K		2.5K		2K		2.5K		2K		2.5K		2K		2.5K	
	ROM Type*	F															
	Data Flash	—				Block A, Block B				—				Block A, Block B			
CPU	Program Security	ID code check function, ROM code protecting function															
	CPU	R8C Core															
	Basic Instructions	89															
	Minimum Instruction Execution Time (ns)	J-ver:50 (@20MHz), K-ver:62.5 (@16MHz)															
	Multiplier	16 × 16 → 32															
DMA	Multiply-Accumulate Instruction	16 × 16 + 32 → 32															
	DMAC (Channels)	—															
Clock	Clock Generation Circuit	2 circuits (XIN clock, On-chip oscillator)															
	PLL	—															
	Subclock	—															
	On-Chip Oscillator	Low-speed, High-speed															
	Oscillation Stop Detection	Yes															
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)															
Power Supply Voltage Detection	Power Save	Normal operating mode, Wait mode, Stop mode															
A/D Converter	Low Voltage Detection/LVD	Voltage detection 2															
	Resolution × Channels	10-bit × 12															
D/A Converter	Sample and Hold	Yes															
	Resolution × Channels	—															
Timer	8-bit	Timer RA × 1, Timer RB × 1, Timer RE × 1															
	16-bit	Timer RD × 1 (on-chip 16-bit timer × 2)															
	Input Capture	2 (Timer RD)															
	Output Compare	3 (Timer RD, RE)															
	PWM Output	2 (Timer RB, RD)															
	Event Counter	1 (Timer RA)															
	2-Phase Encoder Input	—															
	3-Phase Inverter Control	1 (With Timer RD)															
Watchdog Timer		Yes															
Serial Interface	Clock Sync./ Clock Async.	UART0 × 1															
	Clock Async. Only	UART1 × 1															
I ² C-bus		IIC × 1 (shared with SSU)															
IEBus		—															
Smart Card/SIM		—															
SSU/Special Serial I/O		SSU × 1 (shared with IIC)															
CAN	Channels	—								1 (CAN2.0B)							
	Buffers	—								16 (transmit / receive buffers)							
CRC Calculation Circuit		—															
I/O Ports	Input Only (Numbers)	3															
	CMOS I/O Only (Numbers)	41															
	N-Channel Open Drain Port (Numbers)	—															
	Pull-Up Resistor	Yes															
Interrupts(Sources)	External	5 (8 levels)								6 (9 levels)							
Debugging Function	On-Chip Debug	Yes															
	On-Board Flash Program	Yes															
Other Functions	ROM Correction Function	Address agreement × 2															
	Others	—															
Package		48-pin LQFP															
Operating Frequency/Supply Voltage		J-ver:20MHz/3.0 to 5.5V, K-ver:16MHz/3.0 to 5.5V															
Operating Ambient Temperature (°C)		J-ver:-40 to 85, K-ver:-40 to 125															

* F: flash memory version

★★ : Under development

- **Memory Capacity (ROM/RAM) (R8C/Tiny Series)**

48-pin 48



 The F in M3xxxxFx indicates the flash memory version.

* "+2K" "+4K" refers to data flash memory

Package			Lead Pitch (mm)
48-pin	FP	48-pin LQFP (PLQP0048KB-A/48P6Q-A)	0.5

★★ : Under development

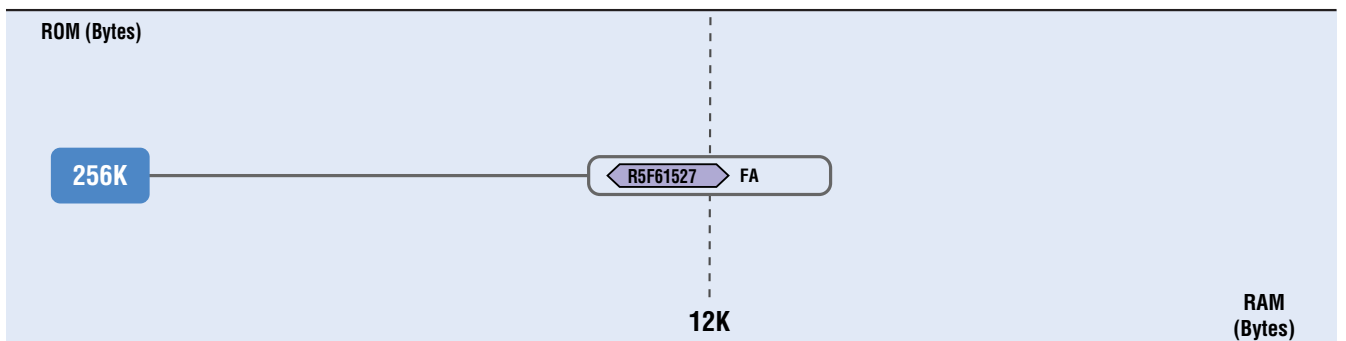
* It is an old package code inside ()

• Specifications (H8SX/1500 Series)

Group		H8SX/1520
Product No.		H8SX/1527
Type No.		R5F61527FP
Memory	ROM(Bytes)	256K
	RAM(Bytes)	12K
	ROM Type*	F
	Cache Memory	—
	Program Security	Yes
CPU	CPU	H8SX Core
	Basic Instructions	87
	Minimum Instruction Execution Time (ns)	25 (@40MHz)
	Multiplier	16 × 16 → 32
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32
DMA	DMAC (Channels)	4
	DTC/DMAC II	—
External Bus Expansion	Address Space (Bytes)	16M
	Bus State Controller	—
	Bus Structure	—
	Endian Conversion	—
Clock	Clock Generation Circuit	1 circuit (Main clock)
	PLL	Yes
	Frequency Divider	1/n (n = 1, 2, 4, 8)
	Power Save	Sleep mode, Every Module clock, Stop mode, Software standby mode
A/D Converter	Resolution × Channels	10-bit × 16
	Sample and Hold	Yes
	Multi-Channel Sample and Hold	Yes
D/A Converter	Resolution × Channels	—
Timer	8-bit	—
	16-bit	12 (TPU)
	32-bit	2 (TPU)
	Prescaler	Yes
	Input Capture	12 (TPU)
	Output Compare	12 (TPU)
	PWM Output	12 (TPU)
	Programmable Pulse Generator	PPG + TPU
	Event Counter	Yes
	2-Phase Encoder Input	Yes
Watchdog Timer		Yes
Serial Interface	Clock Sync./ Clock Async.	2
	Clock Sync. Only	—
	Clock Async. Only	—
I ² C-bus		—
Smart Card/SIM		2
SSU/Special Serial I/O		3
CAN	Channels	1
	Buffers	16
USB Function		—
IrDA		—
I/O Ports	CMOS Output Only (Numbers)	17
	CMOS I/O Only (Numbers)	65
	N-Channel Open Drain Port (Numbers)	15
	Pull-Up Resistor	32
Interrupts(Sources)	External	16
Debugging Function	On-Chip Debug	Yes
	On-Board Flash Program	Yes
Package		FP-100M
Operating Frequency/Supply Voltage		40MHz/4.5 to 5.5V
Operating Ambient Temperature (°C)		-40 to 85

* F: F-ZTAT version

• Memory Capacity (ROM/RAM) (H8SX/1500 Series)



Indicates the flash memory version.

Package	
FA	QFP (PRQP0100KB-A(FP-100M))

* It is an old package code inside ()

• Specifications (H8S/2600 Series)

Group		H8S/2612				H8S/2615		H8S/2628			H8S/2630						
Product No.		H8S/2611	H8S/2612	H8S/2612F	H8S/2614	H8S/2616	H8S/2615	H8S/2615F	H8S/2627	H8S/2628	H8S/2628F	H8S/2630	H8S/2630U	H8S/2630W	H8S/2630F	H8S/2630UF	H8S/2630WF
Type No.		HD6432611xxxFA	HD6432612xxxFA	HD64F2612FA	HD6432614xxxFA	HD6432616xxxFA	HD6432615xxxFA	HD64F2615FA	HD6432627xxxF	HD6432628xxxF	HD64F2628F	HD6432630xxxF	HD6432630UxxxF	HD6432630WxxxF	HD64F2630F	HD64F2630UF	HD64F2630WF
Memory	ROM(Bytes)	64K	128K	64K		128K	64K		96K	128K	384K						
	RAM(Bytes)	4K						6K		8K	16K						
CPU	ROM Type*	M	F	M				F		M	F	M		F			
	Program Security	Yes															
	CPU	H8S/2600 Core															
	Basic Instructions	69															
	Minimum Instruction Execution Time (ns)	50 (@20MHz)				41.7 (@24MHz)								50 (@20MHz)			
	Multiplier	16 × 16 → 32															
DMA	Multiply-Accumulate Instruction	16 × 16 + 42 → 42															
	DMAC (Channels)	—															
	EXDMAC	—															
External Bus Expansion	DTC/DMAC II	DTC		—						DTC							
	Address Space (Bytes)							16M									
	Bus State Controller	—										Direct connection to SRAM and ROM is supported					
	Bus Structure	—										Separate bus (8/16-bit)					
	SDRAM Controller	—															
	DRAM Controller	—															
Clock	Host Interface	—															
	Clock Generation Circuit	1 circuit (Main clock)		2 circuits (Main clock, Sub-clock)						1 circuit (Main clock)		2 circuits (Main clock, Sub-clock)					
	PLL	Yes (×1, ×2, ×4)															
	Subclock	—		Yes (128 divided frequency)						—		Yes		—		Yes	
	RTC	—		Yes (WDT for watch)						—		Yes (WDT for watch)		—		Yes (WDT for watch)	
	Frequency Divider	1/n (n=1, 2, 4, 8, 16, 32)		1/n (n=1, 2, 4, 8, 16, 32, 128)								1/n (n=1, 2, 4, 8, 16, 32)					
	Power Save	Normal operating mode, Medium-Speed mode, Sleep mode, Module stop mode, Software standby mode, Hardware standby mode		Normal operating mode, Medium-Speed mode, Sleep mode, Module stop mode, Watch mode, Sub active mode, Sub sleep mode, Software standby mode, Hardware standby mode						Normal operating mode, Medium-Speed mode, Sleep mode, Module stop mode, Software standby mode, Hardware standby mode		Normal operating mode, Medium-Speed mode, Sleep mode, Module stop mode, Watch mode, Sub active mode, Sub sleep mode, Software standby mode, Hardware standby mode		Normal operating mode, Medium-Speed mode, Sleep mode, Module stop mode, Watch mode, Sub active mode, Sub sleep mode, Software standby mode, Hardware standby mode		Normal operating mode, Medium-Speed mode, Sleep mode, Module stop mode, Watch mode, Sub active mode, Sub sleep mode, Software standby mode, Hardware standby mode	
A/D Converter	Resolution × Channels	10-bit × 12				10-bit × 16		10-bit × 16		10-bit × 12							
D/A Converter	Sample and Hold	Yes															
Timer	Resolution × Channels	—				—		4 (TMR0, 1, 2, 3)		8-bit × 2							
	8-bit	—								—							
	16-bit					TPU × 6											
	32-bit					TPU × 2											
	Prescaler	—															
	Input Capture	6 (TPU)															
	Output Compare	6 (TPU)															
	PWM Output	7 (MMT, TPU)		6 (TPU)								8 (PWM timer, TPU)					
	Real-Time Port	—															
	Programmable Pulse Generator	TPU		—								TPU					
Watchdog Timer	Event Counter	—															
	2-Phase Encoder Input	7 (MMT, TPU)		6 (TPU)								8 (PWM timer, TPU)					
		Yes		Yes (×2)						Yes		Yes (×2)					
Serial Interface	Clock Sync./ Clock Async.	×3				—		×2				×3					
I ² C-bus		—															
IEBus		—															
Smart Card/SIM		1															
SSU/Special Serial I/O		—				2				—							
CAN	Channels	1				2				2							
	Buffers	16								32							
USB Function		—															
LPC/ISA		—															
IrDA		—															
LCD		—															
CRC Calculation Circuit		—															
I/O Ports	Input Only (Numbers)	22		—		18		26				23					
	CMOS Output Only (Numbers)	1		—		1		1				2					
	CMOS I/O Only (Numbers)	43		—		39		59				72					
	High Voltage Port (Numbers)	—															
	N-Channel Open Drain Port (Numbers)	20															
	DTMF	—															
	High Current Drive Port	—															
	Pull-Up Resistor	28		—		24		28				36					
NMOS Push-Pull	—																
Interrupts(Sources)	External	7															
	Boundary Scan/JTAG	—															
Debugging Function	On-Chip Debug	—															
	On-Board Flash Program	—		Yes		—		Yes		—		Yes		—		Yes	
Other Functions	ROM Correction Function	Yes (PC break)		—								Yes (PC break)					
	Others	MMT (×1)		—								10-bit PWM timer (×2)					
Package		FP-80Q				FP-100M		FP-128B									
Operating Frequency/Supply Voltage		20MHz/4.5 to 5.5V		24MHz/4.5 to 5.5V		20MHz/4.5 to 5.5V		24MHz/4.5 to 5.5V		20MHz/4.5 to 5.5V		20MHz/4.5 to 5.5V					
Operating Ambient Temperature (°C)		-40 to 85, -40 to 105, -40 to 125															

Note : The package code described is the former one. Regarding the new one, please refer to the following URL <http://www.renesas.com/en/package>

* M: mask ROM version, F: F-ZTAT version

• Specifications (H8S/2600 Series)

Group		H8S/2636			
Product No.		H8S/2636	H8S/2636U	H8S/2636F	H8S/2636UF
Type No.		HD6432636xxxF	HD6432636UxxxF	HD64F2636F	HD64F2636UF
Memory	ROM(Bytes)	128K			
	RAM(Bytes)	4K			
	ROM Type*	M			F
	Program Security	Yes			
CPU	CPU	H8S/2600 Core			
	Basic Instructions	69			
	Minimum Instruction Execution Time (ns)	50 (@ 20MHz)			
	Multiplier	16 16 →32			
	Multiply-Accumulate Instruction	16 × 16 + 42 →42			
DMA	DMAC (Channels)	—			
	EXDMAC	—			
	DTC/DMAC II	DTC			
External Bus Expansion	Address Space (Bytes)	16M			
	Bus State Controller	Direct connection to SRAM and ROM is supported			
	Bus Structure	Separate bus (8/16-bit)			
	SDRAM Controller	—			
	DRAM Controller	—			
	Host Interface	—			
	Clock Generation Circuit	2 circuits (Main clock, Sub-clock)			
Clock	PLL	Yes (×1, ×2, ×4)			
	Subclock	—	Yes	—	Yes
	RTC	—	Yes (WDT for watch)	—	Yes (WDT for watch)
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)			
	Power Save	Normal operating mode, Medium-Speed mode, Sleep mode, Module stop mode, Watch mode, Software standby mode, Hardware standby mode	Normal operating mode, Medium-Speed mode, Sleep mode, Module stop mode, Watch mode, Sub active mode, Sub sleep mode, Software standby mode, Hardware standby mode	Normal operating mode, Medium-Speed mode, Sleep mode, Module stop mode, Watch mode, Software standby mode, Hardware standby mode	Normal operating mode, Medium-Speed mode, Sleep mode, Module stop mode, Watch mode, Sub active mode, Sub sleep mode, Software standby mode, Hardware standby mode
A/D Converter	Resolution × Channels	10-bit × 12			
	Sample and Hold	Yes			
D/A Converter	Resolution × Channels	8-bit × 2			
Timer	8-bit	—			
	16-bit	TPU × 6			
	32-bit	TPU × 2			
	Prescaler	—			
	Input Capture	6 (TPU)			
	Output Compare	6 (TPU)			
	PWM Output	8 (MMT, TPU)			
	Real-Time Port	—			
	Programmable Pulse Generator	Yes			
	Event Counter	—			
	2-Phase Encoder Input	8(MMT, TPU)			
Watchdog Timer		Yes (×2)			
Serial Interface	Clock Sync./ Clock Async.	3			
I ² C-bus		—			
IEBus		—			
Smart Card/SIM		TPU			
SSU/Special Serial I/O		—			
CAN	Channels	Yes			
	Buffers	2			
USB Function		—			
LPC/ISA		—			
IrDA		—			
LCD		—			
CRC Calculation Circuit		—			
I/O Ports	Input Only (Numbers)	23			
	CMOS Output Only (Numbers)	2			
	CMOS I/O Only (Numbers)	72			
	High Voltage Port (Numbers)	—			
	N-Channel Open Drain Port (Numbers)	26			
	DTMF	—			
	High Current Drive Port	—			
	Pull-Up Resistor	36			
	NMOS Push-Pull	—			
Interrupts(Sources)	External	7			
Debugging Function	Boundary Scan/JTAG	—			
	On-Chip Debug	—			
	On-Board Flash Program	—	Yes		
Other Functions	ROM Correction Function	Yes (PC break)			
	Others	10-bit PWM timer (×2)			
Package		FP-128B			
Operating Frequency/Supply Voltage		20MHz/4.5 to 5.5V			
Operating Ambient Temperature (°C)		-40 to 85, -40 to 105			

* M: mask ROM version, F: F-ZTAT version

• Specifications (H8S/2600 Series)

Group		H8S/2638						H8S/2639				H8S/2646			
Product No.		H8S/2638	H8S/2638U	H8S/2638W	H8S/2638F	H8S/2638UF	H8S/2638WF	H8S/2639U	H8S/2639W	H8S/2639UF	H8S/2639WF	H8S/2645	H8S/2646	H8S/2646RF	
Type No.		HD6432638xxxF	HD6432638UxxxF	HD6432638WxxxF	HD64F2638F	HD64F2638UF	HD64F2638WF	HD6432639UxxxF	HD6432639WxxxF	HD64F2639UF	HD64F2639WF	HD6432645xxxFC	HD6432646xxxFC	HD64F2646RxxFC	
Memory	ROM(Bytes)	128K						256K				64K	128K		
	RAM(Bytes)	16K										2K	4K		
CPU	ROM Type*	M		F				M		F		M		F	
	Program Security	Yes													
	CPU	H8S/2600 Core													
	Basic Instructions	69													
	Minimum Instruction Execution Time (ns)	50 (@20MHz)						200 (@5MHz)				50 (@20MHz)			
DMA	Multiplier	Yes													
	Multiply-Accumulate Instruction	Yes													
	DMAC (Channels)	—													
	EXDMAC	—													
External Bus Expansion	DTC/DMAC II	DTC													
	Address Space (Bytes)	16M													
	Bus State Controller	Direct connection to SRAM and ROM is supported													
	Bus Structure	Separate bus (8/16-bit)													
	SDRAM Controller	—													
Clock	DRAM Controller	—													
	Host Interface	—													
	Clock Generation Circuit	2 circuits (Main clock, Sub-clock)													
	PLL	Yes (×1, ×2, ×4)													
Power Save	Subclock	—	Yes		—	Yes		Yes (128 divided frequency)				Yes			
	RTC	—	Yes (WDT for watch)		—			Yes (WDT for watch)							
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)						1/n (n = 1, 2, 4, 8, 16, 32, 128)				1/n (n = 1, 2, 4, 8, 16, 32)			
	Normal operating mode, Medium-Speed mode, Sleep mode, Module stop mode, Software standby mode, Hardware standby mode	Normal operating mode, Medium-Speed mode, Sleep mode, Module stop mode, Watch mode, Sub active mode, Sub sleep mode, Software standby mode, Hardware standby mode		Normal operating mode, Medium-Speed mode, Sleep mode, Module stop mode, Software standby mode, Hardware standby mode		Normal operating mode, Medium-Speed mode, Sleep mode, Module stop mode, Watch mode, Sub active mode, Sub sleep mode, Software standby mode, Hardware standby mode									
A/D Converter	Resolution × Channels	10-bit × 12													
D/A Converter	Sample and Hold	Yes													
	Resolution × Channels	8-bit × 2										—			
Timer	8-bit	—													
	16-bit	TPU × 6													
	32-bit	TPU × 2													
	Prescaler	—													
	Input Capture	6 (TPU)													
	Output Compare	6 (TPU)													
	PWM Output	8 (PWM, TPU)													
	Real-Time Port	—													
	Programmable Pulse Generator	PPG + TPU													
	Event Counter	—													
Watchdog Timer	2-Phase Encoder Input	8 (PWM, TPU)													
		Yes (×2)													
Serial Interface	Clock Sync./ Clock Async.	—	2	—	3		2	—	2	—	2	2			
I ² C-bus		—													
IEBus		—													
Smart Card/SIM		TPU													
SSU/Special Serial I/O		—													
CAN	Channels	2						—				1			
	Buffers	32										16			
USB Function		—													
LPC/ISA		—													
IrDA		—													
LCD		—										Yes (24seg × 4com)			
CRC Calculation Circuit		—													
I/O Ports	Input Only (Numbers)	23										28			
	CMOS Output Only (Numbers)	2										1			
	CMOS I/O Only (Numbers)	72										92			
	High Voltage Port (Numbers)	—										48			
	N-Channel Open Drain Port (Numbers)	26	24	26	24	26	24	26	24	26	24	26	24	32	
	DTMF	—													
	High Current Drive Port	—										LED drive port × 32			
	Pull-Up Resistor	36										40			
Interrupts(Sources)	NMOS Push-Pull	—	2	—	2		2	—	2	—	2	—			
	External	7													
Debugging Function	Boundary Scan/JTAG	—													
	On-Chip Debug	—													
	On-Board Flash Program	—		Yes				Yes		—		Yes			
Other Functions	ROM Correction Function	Yes (PC break)													
	Others	10-bit PWM timer (×2)													
Package		FP-128B											FP-144J:Flash, FP-144G:Mask		
Operating Frequency/Supply Voltage		20MHz/4.5 to 5.5V						5MHz (20MHz:PLL) /4.5 to 5.5V				20MHz/4.5 to 5.5V			
Operating Ambient Temperature (°C)		-40 to 85, -40 to 105													

* M: mask ROM version, F: F-ZTAT version

• Specifications (H8S/2600 Series)

Group		H8S/2648			H8S/2649*	
Product No.		H8S/2647	H8S/2648	H8S/2648RF	H8S/2649	H8S/2649F
Type No.		HD6432647xxxFC	HD6432648xxxFC	HD64F2648RFC	HD6432649xxxFC	HD64F2649FC
Memory	ROM(Bytes)	64K		128K		256K
	RAM(Bytes)	2K		4K		8K
	ROM Type*		M		M	F
	Program Security			Yes		
CPU	CPU			H8S/2600 Core		
	Basic Instructions			69		
	Minimum Instruction Execution Time (ns)			50 (@20MHz)		
	Multiplier			16 × 16 → 32		
	Multiply-Accumulate Instruction			16 × 16 + 42 → 42		
DMA	DMAC (Channels)			—		
	EXDMAC			—		
	DTC/DMAC II			DTC		
External Bus Expansion	Address Space (Bytes)			16M		
	Bus State Controller			Direct connection to SRAM and ROM is supported		
	Bus Structure			Separate bus (8/16-bit)		
	SDRAM Controller			—		
	DRAM Controller			—		
Clock	Host Interface			—		
	Clock Generation Circuit			2 circuits (Main clock, Sub-clock)		
	PLL			Yes (×1, ×2, ×4)		
	Subclock			Yes		
	RTC			Yes (WDT for watch)		
	Frequency Divider			1/n (n = 1, 2, 4, 8, 16, 32)		
	Power Save			Normal operating mode, Medium-Speed mode, Sleep mode, Module stop mode, Watch mode, Sub active mode, Sub sleep mode, Software standby mode, Hardware standby mode		
A/D Converter	Resolution × Channels		10-bit × 12		10-bit × 16	
D/A Converter	Sample and Hold			Yes		
	Resolution × Channels			—		
Timer	8-bit			—		
	16-bit			TPU × 6		
	32-bit			TPU × 2		
	Prescaler			—		
	Input Capture			6 (TPU)		
	Output Compare			6 (TPU)		
	PWM Output			8 (PWM timer, TPU)		
	Real-Time Port			—		
	Programmable Pulse Generator			TPU		
	Event Counter			—		
Watchdog Timer	2-Phase Encoder Input			8 (PWM timer, TPU)		
				Yes (×2)		
Serial Interface	Clock Sync./ Clock Async.		3		4	
I ² C-bus				—		
IEBus				—		
Smart Card/SIM				TPU		
SSU/Special Serial I/O				—		
CAN	Channels			2		
	Buffers			32		
USB Function				—		
LPC/ISA				—		
IrDA				—		
LCD				Yes (40seg × 4com)		
CRC Calculation Circuit				—		
I/O Ports	Input Only (Numbers)			28		
	CMOS Output Only (Numbers)			1		
	CMOS I/O Only (Numbers)		92		97	
	High Voltage Port (Numbers)			48		
	N-Channel Open Drain Port (Numbers)			32		
	DTMF			—		
	High Current Drive Port			LED drive port × 32		
	Pull-Up Resistor			40		
	NMOS Push-Pull			—		
	Others			—		
Interrupts(Sources)	External			7		
Debugging Function	Boundary Scan/JTAG			—		
	On-Chip Debug			—		
	On-Board Flash Program	—		Yes	—	Yes
Other Functions	ROM Correction Function			Yes (PC break)		
	Others			10-bit PWM timer (×2)		
Package		FP-144J:Flash, FP-144G:Mask			FP-144G	
Operating Frequency/Supply Voltage		20MHz/4.5 to 5.5V				
Operating Ambient Temperature (°C)		-40 to 85, -40 to 105				

* M: mask ROM version, F: F-ZTAT version

★ : New product

• Specifications (H8S/2500 Series)

Group		H8S/2506				H8S/2552				H8S/2556	
Product No.		H8S/2505F		H8S/2506F		H8S/2551F		H8S/2552F		H8S/2556F	
Type No.		HD64F2505FC	HD64F2505BR	HD64F2506FC	HD64F2506BR	HD64F2551FC	HD64F2551BR	HD64F2552FC	HD64F2552BR	HD64F2556FC	
Memory	ROM(Bytes)	384K		512K		384K				512K	
	RAM(Bytes)	32K				24K				32K	
	ROM Type*							F			
	Program Security							Yes			
CPU	CPU					H8S/2000 Core					
	Basic Instructions					65					
	Minimum Instruction Execution Time (ns)	38 (@26MHz)								50(@20MHz)	
	Multiplier							—			
DMA	Multiply-Accumulate Instruction							—			
	DMAC (Channels)							—			
	EXDMAC							—			
	DTC/DMAC II							DTC			
External Bus Expansion	Address Space (Bytes)							16M			
	Bus State Controller					Direct connection to SRAM and ROM is supported					
	Bus Structure					Separate bus (8/16-bit)					
	SDRAM Controller							—			
	DRAM Controller							—			
Clock	Host Interface							—			
	Clock Generation Circuit					2 circuits (Main clock, Sub-clock)					
	PLL					Yes (×1, ×2)					
	Subclock					Yes					
	RTC					Yes (WDT for watch)					
	Frequency Divider					1/n (n = 1, 2, 4, 8, 16, 32)					
	Power Save	Normal operating mode, Medium-Speed mode, Sleep mode, Module stop mode, Watch mode, Software standby mode, Hardware standby mode									
A/D Converter	Resolution × Channels					10-bit × 16					
D/A Converter	Sample and Hold					Yes					
	Resolution × Channels					8-bit × 2					
Timer	8-bit					TMR × 4					
	16-bit					TPU × 6					
	32-bit					TPU × 2					
	Prescaler					—					
	Input Capture					6 (TPU)					
	Output Compare					6 (TPU)					
	PWM Output					6 (TPU)					
	Real-Time Port					—					
	Programmable Pulse Generator					—					
	Event Counter					—					
Watchdog Timer	2-Phase Encoder Input					6 (TPU)					
						Yes (×2)					
Serial Interface	Clock Sync./ Clock Async.					5					
I ² C-bus						2					
IEBus		—				Yes				—	
Smart Card/SIM						1					
SSU/Special Serial I/O						—					
CAN	Channels					—				1	
	Buffers					—				16	
USB Function						—					
LPC/ISA						—					
IrDA						—					
LCD						—					
CRC Calculation Circuit						—					
I/O Ports	Input Only (Numbers)					16				17	
	CMOS Output Only (Numbers)					—				1	
	CMOS I/O Only (Numbers)					104				102	
	High Voltage Port (Numbers)					—					
	N-Channel Open Drain Port (Numbers)					10					
	DTMF					—					
	High Current Drive Port					—					
	Pull-Up Resistor					40					
Interrupts(Sources)	NMOS Push-Pull					2					
	External					9					
	Boundary Scan/JTAG					—					
Debugging Function	On-Chip Debug					—					
	On-Board Flash Program					Yes					
Other Functions	ROM Correction Function					Yes (PC break)					
Package						FP-144J, BP-176V				FP-144J	
Operating Frequency/Supply Voltage						26MHz/3.0 to 5.5V				20MHz/3.0 to 5.5V	
Operating Ambient Temperature (°C)		-20 to 75, -40 to 85								-40 to 85	

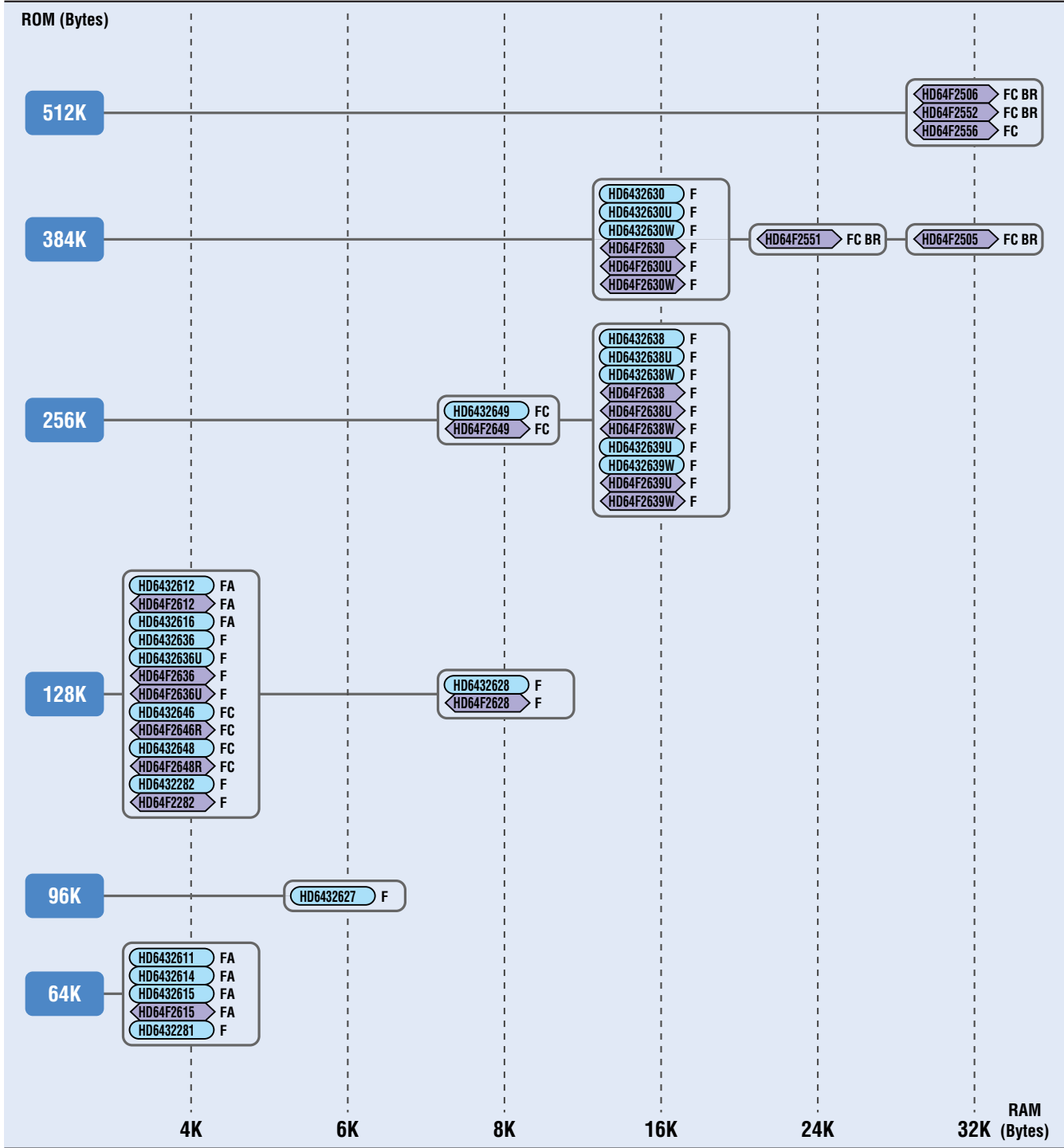
* F: F-ZTAT version

• Specifications (H8S/2200 Series)

Group		H8S/2282		
Product No.		H8S/2281	H8S/2282	H8S/2282F
Type No.		HD6432281xxxF	HD6432282xxxF	HD64F2282F
Memory	ROM(Bytes)	64K	128K	
	RAM(Bytes)		4K	
	ROM Type*	M		F
	Program Security		Yes	
CPU	CPU		H8S/2000 Core	
	Basic Instructions		65	
	Minimum Instruction Execution Time (ns)		50 (@20MHz)	
	Multiplier		—	
DMA	Multiply-Accumulate Instruction		—	
	DMAC (Channels)		—	
	EXDMAC		—	
	DTC/DMAC II		—	
External Bus Expansion	Address Space (Bytes)		16M	
	Bus State Controller		—	
	Bus Structure		—	
	SDRAM Controller		—	
	DRAM Controller		—	
Clock	Host Interface		—	
	Clock Generation Circuit		2 circuits (Main clock, Sub-clock)	
	PLL		Yes (×1, ×2, ×4)	
	Subclock		Yes (128 divided frequency)	
	RTC		Yes (WDT for watch)	
	Frequency Divider		1/n (n = 1, 2, 4, 8, 16, 32, 128)	
Power Save		Normal operating mode, Medium-Speed mode, Sleep mode, Module stop mode, Watch mode, Sub active mode, Sub sleep mode, Software standby mode, Hardware standby mode		
A/D Converter	Resolution × Channels		10-bit × 8	
	Sample and Hold		Yes	
D/A Converter	Resolution × Channels		—	
Timer	8-bit		—	
	16-bit		TPU × 3	
	32-bit		TPU × 2	
	Prescaler		—	
	Input Capture		3 (TPU)	
	Output Compare		3 (TPU)	
	PWM Output		5 (PWM timer, TPU)	
	Real-Time Port		—	
	Programmable Pulse Generator		—	
	Event Counter		—	
	2-Phase Encoder Input		5 (PWM timer, TPU)	
Watchdog Timer			Yes (×2)	
Serial Interface Clock Sync./ Clock Async.			2	
I ² C-bus			—	
IEBus			—	
Smart Card/SIM			—	
SSU/Special Serial I/O			—	
CAN	Channels		1	
	Buffers		16	
USB Function			—	
LPC/ISA			—	
IrDA			—	
LCD			Yes (28seg × 4com)	
CRC Calculation Circuit			—	
I/O Ports	Input Only (Numbers)		17	
	CMOS Output Only (Numbers)		1	
	CMOS I/O Only (Numbers)		64	
	High Voltage Port (Numbers)		—	
	I ² -Channel Open Drain Port (Numbers)		—	
	DTMF		—	
	High Current Drive Port		—	
	Pull-Up Resistor		—	
	NMOS Push-Pull		30	
Interrupts(Sources)	External		7	
	Boundary Scan/JTAG		—	
Debugging Function	On-Chip Debug		—	
	On-Board Flash Program	—		Yes
Other Functions	ROM Correction Function		—	
	Others		10-bit PWM timer (×2)	
Package			FP-100A	
Operating Frequency/Supply Voltage			20MHz/4.5 to 5.5V	
Operating Ambient Temperature (°C)			-40 to 85	

* F: F-ZTAT version, M: mask ROM version

• Memory Capacity (ROM/RAM) (H8S/2600, H8S/2500, H8S/2200 Series)



Package	
F	QFP (PRQP0128KB-A(FP-128B), PRQP0100KB+A(FP-100M))
FA	QFP (PRQP0080JD-A(FP-80Q))
FC	QFP (PRQP0144KB-A(FP-144J), PRQP0144KA-A(FP-144G))
BR	BGA (BP-176V)

* It is an old package code inside ()

• Specifications (H8/300H Tiny Series)

Group		H8/36014															
Product No.		H8/36010				H8/36011				H8/36012				H8/36012F			
Type No.		HD64336010GxxxFP	HD64336010GxxxFY	HD64336010xxxFP	HD64336010xxxFY	HD64336011GxxxFP	HD64336011GxxxFY	HD64336011xxxFP	HD64336011xxxFY	HD64336012GxxxFP	HD64336012GxxxFY	HD64336012xxxFP	HD64336012xxxFY	HD64F36012GFP	HD64F36012GFY	HD64F36012FP	HD64F36012FY
Memory	ROM(Bytes)	8K				12K				16K							
	RAM(Bytes)					512				2K							
	EEPROM(Bytes)									—							
	ROM Type*					M				F							
CPU	Program Security									—							
	CPU	H8/300H Core															
	Basic Instructions	62															
Clock	Minimum Instruction Execution Time (ns)	100 (@ 20MHz)															
	Clock Generation Circuit	1 circuit (System clock circuit)															
	PLL	—															
	Subclock	—															
	On-Chip Oscillator	—															
	Oscillation Stop Detection	—															
	Frequency Divider	1/n (n = 1, 8, 16, 32, 64)															
Power Supply	Power Save	Support 3 power save modes and module standby function, system clock divider.															
	Power-On Reset/POR	Standby mode, Sleep mode, Sub sleep mode															
Voltage Detection	Low Voltage Detection/LVD	Yes (option)															
	Resolution x Channels	Yes (option)															
A/D Converter	Resolution x Channels	10-bit x 4															
	Sample and Hold	Yes															
Timer	8-bit	Timer V x 1															
	16-bit	Timer W x 1															
	Prescaler	Timer V, Timer W															
	Input Capture	Timer W															
	Output Compare	Timer V, Timer W															
	PWM Output	Timer V, Timer W															
	Event Counter	—															
3-Phase Inverter Control	—																
Watchdog Timer		Yes (selectable internal oscillator)															
Serial Interface	Clock Sync./ Clock Async.	2															
I ² C-bus		—															
SSU/Special Serial I/O		—															
CAN	Channels	—															
	Buffers	—															
I/O Ports	Input Only (Numbers)	4															
	CMOS I/O Only (Numbers)	30															
	High Current Drive Port	5															
	Pull-Up Resistor	13															
	NMOS Push-Pull	—															
Interrupts(Sources)	External	9															
Debugging Function	On-Chip Debug	Yes															
	On-Board Flash Program	Yes															
Other Functions	ROM Correction Function	Yes															
Package		FP-48B, FP-64K															
Operating Frequency/Supply Voltage		1 to 20MHz/4.0 to 5.5V															
Operating Ambient Temperature (°C)		-40 to 85, -40 to 105															

* M: mask ROM version, F: F-ZTAT version

• Specifications (H8/300H Tiny Series)

Group		H8/36014											
Product No.		H8/36013				H8/36014				H8/36014F			
Type No.		HD6436013GxxxFP	HD6436013GxxxFY	HD6436013xxxFP	HD6436013xxxFY	HD6436014GxxxFP	HD6436014GxxxFY	HD6436014xxxFP	HD6436014xxxFY	HD64F36014GFP	HD64F36014GFY	HD64F36014FP	HD64F36014FY
Memory	ROM(Bytes)	24K				32K				2K			
	RAM(Bytes)	1K											
	EEPROM(Bytes)					—							
	ROM Type*	M								F			
	Program Security					—							
CPU	CPU	H8/300H Core											
	Basic Instructions	62											
	Minimum Instruction Execution Time (ns)	100 (@20MHz)											
Clock	Clock Generation Circuit	1 circuit (System clock circuit)											
	PLL	—											
	Subclock	—											
	On-Chip Oscillator	—											
	Oscillation Stop Detection	—											
	Frequency Divider	1/n (n = 1, 8, 16, 32, 64)											
	Power Save	Support 3 power save modes and module standby function, system clock divider. Standby mode, Sleep mode, Sub sleep mode											
Power Supply	Power-On Reset/POR	Yes (option)											
Voltage Detection	Low Voltage Detection/LVD	Yes (option)											
A/D Converter	Resolution × Channels	10-bit × 4											
	Sample and Hold	Yes											
Timer	8-bit	Timer V × 1											
	16-bit	Timer W × 1											
	Prescaler	Timer V, Timer W											
	Input Capture	Timer W											
	Output Compare	Timer V, Timer W											
	PWM Output	Timer V, Timer W											
	Event Counter	—											
	3-Phase Inverter Control	—											
Watchdog Timer		Yes (selectable internal oscillator)											
Serial Interface	Clock Sync./ Clock Async.	2											
I ² C-bus		—											
SSU/Special Serial I/O		—											
CAN	Channels	—											
	Buffers	—											
I/O Ports	Input Only (Numbers)	4											
	CMOS I/O Only (Numbers)	30											
	High Current Drive Port	5											
	Pull-Up Resistor	13											
	NMOS Push-Pull	—											
Interrupts(Sources)	External	9											
Debugging Function	On-Chip Debug	Yes											
	On-Board Flash Program	Yes											
Other Functions	ROM Correction Function	Yes											
Package		FP-48B, FP-64K											
Operating Frequency/Supply Voltage		1 to 20MHz/4.0 to 5.5V											
Operating Ambient Temperature (°C)		-40 to 85, -40 to 105											

* M: mask ROM version, F: F-ZTAT version

• Specifications (H8/300H Tiny Series)

Group		H8/36024																			
Product No.		H8/36022				H8/36022F				H8/36023				H8/36024				H8/36024F			
Type No.		HD6436022GxxxFP	HD6436022GxxxFY	HD6436022xxxFP	HD6436022xxxFY	HD64F36022GxxxFP	HD64F36022GxxxFY	HD64F36022xxxFP	HD64F36022xxxFY	HD6436023GxxxFP	HD6436023GxxxFY	HD6436023xxxFP	HD6436023xxxFY	HD6436024GxxxFP	HD6436024GxxxFY	HD6436024xxxFP	HD6436024xxxFY	HD64F36024GFP	HD64F36024GFY	HD64F36024FP	HD64F36024FY
Memory	ROM(Bytes)	16K								24K				32K							
	RAM(Bytes)	512				2K				1K				2K							
	EEPROM(Bytes)									—											
	ROM Type*	M				F				M				F							
CPU	Program Security	—																			
	CPU	H8/300H Core																			
	Basic Instructions	62																			
Clock	Minimum Instruction Execution Time (ns)	100 (@ 20MHz)																			
	Clock Generation Circuit	1 circuit (System clock circuit)																			
	PLL	—																			
	Subclock	—																			
	On-Chip Oscillator	—																			
	Oscillation Stop Detection	—																			
	Frequency Divider	1/n (n = 1, 8, 16, 32, 64)																			
Power Supply	Power Save	Support 3 power save modes and module standby function, system clock divider.																			
	Power-On Reset/POR	Standby mode, Sleep mode, Sub sleep mode																			
Voltage Detection	Low Voltage Detection/LVD	Yes (option)																			
	Resolution x Channels	10-bit x 4																			
A/D Converter	Sample and Hold	Yes																			
	8-bit	Timer V x 1																			
	16-bit	Timer W x 1																			
	Prescaler	Timer V, Timer W																			
	Input Capture	Timer W																			
	Output Compare	Timer V, Timer W																			
	PWM Output	Timer V, Timer W																			
	Event Counter	—																			
Timer	3-Phase Inverter Control	—																			
	Watchdog Timer	Yes (selectable internal oscillator)																			
Serial Interface	Clock Sync./ Clock Async.	3																			
I ² C-bus		—																			
SSU/Special Serial I/O		—																			
CAN	Channels	—																			
	Buffers	—																			
I/O Ports	Input Only (Numbers)	4																			
	CMOS I/O Only (Numbers)	30																			
	High Current Drive Port	5																			
	Pull-Up Resistor	13																			
	NMOS Push-Pull	—																			
Interrupts(Sources)	External	9																			
Debugging Function	On-Chip Debug	Yes																			
	On-Board Flash Program	Yes																			
Other Functions	ROM Correction Function	Yes																			
Package		FP-48B, FP-64K																			
Operating Frequency/Supply Voltage		1 to 20MHz/4.0 to 5.5V																			
Operating Ambient Temperature (°C)		-40 to 85, -40 to 105																			

* M: mask ROM version, F: F-ZTAT version

• Specifications (H8/300H Tiny Series)

Group		H8/36037																																			
Product No.		H8/36032				H8/36033				H8/36034				H8/36034F				H8/36035				H8/36036				H8/36037				H8/36037F							
Type No.		HD4336032GxxxFZ	HD4336032GxxxH	HD4336032xxxFZ	HD4336032xxxH	HD4336033GxxxFZ	HD4336033GxxxH	HD4336033xxxFZ	HD4336033xxxH	HD4336034GxxxFZ	HD4336034GxxxH	HD4336034xxxFZ	HD4336034xxxH	HD4336034GFZ	HD4336034GH	HD4336034FZ	HD4336034H	HD4336035GxxxFZ	HD4336035GxxxH	HD4336035xxxFZ	HD4336035xxxH	HD4336036GxxxFZ	HD4336036GxxxH	HD4336036xxxFZ	HD4336036xxxH	HD4336037GxxxFZ	HD4336037GxxxH	HD4336037xxxFZ	HD4336037xxxH	HD4336037GFZ	HD4336037GH	HD4336037FZ	HD4336037H				
Memory	ROM(Bytes)	16K				24K				32K								40K				48K				56K								3K			
	RAM(Bytes)	1K								2K																				3K							
	EEPROM(Bytes)	—																																			
	ROM Type*	M												F				M								F											
CPU	Program Security	Yes																																			
	CPU	H8/300H Core																																			
	Basic Instructions	62																																			
	Minimum Instruction Execution Time (ns)	100 (@20MHz)																																			
Clock	Clock Generation Circuit	2 circuits (system clock circuit, on-chip sub clock oscillator)																																			
	PLL	—																																			
	Subclock	Yes																																			
	On-Chip Oscillator	—																																			
	Oscillation Stop Detection	—																																			
	Frequency Divider	1/n (n = 1, 8, 16, 32, 64)																																			
	Power Save	Support 4 power save modes and module standby function , system clock divider.																																			
		Standby mode																																			
Sub active mode (when using on-chip oscillation sub clock)																																					
Sleep mode																																					
Power Supply	Power-On Reset/POR	Yes (option)																																			
	Low Voltage Detection/LVD	Yes (option)																																			
A/D Converter	Resolution × Channels	10-bit × 8																																			
	Sample and Hold	Yes																																			
Timer	8-bit	Timer B1 × 1, Timer V × 1, Sub timer × 1																																			
	16-bit	Timer Z × 1																																			
	Prescaler	Timer B1, Timer V, Sub timer, Timer Z																																			
	Input Capture	Timer Z																																			
	Output Compare	Timer V, Timer Z																																			
	PWM Output	Timer V, Timer Z																																			
	Event Counter	Timer B1																																			
	3-Phase Inverter Control	Timer Z																																			
Watchdog Timer	Yes (selectable internal oscillator)																																				
Serial Interface	Clock Sync./ Clock Async.	1																																			
PC-bus		—																																			
SSU/Special Serial I/O		2																																			
CAN	Channels	1																																			
	Buffers	4																																			
I/O Ports	Input Only (Numbers)	8																																			
	CMOS I/O Only (Numbers)	45																																			
	High Current Drive Port	8																																			
	Pull-Up Resistor	13																																			
	NMOS Push-Pull	—																																			
Interrupts(Sources)	External	11																																			
Debugging Function	On-Chip Debug	Yes																																			
	On-Board Flash Program	Yes																																			
Other Functions	ROM Correction Function	Yes																																			
Package		FP-64K, FP-64A																																			
Operating Frequency/Supply Voltage		1 to 20MHz/4.0 to 5.5V																																			
Operating Ambient Temperature (°C)		-40 to 85, -40 to 105, -40 to 125																																			

* M: mask ROM version, F: F-ZTAT version

• Specifications (H8/300H Tiny Series)

Group		H8/36057															
Product No.		H8/36054				H8/36054F				H8/36057				H8/36057F			
Type No.		HD64336054GxxxFZ	HD64336054GxxxH	HD64336054xxxFZ	HD64336054xxxH	HD64F36054GFZ	HD64F36054GH	HD64F36054FZ	HD64F36054H	HD64336057GxxxFZ	HD64336057GxxxH	HD64336057xxxFZ	HD64336057xxxH	HD64F36057GFZ	HD64F36057GH	HD64F36057FZ	HD64F36057H
Memory	ROM(Bytes)	32K								56K							
	RAM(Bytes)	2K												3K			
	EEPROM(Bytes)									—							
	ROM Type*	M				F				M				F			
	Program Security	Yes															
CPU	CPU	H8/300H Core															
	Basic Instructions	62															
	Minimum Instruction Execution Time (ns)	100 (@20MHz)															
Clock	Clock Generation Circuit	2 circuits (system clock circuit, on-chip sub clock oscillator)															
	PLL	—															
	Subclock	Yes															
	On-Chip Oscillator	—															
	Oscillation Stop Detection	—															
	Frequency Divider	1/n (n = 1, 8, 16, 32, 64)															
	Power Save	Support 4 power save modes and module standby function , system clock divider.															
		Standby mode															
Sub active mode (when using on-chip oscillation sub clock)																	
Sub sleep mode (when using on-chip oscillation sub clock)																	
Power Supply	Power-On Reset/POR	Yes (option)															
Voltage Detection	Low Voltage Detection/LVD	Yes (option)															
A/D Converter	Resolution × Channels	10-bit × 8															
	Sample and Hold	Yes															
Timer	8-bit	Timer B1 × 1, Timer V × 1, Sub timer × 1															
	16-bit	Timer Z × 1															
	Prescaler	Timer B1, Timer V, Sub timer, Timer Z															
	Input Capture	Timer Z															
	Output Compare	Timer V, Timer Z															
	PWM Output	Timer V, Timer Z															
	Event Counter	Timer B1															
	3-Phase Inverter Control	Timer Z															
Watchdog Timer		Yes (selectable internal oscillator)															
Serial Interface	Clock Sync./ Clock Async.	2															
I ² C-bus		—															
SSU/Special Serial I/O		2															
CAN	Channels	1															
	Buffers	4															
I/O Ports	Input Only (Numbers)	8															
	CMOS I/O Only (Numbers)	45															
	High Current Drive Port	8															
	Pull-Up Resistor	13															
	NMOS Push-Pull	—															
Interrupts(Sources)	External	11															
Debugging Function	On-Chip Debug	Yes															
	On-Board Flash Program	Yes															
Other Functions	ROM Correction Function	Yes															
Package		FP-64K, FP-64A															
Operating Frequency/Supply Voltage		1 to 20MHz/4.0 to 5.5V															
Operating Ambient Temperature (°C)		-40 to 85, -40 to 105, -40 to 125															

* M: mask ROM version, F: F-ZTAT version

• Specifications (H8/300H Tiny Series)

Group		H8/3687																													
Product No.		H8/3682		H8/3683		H8/3684		H8/3684F		H8/3685		H8/3686		H8/3687		H8/3687F		H8/3687N													
Type No.		HD6433682GxxxFP	HD6433682GxxxH	HD6433682xxxFP	HD6433682xxxH	HD6433683GxxxFP	HD6433683GxxxH	HD6433683xxxFP	HD6433683xxxH	HD6433684GxxxFP	HD6433684GxxxH	HD6433684xxxFP	HD6433684xxxH	HD6433685GxxxFP	HD6433685GxxxH	HD6433685xxxFP	HD6433685xxxH	HD6433686GxxxFP	HD6433686GxxxH	HD6433686xxxFP	HD6433686xxxH	HD6433687GxxxFP	HD6433687GxxxH	HD6433687xxxFP	HD6433687xxxH	HD6433687GFP	HD64F3687GH	HD64F3687FP	HD64F3687H	HD6463687GFP	HD64N3687GFP
Memory	ROM(Bytes)	16K		24K		32K		4K		40K		48K		56K										3K		4K					
	RAM(Bytes)	3K				4K				3K				4K				3K				512									
	EEPROM(Bytes)	—																													
	ROM Type*	M				F				M				F				M				F									
	Program Security	Yes																													
CPU	CPU	H8/300H Core																													
	Basic Instructions	62																													
	Minimum Instruction Execution Time (ns)	100 (@20MHz)																													
Clock	Clock Generation Circuit	2 circuits (system clock circuit, on-chip sub clock oscillator)																													
	PLL	—																													
	Subclock	Yes																													
	On-Chip Oscillator	—																													
	Oscillation Stop Detection	—																													
	Frequency Divider	1/n (n = 1, 8, 16, 32, 64)																													
	Power Save	Support 4 power save modes and module standby function , system clock divider.																													
		Standby mode																													
Sub active mode (when using sub clock at 32kHz)																															
Sleep mode																															
Power Supply	Power-On Reset/POR	Yes (option)																													
	Low Voltage Detection/LVD	Yes (option)																													
A/D Converter	Resolution × Channels	10-bit × 8																													
	Sample and Hold	Yes																													
Timer	8-bit	RTC × 1, Timer B1 × 1, Timer V × 1																													
	16-bit	Timer Z × 1																													
	Prescaler	RTC, Timer B1, Timer V, Timer Z																													
	Input Capture	Timer Z																													
	Output Compare	Timer Z, Timer V																													
	PWM Output	14-bit PWM, Timer Z, Timer V																													
	Event Counter	Timer B1																													
	3-Phase Inverter Control	Timer Z																													
Watchdog Timer		Yes (selectable internal oscillator)																													
Serial Interface Clock Sync./ Clock Async.		2																													
I ² C-bus		1																													
SSU/Special Serial I/O		—																													
CAN	Channels	—																													
	Buffers	—																													
I/O Ports	Input Only (Numbers)	8																													
	CMOS I/O Only (Numbers)	45																43													
	High Current Drive Port	8																													
	Pull-Up Resistor	13																													
	NMOS Push-Pull	2																													
Interrupts(Sources)		11																													
Debugging Function	On-Chip Debug	Yes																													
	On-Board Flash Program	Yes																													
Other Functions		ROM Correction Function																													
Package		FP-64K, FP-64A																FP-64K													
Operating Frequency/Supply Voltage		1 to 20MHz/4.0 to 5.5V																													
Operating Ambient Temperature (°C)		-40 to 85, -40 to 105, -40 to 125																													

* M: mask ROM version, F: F-ZTAT version

• Specifications (H8/300H Tiny Series)

Group		H8/3694																	
Product No.		H8/3690						H8/3691						H8/3692					
Type No.		HD6433690GxxxFP	HD6433690GxxxFY	HD6433690GxxxH	HD6433690xxxFP	HD6433690xxxFY	HD6433690xxxH	HD6433691GxxxFP	HD6433691GxxxFY	HD6433691GxxxH	HD6433691xxxFP	HD6433691xxxFY	HD6433691xxxH	HD6433692GxxxFP	HD6433692GxxxFY	HD6433692GxxxH	HD6433692xxxFP	HD6433692xxxFY	HD6433692xxxH
Memory	ROM(Bytes)	8K						12K						16K					
	RAM(Bytes)							512											
	EEPROM(Bytes)							—											
	ROM Type*							M											
	Program Security							Yes											
CPU	CPU							H8/300H Core											
	Basic Instructions							62											
Clock	Minimum Instruction Execution Time (ns)							100 (@ 20MHz)											
	Clock Generation Circuit							2 circuits (System clock circuit, Sub clock circuit)											
	PLL							—											
	Subclock							Yes											
	On-Chip Oscillator							—											
	Oscillation Stop Detection							—											
	Frequency Divider							1/n (n = 1, 8, 16, 32, 64)											
Power Supply	Power Save	Support 4 power save modes and module standby function , system clock divider.																	
	Standby mode, Sub active mode (when using sub clock at 32kHz), Sleep mode, Sub sleep mode (when using sub clock at 32kHz)																		
Voltage Detection	Power-On Reset/POR							Yes (option)											
	Low Voltage Detection/LVD							Yes (option)											
A/D Converter	Resolution × Channels							10-bit × 8											
	Sample and Hold							Yes											
Timer	8-bit							Timer A × 1, Timer B1 × 1, Timer V × 1											
	16-bit							Timer W × 1											
	Prescaler							Timer A, Timer B1, Timer V, Timer W											
	Input Capture							Timer W											
	Output Compare							Timer W											
	PWM Output							Timer V, Timer W											
	Event Counter							Timer B1											
3-Phase Inverter Control							—												
Watchdog Timer		Yes (selectable internal oscillator)																	
Serial Interface	Clock Sync./ Clock Async.							1											
PC-bus								1											
SSU/Special Serial I/O								—											
CAN	Channels							—											
	Buffers							—											
I/O Ports	Input Only (Numbers)							8											
	CMOS I/O Only (Numbers)							29											
	High Current Drive Port							8											
	Pull-Up Resistor							13											
	NMOS Push-Pull							2											
Interrupts(Sources)	External							11											
Debugging Function	On-Chip Debug							Yes											
	On-Board Flash Program							Yes											
Other Functions	ROM Correction Function							Yes											
Package		FP-48B, FP-64K, FP-64A																	
Operating Frequency/Supply Voltage		1 to 20MHz/4.0 to 5.5V																	
Operating Ambient Temperature (°C)		-40 to 85, -40 to 105, -40 to 125																	

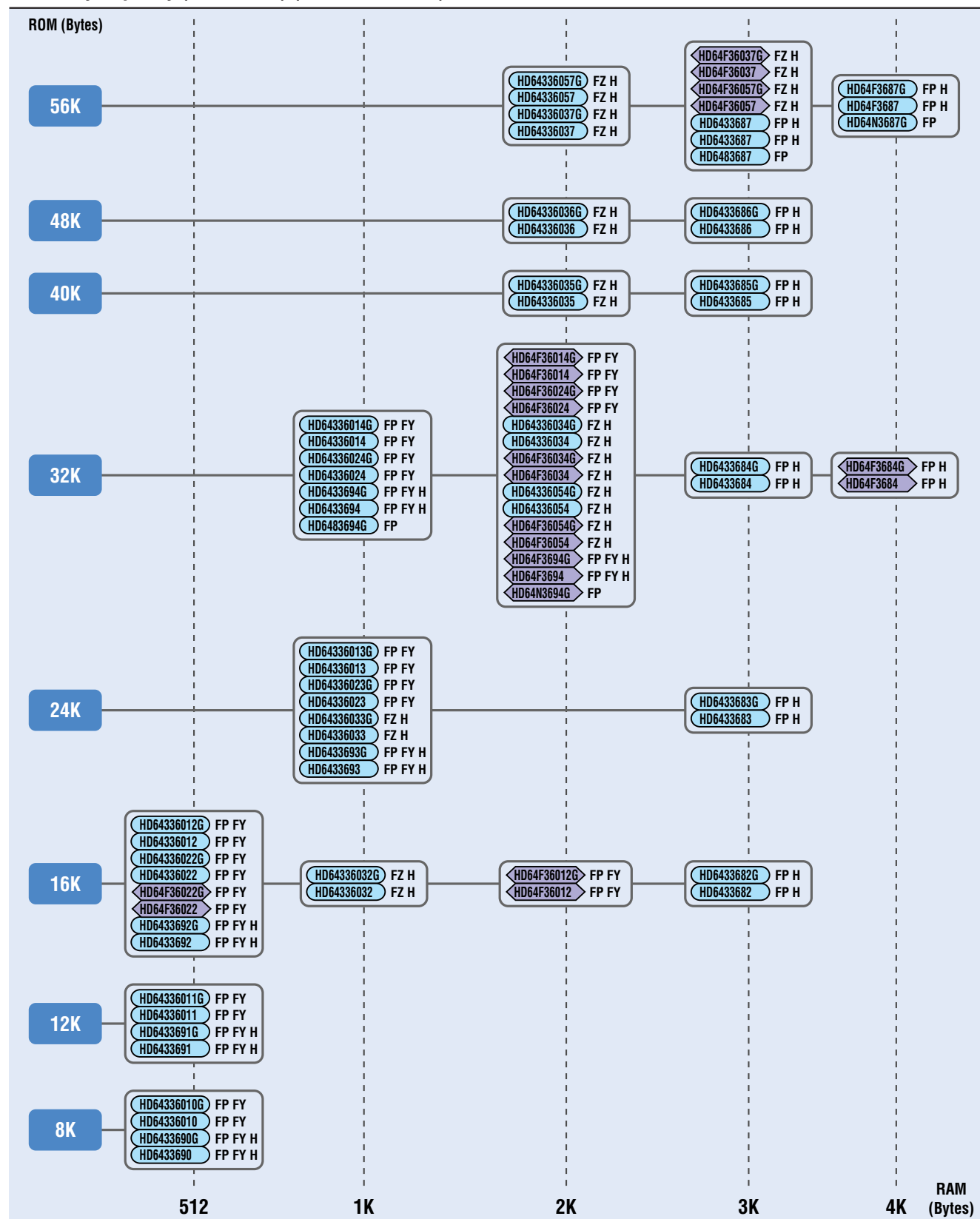
* M: mask ROM version

• Specifications (H8/300H Tiny Series)

Group		H8/3694																				
Product No.		H8/3693						H8/3694						H8/3694F						H8/3694N		
Type No.		HD6433693GxxxFP	HD6433693GxxxFY	HD6433693GxxxH	HD6433693xxxFP	HD6433693xxxFY	HD6433693xxxH	HD6433694GxxxFP	HD6433694GxxxFY	HD6433694GxxxH	HD6433694xxxFP	HD6433694xxxFY	HD6433694xxxH	HD64F3694GFP	HD64F3694GFY	HD64F3694GH	HD64F3694FP	HD64F3694FY	HD64F3694H	HD64N3694GFP	HD64N3694GFP	
Memory	ROM(Bytes)	24K												32K								
	RAM(Bytes)							1K						2K						1K		2K
	EEPROM(Bytes)							—												512		
	ROM Type*							M						F						M		F
CPU	Program Security													Yes								
	CPU													H8/300H Core								
	Basic Instructions													62								
	Minimum Instruction Execution Time (ns)													100 (@20MHz)								
Clock	Clock Generation Circuit													2 circuits (System clock circuit, Sub clock circuit)								
	PLL													—								
	Subclock													Yes								
	On-Chip Oscillator													—								
	Oscillation Stop Detection													—								
	Frequency Divider													1/n (n = 1, 8, 16, 32, 64)								
Power Supply	Power-On Reset/POR													Support 4 power save modes and module standby function , system clock divider.								
	Voltage Detection													Standby mode, Sub active mode (when using sub clock at 32kHz), Sleep mode, Sub sleep mode (when using sub clock at 32kHz)								
A/D Converter	Resolution × Channels													Yes (option)								
	Sample and Hold													Yes (option)								
Timer	8-bit													10-bit × 8								
	16-bit													Yes								
	Prescaler													Timer A × 1, Timer B1 × 1, Timer V × 1								
	Input Capture													Timer W × 1								
	Output Compare													Timer A, Timer B1, Timer V, Timer W								
	PWM Output													Timer W								
	Event Counter													Timer V, Timer W								
	3-Phase Inverter Control													Timer B1								
Watchdog Timer														—								
Serial Interface														Yes (selectable internal oscillator)								
I ² C-bus														1								
SSU/Special Serial I/O														1								
CAN	Channels													—								
	Buffers													—								
I/O Ports	Input Only (Numbers)													8								
	CMOS I/O Only (Numbers)							29												27		
	High Current Drive Port													8								
	Pull-Up Resistor													13								
	NMOS Push-Pull													2								
Interrupts(Sources)														11								
Debugging Function	On-Chip Debug													Yes								
	On-Board Flash Program													Yes								
Other Functions														ROM Correction Function								
Package														FP-48B, FP-64K, FP-64A						FP-64K		
Operating Frequency/Supply Voltage														1 to 20MHz/4.0 to 5.5V								
Operating Ambient Temperature (°C)														-40 to 85, -40 to 105, -40 to 125								

* M: mask ROM version, F: F-ZTAT version

• Memory Capacity (ROM/RAM) (H8/300H Series)



 Indicates the mask ROM version.

 Indicates the flash memory version.

Package	
H	QFP (PRQP0064GB-A(FP-64A))
FP	LQFP (PLQP0064KB-A(FP-64K))
FY	LQFP (PLQP0048KC-A(FP-48B))

* It is an old package code inside ()

• Specifications (7600, 740 Series)

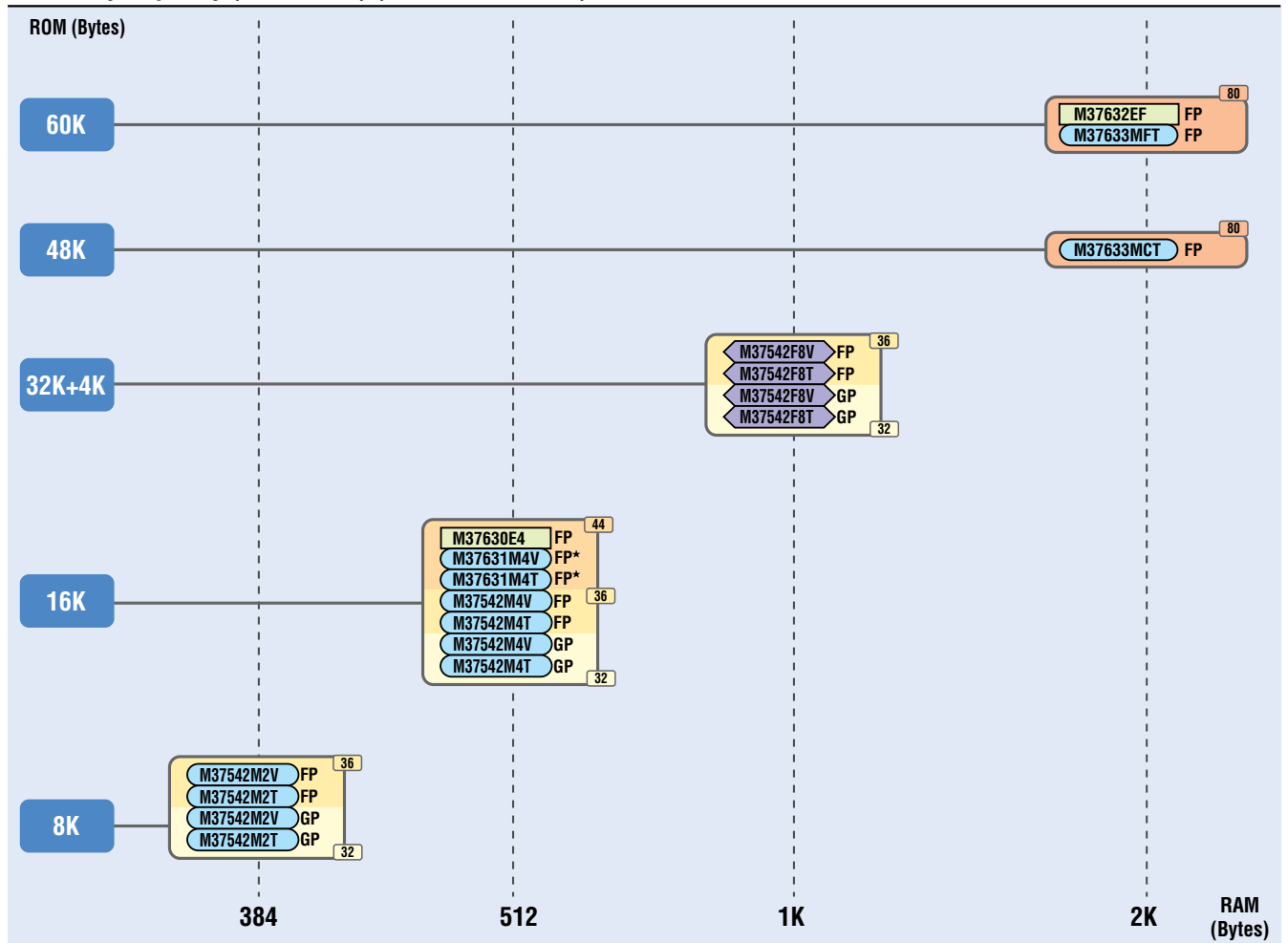
Group		7630			7632			7542												
Type No.		M37631M4T-XXXXFP*	M37631M4V-XXXXFP*	M37630E4FP	M37633MCT-XXXXFP	M37633MFT-XXXXFP	M37632EFPF	M37542M2T-XXXXFP	M37542M2T-XXXGFP	M37542M2V-XXXXFP	M37542M2V-XXXGFP	M37542M4T-XXXXFP	M37542M4T-XXXGFP	M37542M4V-XXXXFP	M37542M4V-XXXGFP	M37542F8TFP	M37542F8TGP	M37542F8VFP	M37542F8VGP	
Memory	ROM(Bytes)	16K			48K	60K		8K			16K			32K+4K						
	RAM(Bytes)	512			2K		384			512			1K							
	ROM Type*	M	O		M	O	M						F							
	Data Flash	—																		
	Program Security	—							ID code check function, ROM code protecting function (Only Flash memory version)											
CPU	CPU	7600 Core							740 Core											
	Basic Instructions								71											
	Minimum Instruction Execution Time (ns)	200 (@ 10MHz)							T-ver : 250 (8MHz), 1.0 (4MHz) V-ver : 500 (8MHz), 1.0 (4MHz)											
	Multiplier	—																		
	Multiply-Accumulate Instruction	—																		
DMA	DMAC (Channels)	—																		
Clock	Clock Generation Circuit	1 circuit (Main clock)							2 circuits (Main clock, On-chip oscillator)											
	PLL	—																		
	Subclock	—																		
	On-Chip Oscillator	—							Yes											
	Oscillation Stop Detection	—							Yes											
	Frequency Divider	1/n (n = 2, 8)							1/n (n = 1, 2, 8, 128)											
	Power Save	Normal operating, Sleep mode, Wait mode							Wait mode, Stop mode, On-chip oscillator operating											
Power Supply Voltage Detection	Low Voltage Detection/LVD	—							10-bit×8 (36-pin version) 10-bit×6 (32-pin version)											
A/D Converter	Resolution×Channels	8-bit×8 channels							—											
D/A Converter	Sample and Hold	—																		
	Resolution×Channels	—																		
Timer	8-bit	Timer X, Timer Y							Timer 1×1, Timer X×1											
	16-bit	Timer 1, Timer 2, Timer 3							Timer A×1, Timer B×1											
	Input Capture	—							2 (also used as Timer A and B)											
	Output Compare	—							4 (also used as Timer A and B)											
	PWM Output	Timer 2, Timer 3							—											
	Real-Time Port	—							Timer A, Timer B											
	Event Counter	Timer X, Timer Y							Timer X											
	2-Phase Encoder Input	Timer X (Two-phase pulse signal processing)							—											
	3-Phase Inverter Control	—																		
Watchdog Timer		Yes																		
Serial Interface	Clock Sync./ Clock Async.	1 (UART)			2 (UART0, UART1)			2 (SI/O1, SI/O2)												
	Clock Sync. Only	1 (SI/O)			—															
	Clock Async. Only																			
I ² C-bus		—																		
IEBus		—																		
Smart Card/SIM		—																		
SSU/Special Serial I/O		—																		
CAN	Channels	1(CAN2.0B)							—											
	Buffers	1 (Transmit), 2 (Receive)							—											
CRC Calculation Circuit		—																		
I/O Ports	Input Only (Numbers)	1							—											
	CMOS I/O Only (Numbers)	35			72				29 (36-pin version), 25 (32-pin version)											
	N-Channel Open Drain Port (Numbers)	—																		
	High Current Drive Port	—							16 (36-pin version), 14 (32-pin version)											
	Pull-Up Resistor	Yes							16 (36-pin version), 14 (32-pin version)											
Interrupts(Sources)	External								6											
Debugging Function	On-Chip Debug	—							Yes											
	On-Board Flash Program	—							Yes											
Other Functions	ROM Correction Function	—																		
	Others 1	—							Key-on wakeup											
	Others 2	—							Permitting RC oscillation											
Package		44-pin QFP			80-pin QFP				36-pin SSOP, 32-pin LQFP											
Operating Frequency/Supply Voltage		10MHz/4.0 to 5.5V							8MHz/2.4 to 5.5V, 8MHz/2.7 to 5.5V (Flash memory version)											
Operating Ambient Temperature (°C)		T-ver:-40 to 85, V-ver:-40 to 125							T-ver:-40 to 85, V-ver:-40 to 125											

* M: mask ROM version, F: flash memory version, O: one-time PROM version

★ : New product

• Memory Capacity (ROM/RAM) (7600, 740 Series)

80-pin 80 44-pin 44 36-pin 36 32-pin 32



- The M in M3xxxxMx indicates the mask ROM version.
 The F in M3xxxxFx indicates the flash memory version.
 The E in M3xxxxEx indicates the one-time PROM version.

Package				Lead Pitch (mm)
32-pin	GP	32-pin LQFP(PLQP0032GB-A(32P6U-A))		0.8
36-pin	FP	36-pin SSOP(PRSP0036GA-A(36P2R-A))		0.8
44-pin	FP	44-pin QFP(44P6N-A)		0.8
80-pin	FP	80-pin QFP(PRQP0080JA-A(80P6S-A))		0.65

★ : New product

* It is an old package code inside ()

CAN MPUs and MCUs

Renesas has developed a line of high-performance MPUs and MCUs incorporating on-chip CAN controllers that provide full support for CAN (Controller Area Network), the standard vehicle LAN protocol in the European automotive market. These MPUs and MCUs are available in versions with an operating temperature range of -40°C to 125°C, a key requirement for automotive applications. (The standard operating temperature range is -40°C to 85°C.) The rugged characteristics of these MPUs and MCUs means that systems incorporating them can be designed for a wide range of operating environments.

• Specifications (SH7750 Series)

Series		SH7750	
Group		SH7760	
Type No.		HD6417760BP	HD6417760BL
Memory	ROM(Bytes)	—	
	RAM(Bytes)	2KB (MFI shared)+ 8KB (USB shared)	
	Data Flash	—	
	ROM Type*	L	
	Cache Memory	16K (instruction) /32K (data) 2-way set-associative	
	Program Security	—	
CPU	CPU	SH-4 Core	
	Basic Instructions	91	
	Minimum Instruction Execution Time (ns)	2.5 (@200MHz)	
	Dhrystone Performance	360MIPS/200MHz, 1.4GFLOPS/200MHz	
	Multiplier	32 × 32 → 64	
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64	
	Barrel Shifter	Yes	
	FPU	Yes	
	MMU	Yes	
DMA	DMAC (Channels)	8	
	DTC/DMAC II	—	
External Bus Expansion	Address Space (Bytes)	448M	
	Bus State Controller	SRAM/SDRAM/MPX/BurstROM/Byte Control SRAM/PCMCIA	
	Bus Structure	Separate bus (8/16/32-bit), Multiplex bus (32-bit)	
	SDRAM Controller	Yes	
	DRAM Controller	—	
	PCI Controller	—	
	Endian Conversion	Yes	
	Host Interface	Multifunction interface (MFI)	
	Clock Generation Circuit	1 circuit	
Clock	PLL	Yes	
	RTC	—	
	Oscillation Stop Detection	—	
	Frequency Divider	Yes	
	Power Save	Sleep mode, Standby mode, Module standby mode	
Power Supply Voltage Detection	Power-On Reset/POR	—	
A/D Converter	Resolution × Channels	10-bit × 4	
	Sample and Hold	Yes	
	Multi-Channel Sample and Hold	Yes	
D/A Converter	Resolution × Channels	—	
	8-bit	—	
Timer	16-bit	*Compare match timer 4ch (Selectable 16-bit, 32-bit)	
	32-bit	Timer unit × 3	
	Prescaler	Yes	
	Input Capture	1 (using Timer unit)	
	Output Compare	1 (using Compare match timer)	
	PWM Output	—	
	Event Counter	—	
	2-Phase Encoder Input	—	
	3-Phase Inverter Control	—	
	Watchdog Timer		Yes
Serial Interface	Clock Sync./ Clock Async.	3	
	Clock Sync. Only	—	
	Clock Async. Only	—	
I ² C-bus		2ch	
Smart Card/SIM		T = 0 (Subset) /T = 1 (Subset)	
SSU/Special Serial I/O		Yes	
CAN	Channels	2	
	Buffers	32	
Ethernet		—	
USB HOST		Yes	
USB Function		—	
IrDA		—	
LCD		Yes	
I/O Ports	Input Only (Numbers)	—	
	CMOS I/O Only (Numbers)	69	
	High Voltage Port (Numbers)	—	
	N-Channel Open Drain Port (Numbers)	—	
	High Current Drive Port	—	
	Pull-Up Resistor	Yes	
Interrupts(Sources)	External	NMI + 15 external (15 level) or 4 external	
Debugging Function	Boundary Scan/JTAG	Yes	
	On-Chip Debug	Yes	
	On-Board Flash Program	—	
Other Functions	ROM Correction Function	—	
	Others	Audio codec interface (HAC) × 2 channels	
		Serial sound interface (SSI) × 2 channels	
		Multimedia card interface (MMCIF)	
		Multifunction interface (MFI)	
		—	
		(* Some pins for each module are multiplexed.)	
Package		BP-256F, BP-256B	
Operating Frequency/Supply Voltage		200MHz/1.5V/3.3V (I/O)	
Operating Ambient Temperature (°C)		-20 to 75/-40 to 85 *: differ from each product	

Note : The package code described is the former one. Regarding the new one, please refer to the following URL <http://www.renesas.com/en/package>

* L: ROM-less version

• Specifications (SH7050 Series)

Series		SH7050	
Group		SH7055	SH7058
Type No.		HD64F7055S	HD64F7058F
Memory	ROM(Bytes)	512K	1M
	RAM(Bytes)	32K	48K
	Data Flash	—	—
	ROM Type*	—	F
	Cache Memory	—	—
	Program Security	—	—
CPU	CPU	SH-2E Core	
	Basic Instructions	79	
	Minimum Instruction Execution Time (ns)	—	
	Dhrystone Performance	25 (@40MHz) 52MIPS (40MHz)	12.5 (@80MHz) 104MIPS (80MHz)
	Multiplier	32 × 32 → 64	
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64	
	Barrel Shifter	—	
	FPU	Yes	
DMA	MMU	—	
	DMAC (Channels)	4	
External Bus Expansion	DTC/DMAC II	—	
	Address Space (Bytes)	16M	
	Bus State Controller	Yes	
	Bus Structure	SRAM	
	SDRAM Controller	—	
	DRAM Controller	—	
	PCI Controller	—	
Clock	Endian Conversion	—	
	Host Interface	—	
	Clock Generation Circuit	1 circuit	
	PLL	Yes	
	RTC	—	
	Oscillation Stop Detection	—	
Power Supply	Frequency Divider	—	
	Power Save	Sleep mode, Software standby mode, Hardware standby mode	
Voltage Detection	Power-On Reset/POR	—	
A/D Converter	Resolution × Channels	10-bit × 32	
	Sample and Hold	3ch	
D/A Converter	Multi-Channel Sample and Hold	—	
	Resolution × Channels	—	
Timer	8-bit	—	
	16-bit	65 (ATU-II)	
	32-bit	—	
	Prescaler	ATU-II	
	Input Capture	ATU-II	
	Output Compare	ATU-II	
	PWM Output	ATU-II	
	Event Counter	ATU-II	
	2-Phase Encoder Input	—	
	3-Phase Inverter Control	—	
Watchdog Timer		Yes	
Serial Interface	Clock Sync./ Clock Async.	5	
	Clock Sync. Only	—	
	Clock Async. Only	—	
I ² C-bus		—	
Smart Card/SIM		—	
SSU/Special Serial I/O		—	
CAN	Channels	2	
	Buffers	32	64
Ethernet		—	
USB HOST		—	
USB Function		—	
IrDA		—	
LCD		—	
I/O Ports	Input Only (Numbers)	—	
	CMOS I/O Only (Numbers)	149	
	High Voltage Port (Numbers)	—	
	N-Channel Open Drain Port (Numbers)	—	
	High Current Drive Port	—	
	Pull-Up Resistor	—	
Interrupts(Sources)	External	9	
	Boundary Scan/JTAG	—	
Debugging Function	On-Chip Debug	—	
	On-Board Flash Program	Yes	
Other Functions		—	
ROM Correction Function		—	
Package		FP-256H, BP-272	
Operating Frequency/Supply Voltage		40MHz/3.3V (internal) (5.0V external I/O, 3.3V bus)	80MHz/3.3V (5.0V external I/O, 3.3V bus)
Operating Ambient Temperature (°C)		-40 to 85	

Note : The package code described is the former one. Regarding the new one, please refer to the following URL <http://www.renesas.com/en/package>

* F: F-ZTAT version

• Specifications (SH7047 Series)

Series		SH7047	
Group		SH7047	SH7049
Type No.		HD64F7047F	HD6437049xxxF
Memory	ROM(Bytes)	256K	128K
	RAM(Bytes)	12K	8K
	Data Flash	—	—
	ROM Type*	F	M
	Cache Memory	—	—
	Program Security	Yes	—
CPU	CPU	SH-2 Core	—
	Basic Instructions	62	—
	Minimum Instruction Execution Time (ns)	20 (@50MHz)	—
	Dhrystone Performance	65MIPS(50MHz)	—
	Multiplier	32 × 32 → 64	—
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64	—
	Barrel Shifter	—	—
	FPU	—	—
DMA	MMU	—	—
	DMA (Channels)	—	—
External Bus Expansion	DTC/DMAC II	DTC	—
	Address Space (Bytes)	256K	—
	Bus State Controller	Wait state (1 to 15 wait, can be extended with an external signal)	—
	Bus Structure	Separate bus (8-bit)	—
	SDRAM Controller	—	—
	DRAM Controller	—	—
	PCI Controller	—	—
	Endian Conversion	—	—
Clock	Host Interface	—	—
	Clock Generation Circuit	1 circuit	—
	PLL	Yes	—
	RTC	—	—
	Oscillation Stop Detection	Yes	—
	Frequency Divider	—	—
Power Supply	Power Save	Sleep mode, Software standby mode, Module standby mode	
Voltage Detection	Power-On Reset/POR	—	—
A/D Converter	Resolution × Channels	10-bit × 8 × 2 unit	—
	Sample and Hold	Yes	—
D/A Converter	Multi-Channel Sample and Hold	2unit	—
	Resolution × Channels	—	—
Timer	8-bit	—	—
	16-bit	7 (MTU, MMT, CMT)	—
	32-bit	—	—
	Prescaler	MTU	—
	Input Capture	MTU	—
	Output Compare	MTU	—
	PWM Output	MTU	—
	Event Counter	MTU	—
	2-Phase Encoder Input	MTU	—
	3-Phase Inverter Control	MTU, MMT	—
	Watchdog Timer	Yes	—
Serial Interface	Clock Sync./ Clock Async.	SCI × 3	—
	Clock Sync. Only	—	—
	Clock Async. Only	—	—
I ² C-bus		—	—
Smart Card/SIM		—	—
SSU/Special Serial I/O		—	—
CAN	Channels	1	—
	Buffers	32	—
Ethernet		—	—
USB HOST		—	—
USB Function		—	—
IrDA		—	—
LCD		—	—
I/O Ports	Input Only (Numbers)	16	—
	CMOS I/O Only (Numbers)	53	—
	High Voltage Port (Numbers)	—	—
	N-Channel Open Drain Port (Numbers)	—	—
	High Current Drive Port	Yes	—
	Pull-Up Resistor	—	—
Interrupts(Sources)	External	5	—
	Boundary Scan/JTAG	—	—
Debugging Function	On-Chip Debug	—	—
	On-Board Flash Program	Yes	—
Other Functions	ROM Correction Function	—	—
Package		FP-100M	—
Operating Frequency/Supply Voltage		5 (@50MHz)	—
Operating Ambient Temperature (°C)		-20 to 75, -40 to 85	—

Note : The package code described is the former one. Regarding the new one, please refer to the following URL <http://www.renesas.com/en/package>

* F: F-ZTAT version, M: mask ROM version

• Specifications (M32R/ECU Series)

Group		32172	32173	32176						32186**	32192**				32196**		
Type No.		M32172F2VFP	M32173F2VFP	M32176F2VFP	M32176F2TFP	M32176F3VFP	M32176F3TFP	M32176F4VFP	M32176F4TFP	M32186F8VFP**	M32192F8VFP**	M32192F8UFP**	M32192F8TFP**	M32196F8VFP**	M32196F8UFP**	M32196F8TFP**	
Memory	ROM(Bytes)	256K			384K		512K			1M							
	RAM(Bytes)	16K	32K	24K						64K	176K			64K			
	ROM Type*	F															
	Data Flash	—		Yes (Option)						—							
	Program Security	Flash memory protecting ID, Protecting by FP pin, Protecting by FENTRY bit, Protecting by lock bit															
CPU	CPU	M32R core								M32R-FPU core (on-chip single-precision FPU)							
	Basic Instructions	83								100							
	Minimum Instruction Execution Time (ns)	25 (@40MHz), 31.25 (@32MHz)		TFP:25 (@40MHz), VFP:31.25 (@32MHz)						12.5 (@80MHz)	7.8125 (@128MHz)	6.25 (@160MHz)		7.8125 (@128MHz)	6.25 (@160MHz)		
	Multiplier	16 × 32 → 48															
	Multiply-Accumulate Instruction	16 × 32 + 56 → 56															
	Barrel Shifter	Yes															
	FPU	—								Yes							
	DMA	DMAC (Channels) ¹	10														
External Bus Expansion	Address Space (Bytes)	2M								31M							
	External Bus Interface	Wait controller (1 to 4 wait cycles inserted + prolonged by external WAIT signal input)								Wait controller (0 to 15 wait cycles inserted + prolonged by external WAIT signal input)							
	Bus Structure	Separate bus (16-bit)															
Clock	Clock Generation Circuit	2 circuits (Oscillation Circuit, PLL)															
	PLL	Yes (4-multiplier)								Yes (8-multiplier)							
	Oscillation Stop Detection	—		Yes						Yes							
A/D Converter	Resolution × Channels	10-bit × 32 ⁴		10-bit × 16													
	Sample and Hold	—		Yes													
D/A Converter	Multi-Channel Sample and Hold	—								Yes (synchronous sampling function)							
	Resolution × Channels	8-bit × 2 ³		—													
Timer	16-bit	TOM × 16, TMS × 4, TID × 2, TPD × 4, TEP × 4		TOP × 11, TIO × 10, TMS × 8						TOP × 11, TIO × 10, TMS × 8, TID × 2							
	24-bit	—								TOU × 16							
	32-bit	TML × 4		TML × 8													
	Prescaler	Yes															
	Input Capture	TMS, TML, TPD		TMS, TML													
	PWM Output	TOM		TIO						TIO, TOU							
	Event Counter	TID, TEP		—						TID							
	2-Phase Encoder Input	TID		—						TID							
	3-Phase Inverter Control	TOM		—						TOU							
Serial Interface	Clock Sync./ Clock Async.	4 (SIO0, SIO1, SIO4, SIO5)		2 (SIO0, SIO1)						4 (SIO0, SIO1, SIO4, SIO5)							
	Clock Async. Only	4 (SIO2, SIO3, SIO6, SIO7)		2 (SIO2, SIO3)													
CAN	Channels	2 (Ver.2.0B active)															
	Buffers(Each channel)	16 (transmit / receive buffers)								32 (transmit / receive buffers)							
I/O Ports	Input Only (Numbers)	17		1 (Input level switch function)						1 (Input level switch function, Output drive performance switch function, Noise canceller control function)							
	CMOS I/O Only (Numbers)	81		95 (Input level switch function)						96 (Input level switch function, Output drive performance switch function, Noise canceller control function)							
Interrupts(Sources)	External	17		11						27							
Debugging Function	Boundary Scan/JTAG	Yes															
	On-Chip Debug	Yes (Scalable debugging interface, Real-Time Debugger)								Yes (Scalable debugging interface, Real-Time Debugger, Non-Break-Debug)							
	On-Board Flash Program	Yes															
Other Functions	Direct RAM Interface	—								Yes							
Package		144-pin LQFP															
Operating Frequency/Supply Voltage		3.3V single or 3.3 and 5.0V dual-power-supply		3.3V or 5.0V single-power-supply						3.3 V single, 5.0 V single, or 3.3 and 5.0 V dual-power-supply	TFP:3.3V single, 5.0V single or 3.3 and 5.0V dual-power-supply, UFP:3.3V single or 3.3 and 5.0V dual-power-supply, VFP:3.3V single or 3.3 and 5.0V dual-power-supply,						
Operating Ambient Temperature (°C)		-40 to 85 (@40MHz), -40 to 125 (@32MHz)		TFP:-40 to 85 (@40MHz), VFP:-40 to 125 (@32MHz)						-40 to 125	TFP:-40 to 85 (@160MHz), UFP:-40 to 105 (@160MHz), VFP:-40 to 125 (@128MHz)						

¹ Only transfers to on-chip RAM and the on-chip peripheral I/O area are supported. Transfers to on-chip ROM or the external expansion area are not supported.

★ ★ : Under development

² Continuous operation at temperatures exceeding 85° C cannot be guaranteed. Customers considering applications where the operating temperature exceeds 85° C are requested to consult with Renesas.

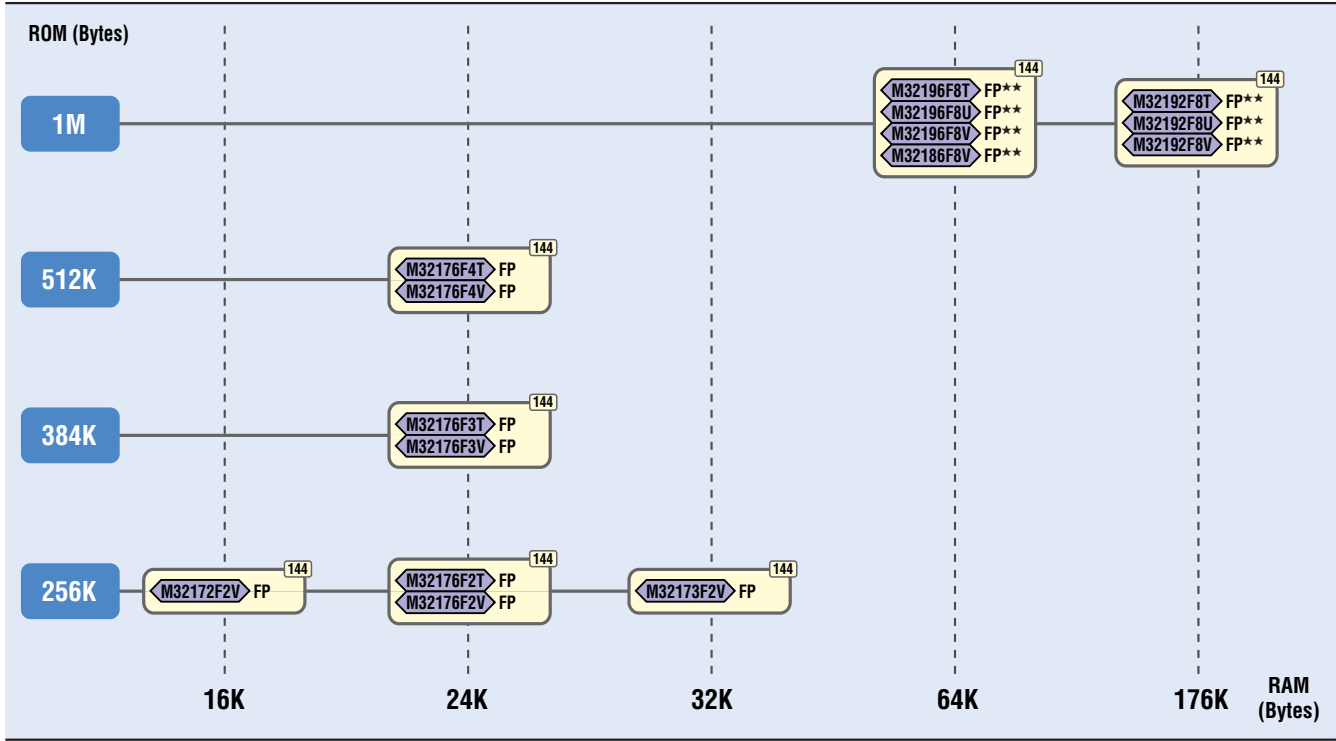
³ Of these, one channel includes an automatic wave detection function.

* The A/D Converter has 12 channels of dedicated analog input pins and 20 other channels of analog input pins which are shared with input/output ports or internal peripheral I/O input/output pins

* F: Flash memory version

• Memory Capacity (ROM/RAM) (M32R/ECU Series)

144-pin 



 The F in M3xxxFx indicates the flash memory version.

Package			Lead Pitch (mm)
144-pin	FP	144-pin LQFP (PLQP0144KA-A(144P6Q-A))	0.5

★★ : Under development
* It is an old package code inside ()

• Specifications (M32C/80 Series)

Group		M32C/81												M32C/83				
Type No.		M30810MC-XXXFP	M30810MC-XXXGP	M30812MC-XXXGP	M3081LMC-XXXFP	M3081LMC-XXXGP	M3081NMC-XXXGP	M30810MCT-XXXFP	M30810MCT-XXXGP	M30812MCT-XXXGP	M30810MCV-XXXFP	M30810MCV-XXXGP	M30812MCV-XXXGP	M30833F-JFP	M30833F-JGP	M30835F-JGP	M30833F-JTGP	M30833F-JVGP
Memory	ROM(Bytes)	128K												512K				
	RAM(Bytes)	10K			12K			10K						31K				
	ROM Type*	M												F				
	Data Flash	—												—				
	Program Security	—												ID code check function, ROM code protecting function				
CPU	CPU	M32C/80 Core																
	Basic Instructions	108																
	Minimum Instruction Execution Time (ns)	31.3 (@32MHz)																
	Multiplier	16 × 16 → 32																
	Multiply-Accumulate Instruction	16 × 16 + 48 → 48																
DMA	Barrel Shifter	Yes																
	DMAC (Channels)	4																
External Bus Expansion	DTC/DMAC II	DMAC II (Starts by all peripheral interrupt factors)																
	Address Space (Bytes)	16M						—						16M			—	
	External Bus Interface	Support for insertion of 1 to 3 wait states, Outputs 4 chip-select signals (CS0, CS1, CS2, CS3)						—						Support for insertion of 1 to 3 wait states, Outputs 4 chip-select signals (CS0, CS1, CS2, CS3)			—	
	Bus Structure	Selectable from Separate bus, Multiplex bus, Address Bus Width can be selected (8-bit/16-bit), The number of output address buses can be selected (16/20)						—						Selectable from Separate bus, Multiplex bus, Address Bus Width can be selected (8-bit/16-bit), The number of output address buses can be selected (16/20)			—	
Clock	DRAM Controller	Yes						—						Yes			—	
	Clock Generation Circuit	4 circuits (Main clock, PLL, Sub-clock and On-chip oscillator)																
	PLL	Yes																
	Subclock	Yes																
	On-Chip Oscillator	Yes																
	Oscillation Stop Detection	Yes																
	Frequency Divider	1/n (n = 1, 2, 3, 4, 6, 8, 10, 12, 14, 16)																
Power Supply Voltage Detection	Power Save	Normal operating mode (High-Speed, Medium-Speed, Low-Speed, Low-Power Consumption, On-chip Oscillator, On-chip Oscillator Low-Power Consumption), Wait mode and Stop mode																
A/D Converter	Low Voltage Detection/LVD	—																
	Resolution × Channels	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26 (2 circuits)	10-bit × 34 (2 circuits)	10-bit × 26 (2 circuits)	10-bit × 34 (2 circuits)	10-bit × 26 (2 circuits)	10-bit × 34 (2 circuits)	
D/A Converter	Sample and Hold	Yes																
	Multi-Channel Sample and Hold	—												Yes				
Timer	Resolution × Channels	8-bit × 2																
	16-bit	Timer A × 5, Timer B × 6																
	Input Capture	5	12	5	12	5	12	5	12	5	12	5	12	5	12	5	12	
	Output Compare	8	20	8	20	8	20	8	20	8	20	8	20	10	28	10	28	
	PWM Output	5 (Timer A) + 8 (Intelligent I/O)	5 (Timer A) + 20 (Intelligent I/O)	5 (Timer A) + 8 (Intelligent I/O)	5 (Timer A) + 20 (Intelligent I/O)	5 (Timer A) + 8 (Intelligent I/O)	5 (Timer A) + 20 (Intelligent I/O)	5 (Timer A) + 8 (Intelligent I/O)	5 (Timer A) + 20 (Intelligent I/O)	5 (Timer A) + 8 (Intelligent I/O)	5 (Timer A) + 20 (Intelligent I/O)	5 (Timer A) + 10 (Intelligent I/O)	5 (Timer A) + 28 (Intelligent I/O)	5 (Timer A) + 10 (Intelligent I/O)	5 (Timer A) + 28 (Intelligent I/O)	5 (Timer A) + 10 (Intelligent I/O)	5 (Timer A) + 28 (Intelligent I/O)	
	Real-Time Port	3 (Intelligent I/O)	8 (Intelligent I/O)	3 (Intelligent I/O)	8 (Intelligent I/O)	3 (Intelligent I/O)	8 (Intelligent I/O)	3 (Intelligent I/O)	8 (Intelligent I/O)	3 (Intelligent I/O)	8 (Intelligent I/O)	3 (Intelligent I/O)	8 (Intelligent I/O)	4 (Intelligent I/O)	16 (Intelligent I/O)	4 (Intelligent I/O)	16 (Intelligent I/O)	
	Event Counter	11 (Timer A, Timer B)																
2-Phase Encoder Input	Event counter two-phase pulse signal processing × 3 (Timer A2, Timer A3, Timer A4) + 2 (Intelligent I/O)																	
3-Phase Inverter Control	Three-Phase Motor Control Timer × 1 (Timer A4, Timer A1, Timer A2, Timer B2, Dead Time Timer)																	
Watchdog Timer		15-bit (Prescaler) × 1																
Serial Interface	Clock Sync./ Clock Async.	5 (UART0 to UART4) + 2 (Intelligent I/O)																
I ² C-bus		5 (UART0 to UART4)																
IEBus		5 (UART0 to UART4) + 1 (Intelligent I/O)																
Smart Card/SIM		5 (UART0 to UART4)																
SSU/Special Serial I/O		5 (UART0 to UART4)																
CAN	Channels	1 (CAN2.0B)																
	Buffers	16																
IrDA		—																
CRC Calculation Circuit		1 (Based on CRC-CCITT)																
X/Y Converter		Yes																
I/O Ports	Input Only (Numbers)	1																
	CMOS I/O Only (Numbers)	85	121	85	121	85	121	85	121	85	121	85	121	85	121	85	121	
	N-Channel Open Drain Port (Numbers)	2 (P7_0, P7_1)																
	Pull-Up Resistor	Yes (Pull-up resistor can be set every four ports)																
Interrupts(Sources)	External	8																
Debugging Function	On-Chip Debug	—												Yes				
	On-Board Flash Program	—												Yes				
Other Functions	ROM Correction Function	4																
	Others	—																
Package		100-pin QFP, 100-pin LQFP, 144-pin LQFP																
Operating Frequency/Supply Voltage		32MHz/4.2 to 5.5V 20MHz/3.0 to 5.5V						32MHz/4.2 to 5.5V						32MHz/4.2 to 5.5V 20MHz/3.0 to 5.5V		32MHz/4.2 to 5.5V		
Operating Ambient Temperature (°C)		-20 to 85, -40 to 85						-40 to 85		-40 to 125				-20 to 85, -40 to 85		-40 to 85, -40 to 125		

* M: mask ROM version, F: flash memory version

• Specifications (M32C/80 Series)

Group		M32C/84																																			
Type No.		M30840SFP**	M30840SGP**	M30842SGP**	M30840MC-XXXFP*	M30840MC-XXXGP*	M30842MC-XXXGP*	M30840MCT-XXXGP**	M30842MCT-XXXGP**	M30840ME-XXXFP*	M30840ME-XXXGP*	M30842ME-XXXGP*	M30843MW-XXXFP	M30843MW-XXXGP	M30845MW-XXXGP	M30843FWFP**	M30843FWGP	M30845FWGP	M30843FHFP**	M30843FHGP	M30845FHGP	M30843FHTGP**	M30845FHTGP**	M30843FHUGP**	M30845FHUGP**	M30843FJFP**	M30843FJGP	M30845FJGP	M30843FJTG*	M30845FJTG**	M30843FJUG**	M30845FJUG**					
Memory	ROM(Bytes)	—		128K								192K				320K		320K + 4K				384K + 4K								512K + 4K							
	RAM(Bytes)	10K								16K				24K																							
	ROM Type*	L		M								F																									
	Data Flash	—								Yes																											
	Program Security	—								ID code check function, ROM code protecting function																											
CPU	CPU	M32C/80 Core																																			
	Basic Instructions	108																																			
	Minimum Instruction Execution Time (ns)	31.3 (@32MHz)																																			
	Multiplier	16 × 16 → 32																																			
	Multiply-Accumulate Instruction	16 × 16 + 48 → 48																																			
DMA	Barrel Shifter	Yes																																			
	DMAC (Channels)	4																																			
External Bus Expansion	DTC/DMAC II	DMAC II (Starts by all peripheral interrupt factors)																																			
	Address Space (Bytes)	16M								—		16M								—		16M								—							
	External Bus Interface	Support for insertion of 1 to 6 wait states, Outputs 4 chip-select signals (CS0, CS1, CS2, CS3), Page mode support (ROMless version only).								—		Support for insertion of 1 to 6 wait states, Outputs 4 chip-select signals (CS0, CS1, CS2, CS3)								—		Support for insertion of 1 to 6 wait states, Outputs 4 chip-select signals (CS0, CS1, CS2, CS3)								—							
	Bus Structure	Selectable from Separate bus, Multiplex bus, Address Bus Width can be selected (8-bit/16-bit), The number of output address buses can be selected (16/20)								—		Selectable from Separate bus, Multiplex bus, Address Bus Width can be selected (8-bit/16-bit), The number of output address buses can be selected (16/20)								—		Selectable from Separate bus, Multiplex bus, Address Bus Width can be selected (8-bit/16-bit), The number of output address buses can be selected (16/20)								—							
	DRAM Controller	—																																			
Clock	Clock Generation Circuit	4 circuits (Main clock, PLL, Sub-clock and On-chip oscillator)																																			
	PLL	Yes																																			
	Subclock	Yes																																			
	On-Chip Oscillator	Yes																																			
	Oscillation Stop Detection	Yes																																			
	Frequency Divider	1/n (n = 1, 2, 3, 4, 6, 8, 10, 12, 14, 16)																																			
Power Supply Voltage Detection	Power Save	Normal operating mode (High-Speed, Medium-Speed, Low-Speed, Low-Power Consumption, On-chip Oscillator, On-chip Oscillator Low-Power Consumption), Wait mode and Stop mode																																			
A/D Converter	Low Voltage Detection/LVD	Low voltage								—		Low voltage								—		Low voltage								—							
	Resolution × Channels	10-bit × 10	10-bit × 18	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34						
	Sample and Hold	Yes																																			
D/A Converter	Multi-Channel Sample and Hold	—																																			
	Resolution × Channels	8-bit × 2																																			
Timer	16-bit	Timer A × 5, Timer B × 6																																			
	Input Capture	8																																			
	Output Compare	8																																			
	PWM Output	5 (Timer A) + 8 (Intelligent I/O)																																			
	Real-Time Port	—																																			
	Event Counter	11 (Timer A, Timer B)																																			
	2-Phase Encoder Input	Event counter two-phase pulse signal processing × 3 (Timer A2, Timer A3, Timer A4) + 1 (Intelligent I/O)																																			
	3-Phase Inverter Control	Three-Phase Motor Control Timer × 1 (Timer A4, Timer A1, Timer A2, Timer B2, Dead Time Timer)																																			
Watchdog Timer	Yes																																				
Serial Interface	Clock Sync./ Clock Async.	5 (UART0 to UART4) + 2 (Intelligent I/O) ¹																																			
I ² C-bus		5 (UART0 to UART4)																																			
IEBus		5 (UART0 to UART4)																																			
Smart Card/SIM		5 (UART0 to UART4)																																			
SSU/Special Serial I/O		5 (UART0 to UART4)																																			
CAN	Channels	1 (CAN2.0B)																																			
	Buffers	16																																			
IrDA		—																																			
CRC Calculation Circuit		1 (Based on CRC-CCITT)																																			
X/Y Converter		Yes																																			
I/O Ports	Input Only (Numbers)	1																																			
	CMOS I/O Only (Numbers)	45	81	85	121	85	121	85	121	85	121	85	121	85	121	85	121	85	121	85	121	85	121	85	121	85	121	85	121	85	121						
	N-Channel Open Drain Port (Numbers)	2 (P7_0, P7_1)																																			
	Pull-Up Resistor	Yes (Pull-up resistor can be set every four ports)																																			
Interrupts(Sources)	External	8																																			
Debugging Function	On-Chip Debug	—								Yes																											
	On-Board Flash Program	—								Yes																											
Other Functions	ROM Correction Function	8																																			
	Others	—																																			
Package		100-pin QFP, 100-pin LQFP, 144-pin LQFP																																			
Operating Frequency/Supply Voltage		32MHz/4.2 to 5.5V 20MHz/3.0 to 5.5V								32MHz/ 4.2 to 5.5V		32MHz/4.2 to 5.5V 20MHz/3.0 to 5.5V								32MHz/ 4.2 to 5.5V		32MHz/4.2 to 5.5V 20MHz/3.0 to 5.5V								32MHz/ 4.2 to 5.5V							
Operating Ambient Temperature (°C)		-20 to 85, -40 to 85								-40 to 85		-20 to 85, -40 to 85								-40 to 85, -40 to 105		-20 to 85, -40 to 85								-40 to 85, -40 to 105							

¹ Clock asynchronous (UART) of Intelligent I/O is 1 channel.

* L: ROM-less version, M: mask ROM version, F: flash memory version

★ : New product ★★ : Under development

• Specifications (M32C/80 Series)

Group		M32C/85																																			
Type No.		M30853MW-XXXFP	M30853MW-XXG	M30855MW-XXG	M30853FWFP**	M30853FWG	M30855FWG	M30853FWTGP*	M30855FWTGP**	M30853FWUGP*	M30855FWUGP*	M30853FHFP**	M30853FHGP	M30855FHGP	M30853FHTGP*	M30855FHTGP*	M30853FHUGP**	M30855FHUGP**	M30853FJFP**	M30853FJGP	M30855FJGP	M30853FJTGP**	M30855FJTGP**	M30853FJUGP**	M30855FJUGP**												
Memory	ROM(Bytes)	320K				320K + 4K						384K + 4K								512K + 4K																	
	RAM(Bytes)	24K																																			
	ROM Type*	M		F																																	
	Data Flash	—		Yes																																	
	Program Security	—		ID code check function, ROM code protecting function																																	
CPU	CPU	M32C/80 Core																																			
	Basic Instructions	108																																			
	Minimum Instruction Execution Time (ns)	31.3 (@32MHz)																																			
	Multiplier	16 × 16 → 32																																			
	Multiply-Accumulate Instruction	16 × 16 + 48 → 48																																			
DMA	Barrel Shifter	Yes																																			
	DMAC (Channels)	4																																			
External Bus Expansion	DTC/DMAC II	DMAC II (Starts by all peripheral interrupt factors)																																			
	Address Space (Bytes)	16M						—						16M						—						16M						—					
	External Bus Interface	Support for insertion of 1 to 6 wait states, Outputs 4 chip-select signals (CS0, CS1, CS2, CS3), Page mode support (ROMless version only).						—						Support for insertion of 1 to 6 wait states, Outputs 4 chip-select signals (CS0, CS1, CS2, CS3)						—						Support for insertion of 1 to 6 wait states, Outputs 4 chip-select signals (CS0, CS1, CS2, CS3)						—					
	Bus Structure	Selectable from Separate bus, Multiplex bus, Address Bus Width can be selected (8-bit/16-bit), The number of output address buses can be selected (16/20)						—						Selectable from Separate bus, Multiplex bus,Address Bus Width can be selected (8-bit/16-bit), The number of output address buses can be selected (16/20)						—						Selectable from Separate bus, Multiplex bus,Address Bus Width can be selected (8-bit/16-bit), The number of output address buses can be selected (16/20)						—					
	DRAM Controller	—																																			
Clock	Clock Generating Circuit	4 circuits (Main clock, PLL, Sub-clock and On-chip oscillator)																																			
	PLL	Yes																																			
	Subclock	Yes																																			
	On-Chip Oscillator	Yes																																			
	Oscillation Stop Detection	Yes																																			
	Frequency Divider	1/n (n = 1, 2, 3, 4, 6, 8, 10, 12, 14, 16)																																			
Power Supply Voltage Detection	Power Save	Normal operating mode (High-Speed, Medium-Speed, Low-Speed, Low-Power Consumption, On-chip Oscillator, On-chip Oscillator Low-Power Consumption), Wait mode and Stop mode																																			
A/D Converter	Low Voltage Detection/LVD	Low voltage						—						Low voltage						—						Low voltage						—					
	Resolution × Channels	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34												
	Sample and Hold	Yes																																			
D/A Converter	Multi-Channel Sample and Hold	—																																			
	Resolution × Channels	8-bit × 2																																			
Timer	16-bit	Timer A × 5, Timer B × 6																																			
	Input Capture	8																																			
	Output Compare	8																																			
	PWM Output	5 (Timer A) + 8 (Intelligent I/O)																																			
	Real-Time Port	—																																			
	Event Counter	11 (Timer A, Timer B)																																			
	2-Phase Encoder Input	Event counter two-phase pulse signal processing × 3 (Timer A2, Timer A3, Timer A4) + 1 (Intelligent I/O)																																			
3-Phase Inverter Control	Three-Phase Motor Control Timer × 1 (Timer A4, Timer A1, Timer A2, Timer B2, Dead Time Timer)																																				
Watchdog Timer		Yes																																			
Serial Interface	Clock Sync./ Clock Async.	5 (UART0 to UART4) + 2 (Intelligent I/O) ¹																																			
I ² C-bus		5 (UART0 to UART4)																																			
IEBus		5 (UART0 to UART4)																																			
Smart Card/SIM		5 (UART0 to UART4)																																			
SSU/Special Serial I/O		5 (UART0 to UART4)																																			
CAN	Channels	2 (CAN2.0B)																																			
	Buffers	16																																			
IrDA		—																																			
CRC Calculation Circuit		1 (Based on CRC-CCITT)																																			
X/Y Converter		Yes																																			
I/O Ports	Input Only (Numbers)	1																																			
	CMOS I/O Only (Numbers)	85	121	85	121	85	121	85	121	85	121	85	121	85	121	85	121	85	121	85	121	85	121	85	121												
	N-Channel Open Drain Port (Numbers)	2 (P7_0, P7_1)																																			
	Pull-Up Resistor	Yes (Pull-up resistor can be set every four ports)																																			
Interrupts(Sources)	External	8																																			
Debugging Function	On-Chip Debug	—		Yes																																	
	On-Board Flash Program	—		Yes																																	
Other Functions	ROM Correction Function	8																																			
	Others	—																																			
Package		100-pin QFP, 100-pin LQFP- 144-pin LQFP																																			
Operating Frequency/Supply Voltage		32MHz/4.2 to 5.5V 20MHz/3.0 to 5.5V						32MHz/ 4.2 to 5.5V						32MHz/4.2 to 5.5V 20MHz/3.0 to 5.5V						32MHz/ 4.2 to 5.5V																	
Operating Ambient Temperature (°C)		-20 to 85, -40 to 85						-40 to 85 -40 to 105						-20 to 85, -40 to 85						-40 to 85 -40 to 105						-20 to 85, -40 to 85						-40 to 85 -40 to 105					

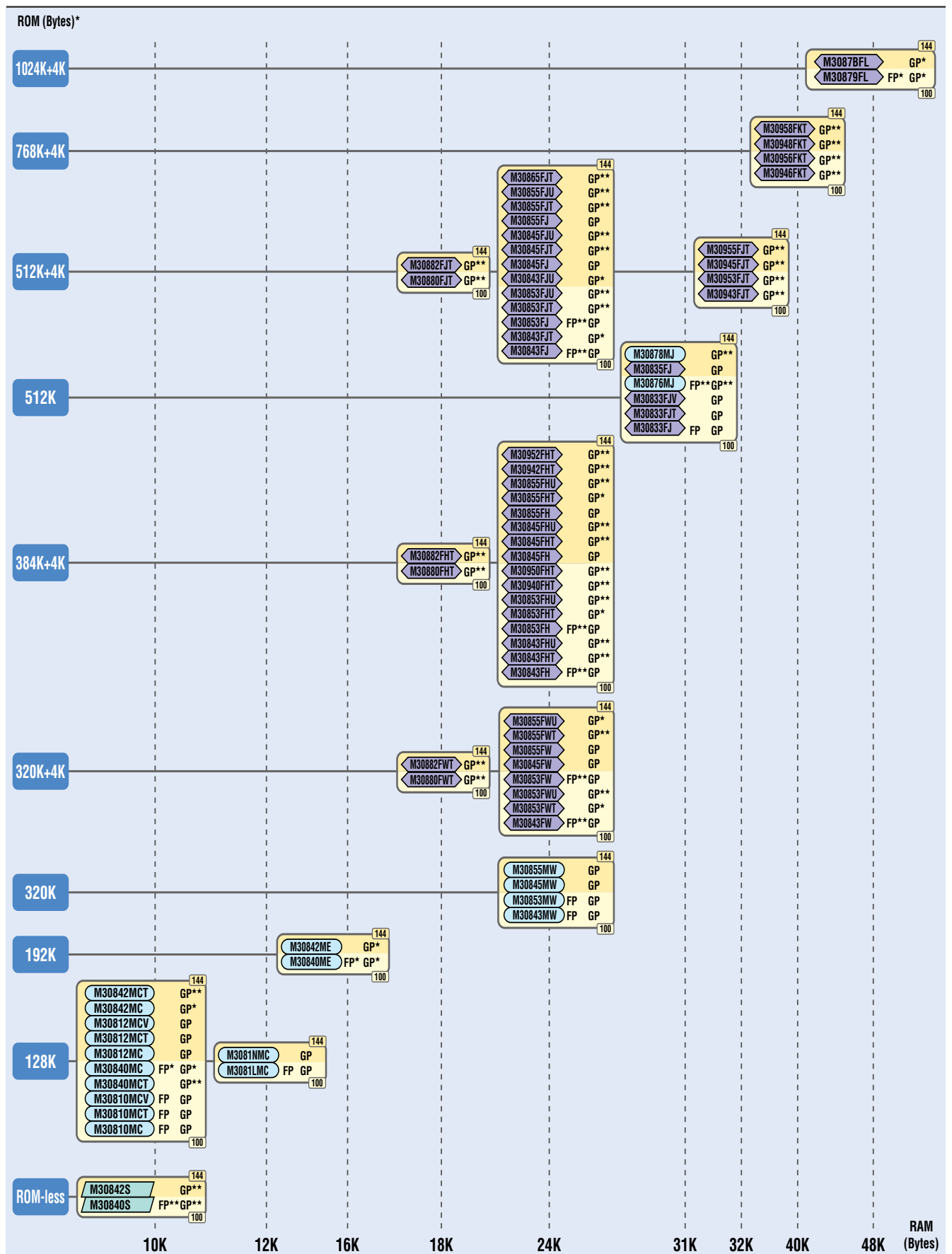
• Specifications (M32C/90, M32C/80 Series)

Group		M32C/86**		M32C/87**					M32C/88**					M32C/94**					M32C/95**														
Type No.		M30865FJTGp**	M30876MJ-XXXP**	M30876MJ-XXXP**	M30876MJ-XXXP**	M30879FLP*	M30879FLGp*	M30879FLGp*	M30880FWTGP**	M30882FWTGP**	M30880FHTGP**	M30882FHTGP**	M30880FJTGp**	M30882FJTGp**	M30940FHTGP**	M30942FHTGP**	M30943FJTGp**	M30945FJTGp**	M30946FKTGP**	M30948FKTGP**	M30950FHTGP**	M30952FHTGP**	M30953FJTGp**	M30955FJTGp**	M30956FKTGP**	M30958FKTGP**							
Memory	ROM(Bytes)	512K + 4K	512K		1M + 4K		320K + 4K		384K + 4K	512K + 4K	384K + 4K		24K	32K	40K	24K	32K	40K	24K	32K	40K	24K	32K	40K	24K	32K	40K						
	RAM(Bytes)	24K	31K		48K		18K																										
	ROM Type*	F	M																														
	Data Flash	Yes	—																														
Program Security		ID code check function, ROM code protecting function (Only Flash memory version)																															
CPU	CPU	M32C/80 Core												M32C/80 double speed CPU core																			
	Basic Instructions	108																															
	Minimum Instruction Execution Time (ns)	31.3 (@32MHz)												15.6 (@64MHz)																			
	Multiplier	16 × 16 → 32																															
	Multiply-Accumulate Instruction	16 × 16 + 48 → 48																															
DMA	Barrel Shifter	Yes																															
	DMAC (Channels)	4																															
DTC/DMAC II		DMAC II (Starts by all peripheral interrupt factors)																															
External Bus Expansion	Address Space (Bytes)	—	16M																														
	External Bus Interface	—	Support for insertion of 1 to 6 wait states, Outputs 4 chip-select signals (CS0, CS1, CS2, CS3)																														
	Bus Structure	—	Selectable from Separate bus, Multiplex bus, Address Bus Width can be selected (8-bit/16-bit), The number of output address buses can be selected (16/20)																														
	DRAM Controller	—																															
Clock	Clock Generation Circuit	4 circuits (Main clock, PLL, Sub-clock and On-chip oscillator)																															
	PLL	Yes																															
	Subclock	Yes																															
	On-Chip Oscillator	Yes																															
	Oscillation Stop Detection	Yes																															
	Frequency Divider	1/n (n = 1, 2, 3, 4, 6, 8, 10, 12, 14, 16)																															
	Power Save	Normal operating mode (High-Speed, Medium-Speed, Low-Speed, Low-Power Consumption, On-chip Oscillator, On-chip Oscillator Low-Power Consumption), Wait mode and Stop mode																															
Power Supply Voltage Detection	Low Voltage Detection/LVD	—	Low voltage																														
A/D Converter	Resolution × Channels	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34	10-bit × 26	10-bit × 34					
	Sample and Hold	Yes																															
	Multi-Channel Sample and Hold	—																															
D/A Converter	Resolution × Channels	8-bit × 2																															
Timer	16-bit	Timer A × 5, Timer B × 6																															
	Input Capture	8												16																			
	Output Compare	8	10	16	10	16	8												16														
	PWM Output	5 (Timer A) + 8 (Intelligent I/O)	5 (Timer A) + 10 (Intelligent I/O)	5 (Timer A) + 16 (Intelligent I/O)	5 (Timer A) + 10 (Intelligent I/O)	5 (Timer A) + 16 (Intelligent I/O)	5 (Timer A) + 8 (Intelligent I/O)					5 (Timer A) + 16 (Intelligent I/O)																					
	Real-Time Port	—	3 (Intelligent I/O)	3 (Intelligent I/O)	3 (Intelligent I/O)	3 (Intelligent I/O)																											
	Event Counter	11 (Timer A, Timer B)																															
	2-Phase Encoder Input	Event counter two-phase pulse signal processing × 3 (Timer A2, Timer A3, Timer A4) + 1 (Intelligent I/O)																															
3-Phase Inverter Control		Three-Phase Motor Control Timer × 1 (Timer A4, Timer A1, Timer A2, Timer B2, Dead Time Timer)																															
Watchdog Timer		Yes																															
Serial Interface	Clock Sync./ Clock Async.	5 (UART0 to UART5) + 2 (Intelligent I/O) ¹	6 (UART0 to UART5) + 2 (Intelligent I/O) ¹	7 (UART0 to UART5) + 2 (Intelligent I/O) ¹	6 (UART0 to UART5) + 2 (Intelligent I/O) ¹	7 (UART0 to UART5) + 2 (Intelligent I/O) ¹	5 (UART0 to UART4) + 2 (Intelligent I/O) ¹					7 (UART0 to UART6) ²																					
I ² C-bus		5 (UART0 to UART4)																															
IEBus		5 (UART0 to UART4)	5 (UART0 to UART4) + 1 (Intelligent I/O)					5 (UART0 to UART4)																									
Smart Card/SIM		5 (UART0 to UART4)																															
SSU/Special Serial I/O		5 (UART0 to UART4)																															
CAN	Channels	2 (CAN2.0B)					3 (CAN2.0B)					2 (CAN2.0B)					3 (CAN2.0B)																
	Buffers	16					3 (16) or 1 (16) + 1 (32)					1 (16) + 1 (32)					2 (16) + 1 (32)																
IrDA		—	1 (UART0)																														
CRC Calculation Circuit		1 (Based on CRC-CCITT)																															
X/Y Converter		Yes																															
I/O Ports	Input Only (Numbers)	1																															
	CMOS I/O Only (Numbers)	121	85	121	85	121	85	121	85	121	85	121	85	121	85	121	85	121	85	121	85	121	85	121	85	121	85	121					
	N-Channel Open Drain Port (Numbers)	2 (P7_0, P7_1)																															
	Pull-Up Resistor	Yes (Pull-up resistor can be set every four ports)																															
Interrupts/Sources	External	8	11	8	11	8					8	11	8	11	8	11	8	11	8	11	8	11	8	11	8	11	8	11					
Debugging Function	On-Chip Debug	Yes (Only Flash memory version)																															
	On-Board Flash Program	Yes (Only Flash memory version)																															
Other functions	ROM Correction Function	8																															
	Others	—																															
Package		144-pin LQFP	100-pin QFP, 100-pin LQFP, 144-pin LQFP					100-pin LQFP, 144-pin LQFP																									
Operating Frequency/Supply Voltage		32MHz/ 4.2 to 5.5V	32MHz/4.2 to 5.5V 20MHz/3.0 to 5.5V					32MHz/ 4.2 to 5.5V					64MHz/ 4.2 to 5.5V																				
Operating Ambient Temperature (°C)		-40 to 85	-20 to 85, -40 to 85					-40 to 85																									

¹ Clock asynchronous (UART) of Intelligent I/O is 1 channel. ★ : New product ★★ : Under development
² At 100-pin version, Clock Sync. Serial : 6 channel Clock Async. Serial (UART) : 7 channel
 * M: mask ROM version, F: flash memory version

• Memory Capacity (ROM/RAM) (M32C/90, M32C/80 Series)

144-pin 140 100-pin 100



- The M in M3xxxMx indicates the mask ROM version.
 - The F in M3xxxFx indicates the flash memory version.
 - The S in M3xxxSx indicates the ROM less version.
- * The notation "+4K" refers to data flash memory.

Package				Lead Pitch (mm)
100-pin	FP	100-pin	QFP (PRQP0100JB-A(100P6S-A))	0.65
	GP	100-pin	LQFP (PLQP0100KB-A(100P6Q-A))	0.5
144-pin	GP	144-pin	LQFP (PLQP0144KA-A(144P6Q-A))	0.5

★ : New product ★★ : Under development
 * It is an old package code inside ()

• Specifications (M16C/60 Series)

Group		M16C/6N4*														M16C/6N5*									
Type No.		M306N4FCGP**	M306N4FCTFP*	M306N4FCTGP**	M306N4FCVFP*	M306N4FCVGP**	M306N4FGGP**	M306N4FGTTP*	M306N4FGTGP**	M306N4FGVFP*	M306N4FGVGP**	M306N4MCT-XXXGP**	M306N4MCT-XXXFP*	M306N4MCT-XXXGP**	M306N4MCT-XXXFP*	M306N4MGT-XXXGP**	M306N4MGT-XXXFP*	M306N4MGV-XXXGP**	M306N4MGV-XXXFP*						
Memory	ROM(Bytes)	128K + 4K				256K + 4K				128K				256K				128K + 4K				128K			
	RAM(Bytes)	5K				10K				5K				10K				5K							
	ROM Type*	F								M								F				M			
	Data Flash	Block A								—								Block A				—			
	Program Security	ID code check function, ROM code protecting function (Only Flash memory version)																							
CPU	CPU	M16C/60 Core																							
	Basic Instructions	91																							
	Minimum Instruction Execution Time (ns)	Non-T-ver:41.6 (@24MHz), T-ver:50 (@20MHz), V-ver:50 (@20MHz)																							
	Multiplier	16×16→32																							
	Multiply-Accumulate Instruction	16×16+32→32																							
DMA	DMAC (Channels)	2																							
External Bus Expansion	Address Space (Bytes)	1M																							
	External Bus Interface	0 to 3 wait, CS 4																							
	Bus Structure	Separate bus, Multiplex bus																							
Clock	Clock Generation Circuit	4 circuits (Main clock, PLL, Sub-clock and On-chip oscillator)																							
	PLL	Yes																							
	Subclock	Yes																							
	On-Chip Oscillator	Yes																							
	Oscillation Stop Detection	Yes																							
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)																							
Power Save	Normal operating mode, Wait mode, Stop mode, Low-Power Consumption mode																								
Power Supply Voltage Detection	Low Voltage Detection/LVD	—																							
A/D Converter	Resolution×Channels	10-bit×26																							
	Sample and Hold	Yes																							
D/A Converter	Resolution×Channels	8-bit×2																							
Timer	16-bit	Timer A×5, Timer B×6																							
	Input Capture	—																							
	Output Compare	—																							
	PWM Output	Timer A																							
	Event Counter	Timer A, Timer B																							
	2-Phase Encoder Input	Timer A (Two-phase pulse signal processing)																							
3-Phase Inverter Control	Three-Phase Motor Control (Timer A, Timer B)																								
Watchdog Timer		Yes																							
Serial Interface	Clock Sync./ Clock Async.	3 (UART0 to UART2)																							
	Clock Sync. Only	1 (SI/O3)																							
	Clock Async. Only	—																							
I ² C-bus		3 (UART0 to UART2)																							
IEBus		3 (UART0 to UART2)																							
Smart Card/SIM		1 (UART2)																							
SSU/Special Serial I/O		3 (UART0 to UART2)																							
CAN	Channels	2 (CAN2.0B)												1 (CAN2.0B)											
	Buffers	16 (transmit/receive buffers)																							
CRC Calculation Circuit		1 (Based on CRC-CCITT)																							
I/O Ports	Input Only (Numbers)	1																							
	CMOS I/O Only (Numbers)	85																							
	N-Channel Open Drain Port (Numbers)	2 (P7_1, P9_1)																							
	Pull-Up Resistor	Yes																							
Interrupts(Sources)	External	9																							
Debugging Function	On-Chip Debug	Yes (Only Flash memory version)																							
	On-Board Flash Program	Yes (Only Flash memory version)																							
Other Functions	ROM Correction Function	Address agreement×2																							
Package		100-pin QFP, 100-pin LQFP																							
Operating Frequency/Supply Voltage		Non-T-ver:24MHz/3.0 to 5.5V, T-ver:20MHz/4.2 to 5.5V, V-ver:20MHz/4.2 to 5.5V																							
Operating Ambient Temperature (°C)		Non-T-ver:-40 to 85, T-ver:-40 to 85, V-ver:-40 to 125																							

* F: flash memory version, M: mask ROM version

★ : New product ★★ : Under development

• Specifications (M16C/60 Series)

Group		M16C/6NK*								M16C/6NL*			
Type No.		M306NKFHGP**	M306NKFHTGP**	M306NKFHVGP**	M306NKFJGP**	M306NKFJTGP**	M306NKFJVG**	M306NKMEXXXGP*	M306NKMGMXXXGP*	M306NLFHGP*	M306NLFJGP**	M306NLMEXXXGP*	M306NLMGMXXXGP*
Memory	ROM(Bytes)	384K + 4K			512K + 4K			192K	256K	384K + 4K	512K + 4K	192K	256K
	RAM(Bytes)	31K						16K	20K	31K		16K	20K
	ROM Type*	F						M		F		M	
	Data Flash	Block A						—		Block A		—	
	Program Security	ID code check function, ROM code protecting function (Only Flash memory version)											
CPU	CPU	M16C/60 Core											
	Basic Instructions	91											
	Minimum Instruction Execution Time (ns)	Non-T-Ver:41.6 (@24MHz), T-Ver:50 (@20MHz), V-Ver:50 (@20MHz)											
	Multiplier	16 × 16 → 32											
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32											
DMA	DMAC (Channels)	2											
External Bus Expansion	Address Space (Bytes)	—											
	External Bus Interface	—											
	Bus Structure	—											
Clock	Clock Generation Circuit	4 circuits (Main clock, PLL, Sub-clock and On-chip oscillator)											
	PLL	Yes											
	Subclock	Yes											
	On-Chip Oscillator	Yes											
	Oscillation Stop Detection	Yes											
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)											
	Power Save	Normal operating mode, Wait mode, Stop mode, Low-Power Consumption mode											
Power Supply Voltage Detection	Low Voltage Detection/LVD	—											
A/D Converter	Resolution × Channels	10-bit × 26											
	Sample and Hold	Yes											
D/A Converter	Resolution × Channels	8-bit × 2											
Timer	16-bit	Timer A × 5, Timer B × 6											
	Input Capture	—											
	Output Compare	—											
	PWM Output	Timer A											
	Event Counter	Timer A, Timer B											
	2-Phase Encoder Input	Timer A (Two-phase pulse signal processing)											
3-Phase Inverter Control	Three-Phase Motor Control (Timsr A, Timer B)												
Watchdog Timer		Yes											
Serial Interface	Clock Sync./ Clock Async.	3 (UART0 to UART2)											
	Clock Sync. Only	2 (SI/O3, SI/O4)											
	Clock Async. Only	—											
I ² C-bus		3 (UART0 to UART2)											
IEBus		3 (UART0 to UART2)											
Smart Card/SIM		1 (UART2)											
SSU/Special Serial I/O		3 (UART0 to UART2)											
CAN	Channels	2 (CAN2.0B)							1 (CAN2.0B)				
	Buffers	16 (transmit/receive buffers)											
CRC Calculation Circuit		1 (Based on CRC-CCITT)											
I/O Ports	Input Only (Numbers)	1											
	CMOS I/O Only (Numbers)	85											
	N-Channel Open Drain Port (Numbers)	2 (P7_1, P9_1)											
	Pull-Up Resistor	Yes											
Interrupts(Sources)	External	9											
Debugging Function	On-Chip Debug	Yes (Only Flash memory version)											
	On-Board Flash Program	Yes (Only Flash memory version)											
Other Functions	ROM Correction Function	Address agreement × 2											
Package		100-pin LQFP											
Operating Frequency/Supply Voltage		Non-T-ver:24MHz/3.0 to 5.5V, T-ver:20MHz/4.2 to 5.5V, V-ver:20MHz/4.2 to 5.5V											
Operating Ambient Temperature (°C)		Non-T-ver:-40 to 85, T-ver:-40 to 85, V-ver:-40 to 125											

* F: flash memory version, M: mask ROM version

★ : New product ★★ : Under development

• Specifications (M16C/60 Series)

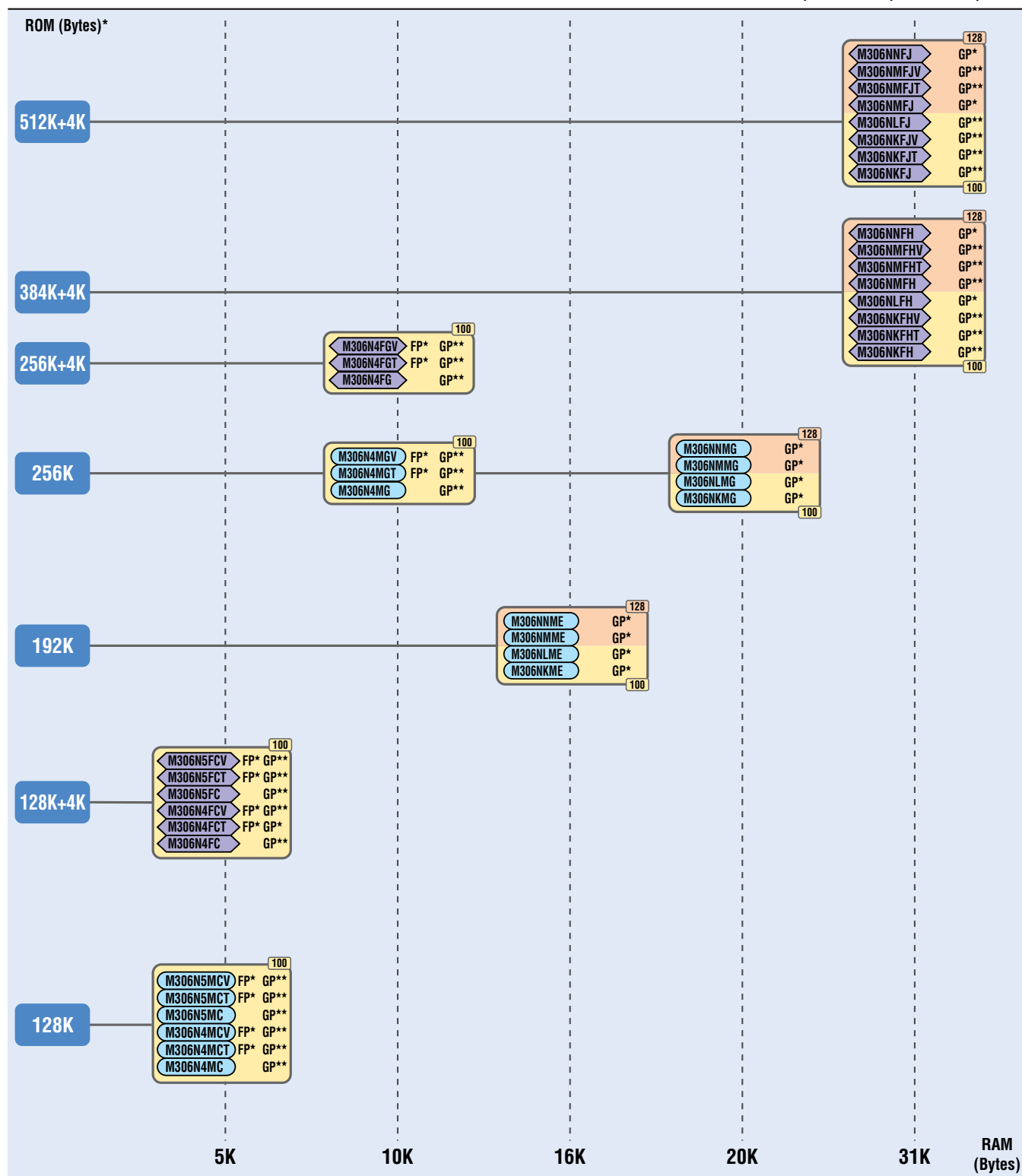
Group		M16C/6NM*								M16C/6NN*			
Type No.		M306NMFHGP**	M306NMFHTGP**	M306NMFHVGP**	M306NMFJGP*	M306NMFJTGP**	M306NMFJVG**	M306NMME-XXXGP*	M306NMMG-XXXGP*	M306NMFHGP*	M306NMFJGP*	M306NMME-XXXGP*	M306NMMG-XXXGP*
Memory	ROM(Bytes)	384K + 4K			512K + 4K			192K	256K	384K + 4K	512K + 4K	192K	256K
	RAM(Bytes)	31K						16K	20K	31K		16K	20K
	ROM Type*	F						M		F		M	
	Data Flash	Block A						—		Block A		—	
	Program Security	ID code check function, ROM code protecting function (Only Flash memory version)											
CPU	CPU	M16C/60 Core											
	Basic Instructions	91											
	Minimum Instruction Execution Time (ns)	Non-T-Ver:41.6 (@24MHz), T-Ver:50 (@20MHz), V-Ver:50 (@20MHz)											
	Multiplier	16 × 16 → 32											
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32											
DMA	DMAC (Channels)	2											
External Bus Expansion	Address Space (Bytes)	—											
	External Bus Interface	—											
	Bus Structure	—											
Clock	Clock Generation Circuit	4 circuits (Main clock, PLL, Sub-clock and On-chip oscillator)											
	PLL	Yes											
	Subclock	Yes											
	On-Chip Oscillator	Yes											
	Oscillation Stop Detection	Yes											
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)											
	Power Save	Normal operating mode, Wait mode, Stop mode, Low-Power Consumption mode											
Power Supply Voltage Detection	Low Voltage Detection/LVD	—											
A/D Converter	Resolution × Channels	10-bit × 26											
	Sample and Hold	Yes											
D/A Converter	Resolution × Channels	8-bit × 2											
Timer	16-bit	Timer A × 5, Timer B × 6											
	Input Capture	—											
	Output Compare	—											
	PWM Output	Timer A											
	Event Counter	Timer A, Timer B											
	2-Phase Encoder Input	Timer A (Two-phase pulse signal processing)											
	3-Phase Inverter Control	Three-Phase Motor Control (Timrs A, Timer B)											
Watchdog Timer		Yes											
Serial Interface	Clock Sync./ Clock Async.	3 (UART0 to UART2)											
	Clock Sync. Only	4 (SI/O3, SI/O4, SI/O5, SI/O6)											
	Clock Async. Only	—											
I ² C-bus		3 (UART0 to UART2)											
IEBus		3 (UART0 to UART2)											
Smart Card/SIM		1 (With UART2)											
SSU/Special Serial I/O		3 (UART0 to UART2)											
CAN	Channels	2 (CAN2.0B)						1 (CAN2.0B)					
	Buffers	16 (transmit/receive buffers)											
CRC Calculation Circuit		1 (Based on CRC-CCITT)											
I/O Ports	Input Only (Numbers)	1											
	CMOS I/O Only (Numbers)	111											
	N-Channel Open Drain Port (Numbers)	2 (P7_1, P9_1)											
	Pull-Up Resistor	Yes											
Interrupts(Sources)	External	12											
Debugging Function	On-Chip Debug	Yes (Only Flash memory version)											
	On-Board Flash Program	Yes (Only Flash memory version)											
Other Functions	ROM Correction Function	Address agreement × 2											
Package		128-pin LQFP											
Operating Frequency/Supply Voltage		Non-T-ver:24MHz/3.0 to 5.5V, T-ver:20MHz/4.2 to 5.5V, V-ver:20MHz/4.2 to 5.5V											
Operating Ambient Temperature (°C)		Non-T-ver:-40 to 85, T-ver:-40 to 85, V-ver:-40 to 125											

* F: flash memory version, M: mask ROM version

★ : New product ★★ : Under development

- **Memory Capacity (ROM/RAM) (M16C/60 Series)**

128-pin 80 100-pin 64 80-pin 80



 The M in M3xxxxMx indicates the mask ROM version.

 The F in M3xxxxFx indicates the flash memory version.

*1 The notation “+4K” refers to data flash memory.

Package				Lead Pitch (mm)
80-pin	GP	80-pin	QFP (PRQP0080JA-A(80P6S-A))	0.65
100-pin	FP	100-pin	QFP (PRQP0100JB-A(100P6S-A))	0.65
	GP	100-pin	LQFP (PLQP0100KB-A(100P6Q-A))	0.5
128-pin	GP	128-pin	LQFP (PLQP0128KB-A(128P6Q-A))	0.5

★ : New product ★★ : Under development

* It is an old package code inside ()

• Specifications (M16C/Tiny Series)

Group		M16C/29**																							
Type No.		M30290M8-XXXHP**	M30290F8HP**	M30290MA-XXXHP**	M30290FAHP**	M30290FATHP**	M30290FAVHP**	M30290MC-XXXHP**	M30290FCHP**	M30290FCTHP**	M30290FCVHP**	M30291M8-XXXHP**	M30291F8HP**	M30291MA-XXXHP**	M30291FAHP**	M30291FATHP**	M30291FAVHP**	M30291MC-XXXHP**	M30291FCHP**	M30291FCTHP**	M30291FCVHP**				
Memory	ROM(Bytes)	64K	64K+4K	96K	96K + 4K		128K	128K+4K		64K	64K+4K	96K	96K + 4K		128K	128K + 4K									
	RAM(Bytes)	4K		8K				12K				4K		8K				12K							
	ROM Type*	M	F	M	F		M	F		M	F	M	F		M	F									
	Data Flash	—	Block A, Block B	—	Block A, Block B		—	Block A, Block B		—	Block A, Block B	—	Block A, Block B		—	Block A, Block B									
	Program Security	ID code check function, ROM code protecting function (Only Flash memory version)																							
CPU	CPU	M16C/60 Core																							
	Basic Instructions	91																							
	Minimum Instruction Execution Time (ns)	50 (@20MHz)				62.5 (@16MHz)	50 (@20MHz)				62.5 (@16MHz)	50 (@20MHz)				62.5 (@16MHz)	50 (@20MHz)				62.5 (@16MHz)				
	Multiplier	16 × 16 → 32																							
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32																							
DMA	DMAC (Channels)	2																							
Clock	Clock Generation Circuit	4 circuits (Main clock, PLL, Sub-clock and On-chip oscillator)																							
	PLL	Yes																							
	Subclock	Yes																							
	On-Chip Oscillator	Yes																							
	Oscillation Stop Detection	Yes																							
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)																							
Power Supply Voltage Detection	Low Voltage Detection/LVD	Low voltage detection				—		Low voltage detection		—		Low voltage detection				—		Low voltage detection		—					
A/D Converter	Resolution × Channels	10-bit × 27										10-bit × 16													
	Sample and Hold	Yes																							
	Multi-Channel Sample and Hold	Yes				—		Yes		—		Yes				—		Yes		—					
D/A Converter	Resolution × Channels	—																							
Timer	8-bit	—																							
	16-bit	Timer A × 5, Timer B × 3																							
	Input Capture	8 (Timer S)																							
	Output Compare	8 (Timer S)																							
	PWM Output	5 (Timer A) + 8 (Timer S)																							
	Event Counter	5 (Timer A) + 3 (Timer B)																							
	2-Phase Encoder Input	Two-phase pulse signal processing × 4 (Timer A2, Timer A3, Timer A4, Timer S)																							
	3-Phase Inverter Control	Three-Phase Motor Control × 1 (Timer A, Timer B)																							
Watchdog Timer		Yes																							
Serial Interface	Clock Sync./ Clock Async.	3 (UART0 to UART2)										1 (SI/O3)													
	Clock Sync. Only	2 (SI/O3, SI/O4)										—													
	Clock Async. Only	—																							
I ² C-bus		2 (Multi master I ² C bus interface, UART2)																							
IEBus		1 (UART2)																							
Smart Card/SIM		1 (UART2)																							
SSU/Special Serial I/O		1 (UART2:Special mode 2)																							
CAN	Channels	1 (CAN2.0B)																							
	Buffers	16 (transmit/receive buffers)																							
CRC Calculation Circuit		1 (Based on CRC-CCITT and CRC-16)																							
I/O Ports	Input Only (Numbers)	—										55													
	CMOS I/O Only (Numbers)	71										—													
	N-Channel Open Drain Port (Numbers)	—																							
	Pull-Up Resistor	Yes																							
Interrupts(Sources)	External	8																							
	On-Chip Debug	Yes (Only Flash memory version)																							
Debugging Function	On-Board Flash Program	Yes (Only Flash memory version)																							
	ROM Correction Function	Address agreement × 2																							
Package		80-pin LQFP										64-pin LQFP													
Operating Frequency/Supply Voltage		20MHz/3.0 to 5.5V 10MHz/2.7 to 5.5V				20MHz/ 3.0 to 5.5V 4.2 to 5.5V				20MHz/3.0 to 5.5V 10MHz/2.7 to 5.5V				20MHz/ 3.0 to 5.5V 4.2 to 5.5V				20MHz/3.0 to 5.5V 10MHz/2.7 to 5.5V				20MHz/ 3.0 to 5.5V 4.2 to 5.5V			
Operating Ambient Temperature (°C)		-20 to 85, -40 to 85				-40 to 85 -40 to 125 -20 to 85, -40 to 85 -40 to 85				-40 to 85 -40 to 125 -20 to 85, -40 to 85 -40 to 125				-20 to 85, -40 to 85				-40 to 85 -40 to 125 -20 to 85, -40 to 85 -40 to 125							

★★ : Under development

• Specifications (M16C/10, R8C/Tiny Series)

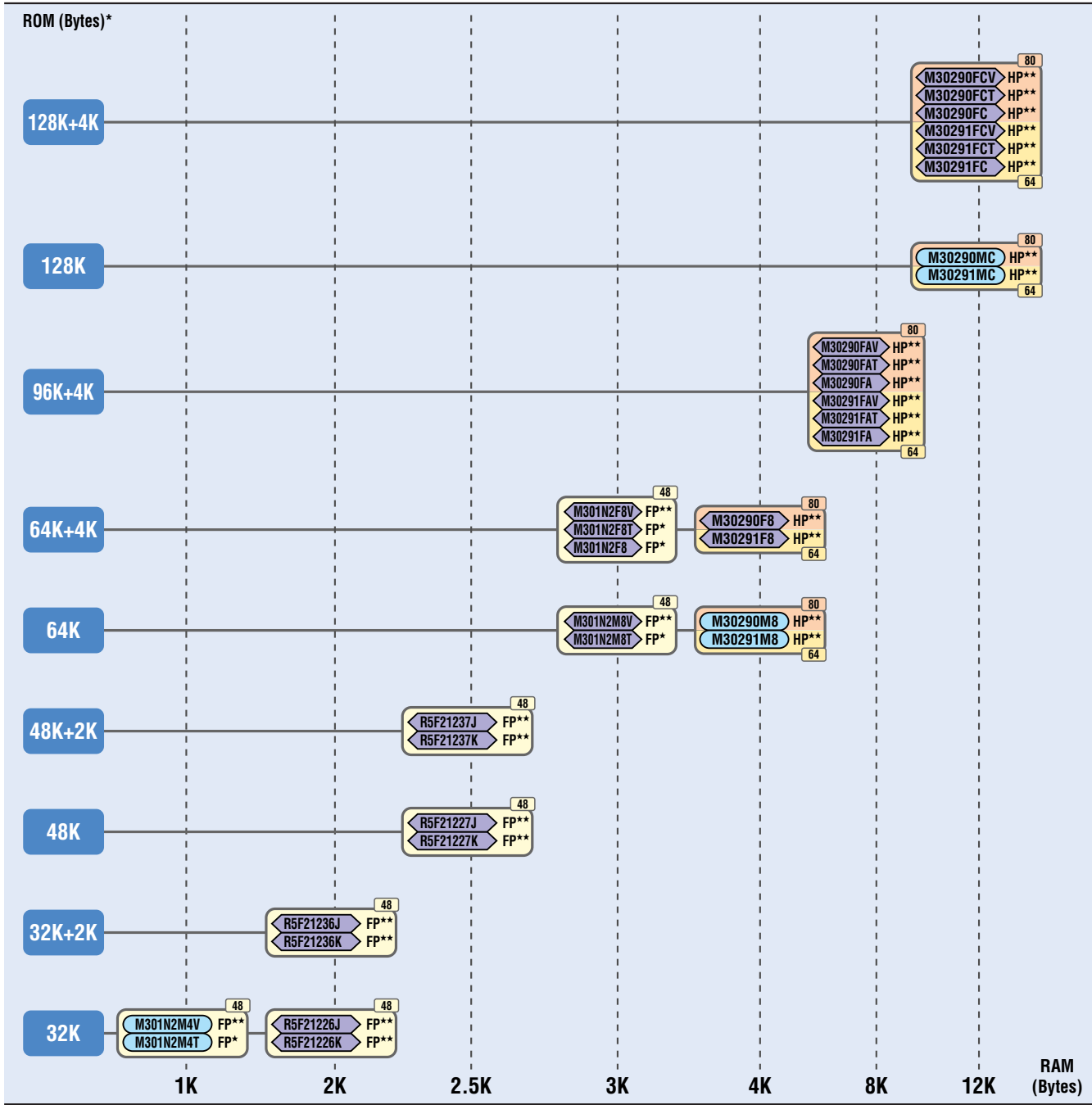
Group		M16C/1N*							R8C/22**				R8C/23**			
Type No.		M301N2M4T-XXXXFP*	M301N2M4V-XXXXFP**	M301N2M8T-XXXXFP*	M301N2M8V-XXXXFP**	M301N2F8FP*	M301N2F8TFP*	M301N2M8VFP**	R5F21226JFP**	R5F21226KFP**	R5F21227JFP**	R5F21227KFP**	R5F21236JFP**	R5F21236KFP**	R5F21237JFP**	R5F21237KFP**
Memory	ROM(Bytes)	32K		64K		64K + 4K			32K		48K		32K + 2K		48K + 2K	
	RAM(Bytes)	1K		3K					2K		2.5K		2K		2.5K	
	ROM Type*	M								F						
	Data Flash	—			Block A, Block B				—			Block A, Block B				
	Program Security	—			ID code check function, ROM code protecting function											
CPU	CPU	M16C/60 Core							R8C Core							
	Basic Instructions	91							89							
	Minimum Instruction Execution Time (ns)	62.5 (@16MHz)							J-ver:50 (@20MHz), K-ver:62.5 (@16MHz)							
	Multiplier	16 × 16 → 32														
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32														
DMA	DMAC (Channels)	—														
Clock	Clock Generation Circuit	3 circuits (Main clock, Sub-clock and On-chip oscillator)							2 circuits (XIN clock, On-chip oscillator)							
	PLL	—							—							
	Subclock	Yes							—							
	On-Chip Oscillator	Yes							Low-speed, High-speed							
	Oscillation Stop Detection	Yes														
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)														
	Power Save	Normal operating mode, Wait mode, Stop mode, Low-Power Consumption mode														
Power Supply Voltage Detection	Low Voltage Detection/LVD	—							Voltage detection 2							
A/D Converter	Resolution × Channels	10-bit × 14							10-bit × 12							
	Sample and Hold	—							Yes							
D/A Converter	Multi-Channel Sample and Hold	—							—							
	Resolution × Channels	8-bit × 1							—							
Timer	8-bit	4 (Timer 1, Timer X, Timer Y, Timer Z)							Timer RA × 1, Timer RB × 1, Timer RE × 1							
	16-bit	1 (Timer C)							Timer RD × 1 (on-chip 16-bit timer × 2)							
	Input Capture	—							2 (Timer RD)							
	Output Compare	—							3 (Timer RD, RE)							
	PWM Output	Timer Y, Timer Z							2 (Timer RB, RD)							
	Event Counter	Timer X							1 (Timer RA)							
	2-Phase Encoder Input	—							—							
	3-Phase Inverter Control	—							—							
Watchdog Timer		—							Yes							
Serial Interface	Clock Sync./ Clock Async.	2 (UART0, UART1)							UART0 × 1							
	Clock Async. Only	—							UART1 × 1							
I ² C-bus		—							IIC × 1 (also used as SSU)							
IEBus		—														
Smart Card/SIM		—														
SSU/Special Serial I/O		—							SSU × 1 (also used as IIC)							
CAN	Channels	1 (CAN2.0B)														
	Buffers	16 (transmit/receive buffers)														
CRC Calculation Circuit		—														
I/O Ports	Input Only (Numbers)	—							3							
	CMOS I/O Only (Numbers)	37							41							
	N-Channel Open Drain Port (Numbers)	—							—							
	Pull-Up Resistor	—							Yes							
Interrupts(Sources)	External	8							6							
Debugging Function	On-Chip Debug	—							Yes							
	On-Board Flash Program	—							Yes							
Other Functions	ROM Correction Function	Address agreement × 2														
	Others	—														
Package		48-pin LQFP														
Operating Frequency/Supply Voltage		4.2 to 5.5V (@16MHz)							3.0 to 5.5V							
Operating Ambient Temperature (°C)		T-ver:-40 to 85, V-ver:-40 to 125				-40 to 85 (Non-T)	T-ver:-40 to 85, V-ver:-40 to 125		J-ver:-40 to 85, K-ver:-40 to 125							

* M: mask ROM version, F: flash memory version

★ : New product ★★ : Under development

• Memory Capacity (ROM/RAM) (M16C/Tiny, M16C/10, R8C/Tiny Series)

80-pin 80 64-pin 64 48-pin 48



- The M in M3xxxxMx indicates the mask ROM version.
- The F in M3xxxxFx indicates the flash memory version.
- The F in R5FxxxxFx indicates the flash memory version.

*1 The notation "+4K" refers to data flash memory.

Package			Lead Pitch (mm)
48-pin	FP	48-pin LQFP (PLQP0048KB-A(48P6Q-A))	0.5
64-pin	HP	64-pin LQFP (PLQP0064KB-A(64P6Q-A))	0.5
80-pin	HP	80-pin LQFP (PLQP0080KB-A(80P6Q-A))	0.5

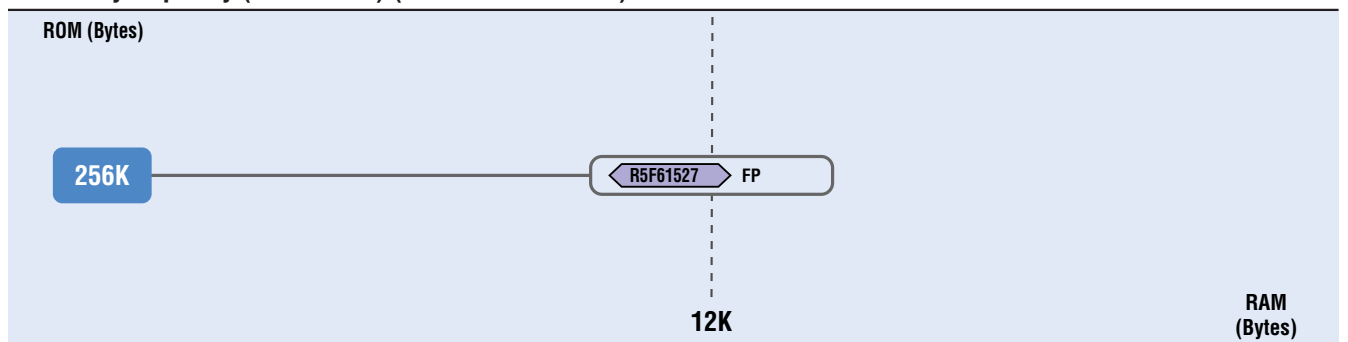
★ : New product ★★ : Under development
* It is an old package code inside ()

• Specifications (H8SX/1500 Series)

Group		H8SX/1520
Product No.		H8SX/1527
Type No.		R5F61527FP
Memory	ROM(Bytes)	256K
	RAM(Bytes)	12K
	ROM Type*	F
	Cache Memory	—
	Program Security	Yes
CPU	CPU	H8SX Core
	Basic Instructions	87
	Minimum Instruction Execution Time (ns)	25 (@ 40MHz)
	Multiplier	16 × 16 → 32
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32
DMA	DMAC (Channels)	4
	DTC/DMAC II	—
External Bus Expansion	Address Space (Bytes)	16M
	Bus State Controller	—
	Bus Structure	—
	Endian Conversion	—
Clock	Clock Generation Circuit	1 circuit (Main clock)
	PLL	Yes
	Frequency Divider	1/n (= 1, 2, 4, 8)
	Power Save	Sleep mode, Every module clock, Stop mode, Software standby mode
A/D Converter	Resolution × Channels	10-bit × 16
	Sample and Hold	Yes
	Multi-Channel Sample and Hold	Yes
D/A Converter	Resolution × Channels	—
	8-bit	—
Timer	16-bit	12 (TPU)
	32-bit	2 (TPU)
	Prescaler	Yes
	Input Capture	12 (TPU)
	Output Compare	12 (TPU)
	PWM Output	12 (TPU)
	Programmable Pulse Generator	PPG + TPU
	Event Counter	Yes
	2-Phase Encoder Input	Yes
	Watchdog Timer	Yes
Serial Interface	Clock Sync./ Clock Async.	2
	Clock Sync. Only	—
	Clock Async. Only	—
I ² C-bus		—
Smart Card/SIM		2
SSU/Special Serial I/O		3
CAN	Channels	1
	Buffers	16
USB Function		—
IrDA		—
I/O Ports	CMOS Output Only (Numbers)	17
	CMOS I/O Only (Numbers)	65
	N-Channel Open Drain Port (Numbers)	15
	Pull-Up Resistor	32
Interrupts(Sources)	External	16
	On-Chip Debug	Yes
Debugging Function	On-Chip Debug	Yes
	On-Board Flash Program	Yes
Package		FP-100M
Operating Frequency/Supply Voltage		40MHz/4.5 to 5.5V
Operating Ambient Temperature (°C)		-40 to 85

* F: F-ZTAT version

• Memory Capacity (ROM/RAM) (H8SX/1500 Series)



Indicates the flash memory version.

Package	
FA	QFP (PRQP0100KB-A(FP-100M))

* It is an old package code inside ()

• Specifications (H8S/2600 Series)

Group		H8S/2612				H8S/2615		H8S/2628		H8S/2630								
Product No.		H8S/2611	H8S/2612	H8S/2612F	H8S/2614	H8S/2616	H8S/2615	H8S/2615F	H8S/2627	H8S/2628	H8S/2628F	H8S/2630	H8S/2630U	H8S/2630W	H8S/2630F	H8S/2630UF	H8S/2630WF	
Type No.		HD6432611xxxFA	HD6432612xxxFA	HD64F2612FA	HD6432614xxxFA	HD6432616xxxFA	HD6432615xxxFA	HD64F2615FA	HD6432627xxxF	HD6432628xxxF	HD64F2628F	HD6432630xxxF	HD6432630UxxxF	HD6432630WxxxF	HD64F2630F	HD64F2630UF	HD64F2630WF	
Memory	ROM(Bytes)	64K	128K		64K	128K	64K		96K	128K		384K						
	RAM(Bytes)	4K							6K	8K	16K							
CPU	ROM Type*	M	F		M		F		M	F		M			F			
	Program Security	Yes																
	CPU	H8S/2600 Core																
	Basic Instructions	69																
	Minimum Instruction Execution Time (ns)	50 (@20MHz)				41.7 (@24MHz)								50 (@20MHz)				
	Multiplier	Yes																
DMA	Multiply-Accumulate Instruction	Yes																
	DMAC (Channels)	—																
	EXDMAC	—																
External Bus Expansion	DTC/DMAC II	DTC			—				DTC									
	Address Space (Bytes)							16M										
	Bus State Controller											Direct connection to SRAM and ROM is supported						
	Bus Structure											Separate bus (8/16-bit)						
	SDRAM Controller	—																
	DRAM Controller	—																
Clock	Host Interface	—																
	Clock Generation Circuit	1 circuit (Main clock)		2 circuits (Main clock, Sub-clock)						1 circuit (Main clock)		2 circuits (Main clock, Sub-clock)						
	PLL	Yes (×1, ×2, ×4)																
	Subclock	—		Yes (128 divided frequency)						—		Yes		—		Yes		
	RTC	—		Yes (WDT for watch)						—		Yes (WDT for watch)		—		Yes (WDT for watch)		
	Frequency Divider	1/n (n=1, 2, 4, 8, 16, 32)		1/n (n=1, 2, 4, 8, 16, 32, 128)								1/n (n=1, 2, 4, 8, 16, 32)						
	Power Save			Normal operating mode, Medium-Speed mode, Sleep mode, Module stop mode, Software standby mode, Hardware standby mode						Normal operating mode, Medium-Speed mode, Sleep mode, Module stop mode, Software standby mode, Hardware standby mode		Normal operating mode, Medium-Speed mode, Sleep mode, Module stop mode, Watch mode, Sub active mode, Sub sleep mode, Software standby mode, Hardware standby mode		Normal operating mode, Medium-Speed mode, Sleep mode, Module stop mode, Watch mode, Sub active mode, Sub sleep mode, Software standby mode, Hardware standby mode		Normal operating mode, Medium-Speed mode, Sleep mode, Module stop mode, Watch mode, Sub active mode, Sub sleep mode, Software standby mode, Hardware standby mode		
A/D Converter	Resolution × Channels	10-bit × 12						10-bit × 16		10-bit × 16		10-bit × 12						
Timer	Sample and Hold	Yes																
	Resolution × Channels	—								4 (TMR0, 1, 2, 3)		8-bit × 2						
	8-bit																	
	16-bit							TPU × 6										
	32-bit							TPU × 2										
	Prescaler	—																
	Input Capture	6 (TPU)																
	Output Compare	6 (TPU)																
	PWM Output	7 (MMT, TPU)		6 (TPU)								8 (PWM timer, TPU)						
	Real-Time Port	—																
Watchdog Timer	Programmable Pulse Generator	TPU		—								TPU						
	Event Counter	—																
	2-Phase Encoder Input	7 (MMT, TPU)		6 (TPU)								8 (PWM timer, TPU)						
	Serial Interface	Yes		Yes (×2)						Yes		Yes (×2)						
I ² C-Bus	Clock Sync./ Clock Async.	×3						—		×2		×3						
	IC-Bus	—																
IEBus	Smart Card/SIM	1																
	SSU/Special Serial I/O	—																
CAN	Channels	1						2				2						
	Buffers	16										32						
I/O Ports	USB Function	—																
	LPC/ISA	—																
	IrDA	—																
	LCD	—																
	CRC Calculation Circuit	—																
	Input Only (Numbers)	22		—						18		26		23				
	CMOS Output Only (Numbers)	1		—						1		1		2				
	CMOS I/O Only (Numbers)	43		—						39		59		72				
High Voltage Port (Numbers)	—																	
N-Channel Open Drain Port (Numbers)	20																	
DTMF	—																	
High Current Drive Port	—																	
Pull-Up Resistor	28		—						24		28		36					
NMOS Push-Pull	—																	
Interrupts(Sources)	External	7																
	Boundary Scan/JTAG	—																
Debugging Function	On-Chip Debug	—																
	On-Board Flash Program	—	Yes	—						Yes		—		Yes		Yes		
Other Functions	ROM Correction Function	Yes (PC break)		—								Yes (PC break)						
	Others	MMT (×1)		—								10-bit PWM timer (×2)						
Package		FP-80Q																
Operating Frequency/Supply Voltage		20MHz/4.5 to 5.5V				24MHz/4.5 to 5.5V				20MHz/4.5 to 5.5V				24MHz/4.5 to 5.5V				
Operating Ambient Temperature (°C)		-40 to 85, -40 to 105, -40 to 125																

• Specifications (H8S/2600 Series)

Group		H8S/2636			
Product No.		H8S/2636	H8S/2636U	H8S/2636F	H8S/2636UF
Type No.		HD6432636xxxF	HD6432636UxxxF	HD64F2636F	HD64F2636UF
Memory	ROM(Bytes)	128K			
	RAM(Bytes)	4K			
	ROM Type*	M			F
	Program Security	Yes			
CPU	CPU	H8S/2600 Core			
	Basic Instructions	69			
	Minimum Instruction Execution Time (ns)	50 (@ 20MHz)			
	Multiplier	16 × 16 → 32			
	Multiply-Accumulate Instruction	16 × 16 + 42 → 42			
DMA	DMAC (Channels)	—			
	EXDMAC	—			
	DTC/DMAC II	DTC			
External Bus Expansion	Address Space (Bytes)	16M			
	Bus State Controller	Direct connection to SRAM and ROM is supported			
	Bus Structure	Separate bus (8/16-bit)			
	SDRAM Controller	—			
	DRAM Controller	—			
	Host Interface	—			
Clock	Clock Generation Circuit	2 circuits (Main clock, Sub-clock)			
	PLL	Yes (× 1, × 2, × 4)			
	Subclock	—	Yes	—	Yes
	RTC	—	Yes (WDT for watch)	—	Yes (WDT for watch)
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)			
	Power Save	Normal operating mode, Medium-Speed mode, Sleep mode, Module stop mode, Software standby mode, Hardware standby mode	Normal operating mode, Medium-Speed mode, Sleep mode, Module stop mode, Watch mode, Sub active mode, Sub sleep mode, Software standby mode, Hardware standby mode	Normal operating mode, Medium-Speed mode, Sleep mode, Module stop mode, Software standby mode, Hardware standby mode	Normal operating mode, Medium-Speed mode, Sleep mode, Module stop mode, Watch mode, Sub active mode, Sub sleep mode, Software standby mode, Hardware standby mode
A/D Converter	Resolution × Channels	10-bit × 12			
	Sample and Hold	Yes			
D/A Converter	Resolution × Channels	8-bit × 2			
Timer	8-bit	—			
	16-bit	TPU × 6			
	32-bit	TPU × 2			
	Prescaler	—			
	Input Capture	6 (TPU)			
	Output Compare	6 (TPU)			
	PWM Output	8 (MMT, TPU)			
	Real-Time Port	—			
	Programmable Pulse Generator	Yes			
Event Counter	—				
	2-Phase Encoder Input	8 (MMT, TPU)			
Watchdog Timer		Yes (× 2)			
Serial Interface	Clock Sync./ Clock Async.	3			
I ² C-bus		—			
IEBus		—			
Smart Card/SIM		TPU			
SSU/Special Serial I/O		—			
CAN	Channels	2			
	Buffers	32			
USB Function		—			
LPC/ISA		—			
IrDA		—			
LCD		—			
CRC Calculation Circuit		—			
I/O Ports	Input Only (Numbers)	23			
	CMOS Output Only (Numbers)	2			
	CMOS I/O Only (Numbers)	72			
	High Voltage Port (Numbers)	—			
	N-Channel Open Drain Port (Numbers)	26			
	DTMF	—			
	High Current Drive Port	—			
	Pull-Up Resistor	36			
	NMOS Push-Pull	—			
Interrupts(Sources)	External	7			
Debugging Function	Boundary Scan/JTAG	—			
	On-Chip Debug	—			
	On-Board Flash Program	—		Yes	
Other Functions	ROM Correction Function	—			
	Others	Yes (PC break)			
Package		10-bit PWM timer (× 2)			
Operating Frequency/Supply Voltage		FP-128B			
Operating Ambient Temperature (°C)		20MHz/4.5 to 5.5V			
		-40 to 85, -40 to 105			

* M: mask ROM version, F: F-ZTAT version

• Specifications (H8S/2600 Series)

Group		H8S/2638						H8S/2639				H8S/2646			
Product No.		H8S/2638	H8S/2638U	H8S/2638W	H8S/2638F	H8S/2638UF	H8S/2638WF	H8S/2639U	H8S/2639W	H8S/2639UF	H8S/2639WF	H8S/2645	H8S/2646	H8S/2646RF	
Type No.		HD6432638xxxF	HD6432638UxxxF	HD6432638WxxxF	HD64F2638F	HD64F2638UF	HD64F2638WF	HD6432639UxxxF	HD6432639WxxxF	HD64F2639UF	HD64F2639WF	HD6432645xxxFC	HD6432646xxxFC	HD64F2646RFC	
Memory	ROM(Bytes)	128K						256K				64K	128K		
	RAM(Bytes)	16K										2K	4K		
CPU	ROM Type*	M		F				M		F		M		F	
	Program Security	Yes													
	CPU	H8S/2600 Core													
	Basic Instructions	69													
	Minimum Instruction Execution Time (ns)	50 (@20MHz)						200 (@5MHz)				50 (@20MHz)			
DMA	Multiplier	Yes													
	Multiply-Accumulate Instruction	Yes													
	DMAC (Channels)	—													
	EXDMAC	—													
	DTC/DMAC II	DTC													
External Bus Expansion	Address Space (Bytes)	16M													
	Bus State Controller	Direct connection to SRAM and ROM is supported													
	Bus Structure	Separate bus (8/16-bit)													
	SDRAM Controller	—													
	DRAM Controller	—													
Clock	Host Interface	—													
	Clock Generation Circuit	2 circuits (Main clock, Sub-clock)													
	PLL	Yes (×1, ×2, ×4)													
	Subclock	—	Yes		—	Yes		Yes (128 divided frequency)				Yes			
	RTC	—	Yes (WDT for watch)		—			Yes (WDT for watch)							
A/D Converter	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)						1/n (n = 1, 2, 4, 8, 16, 32, 128)				1/n (n = 1, 2, 4, 8, 16, 32)			
	Power Save	Normal operating mode, Medium-Speed mode, Sleep mode, Module stop mode, Watch mode, Sub active mode, Sub sleep mode, Software standby mode, Hardware standby mode	Normal operating mode, Medium-Speed mode, Sleep mode, Module stop mode, Watch mode, Sub active mode, Sub sleep mode, Software standby mode, Hardware standby mode	Normal operating mode, Medium-Speed mode, Sleep mode, Module stop mode, Watch mode, Sub active mode, Sub sleep mode, Software standby mode, Hardware standby mode	Normal operating mode, Medium-Speed mode, Sleep mode, Module stop mode, Watch mode, Sub active mode, Sub sleep mode, Software standby mode, Hardware standby mode	Normal operating mode, Medium-Speed mode, Sleep mode, Module stop mode, Watch mode, Sub active mode, Sub sleep mode, Software standby mode, Hardware standby mode	Normal operating mode, Medium-Speed mode, Sleep mode, Module stop mode, Watch mode, Sub active mode, Sub sleep mode, Software standby mode, Hardware standby mode	Normal operating mode, Medium-Speed mode, Sleep mode, Module stop mode, Watch mode, Sub active mode, Sub sleep mode, Software standby mode, Hardware standby mode	Normal operating mode, Medium-Speed mode, Sleep mode, Module stop mode, Watch mode, Sub active mode, Sub sleep mode, Software standby mode, Hardware standby mode	Normal operating mode, Medium-Speed mode, Sleep mode, Module stop mode, Watch mode, Sub active mode, Sub sleep mode, Software standby mode, Hardware standby mode	Normal operating mode, Medium-Speed mode, Sleep mode, Module stop mode, Watch mode, Sub active mode, Sub sleep mode, Software standby mode, Hardware standby mode	Normal operating mode, Medium-Speed mode, Sleep mode, Module stop mode, Watch mode, Sub active mode, Sub sleep mode, Software standby mode, Hardware standby mode	Normal operating mode, Medium-Speed mode, Sleep mode, Module stop mode, Watch mode, Sub active mode, Sub sleep mode, Software standby mode, Hardware standby mode	Normal operating mode, Medium-Speed mode, Sleep mode, Module stop mode, Watch mode, Sub active mode, Sub sleep mode, Software standby mode, Hardware standby mode	Normal operating mode, Medium-Speed mode, Sleep mode, Module stop mode, Watch mode, Sub active mode, Sub sleep mode, Software standby mode, Hardware standby mode
	Resolution × Channels	10-bit × 12													
	Sample and Hold	Yes													
	Resolution × Channels	8-bit × 2													
Timer	8-bit	—													
	16-bit	TPU × 6													
	32-bit	TPU × 2													
	Prescaler	—													
	Input Capture	6 (TPU)													
	Output Compare	6 (TPU)													
	PWM Output	8 (PWM, TPU)													
	Real-Time Port	—													
	Programmable Pulse Generator	PPG + TPU													
	Event Counter	—													
Watchdog Timer	2-Phase Encoder Input	8 (PWM, TPU)													
		Yes (×2)													
Serial Interface	Clock Sync./ Clock Async.	—	2	—	—	3	2	—	2	—	2	2			
I ² C-bus		—													
IEBus		—													
Smart Card/SIM		TPU													
SSU/Special Serial I/O		—													
CAN	Channels	2										1			
	Buffers	32										16			
USB Function		—													
LPC/ISA		—													
IrDA		—													
LCD		—													
CRC Calculation Circuit		—						—				Yes (24seg × 4com)			
I/O Ports	Input Only (Numbers)	23										28			
	CMOS Output Only (Numbers)	2										1			
	CMOS I/O Only (Numbers)	72										92			
	High Voltage Port (Numbers)	—										48			
	N-Channel Open Drain Port (Numbers)	26	24	26	24	26	24	26	24	26	24	26	24	32	
	DTMF	—													
	High Current Drive Port	—													
	Pull-Up Resistor	36										LED drive port × 32			
	NMOS Push-Pull	—	2	—	—	2	—	2	—	2	—	2	—		
	Interrupts(Sources)	External	7												
Boundary Scan/JTAG		—													
Debugging Function	On-Chip Debug	—													
	On-Board Flash Program	—	Yes		Yes		Yes		Yes		—		Yes		
Other Functions	ROM Correction Function	Yes (PC break)													
	Others	10-bit PWM timer (×2)													
Package		FP-128B													
Operating Frequency/Supply Voltage		20MHz/4.5 to 5.5V						5MHz (20MHz:PLL) /4.5 to 5.5V				FP-144J:Flash, FP-144G:Mask			
Operating Ambient Temperature (°C)		-40 to 85, -40 to 105													

* M: mask ROM version, F: F-ZTAT version

• Specifications (H8S/2600 Series)

Group		H8S/2648			H8S/2649*	
Product No.		H8S/2647	H8S/2648	H8S/2648RF	H8S/2649	H8S/2649F
Type No.		HD6432647xxxFC	HD6432648xxxFC	HD64F2648RFC	HD6432649xxxFC	HD64F2649FC
Memory	ROM(Bytes)	64K	128K		256K	
	RAM(Bytes)	2K	4K		8K	
	ROM Type*	M		F	M	F
	Program Security			Yes		
CPU	CPU	H8S/2600 Core				
	Basic Instructions	69				
	Minimum Instruction Execution Time (ns)	50 (@ 20MHz)				
	Multiplier	16 × 16 → 32				
	Multiply-Accumulate Instruction	16 × 16 + 42 → 42				
DMA	DMAC (Channels)	—				
	EXDMAC	—				
	DTC/DMAC II	DTC				
External Bus Expansion	Address Space (Bytes)	16M				
	Bus State Controller	Direct connection to SRAM and ROM is supported				
	Bus Structure	Separate bus (8/16-bit)				
	SDRAM Controller	—				
	DRAM Controller	—				
	Host Interface	—				
Clock	Clock Generation Circuit	2 circuits (Main clock, Sub-clock)				
	PLL	Yes (× 1, × 2, × 4)				
	Subclock	Yes				
	RTC	Yes (WDT for watch)				
	Frequency Divider	1/n (n=1, 2, 4, 8, 16, 32)				
	Power Save	Normal operating mode, Medium-Speed mode, Sleep mode, Module stop mode, Watch mode, Sub active mode, Sub sleep mode, Software standby mode, Hardware standby mode				
A/D Converter	Resolution × Channels	10-bit × 12			10-bit × 16	
D/A Converter	Sample and Hold	—			Yes	
	Resolution × Channels	—			—	
Timer	8-bit	—				
	16-bit	TPU × 6				
	32-bit	TPU × 2				
	Prescaler	—				
	Input Capture	6 (TPU)				
	Output Compare	6 (TPU)				
	PWM Output	8 (PWM timer, TPU)				
	Real-Time Port	—				
	Programmable Pulse Generator	TPU				
	Event Counter	—				
Watchdog Timer	2-Phase Encoder Input	8 (PWM timer, TPU)				
		Yes (× 2)				
Serial Interface	Clock Sync./ Clock Async.	3			4	
I ² C-bus		—				
IEBus		—				
Smart Card/SIM		TPU				
SSU/Special Serial I/O		—				
CAN	Channels	2				
	Buffers	32				
USB Function		—				
LPC/ISA		—				
IrDA		—				
LCD		Yes (40seg × 4com)				
CRC Calculation Circuit		—				
I/O Ports	Input Only (Numbers)	28				
	CMOS Output Only (Numbers)	1				
	CMOS I/O Only (Numbers)	92			97	
	High Voltage Port (Numbers)	48				
	N-Channel Open Drain Port (Numbers)	32				
	DTMF	—				
	High Current Drive Port	LED drive port × 32				
	Pull-Up Resistor	40				
	NMOS Push-Pull	—				
Interrupts(Sources)	External	7				
	Boundary Scan/JTAG	—				
Debugging Function	On-Chip Debug	—				
	On-Board Flash Program	—		Yes	—	Yes
	ROM Correction Function	Yes (PC break)				
Other functions	Others	10-bit PWM timer (× 2)				
Package		FP-144J:Flash, FP-144G:Mask			FP-144G	
Operating Frequency/Supply Voltage		20MHz/4.5 to 5.5V				
Operating Ambient Temperature (°C)		-40 to 85, -40 to 105				

* M: mask ROM version, F: F-ZTAT version

★ : New product

• Specifications (H8S/2500 Series)

Group		H8S/2556
Product No.		H8S/2556F
Type No.		HD64F2556FC
Memory	ROM(Bytes)	512K
	RAM(Bytes)	32K
	ROM Type*	F
	Program Security	Yes
CPU	CPU	H8S/2000 Core
	Basic Instructions	65
	Minimum Instruction Execution Time (ns)	50 (@20MHz)
	Multiplier	—
DMA	Multiply-Accumulate Instruction	—
	DMAC (Channels)	—
	EXDMAC	—
	DTC/DMAC II	DTC
External Bus Expansion	Address Space (Bytes)	16M
	Bus State Controller	Direct connection to SRAM and ROM is supported
	Bus Structure	Separate bus (8/16-bit)
	SDRAM Controller	—
	DRAM Controller	—
Clock	Host Interface	—
	Clock Generation Circuit	2 circuits (Main clock, Sub-clock)
	PLL	Yes (×1, ×2)
	Subclock	Yes
	RTC	Yes (WDT for watch)
	Frequency Divider	1/n (n=1, 2, 4, 8, 16, 32)
A/D Converter	Resolution × Channels	10-bit × 16
	Sample and Hold	Yes
D/A Converter	Resolution × Channels	8-bit × 2
	8-bit	TMR × 4
Timer	16-bit	TPU × 6
	32-bit	TPU × 2
	Prescaler	—
	Input Capture	6 (TPU)
	Output Compare	6 (TPU)
	PWM Output	6 (TPU)
	Real-Time Port	—
	Programmable Pulse Generator	—
	Event Counter	—
	2-Phase Encoder Input	6 (TPU)
Watchdog Timer		Yes (×2)
Serial Interface Clock Sync./ Clock Async.		5
I ² C-bus		2
IEBus		—
Smart Card/SIM		1
SSU/Special Serial I/O		—
CAN	Channels	1
	Buffers	16
USB Function		—
LPC/ISA		—
IrDA		—
LCD		—
CRC Calculation Circuit		—
I/O Ports	Input Only (Numbers)	17
	CMOS Output Only (Numbers)	1
	CMOS I/O Only (Numbers)	102
	High Voltage Port (Numbers)	—
	N-Channel Open Drain Port (Numbers)	10
	DTMF	—
	High Current Drive Port	—
	Pull-Up Resistor	40
	NMOS Push-Pull	2
Interrupts(Sources)	External	9
	Boundary Scan/JTAG	—
Debugging Function	On-Chip Debug	—
	On-Board Flash Program	Yes
Other Functions ROM Correction Function		Yes (PC break)
Package		FP-144J
Operating Frequency/Supply Voltage		20MHz/3.0 to 5.5V
Operating Ambient Temperature (°C)		-40 to 85

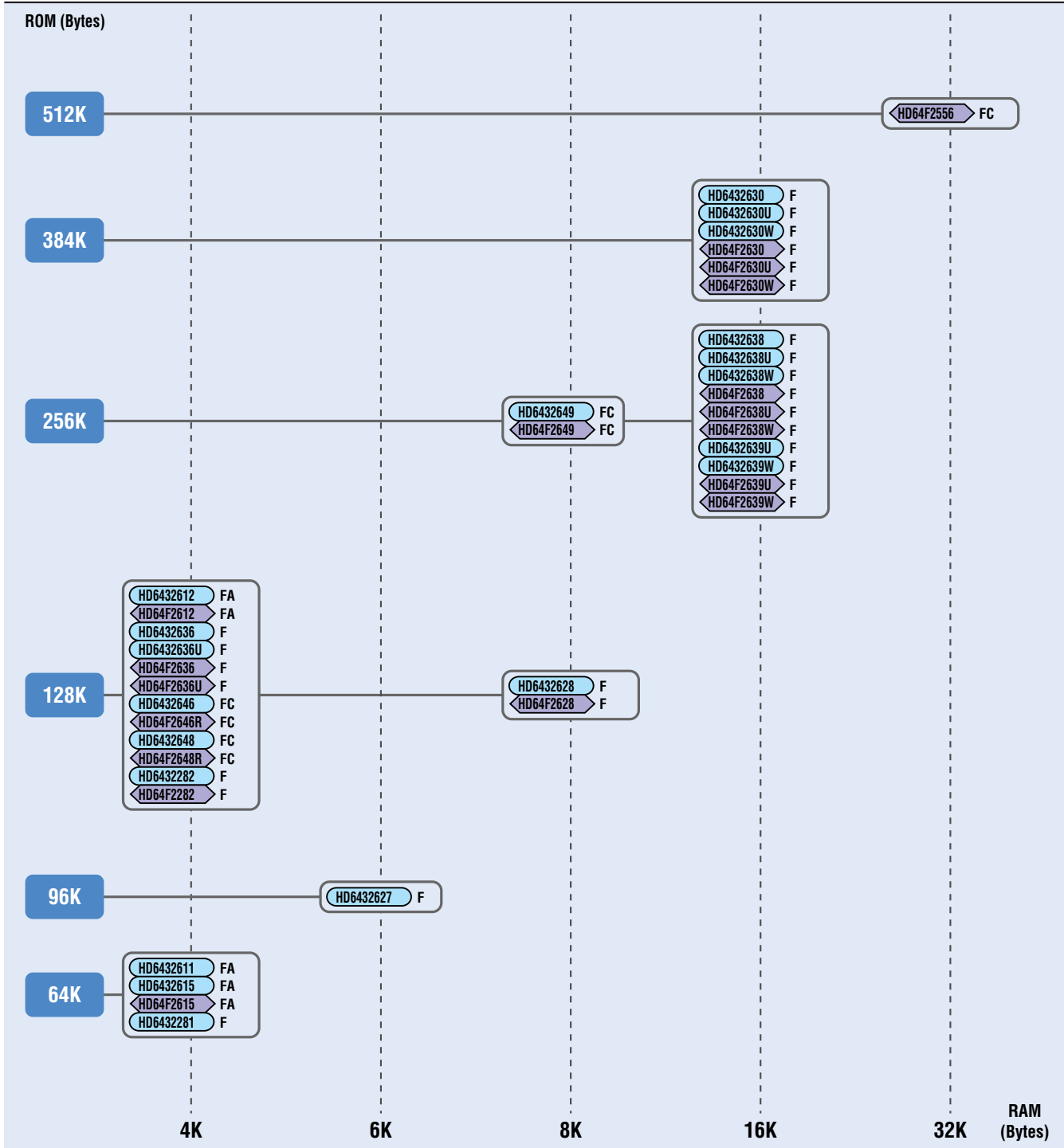
* F: F-ZTAT version

• Specifications (H8S/2200 Series)

Group		H8S/2282		
Product No.		H8S/2281	H8S/2282	H8S/2282F
Type No.		HD6432281xxxF	HD6432282xxxF	HD64F2282F
Memory	ROM(Bytes)	64K	128K	
	RAM(Bytes)		4K	
	ROM Type*	M		F
	Program Security		Yes	
CPU	CPU		H8S/2000 Core	
	Basic Instructions		65	
	Minimum Instruction Execution Time (ns)		50 (@ 20MHz)	
	Multiplier		—	
DMA	Multiply-Accumulate Instruction		—	
	DMAC (Channels)		—	
	EXDMAC		—	
	DTC/DMAC II		—	
External Bus Expansion	Address Space (Bytes)		16M	
	Bus State Controller		—	
	Bus Structure		—	
	SDRAM Controller		—	
	DRAM Controller		—	
Clock	Host Interface		—	
	Clock Generation Circuit		2 circuits (Main clock, Sub-clock)	
	PLL		Yes (×1, ×2, ×4)	
	Subclock		Yes (128 divided frequency)	
	RTC		Yes (WDT for watch)	
	Frequency Divider		1/n (n = 1, 2, 4, 8, 16, 32, 128)	
Power Save		Normal operating mode, Medium-Speed mode, Sleep mode, Module stop mode, Watch mode, Sub active mode, Sub sleep mode, Software standby mode, Hardware standby mode		
A/D Converter	Resolution × Channels		10-bit × 8	
D/A Converter	Sample and Hold		Yes	
	Resolution × Channels		—	
Timer	8-bit		—	
	16-bit		TPU × 3	
	32-bit		TPU × 2	
	Prescaler		—	
	Input Capture		3 (TPU)	
	Output Compare		3 (TPU)	
	PWM Output		5 (PWM timer, TPU)	
	Real-Time Port		—	
	Programmable Pulse Generator		—	
	Event Counter		—	
2-Phase Encoder Input			5 (PWM timer, TPU)	
Watchdog Timer			Yes (×2)	
Serial Interface Clock Sync./ Clock Async.			2	
I ² C-bus			—	
IEBus			—	
Smart Card/SIM			—	
SSU/Special Serial I/O			—	
CAN	Channels		1	
	Buffers		16	
USB Function			—	
LPC/ISA			—	
IrDA			—	
LCD			Yes (28seg × 4com)	
CRC Calculation Circuit			—	
I/O Ports	Input Only (Numbers)		17	
	CMOS Output Only (Numbers)		1	
	CMOS I/O Only (Numbers)		64	
	High Voltage Port (Numbers)		—	
	N-Channel Open Drain Port (Numbers)		—	
	DTMF		—	
	High Current Drive Port		—	
	Pull-Up Resistor		—	
	NMOS Push-Pull		30	
Interrupts(Sources)	External		7	
	Boundary Scan/JTAG		—	
Debugging Function	On-Chip Debug		—	
	On-Board Flash Program	—		Yes
	ROM Correction Function		—	
Other Functions	Others		10-bit PWM timer (×2)	
			FP-100A	
Operating Frequency/Supply Voltage			20MHz/4.5 to 5.5V	
Operating Ambient Temperature (°C)			-40 to 85	

* F: F-ZTAT version, M: mask ROM version

• Memory Capacity (ROM/RAM) (H8S/2600, H8S/2500, H8S/2200 Series)



Indicates the mask ROM version.

Indicates the flash memory version.

Package	
F	QFP (PRQP0128KB-A(FP-128B), PRQP0100KB-A(FP-100M))
FA	QFP (PRQP0080JD-A(FP-80Q))
FC	QFP (PRQP0144KB-A(FP-144J), PRQP0144KA-A(FP-144G))
BR	BGA (BP-176V)

* It is an old package code inside ()

• Specifications (H8/300H Tiny Series)

Group		H8/36037																															
Product No.		H8/36032				H8/36033				H8/36034				H8/36034F				H8/36035				H8/36036				H8/36037				H8/36037F			
Type No.		HD64336032GxxxFZ	HD64336032GxxxH	HD64336032xxxFZ	HD64336032xxxH	HD64336033GxxxFZ	HD64336033GxxxH	HD64336033xxxFZ	HD64336033xxxH	HD64336034GxxxFZ	HD64336034GxxxH	HD64336034xxxFZ	HD64336034xxxH	HD64F36034GFZ	HD64F36034GH	HD64F36034FZ	HD64F36034H	HD64336035GxxxFZ	HD64336035GxxxH	HD64336035xxxFZ	HD64336035xxxH	HD6436036GxxxFZ	HD6436036GxxxH	HD6436036xxxFZ	HD6436036xxxH	HD64336037GxxxFZ	HD6436037GxxxH	HD6436037xxxFZ	HD6436037xxxH	HD64F36037GFZ	HD64F36037GH	HD64F36037FZ	HD64F36037H
Memory	ROM(Bytes)	16K				24K				32K				40K				48K				56K				3K							
	RAM(Bytes)	1K								2K								3K															
	EEPROM(Bytes)	—																															
	ROM Type*	M								F				M				F															
CPU	Program Security	Yes																M				F											
	CPU	H8/300H Core																															
	Basic Instructions	62																															
	Minimum Instruction Execution Time (ns)	100 (@20MHz)																															
Clock	Clock Generation Circuit	2 circuits (system clock circuit, on-chip sub clock circuit)																															
	PLL	—																															
	Subclock	Yes																															
	On-Chip Oscillator	—																															
	Oscillation Stop Detection	—																															
	Frequency Divider	1/n (n = 1, 8, 16, 32, 64)																															
	Power Save	Support 4 power save modes and module standby function, system clock divider. Standby mode Sub active mode (when using on-chip oscillation sub clock) Sleep mode Sub sleep mode (when using on-chip oscillation sub clock)																															
Power Supply	Power-On Reset/POR	Yes (option)																															
Voltage Detection	Low Voltage Detection/LVD	Yes (option)																															
A/D Converter	Resolution × Channels	10-bit × 8																															
	Sample and Hold	Yes																															
Timer	8-bit	Timer B1 × 1, Timer V × 1, Sub timer × 1																															
	16-bit	Timer Z × 1																															
	Prescaler	Timer B1, Timer V, Sub timer, Timer Z																															
	Input Capture	Timer Z																															
	Output Compare	Timer V, Timer Z																															
	PWM Output	Timer V, Timer Z																															
	Event Counter	Timer B1																															
3-Phase Inverter Control	Timer Z																																
Watchdog Timer		Yes (selectable internal oscillator)																															
Serial Interface	Clock Sync./ Clock Async.	1																															
I ² C-bus		—																															
SSU/Special Serial I/O		2																															
CAN	Channels	1																															
	Buffers	4																															
I/O Ports	Input Only (Numbers)	8																															
	CMOS I/O Only (Numbers)	45																															
	High Current Drive Port	8																															
	Pull-Up Resistor	13																															
	NMOS Push-Pull	—																															
Interrupts(Sources)	External	11																															
Debugging Function	On-Chip Debug	Yes																															
	On-Board Flash Program	Yes																															
Other Functions	ROM Correction Function	Yes																															
Package		FP-64K, FP-64A																															
Operating Frequency/Supply Voltage		1 to 10MHz/ 2.7 to 5.5V 1 to 20MHz/ 4.0 to 5.5V								1 to 10MHz/ 3.0 to 5.5V 1 to 20MHz/ 4.0 to 5.5V				1 to 10MHz/ 2.7 to 5.5V 1 to 20MHz/ 4.0 to 5.5V				1 to 10MHz/ 3.0 to 5.5V 1 to 20MHz/ 4.0 to 5.5V															
Operating Ambient Temperature (°C)		-20 to 75, -40 to 85, -40 to 105, -40 to 125																															

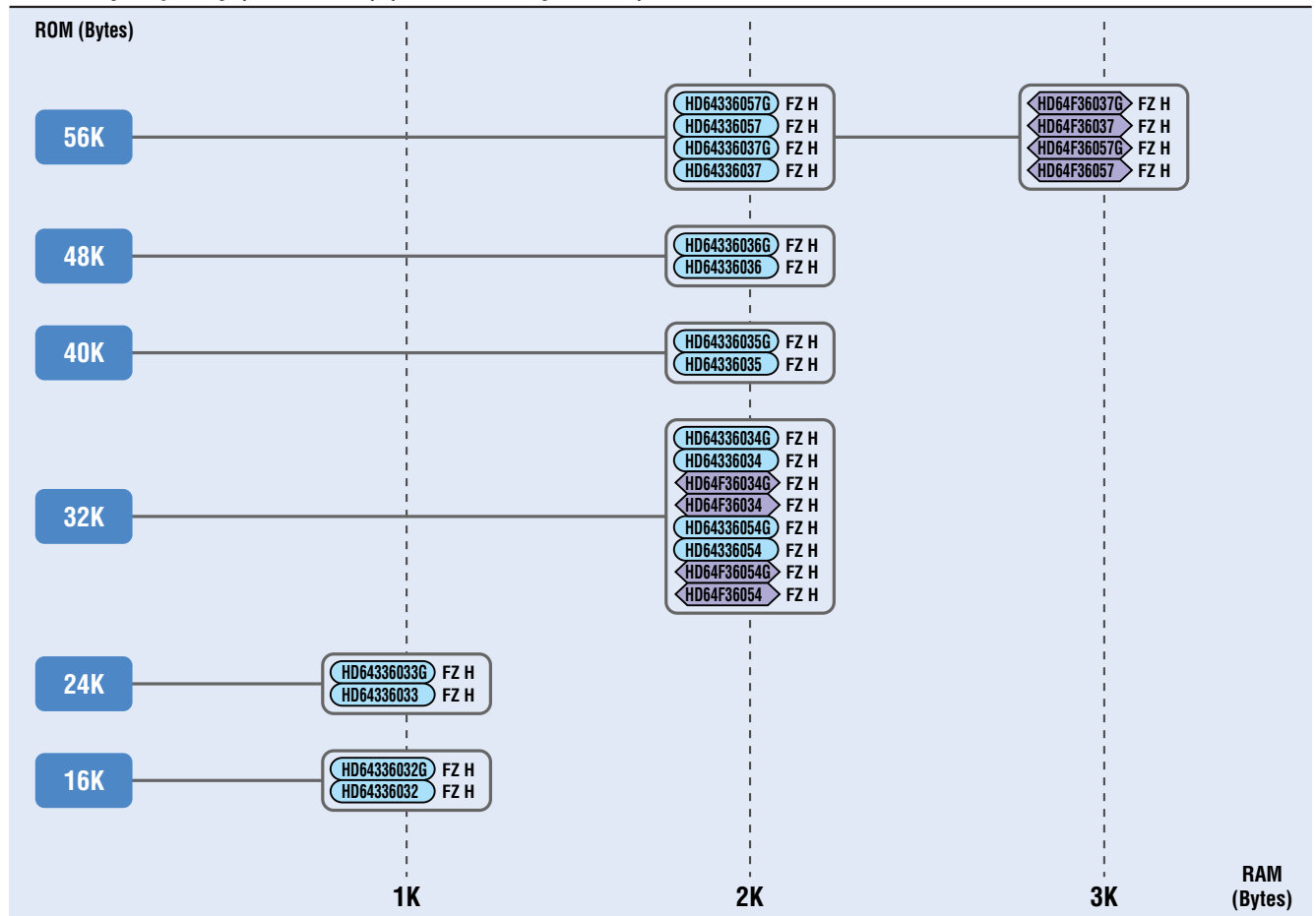
* M: mask ROM version, F: F-ZTAT version

• Specifications (H8/300H Tiny Series)

Group		H8/36057															
Product No.		H8/36054				H8/36054F				H8/36057				H8/36057F			
Type No.		HD64336054GxxxFZ	HD64336054GxxxH	HD64336054xxxFZ	HD64336054xxxH	HD64F36054GFZ	HD64F36054GH	HD64F36054FZ	HD64F36054H	HD64336057GxxxFZ	HD64336057GxxxH	HD64336057xxxFZ	HD64336057xxxH	HD64F36057GFZ	HD64F36057GH	HD64F36057FZ	HD64F36057H
Memory	ROM(Bytes)	32K								56K							
	RAM(Bytes)	2K								3K							
	EEPROM(Bytes)	—								—							
	ROM Type*	M				F				M				F			
	Program Security	Yes															
CPU	CPU	H8/300H Core															
	Basic Instructions	62															
	Minimum Instruction Execution Time (ns)	100 (@20MHz)															
Clock	Clock Generation Circuit	2 circuits (system clock circuit, on-chip sub clock circuit)															
	PLL	—															
	Subclock	Yes															
	On-Chip Oscillator	—															
	Oscillation Stop Detection	—															
	Frequency Divider	1/n (n= 1, 8, 16, 32, 64)															
	Power Save	Support 4 power save modes and module standby function, system clock divider. Standby mode Sub active mode (when using on-chip oscillation sub clock) Sleep mode Sub sleep mode (when using on-chip oscillation sub clock)															
Power Supply	Power-On Reset/POR	Yes (option)															
Voltage Detection	Low Voltage Detection/LVD	Yes (option)															
A/D Converter	Resolution × Channels	10-bit × 8															
	Sample and Hold	Yes															
Timer	8-bit	Timer B1 × 1, Timer V × 1, Sub timer × 1															
	16-bit	Timer Z × 1															
	Prescaler	Timer B1, Timer V, Sub timer, Timer Z															
	Input Capture	Timer Z															
	Output Compare	Timer V, Timer Z															
	PWM Output	Timer V, Timer Z															
	Event Counter	Timer B1															
	3-Phase Inverter Control	Timer Z															
Watchdog Timer		Yes (Selectable internal oscillator)															
Serial Interface	Clock Sync./ Clock Async.	2															
I ² C-bus		—															
SSU/Special Serial I/O		2															
CAN	Channels	1															
	Buffers	4															
I/O Ports	Input Only (Numbers)	8															
	CMOS I/O Only (Numbers)	45															
	High Current Drive Port	8															
	Pull-Up Resistor	13															
NMOS Push-Pull		—															
Interrupts(Sources)	External	11															
Debugging Function	On-Chip Debug	Yes															
	On-Board Flash Program	Yes															
Other Functions	ROM Correction Function	Yes															
Package		FP-64K, FP-64A															
Operating Frequency/Supply Voltage		1 to 10MHz/ 2.7 to 5.5V 1 to 20MHz/ 4.0 to 5.5V				1 to 10MHz/ 3.0 to 5.5V 1 to 20MHz/ 4.0 to 5.5V				1 to 10MHz/ 2.7 to 5.5V 1 to 20MHz/ 4.0 to 5.5V				1 to 10MHz/ 3.0 to 5.5V 1 to 20MHz/ 4.0 to 5.5V			
Operating Ambient Temperature (°C)		-20 to 75, -40 to 85, -40 to 105, -40 to 125															

* M: mask ROM version, F: F-ZTAT version

• Memory Capacity (ROM/RAM) (H8/300H Tiny Series)



Indicates the mask ROM version.
Indicates the flash memory version.

Package	
H	QFP (PRQP0064GB-A(FP-64A))
FZ	LQFP (PLQP0064KB-A(FP-64K))

* It is an old package code inside ()

• Specifications (7600 Series)

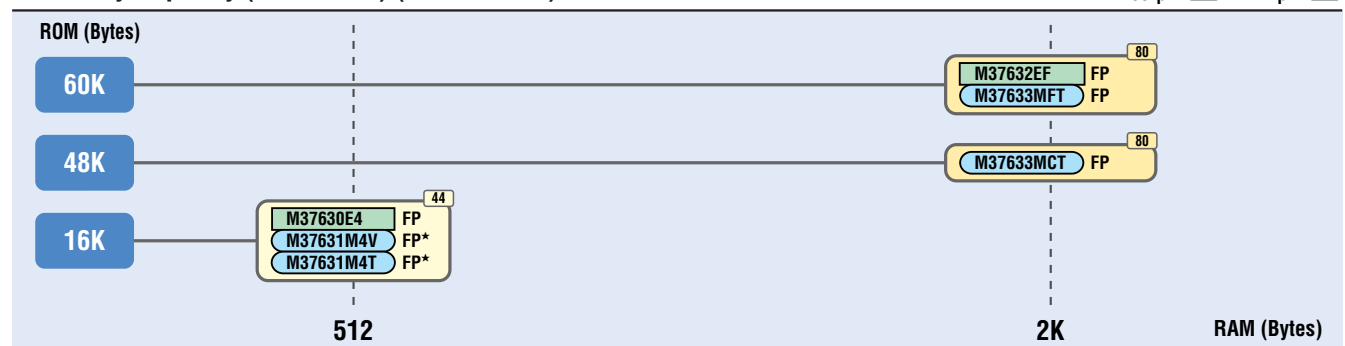
Group		7630			7632		
Type No.		M37631M4T-XXXFP*	M37631M4V-XXXFP*	M37630E4FP	M37633MCT-XXXFP	M37633MFT-XXXFP	M37632EFPF
Memory	ROM(Bytes)	16K			48K	60K	
	RAM(Bytes)	512			2K		
	ROM Type*	M		O	M		O
	Data Flash	—					
	Program Security	—					
CPU	CPU	7600 Core					
	Basic Instructions	71					
	Minimum Instruction Execution Time (ns)	200 (@10MHz)					
DMA	DMAC (Channels)	—					
Clock	Clock Generation Circuit	1 (Main clock)					
	Subclock	—					
	On-Chip Oscillator	—					
	Oscillation Stop Detection	—					
	Frequency Divider	1/n (n=2, 8)					
	Power Save	Normal operating mode, Sleep mode, Wait mode					
A/D Converter	Resolution×Channels	8-bit×8 channels					
D/A Converter	Resolution×Channels	—					
Timer	8-bit	Timer X, Timer Y					
	16-bit	Timer 1, Timer 2, Timer 3					
	Prescaler	—					
	Input Capture	—					
	Output Compare	—					
	PWM Output	Timer 2, Timer 3					
	Real-Time Port	—					
	Event Counter	Timer X, Timer Y					
	2-Phase Encoder Input	Timer X (Two-phase signal processing)					
	3-Phase Inverter Control	—					
Watchdog Timer		Yes					
Serial Interface	Clock Sync./ Clock Async.	1 (UART)			2 (UART0, UART1)		
	Clock Sync. Only	1 (SI/O)			—		
	Clock Async. Only	—					
I ² C-bus		—					
CAN	Channels	1 (CAN2.0B)					
	Buffers	1 (Transmit), 2 (Receive)					
CRC Calculation Circuit		—					
I/O Ports	Input Only (Numbers)	1			—		
	CMOS I/O Only (Numbers)	35			72		
	N-Channel Open Drain Port (Numbers)	—					
	High Current Drive Port	—					
	Pull-Up Resistor	Yes					
Interrupts(Sources)	External	6					
Debugging Function	On-Chip Debug	—					
	On-Board Flash Program	—					
Other Functions	ROM Correction Function	—					
	Others	—					
Package		44-pin QFP			80-pin QFP		
Operating Frequency/Supply Voltage		10MHz/4.0 to 5.5V					
Operating Ambient Temperature (°C)		T-ver:-40 to 85, V-ver:-40 to 125					

* M: mask ROM version, O: one-time PROM version

★ : New product

• Memory Capacity (ROM/RAM) (7600 Series)

80-pin 80 44-pin 44



The M in M3xxxxMx indicates the mask ROM version.
The E in M3xxxxEx indicates the one-time PROM version.

Package			Lead Pitch (mm)
44-pin	FP	44-pin QFP (44P6N-A)	0.8
80-pin	FP	80-pin QFP (PRQP0080JA-A(80P6S-A))	0.65

★ : New product

* It is an old package code inside ()

Notebook PC MCUs

Notebook PCs are hugely popular computing choices for business people and consumers. Renesas serves this vibrant market by delivering MCUs for applications such as power supply control and keyboard control. These notebook PC MCUs are compatible with Intel's LPC and Philips's I²C-bus standards.

Keyboard Controller MCUs

Renesas keyboard controller MCUs incorporate host bus interface circuitry (LPC, ISA-Bus).

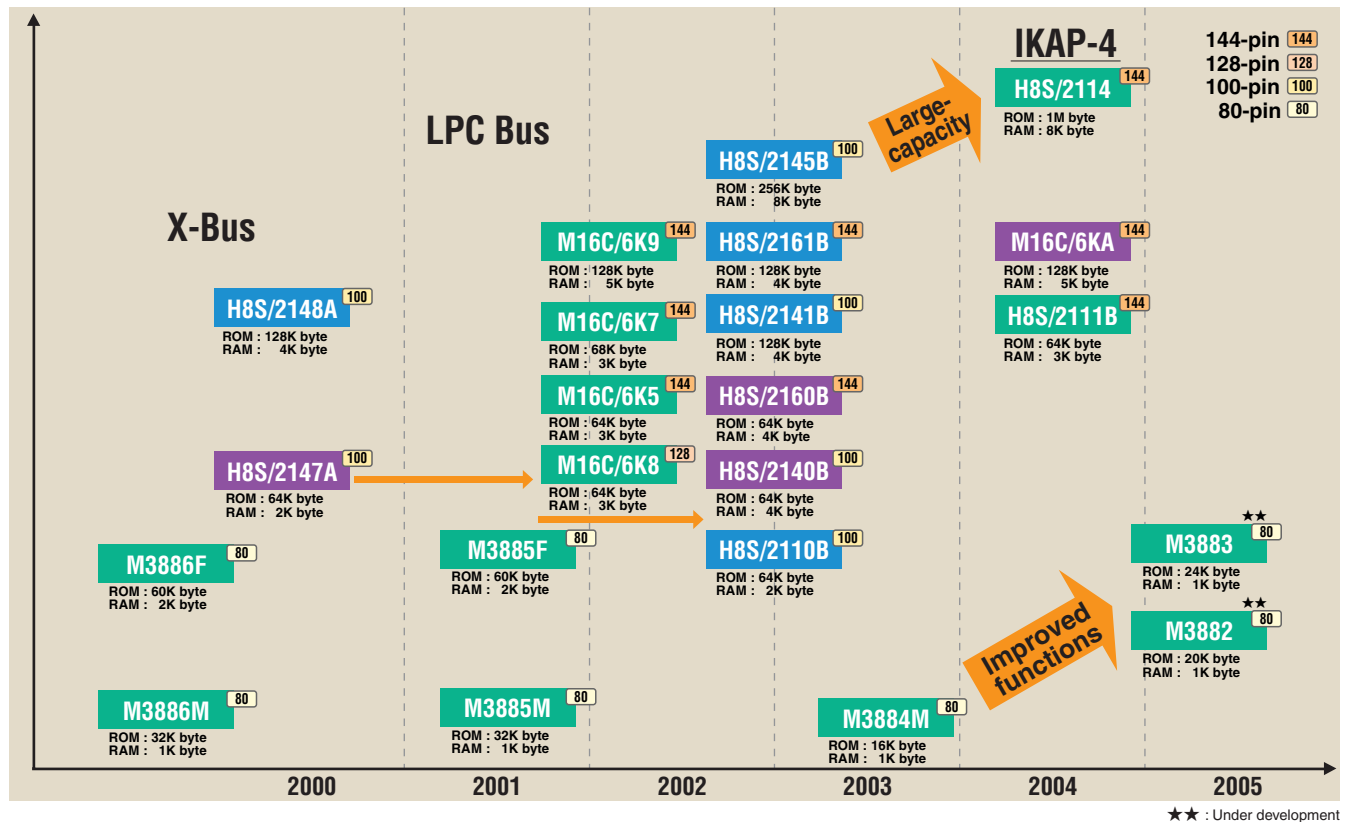
Applications Notebook PCs

Compact Package MCUs

These MCUs have high-precision 10-bit A/D converters on-chip. Their small package and I²C-bus compatibility make them suitable for use in mobile applications.

Applications Notebook PCs, PDAs

• Keyboard Controller MCU Roadmap



• Specifications (M16C/60 Series)

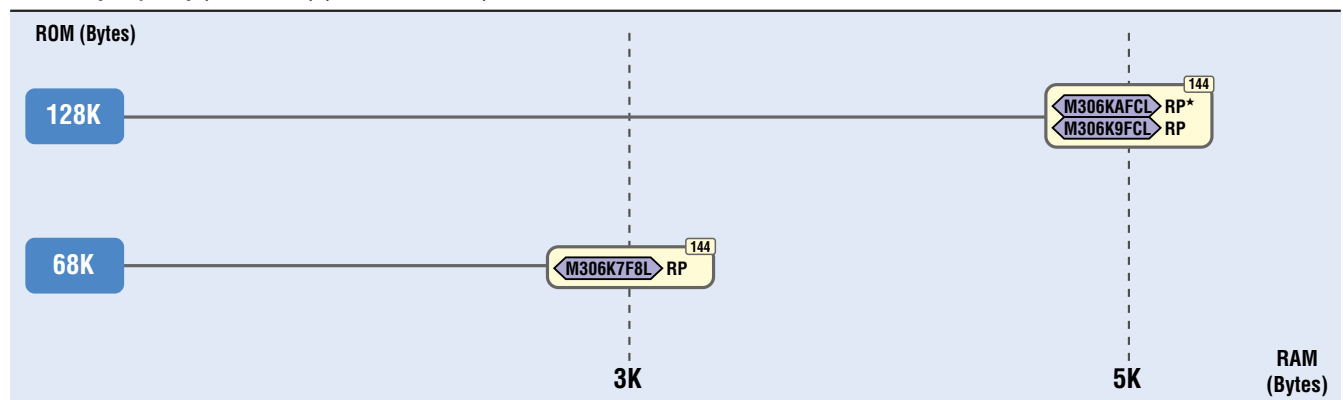
Group		M16C/6K7	M16C/6K9	M16C/6KA*	
Type No.		M306K7F8LRP	M306K9FCLRP	M306KAFLRP*	
Memory	ROM(Bytes)	68K	128K		
	RAM(Bytes)	3K	5K		
	ROM Type*	F			
	Data Flash	—			
	Program Security	ID code check function, ROM code protecting function			
CPU	CPU	M16C/60 Core			
	Basic Instructions	91			
	Minimum Instruction Execution Time (ns)	125 (@8MHz)	62.5 (@16MHz)		
	Multiplier	16 × 16 → 32			
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32			
DMA	DMAC (Channels)	2	—		
Clock	Clock Generation Circuit	2 circuits (Main clock, Sub-clock)		1 circuit (Main clock)	
	Subclock	Yes		—	
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)			
	Power Save	Normal operating mode (High-Speed, Medium-Speed, Low-Speed, Low-Power Consumption), Wait mode and Stop mode		Normal operating mode (High-Speed, Medium-Speed), Wait mode and Stop mode	
	A/D Converter	Resolution × Channels	10-bit × 10		
D/A Converter	Sample and Hold	Yes			
	Resolution × Channels	8-bit × 2	—		
	8-bit	—			
	16-bit	Timer A × 5, Timer B × 6			
	PWM Output	5 (Timer A) + 14-bit × 4	5 (Timer A) + 8-bit × 6		
Timer	Event Counter	5 (Timer A) + 6 (Timer B)			
	Watchdog Timer	Yes			
	Serial Interface	Clock Sync./ Clock Async.	3 (UART0 to UART2)		1
		Clock Sync. Only	2 (SI/O3, SI/O4)		
		Clock Async. Only	—		
I ² C-bus		2 (option)	3		
LPC/ISA		Yes			
I/O Ports	Input Only (Numbers)	1			
	CMOS I/O Only (Numbers)	104			
	N-Channel Open Drain Port (Numbers)	25			
	High Current Drive Port	8	12		
	Pull-Up Resistor	Yes			
Interrupts(Sources)	External	15	16		
Other Functions	ROM Correction Function	—			
	Others	PS/2 interface × 3			
Package		144-pin TQFP			
Operating Frequency/Supply Voltage		8MHz/3.0 to 3.6V	16MHz/3.0 to 3.6V		
Operating Ambient Temperature (°C)		-20 to 85			

* F: flash memory version

★ : New product

• Memory Capacity (ROM/RAM) (M16C/60 Series)

144-pin (144)



The F in M3xxxxFx indicates the flash memory version.

Package		Lead Pitch (mm)
144-pin RP	144-pin TQFP(PTQP0144LA-A((144PFB-A))	0.4

★ : New product

* It is an old package code inside ()

Specifications (H8S/2100 Series)

Group		H8S/2110B		H8S/2111B		H8S/2114
Product No.		H8S/2110BF		H8S/2111B-BF	H8S/2111B-CF	H8S/2114F
Type No.		HD64F2110BVFA	HD64F2110BVTE	HD64F2111BVBTE	HD64F2111BVBCTE	R4F2114VTE
Memory	ROM(Bytes)	64K				1M
	RAM(Bytes)	2K				8K
	ROM Type*	F				
	Program Security	—				
CPU	CPU	H8S/2000 Core				
	Basic Instructions	65				
	Minimum Instruction Execution Time (ns)	100 (@10MHz)				100 (@10MHz), 50 (@20MHz)
	Multiplier	—				
	Multiply-Accumulate Instruction	—				
DMA	DMAC (Channels)	—				
	EXDMAC	—				
	DTC/DMAC II	—				DTC (85 channels)
External Bus Expansion	Address Space (Bytes)	16M				
	Bus State Controller	—				
	Bus Structure	—				
	SDRAM Controller	—				
	DRAM Controller	—				
Clock	Host Interface	LPC				
	Clock Generation Circuit	1 circuit (System clock)				
	PLL	—				
	Subclock	—				
	RTC	—				
A/D Converter	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)				
	Power Save	Sub active mode, Medium-Speed mode, Sleep mode, Sub sleep mode, Watch mode, Software standby mode, Hardware standby mode, Module stop mode				
	Resolution × Channels	—				10-bit × 8
	Sample and Hold	—				Yes
	D/A Converter	Resolution × Channels	—			
Timer	8-bit	4 (TMR0, 1, X, Y)		6 (TMR0, 1, X, Y, A, B)		4 (TMR0, 1, X, Y)
	16-bit	1 (FRT)				4 (FRT, TPU)
	32-bit	—				
	Prescaler	Yes				
	Input Capture	4 (16-bit timer combined)		5 (16-bit timer combined)		8 (16-bit timer combined)
	Output Compare	6 (16-bit timer combined)		8 (16-bit timer combined)		14 (16-bit timer combined)
	PWM Output	2 (PWMX)		2 (PWMX), 8-bit × 8		
	Real-Time Port	—				
	Programmable Pulse Generator	—				
	Event Counter	—				
	2-Phase Encoder Input	—				Yes
	Watchdog Timer		Yes (× 2)			
Serial Interface	Clock Sync./ Clock Async.	1				2
I ² C-bus		2				
IEBus		—				
Smart Card/SIM		—				1
SSU/Special Serial I/O		—				
CAN	Channels	—				
	Buffers	—				
USB Function		—				
LPC/ISA		Yes				
IrDA		—				Yes
LCD		—				
CRC Calculation Circuit		—				
I/O Ports	Input Only (Numbers)	9				8
	CMOS Output Only (Numbers)	—				
	CMOS I/O Only (Numbers)	69		101		85
	High Voltage Port (Numbers)	—				
	N-Channel Open Drain Port (Numbers)	—				
	DTMF	—				
	High Current Drive Port	10		14		
	Pull-Up Resistor	48		80		78
Interrupts(Sources)	NMOS Push-Pull	4		12		20
	External	9				17
Debugging Function	Boundary Scan/JTAG	—				Yes
	On-Chip Debug	—				Yes
	On-Board Flash Program	Yes				
Other Functions	ROM Correction Function	—				
Package		FP-100B, TFP-100B		TFP-144		
Operating Frequency/Supply Voltage		10MHz/3.0 to 3.6V				20MHz/3.0 to 3.6V
Operating Ambient Temperature (°C)		-20 to 75				

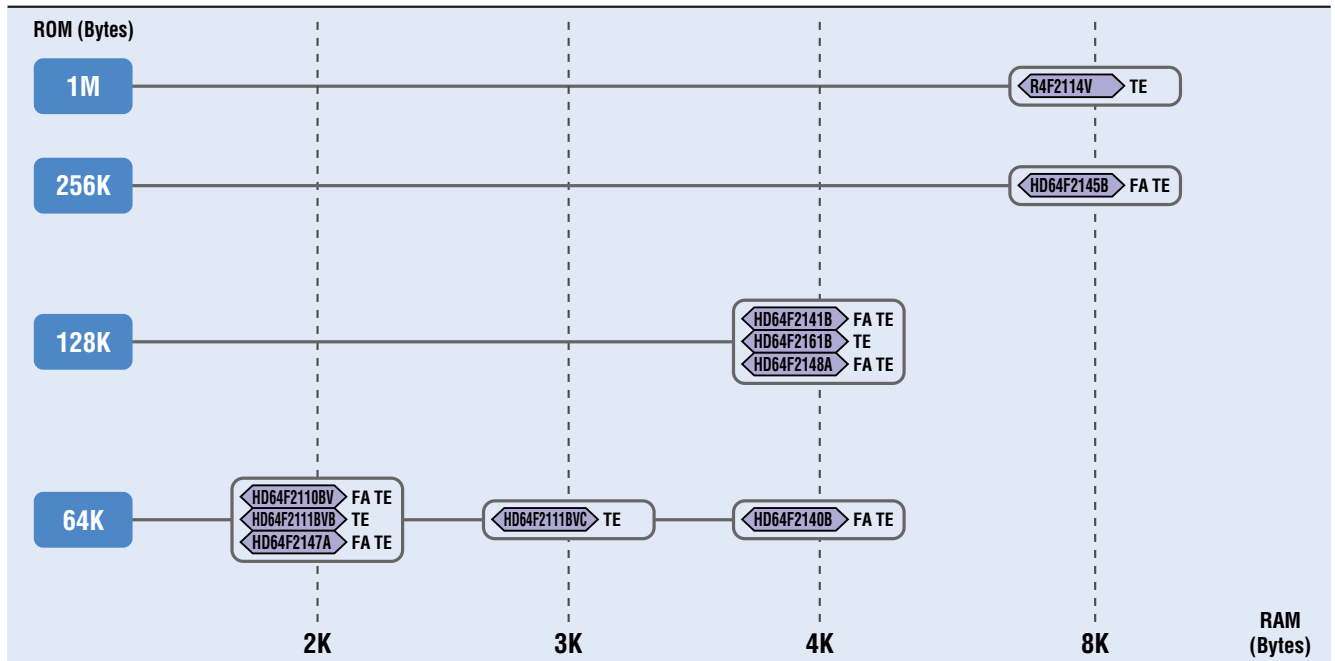
* F: F-ZTAT version

• Specifications (H8S/2100 Series)

Group		H8S/2140B										H8S/2148			
Product No.		H8S/2140BF		H8S/2141BF		H8S/2160B		H8S/2161B		H8S/2145BF		H8S/2147AF		H8S/2148AF	
Type No.		HD64F2140BFA	HD64F2140BTE	HD64F2141BFA	HD64F2141BTE	HD6432160BxxTE	HD64F2160BTE	HD6432161BxxTE	HD64F2161BTE	HD64F2145BFA	HD64F2145BTE	HD64F2147AFA	HD64F2147ATE	HD64F2148AFA	HD64F2148ATE
Memory	ROM(Bytes)	64K		128K		64K		128K		256K		64K		128K	
	RAM(Bytes)					4K				8K		2K		4K	
	ROM Type*			F		M		F		M				F	
	Program Security							Yes							
CPU	CPU	H8S/2000 Core													
	Basic Instructions	65													
	Minimum Instruction Execution Time (ns)	100 (@10MHz)												100 (@10MHz), 50 (@20MHz)	
	Multiplier	—													
DMA	Multiply-Accumulate Instruction	—													
	DMAC (Channels)	—													
	EXDMAC	—													
	DTC/DMAC II	DTC (85 channels)													
External Bus Expansion	Address Space (Bytes)	16M													
	Bus State Controller	Direct connection to SRAM and ROM is supported													
	Bus Structure	Separate bus (8/16-bit)													
	SDRAM Controller	—													
	DRAM Controller	—													
	Host Interface	LPC/ISA										ISA			
Clock	Clock Generation Circuit	1 circuit (System clock)													
	PLL	—													
	Subclock	—													
	RTC	—													
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)													
	Power Save	Medium-Speed mode, Sub active mode, Sleep mode, Sub sleep mode, Watch mode, Software standby mode, Hardware standby mode, Module stop mode													
A/D Converter	Resolution × Channels	10-bit × 8, 10-bit × 16 (expanded A/D input)													
D/A Converter	Sample and Hold	Yes													
	Resolution × Channels	8-bit × 2													
Timer	8-bit	4 (TMR0, 1, X, Y)													
	16-bit	1 (FRT)													
	32-bit	—													
	Prescaler	Yes													
	Input Capture	4 (16-bit timer combined)													
	Output Compare	5 (16-bit timer combined)													
	PWM Output	PWMX × 2, PWM × 16													
	Real-Time Port	—													
	Programmable Pulse Generator	—													
	Event Counter	—													
	2-Phase Encoder Input	—													
Watchdog Timer		2													
Serial Interface	Clock Sync./ Clock Async.	3													
I ² C-bus		2													
IEBus		—													
Smart Card/SIM		—													
SSU/Special Serial I/O		—													
CAN	Channels	—													
	Buffers	—													
USB Function		—													
LPC/ISA		Yes													
IrDA		Yes													
LCD		—													
CRC Calculation Circuit		—													
I/O Ports	Input Only (Numbers)	9													
	CMOS Output Only (Numbers)	—													
	CMOS I/O Only (Numbers)	69				109				69				71	
	High Voltage Port (Numbers)	—													
	N-Channel Open Drain Port (Numbers)	—												2	
	DTMF	—													
	High Current Drive Port	10												14	
	Pull-Up Resistor	32				64				32				48	
Interrupts(Sources)	NMOS Push-Pull	4												2	
	External	31												9	
Debugging Function	Boundary Scan/JTAG	—													
	On-Chip Debug	—													
	On-Board Flash Program	—													
Other Functions	ROM Correction Function	Yes													
Package		FP-100B, TFP-100B				TFP-144				FP-100B, TFP-100B					
Operating Frequency/Supply Voltage		10MHz/2.7 to 3.6V										20MHz/4.5 to 5.5V 16MHz/4.0 to 5.5V 10MHz/2.7 to 3.6V		20MHz/4.5 to 5.5V 16MHz/4.0 to 5.5V 10MHz/2.7 to 3.6V	
Operating Ambient Temperature (°C)		-20 to 75										-20 to 75, -40 to 85		-20 to 75, -40 to 85, -40 to 110	

* F: F-ZTAT version, M: mask ROM version

Memory Capacity (ROM/RAM) (H8S/2100 Series)



Indicates the flash memory version.

Package	
FA	QFP (PRQP0100KA-A(FP-100B))
TE	TQFP (PTQP0100KA-A(TFP-100B), PTQP0144LC-A(TFP-144))

* It is an old package code inside ()

• Specifications (740, 38000 Series)

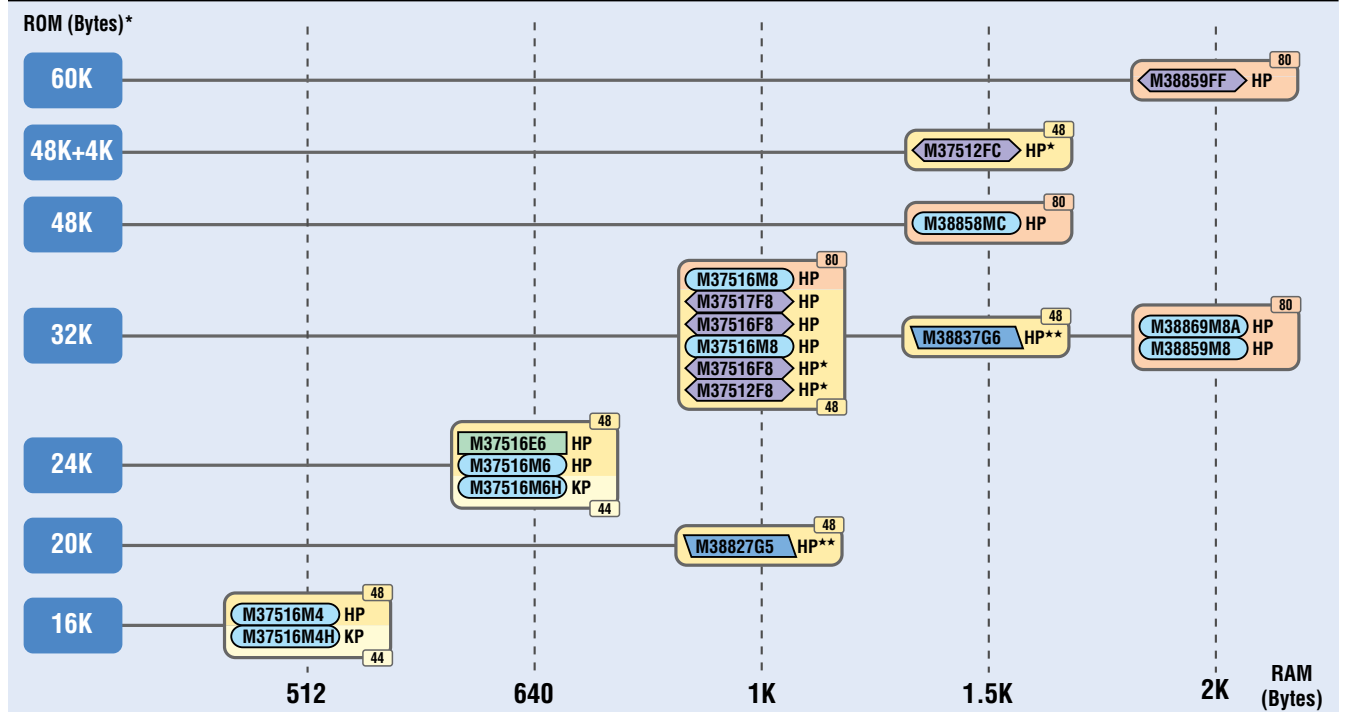
Group		7512*		7516 (H specification)		7516				7517	3882**	3883**	3885			3886			
Type No.		M37512F8HP*	M37512FCHP*	M37516M4H-XXXXP	M37516M6H-XXXXP	M37516M4-XXXXHP	M37516M6-XXXXHP	M37516E6HP	M37516M8-XXXXHP	M37516F8HP	M37517F8HP	M38827G5HP**	M38837G6HP**	M38857M8-XXXXHP	M38858MC-XXXXHP	M38859FFHP	M38859M8-XXXXHP	M38869M8A-XXXXHP	
Memory	ROM(Bytes)	32K + 4K	48K + 4K	16K	24K	16K	24K	32K			20K	32K		48K	60K	32K			
	RAM(Bytes)	1K	1.5K	512	640	512	640	1K			1.5K	1K	1.5K	2K					
	ROM Type*	F		M				O		M	F		Qz		M	F	M		
	Data Flash	Yes		—															
	Cache Memory	—																	
	Program Security	—		ID code check function, ROM code protecting function (Only Flash memory version)							—								
CPU	CPU	740 Core																	
	Basic Instructions	71																	
	Minimum Instruction Execution Time (ns)	1000 (@4MHz)		500 (@8MHz)						1000 (@4MHz)	500 (@8MHz)						400 (@10MHz)		
Clock	Clock Generation Circuit	2 circuits (Main clock, Sub-clock)										1 circuit (Main clock)	2 circuits (Main clock, Sub-clock)						
	Subclock	Yes										—		Yes					
	On-Chip Oscillator	Yes		—						Yes		—		—					
	Frequency Divider	1/n (n = 2, 8)										Main clock: 1/n (n = 1, 2, 8)		Main clock: 1/n (n = 1, 2, 8) Sub clock : 1/n (n = 1, 2)					
	Power Save	Wait mode, Stop mode, Low-Speed mode (Sub clock)										Wait mode, Stop mode		Wait mode, Stop mode, Low-Speed mode (Sub clock)					
A/D Converter	Resolution × Channels	10-bit × 10		10-bit × 6		10-bit × 8				10-bit × 10	—		10-bit × 8						
D/A Converter	Resolution × Channels	—										—			8-bit × 2				
Timer	8-bit	—																	
	16-bit	—																	
	Prescaler	Timer X × 1, Timer Y × 1, Timer 1 × 1, Timer 2 × 1																	
	PWM Output	8-bit × 1 (Dedicated)										—		6-bit × 1 (Dedicated: PWM0) 8-bit × 5 (Dedicated: PWM1-5)	14-bit × 2 (Dedicated: PWM0, PWM1)				
	Event Counter	Timer X, Timer Y																	
Watchdog Timer		Yes																	
Serial Interface	Clock Sync./ Clock Async.	1 (SI/O1)										—		1 (SI/O1)					
	Clock Sync. Only	1 (SI/O2)										—					1 (SI/O2)		
I ² C-bus		Yes (option)										—		Yes	Yes (option)				
LPC/ISA		—										Yes(LPC)					Yes (ISA)		
I/O Ports	Input Only (Numbers)	—																	
	CMOS I/O Only (Numbers)	22	34	38				34	64										
	N-Channel Open Drain Port (Numbers)	14	2						8										
	High Current Drive Port	8										4							
	Pull-Up Resistor	—										8							
Interrupts(Sources)	External	7										10		13				9	
Debugging Function	On-Board Flash Program	Yes										—		Yes					
Other Functions	ROM Correction Function	—																	
	Others	—												Comparator × 8					
Package		48-pin LQFP		44-pin QFN		48-pin LQFP				80-pin LQFP									
Operating Frequency/Supply Voltage		4MHz/ 2.45 to 2.55V		(at High-speed mode) 8MHz/4.0 to 5.5V 4MHz/2.7 to 5.5V (at Low-speed mode)				4MHz/ 3.0 to 3.6V		8MHz/3.0 to 3.6V								(at High-speed mode) 10MHz/ 4.0 to 5.5V (at Medium-speed mode) 10MHz/ 2.7 to 5.5V (at Low-speed mode) 32MHz/ 2.7 to 5.5V	
Operating Ambient Temperature (°C)		-20 to 85																	

* M: mask ROM version, F: flash memory version, O: one-time PROM version, Qz: QzROM version

★ : New product ★★ : Under development

• Memory Capacity (ROM/RAM) (740, 38000 Series)

80-pin 80 48-pin 48 44-pin 44



- The M in M3xxxxMx indicates the mask ROM version.
- The F in M3xxxxFx indicates the flash memory version.
- The E in M3xxxxEx indicates the one-time PROM version.
- The G in M3xxxxGx indicates the Qz ROM version.

* The notation "+4K" refers to data flash memory.

Package			Lead Pitch (mm)
44-pin	KP	44-pin QFP(PLQP0048KB-A(44PJX-A))	0.5
48-pin	HP	48-pin LQFP(PLQP0048KB-A(48P6Q-A))	0.5
80-pin	HP	80-pin LQFP(PLQP0080KB-A(80P6Q-A))	0.5

★ : New product ★★ : Under development

* It is an old package code inside ()

MPUs and MCUs with Ethernet Controllers

More and more electronic office equipment and factory equipment is being linked to networks, and the spread of broadband connectivity means that even household appliances are becoming networked. Against this background, demand is growing for networking technology with high-speed data transfer capabilities. The Ethernet networking standard meets these requirements and is firmly established as a connection interface between network-capable devices. The MPUs and MCUs listed on this page incorporate on-chip Ethernet controllers conforming to the IEEE 802.3 standard. They make it simple to design systems with high-speed Ethernet capabilities.

• Specifications (SH-Ether Series)

Series		SH-Ether											
Group		SH7615			SH7616		SH7618	SH7619**	SH7710		SH7712*		
Type No.		HD6417615F	HD6417615ARF	HD6417615ARBP	HD6417616F	HD6417616SF	HD6417618RBP	R4S76190**	HD6417710BP	HD6417710F	HD6417712BP	HD6417712F	
Memory	ROM(Bytes)	8K						4K	16K				
	RAM(Bytes)	—											
	ROM Type*	L											
	Cache Memory	4K						16K		32K			
	Program Security	—											
CPU	CPU	SH2-DSP Core						SH-2 Core		SH3-DSP Core			
	Basic Instructions	65						62		160			
	Minimum Instruction Execution Time (ns)	16 (@62.5MHz)						10 (@100MHz) 8 (@125MHz)		5 (@200MHz)			
	Dhrystone Performance	81MIPS (62.5MHz)						130MIPS (100MHz) 163MIPS (125MHz)		260MIPS (200MHz)			
	Multiplier	32 × 32 – 64						—					
	Multiply-Accumulate Instruction	32 × 32 + 64 – 64						—					
	Barrel Shifter	—						—		Yes			
	FPU	—						—		—			
	MMU	—						—		Yes			
DMA	DMAC (Channels)	2						—		4		6 (2 of them are available externally)	
	DTC/DMAC II	—						—		—		—	
External Bus Expansion	Address Space (Bytes)	160M						320M		384M			
	Bus State Controller	SRAM/SDRAM/DRAM/BurstROM						SRAM/SDRAM/Byte Control SRAM/PCMCIA		SRAM/SDRAM/BurstROM/Byte Control SRAM/PCMCIA			
	Bus Structure	Separate bus (8/16/32-bit)						Separate bus (8/16-bit)		Separate bus (8/16/32-bit)			
	SDRAM Controller	—						Yes		—			
	DRAM Controller	Yes						—		—			
	PCI Controller	—						—		—			
	Endian Conversion	Yes (CS2, CS4 area only)						—		Yes			
	Host Interface	—						Yes		—		—	
Clock	Clock Generation Circuit	—						1 circuit		—			
	PLL	—						Yes		—			
	RTC	—						—		Yes (not separated power supply)			
	Oscillation Stop Detection	—						—		—			
	Frequency Divider	—						Yes		—			
Power Supply Voltage Detection	Power Save	Sleep mode, Standby mode, Module standby mode						Sleep mode, Software standby mode, Module standby mode					
	Power-On Reset/POR	—						—					
A/D Converter	Resolution × Channels	—						—					
	Sample and Hold	—						—					
	Multi-Channel Sample and Hold	—						—					
D/A Converter	Resolution × Channels	—						—					
	8-bit	—						—					
Timer	16-bit	16-bit free-running Timer × 1, Timer pulse unit × 3						Compare match timer × 2		—			
	32-bit	—						—		Timer unit × 3			
	Prescaler	TPU						—		CMT			
	Input Capture	TPU						—		—			
	Output Compare	TPU						—		—			
	PWM Output	TPU						—		—			
	Event Counter	—						—		—			
	2-Phase Encoder Input	TPU						—		—			
	3-Phase Inverter Control	—						—		—			
Watchdog Timer		—						Yes		—			
Serial Interface	Clock Sync./ Clock Async.	2						3		2			
	Clock Sync. Only	—						—		—			
	Clock Async. Only	—						—		—			
I ² C-bus		—						—		—			
Smart Card/SIM		—						—		—			
SSU/Special Serial I/O		Serial I/O × 2						—		Serial I/O × 1		Serial I/O × 2	
CAN	Channels	—						—		—			
	Buffers	—						—		—			
Ethernet		1						1 (with PHY)		2 (with Bridge)			
USB HOST		—						—		—			
USB Function		—						—		—			
IrDA		—						—		—			
LCD		—						—		—			
I/O Ports	Input Only (Numbers)	—						—		—			
	CMOS I/O Only (Numbers)	29						71		24			
	High Voltage Port (Numbers)	—						—		—			
	N-Channel Open Drain Port (Numbers)	—						—		—			
	High Current Drive Port	—						—		—			
	Pull-Up Resistor	—						—		—			
Interrupts(Sources)	External	NMI + 4 (15 levels)						9 (NMI + 8)		NMI + 4 (15 levels) or 6			
Debugging Function	Boundary Scan/JTAG	—						Yes		—			
	On-Chip Debug	—						Yes		—			
	On-Board Flash Program	—						—		—			
Other Functions	ROM Correction Function	—						—		—			
	Others	DSP function						—		DSP function			
		E-DMAC × 2						—		IP security accelerator		—	
Package		FP-208C		BP-240A	FP-208C		TBP-176		BP-256H	FP-256G	BP-256H	FP-256G	
Operating Frequency/Supply Voltage		62.5MHz/3.3V						100MHz/3.3+1.5V 125MHz/3.3+1.8V		200MHz/1.5V (Core), 3.3V (I/O)			
Operating Ambient Temperature (°C)		-20 to 75						—					

Note : The package code described is the former one. Regarding the new one, please refer to the following URL <http://www.renesas.com/en/package>

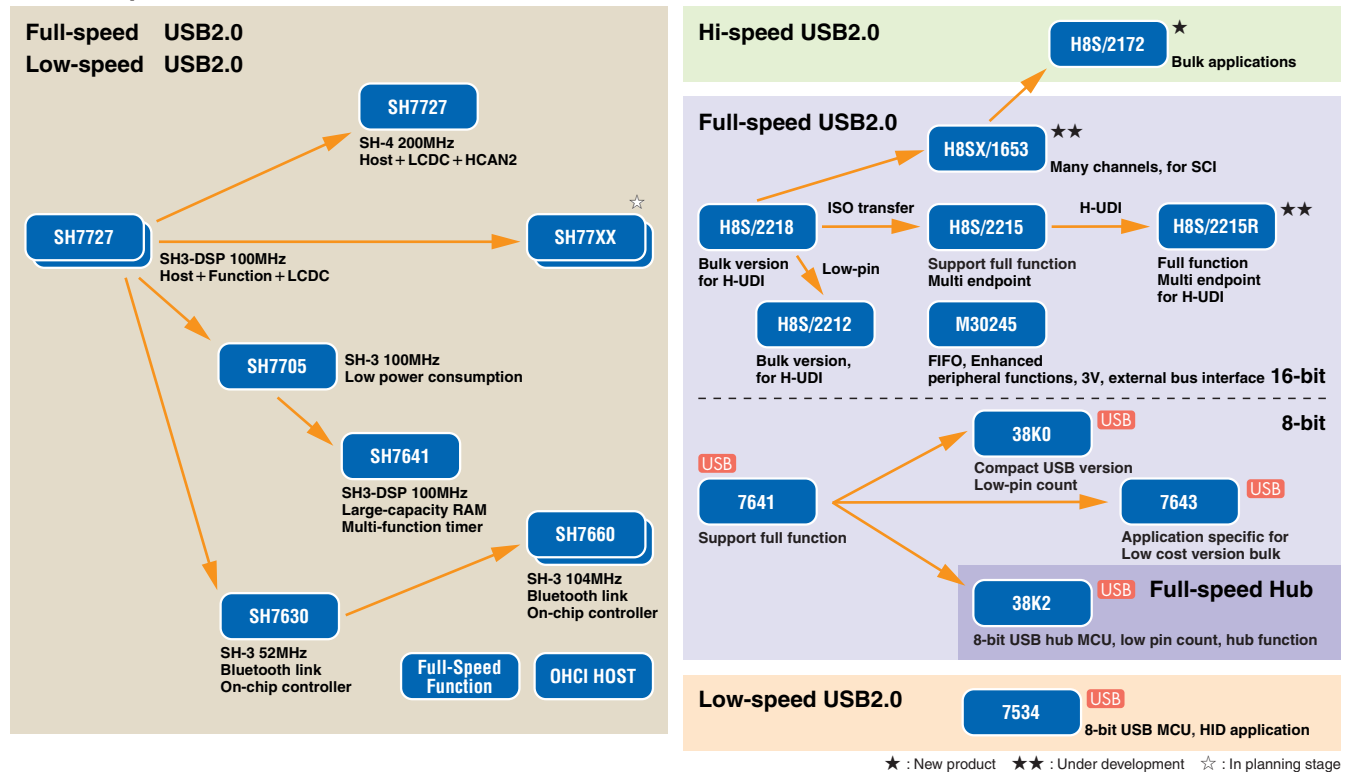
* L: ROM-less version

★ : New product ★★ : Under development

USB MPUs and MCUs

Renesas has the lineups of 8-bit MPUs and MCUs suitable for low-speed and Hub-type USB applications, and 8/16-bit MPUs and MCUs suitable for Full-speed applications. These devices can be employed in applications such as audio equipment, electronic musical equipment, printers, scanners, modems and peripheral products for PCs.

• Roadmap



• Specifications (SH7700 Series)

Series		SH7700					
Group		SH7705		SH7720*		SH7727	
Type No.		HD6417705BP	HD6417705F	HD6417720BP*	HD6417720BL*	HD6417727BP	HD6417727F
Memory	ROM(Bytes)	—		—		16K	
	RAM(Bytes)	—		—		—	
	Data Flash	—		—		—	
	ROM Type*	—		L		—	
	Cache Memory	32K 4-way set-associative				16K 4-way set-associative	
Program Security		—					
CPU	CPU	SH-3 Core		SH3-DSP Core			
	Basic Instructions	68		160			
	Minimum Instruction Execution Time (ns)	7.5 (@133MHz)				6.3 (@160MHz)	
	Dhrystone Performance	173MIPS (133MHz)				208MIPS (160MHz) 130MIPS (100MHz)	
	Multiplier	32 × 32 → 64					
	Multiply-Accumulate Instruction	32 × 32 + 64 → 64					
	Barrel Shifter	Yes					
	FPU	—					
DMA	MMU	Yes					
	DMAC (Channels)	4		6		4	
External Bus Expansion	DTC/DMAC II	—					
	Address Space (Bytes)	384M					
	Bus State Controller	SRAM/SDRAM/BurstROM/Byte Control SRAM/PCMCIA				SRAM/SDRAM/BurstROM/PCMCIA	
	Bus Structure	8.16.32					
	SDRAM Controller	Yes					
	DRAM Controller	—					
	PCI Controller	—					
	Endian Conversion	Yes					
Clock	Host Interface	—					
	Clock Generation Circuit	1 circuit					
	PLL	Yes					
	RTC	Yes					
	Oscillation Stop Detection	—					
	Frequency Divider	Yes					
Power Save		Sleep mode, Software standby mode, Module standby mode, Hardware standby mode					
Power Supply Voltage Detection	Power-On Reset/POR	—					
A/D Converter	Resolution × Channels	10-bit × 4				10-bit × 6	
	Sample and Hold	—					
D/A Converter	Multi-Channel Sample and Hold	Yes					
	Resolution × Channels	—		8-bit × 2			
Timer	8-bit	—		—			
	16-bit	16-bit timer pulse unit × 4, Compare match timer × 1		16-bit timer pulse unit × 4, Compare match timer × 5		—	
	32-bit	Timer unit × 3					
	Prescaler	Yes					
	Input Capture	one of them		—			
	Output Compare	one of them				—	
	PWM Output	Maximum 4-phase PWM waveform by 16-bit timer pulse unit is possible to output				—	
	Event Counter	—					
	2-Phase Encoder Input	—					
	3-Phase Inverter Control	—					
Watchdog Timer		Yes					
Serial Interface	Clock Sync./ Clock Async.	2		—		1	
	Clock Sync. Only	—		2		1	
	Clock Async. Only	—		—		1	
I ² C-bus		—		1		—	
Smart Card/SIM		—		T = 0 (Sub set) / T = 1 (Sub set)		T = 0 (Sub set)	
SSU/Special Serial I/O		—					
CAN	Channels	—					
	Buffers	—					
Ethernet		—					
USB HOST		—		—		2*	
USB Function		1		—		1*	
IrDA		1 (using Serial interface (1ch))				—	
LCD		—		Yes			
I/O Ports	Input Only (Numbers)	—		—		—	
	CMOS I/O Only (Numbers)	105		117		104	
	High Voltage Port (Numbers)	—					
	N-Channel Open Drain Port (Numbers)	—					
	High Current Drive Port	—					
	Pull-Up Resistor	Yes					
Interrupts(Sources)	External	NMI + 22 (15 levels)				NMI + 6 (15 levels)	
Debugging Function	Boundary Scan/JTAG	—		Yes		—	
	On-Chip Debug	—		Yes		—	
	On-Board Flash Program	—		—		—	
Other Functions	ROM Correction Function	—					
	Others	—		DSP function			
		—		Multi Media card interface		—	
		—		Compare match timer		—	
		—		SSL accelerator		—	
Package		TBP-208A	FP-208C	BP-256H	BP-256C	BP-240A	FP-240B
Operating Frequency/Supply Voltage		(100/133MHz)/1.5V/3.3V		(133MHz)/1.5V/3.3V		(167MHz)/1.9V/3.3V, (100MHz)/1.8V/3.3V	
Operating Ambient Temperature (°C)		-20 to 75					

Note : The package code described is the former one. Regarding the new one, please refer to the following URL. <http://www.renesas.com/en/package>

★ : New product

* : When using 2ch as USB host, USB function is not available.

* L : ROM-less version

• Specifications (SH7641, SH7750 Series)

Series		SH7641		SH7750			
Group		SH7641		SH7760			
Type No.		HD6417641BP		HD6417760BP		HD6417760BL	
Memory	ROM(Bytes)			—			
	RAM(Bytes)	144K		2KB (MFI shared) + 8KB (USB shared)			
	Data Flash			—			
	ROM Type*			L			
	Cache Memory	16K		16K (instruction)/32K (data), 2-way set-associative			
	Program Security			—			
CPU	CPU	SH3-DSP Core (MMU less)		SH-4 Core			
	Basic Instructions	159		91			
	Minimum Instruction Execution Time (ns)	10 (@100MHz)		2.5 (@200MHz)			
	Dhrystone Performance	130MIPS (100MHz)		360MIPS/200MHz, 1.4GFLOPS/200MHz			
	Multiplier			32 × 32 ~64			
	Multiply-Accumulate Instruction			32 × 32 + 64 ~64			
	Barrel Shifter			Yes			
	FPU	—		Yes			
	MMU	—		Yes			
DMA	DMAC (Channels)	4		8			
	DTC/DMAC II			—			
External Bus Expansion	Address Space (Bytes)	384M		448M			
	Bus State Controller	Yes		SRAM/SDRAM/MPX/BurstROM/Byte Control SRAM/PCMCIA			
	Bus Structure	SRAM/SDRAM		Separate bus (8/16/32-bit), Multiplex bus (32-bit)			
	SDRAM Controller			Yes			
	DRAM Controller	Yes		—			
	PCI Controller			—			
	Endian Conversion	—		Yes			
Clock	Host Interface	—		Multi function interface (MFI)			
	Clock Generation Circuit			1 circuit			
	PLL			Yes			
	RTC			—			
	Oscillation Stop Detection			—			
	Frequency Divider			Yes			
Power Save		Sleep mode, Software standby mode, Module standby mode		Sleep mode, Standby mode, Module standby mode, etc.			
Power Supply Voltage Detection	Power-On Reset/POR			—			
A/D Converter	Resolution × Channels	10-bit × 8		10-bit × 4			
	Sample and Hold	2ch		Yes			
	Multi-Channel Sample and Hold	—		Yes			
D/A Converter	Resolution × Channels			—			
	8-bit			—			
Timer	16-bit	9 (MTU, CMT)		*Compare match timer, 4ch (selectable 16-bit, 32-bit)			
	32-bit	—		Timer unit × 3			
	Prescaler	MTU		Yes			
	Input Capture	MTU		1 (using Timer unit)			
	Output Compare	MTU		1 (using Compare match Timer)			
	PWM Output	MTU		—			
	Event Counter	MTU		—			
	2-Phase Encoder Input	MTU		—			
	3-Phase Inverter Control	MTU		—			
Watchdog Timer				Yes			
Serial Interface	Clock Sync./ Clock Async.			3			
	Clock Sync. Only			—			
	Clock Async. Only			—			
I ² C-bus		1		2ch			
Smart Card/SIM		—		T = 0 (Sub set)/T = 1 (Sub set)			
SSU/Special Serial I/O		—		Yes			
CAN	Channels	—		2			
	Buffers	—		32			
Ethernet				—			
USB HOST				Yes			
USB Function		1		—			
IrDA				—			
LCD				Yes			
I/O Ports	Input Only (Numbers)	8		—			
	CMOS I/O Only (Numbers)	156		69			
	High Voltage Port (Numbers)			—			
	N-Channel Open Drain Port (Numbers)	2		—			
	High Current Drive Port	Yes		—			
	Pull-Up Resistor	—		Yes			
Interrupts(Sources)	External	9		NMI + 15 external (15 level) or 4 external			
Debugging Function	Boundary Scan/JTAG			Yes			
	On-Chip Debug			Yes			
	On-Board Flash Program			—			
Other Functions	ROM Correction Function			—			
	Others	—		Audio Codec Interface (HAC) × 2 Channels			
		—		Serial Sound Interface (SSI) × 2 Channels			
		—		MultiMediaCard Interface (MMCIF)			
		—		Multi function interface (MFI)			
Package		CSP-256		(*Some pins for each module are multiplexed)			
Operating Frequency/Supply Voltage		100MHz/1.8V/3.3V		BP-256F, BP-256B			
Operating Ambient Temperature (°C)		-40 to 85		200MHz/1.5V/3.3V(I/O)			
				-20 to 75/-40 to 85 *: differ from each product			

Note : The package code described is the former one. Regarding the new one, please refer to the following URL. <http://www.renesas.com/en/package>

* L: ROM-less version

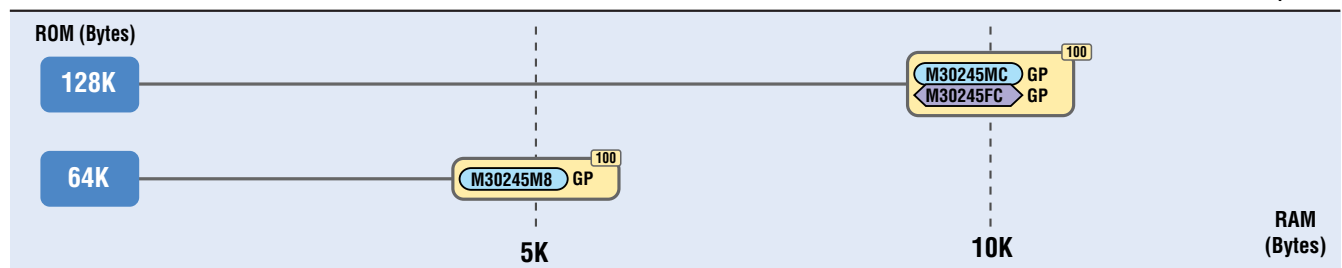
• Specifications (M16C/20 Series)

Group		M16C/24		
Type No.		M30245FCGP	M30245M8-XXXGP	M30245MC-XXXGP
Memory	ROM(Bytes)	128K	64K	128K
	RAM(Bytes)	10K	5K	10K
	ROM Type*	F	M	
	Data Flash	—		
	Program Security	ID code check function, ROM code protecting function (Only Flash memory version)		
CPU	CPU	M16C/61 Core		
	Basic Instructions	91		
	Minimum Instruction Execution Time (ns)	62.5 (@16MHz)		
	Multiplier	16 × 16 → 32		
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32		
DMA	DMAC (Channels)	4		
	DTC/DMAC II	—		
Clock	Clock Generation Circuit	3 circuits (Main clock, Sub-clock and On-chip oscillator)		
	Subclock	Yes		
	On-Chip Oscillator	Yes		
	Oscillation Stop Detection	Yes		
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)		
	Power Save	Normal operating mode (High-Speed, Medium-Speed, Low-Speed, Low-Power Consumption), Wait mode and Stop mode		
A/D Converter	Resolution × Channels	10-bit × 8		
	Sample and Hold	Yes		
Timer	16-bit	Timer A × 5		
Watchdog Timer		Yes		
Serial Interface	Clock Sync./ Clock Async.	2 (UART0, UART1)		
I ² C-bus		1		
Smart Card/SIM		Yes		
USB Function		USB3.3 V regulator + built-in transceiver for USB Spec.2.0 + FIFO for EP (MAX. size can be changed.)		
CRC Calculation Circuit		2 (Based on CRC-CCITT and CRC-16)		
I/O Ports	Input Only (Numbers)	—		
	CMOS Output Only (Numbers)	—		
	CMOS I/O Only (Numbers)	80		
	N-Channel Open Drain Port (Numbers)	2		
Interrupts(Sources)	External	5		
Debugging Function	On-Chip Debug	—		
	On-Board Flash Program	Yes		
Other Functions	ROM Correction Function	Address agreement interrupt		
	Others	Serial sound interface : 2		
		AND flash controller		
Package		100-pin LQFP		
Operating Frequency/Supply Voltage		16MHz/3.0 to 3.6V		
Operating Ambient Temperature (°C)		-20 to 85		

* M: mask ROM version, F: flash memory version

• Memory Capacity (ROM/RAM) (M16C/20 Series)

100-pin 100



The M in M3xxxxMx indicates the mask ROM version.

The F in M3xxxxFx indicates the flash memory version.

Package		Lead Pitch (mm)
100-pin GP	100-pin LQFP(PLQP0100KB-A(100P6Q-A))	0.5

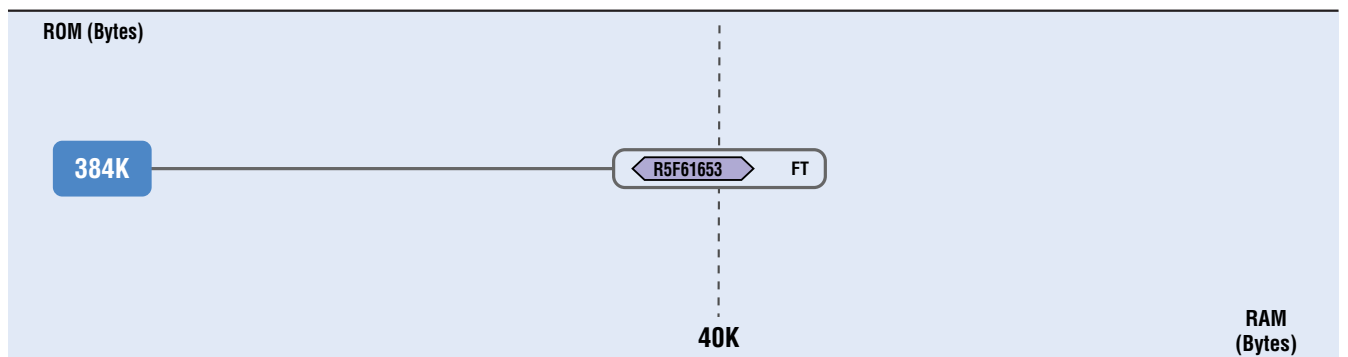
* It is an old package code inside ()

• Specifications (H8SX/1600 Series)

Group		H8SX/1650
Product No.		H8SX/1653F
Type No.		R5F61653FT
Memory	ROM(Bytes)	384K
	RAM(Bytes)	40K
	ROM Type*	F
	Cache Memory	—
	Program Security	Yes
CPU	CPU	H8SX Core
	Basic Instructions	87
	Minimum Instruction Execution Time (ns)	20.0 (@50MHz)
	Multiplier	16 × 16 → 32
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32
DMA	DMAC (Channels)	4
	DTC/DMAC II	DTC
External Bus Expansion	Address Space (Bytes)	16M
	Bus State Controller	ROM, burst ROM, SRAM, bytes control SRAM
	Bus Structure	Separate bus (8/16-bit) / Multiplex bus (8/16-bit)
	Endian Conversion	Yes
Clock	Clock Generation Circuit	2 circuits (Main clock, USB)
	PLL	Yes
	Frequency Divider	1/n (n = 1, 2, 4, 8)
	Power Save	Sleep mode, All module clock, Stop mode, Software standby mode, Hardware standby mode
A/D Converter	Resolution × Channels	10-bit × 8
	Sample and Hold	Yes
D/A Converter	Multi-Channel Sample and Hold	—
	Resolution × Channels	8-bit × 2
Timer	8-bit	8 (TMR)
	16-bit	6 (TPU), 1 (TMR)
	32-bit	2 (TPU)
	Prescaler	—
	Input Capture	6 (TPU)
	Output Compare	6 (TPU)
	PWM Output	6 (TPU)
	Programmable Pulse Generator	PPG + TPU
	Event Counter	Yes
	2-Phase Encoder Input	Yes
Watchdog Timer		Yes
Serial Interface	Clock Sync./ Clock Async.	4
	Clock Sync. Only	—
	Clock Async. Only	2
I ² C-bus		2
Smart Card/SIM		6
SSU/Special Serial I/O		—
CAN	Channels	—
	Buffers	—
USB Function		Yes
IrDA		Yes
I/O Ports	CMOS Output Only (Numbers)	9
	CMOS I/O Only (Numbers)	75
	N-Channel Open Drain Port (Numbers)	13
	Pull-Up Resistor	37
Interrupts(Sources)	External	13
Debugging Function	On-Chip Debug	Yes
	On-Board Flash Program	Yes
Package		TFP-120
Operating Frequency/Supply Voltage		50MHz/3.0 to 3.6V
Operating Ambient Temperature (°C)		-20 to 75

Note : The package code described is the former one. Regarding the new one, please refer to the following URL <http://www.renesas.com/en/package>
 * F: F-ZTAT version

• Memory Capacity (ROM/RAM) (H8SX/1600 Series)



Indicates the flash memory version.

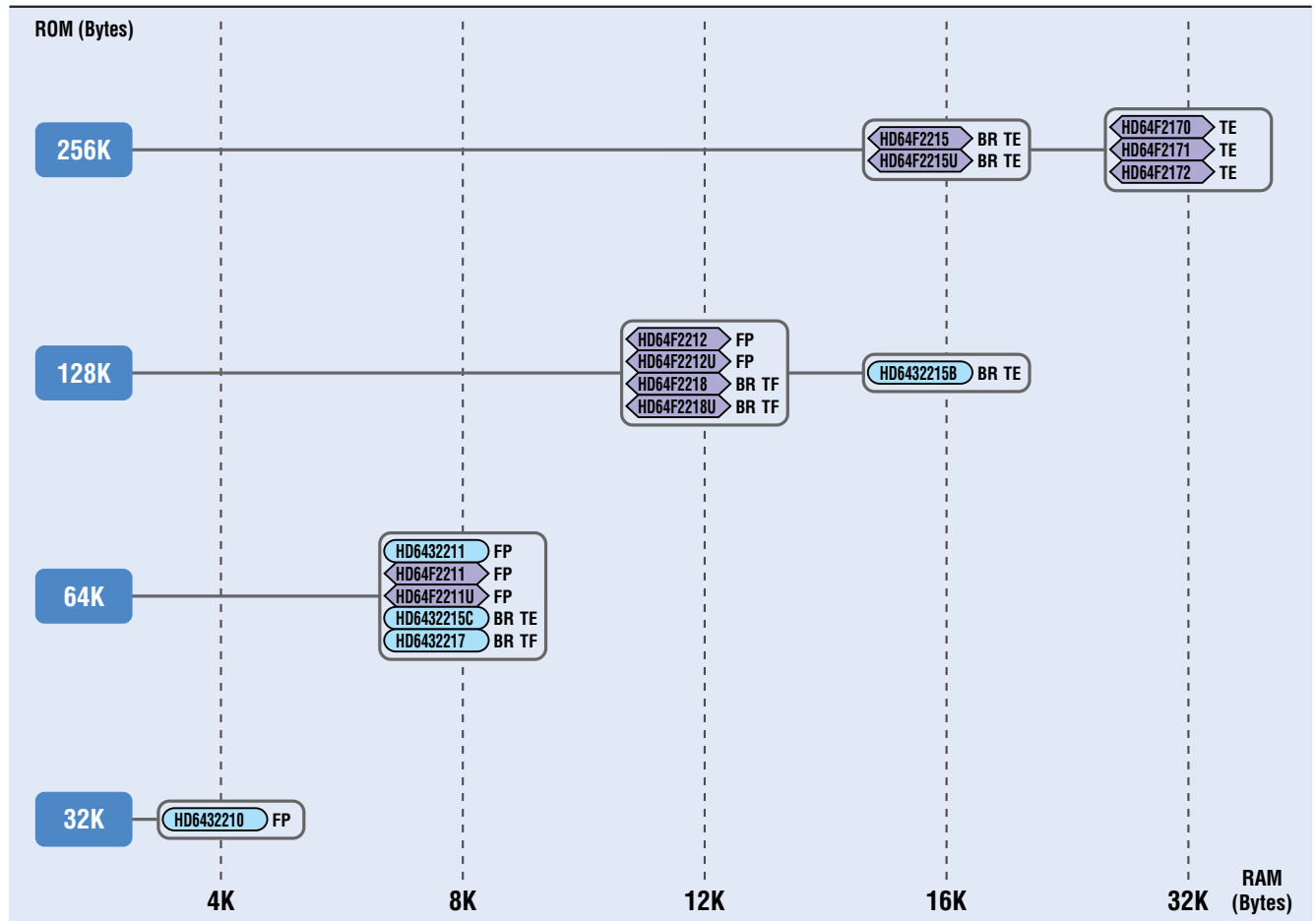
Package	
FT	TQFP (PTQP0120LA-A(TFP-120))

* It is an old package code inside ()

• Specifications (H8S/2200, 2100 Series)

Group		H8S/2172			H8S/2212					H8S/2215										H8S/2218																			
Product No.		H8S/2170F	H8S/2171F	H8S/2172F	H8S/2210	H8S/2211	H8S/2211F	H8S/2211UF	H8S/2212F	H8S/2212UF	H8S/2215C	H8S/2215B	H8S/2215F		H8S/2215UF	H8S/2215RF**	H8S/2215RUF**	H8S/2215TF**		H8S/2215TUF**	H8S/2217	H8S/2218F	H8S/2218UF																
Type No.		HD64F2170TE	HD64F2171TE	HD64F2172TE	HD6432210xxxFP	HD6432211xxxFP	HD64F2211FP	HD64F2211UFP	HD64F2212FP	HD64F2212UFP	HD6432215CxxxBR	HD6432215CxxxTE	HD6432215BxxxBR	HD6432215BxxxTE	HD64F2215BR	HD64F2215TE	HD64F2215UBR	HD64F2215UTE	HD64F2215RBR	HD64F2215RTE	HD64F2215RUBR	HD64F2215RUTE	HD64F2215TBR	HD64F2215TTE	HD64F2215TUBR	HD64F2215TUTE	HD6432217xxxBR	HD6432217xxxTF	HD64F2218BR	HD64F2218TF	HD64F2218UBR	HD64F2218UTF							
Memory	ROM(Bytes)	256K	32K		64K			128K	64K	64K	256K										64K	128K																	
	RAM(Bytes)	32K	4K		8K			12K	8K		16K										8K	12K																	
	ROM Type*	F		M			F			M	F										M	F																	
	Program Security	—		Yes																																			
CPU	CPU	H8S/2000 Core																																					
	Basic Instructions	65																																					
	Minimum Instruction Execution Time (ns)	30 (@33MHz)		42 (@24MHz)				63 (@24MHz)										42 (@24MHz)																					
	Multiplier	—																																					
DMA	Multiply-Accumulate Instruction	—																																					
	DMAC (Channels)	4		6																																			
	EXDMAC	—																																					
	DTC/DMAC II	—					DTC										—																						
External Bus Expansion	Address Space (Bytes)	16M										3 circuits (Main clock, Sub-clock and USB-clock)										3 circuits (Main clock, Sub-clock and USB-clock)																	
	Bus State Controller	SRAM, ROM		—				SRAM, ROM direct connection supported										SRAM, ROM direct connection supported																					
	Bus Structure	Separate bus (8/16-bit)		—				Separate bus (8/16-bit)										Separate bus (8/16-bit)																					
	SDRAM Controller	—																																					
	DRAM Controller	Yes		—																																			
	Host Interface	—																																					
Clock	Clock Generation Circuit	1 circuit (System clock)		3 circuits (Main clock, Sub-clock and USB-clock)				2 circuits (Main clock,USB-clock)										3 circuits (Main clock, Sub-clock and USB-clock)																					
	PLL	Yes		Yes (USB: ×2, ×3)				Yes (USB: ×3)										Yes (USB: ×2, ×3)																					
	Subclock	—		Yes				—										Yes																					
	RTC	—		RTC				—										RTC																					
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16, 32)																																					
	Power Save	Sleep mode, Module stop mode, Software standby mode, Hardware standby mode		Normal operating mode, Medium-Speed mode, Sleep mode, Module stop mode, Watch mode, Sub active mode, Sub sleep mode, Software standby mode, Hardware standby mode				Normal operating mode, Medium-Speed mode, Sleep mode, Module stop mode, Software standby mode, Hardware standby mode										Normal operating mode, Medium-Speed mode, Sleep mode, Module stop mode, Watch mode, Sub active mode, Sub sleep mode, Software standby mode, Hardware standby mode																					
	A/D Converter	Resolution × Channels	—		10-bit × 6																					—													
D/A Converter	Sample and Hold	—		Yes																					—														
Timer	Resolution × Channels	—				8-bit × 2										—																							
	8-bit	TMR (2)		—				TMR × 2										—																					
	16-bit	TMR is available						TPU × 3																															
	32-bit	—						TPU × 2																															
	Prescaler	—																																					
	Input Capture	—						3 (TPU)																															
	Output Compare	—						3 (TPU)																															
	PWM Output	—						3 (TPU)																															
	Real-Time Port	—		Yes (RTC)				—										Yes (RTC)																					
	Programmable Pulse Generator	—																																					
Event Counter	—																																						
2-Phase Encoder Input	—		3 (TPU)																																				
Watchdog Timer	1		Yes																																				
Serial Interface	Clock Sync./ Clock Async.	—		2				3										2																					
IC-bus	—																																						
IEBus	—																																						
Smart Card/SIM	—		1																																				
SSU/Special Serial I/O	—																																						
CAN	Channels	—																																					
	Buffers	—																																					
USB Function	Yes (USB2.0)		Yes																																				
LPC/ISA	—																																						
IrDA	—																																						
LCD	—																																						
CRC Calculation Circuit	—																																						
I/O Ports	Input Only (Numbers)	—		21										4					24																				
	CMOS Output Only (Numbers)	—		3																																			
	CMOS I/O Only (Numbers)	76		37				68										69																					
	High Voltage Port (Numbers)	—																																					
	N-Channel Open Drain Port (Numbers)	—		4				11										4																					
	DTMF	—																																					
	High Current Drive Port	—																																					
	Pull-Up Resistor	—		11				36																															
NMOS Push-Pull	—																																						
Interrupts(Sources)	External	9		7				8										7																					
Debugging Function	Boundary Scan/JTAG	—																																					
	On-Chip Debug	Yes		Yes (E10A)				—										Yes (E10A)																					
	On-Board Flash Program	Yes		—				Yes				—										—																	
Other Functions	ROM Correction Function	—																																					
	Others	—		Memory Stick I/F																							SCIO for high-speed UART												
		—		Copyright protection function																							—					USB seralock available					—		
Package		TFP-100B			FP-64E					TFP-120, BP-112										TFP-100G, BP-112																			
Operating Frequency/Supply Voltage		33MHz/ 3.0 to 3.6V		when using USB: 24MHz/3.0 to 3.6V when not using USB: 24MHz/3.0 to 3.6V 16MHz/2.7 to 3.6V 6MHz/2.4 to 3.6V				when using USB: 24MHz/3.0 to 3.6V when not using USB: 24MHz/3.0 to 3.6V 16MHz/2.7 to 3.6V				when using USB: 16MHz/3.0 to 3.6V when not using USB: 16MHz/2.7 to 3.6V										when using USB: 24MHz/3.0 to 3.6V when not using USB: 24MHz/3.0 to 3.6V 16MHz/2.7 to 3.6V 6MHz/2.4 to 3.6V					when using USB: 24MHz/3.0 to 3.6V when not using USB: 24MHz/3.0 to 3.6V 16MHz/2.7 to 3.6V												
Operating Ambient Temperature (°C)		-20 to 75, -40 to 85																																					

• Memory Capacity (ROM/RAM) (H8S/2200, 2100 Series)



Package	
FP	LQFP (PLQP0064KC-A(FP-64E))
TE	TQFP (PTQP0120LA-A(TFP-120), PTQP0100KA-A(TFP-100B))
TF	TQFP (PTQP0100LC-A(TFP-100G))
BR	BGA (PLBG0112GA-A(BP-112))

* It is an old package code inside ()

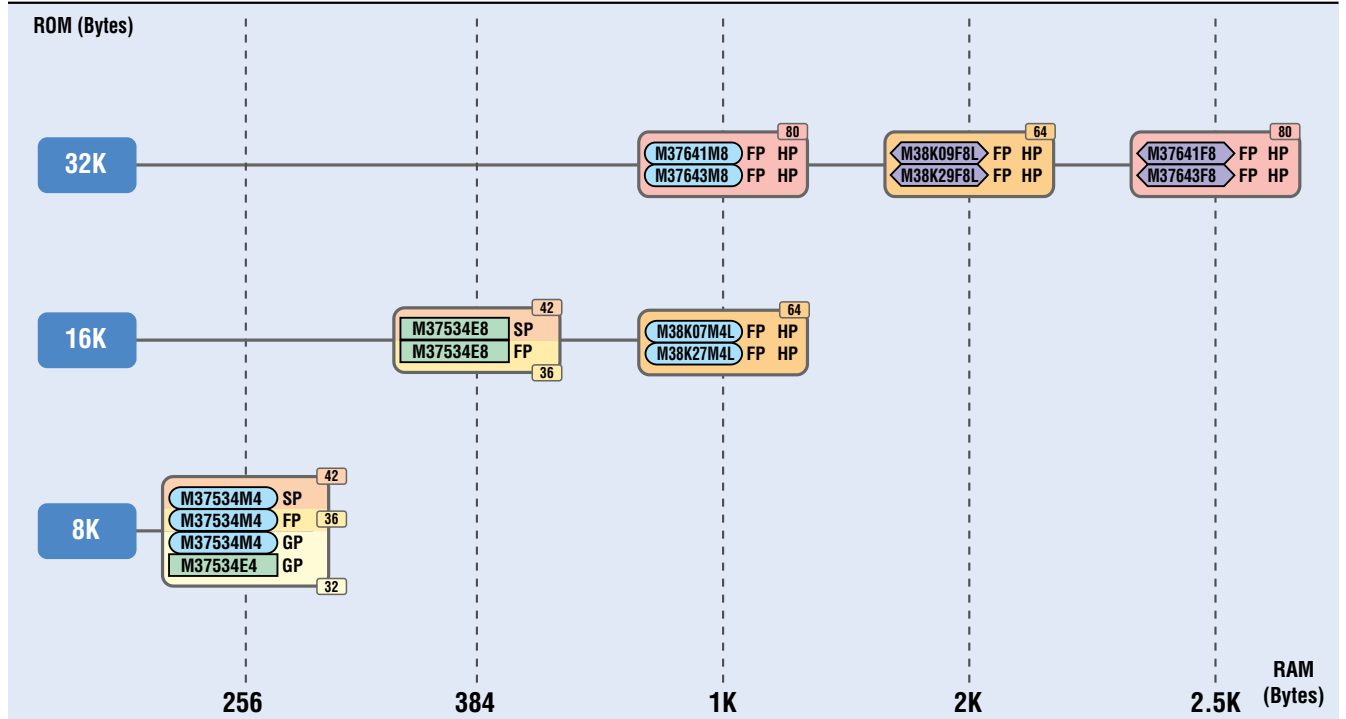
• Specifications (740, 7600, 38000 Series)

Group		7534						38K0				38K2				7641				7643					
Type No.		M37534E4GP	M37534E8FP	M37534E8SP	M37534M4-XXFP	M37534M4-XXGP	M37534M4-XXSP	M38K07M4L-XXFP	M38K07M4L-XXHP	M38K09F8LFP	M38K09F8LHP	M38K27M4L-XXFP	M38K27M4L-XXHP	M38K29F8LFP	M38K29F8LHP	M37641M8-XXFP	M37641M8-XXHP	M37641F8FP	M37641F8HP	M37643M8-XXFP	M37643M8-XXHP	M37643F8FP	M37643F8HP		
Memory	ROM(Bytes)	8K	16K	8K				16K		32K		16K	32K												
	RAM(Bytes)	256	384	256				1K		2K		1K		2K		1K		2.5K		1K		2.5K			
	ROM Type*	O			M					F		M		F		M		F		M		F			
	Data Flash	—																							
	Program Security	—																							
CPU	CPU	740 Core																							
	Basic Instructions	69						71																	
	Minimum Instruction Execution Time (ns)	340 (@6MHz)						250 (@8MHz)								83 (@24MHz)									
External Bus Expansion	Host Interface	—						Yes																—	
Clock	Clock Generation Circuit	2 circuits (Main clock, On-chip oscillator)						2 circuits (Main clock, PLL)								3 circuits (Main clock, PLL, Sub-clock)				2 circuits (Main clock, PLL)					
	PLL	—						Yes																	
	Subclock	—														Yes				—					
	On-Chip Oscillator	Yes						—																	
A/D Converter	Resolution×Channels	10-bit×8 (7534SP, 7534FP) 10-bit×6 (7534GP)						10-bit×8								—									
Timer	8-bit	3																							
	16-bit	—						—								2 (Timer X, Timer Y)				—					
Watchdog Timer		Yes						—								—									
Serial Interface	Clock Sync./ Clock Async.	—						1								—									
	Clock Sync. Only	1						—								1									
	Clock Async. Only	1 (USB combined)						—								7/8/9-bit×2									
USB Function		USB3.3 V regulator + built-in transceiver for USB Spec.2.0 + FIFO for EP (MAX. size can be changed.) (Supports LS)						USB3.3 V regulator + built-in transceiver for USB Spec.2.0 + FIFO for EP (MAX. size can be changed.) (Supports FS)				USB3.3 V regulator + built-in transceiver for USB Spec.2.0 + FIFO for EP (MAX. size can be changed.) HUB function (Supports FS)				USB3.3 V regulator + built-in transceiver for USB Spec.2.0 + FIFO for EP (MAX. size can be changed.) (Supports FS)				USB3.3 V regulator + built-in transceiver for USB Spec.2.0 + FIFO for EP (MAX. size can be changed.) (Supports)					
I/O Ports	Input Only (Numbers)	—																							
	CMOS Output Only (Numbers)	24	28	33	28	24	33	48				44				66									
	CMOS I/O Only (Numbers)	—																							
	N-Channel Open Drain Port (Numbers)	—																							
	Pull-Up Resistor	Yes						—								Yes									
Interrupts(Sources)	External	4 (7534SP) 3 (7534FP) 2 (7534GP)						4								5				3					
Debugging Function	On-Board Flash Program	—						Yes																	
Other Functions	ROM Correction Function	—																							
	Others	—																							
Package		42-pin SDIP 36-pin SSOP 32-pin LQFP						64-pin LQFP (0.5mm pitch /0.8mm pitch)								80-pin QFP, 80-pin LQFP									
Operating Frequency/Supply Voltage		6MHz/4.1 to 5.5V (during USB operation:4.4 to 5.25V)						8MHz/4.0 to 5.25V 6MHz/3.0 to 5.25V								24MHz (Ø=12MHz) /4.15 to 5.25V 24MHz (Ø=6MHz) /3.0 to 3.6V									
Operating Ambient Temperature (°C)		-20 to 85 (during USB operation:0 to 70)																							
		-20 to 70																							

* M: mask ROM version, F: flash memory version, O: one-time PROM version

• Memory Capacity (ROM/RAM) (740, 7600, 38000 Series)

80-pin 80 64-pin 64 42-pin 42 36-pin 36 32-pin 32



- The M in M3xxxxMx indicates the mask ROM version.
- The E in M3xxxxEx indicates the one-time PROM version.
- The F in M3xxxxFx indicates the flash memory version.

Package			Lead Pitch (mm)
32-pin	GP	32-pin LQFP(PLQP0032GB-A(32P6U-A))	0.8
36-pin	FP	36-pin SSOP(PRSP0036GA-A(36P2R-A))	0.8
42-pin	SP	42-pin SDIP(PRDP0042BA-A(42P4B))	1.778
64-pin	FP	64-pin LQFP(PLQP0064GA-A(64P6U-A))	0.8
	HP	64-pin LQFP(PLQP0064KB-A(64P6Q-A))	0.5
80-pin	FP	80-pin QFP(PRQP0080GB-A(80P6N-A))	0.8
	HP	80-pin LQFP(PLQP0080KB-A(80P6Q-A))	0.5

* It is an old package code inside ()

PLC MCUs

The MCUs in the M16C/6S Group are fully optimized for power-line data transmission applications. They have an M16C/60 CPU with built-in IT800 power line modems developed by YITRAN Corporation. The devices use a frequency band ranging from 100kHz to 400kHz, with transmission up to 7.5Kbps possible. For home-network applications, they can be equipped with SCP (Simple Control Protocol), the communication protocol offered by Microsoft Corporation.

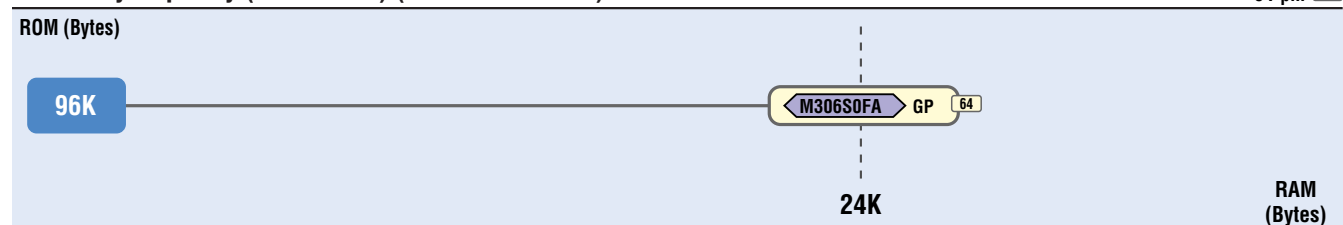
• Specifications (M16C/60 Series)

Group		M16C/6S
Type No.		M306S0FA-XXXGP
Memory	ROM(Bytes)	96K
	RAM(Bytes)	24K
	ROM Type*	F
	Data Flash	—
	Program Security	ID code check function, ROM code protecting function
CPU	CPU	M16C/60 Core
	Basic Instructions	91
	Minimum Instruction Execution Time (ns)	65.1 (@ 15.36MHz)
	Multiplier	16 × 16 → 32
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32
DMA	DMA C (Channels)	2
Clock	Clock Generation Circuit	2 circuits (Main clock, On-chip oscillator)
	PLL	—
	Subclock	—
	On-Chip Oscillator	Yes
	Oscillation Stop Detection	—
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)
	Power Save	—
A/D Converter	Resolution × Channels	—
D/A Converter	Resolution × Channels	—
Timer	16-bit	5 (TA0, TA1, TA2, TA3, TA4)
	PWM Output	Yes
	Event Counter	—
Watchdog Timer		Yes
Serial Interface	Clock Sync./ Clock Async.	2 (UART0, UART1)
	Clock Sync. Only	2 (SI/O4 is internally connected to IT800)
	Clock Async. Only	1 (UART2)
I ² C-bus		3 (UART0 to UART2)
I/O Ports	Input Only (Numbers)	1
	CMOS I/O Only (Numbers)	20
	N-Channel Open Drain Port (Numbers)	1
Interrupts(Sources)	External	3
Debugging Function	On-Chip Debug	Yes
	On-Board Flash Program	Yes
Other Functions	ROM Correction Function	—
	Others	Power line communication function, PLL on-chip oscillator
Package		64-pin LQFP
Operating Frequency/Supply Voltage		15.36MHz/3.0 to 3.6V
Operating Ambient Temperature (°C)		-20 to 85

* F: flash memory version

• Memory Capacity (ROM/RAM) (M16C/60 Series)

64-pin 64



The F in M3xxxFx indicates the flash memory version.

Package		Lead Pitch (mm)
64-pin	GP	0.5

The old package code is shown in parenthesis

DVD/HDD Recorder MCUs

The M16C/6H Group devices combine the numerous on-chip peripheral functions of the M16C/60 series with additional functions required by TELETEXT1 compatible video recording equipment, such as a VBI (Vertical Blanking Interval) data slicer. The VBI data slicer incorporated in these MCUs can be used to slice multiple VBI data formats (TELETEXT, CCD/XDS, EPG-J), making it possible to accommodate all of the world's digital video recording formats in a single chassis.

¹ The VBI data slicer supports the following functions:

Europe: TELETEXT (PDC, VPS, WSS)

North America: CC, CC2X

Japan: EPG-J, text multiplex broadcasts

Other: Video ID

Applications DVD/HDD recorders, etc.

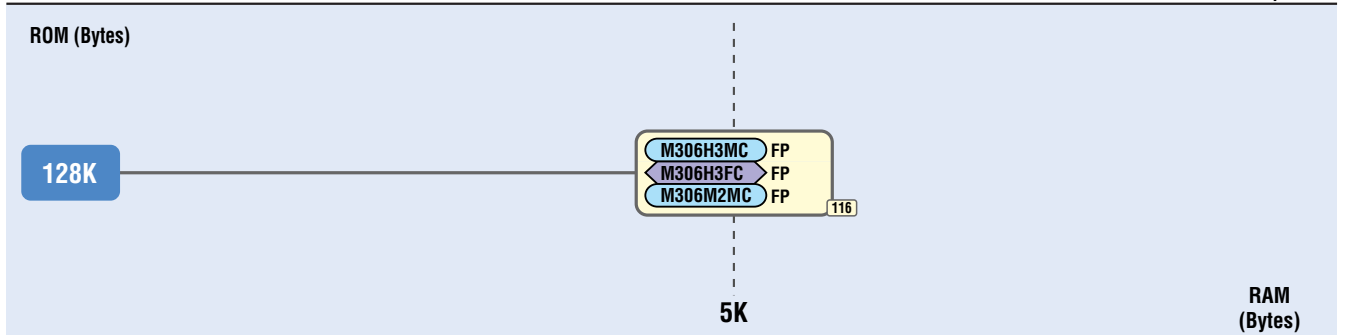
• Specifications (M16C/60 Series)

Group		M16C/6H		
Type No.		M306H2MC-XXXFP	M306H3FCFP	M306H3MC-XXXFP
Memory	ROM(Bytes)	128K		
	RAM(Bytes)	5K		
	ROM Type*	M	F	M
	Data Flash	—		
	Program Security	ID code check function, ROM code protecting function (Only Flash memory version)		
CPU	CPU	M16C/60 Core		
	Basic Instructions	91		
	Minimum Instruction Execution Time (ns)	100 (@10MHz)		
	Multiplier	16 × 16 → 32		
	Multiply-Accumulate Instruction	16 × 16 + 32 → 32		
DMA	DMAC (Channels)	2		
Clock	Clock Generation Circuit	2 circuits (Main clock, Sub-clock)		
	PLL	—		
	Subclock	Yes		
	On-Chip Oscillator	—		
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)		
	Power Save	Normal operating mode (High-Speed, Medium-Speed, Low-Speed, Low-Power Consumption), Wait mode and Stop mode		
A/D Converter	Resolution × Channels	8-bit × (8 + 2)		
D/A Converter	Resolution × Channels	—		
Timer	16-bit	Timer A × 5, Timer B × 6		
Watchdog Timer		Yes		
Serial Interface	Clock Sync./ Clock Async.	3 (UART0 to UART2)		
	Clock Sync. Only	2 (SI/O3, SI/O4)		
	Clock Async. Only	—		
I ² C-bus		3 (UART0 to UART2)		
IEBus		3 (UART0 to UART2)		
CRC Calculation Circuit		1 (Based on CRC-CCITT (X ¹⁶ + X ¹² + X ⁵ + 1))		
I/O Ports	Input Only (Numbers)	1		
	CMOS Output Only (Numbers)	1		
	CMOS I/O Only (Numbers)	87		
	N-Channel Open Drain Port (Numbers)	2		
Interrupts(Sources)	External	8		
Debugging Function	On-Board Flash Program	Yes		
Other Functions	ROM Correction Function	Address agreement × 2	Address agreement × 4	
	Others	VB1 Data slicer (PDC, VPS, EPG-J, WSS, CC, CC2X, ID-1)		
		—		
Package		116-pin LQFP		
Operating Frequency/Supply Voltage		10MHz/4.75 to 5.25V		
Operating Ambient Temperature (°C)		-20 to 70		

* M: mask ROM version, F: flash memory version

• Memory Capacity (ROM/RAM) (M16C/60 Series)

116-pin 116



The M in M3xxxxMx indicates the mask ROM version.

The F in M3xxxxFx indicates the flash memory version.

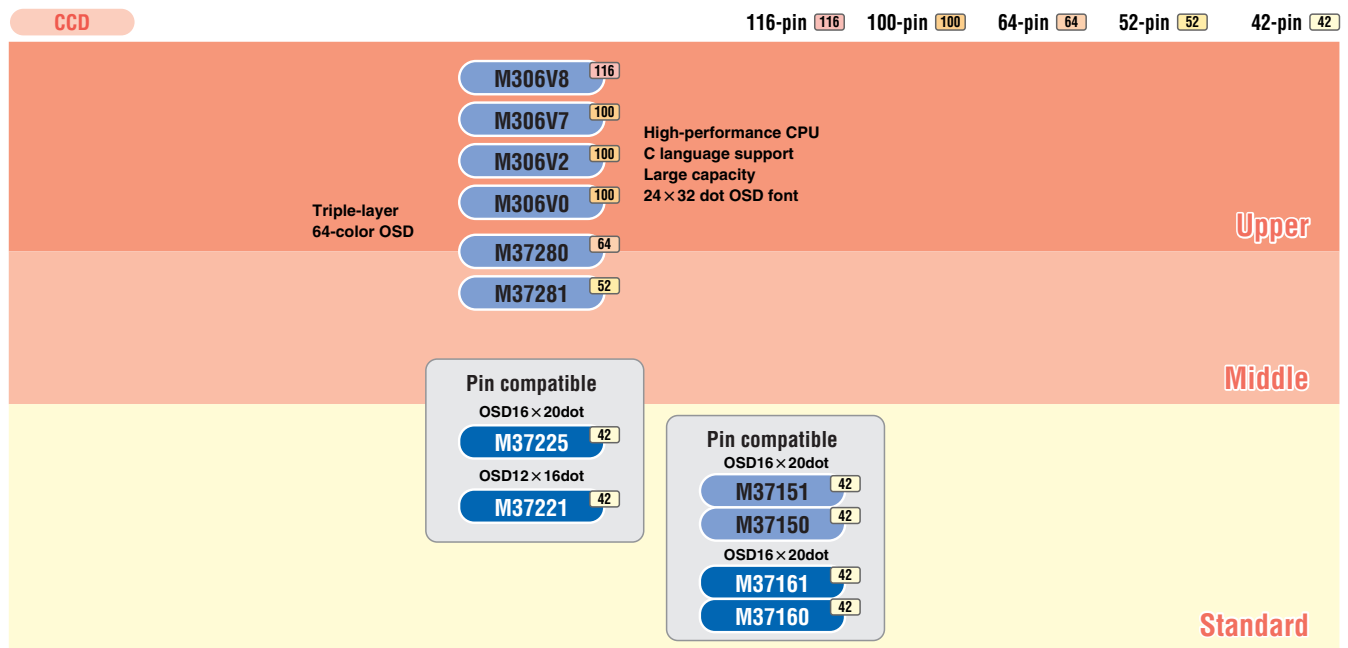
Package		Lead Pitch (mm)
116-pin	FP 116-pin LQFP(PLQP0116JA-A(116P6A-A))	0.65

The old package code is shown in parenthesis

TV MCUs

The MCUs listed on this page add tuning functions such as OSD, PWM, and A/D conversion to the 8-bit 740 CPU core. In particular, a large number of models integrating the closed caption decoding CCD function for North American TV broadcasts are available. Renesas has also developed models based on the high-performance 16-bit M16C/60 series CPU core that incorporate CCD and OSD functions.

• Product Development



• Specifications (M16C/60 Series)

Group		M16C/6V										
Type No.		M306V0EEFP	M306V0ME-XXXFP	M306V2EEFP	M306V2ME-XXXFP	M306V7FGFP	M306V7FHFP	M306V7FJFP	M306V7MG-XXXFP	M306V7MH-XXXFP	M306V7MJ-XXXFP	M306V8FJFP**
Memory	ROM(Bytes)	192K				256K	348K	512K	256K	384K	512K	
	RAM(Bytes)	5K				10K						16K
	ROM Type*	O	M	O	M	F			M			F
	Data Flash	—										
	Program Security	ID code check function, ROM code protecting function (Only Flash memory version)										
CPU	CPU	M16C/60 Core										
	Basic Instructions	91										
	Minimum Instruction Execution Time (ns)	100 (@10MHz)				62.5 (@16MHz)						
	Multiplier	16×16→32										
DMA	Multiply-Accumulate Instruction	16×16+32→32										
	DMAC (Channels)	2										
External Bus Expansion	Address Space (Bytes)	1M										
	External Bus Interface	Support for insertion of 1 wait states, Outputs 4 chip-select signals (CS0, CS1, CS2, CS3)										Support for insertion of 1 to 3 wait states, Outputs 4 chip-select signals (CS0, CS1, CS2, CS3)
	Bus Structure	Selectable from Separate bus, Multiplex bus				Separate bus			Selectable from Separate bus, Multiplex bus			
Clock	Clock Generation Circuit	2 circuits (Main clock, Sub-clock)										
	PLL	—										
	Subclock	Yes										
	On-Chip Oscillator	—										
	Frequency Divider	1/n (n = 1, 2, 4, 8, 16)										
	Power Save	Normal operating mode (High-Speed, Medium-Speed, Low-Speed, Low-Power Consumption), Wait mode and Stop mode										
A/D Converter	Resolution×Channels	8-bit×6										8-bit×13
D/A Converter	Sample and Hold	Yes										
	Resolution×Channels	8-bit×2										
Timer	16-bit	Timer A×5, Timer B×6										
	PWM Output	2 (Timer A)										
	Event Counter	5 (Timer A)+6 (Timer B)										
Watchdog Timer		Yes										
Serial Interface	Clock Sync./ Clock Async.	2										3 (UART0 to UART2)
I ² C-bus		1		2							3	
OSD		Number of display characters : 42 characters×16 lines Kinds of display characters : 825 dots colored		Number of display characters : 42 characters×16 lines Kinds of display characters : 890 dots colored								
I/O Ports	CMOS I/O Only (Numbers)	76				74					73	
	N-Channel Open Drain Port (Numbers)	2										
	Pull-Up Resistor	Yes										
Interrupts(Sources)	External	3										5
Debugging Function	On-Chip Debug	Yes										
	On-Board Flash Program	Yes										
Other Functions	ROM Correction Function	Address agreement×2										Address agreement×4
	Others	CCD:1 circuit				CCD, ID-1:2 circuits						
		Triple layer 64-color OSD	Triple layer 512-color OSD									
Package		100-pin QFP										116-pin QFP
Operating Frequency/Supply Voltage		10MHz/4.5 to 5.5V				16MHz/3.15 to 3.45V						
Operating Ambient Temperature (°C)		-10 to 70				-20 to 70						

* M: mask ROM version, F: flash memory version, O: one-time PROM version

Package			Lead Pitch (mm)
100-pin	FP	100-pin QFP(PRQP0100JB-A(100P6S-A))	0.65
116-pin	FP	116-pin QFP(PLQP0116JA-A(116P6A-A))	0.65

★ ★ : Under development

* It is an old package code inside ()

• Specifications (7200 Series)

Group		7150												7160															
Type No.		M37150M6-XXXXFP	M37150M8-XXXXFP	M37150MA-XXXXFP	M37150MC-XXXXFP	M37150MF-XXXXFP	M37150EFPF	M37151M6-XXXXFP	M37151M8-XXXXFP	M37151MA-XXXXFP	M37151MC-XXXXFP	M37151MF-XXXXFP	M37151EFPF	M37160M8-XXXXSP	M37160M8-XXXXFP	M37160MA-XXXXSP	M37160MA-XXXXFP	M37160MF-XXXXSP	M37160MF-XXXXFP	M37160EFPSP	M37160EFPF	M37161M8-XXXXSP	M37161M8-XXXXFP	M37161MA-XXXXSP	M37161MA-XXXXFP	M37161MF-XXXXSP	M37161MF-XXXXFP	M37161EFPSP	M37161EFPF
Memory	ROM(Bytes)	24K	32K	40K	48K	60K		24K	32K	40K	48K	60K		32K		40K		60K				32K		40K		60K			
	RAM(Bytes)	1024	1152	1472		2048		1024	1152	1472		2048		1152	1472						1152	1472							
	ROM Type*	M				O		M				O		M				O			M				O				
CPU	CPU	740 Core																											
	Basic Instructions	71																											
	Minimum Instruction Execution Time (ns)	447 (@3.58MHz), 451 (@4.43MHz)						500 (@8MHz)						451 (@4.43MHz)						500 (@8MHz)									
Clock	Clock Generation Circuit	2 circuits (Main clock, Sub-clock)																											
	PLL	—																											
	Subclock	Yes																											
	On-Chip Oscillator	—																											
	Power Save	Wait mode, Stop mode Low-speed mode (Sub-clock)																											
A/D Converter	Resolution × Channels	—																											
D/A Converter	Resolution × Channels	—																											
Timer	8-bit													6															
	PWM Output	8-bit × 5												8-bit × 5, 14-bit × 1															
Watchdog Timer		—																											
Serial Interface	Clock Sync./ Clock Async.	—																											
I ² C-bus		1																											
OSD		Number of display characters : 32 characters × 2 lines Kinds of display characters : 254												Number of display characters : 32 characters × 2 lines Kinds of display characters : 316 dots colored															
I/O Ports	CMOS Output Only (Numbers)	4																											
	CMOS I/O Only (Numbers)	10																											
	High Voltage Port (Numbers)	—																											
	N-Channel Open Drain Port (Numbers)	20																											
Interrupts(Sources)	External	3																											
Other Functions	ROM Correction Function	Yes																											
	Others	CCD												—															
		A/D comparators:7-bit × 8																											
Package		42-pin SSOP												42-pin SSOP, 42-pin SDIP															
Operating Frequency/Supply Voltage		3.58MHz/4.5 to 5.5V 4.43MHz/4.5 to 5.5V						8MHz/4.5 to 5.5V						4.43MHz/4.5 to 5.5V						8MHz/4.5 to 5.5V									
Operating Ambient Temperature (°C)		-10 to 70																											

* M: mask ROM version, O: one-time PROM version

Package			Lead Pitch (mm)
42-pin	SP	42-pin SDIP(PRDP0042BA-A(42P4B))	1.778
	FP	42-pin SSOP(42P2R-A/F)	0.8

* It is an old package code inside ()

• Specifications (7200 Series)

Group		7220														7280							
Type No.		M37221M4H-XXXSP	M37221M4H-XXXFP	M37221M6H-XXXSP	M37221M6H-XXXFP	M37221M8H-XXXSP	M37221M8H-XXXFP	M37221MAH-XXXSP	M37221MAH-XXXFP	M37221EASP	M37221EAFP	M37225M6-XXXSP	M37225M8-XXXSP	M37225MA-XXXSP	M37225MC-XXXSP	M37225ECSP	M37280MFH-XXXSP	M37280MKH-XXXSP	M37280EKSP	M37281MAH-XXXSP	M37281MFH-XXXSP	M37281MKH-XXXSP	M37281EKSP
Memory	ROM(Bytes)	16K	24K	32K	40K				24K	32K	40K	48K		60K	80K	40K	60K	80K	40K	60K	80K		
	RAM(Bytes)	384	448	576	704				1024		2048		1088	1536	1088		1536						
	ROM Type*	M								O		M		O		M	O	M		O			
CPU	CPU	740 Core																					
	Basic Instructions	71																					
	Minimum Instruction Execution Time (ns)	500 (@8MHz)																					
Clock	Clock Generation Circuit	1 circuit (Main clock)														2 circuits (Main clock, Sub-clock)							
	PLL	—																					
	Subclock	—														Yes							
	On-Chip Oscillator	—																					
	Power Save	Wait mode, Stop mode, Low-speed mode (Sub-clock)																					
A/D Converter	Resolution × Channels	—										8-bit × 8											
D/A Converter	Resolution × Channels	—																					
Timer	8-bit	4														6							
	PWM Output	8-bit × 6, 14-bit × 1														8-bit × 8							
Watchdog Timer		—																					
Serial Interface	Clock Sync./ Clock Async.	—																					
I ² C-bus		1																					
OSD		Number of display characters : 24 characters × 2 lines Kinds of display characters : 256										Number of display characters : 24 characters × 2 lines Kinds of display characters : 381				Number of display characters : 32 characters × 16 lines Kinds of display characters : 572 dots colored							
I/O Ports	CMOS Output Only (Numbers)	—																					
	CMOS I/O Only (Numbers)	23														20							
	High Voltage Port (Numbers)	—										12V × 6											
	N-Channel Open Drain Port (Numbers)	9														19							
Interrupts(Sources)	External	3																					
Other Functions	ROM Correction Function	Yes																					
	Others	—														CCD							
		A/D comparators:6-bit × 6										—											
		—										Cursor display, Button display				Triple layer							
Package		42-pin SSOP, 42-pin SDIP														64-pin SDIP				52-pin SDIP			
Operating Frequency/Supply Voltage		8MHz/4.5 to 5.5V																					
Operating Ambient Temperature (°C)		-10 to 70																					

* M: mask ROM version, O: one-time PROM version

Package				Lead Pitch (mm)
42-pin	SP	42-pin SDIP(PRDP0042BA-A(42P4B))		1.778
	FP	42-pin SSOP(42P2R-A/F)		0.8
52-pin	SP	52-pin SDIP(PRDP0052BA-A(52P4B))		1.778
64-pin	FP	64-pin SDIP(PRDP0064BA-A(64P4B))		1.778

* It is an old package code inside ()

VCR Servo MCUs

The MCUs of the 776A group, which belong to the 7700 family, were developed specifically as software servo processors for VCR control. They implement a variety of useful peripheral functions, including analog amplifiers, clock timers, real-time pattern output, and OSD.

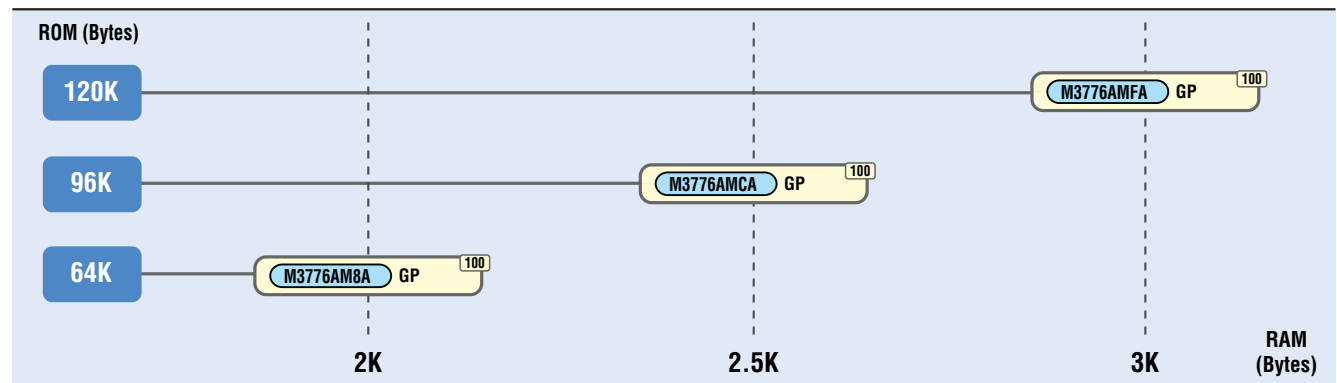
• Specifications (7770 Series)

Group		776A		
Type No.		M3776AM8A-XXXGP	M3776AMCA-XXXGP	M3776AMFA-XXXGP
Memory	ROM(Bytes)	64K	96K	120K
	RAM(Bytes)	2048	2560	3072
	ROM Type*	M		
CPU	CPU	7700 Core		
	Basic Instructions	103		
	Minimum Instruction Execution Time (ns)	167 (@MHz) (12MHz at Double-speed mode)		
Clock	Clock Generation Circuit	2 circuits (Main clock, Sub-clock)		
	Subclock	Yes		
	Frequency Divider	Main clock divided by 2		
A/D Converter	Resolution × Channels	8-bit × 11		
D/A Converter	Resolution × Channels	8-bit × 2		
Timer	8-bit	3		
	16-bit	3		
	PWM Output	12/14-bit × 2 14-bit × 1		
	Event Counter	6		
Watchdog Timer		Yes		
Serial Interface	Clock Sync. Only	2 (one with automatic data transfer function)		
I ² C-bus		1		
OSD		Number of display characters : 32 characters × 16 lines Font Characters Composite output: 254 characters, RGB output: 285 characters		
I/O Ports	Input Only (Numbers)	10		
	CMOS I/O Only (Numbers)	29		
	N-Channel Open Drain Port (Numbers)	4		
	Pull-Up Resistor	12		
Interrupts(Sources)	External	10		
Other Functions	ROM Correction Function	Yes		
	Others	Data slicer:On-chip XDS compatible slicer		
		CTL amp		
		Real-time pattern output External events: 12, internal events: 9		
		Pulse duty detection circuit PBCTL signal duty ratio measurement		
Package		Synchronous separation circuit 100-pin TQFP		
Operating Frequency/Supply Voltage		(at Double-speed mode) 12MHz/4.0 to 5.5V (at High-speed mode) 16MHz/4.0 to 5.5V (at Low-speed mode) 32kHz/2.6 to 5.5V		
Operating Ambient Temperature (°C)		-20 to 70		

* M: mask ROM version

• Memory Capacity (ROM/RAM) (7770 Series)

100-pin ⁽¹⁰⁰⁾



The M in M3xxxxMx indicates the mask ROM version.

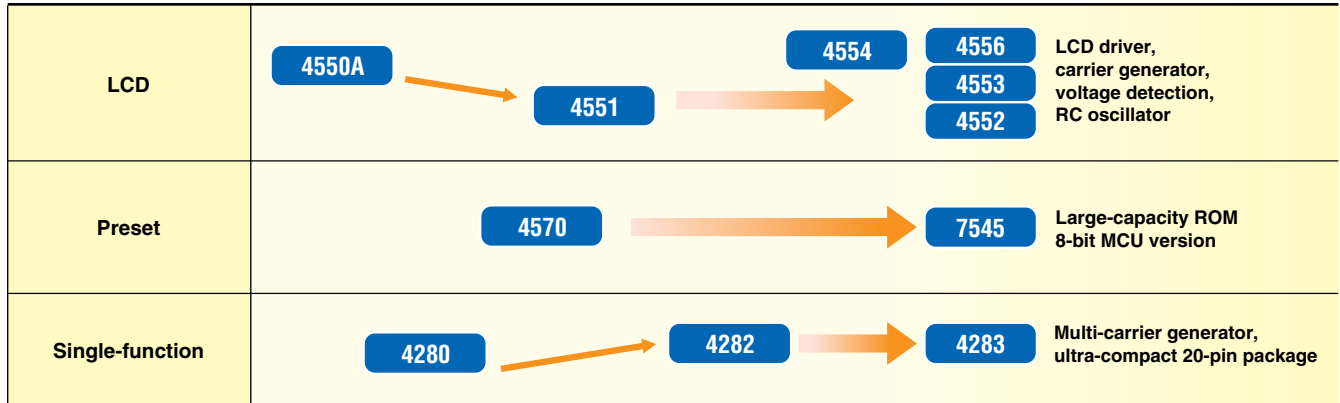
Package		Lead Pitch (mm)
100-pin GP	100-pin TQFP(PRQP0100JB-D(100P6P-E))	0.65

The old package code is shown in parenthesis

Remote Control MCUs

The 4-bit MCUs listed here are designed for use in remote control transmitters. They provide support for transfer code output using different configurations, multiple types of custom code output, and user-defined multiple-key input.

• Roadmap



• Specifications (On-chip LCD driver : 4500 Series)

Group		4552												4553				4554				4556							
Type No.		M34552M4-XXXXFP	M34552M4H-XXXXFP	M34552M8-XXXXFP	M34552M8H-XXXXFP	M34552G8FP*	M34552G8HFP*	M34553M4-XXXXFP	M34553M4H-XXXXFP	M34553M8-XXXXFP	M34553M8H-XXXXFP	M34553G8FP*	M34553G8HFP*	M34554M8-XXXXFP	M34554MC-XXXXFP	M34554EDFP	M34556M4-XXXXFP	M34556M4H-XXXXFP	M34556M8-XXXXFP	M34556M8H-XXXXFP	M34556G8FP*	M34556G8HFP*							
Memory	ROM(Word×10Bit)	4096		8192				4096		8192				12288		16384		4096		8192									
	RAM(Word×4Bit)	288												512				288											
	ROM Type*	M				O		M				O		M		O		M				O							
	Program Security	—																											
CPU	Basic Instructions	123	124	123	124	123	124	123	124	123	124	123	124	136				123	124	123	124	123	124						
	Minimum Instruction Execution Time (ns)	500 (@6MHz)				680 (@4.4MHz)		500 (@6MHz)				680 (@4.4MHz)				500 (@6MHz)								680 (@4.4MHz)					
Clock	Clock Generation Circuit	4 circuits (Ceramic resonator, RC oscillator, Sub-clock and On-chip oscillator)																											
	Subclock	quartz-crystal																											
	On-Chip Oscillator	Yes																											
	Frequency Divider	1/n (n=1, 2, 4, 8)																											
	Power Save	Clock operating mode, RAM back up mode																											
Power Supply Voltage Detection	Power-On Reset/POR	Yes																											
	Low Voltage Detection/LVD	—	Low voltage Detection circuit x1	—	Low voltage Detection circuit x1	—	Low voltage Detection circuit x1	—	Low voltage Detection circuit x1	—	Low voltage Detection circuit x1	—	Low voltage Detection circuit x1	Low voltage Detection circuit×1		—	Low voltage Detection circuit x1	—	Low voltage Detection circuit x1	—	Low voltage Detection circuit x1	—	Low voltage Detection circuit x1						
A/D Converter	Resolution×Channels	—																											
Timer	8-bit	Timer 1×1, Timer 2×1												Timer 1×1, Timer 2×1, Timer 3×1, Timer 4×1				Timer 1×1, Timer 2×1											
	10-bit	—																											
	16-bit	Timer 3×1												Timer 5×1				Timer 3×1											
	Prescaler	Yes																											
	PWM Output	Timer 2												Timer 4				Timer 2											
	Event Counter	Timer 1												Timer 1, Timer 3				Timer 1											
Watchdog Timer		Yes																											
LCD		Segment 28, Common 4						Segment 29, Common 4						Segment 32, Common 4				Segment 23, Common 4											
I/O Ports	Input Only (Numbers)	—																											
	CMOS Output Only (Numbers)	1																											
	CMOS I/O Only (Numbers)	18												16				18											
	N-Channel Open Drain Port (Numbers)	2																											
	High Current Drive Port	Drives LED directly (port D)																											
	Pull-Up Resistor	8																											
Interrupts(Sources)	External	1												2				1											
Other Functions		Carrier wave generation																											
Package		48-pin QFP						48-pin LQFP						64-pin QFP				42-pin SSOP											
Operating Frequency/Supply Voltage		1.8 to 5.5V				1.8 to 3.6V		1.8 to 5.5V				1.8 to 3.6V		2.0 to 5.5V		2.5 to 5.5V		1.8 to 5.5V				1.8 to 3.6V							
Operating Ambient Temperature (℃)		-20 to 85																											

* LCD preset is same as general-purpose 4552, 4553, 4554 and 4556

* M: mask ROM version, O: one-time PROM version

★ : New product

• Specifications (Preset : 4500 Series)

Group		4570				
Type No.		M34570M4-XXXXFP	M34570M8-XXXXFP	M34570E8FP	M34570MD-XXXXFP	M34570EDFP
Memory	ROM(Word × 10Bit)	4096	8192		16384	
	RAM(Word × 4Bit)	128				
	ROM Type*	M		O	M	O
	Program Security	—				
CPU	Basic Instructions	99				
	Minimum Instruction Execution Time (ns)	1500 (@2MHz)				
Clock	Clock Generation Circuit	1 circuit (Ceramic resonator)				
	Subclock	—				
	On-Chip Oscillator	—				
	Frequency Divider	1/n (n = 1, 4)				
	Power Save	RAM back up mode				
Power Supply	Power-On Reset/POR	Yes				
Voltage Detection	Low Voltage Detection/LVD	Low voltage detection circuit × 1				
A/D Converter	Resolution × Channels	—				
Timer	8-bit	Timer 2 × 1, Timer 3 × 1				
	10-bit	Timer 1 × 1				
	16-bit	—				
	Prescaler	Yes				
	PWM Output	—				
	Event Counter	—				
Watchdog Timer		Yes				
LCD		—				
I/O Ports	Input Only (Numbers)	6				
	CMOS Output Only (Numbers)	1				
	CMOS I/O Only (Numbers)	—				
	N-Channel Open Drain Port (Numbers)	22				
	High Current Drive Port	—				
	Pull-Up Resistor	12				
Interrupts(Sources)	External	1				
Other Functions	Others	Carrier wave generation				
Package		36-pin SSOP				
Operating Frequency/Supply Voltage		2.0 to 5.5V		2.5 to 5.5V	2.0 to 5.5V	2.5 to 5.5V
Operating Ambient Temperature (°C)		-20 to 70				

* Preset is same as general purpose 4570

* M: mask ROM version, O: one-time PROM version

• Specifications (Single-function : 720 Series)

Group		4282			4283*		
Type No.		M34282M1-XXXXGP	M34282M2-XXXXGP	M34282E2GP	M34283G2-XXXXGP*	M34283G2GP*	
Memory	ROM(Word×9Bit)	1024	2048				
	RAM(Word×4Bit)	48	64				
	ROM Type*	M		O	Qz		
	Program Security	—			Yes		
CPU	Basic Instructions	68					
	Minimum Instruction Execution Time (ns)	800 (@4MHz)					
Clock	Clock Generation Circuit	1 circuit (Ceramic resonator)					
	Subclock	—					
	On-Chip Oscillator	—					
	Frequency Divider	1/n (n = 1, 8)					
Power Supply	Power-On Reset/POR	RAM back up					
	Voltage Detection	Yes					
A/D Converter	Low Voltage Detection/LVD	Low voltage detection circuit × 1					
Timer	A/D Converter	Resolution × Channels					
	8-bit	—					
		Timer 1 × 1, Timer 2 × 1					
		10-bit	—				
		16-bit	—				
		Prescaler	—				
PWM Output	—						
Event Counter	Event Counter	—					
	Watchdog Timer	Yes					
LCD		—					
I/O Ports	Input Only (Numbers)	1					
	CMOS Output Only (Numbers)	1					
	CMOS I/O Only (Numbers)	—					
	N-Channel Open Drain Port (Numbers)	Pch open drain port × 14					
	High Current Drive Port	—					
Interrupts(Sources)	Pull-Up Resistor	Pull-down resistance × 11					
	External	—					
Other Functions	Others	Carrier wave generation					
Package		20-pin SSOP					
Operating Frequency/Supply Voltage		1.8 to 3.6V					
Operating Ambient Temperature (°C)		-20 to 85					

* M: mask ROM version; O: one-time PROM version, Qz: QzROM version

★ : New product

• Specifications (Preset : 740 Series)

Group		7545**				
Type No.		M37545G4-XXXXGP**	M37545G4GP**	M37545G6-XXXXGP**	M37545G6GP**	M37545G8-XXXXFP**
Memory	ROM(Bytes)	16K		24K		32K
	RAM(Bytes)	512				
	ROM Type*	Qz				
	Data Flash	—				
CPU	Program Security	Yes				
	CPU	740 Core				
	Basic Instructions	71				
External Bus Expansion	Minimum Instruction Execution Time (ns)	2000				
	Host Interface	—				
Clock	Clock Generation Circuit	1 circuit (Ceramic resonator, quartz-crystal)				
	Subclock	—				
	On-Chip Oscillator	—				
	Oscillation Stop Detection	—				
	Frequency Divider	1/n (n = 4)				
	Power Save	Wait mode, Stop mode				
Power Supply	Power-On Reset/POR	Yes				
Voltage Detection	Low Voltage Detection/LVD	Yes				
A/D Converter	Resolution × Channels	—				
D/A Converter	Resolution × Channels	—				
Timer	8-bit	Timer 2 × 1, Timer 3 × 1				
	16-bit	—				
	Prescaler	Timer 1 × 1				
	Input Capture	—				
	Output Compare	—				
	PWM Output	—				
	Real-Time Port	—				
	Event Counter	—				
Watchdog Timer		Yes				
Serial Interface	Clock Sync./ Clock Async.	—				
	Clock Sync. Only	—				
I ² C-bus		—				
LPC/ISA		—				
LCD		—				
I/O Ports	Input Only (Numbers)	—				
	CMOS Output Only (Numbers)	—				
	CMOS I/O Only (Numbers)	25				
	N-Channel Open Drain Port (Numbers)	16				
	DTMF	—				
	High Current Drive Port	LED output port × 8				
	Pull-Up Resistor	8				
	External	3				
Interrupts(Sources)	External	3				
Debugging Function	On-Board Flash Program	—				
Other Functions	ROM Correction Function	—				
	Others	Key-on wakeup Carrier wave generation				
Package		32-pin LQFP				
Operating Frequency/Supply Voltage		(Ceramic, quartz-crystal) 4MHz/1.8 to 3.6V				
Operating Ambient Temperature (°C)		-20 to 85				

* Qz: QzROM version

★★ : Under development

Inverter Controller MPUs and MCUs

Electric motors power diverse products in industry (factory equipment, servers, etc.), office equipment (printers, scanners, etc.), and consumer goods (white goods, etc.). Efforts to conserve energy and meet tougher environmental regulations are boosting demand for inverter control systems. The MPUs and MCUs listed on this page incorporate either one or two timers capable of producing three-phase PWM waveforms with no overlap between positive and negative-phases. This makes it easy to design products incorporating inverter control. These MPUs and MCUs are suitable for a broad range of motor control applications.

• Inverter Controller MPUs and MCUs (Frequency, Operating Voltage, ROM Capacity)

F: F-ZTAT version ROM capacity
Z: ZTAT version ROM capacity
M: Mask ROM version ROM capacity
L: ROM-less version

SuperH Family

Core	Series	Operating Voltage (V)	Maximum Operating Frequency (Columns Indicate ROM Capacity)								
			12.5MHz	16.7MHz	20MHz	28.7MHz	50MHz	60MHz	80MHz	100MHz	200MHz
SH3-DSP	SH7641	3.3								L	
		1.8								L	
SH2-DSP	SH7060 (MMT)	3.3 (I/O-some 5V)						F:256K M:256K			
SH-2A	SH7200	1.25+3.3									L
SH-2	SH7080 (MTU2)	5.0							F:512/256K		
		3.3							F:512/256K		
	SH7146 (MTU2, MTU2S)	5.0							F:256K M:256K		
	SH7125 (MTU2)	5.0							F:128/64K		
	SH7046 (MMT, MTU)	5.0					F:256K M:256/128/64/32K				
	SH7047 (MMT, MTU)	5.0					F:256K M:256/128K				
	SH7144 (MTU)	3.3					F:256K, M:256K L				
	SH7040 (MTU)	5.0				F:256K, Z:128K, M:256/128/64K, L					
		3.3		Z:128K, M: 128/64K, L							
	SH-1	SH7030 (ITU)	5.0			Z:64K, M:64K, L					
3.3			Z:64K, M:64K, L		L						
SH7020 (ITU)		5.0			Z:32K, M:32/16K, L						
		3.3	Z:32K, M:32/16K, L								

F: Flash memory version ROM capacity
M: Mask ROM version ROM capacity
L: ROM-less version

M32R Family

Series	Group	Power Supply Voltage (V)	Maximum Operating Frequency (Columns Indicate ROM Capacity)					
			32MHz	40MHz	64MHz	80MHz	128MHz	160MHz
M32R/ECU	32196	4.5 to 5.5 or 3.0 to 3.6 single-power-supply					F:1M	F:1M
	32192	4.5 to 5.5 or 3.0 to 3.6 single-power-supply					F:1M	F:1M
	32186	4.5 to 5.5 or 3.0 to 3.6 single-power-supply				F:1M		
	32173	4.5 to 5.5 or 3.0 to 3.6 (External I/O) 3.0 to 3.6 (Internal Logic)	F:256K	F:256K				
	32172	4.5 to 5.5 or 3.0 to 3.6 (External I/O) 3.0 to 3.6 (Internal Logic)	F:256K	F:256K				

M16C Family

F: Flash memory version ROM capacity
M: Mask ROM version ROM capacity
L: ROM-less version

Series	Group	Operating Voltage (V)	Maximum Operating Frequency (Columns Indicate ROM Capacity)						
			7MHz	10MHz	16MHz	20MHz	24MHz	30MHz	32MHz
M32C/80	M32C/87	3.0 to 5.5				M:512K F:1024K+4K			
		4.2 to 5.5							M:512K F:1024K+4K
	M32C/86	3.0 to 5.5				F:512K+4K			
		4.2 to 5.5							F:512K+4K
	M32C/85	3.0 to 5.5					M:320K F:320K+4K/ 384K+4K/512K+4K		
		4.2 to 5.5							M:320K F:320K+4K/ 384K+4K/512K+4K
	M32C/84	3.0 to 5.5					M:128K/192K/320K F:512K+4K/ 320K+4K/384K+4K		
		4.2 to 5.5							M:128K/192K/320K F:512K+4K/ 320K+4K/384K+4K
	M32C/83	3.0 to 5.5				F:512K			
		4.2 to 5.5							F:512K
	M32C/82	3.0 to 5.5				M:320K/384K			
		4.2 to 5.5					M:320K/384K		
	M32C/81	3.0 to 5.5				M:128K			M:128K
		4.2 to 5.5							
	M32C/80	3.0 to 5.5					L		
		4.2 to 5.5							L
M16C/80	M16C/80	2.7 to 5.5		M:128K/256K F:128K/256K L					
		4.2 to 5.5				M:128K/256K F:128K/256K L			
M16C/60	M16C/62P	2.7 to 5.5		M:48K/64K/96K/128K/ 192K/256K/320K/384K F:64K+4K/128K+4K/ 256K+4K/384K+4K L					
		3.0 to 5.5					M:48K/64K/96K/128K/ 192K/256K/320K/384K F:64K+4K/128K+4K/ 256K+4K/384K+4K L		
	M16C/62A	2.7 to 5.5		M:32K/64K/96K 128K/256K F:128K/256K L					
		4.2 to 5.5			M:32K/64K/96K 128K/256K F:128K/256K L				
	M16C/62M	2.2 to 3.6	M:128K/256K F:128K/256K						
		2.7 to 3.6		M:128K/256K F:128K/256K					
	M16C/62N	2.4 to 3.6 2.2 to 3.6 (Only M)	M:128K/256K F:128K/256K						
		3.0 to 3.6		F:64K					
		3.0 to 3.6			M:128K/256K F:128K/256K				
	M16C/29	2.7 to 5.5		F:64K+4K/ 96K+4K/128K+4K					
		3.0 to 5.5				F:64K+4K/ 96K+4K/128K+4K			
M16C/Tiny	M16C/28	2.7 to 5.5		F:48K+4K/64K+4K/ 96K+4K					
		3.0 to 5.5				F:48K+4K/64K+4K/ 96K+4K			
	M16C/26A	2.7 to 5.5		M:24K/48K/64K F:24K+4K/ 48K+4K/64K+4K					
		3.0 to 5.5				M:24K/48K/64K F:24K+4K/ 48K+4K/64K+4K			
	M16C/26	2.7 to 5.5		F:24K+4K/32K+4K/ 48K+4K/64K+4K					
		3.0 to 5.5				F:24K+4K/32K+4K/ 48K+4K/64K+4K			

Inverter Controller MPUs and MCUs

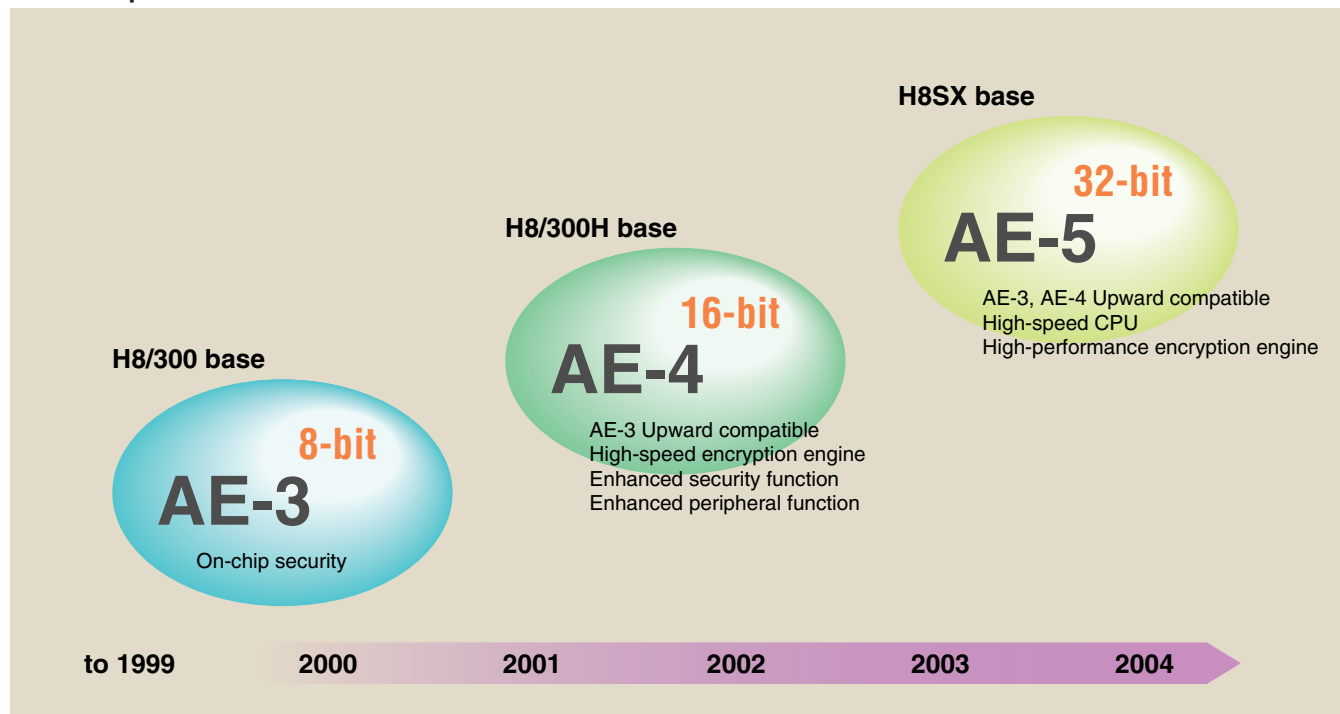
H8S, H8 Family

F: Flash memory version ROM capacity
M: Mask ROM version ROM capacity
L: ROM-less version

Series	Group	Operating Voltage (V)	Maximum Operating Frequency (Columns Indicate ROM Capacity)							
			8MHz	10MHz	13MHz	16MHz	17MHz	18MHz	20MHz	25MHz
H8S/2600	H8S/2612 (MMT)	4.5 to 5.5							F:128K M:128/64K	
H8/300H	H8/3052B (ITU)	4.5 to 5.5								F:512K
	H8/3048B (ITU)	4.5 to 5.5								F:128K,M:128K
		3.0 to 3.6								F:128K,M:128K
	H8/3048 (ITU)	4.5 to 5.5				F:128K		M:128/96/64/32K Z:128K		F:128K
		3.15 to 5.5			M:128/96/64/32K Z:128K					
		2.7 to 5.5	F:128K,Z:128K M:128/96/64/32K							
	H8/3022 (ITU)	3.0 to 3.6						F:256K M:256/192/128K		
	H8/3039 (ITU)	4.5 to 5.5						F:128K,M:128/64/32/16K		
		3.0 to 5.5		F:128K,M:128/64/32/16K						
		2.7 to 5.5	M:128/64/32/16K							
	H8/3035 (ITU)	4.5 to 5.5						Z:256K,M:256/128K		
		3.0 to 5.5		Z:256K,M:256/128K						
		2.7 to 5.5	Z:256K,M:256/128K							
	H8/3032 (ITU)	4.5 to 5.5						Z:64K,M:64/32/16K		
		3.0 to 5.5		Z:64K,M:64/32/16K						
		2.7 to 5.5	Z:64K,M:64/32/16K							
	H8/3042 (ITU)	4.5 to 5.5				Z:64K,M:64/48/32K				
		3.0 to 5.5		Z:64K,M:64/48/32K						
		2.7 to 5.5	Z:64K,M:64/48/32K							
	H8/3001 to 3006 (ITU)	4.5 to 5.5				L	L	L	L	
		3.0 to 5.5		L	L					
		2.7 to 5.5	L	L						
H8/300H Tiny	H8/36037 (TimerZ)	4.0 to 5.5							F:56/32K,M:56/48/40/ 32/24/16K	
		3.0 to 5.5		F:56/32K						
		2.7 to 5.5		M:56/48/40/ 32/24/16K						
	H8/36057 (TimerZ)	4.0 to 5.5							F:56/32K,M:56/32K	
		3.0 to 5.5		F:56/32K						
		2.7 to 5.5		M:56/32K						
	H8/36049 (TimerZ)	4.0 to 5.5							F:96K,M:96/80/64K	
		3.0 to 5.5		F:96K						
		2.7 to 5.5		M:96/80/64K						
	H8/36064G (TimerZ)	4.0 to 5.5							F:32K	
		3.0 to 5.5		F:32K						
	H8/36077 (TimerZ)	4.5 to 5.5							F:56K	
	H8/36087 (TimerZ)	3.0 to 3.6						F:56K,M:56/48/40/ 32/24/16K		
	H8/3687 (Timer Z)	4.0 to 5.5							F:56/32K,M:56/48/40/ 32/24/16K	
		3.0 to 5.5		F:56/32K						
		2.7 to 5.5		M:56/48/40/ 32/24/16K						

The information industry's for improved data security has lead to an expansion in IT products equipped with security functions and designed to ensure data integrity. Smart cards, which play a core role in such security systems, are popular for applications such as GSM-SIM and W-CDMA-USIM cards for mobile phones, credit cards and ATM cards for the financial industry, and electronic tickets and ETC cards for the transport field. The AE series of smart card MCUs encompasses an extensive line of products featuring highly reliable EEPROM nonvolatile memory, high-level security functions, and support for contact and non-contact interfaces.

• Roadmap



• Specifications

Series		AE-4 (16-bit)										AE-5 (32-bit)			
Model		AE420	AE4503	AE4602	AE43C	AE45C1	AE46C1	AE46CG	AE46C1G	AE45X1-B	AE45X1-C	AE57C	AE57C1	AE58C**	AE55C1**
Non-Contact Interface		—	—	—	—	—	—	—	—	Type-B	Type-C	—	—	—	—
Modular Multiplication Coprocessor		—	—	—	○	○	○	—	—	○	○	○	○	○	○
Memory	EEPROM (Bits)	5K	32K+4K	64K+512	8K+512	32K+4K	64K+4K	64K+4K	64K+4K	32K+4K	32K+4K	128K+4K	128K+16K	256K+32K	32K+8K
	ROM (Bytes)	64K	196K	96K	64K	196K	368K	196K	368K	144K	144K	320K	480K	480K	240K
	RAM (Bytes)	2K	5K	3K	2.5K	6.5K	6.5K	6.5K	6.5K	4.5K	4.5K	10K	12K+2K	16K+2K	8K
DES Coprocessor		○	○	○	○	○	○	○	○	○	○	○	○	○	○
AES Coprocessor		—	—	—	—	—	—	—	—	—	—	○	○	○	—
Random Number Generator		○	○	○	○	○	○	○	○	○	○	○	○	○	○
FMU		—	○	○	○	○	○	○	○	○	○	○	○	○	○
Watchdog Timer		○	○	○	○	○	○	○	○	○	○	○	○	○	○
Interval Timers		—	2	—	2	2	2	2	2	1	1	2	2	2	2
UART		—	○	—	○	○	○	○	○	○	○	○+DMA	○+DMA	○+DMA	○+DMA
I/O		2	2	2	2	2	2	2	2	2	2	2	2	2	2
PLL		—	○	—	○	○	○	○	○	○	○	○	○	○	○

FMU: Firewall Management Unit (monitors illegal memory accesses)

★★ : Under development

MCUs with LCD Controllers and Drivers

- A variety of standard MCUs incorporating LCD controllers and drivers are available.

• Specifications

On-chip controller

Series	SH7750	SH7700	
Group	SH7760	SH7727	SH7720
Display Size	16×1 to 640×480 dots	16×1 to 1024×1024 pixel	
Color Support	4/8/15/16bpp	1/2/4/8/15/16bpp	4/8/15/16bpp
Gray Scale Support	1/2/4/6bpp	1/2/4bpp	1/2/4/6bpp
Panel	STN/DSTN/TFT		
Other Functions	Windows CE support		
Detailed Specifications Page	34	35	

* The HD66130 and HD66137 are suitable for use as driver LSIs.

Dot Type(on-chip controller/Driver)

Series	H8/300L	
Group	H8/3857	H8/3854
Display Size	40×32 dots, 58×16 dots, 64×8 dots	40×16 dots, 40×8 dots
No. of Pins	144-pin	100-pin
Other Functions	On-chip voltage pull-up circuit	—
Detailed Specifications Page	175	175

Series	38000	
Group	38C5	38C8
Display Size	32×8 dots 32×4 dots	52×32 dots 68×16 dots
No. of Pins	80-pin	144-pin
Other Functions	On-chip voltage pull-up circuit	On-chip voltage pull-up circuit
Detailed Specifications Page	189	189

Segment Type(on-chip controller/Driver)

Series	H8S/2600			H8S/2200		H8S Super Low Power
Group	H8S/2646	H8S/2648	H8S/2649*	H8S/2268	H8S/2282	H8S/2264
Display Size	24seg×4com	40seg×4com	40seg×4com	40seg×4com	28seg×4com	40seg×4com
No. of Pins	144-pin	144-pin	144-pin	100-pin	100-pin	100-pin
Other Functions	—	—	—	—	—	—
Detailed Specifications Page	86	87	87	111	111	123

Series	H8/300L Super Low Power										H8/300L		
Group	H8/388x	H8/384xR, S	H8/386x	H8/383xx**	H8/382xR, S	H8/3812x	H8/3802x	H8/3810x	H8/3800x	H8/380x	H8/387x(U)	H8/383xU, S	H8/381xU
Display Size	40seg×4com	40seg×4com	32seg×4com	40seg×4com 32seg×4com	32seg×4com	32seg×4com	32seg×4com	25seg×4com	25seg×4com	25seg×4com	52seg×4com	40seg×4com	40seg×4com
No. of Pins	100-pin	100-pin	80-pin	100, 80-pin	80-pin	80-pin	80-pin	64-pin	64-pin	64-pin	100-pin	100-pin	100-pin
Other Functions	On-chip voltage pull-up circuit	—	On-chip voltage pull-up circuit	—	—	—	—	—	—	—	—	—	—
Detailed Specifications Page	161	162	158	160	159	157	156	155	154	154	173	171	170

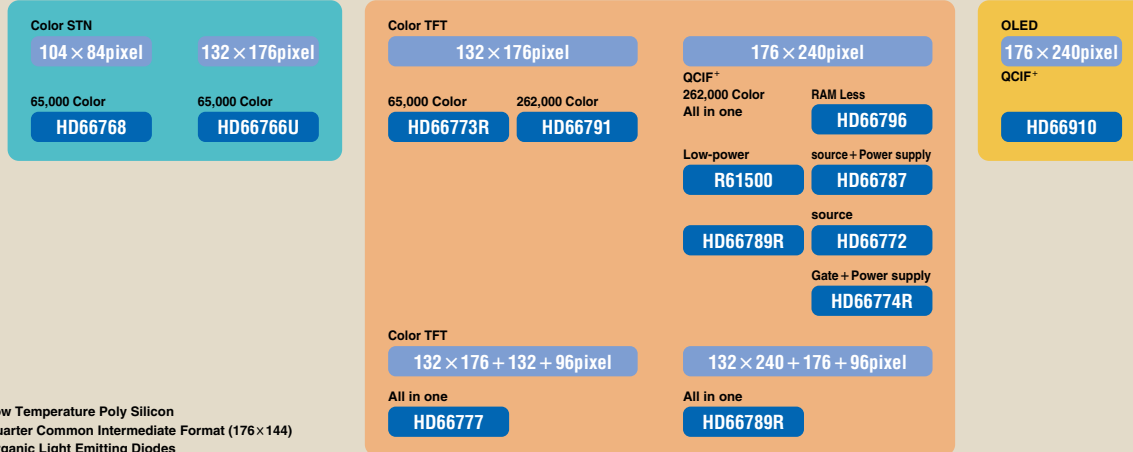
Series	38000				740	38000
Group	38C1	38C2	3822	3823**	7560	3826
Display Size	25seg×4com	24seg×4com	32seg×4com	32seg×4com	40seg×4com	40seg×4com
No. of Pins	64-pin	64-pin	80-pin	80-pin	100-pin	100-pin
Other Functions	LED direct connection drive ports			—	On-chip voltage pull-up circuit	
Detailed Specifications Page	188	188	188	188	189	189

Series	4500				
Group	4524	4556	4552	4553	4554
Display Size	20seg×4com	23seg×4com	28seg×4com	29seg×4com	32seg×4com
No. of Pins	64-pin	42-pin	48-pin	48-pin	64-pin
Other Functions	On-chip voltage drop detection circuit				
Detailed Specifications Page	195	196	195	195	196

★ : New product ★★ : Under development

- Improved low-power performance for mobile applications
- Support for larger displays and improved functionality on a single chip
- Reduced cost for system development (RAMLess)
- Devices for OLED applications

Line-up of color displays for mobile equipment (QCIF⁺)



• Specifications

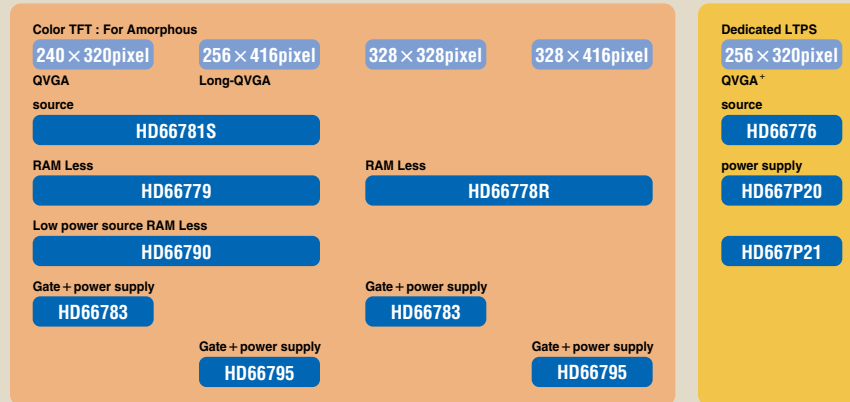
Application		Color STN	
Type No.		HD66766U	HD66768
Supply Voltage (V)		2.2 to 3.6	1.7 to 3.6
LCD Driver	Columns	396	312
	Common	176	84
On-Chip RAM (bits)		132 × 176 × 16	104 × 84 × 16
Package		Bump,Die	
Functions/Features		64,512 colors, voltage pull-up circuit	64,512 colors, voltage pull-up circuit, reference voltage generator circuit

Application		Color TFT					
Type No.		HD66772	HD66773R	HD66774R	HD66777	HD66782	HD66784R
Supply Voltage (V)		1.8 to 3.3	2.2 to 3.3	1.8 to 3.3	2.4 to 3.3		2.5 to 3.3
Interface Voltage (V)		1.8 to 3.3	2.2 to 3.3	1.8 to 3.3	1.65 to 3.3		
LCD Driver	Sources	528	396	—	396		528
	Gates	—	176	240	272	132	320
On-Chip RAM (bits)		176 × 240 × 18	132 × 176 × 16	—	132 × 272 × 18	132 × 132 × 18	176 × 320 × 18
Package		Bump,Die					
Functions/Features		262,144 colors, on-chip RGB interface	65,536 colors, on-chip power supply	On-chip power supply, gate driver	262,144 colors, on-chip RGB interface		262,144 colors, on-chip RGB, VSYNC interface

Application		Color TFT				OLED
Type No.		HD66787	HD66789R	HD66796	HD66791	HD66910
Supply Voltage (V)		2.4 to 3.3				
Interface Voltage (V)		1.65 to 3.3				1.8 to 3.3
LCD Driver	Sources	528		396	528	
	Gates	—	240	176	240	—
On-Chip RAM (bits)		176 × 240 × 18		—	132 × 176 × 18	176 × 240 × 18
Package		Bump,Die				
Functions/Features		262,144 colors, On-chip RGB interface	262,144 colors, on-chip RGB, VSYNC interface	262,144 colors, On-chip RGB interface	262,144 colors, on-chip RGB, VSYNC interface	262,144 colors, on-chip RGB, VSYNC interface

*Preliminary use

Line-up of Color displays for mobile Equipment (QVGA⁺)



LTPS : Low Temperature Poly Silicon
QVGA : Quarter Video Graphics Array (320 × 240)

• Specifications

Application		Color LTPS-TFT	Color Amorphous TFT					
Type No.		HD66776	HD66778R	HD66779	HD66781S	HD66783	HD66790	HD66795
Supply Voltage (V)		2.4 to 3.3	2.5 to 3.6		2.5 to 3.3	1.65 to 3.3	2.5 to 3.6	2.5 to 3.3
Interface Voltage (V)		2.4 to 3.3	2.5 to 3.6		1.65 to 3.3			
LCD Driver	Sources	256	360/492	366	720	—	720	—
	Gates	—	—			328	—	416
On-chip RAM (bits)		256 × 320 × 18	—		240 × 416 × 18	—		
Package		Bump, Die						
Functions/Features		For LTPS, 262,144 colors, On-chip RGB I/F	262,144 colors On-chip RGB I/F T-CON		262,144 colors, On-chip RGB I/F	On-chip power supply Gate driver	262,144 colors On-chip RGB I/F, T-con	On-chip power supply Gate driver

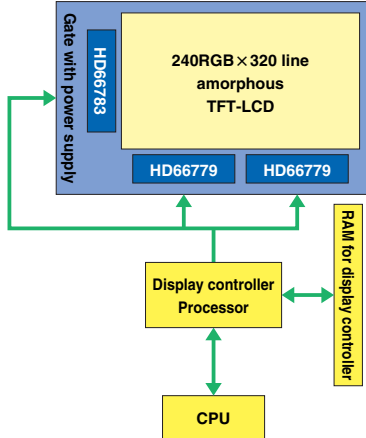
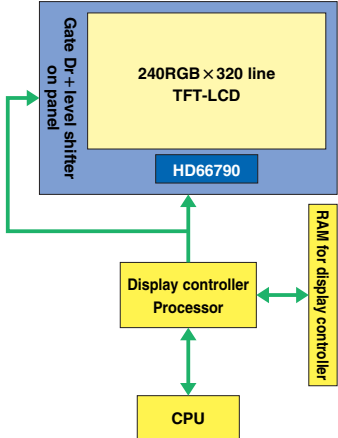
Application		Color LTPS-TFT power supply LSI	
Type No.		HD667P20	HD667P21
Supply Voltage (V)		1.7 to 3.3	
Package		Bump, Die	
Drive Voltage	DDVDH-GND (V)	4.0 to 5.5	4.0 to 5.9
	VGH-GND (V)	6.0 to 17.0	
	VGL-GND (V)	-4.0 to -14.5	
	VCL-GND (V)	0 to 3.3	

- Simple LCD driver
- TFT displays for Mobile terminals

- Ideal for QVGA display system (240×320 dots)
- Realizes large displays with a few LSIs (Max.3 chips)

- On-chip display timing controller in TFT type
- Low power consumption LCD driver chip set

• Specifications

	HD66778 (Source)	HD66779 (Source)	HD66790 (Source)
	HD66783 (Gate with power supply)		—
Resolution	240×320 dots (Max.)	240×412 dots (Max.)	240×320 dots (Max.)
RGB	6×3/16/18-bit		18/6×3-bit
Serial I/F	Incorporated for addressing each resister		
Supply Voltage (V)	2.5 to 3.5		1.65 to 3.5
Operating Frequency (MHz)	10.0		25.0
Output Count	320 (Source)	492 (Source)	720 (Source)
Configurations	3 chips		1 chip
Other Functions	On-chip timing controller		
	Terminal of reference supply voltage for γ correction		Voltage output for level shifter
	Output for border line display		—
	On-chip Vcom generator		
System Examples			

Segment + Character Display Controller/Driver

- The HD66704 is a controller/driver enabling display of 7-segment alphanumeric, Japanese kana, and symbol characters

Features of Segment + Character Display Controller/Driver

- Support for a maximum of 320 display segments
- On-chip voltage pull-up circuit generates drive voltage for LCD panel
- High-speed clock synchronous serial, and high-speed 4-bit bus interface supported

Applications Fax machines, telephones, audio equipment, VCRs, electric blankets, etc.

Panel Display Examples



16-column, 2-line character + 160-segment display



16-column, 1-line double-size character + 160-segment display

(1/18duty)



320-segment (40 character) display

The HD66704 can also be set to segment display only. When displaying 320 segments and 40 characters, 1/4-duty drive is supported, thereby reducing power consumption.

Specifications

Type No.		HD66704
Power Supply Voltage (V)		1.8 to 5.5
LCD Power Supply Voltage (V)		3.0 to 6.5
Power Consumption (μA)		50
LCD Driver	Columns	80
	Common	18
	Marks	160 to 320
	On Resistance (kΩ)	3
Operating Frequency (kHz)		32
On-Chip Memory	ROM (Bits)	17280
	Display RAM (Bits)	80 × 8
	Character RAM (Bits)	16 × 5
Recommended Operating Duty		1/2, 3/4, 11, 18
Package		Bump Die
Other Functions		Voltage pull-up circuit double-height font, serial interface

4-gradation Controller/Driver Displays for Mobile Devices

- On-chip character ROM reduces software size
- On-chip peripheral functions such as LCD drive power supply

Features of 4-gradation Displays for Mobile Devices

- Voltage pull-up circuit and electronic VR required for portable devices implemented on-chip
- Support for low-power drive control modes such as standby and sleep

- Support for 4-gradation displays in 168 dots × 132 dots monochrome STN LCD: × 3, × 5, × 6, × 7

Specifications

Application		Monochrome 4-gradation display
Type No.		HD66753
Supply Voltage (V)		1.7 to 3.6
LCD Driver	Columns	168
	Common	132
On-Chip RAM (Bit)		160 × 132 × 2
Pull-Up Circuit		× 3/× 5/× 6/× 7
LCD Drive Voltage		5.0 to 19.5
Interface		8bit or 16bit-Bus Serial I ² C Bus
Bit Map Operation		Write data mask rotation Logic calculation
Package		Bump-Die

OSD Controllers

OSD Controllers

These OSD controllers are suitable for implementing adjustment menu displays on TFT or PDP video monitors. Versions for low-voltage mobile systems such as digital cameras are also available.

• OSD Controllers

Type	Group	Type No.	Screen Composition	Sync Signal Generator	Characters	Functions	Package
Digital RGB Output Only	3507	M35074-XXXSP	24 characters × 12 lines	On-chip VCO	511	Operating frequency: 6.3 to 120 MHz I ² C-bus compatible Low-voltage compatible ¹	20P4B
		M35075-XXXFP			255 (ROM) 8 (RAM)	Operating frequency: 6.3 to 110 MHz I ² C-bus compatible Low-voltage compatible ¹	24P2Q-A
		M35076-XXXSP	24 characters × 12 lines × 2 pages		256+256		20P4B

¹ Imposes limitations on some functions.

² This OSD is for consumer use.

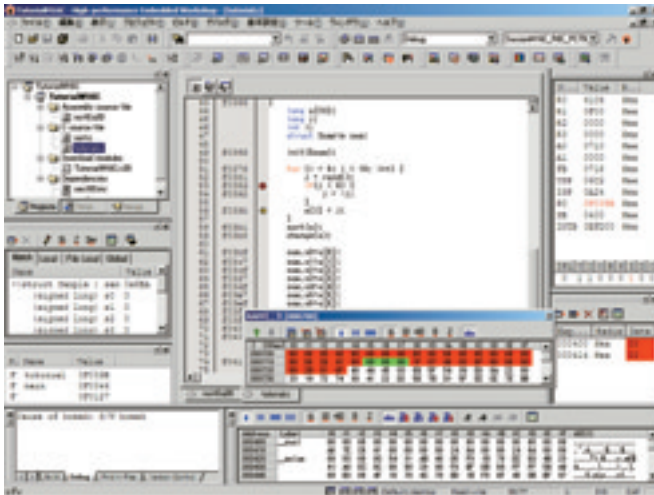
Please check with the sales department on limitations for automotive use.

Renesas Development Environments

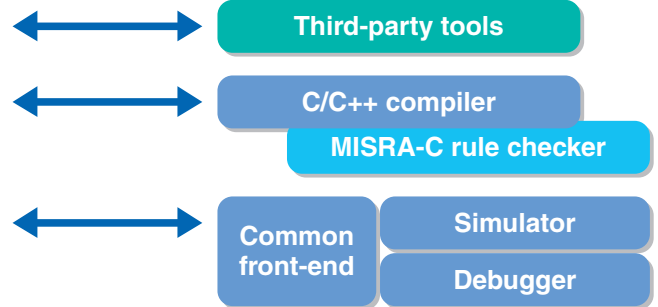
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We are continuously improving the functionality of our existing tools and expanding our support with the introduction of new tools to meet the evolving needs of our customers.

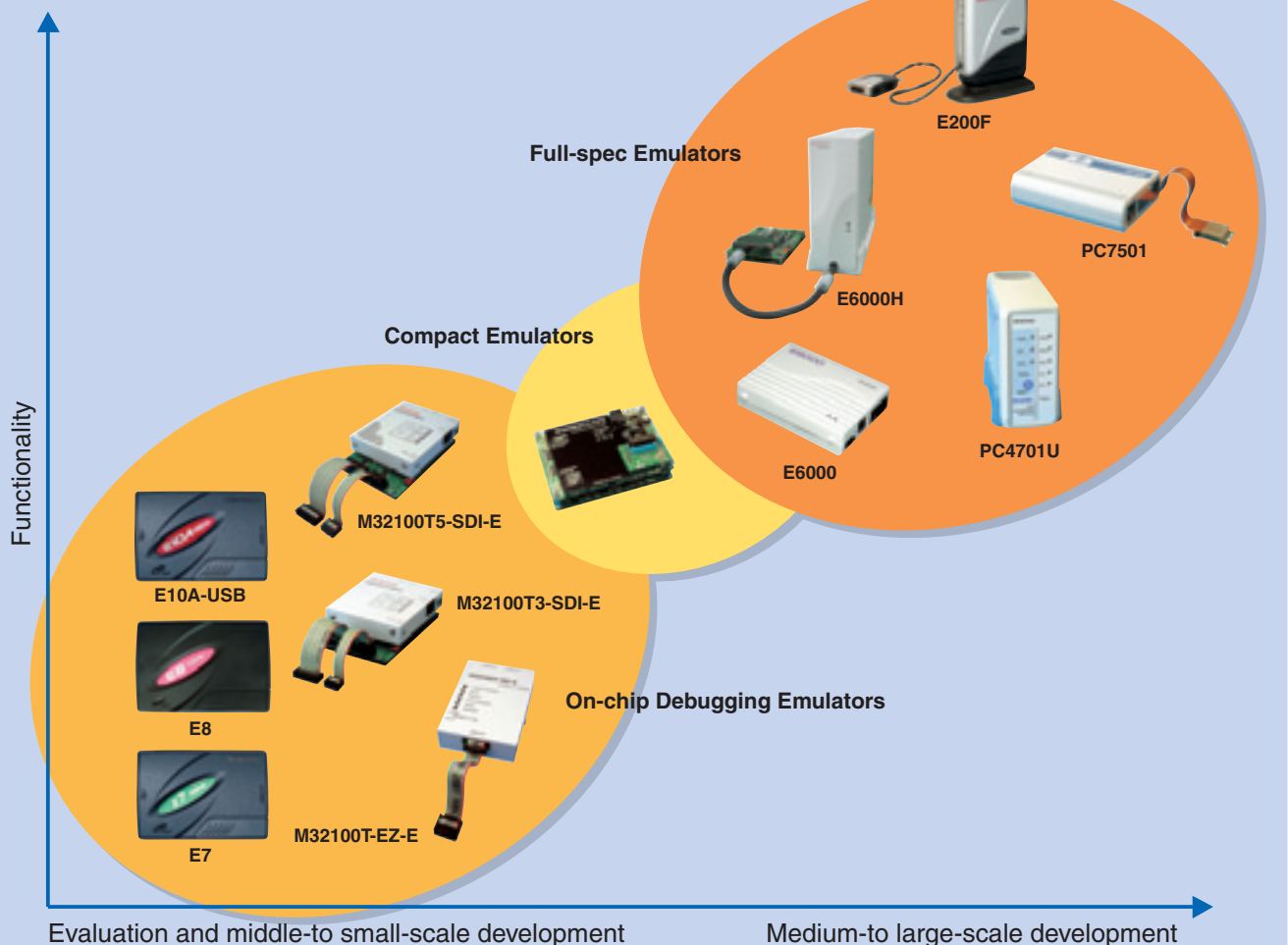
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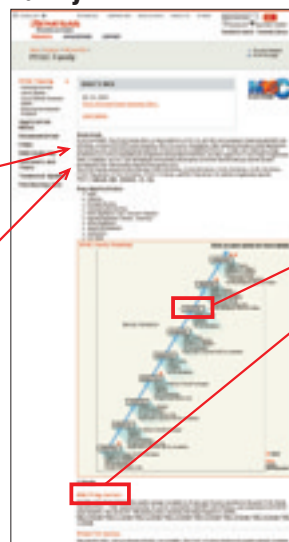
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Unified Hierarchy Structure (Family, Series, Group)

MPU & MCU



Family



Series



Group



The latest product information from database and link to document and package information.

support for your system development efforts.



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List of Flash Memory Versions

Flash Memory Version

Family	Series	Group	ROM (Bytes) ¹	Page
SuperH™	SH7146	SH7149**	256K	24
		SH7146**	256K	24
	SH7144	SH7145	256K	23
		SH7144	256K	23
	SH7125	SH7125**	128K 64K	26
		SH7124**	128K 64K	26
	SH7080	SH7086**	512K	23
		SH7085**	512K	23
		SH7084**	256K	23
		SH7083**	256K	23
	SH7060	SH7065	256K	27
	SH7050	SH7058	1M	30
		SH7055	512K	30
		SH7051	384K	30
		SH7050	256K	30
	SH7047	SH7047	256K	25
	SH7046	SH7046	256K	24
	SH7040	SH7045	256K	28
		SH7044	256K	28
	SH7010	SH7018	160K	29
		SH7017	128K	29
M32R	M32R/ECU	32196**	1M	41
		32192**	1M	41
		32186**	1M	41
		32176	512K 384K 256K	41
		32173	256K	41
		32172	256K	41
M16C	M32C/90	M32C/95**	768K + 4K 512K + 4K 384K + 4K	242
		M32C/94**	768K + 4K 512K + 4K 384K + 4K	242
	M32C/80	M32C/88**	512K + 4K 384K + 4K 320K + 4K	242
		M32C/87*	1M + 4K	47
		M32C/86	512K + 4K	47
		M32C/85	512K + 4K 384K + 4K 320K + 4K	47
		M32C/84	512K + 4K 384K + 4K 320K + 4K	46
		M32C/83	512K	45
	M16C/80	M16C/80	256K 128K	50
	M16C/60	M16C/6V	512K 384K 256K 192K	283
		M16C/6S	96K	280
		M16C/6N	512K + 4K 384K + 4K 256K + 4K 128K + 4K	244
		M16C/6K	128K 68K	264
		M16C/6H	256K 128K	281
		M16C/62P	512K + 4K 384K + 4K 256K + 4K 128K + 4K 64K + 4K	55
		M16C/62M	256K 128K	58

Family	Series	Group	ROM (Bytes) ¹	Page
M16C	M16C/60	M16C/62N	256K 128K 64K	59
		M16C/62A	384K + 4K 256K 128K	56
	M16C/20	M16C/24	128K	274
	M16C/Tiny	M16C/29**	128K + 4K 96K + 4K 64K + 4K	67
		M16C/28*	96K + 4K 64K + 4K 48K + 4K	67
		M16C/26A**	64K + 4K 48K + 4K 24K + 4K	66
		M16C/26	64K + 4K 48K + 4K 32K + 4K	66
	M16C/10	M16C/1N	64K + 4K	249
		M16C/10	24K	70
	R8C/Tiny	R8C/25**	64K + 2K 48K + 2K 32K + 2K 16K + 2K	76
		R8C/24**	64K 48K 32K 16K	76
		R8C/23**	48K + 2K 32K + 2K	249
		R8C/22**	48K 32K	249
		R8C/21**	48K + 2K 32K + 2K	214
		R8C/20**	48K 32K	214
		R8C/19**	16K + 2K 12K + 2K 8K + 2K 4K + 2K	75
		R8C/18**	16K 12K 8K 4K	75
		R8C/17*	16K + 2K 12K + 2K 8K + 2K	74
		R8C/16*	16K 12K 8K	74
		R8C/15*	16K + 2K 12K + 2K 8K + 2K	74
		R8C/14*	16K 12K 8K	74
		R8C/13	16K + 4K 12K + 4K 8K + 4K	73
		R8C/12	16K + 4K 12K + 4K 8K + 4K	73
		R8C/11	16K 12K 8K	73
		R8C/10	16K 12K 8K	73

*1 The notation "+2K" and "+4K" refer to data flash memory.

★ : New product ★★ : Under development

Family	Series	Group	ROM (Bytes)	Page
H8SX	H8SX/1600	H8SX/1650	768K	80
	H8SX/1500	H8SX/1580	256K	80
		H8SX/1520	256K	80
H8S	H8S/2600	H8S/2678	256K	87
		H8S/2668	384K	87
		H8S/2649*	256K	87
		H8S/2648	128K	87
		H8S/2646	128K	86
		H8S/2643	256K	86
		H8S/2639	256K	86
		H8S/2638	128K	86
		H8S/2636	128K	85
		H8S/2635	192K	85
		H8S/2633	128K	84
		H8S/2630	384K	83
		H8S/2628	128K	83
		H8S/2615	64K	83
		H8S/2612	128K	83
	H8S/2500	H8S/2556	512K	90
		H8S/2552	512K	90
		H8S/2506	512K	90
	H8S/2400	H8S/2437	512K	93
			384K	
			256K	
	H8S/2300	H8S/2398	256K	101
		H8S/2378	384K	100
		H8S/2368	512K	100
			384K	
		H8S/2357	128K	99
		H8S/2345	128K	98
		H8S/2339	384K	97
		H8S/2338	256K	97
		H8S/2329	384K	97
		H8S/2328	256K	97
		H8S/2319	512K	96
		H8S/2318	384K	96
			256K	
			128K	111
		H8S/2282	128K	
	H8S/2200	H8S/2268	256K	111
			128K	
		H8S/2258	256K	110
		H8S/2239	256K	109
		H8S/2238R	256K	109
		H8S/2238B	256K	108
		H8S/2227	128K	107
		H8S/2218	128K	106
		H8S/2215	256K	106
		H8S/2214	128K	105
		H8S/2212	128K	105
			64K	
	H8S/2100	H8S/2199	256K	120
		H8S/2194	256K	120
			128K	
		H8S/2189	1M	119
		H8S/2172	256K	119
		H8S/2168	512K	119
			384K	
			256K	119
		H8S/2158	256K	
		H8S/2148	128K	119
			64K	
		H8S/2144	128K	118
			64K	
		H8S/2140B	256K	118
			128K	
			64K	117
		H8S/2138	128K	
		H8S/2134	128K	117
			64K	
		H8S/2128	128K	116
		H8S/2114	1M	115
		H8S/2111B	64K	115
		H8S/2110B	64K	115

Family	Series	Group	ROM (Bytes) ¹	Page
H8	H8/300H	H8/3069R	512K	132
		H8/3068	384K	132
		H8/3067	128K	132
		H8/3062	256K	131
			128K	
		H8/3052B	512K	130
		H8/3048B	128K	130
		H8/3048	128K	129
		H8/3039	128K	128
		H8/3029	512K	130
		H8/3028	384K	130
		H8/3024	256K	130
			128K	
		H8/3022	256K	128
	H8/300H Tiny	H8/3694	32K	146
		H8/36912G	8K	145
		H8/36902G	8K	145
		H8/3687	56K	144
			32K	
		H8/3672	16K	143
			8K	
		H8/3664	32K	142
		H8/36087	56K	141
		H8/36077**	56K	141
		H8/36064G	32K	141
		H8/36057	56K	140
			32K	
		H8/36049	96K	140
		H8/36037	56K	139
			32K	
		H8/36024	32K	138
			16K	
		H8/36014	32K	136
			16K	
	H8/300H Super Low Power	H8/38602R*	16K	150
		H8/38086R*	48K	150
		H8/38076R*	48K	150
H8	H8/300L Super Low Power	H8/38347**	60K	163
		H8/38327**	60K	160
		H8/38124*	32K	157
			16K	
		H8/38104*	32K	155
			16K	
		H8/38024R	32K	156
		H8/38004	32K	154
			16K	
	H8/300L	H8/3857	60K	175
		H8/3854	60K	175
		H8/3644	32K	167
			24K	
			16K	
740	7600	7643	32K	278
		7641	32K	278
	38000	38K2	32K	278
		38K0	32K	278
		38C2	60K	188
		3886	60K	185
		3885	60K	268
		3851	32K	181
		3850	32K	181
		3804*	60K	185
		3803	60K	184
	740	7542	32K + 4K	179
			32K	
		7517	32K	268
		7516	32K	181
		7512*	48K + 4K	268
			32K + 4K	

*1 The notation "+4K" refer to data flash memory.

★ : New product ★★ : Under development

□ SuperH/M32R/M16C/H8SX/H8S Family

*1 The notation "+2K" and "+4K" refer to data flash memory

740 Family

144	100	80	64	52	48	44	42	36	32	24	20	ROM Size (Bytes)	28		30	32	42	44	48	64	80	85	100	112	120	144
												512K											H8/3069R H8/3029 H8/3052B			
												384K											H8/3068 H8/3028			
												256K											H8/3024 H8/3062			
												192K											H8/3035 H8/3022			
												128K											H8/3022			
												96K											H8/3035 H8/3039 H8/3022			H8/3048 H8/3024 H8/3062
												80K											H8/3067 H8/3048B			H8/3062 H8/3067
			7280	7280								64K											H8/36049			H8/3042 H8/3048 H8/3062
																							H8/3032 H8/3039 H8/36049			H8/3067
38C8	7560 3826	3885 7632 3886 38C5 3823	38C2 7280 3803 3804	7280			7150 7160					60K								H8/3627	H8/38327 H8/3827R H8/3827S H8/3867 H8/3657 H8/3637 H8/3927 H8/3297		H8/38347 H8/3847R H8/3847S H8/3887 H8/3834 H8/3877 H8/3877N H8/3977R H8/3947 H8/3854			H8/3857
												56K								H8/3687 H8/36037 H8/36057 H8/36077 H8/36087						
	3826	7632 38C5 3886 3885 3822	3803 38C2 3804		7512		7150 7220					48K + 4K								H8/3687 H8/36037 H8/36087 H8/3627	H8/3827R H8/3827S H8/3867 H8/3657 H8/3637 H8/3724 H8/3927 H8/3297 H8/38327 H8/38086R H8/38076R	H8/38086R H8/38076R	H8/3042 H8/3847R H8/3847S H8/3887 H8/3834 H8/38347 H8/3877 H8/3877N H8/3977R H8/3947			H8/3857
				7280			7220 7150 7160					40K								H8/3687 H8/36037 H8/36087 H8/3627	H8/38327 H8/38086R H8/38076R H8/3827R H8/3827S H8/3867 H8/3657 H8/3637 H8/3724 H8/3927	H8/38086R H8/38076R	H8/38347 H8/3847R H8/3847S H8/3887 H8/3834 H8/3877 H8/3877N H8/3977R H8/3947			H8/3857
					7512			7542	7542			32K + 4K														
	7560	7643 7641 3885 3886 3822 38C5	38K2 38K0 3804 3803		7517 7516		7150 7160 7220 3850 3851	7542 7540	7540 7545 7546			32K					H8/3664		H8/3664 H8/3694 H8/36014 H8/36024	H8/3664 H8/3664N H8/3694 H8/3687 H8/38104 H8/36014 H8/36024 H8/36037 H8/36057 H8/36064G H8/36087 H8/38004 H8/3644 H8/3627 H8/3614 H8/3714	H8/3032 H8/3039 H8/3827R H8/3827S H8/3867 H8/38024 H8/38024R H8/38327 H8/38024S H8/3644 H8/3657 H8/3724 H8/3927 H8/3297 H8/38124 H8/38086R H8/38076R	H8/38086R H8/38076R	H8/3042 H8/3048 H8/3847R H8/3847S H8/3887 H8/3834 H8/3814 H8/38347 H8/3977R H8/3854			
		3883 3822	38C1 3803 3804 38C2		7516	7516	7150 7220 3850 3851		7545			24K					H8/3664		H8/3694 H8/36014 H8/36024 H8/3664	H8/3664 H8/3664N H8/3694 H8/3687 H8/38104 H8/36014 H8/36024 H8/36037 H8/36087 H8/38004 H8/3644 H8/3627 H8/3614 H8/3714	H8/3827R H8/3867 H8/38124 H8/38086R H8/38076R H8/38024 H8/38024S H8/3644 H8/3657 H8/3724	H8/38076R H8/38086R H8/38024S	H8/3847R H8/3887 H8/3834 H8/3814 H8/3854			
		3882 3822	38K2 38K0 38C2 38C1 3804 3803		7516	7516 7630	7220 7534 3850	7534 7540 7542 7546 7547	7540 7542 7545 7546			20K					H8/38602R	H8/3664	H8/3672 H8/3694 H8/36014 H8/36024 H8/3664	H8/3664 H8/3664N H8/3672 H8/3694 H8/3687 H8/38104 H8/36014 H8/36024 H8/36037 H8/36087 H8/3802 H8/38004 H8/38002S H8/3644 H8/3627 H8/3614 H8/3714	H8/3032 H8/3039 H8/3827R H8/3867 H8/38124 H8/38024 H8/38024S H8/3644 H8/3657 H8/3624	H8/38024S	H8/3847R H8/3887 H8/3834 H8/3814 H8/3854			
												12K							H8/3664	H8/3694 H8/36014 H8/3664 H8/3664N	H8/3664 H8/3664N H8/3694 H8/38104 H8/38004 H8/38002S H8/36014 H8/3802 H8/3644	H8/38124 H8/38024 H8/38024S H8/3644	H8/38024S			
							3850 7534	7534 7540 7542 7544 7546 7547	7542 7544 7546 7540 7534			8K					H8/36912G H8/36902G H8/38602R	H8/3664	H8/3672 H8/3694 H8/36014 H8/3664	H8/3664 H8/3664N H8/3672 H8/3694 H8/38104 H8/38004 H8/38002S H8/36014 H8/3802 H8/3644	H8/38124 H8/38024 H8/38024S H8/3644	H8/38024S				
												4K														
												2K														
												ROM-less											H8/3001 H8/3004		H8/3002 H8/3006 H8/3008 H8/3003 H8/3003	
144	100	80	64	52	48	44	42	36	32	24	20		28		30	32	42	44	48	64	80	85	100	112	120	144
											4282	1K														
								4518	4502 4507	4501 4506 4582 4283		2K														
					4553 4552		4556	4570	4518	4502 4507 4509	4501 4506 4508	4K														
							4519		4518			6K														
			4554 4524		4552 4553		4519 4556	4570	4518			8K														
			4554 4524 4554 4524									12K														
							4570					16K														

720 Family

*720 family: 720 series (word×9-bit), 4500 series (word×10-bit)

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450 Holger Way, San Jose, CA 95134-1368, U.S.A
Tel: <1> (408) 382-7500, Fax: <1> (408) 382-7501

Renesas Technology Europe Limited

Dukes Meadow, Millboard Road, Bourne End, Buckinghamshire, SL8 5FH, U.K.
Tel: <44> (1628) 585-100, Fax: <44> (1628) 585-900

Renesas Technology (Shanghai) Co., Ltd.

Unit 2607 Ruijing Building, No.205 Maoming Road (S), Shanghai 200020, China
Tel: <86> (21) 6472-1001, Fax: <86> (21) 6415-2952

Renesas Technology Hong Kong Ltd.

7th Fl., North Tower, World Finance Centre, Harbour City, 1 Canton Road, Tsimshatsui, Kowloon, Hong Kong
Tel: <852> 2265-6688, Fax: <852> 2730-6071

Renesas Technology Taiwan Co., Ltd.

10th Fl., No.99, Fushing North Road, Taipei, Taiwan
Tel: <886> (2) 2715-2888, Fax: <886> (2) 2713-2999

Renesas Technology Singapore Pte. Ltd.

1 Harbour Front Avenue, #06-10, Keppel Bay Tower, Singapore 098632
Tel: <65> 6213-0200, Fax: <65> 6278-8001

Renesas Technology Korea Co., Ltd.

Kukje Center Bldg. 18th Fl., 191, 2-ka, Hangang-ro, Yongsan-ku, Seoul 140-702, Korea
Tel: <82> 2-796-3115, Fax: <82> 2-796-2145

Renesas Technology Malaysia Sdn. Bhd.

Unit 906, Block B, Menara Amcorp, Amcorp Trade Centre, No.18, Jalan Persiaran Barat, 46050 Petaling Jaya, Selangor Darul Ehsan, Malaysia
Tel: <603> 7955-9390, Fax: <603> 7955-9510