PRECISION 5.0 VOLT MICROPOWER VOLTAGE REFERENCE

ZRB500

ISSUE 3 - JANUARY 2003

DEVICE DESCRIPTION

The ZRB500 uses a bandgap circuit design to achieve a precision micropower voltage reference of 5.0 volts. The device is available in a small outline surface mount package, ideal for applications where space saving is important.

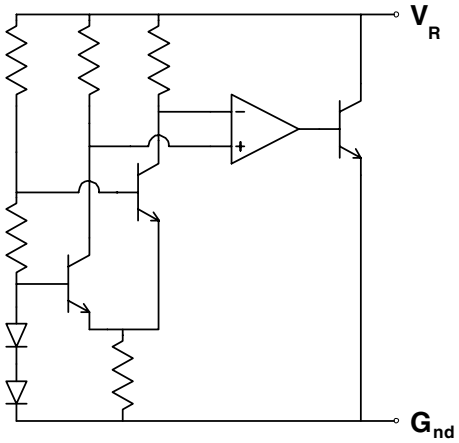
The ZRB500 design provides a stable voltage without an external capacitor and is stable with capacitive loads. The ZRB500 is recommended for operation between 50μA and 15mA and so is ideally suited to low power and battery powered applications.

Excellent performance is maintained to an absolute maximum of 25mA, however the rugged design and 20 volt processing allows the reference to withstand transient effects and currents up to 200mA. Superior switching capability allows the device to reach stable operating conditions in only a few microseconds.

FEATURES

- Small outline SOT23 style package
- No stabilising capacitor required
- Typical T_C 15ppm/°C
- Typical slope resistance 0.33Ω
- ± 3%, 2% and 1% tolerance
- Industrial temperature range
- Operating current 50μA to 15mA
- Transient response, stable in less than 10μs
- **APPLICATIONS**
- Battery powered and portable equipment.
- Metering and measurement systems.
- Instrumentation.
- Test equipment.
- Data acquisition systems.
- Precision power supplies.

SCHEMATIC DIAGRAM



ZRB500

ABSOLUTE MAXIMUM RATING

Reverse Current	25mA
Forward Current	25mA
Operating Temperature	-40 to 85°C
Storage Temperature	-55 to 125°C

Power Dissipation (T_{amb}=25°C)

SOT23	330mW

ELECTRICAL CHARACTERISTICS

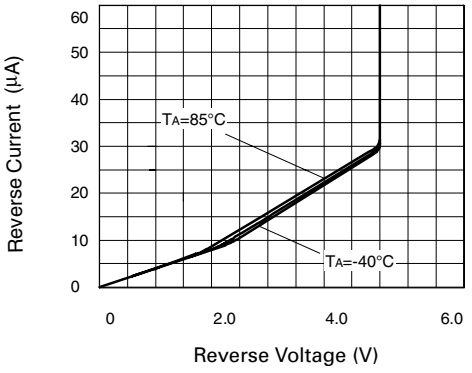
TEST CONDITIONS (Unless otherwise stated) T_{amb}=25°C

SYMBOL	PARAMETER	CONDITIONS	LIMITS			TOL. %	UNITS
			MIN	TYP	MAX		
V_R	Reverse Breakdown Voltage	I_R=150µA	4.95 4.90 4.85	5.0 5.0 5.0	5.05 5.10 5.15	1 2 3	V
I_{MIN}	Minimum Operating Current			30	50		µA
I_R	Recommended Operating Current		0.05		15		mA
T_C †	Average Reverse Breakdown Voltage Temp. Co.	$I_{R(min)}$ to $I_{R(max)}$		15	50		ppm/°C
R_S §	Slope Resistance			0.33	1.5		Ω
Z_R	Reverse Dynamic Impedance	I_R = 1mA f = 100Hz I_{AC}=0.1 I_R		0.4	1		Ω
E_N	Wideband Noise Voltage	I_R= 150µA f = 10Hz to 10kHz		105			µV(rms)

† $$T_C = \frac{(V_{R(max)} - V_{R(min)}) \times 1000000}{V_R \times (T_{(max)} - T_{(min)})}$$

Note: $V_{R(max)}$ - $V_{R(min)}$ is the maximum deviation in reference voltage measured over the full operating temperature range.

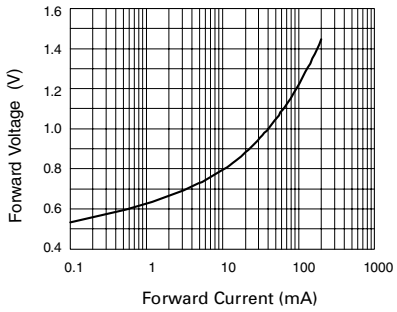
§ $$R_S = \frac{V_R \text{ Change } (I_{R(min)} \text{ to } I_{R(max)})}{I_{R(max)} - I_{R(min)}}$$



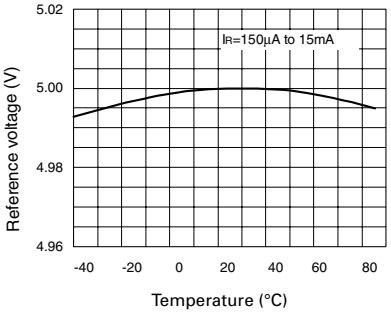
Reverse Characteristics

ZRB500

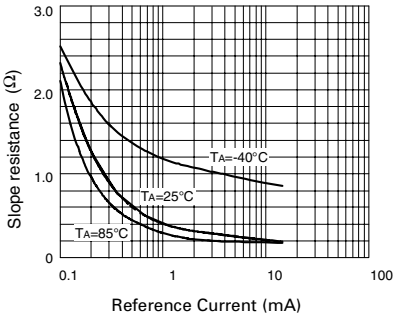
TYPICAL CHARACTERISTICS



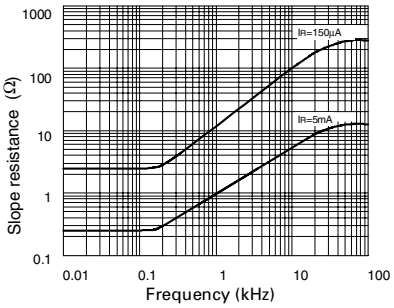
Forward Characteristics



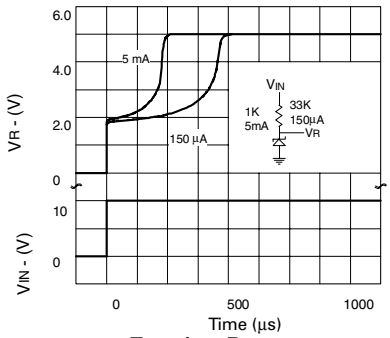
Temperature Drift



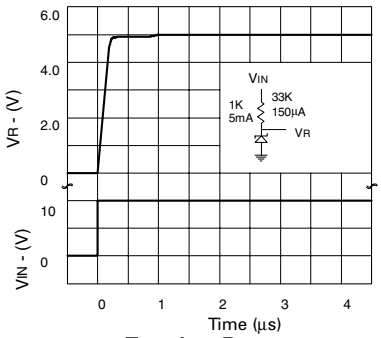
Slope Resistance v Current



Slope Resistance v Frequency



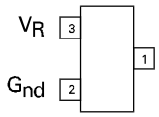
Transient Response (Single Pulse)



Transient Response (Repetitive Pulse)

CONNECTION DIAGRAMS

SOT23 Package Suffix – F



Top View –
Pin 1 floating or connected to pin 2

ZRB500

ORDERING INFORMATION

Part No	Tol%	Package	Partmark
ZRB500F03	3	SOT23	50G
ZRB500F02	2	SOT23	50H
ZRB500F01	1	SOT23	50I