5SDD71X0200

Welding diode

- V_{RRM} = 200 V
- I_{FAVm} = 7110 A
- I_{FSM} = 55000 A
- V_{T0} = 0.740 V
- r_T = 0.026 mΩ
- High operational reliability
- High forward current capability
- Low forward and reverse recovery losses
- Medium frequency range, typ. up to 2 kHz

Maximum rated values [1)]

Parameter	Symbol	Conditions	Min.	Max.	Unit
Repetitive peak reverse voltage	V_{RRM}	T_j = -40 ÷ 170 °C		200	V
Repetitive peak reverse current	I_{RRM}	$V_R = V_{RRM}$, half sine waveform, f = 50 Hz, peak value		50	mA
Average forward current	I_{FAVm}	half sine waveform, f = 50 Hz, T_c = 85 °C		7110	A
RMS forward current	I_{FRMS}	half sine waveform, f = 50 Hz, T_c = 85 °C		11200	A
Non repetitive peak surge current	I_{FSM}	half sine pulse, V_R = 0 V, t_p = 10 ms		55000	A
Limiting load integral	I^2t	half sine pulse, V_R = 0 V, t_p = 10 ms		15125000	A^2s
Operating temperature range	T_{jmin} - T_{jmax}		-40	170	°C
Storage temperature range	T_{STG}		-40	170	°C

Unless otherwise specified T_j = 170 °C
[1)] Maximum rated values indicate limits beyond which damage to the device may occur per IEC 60747

Characteristic values

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Threshold voltage	V_{T0}				0.740	V
Forward slope resistance	r_T	I_{F1} = 5000 A, I_{F2} = 15000 A			0.026	mΩ
Maximum forward voltage	V_{FM}	I_{FM} = 5000 A, T_j = 25°C			1.050	V
		I_{FM} = 5000 A			0.870	
Recovered charge	Q_{rr}	I_{FM} = 1000 A, di_F/dt = -30 A/µs, V_R = 100 V		500		µC

Unless otherwise specified T_j = 170 °C

Mechanical properties

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Mounting force	F_m		20		24	kN
Mass	m			0.14		kg
Surface creepage distance	D_s		4			mm
Air strike distance	D_a		4			mm

Mechanical drawing

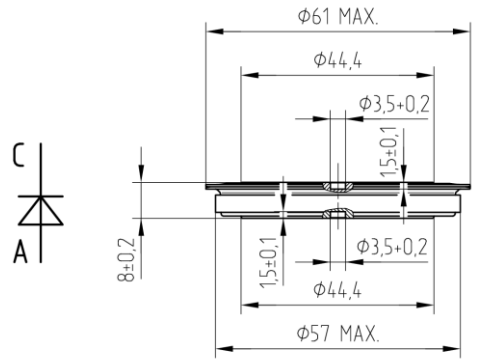

Fig. 1 Case
Note: all dimensions are shown in millimeters

Thermal properties

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Thermal resistance junction to case	R_{thjc}	double side cooling			10.0	K/kW
		single side cooling			20.0	
Thermal resistance case to heatsink	R_{thch}	double side cooling			5.0	
		single side cooling			10.0	

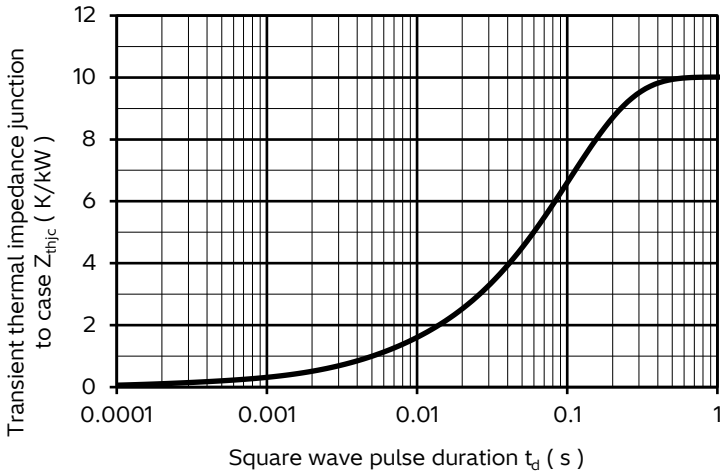

Fig. 2 Dependence transient thermal impedance junction to case on square pulse

Analytical function for transient thermal impedance

$$Z_{th\,(j\text{-}c)}(t) = \sum_{i=1}^{n} R_i(1 - e^{-t/\tau_i})$$

i	1	2	3	4
τ_i (s)	0.1052	0.0170	0.0042	0.0002
R_i(K/kW)	8.7977	0.6405	0.4702	0.0994

Forward and surge characteristics

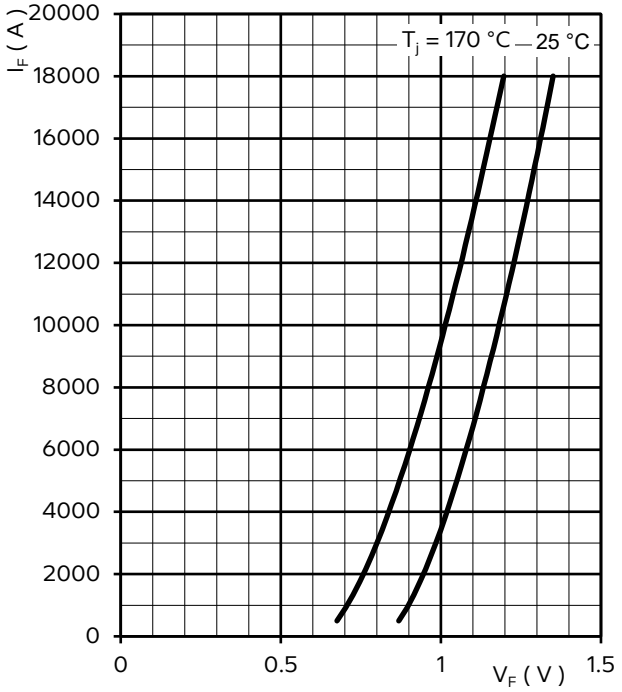

Fig. 3 Maximum forward voltage drop characteristics

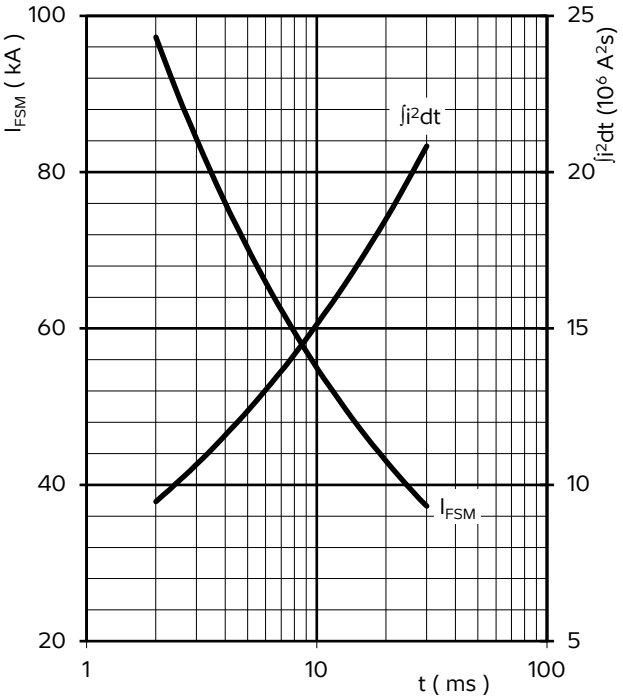

Fig. 4 Surge forward current vs. pulse length, half sine wave, single pulse, V_R = 0 V, T_j = T_{jmax}

Power loss and maximum case temperature characteristics

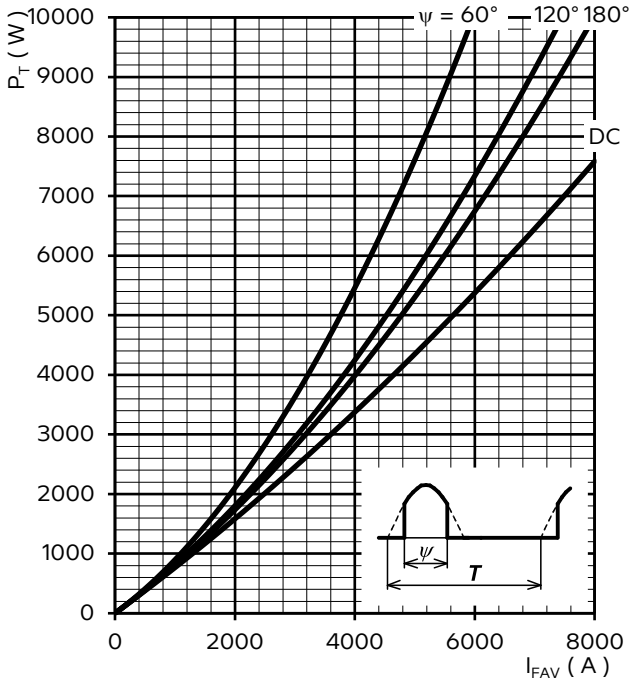

Fig. 5 Forward power loss vs. average forward current, sine waveform, f = 50 Hz, T = 1/f

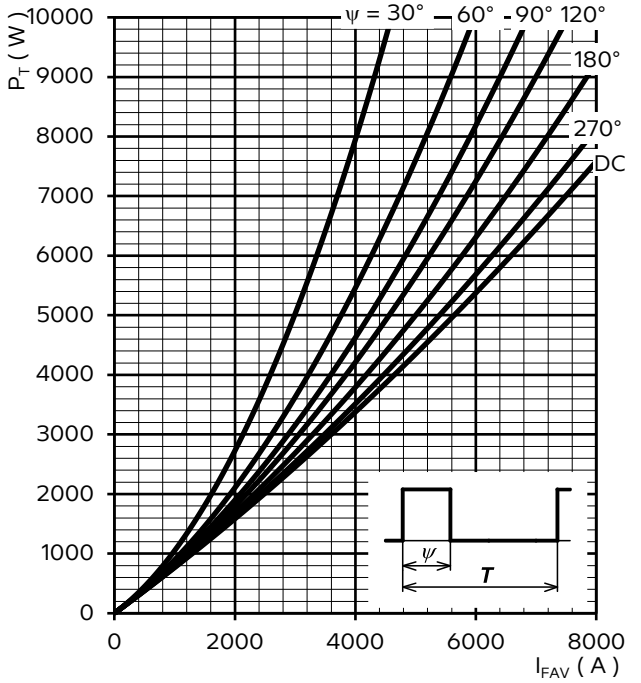

Fig. 6 Forward power loss vs. average forward current, square waveform, f = 50 Hz, T = 1/f

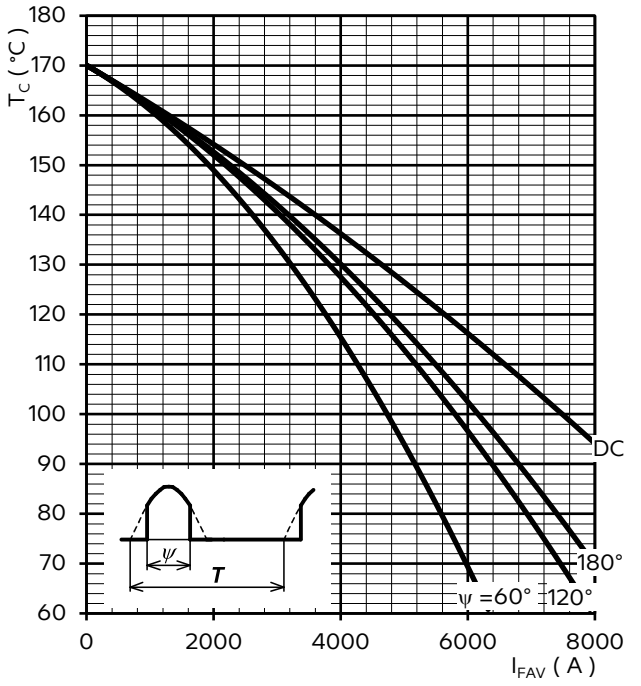

Fig. 7 Max. case temperature vs. average forward current, sine waveform, f = 50 Hz, T = 1/f

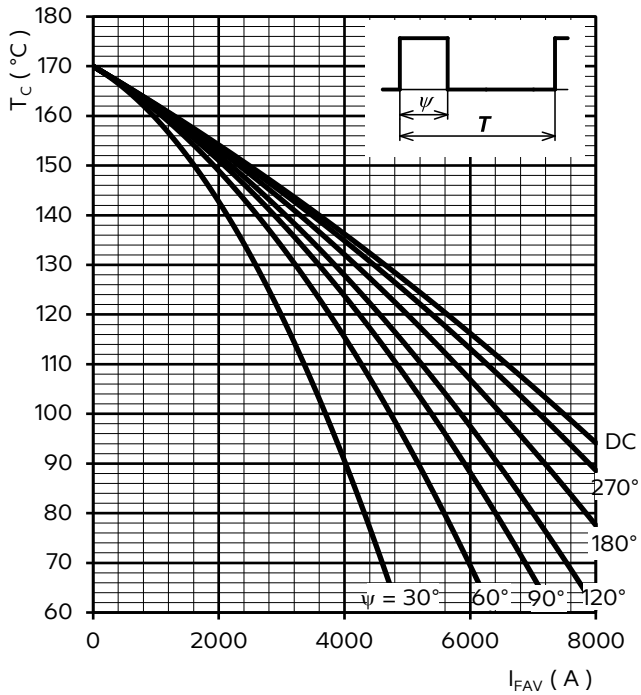

Fig. 8 Max. case temperature vs. average forward current, square waveform, f = 50 Hz, T = 1/f

Note: Figures number 5 ÷ 8 have been calculated without considering any forward and reverse recovery losses.
They are valid for f = 50 or 60 Hz operation.

Welding parameters definition

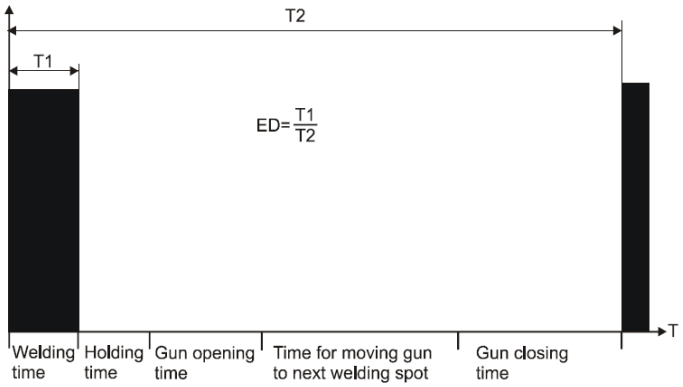

Fig. 9 Definition of ED for typical welding sequence

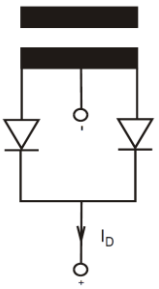

Fig. 10 Definition of I_D for single-phase centre tap

DC output welding current load capacity

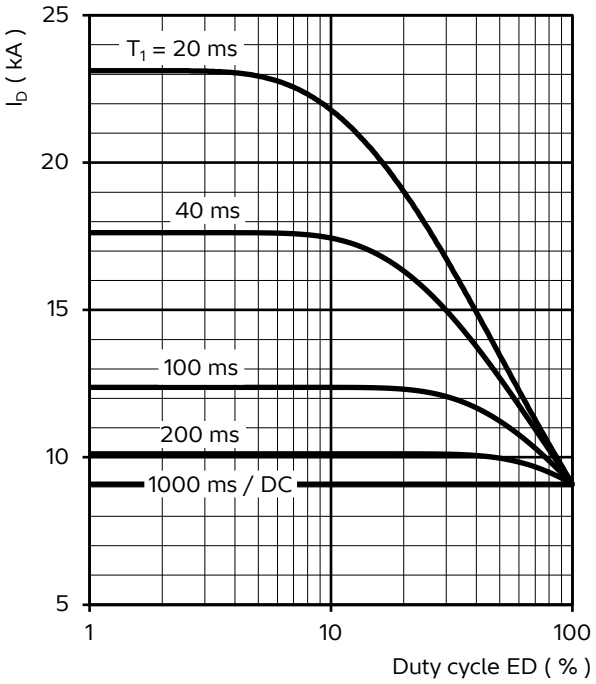

Fig. 11 Current load capacity, cont., DC output welding current with single-phase centre tap vs. duty cycle,
f = 1000 Hz, square wave, ΔTj = 80 °C

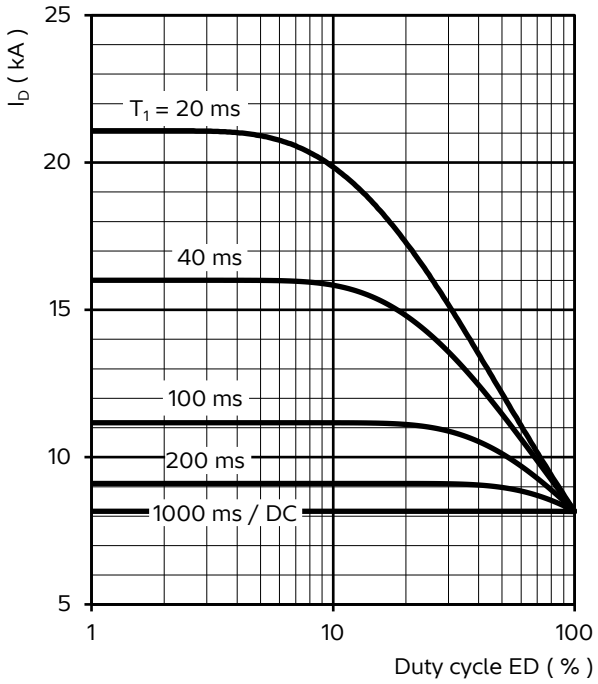

Fig. 12 Current load capacity, cont., DC output welding current with single-phase centre tap vs. duty cycle,
f = 1000 Hz, square wave, ΔTj = 70 °C

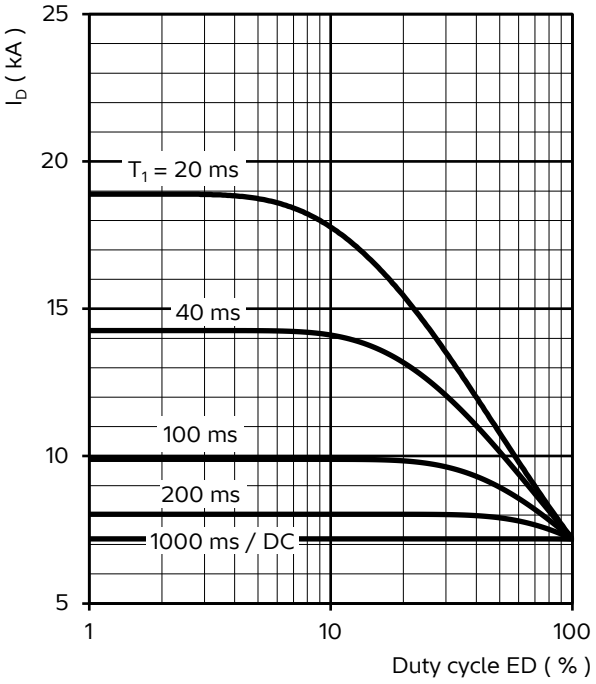

Fig. 13 Current load capacity, cont., DC output welding current with single-phase centre tap vs. duty cycle,
f = 1000 Hz, square wave, ΔTj = 60 °C

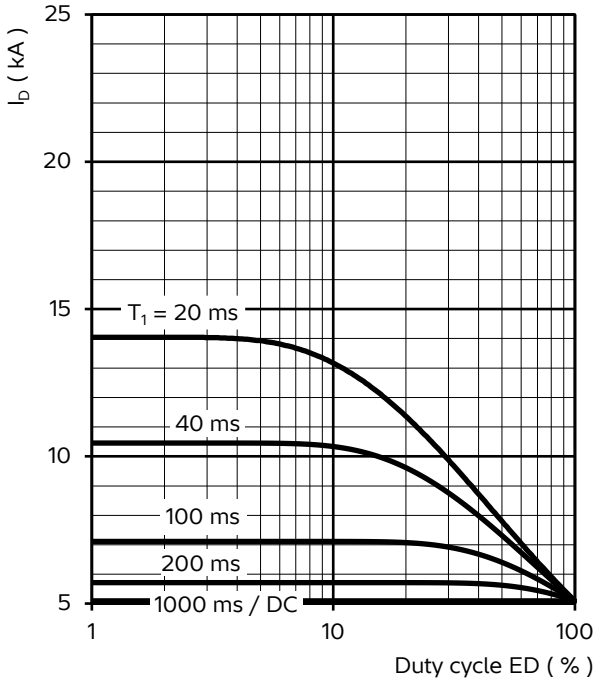

Fig. 14 Current load capacity, cont., DC output welding current with single-phase centre tap vs. duty cycle,
f = 1000 Hz, square wave, ΔTj = 40 °C

Related documents

5SYA 2013	High current rectifier diodes for welding applications
5SYA 2029	High power rectifier diodes
5SYA 2036	Mechanical clamping of press-pack high power semiconductors
5SYA 2048	Field measurements on high power press-pack semiconductors
5SZK 9118	General environmental conditions for high power semiconductors

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