

V_{RSM}	=	5200 V
I_{FAVM}	=	1978 A
I_{FRMS}	=	3106 A
I_{FSM}	=	25.6×10^3 A
V_{F0}	=	0.94 V
r_F	=	0.284 m Ω

Rectifier Diode

5SDD 20F5000

Doc. No. 5SYA1162-01 Jan. 03

- Very low on-state losses
- Optimum power handling capability

Blocking

Maximum rated values ¹⁾

Parameter	Symbol	Conditions	Value	Unit
Repetitive peak reverse voltage	V_{RRM}	$f = 50$ Hz, $t_p = 10$ ms, $T_j = -40 \dots 160^\circ\text{C}$	5000	V
Non - repetitive peak reverse voltage	V_{RSM}	$f = 5$ Hz, $t_p = 10$ ms, $T_j = -40 \dots 160^\circ\text{C}$	5200	V

Characteristic values

Parameter	Symbol	Conditions	min	typ	max	Unit
Max. (reverse) leakage current	I_{RRM}	V_{RRM} , $T_j = 160^\circ\text{C}$			50	mA

Mechanical data

Maximum rated values ¹⁾

Parameter	Symbol	Conditions	min	typ	max	Unit
Mounting force	F_M		20	22	24	kN
Acceleration	a	Device unclamped			50	m/s ²
Acceleration	a	Device clamped			100	m/s ²

Characteristic values

Parameter	Symbol	Conditions	min	typ	max	Unit
Weight	m			0.5		kg
Housing thickness	H			26		mm
Pole-piece diameter	D_P			47		mm
Surface creepage distance	D_S		33			mm
Air strike distance	D_a		18			mm

1) Maximum rated values indicate limits beyond which damage to the device may occur

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On-state

Maximum rated values ¹⁾

Parameter	Symbol	Conditions	min	typ	max	Unit
Max. average on-state current	I _{FAVM}	50 Hz, Half sine wave, T _C = 85 °C			1978	A
Max. RMS on-state current	I _{FRMS}				3106	A
Max. peak non-repetitive surge current	I _{FSM}	t _p = 10 ms, T _j = 160°C, V _R = 0 V			25.6×10 ³	A
Limiting load integral	I ² t				2.727×10 ⁶	A ² s
Max. peak non-repetitive surge current	I _{FSM}	t _p = 8.3 ms, T _j = 160°C, V _R = 0 V			24×10 ³	A
Limiting load integral	I ² t				2.88×10 ⁶	A ² s

Characteristic values

Parameter	Symbol	Conditions	min	typ	max	Unit
On-state voltage	V _F	I _F = 4000 A, T _j = 160°C			2.1	V
Threshold voltage	V _(T0)	T _j = 160°C			0.94	V
Slope resistance	r _T	I _T = 2827...8480 A			0.284	mΩ

Switching

Characteristic values

Parameter	Symbol	Conditions	min	typ	max	Unit
Recovery charge	Q _{rr}	di _F /dt = -30 A/μs, V _R = 100 V I _{FRM} = 1000 A, T _j = 160°C		4500	5500	μAs

Thermal

Maximum rated values ¹⁾

Parameter	Symbol	Conditions	min	typ	max	Unit
Operating junction temperature range	T _{vj}		-40		160	°C
Storage temperature range	T _{stg}		-40		160	°C

Characteristic values

Parameter	Symbol	Conditions	min	typ	max	Unit
Thermal resistance junction to case	R _{th(j-c)}	Double-side cooled			15	K/kW
	R _{th(j-c)A}	Anode-side cooled			24	K/kW
	R _{th(j-c)C}	Cathode-side cooled			40	K/kW
Thermal resistance case to heatsink	R _{th(c-h)}	Double-side cooled			4	K/kW
	R _{th(c-h)}	Single-side cooled			8	K/kW

Analytical function for transient thermal impedance:

$$Z_{thJC}(t) = \sum_{i=1}^n R_i(1 - e^{-t/\tau_i})$$

i	1	2	3	4
R _i (K/kW)	6.060	3.850	3.780	1.320
τ _i (s)	0.6937	0.2040	0.0452	0.0040

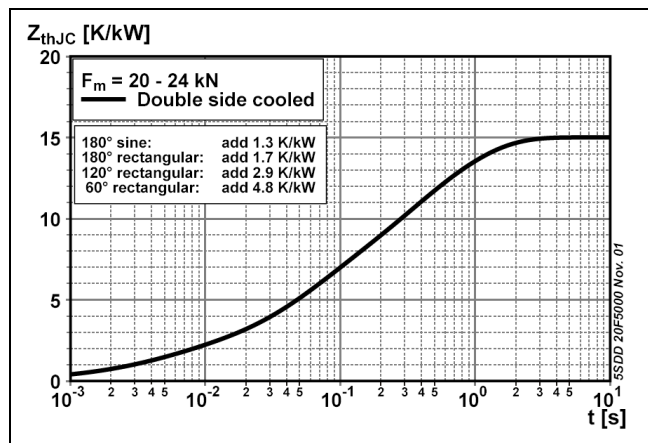


Fig. 1 Transient thermal impedance junction-to-case.

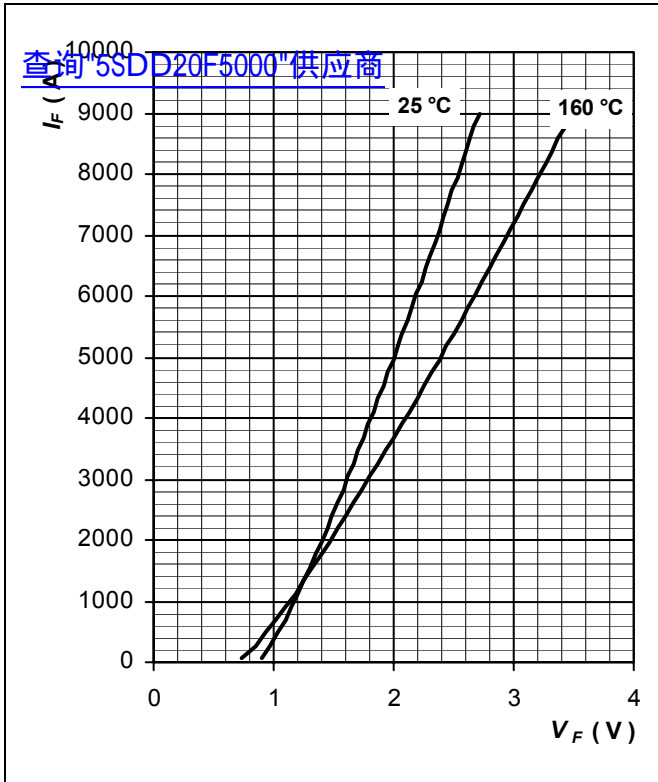


Fig. 2 Max. on-state characteristics.

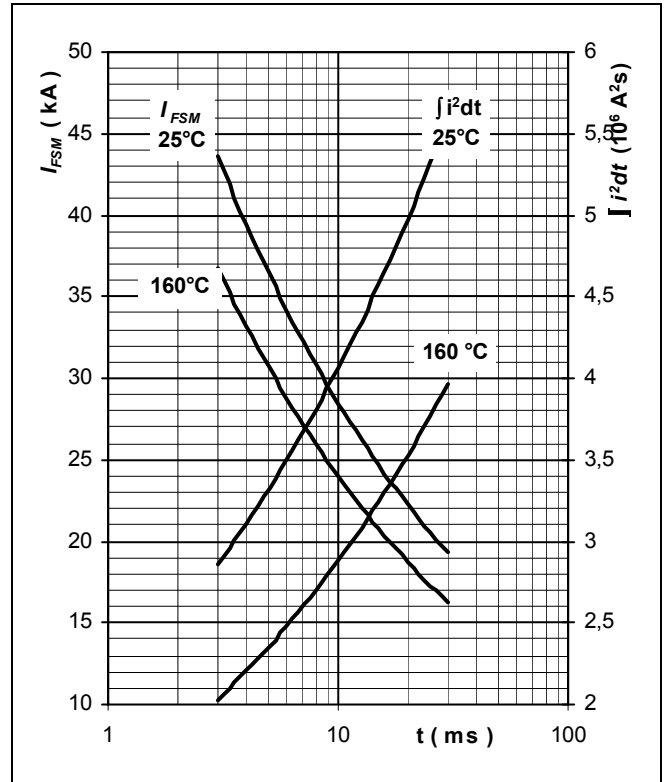


Fig. 3 Surge forward current vs. pulse length. Half sine wave, single pulse, $V_R = 0$ V

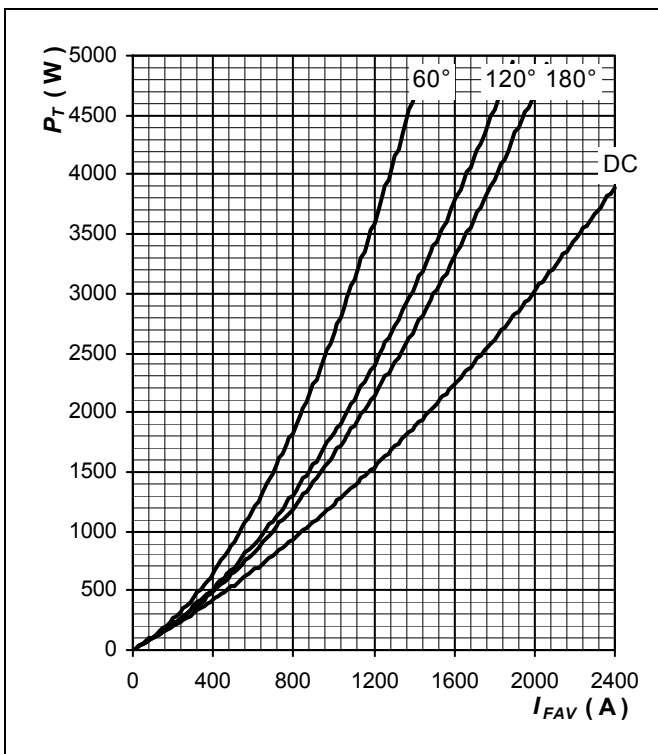


Fig. 4 Forward power loss vs. average forward current, sine waveform, $f = 50$ Hz

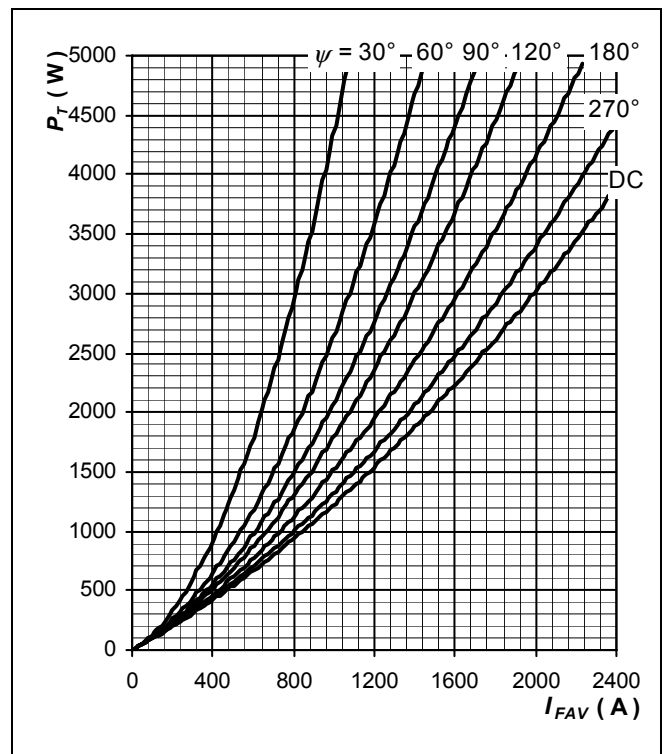


Fig. 5 Forward power loss vs. average forward current, square waveform, $f = 50$ Hz

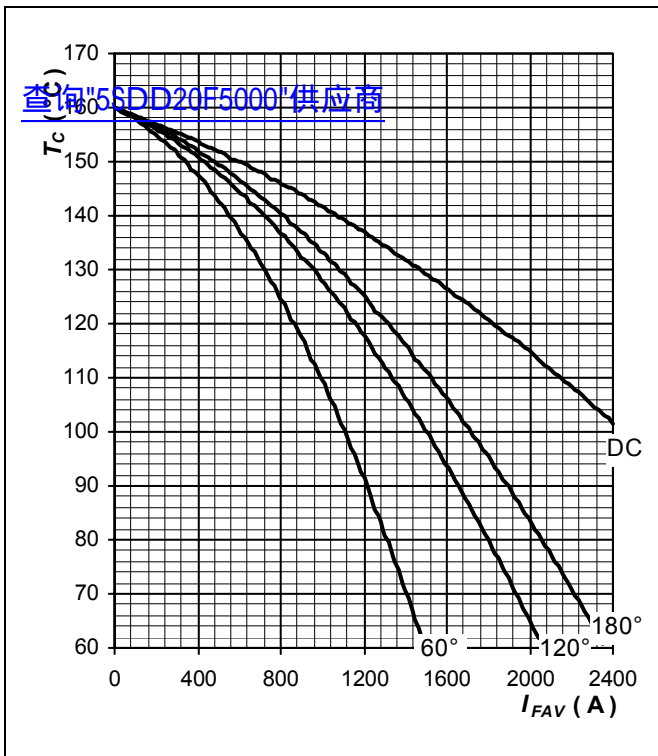


Fig. 6 Max. case temperature vs aver. forward current, sine waveform, $f = 50$ Hz

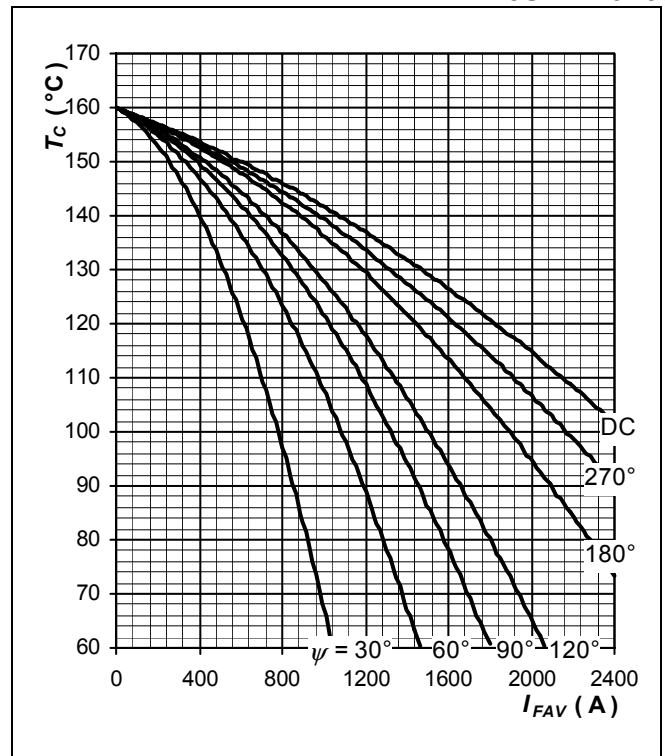


Fig. 7 Max. case temperature vs aver. forward current, square waveform, $f = 50$ Hz

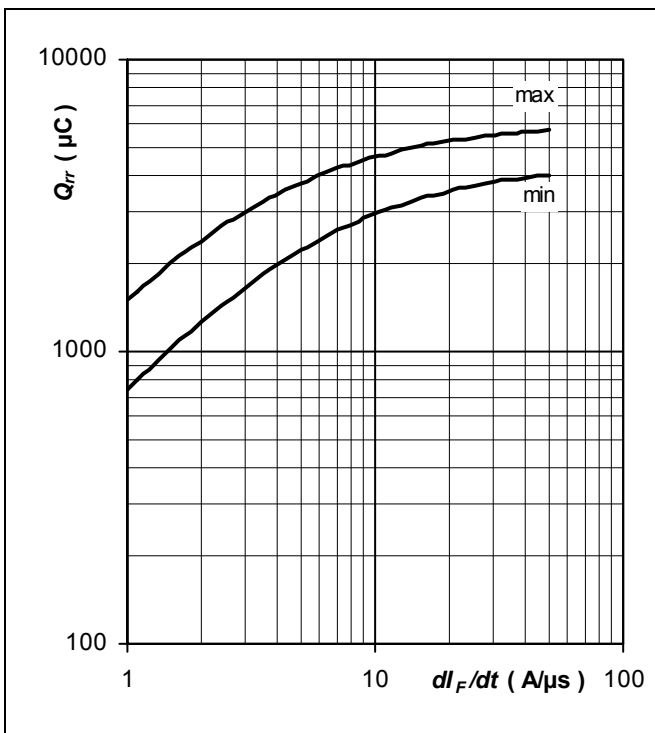


Fig. 8 Reverse recovery charge vs. di_F/dt , $I_F = 1000$ A; $T_j = T_{jmax}$, limit values

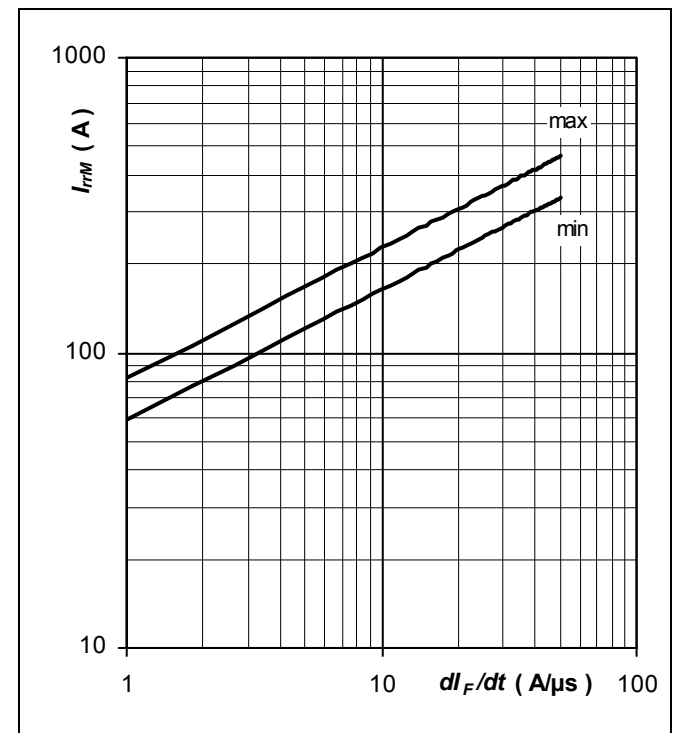


Fig. 9 Peak reverse recovery current vs. di_F/dt , $I_F = 1000$ A; $T_j = T_{jmax}$, limit values

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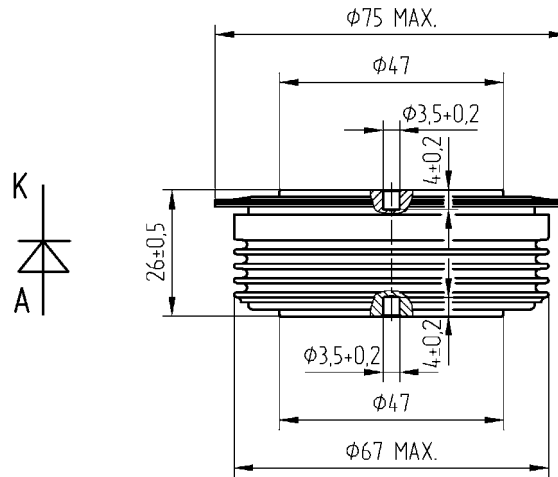


Fig. 10 Outline drawing. All dimensions are in millimeters and represent nominal values unless stated otherwise.

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