

V_{RSM}	=	3000 V
I_{FAVM}	=	2596 A
I_{FRMS}	=	4078 A
I_{FSM}	=	30×10^3 A
V_{F0}	=	0.906 V
r_F	=	0.135 mΩ

Rectifier Diode

5SDD 24F2800

Doc. No. 5SYA1167-00 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, $T_j = -40 \dots 160^\circ\text{C}$	2800	V
Non - repetitive peak reverse voltage	V_{RSM}	$f = 5$ Hz, $t_p = 10$ ms, $T_j = -40 \dots 160^\circ\text{C}$	3000	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, $T_C = 85^\circ\text{C}$			2596	A
Max. RMS on-state current	I_{FRMS}				4078	A
Max. peak non-repetitive surge current	I_{FSM}	$t_p = 10\text{ ms}$, $T_j = 160^\circ\text{C}$, $V_R = 0\text{ V}$			30×10^3	A
Limiting load integral	I^2t				4.5×10^6	A^2s
Max. peak non-repetitive surge current	I_{FSM}	$t_p = 8.3\text{ ms}$, $T_j = 160^\circ\text{C}$, $V_R = 0\text{ V}$			32×10^3	A
Limiting load integral	I^2t				4.262×10^6	A^2s

Characteristic values

Parameter	Symbol	Conditions	min	typ	max	Unit
On-state voltage	V_F	$I_F = 3000\text{ A}$, $T_j = 160^\circ\text{C}$			1.3	V
Threshold voltage	$V_{(TO)}$	$T_j = 160^\circ\text{C}$ $I_T = 3140 \dots 9420\text{ A}$			0.906	V
Slope resistance	r_T				0.135	$\text{m}\Omega$

Switching

Characteristic values

Parameter	Symbol	Conditions	min	typ	max	Unit
Recovery charge	Q_{rr}	$di_F/dt = -30\text{ A}/\mu\text{s}$, $V_R = 100\text{ V}$ $I_{FRM} = 1000\text{ A}$, $T_j = 160^\circ\text{C}$		3000	3500	μAs

Thermal

Maximum rated values ¹⁾

Parameter	Symbol	Conditions	min	typ	max	Unit
Operating junction temperature range	T_{vj}		-40		160	$^\circ\text{C}$
Storage temperature range	T_{stg}		-40		160	$^\circ\text{C}$

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
$R_i(\text{K/kW})$	6.060	3.850	3.780	1.320
$\tau_i(\text{s})$	0.6937	0.2040	0.0452	0.0040

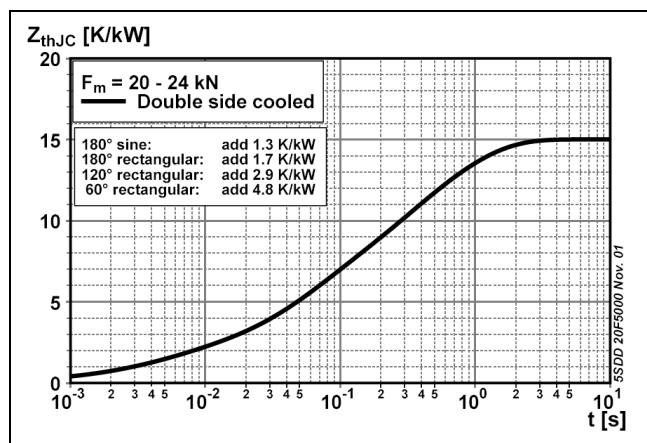


Fig. 1 Transient thermal impedance junction-to-case.

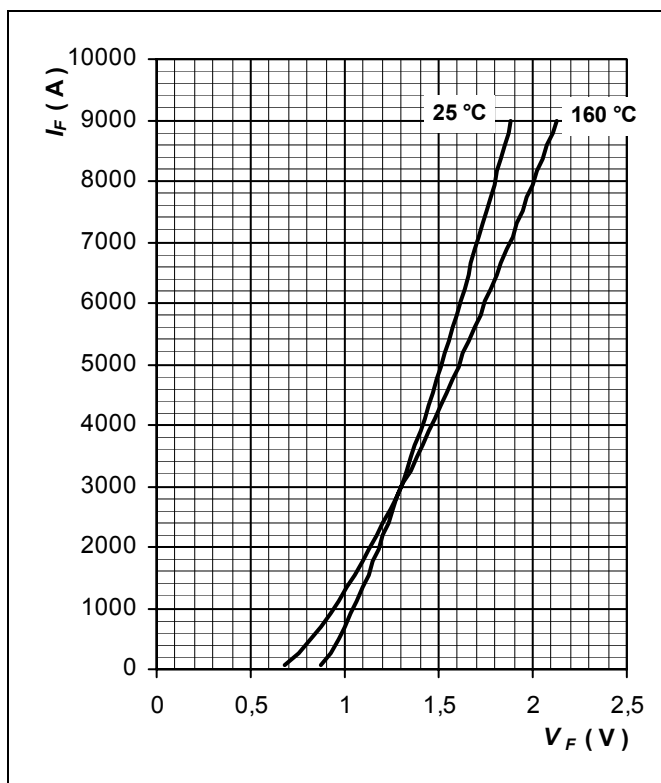


Fig. 2 Max. on-state characteristics.

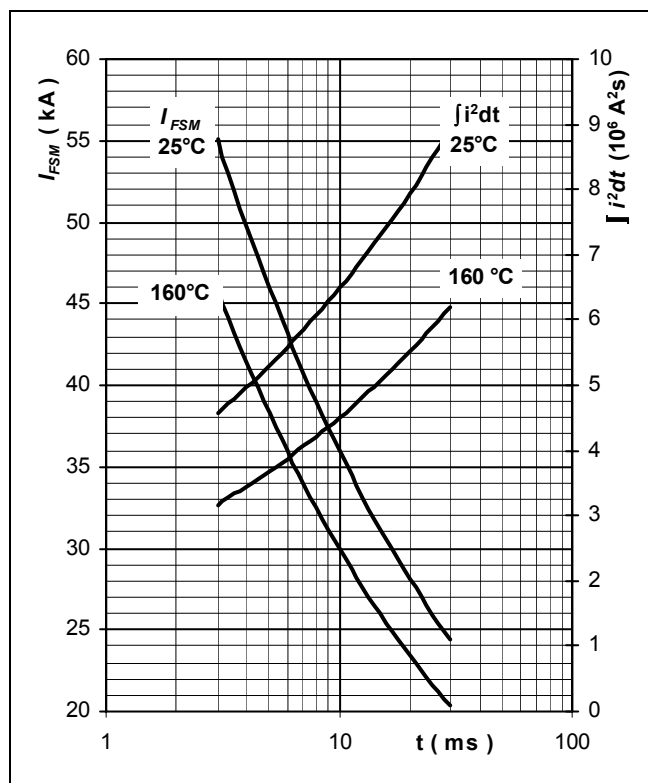


Fig. 3 Surge forward current vs. pulse length. Half sine wave, single pulse, $V_R = 0$ V

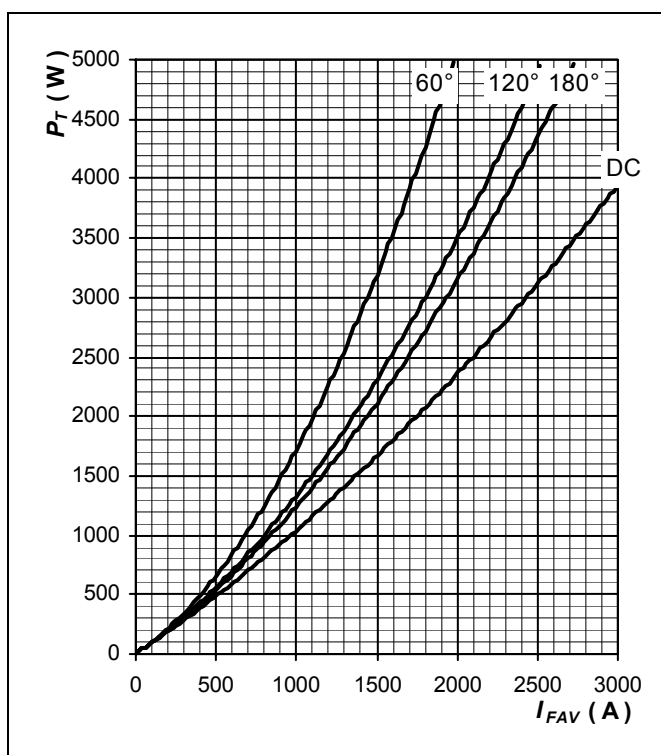


Fig. 4 Forward power loss vs. average forward current, sine waveform, $f = 50$ Hz

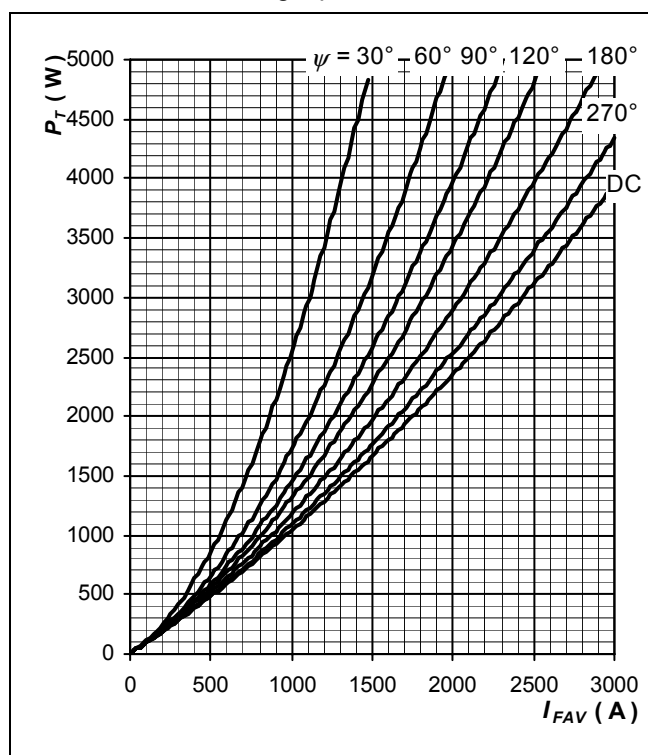


Fig. 5 Forward power loss vs. average forward current, square waveform, $f = 50$ Hz

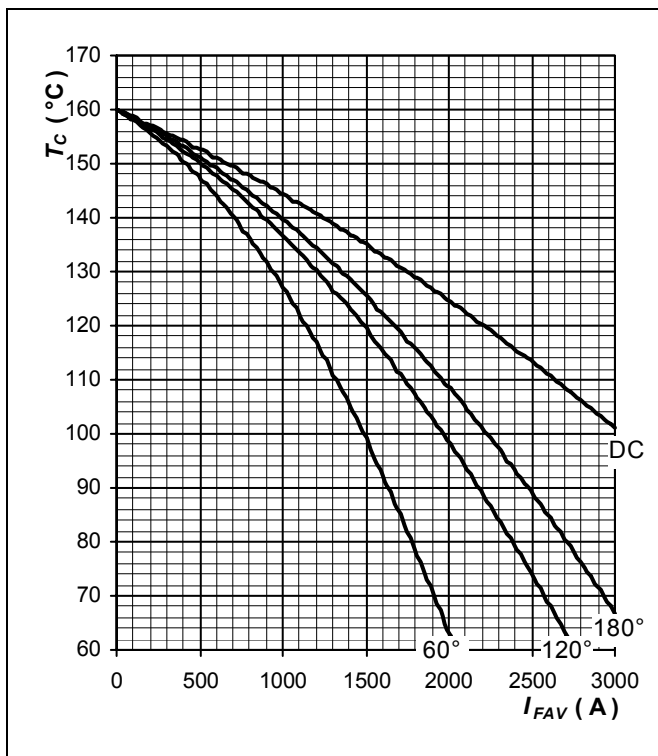


Fig. 6 Max. case temperature vs. aver. forward current, sine waveform, $f = 50 \text{ Hz}$

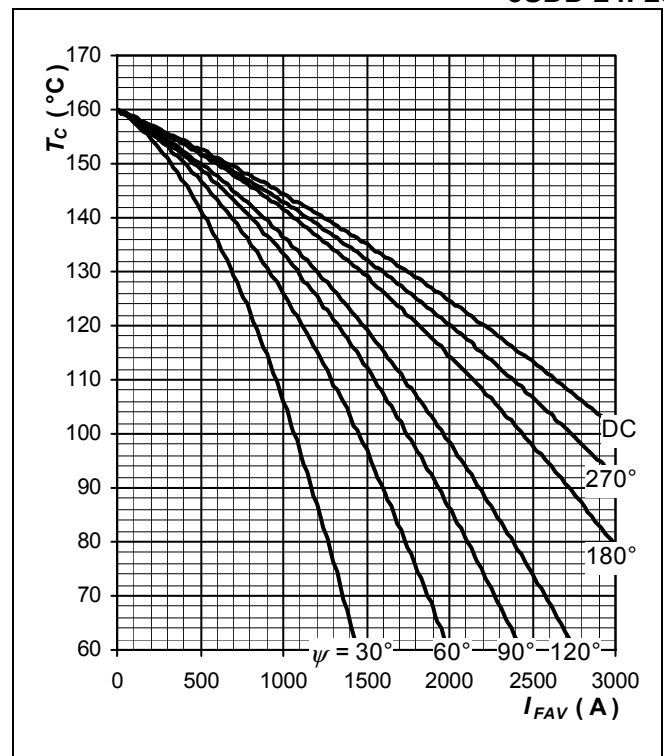


Fig. 7 Max. case temperature vs. aver. forward current, square waveform, $f = 50 \text{ Hz}$

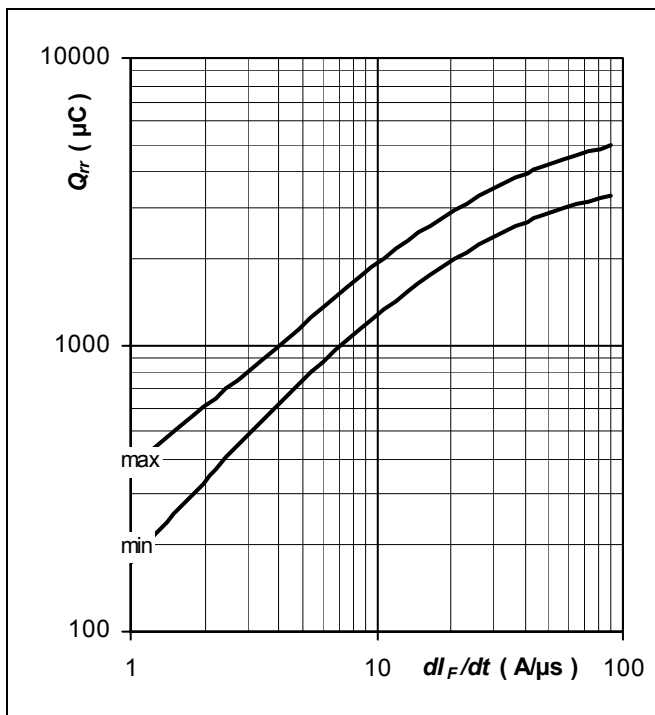


Fig. 8 Reverse recovery charge vs. di_F/dt , $I_F = 1000 \text{ A}$; $T_J = T_{Jmax}$, limit values

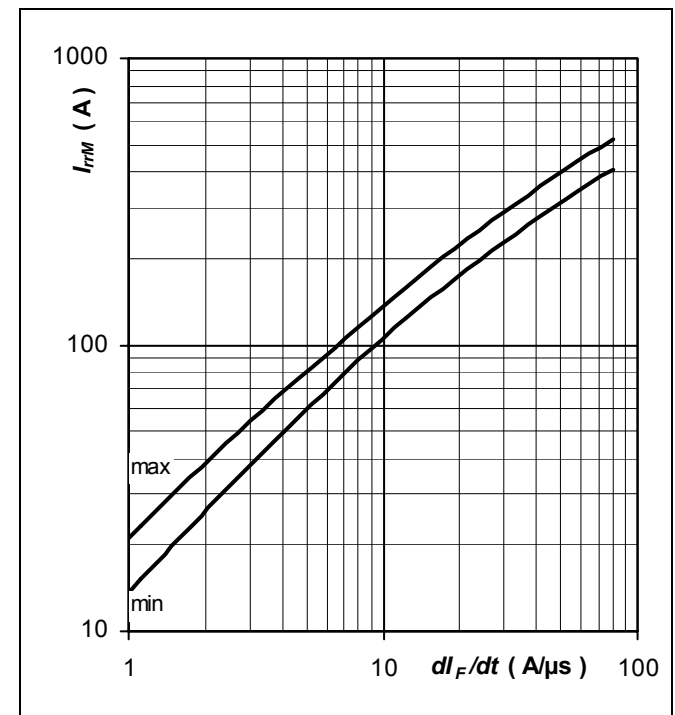


Fig. 9 Peak reverse recovery current vs. di_F/dt , $I_F = 1000 \text{ A}$; $T_J = T_{Jmax}$, limit values

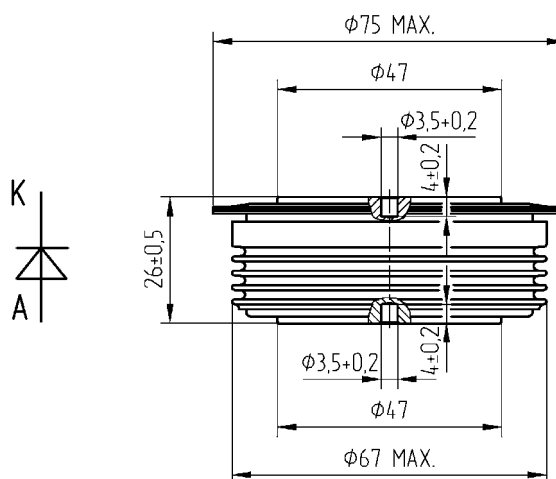


Fig. 10 Outline drawing. All dimensions are in millimeters and represent nominal values unless stated otherwise.

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