

$V_{RRM} = 5000 \text{ V}$
 $I_{FAVM} = 1850 \text{ A}$
 $I_{FRMS} = 2900 \text{ A}$
 $I_{FSM} = 23500 \text{ A}$
 $V_{F0} = 0.99 \text{ V}$
 $r_F = 0.282 \text{ m}\Omega$

Rectifier Diode

5SDD 20F5000

Doc. No. 5SYA1162-01 Jan. 01

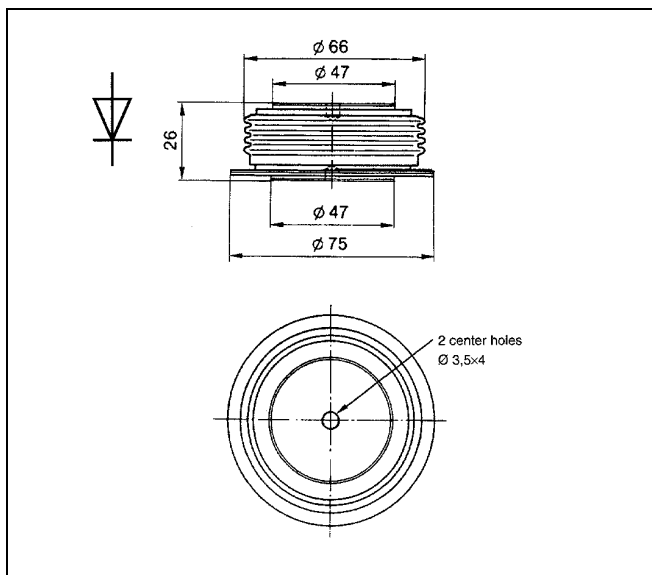
- Very low on-state losses
- Optimum power handling capability

Blocking

Part Number	5SDD 20F5000	5SDD 20F4800	5SDD 20F4400	Conditions
V_{RRM}	5000 V	4800 V	4400 V	$f = 50 \text{ Hz}$, $t_p = 10\text{ms}$
V_{RSM}	5200 V	5000 V	4600 V	$f = 5 \text{ Hz}$, $t_p = 10\text{ms}$
I_{RRM}	$\leq 75 \text{ mA}$			V_{RRM} $T_j = 160^\circ\text{C}$

Mechanical data

F_M	Mounting force	nom.	22 kN
		min.	20 kN
		max.	24 kN
a	Acceleration		
	Device unclamped		50 m/s^2
	Device clamped		100 m/s^2
m	Weight		0.5 kg
D_S	Surface creepage distance		30 mm
D_a	Air strike distance		20 mm



On-state

I _{FAVM}	Max. average on-state current	1850 A	Half sine wave, T _C = 90°C	
I _{FRMS}	Max. RMS on-state current	2900 A		
I _{FSM}	Max. peak non-repetitive surge current	23500 A	tp = 10 ms	T _j = 160°C
		24300 A	tp = 8.3 ms	After surge:
I ² t	Limiting load integral	2760 kA ² s	tp = 10 ms	V _D = V _R = 0V
		2460 kA ² s	tp = 8.3 ms	
V _F	On-state voltage	2.13 V	I _F = 4000 A	T _j = 160°C
V _{F0}	Threshold voltage	0.99 V	I _F = 2500 - 7500 A	
r _F	Slope resistance	0.282 mΩ		

Switching

Q_{rr}	Recovery charge	min	3800 μAs	$di_F/dt = -30\text{A}/\mu\text{s}$	$V_R = 200\text{ V}$
		max	5200 μAs	$I_{FRM} = 1000\text{A}$	$T_j = 160^\circ\text{C}$

Thermal

$T_{j\text{ max}}$	Max. junction temperature	160 $^\circ\text{C}$	
$T_{j\text{ stg}}$	Storage temperature range	-40...175 $^\circ\text{C}$	
R_{thJC}	Thermal resistance junction to case	30 K/kW	Anode side cooled
		30 K/kW	Cathode side cooled
		15 K/kW	Double side cooled
R_{thCH}	Thermal resistance case to heat sink	8 K/kW	Single side cooled
		4 K/kW	Double side cooled

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
$R_i(\text{K/kW})$	8.96	4.66	1.02	0.34
$\tau_i(\text{s})$	0.4078	0.0643	0.0051	0.0012

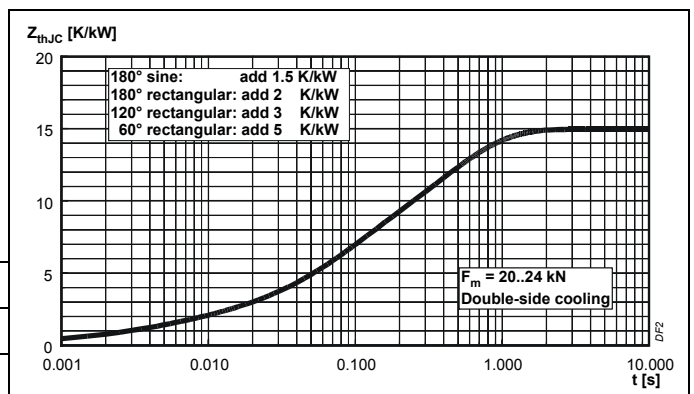


Fig. 1 Transient thermal impedance junction to case

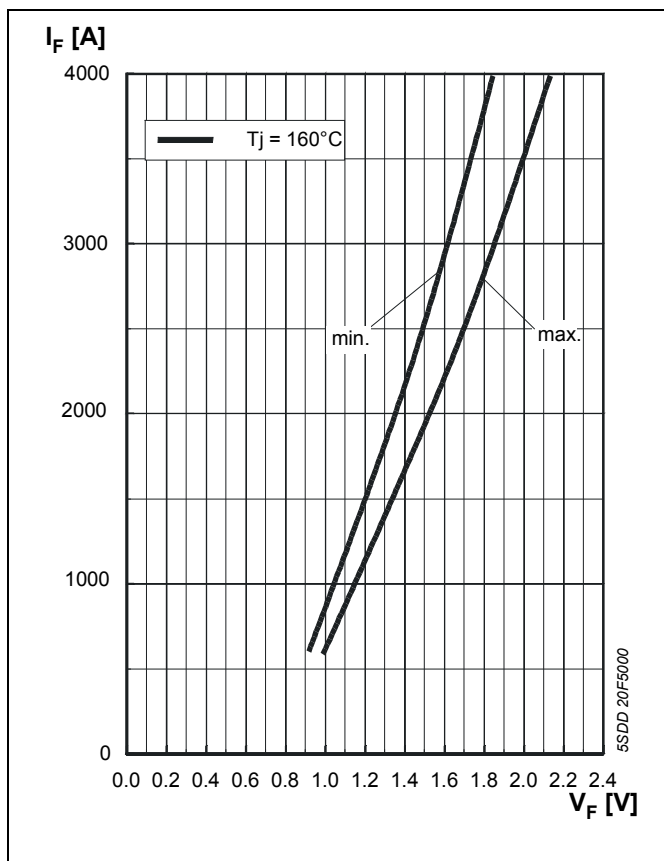


Fig 2. On-state characteristics.

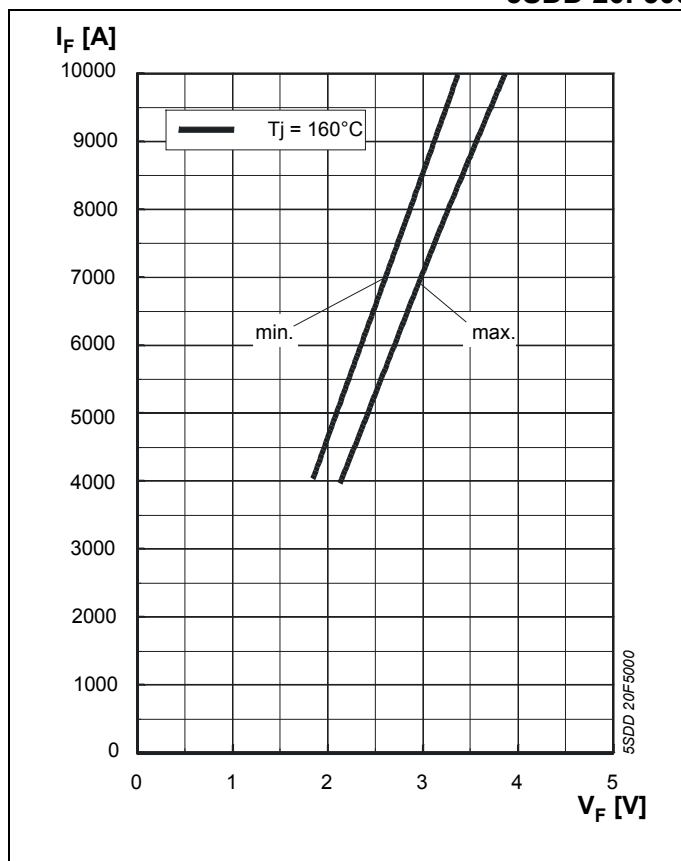


Fig 3. On-state characteristics.

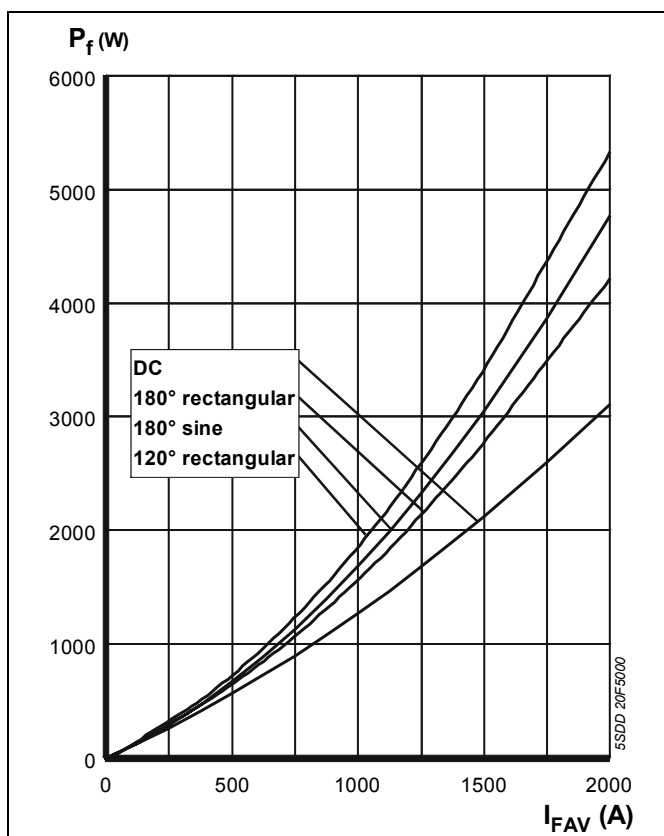


Fig. 4 On-state power dissipation vs. mean on-state current. Switching losses excluded.

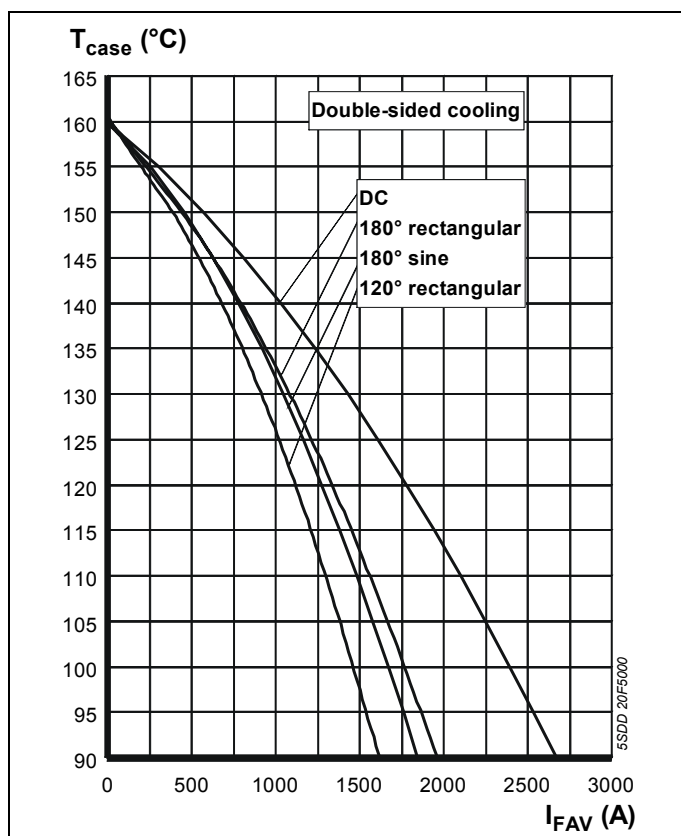


Fig. 5 Max. permissible case temperature vs. mean on-state current. Switching losses excluded.

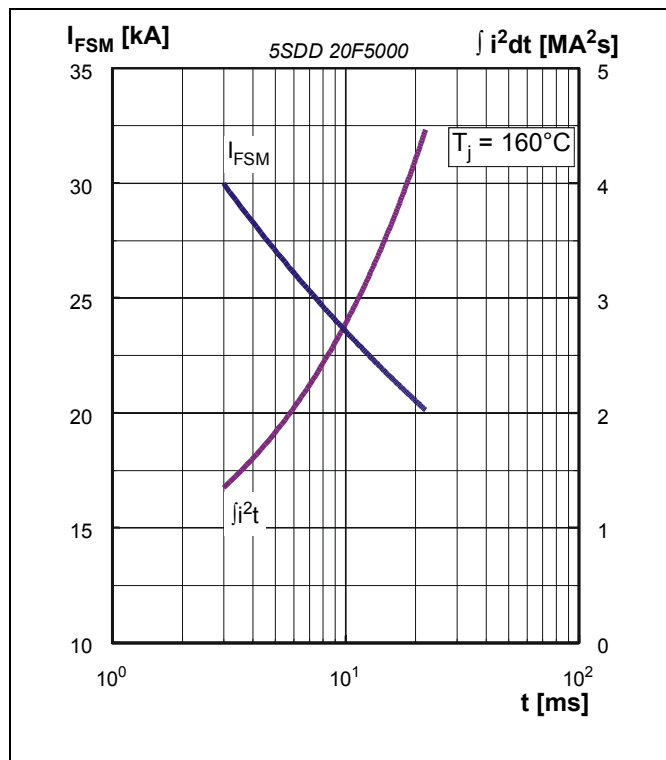


Fig. 6 Surge on-state current vs. pulse length. Half-sine wave.

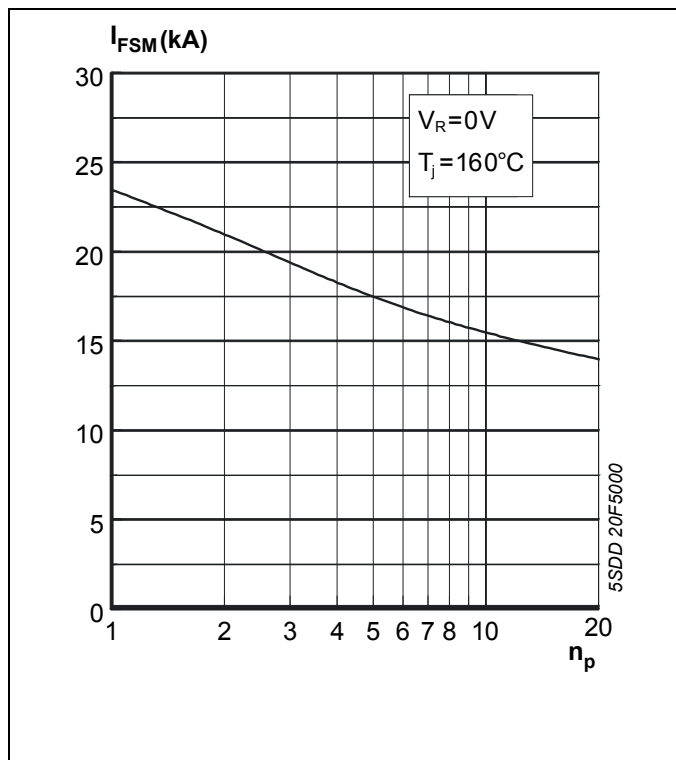


Fig. 7 Surge on-state current vs. number of pulses. Half-sine wave, 10 ms, 50Hz.

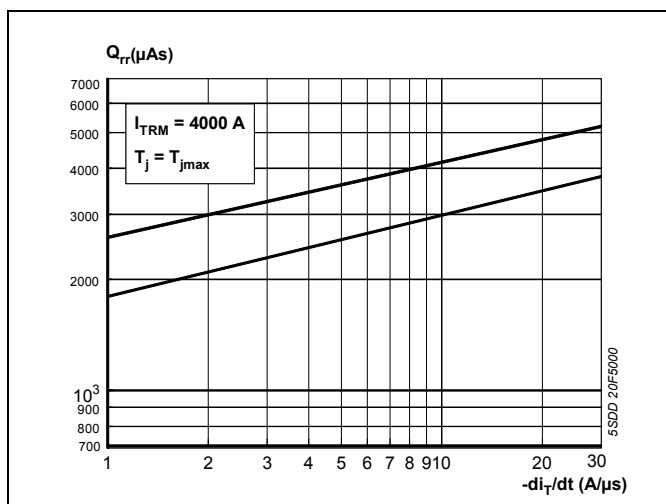


Fig. 8 Recovery charge vs. decay rate of on-state current.

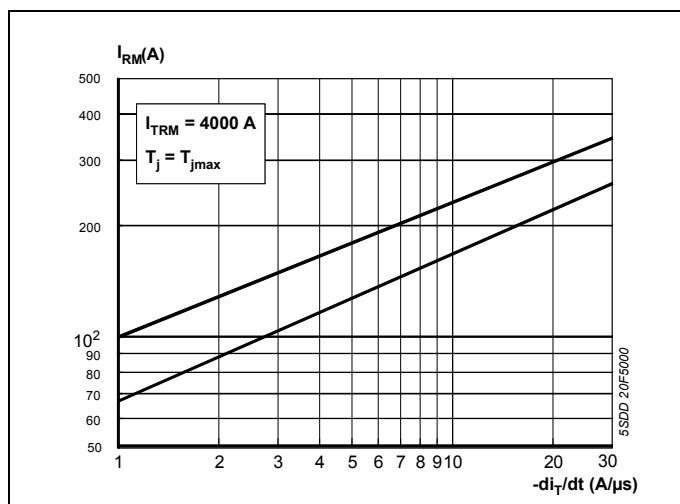


Fig. 9 Peak reverse recovery current vs. decay rate of on-state current.

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