V_{RRM}	=	5000 V
I_{FAVM}	=	1850 A
I_{FRMS}	=	2900 A
I_{FSM}	=	23500 A
V_{F0}	=	0.99 V
r_F	=	0.282 mΩ

Rectifier Diode

5SDD 20F5000

Doc. No. 5SYA1162-01 Jan. 01

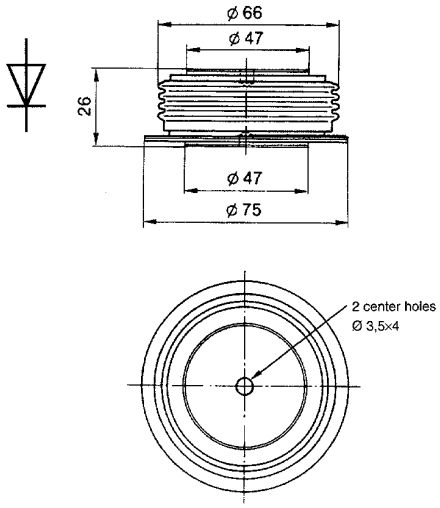
- **Very low on-state losses**
- **Optimum power handling capability**

Blocking

Part Number	5SDD 20F5000	5SDD 20F4800	5SDD 20F4400	Conditions
V_{RRM}	5000 V	4800 V	4400 V	f = 50 Hz, t_p = 10ms
V_{RSM}	5200 V	5000 V	4600 V	f = 5 Hz, t_p = 10ms
I_{RRM}	≤ 75 mA			V_{RRM} T_j = 160°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^2t	Limiting load integral	2760 kA^2s	tp = 10 ms	$V_D = V_R$ = 0V
		2460 kA^2s	tp = 8.3 ms	
V_F	On-state voltage	2.13 V	I_F = 4000 A	
V_{F0}	Threshold voltage	0.99 V	I_F = 2500 - 7500 A	T_j = 160°C
r_F	Slope resistance	0.282 mΩ		

Switching

Q_{rr}	Recovery charge	min	3800 µAs	di_F/dt = -30A/µs	V_R = 200 V
		max	5200 µAs	I_{FRM} = 1000A	T_j = 160°C

Thermal

$T_{j\,max}$	Max. junction temperature	160°C	
$T_{j\,stg}$	Storage temperature range	-40...175°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(K/kW)	8.96	4.66	1.02	0.34
τ_i(s)	0.4078	0.0643	0.0051	0.0012

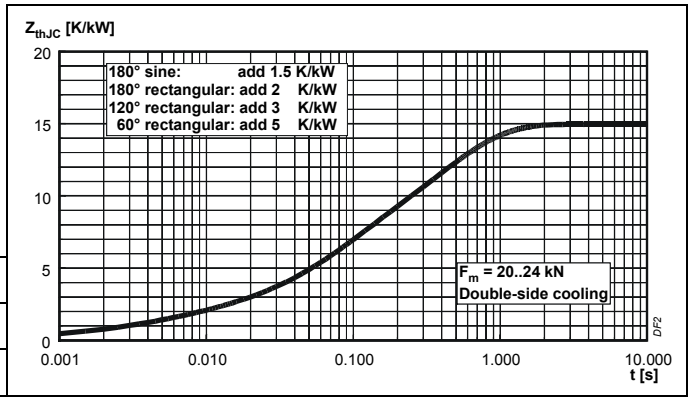


Fig. 1 Transient thermal impedance junction to case

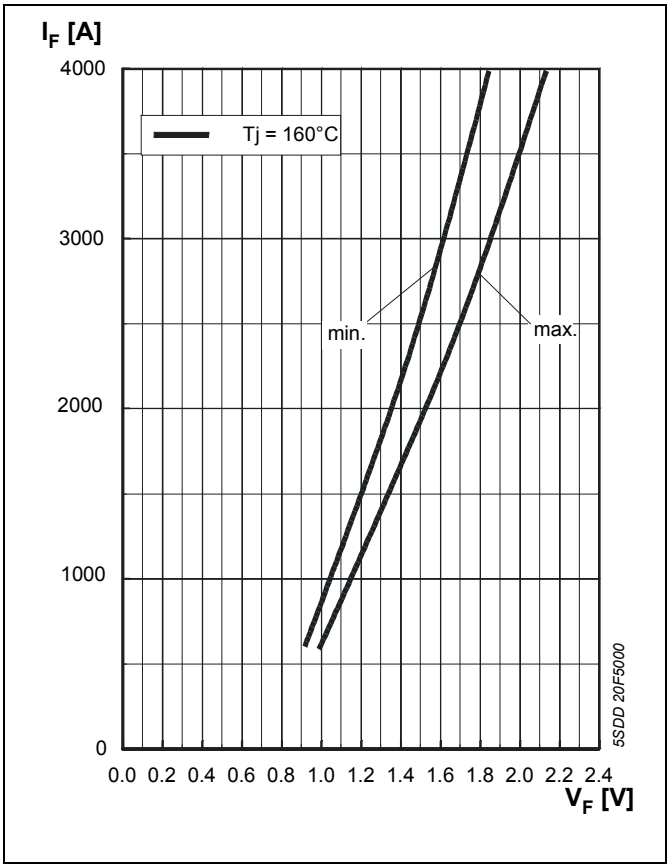


Fig 2. On-state characteristics.

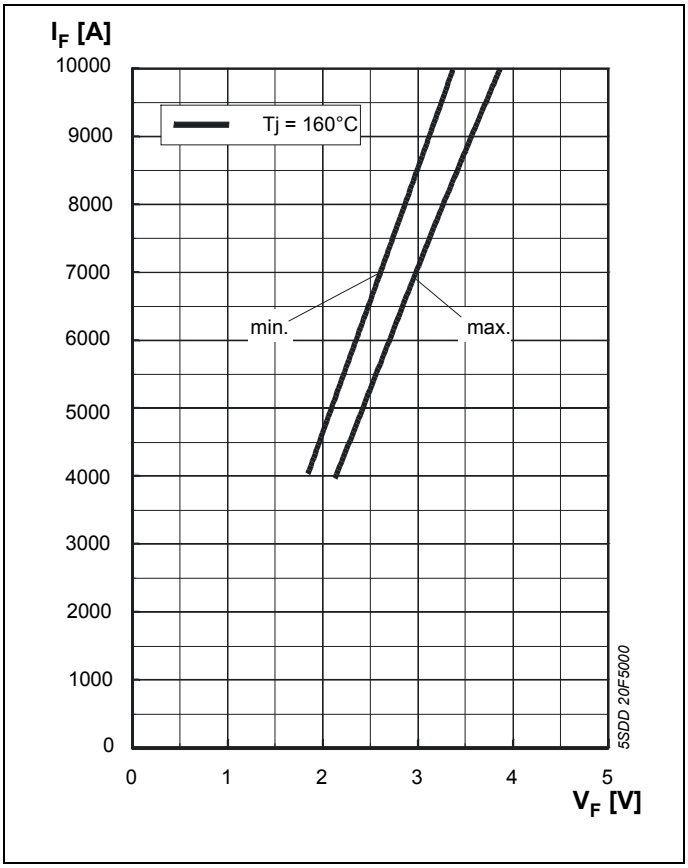


Fig. 3 On-state characteristics.

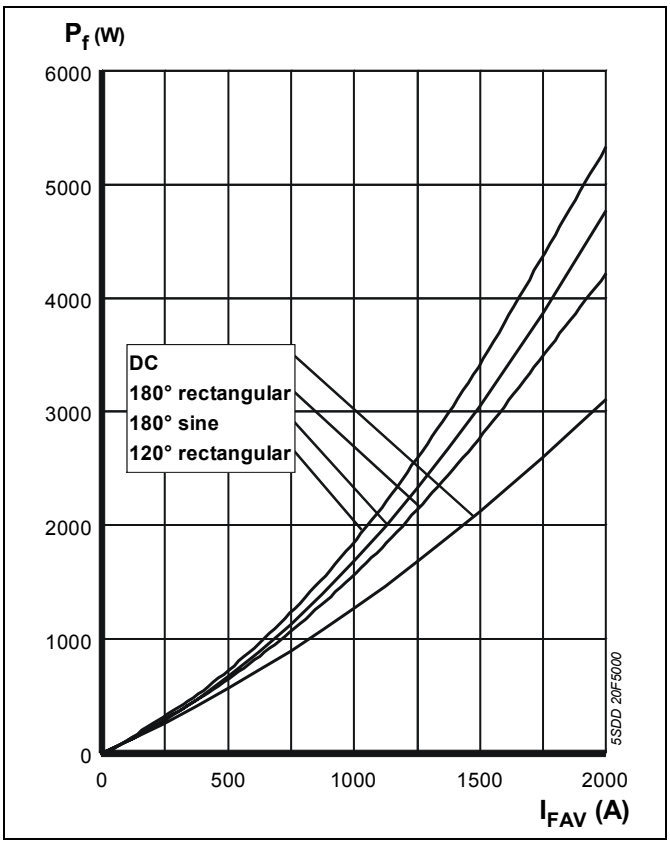


Fig. 4 On-state power dissipation vs. mean on-state current. Switching losses excluded.

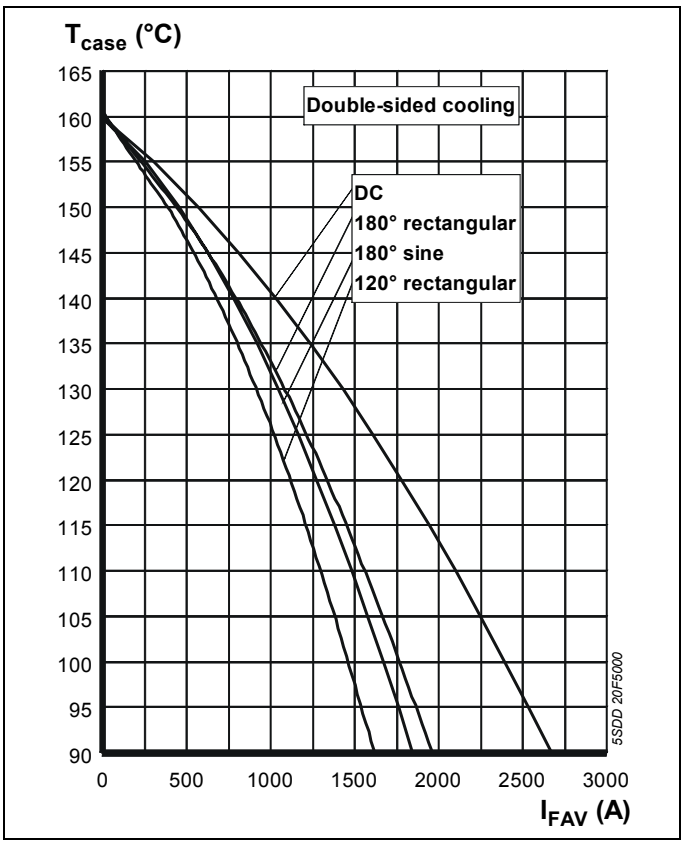


Fig. 5 Max. permissible case temperature vs. mean on-state current. Switching losses excluded.

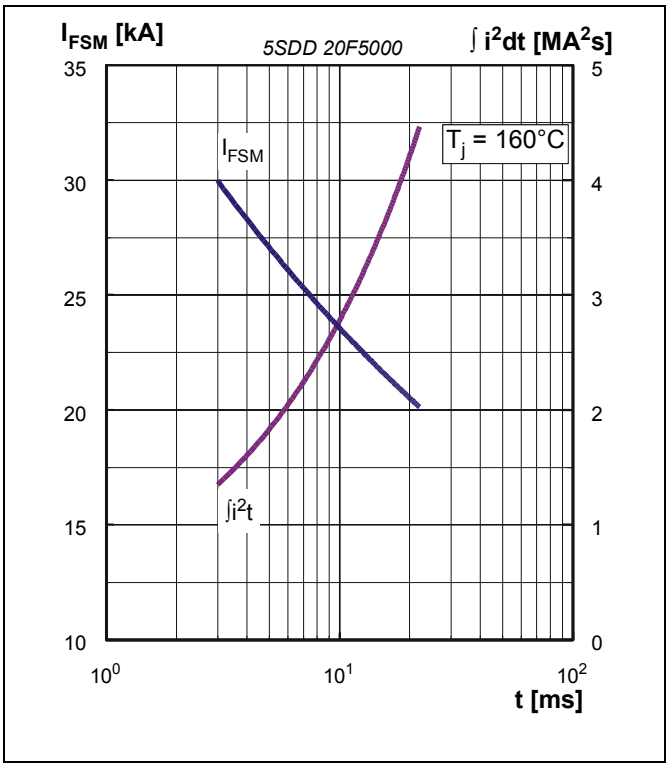


Fig. 6 Surge on-state current vs. pulse length. Half-sine wave.

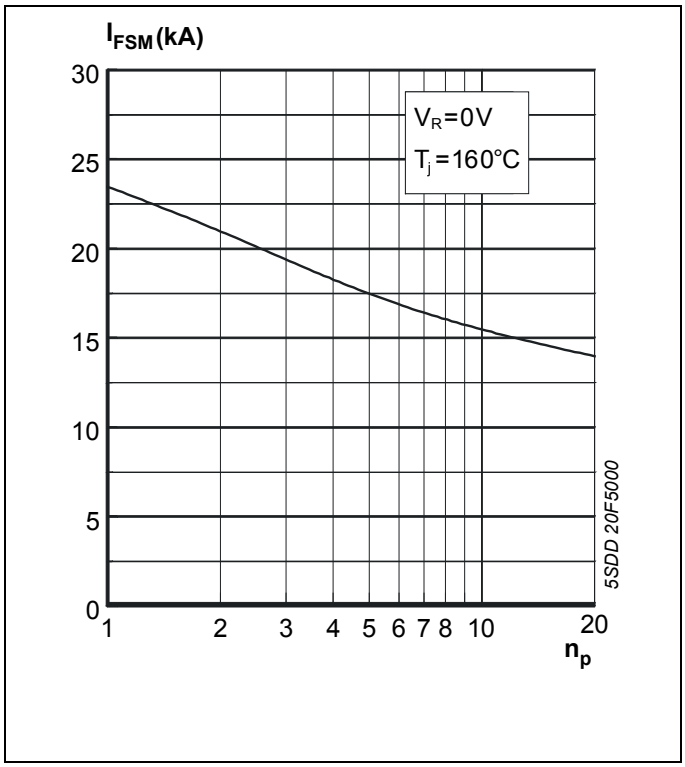


Fig. 7 Surge on-state current vs. number of pulses. Half-sine wave, 10 ms, 50Hz.

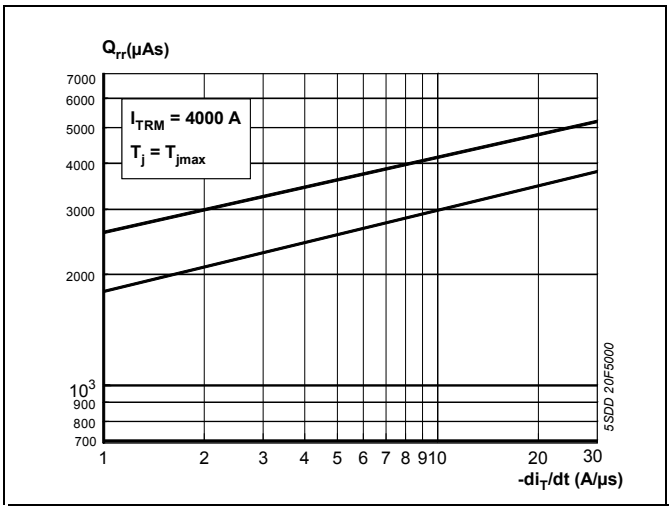


Fig. 8 Recovery charge vs. decay rate of on-state current.

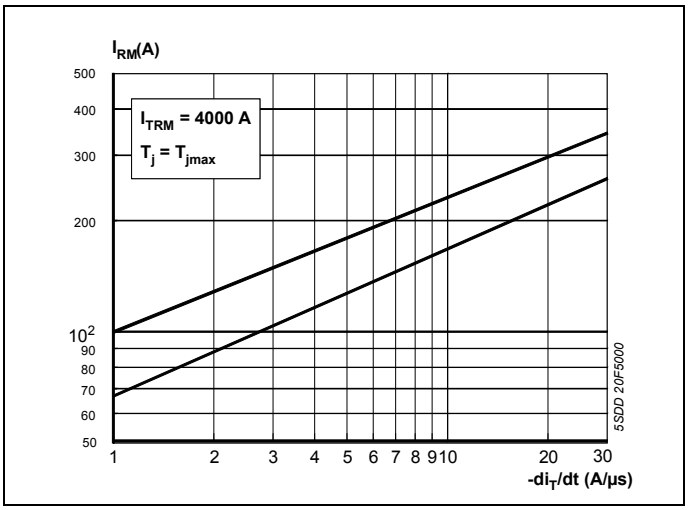


Fig. 9 Peak reverse recovery current vs. decay rate of on-state current.

ABB Semiconductors AG
Fabrikstrasse 3
CH-5600 Lenzburg, Switzerland

Telephone +41 (0)62 888 6419
Fax +41 (0)62 888 6306
Email Info@ch.abb.com
Internet www.abbsem.com

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