5SDD 20F5000

Old part no. DV 818-2000-50

Rectifier Diode

Properties

- low forward voltage drop
- low recovery charge
- high operating temperature
- low leakage current

Applications

- Rectifier bridges

Key Parameters

V_{RRM}	=	5 000	V
I_{FAVm}	=	1 978	A
I_{FSM}	=	24 000	A
V_{TO}	=	0.940	V
r_T	=	0.284	mΩ

Types

	V_{RRM}
5SDD 20F5000	**5 000 V**
Conditions:	*T_j = -40 ÷ 160 °C, half sine waveform, f = 50 Hz*

Mechanical Data

F_m	**Mounting force**	**22 ± 2**	**kN**
m	**Weight**	**0.49**	**kg**
D_S	**Surface creepage distance**	**33**	**mm**
D_a	**Air strike distance**	**20**	**mm**

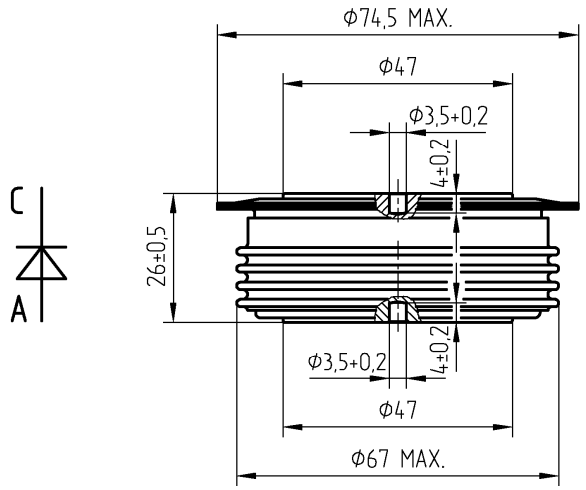

Fig. 1 Case

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Maximum Ratings			*Maximum Limits*	*Unit*
V_{RRM}	**Repetitive peak reverse voltage** T_j = -40 ÷ 160 °C		**5 000**	**V**
I_{FAVm}	**Average forward current** T_c = 85 °C		**1 978**	**A**
I_{FRMS}	**RMS forward current** T_c = 85 °C		**3 106**	**A**
I_{RRM}	**Repetitive reverse current** $V_R = V_{RRM}$		**50**	**mA**
I_{FSM}	**Non repetitive peak surge current** V_R = 0 V, half sine pulse, T_j = 25 °C	t_p = 8.3 ms	**30 400**	**A**
		t_p = 10 ms	**28 500**	**A**
	Non repetitive peak surge current V_R = 0 V, half sine pulse	t_p = 8.3 ms	**25 600**	**A**
		t_p = 10 ms	**24 000**	**A**
I^2t	**Limiting load integral** V_R = 0 V, half sine pulse, T_j = 25 °C	t_p = 8.3 ms	**3 846 600**	**A^2s**
		t_p = 10 ms	**4 500 000**	**A^2s**
	Limiting load integral V_R = 0 V, half sine pulse	t_p = 8.3 ms	**2 727 800**	**A^2s**
		t_p = 10 ms	**2 880 000**	**A^2s**
T_{jmin} -T_{jmax}	**Operating temperature range**		**-40 ÷ 160**	**°C**
T_{STG}	**Storage temperature range**		**-40 ÷ 160**	**°C**

Unless otherwise specified T_j = 160 °C

Characteristics		*Value*			*Unit*
		min	*typ*	*max*	
V_{T0}	**Threshold voltage**			**0.940**	**V**
r_T	**Forward slope resistance** I_{F1} = 2 827 A, I_{F2} = 8 480 A;			**0.284**	**mΩ**
V_{FM}	**Maximum forward voltage** I_{FM} = 4 000 A			**2.10**	**V**
Q_{rr}	**Recovered charge** V_R = 100 V, I_{FM} = 1000 A, di/dt = -30 A/µs		**4 500**	**5 500**	**µC**

Unless otherwise specified T_j = 160 °C

Thermal Parameters			*Value*	*Unit*
R_{thjc}	**Thermal resistance junction to case**	*double side cooling*	**15**	**K/kW**
		anode side cooling	**24**	
		cathode side cooling	**40**	
R_{thch}	**Thermal resistance case to heatsink**	*double side cooling*	**4**	**K/kW**
		single side cooling	**8**	

Transient Thermal Impedance

Analytical function for transient thermal impedance

$$Z_{thjc} = \sum_{i=1}^{5} R_i (1 - \exp(-t / \tau_i))$$

Conditions:
F_m = 22 ± 2 kN, Double side cooled

Correction for periodic waveforms

180°	**sine:**	**1.3 K/kW**
180°	**rectangular:**	**1.7 K/kW**
120°	**rectangular:**	**2.9 K/kW**
60°	**rectangular:**	**4.8 K/kW**

i	1	2	3	4	5
τ_i (s)	0.6937	0.2040	0.0452	0.0040	0.0005
R_i(K/kW)	6.04	3.83	3.76	1.31	0.07

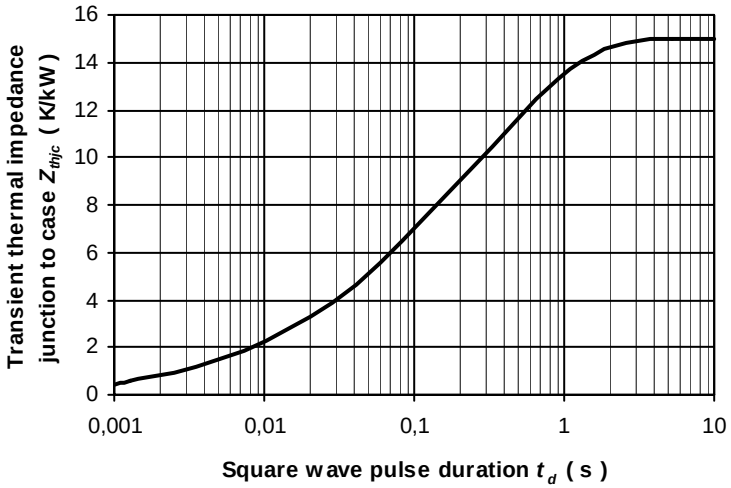

Fig. 2 Dependence transient thermal impedance junction to case on square pulse

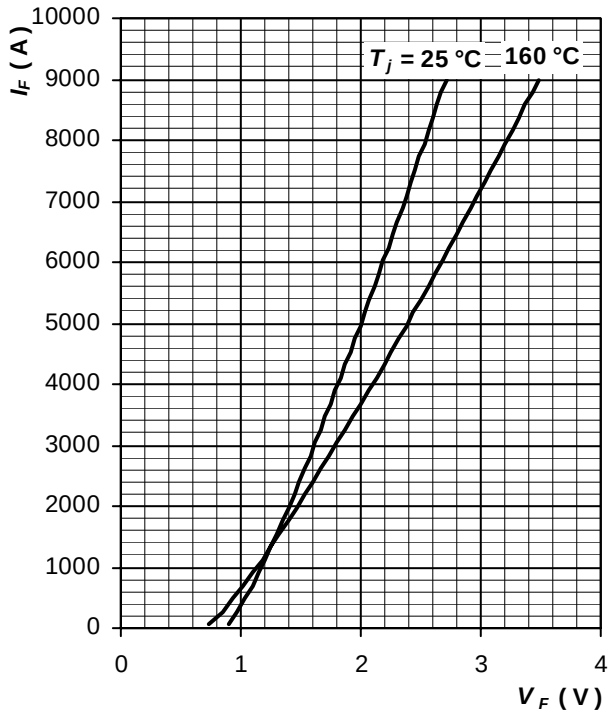

Fig. 3 Maximum forward voltage drop characteristics

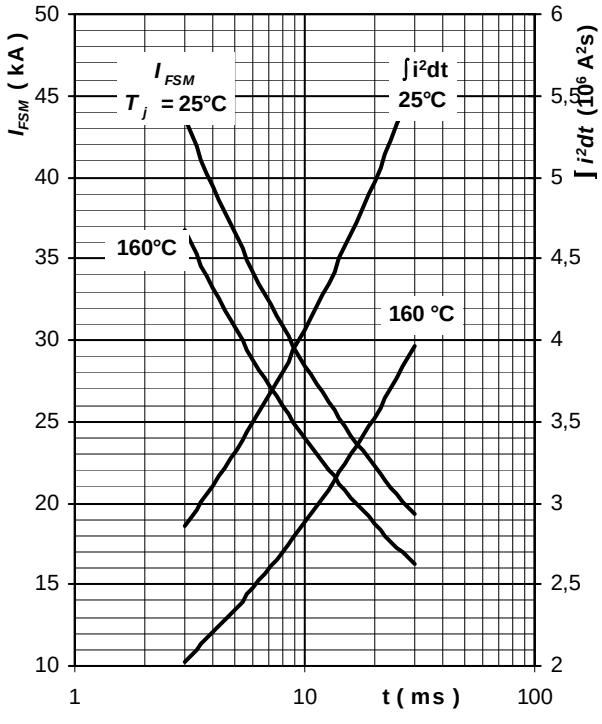

Fig. 4 Surge forward current vs. pulse length, half sine wave, single pulse, V_R = 0 V, $T_j = T_{jmax}$

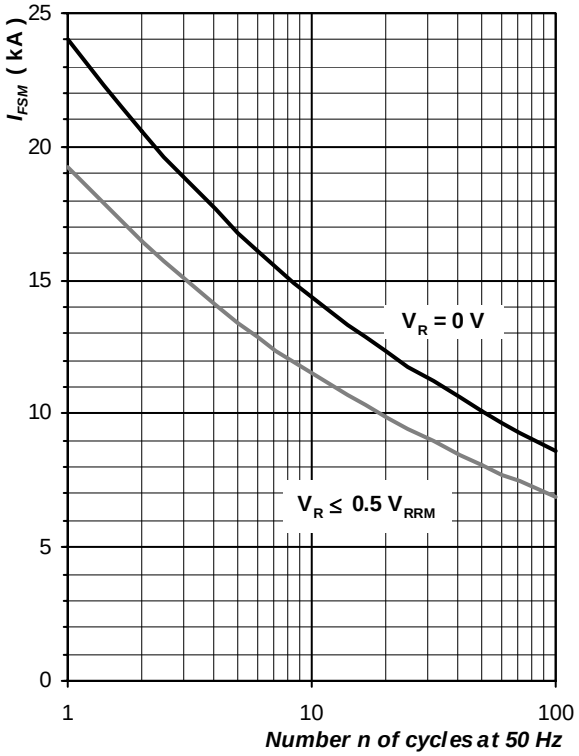

Fig. 5 Surge forward current vs. number of pulses, half sine wave, $T_j = T_{jmax}$

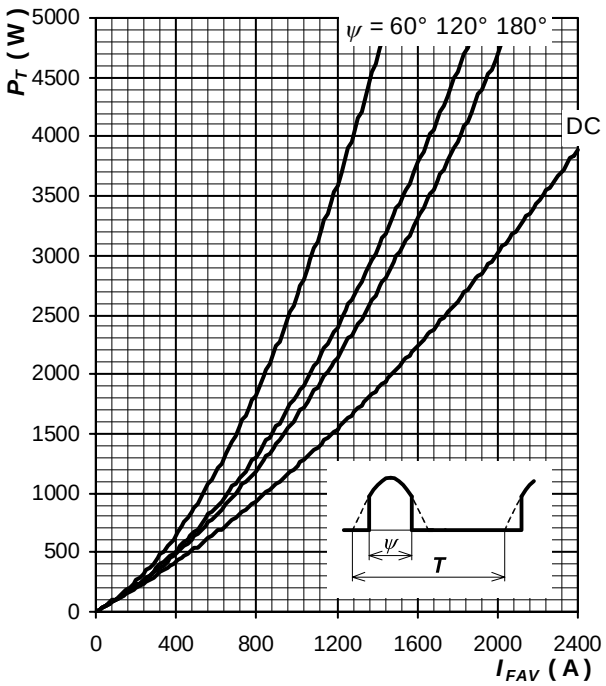

Fig. 6 Forward power loss vs. average forward current, sine waveform, f = 50 Hz, T = 1/f

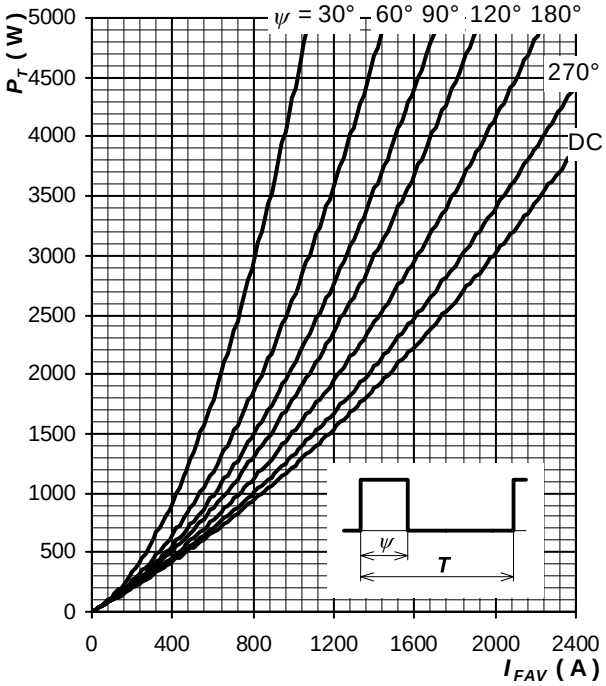

Fig. 7 Forward power loss vs. average forward current, square waveform, f = 50 Hz, T = 1/f

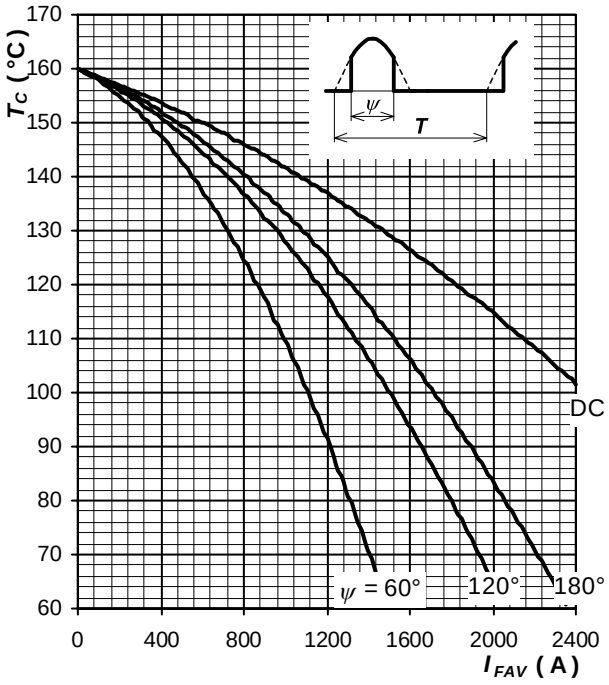

Fig. 8 Max. case temperature vs. aver. forward current, sine waveform, f = 50 Hz, T = 1/f

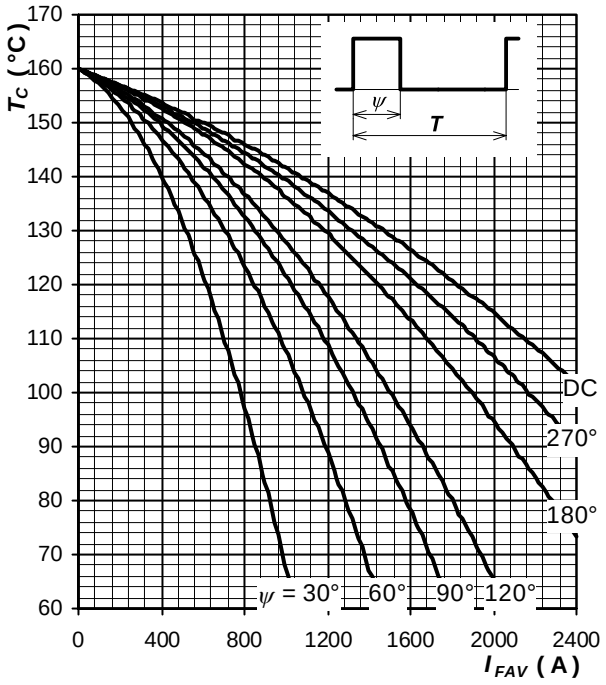

Fig. 9 Max.case temperature vs. aver. forward current, square waveform, f = 50 Hz, T = 1/f

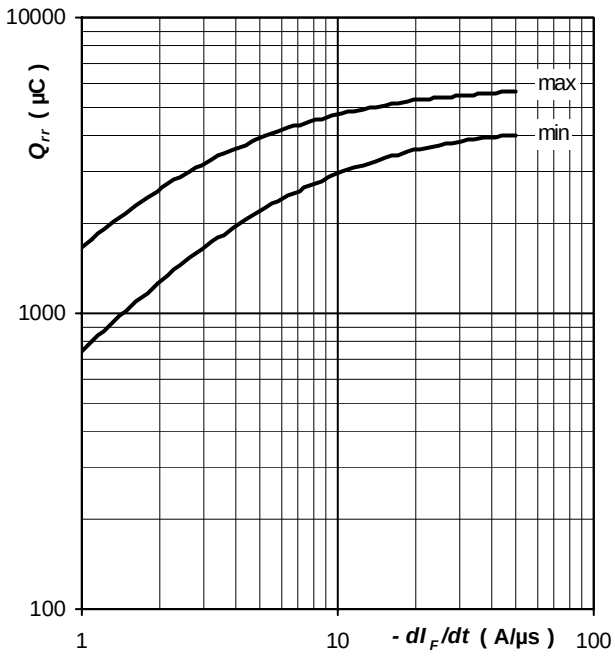

Fig. 10 Recovered charge Q_{rr}
vs. rate of fall forward current di_F/dt,
trapezoid pulse, I_{FM} *= 1 000 A,*
V_R *= 100 V,* $T_j = T_{jmax}$

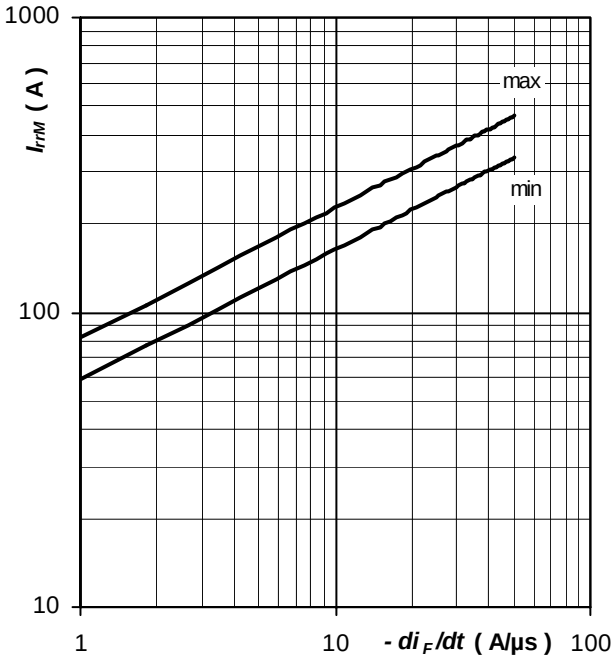

Fig. 11 Reverse recovery maximum current I_{rrM}
vs. rate of fall forward current di_F/dt,
trapezoid pulse, I_{FM} *= 1 000 A,*
V_R *= 100 V,* $T_j = T_{jmax}$

Notes:

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