5SDD 31K6000

Old part no. DV 889B-3100-60

High Voltage Diode

Properties

- Industry standard housing
- Suitable for parallel operation
- High operating temperature
- Low forward voltage drop
- Explosive protection

Key Parameters

V_{RRM}	=	6 000	V
I_{FAVm}	=	3 097	A
I_{FSM}	=	40 000	A
V_{TO}	=	0.894	V
r_T	=	0.166	mΩ

Applications

- Rectifier bridges

Types

	V_{RRM}
5SDD 31K6000	**6 000 V**
5SDD 31K5800	**5 800 V**
Conditions:	*T_j = -40 ÷ 150 °C, half sine waveform, f = 50 Hz*

Mechanical Data

F_m	**Mounting force**	**50 ± 5 kN**
m	**Weight**	**1.2 kg**
D_S	**Surface creepage distance**	**49 mm**
D_a	**Air strike distance**	**28 mm**

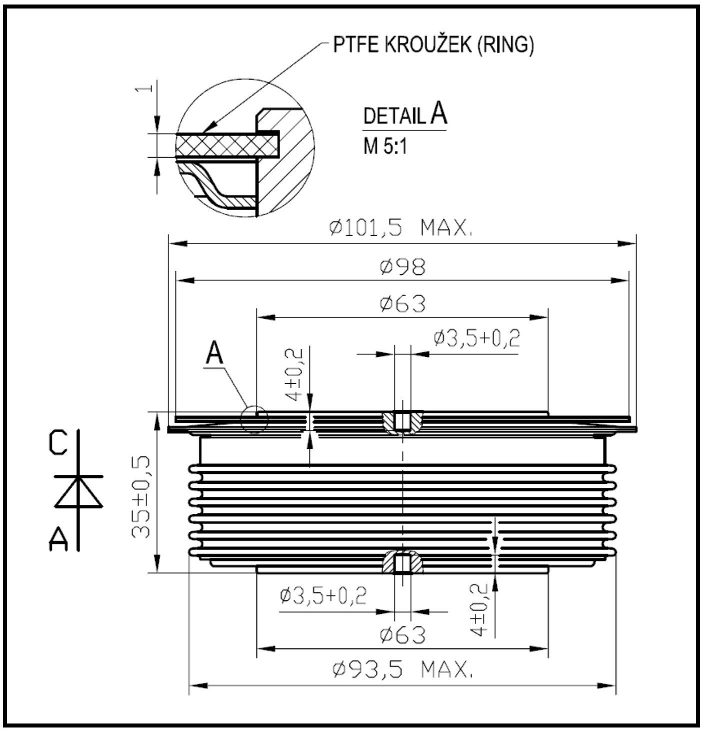

Fig. 1 Case

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Maximum Ratings			***Maximum Limits***	***Unit***
V_{RRM}	**Repetitive peak reverse voltage** *T_j = -40 ÷ 150 °C*	**5SDD 31K6000** **5SDD 31K5800**	**6 000** **5 800**	**V**
I_{FAVm}	**Average forward current** *T_c = 85 °C*		**3 097**	**A**
I_{FRMS}	**RMS forward current** *T_c = 85 °C*		**4 864**	**A**
I_{RRM}	**Repetitive reverse current** *$V_R = V_{RRM}$*		**120**	**mA**
I_{FSM}	**Non repetitive peak surge current** *V_R = 0 V, half sine pulse*	*t_p = 8.3 ms*	**42 700**	**A**
		t_p = 10 ms	**40 000**	**A**
I^2t	**Limiting load integral** *V_R = 0 V, half sine pulse*	*t_p = 8.3 ms*	**7 577 200**	**A^2s**
		t_p = 10 ms	**8 000 000**	**A^2s**
T_{jmin} - T_{jmax}	**Operating temperature range**		**-40 ÷ 150**	**°C**
T_{STG}	**Storage temperature range**		**-40 ÷ 150**	**°C**

Unless otherwise specified T_j = 150 °C

Characteristics		***Value***			***Unit***
		min	***typ***	***max***	
V_{T0}	**Threshold voltage**			**0.894**	**V**
r_T	**Forward slope resistance** *I_{F1} = 4 869 A, I_{F2} = 14 608 A*			**0.166**	**mW**
V_{FM}	**Maximum forward voltage** *I_{FM} = 4 000 A*			**1.550**	**V**
Q_{rr}	**Recovered charge** *V_R = 100 V, I_{FM} = 2000 A, di_F/dt = -30 A/µs*		**6 500**	**7 000**	**µC**

Unless otherwise specified T_j = 150 °C

Thermal Parameters			*Value*	*Unit*
R_{thjc}	**Thermal resistance junction to case**	*double side cooling*	**9.2**	**K/kW**
		anode side cooling	**14.5**	
		cathode side cooling	**25.2**	
R_{thch}	**Thermal resistance case to heatsink**	*double side cooling*	**2.5**	**K/kW**
		single side cooling	**5.0**	

Transient Thermal Impedance

Analytical function for transient thermal impedance

$$Z_{thjc} = \sum_{i=1}^{4} R_i (1 - \exp(-t / \tau_i))$$

Conditions:
F_m = 50 ± 5 kN, Double side cooled

Correction for periodic waveforms

180°	**sine:**	**0.5**	**K/kW**
120°	**sine:**	**0.6**	**K/kW**
60°	**sine:**	**0.9**	**K/kW**
180°	**rectangular:**	**0.5**	**K/kW**
120°	**rectangular:**	**0.6**	**K/kW**
60°	**rectangular:**	**0.9**	**K/kW**

i	1	2	3	4
τ_i (s)	0.9405	0.1146	0.0807	0.0071
R_i(K/kW)	5.73	2.25	0.87	0.34

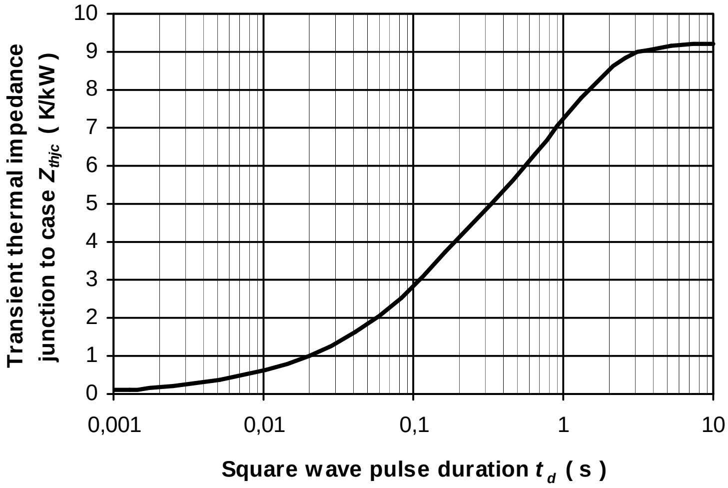

Fig. 2 Dependence transient thermal impedance junction to case on square pulse

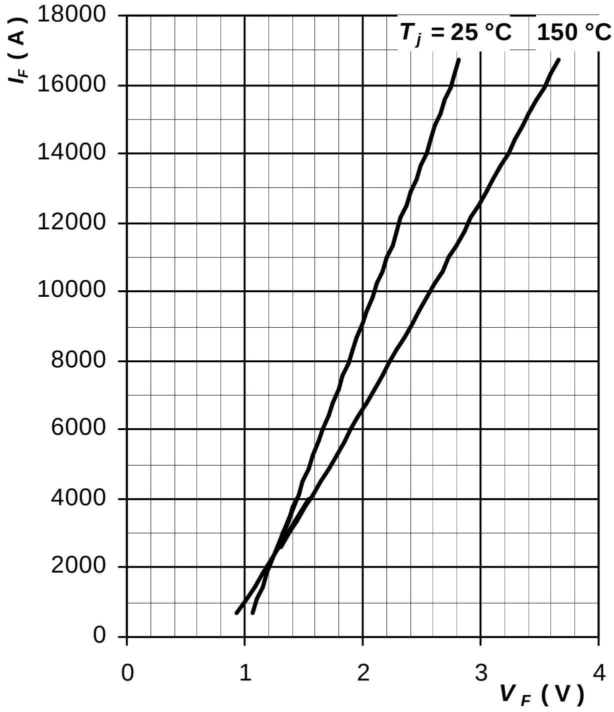

Fig. 3 Maximum forward voltage drop characteristics

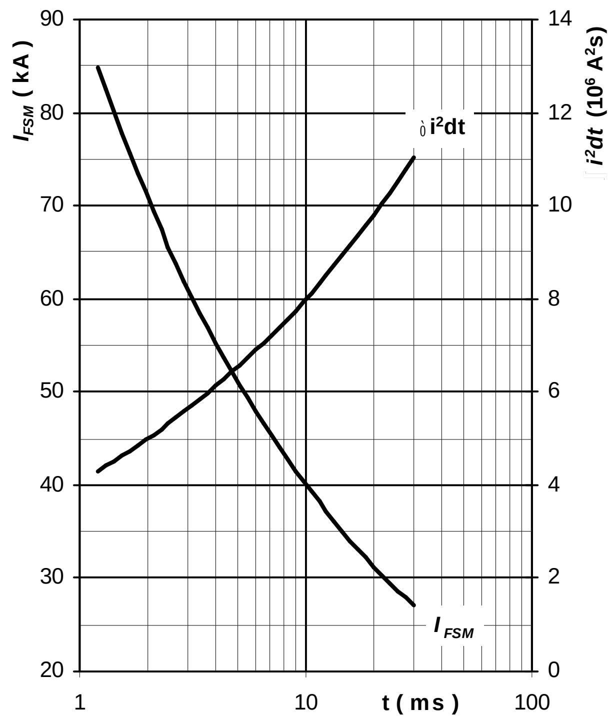

Fig. 4 Surge forward current vs. pulse length, half sine wave, single pulse, V_R = 0 V, $T_j = T_{jmax}$

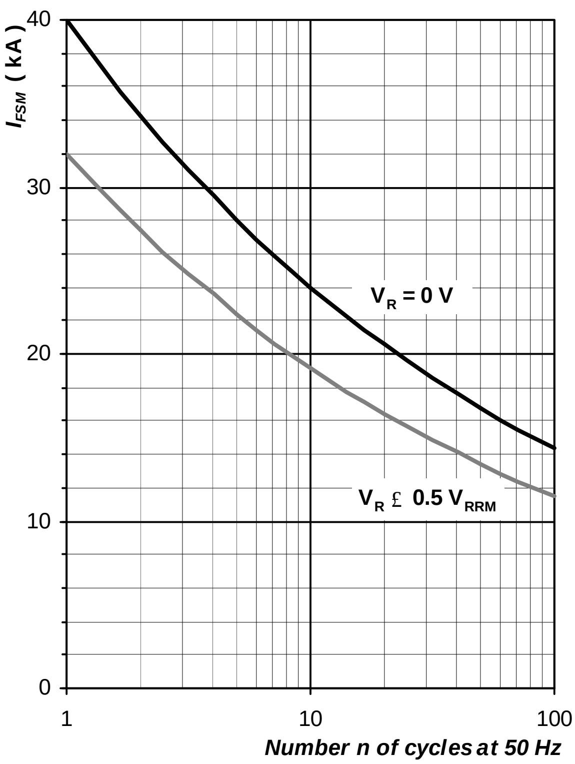

Fig. 5 Surge forward current vs. number of pulses, half sine wave, $T_j = T_{jmax}$

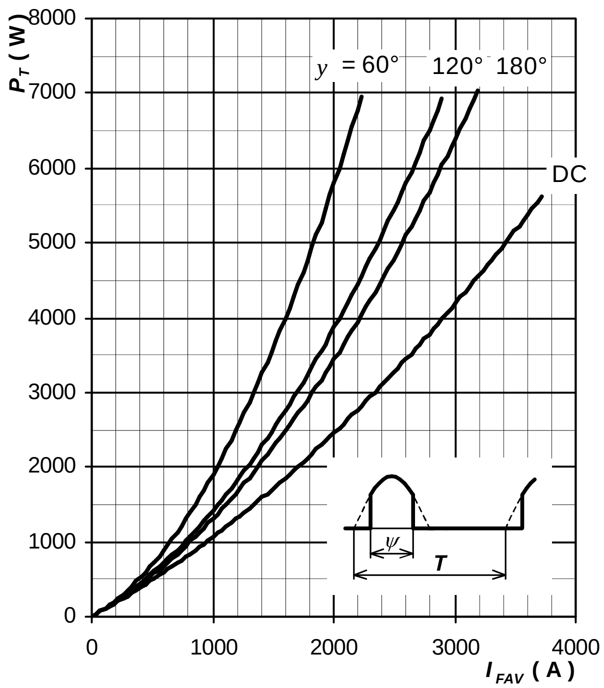

Fig. 6 *Forward power loss vs. average forward current, sine waveform, f = 50 Hz, T = 1/f*

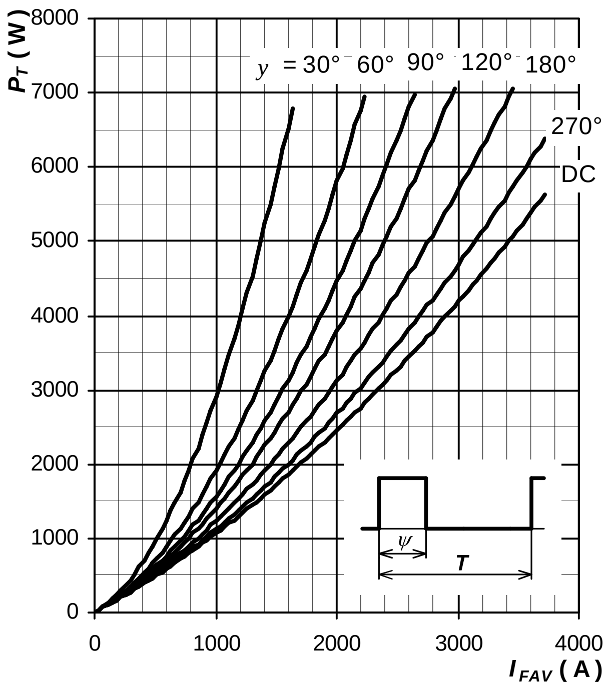

Fig. 7 *Forward power loss vs. average forward current, square waveform, f = 50 Hz, T = 1/f*

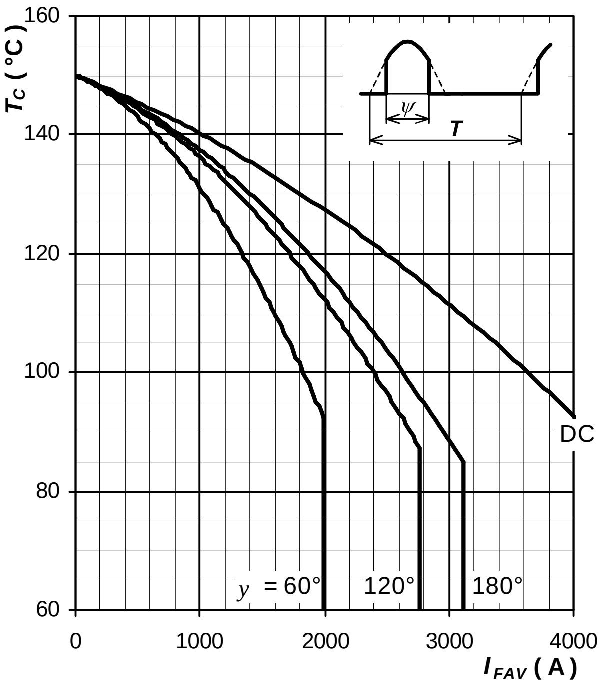

Fig. 8 *Max. case temperature vs. aver. forward current, sine waveform, f = 50 Hz, T = 1/f*

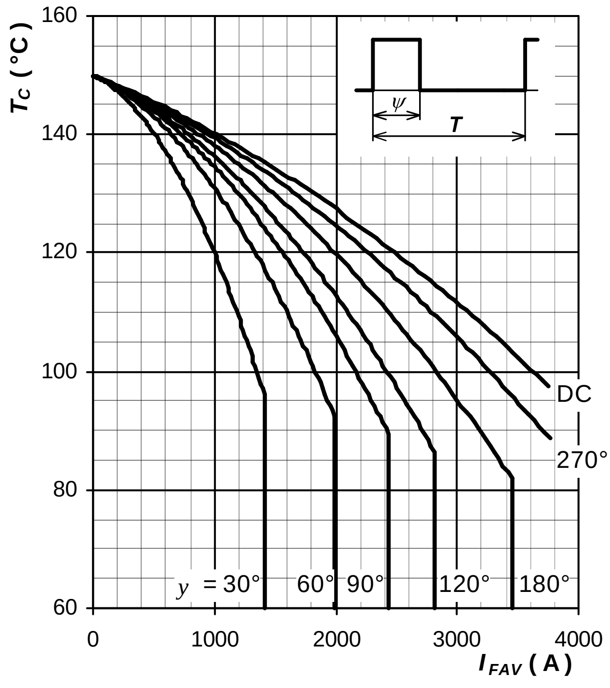

Fig. 9 *Max.case temperature vs. aver. forward current, square waveform, f = 50 Hz, T = 1/f*

Notes: