ABB

5SDD 36K5000
Old part no. DV 889B-3600-50

Rectifier Diode

Properties

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

Key Parameters

V_{RRM}	=	5 000	V
I_{FAVm}	=	3 638	A
I_{FSM}	=	45 000	A
V_{TO}	=	0.903	V
r_T	=	0.136	mΩ

Types

	V_{RRM}
5SDD 36K5000	**5 000 V**
Conditions:	$T_j = -40 \div 160\ °C$, 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** $T_j = -40 \div 160 \; °C$		**5 000**	**V**
I_{FAVm}	**Average forward current** $T_c = 85 \; °C$		**3 638**	**A**
I_{FRMS}	**RMS forward current** $T_c = 85 \; °C$		**5 715**	**A**
I_{RRM}	**Repetitive reverse current** $V_R = V_{RRM}$		**110**	**mA**
I_{FSM}	**Non repetitive peak surge current** $V_R = 0 \; V$, half sine pulse	$t_p = 8.3 \; ms$	**48 070**	**A**
		$t_p = 10 \; ms$	**45 000**	**A**
I^2t	**Limiting load integral** $V_R = 0 \; V$, half sine pulse	$t_p = 8.3 \; ms$	**9 589 900**	**A²s**
		$t_p = 10 \; ms$	**10 125 000**	**A²s**
$T_{jmin} - T_{jmax}$	**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**			0.903	**V**
r_T	**Forward slope resistance** $I_{F1} = 5 \; 969 \; A$, $I_{F2} = 17 \; 907 \; A$			0.136	**mΩ**
V_{FM}	**Maximum forward voltage** $I_{FM} = 4 \; 000 \; A$			1.430	**V**
Q_{rr}	**Recovered charge** $V_R = 100 \; V$, $I_{FM} = 2000 \; A$, $di_F/dt = -30 \; A/\mu s$		5 000		**μC**

Unless otherwise specified $T_j = 160 \; °C$

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:
$F_m = 50 \pm 5$ 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

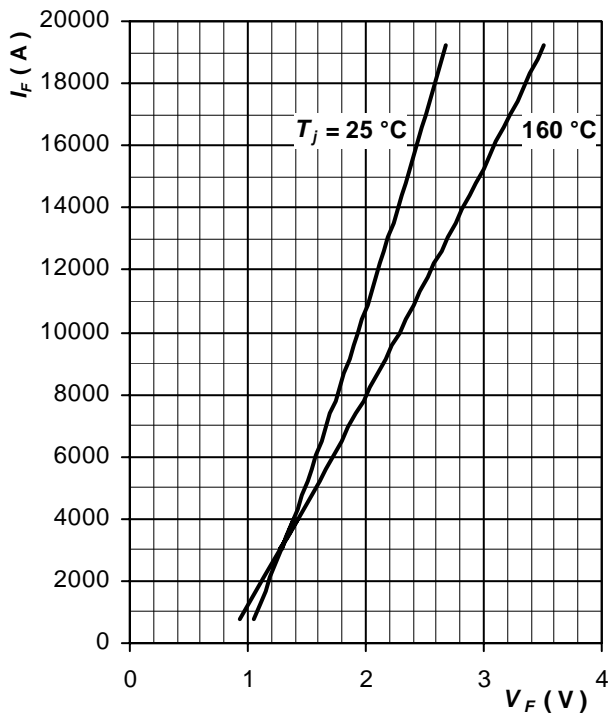Fig. 2 *Dependence transient thermal impedance junction to case on square pulse*
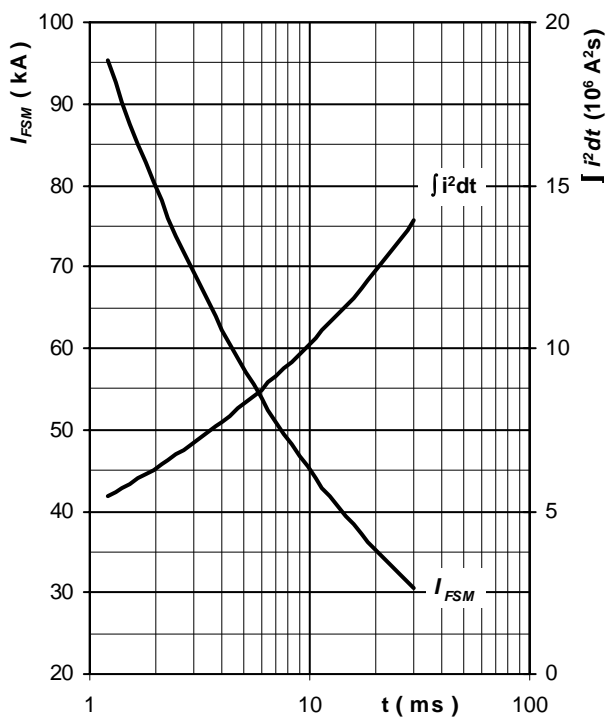
Fig. 3 Maximum forward voltage drop
characteristics

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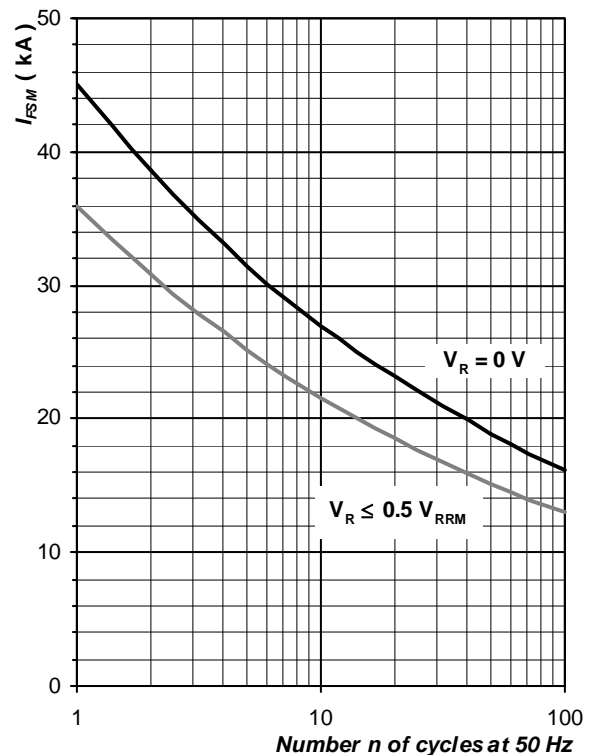$V_R = 0$ V, $T_j = T_{jmax}$

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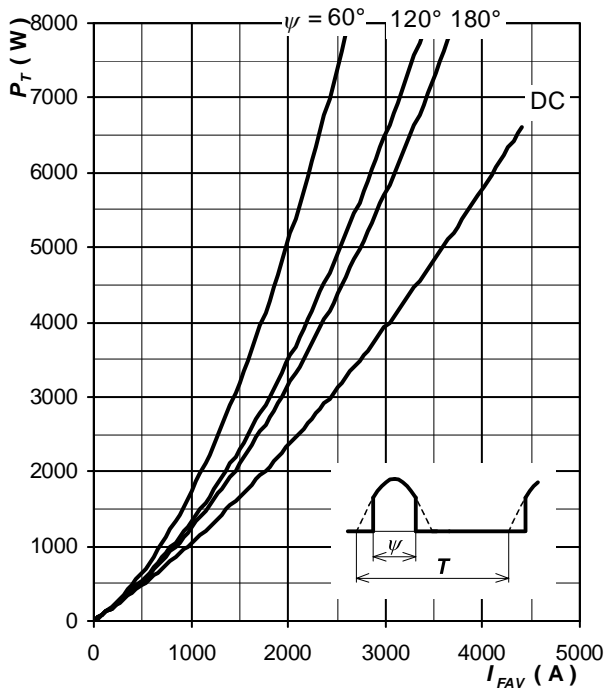of pulses, half sine wave, $T_j = T_{jmax}$

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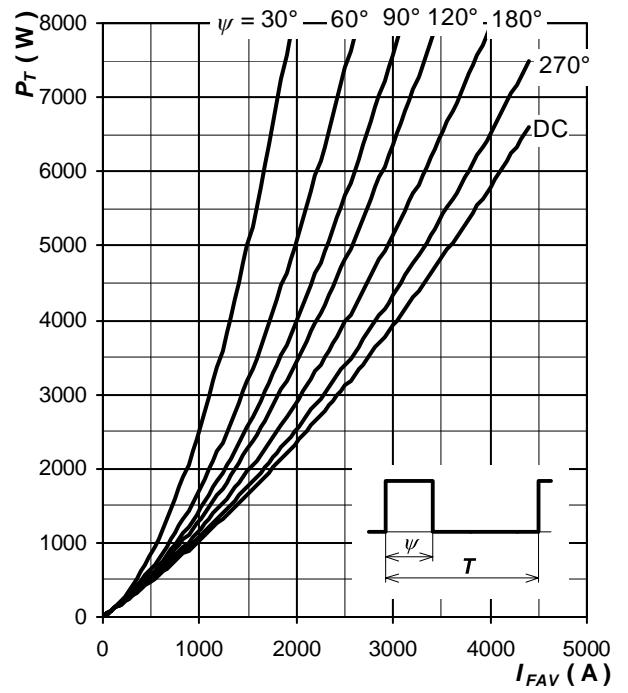current, sine waveform, f = 50 Hz, T = 1/f

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

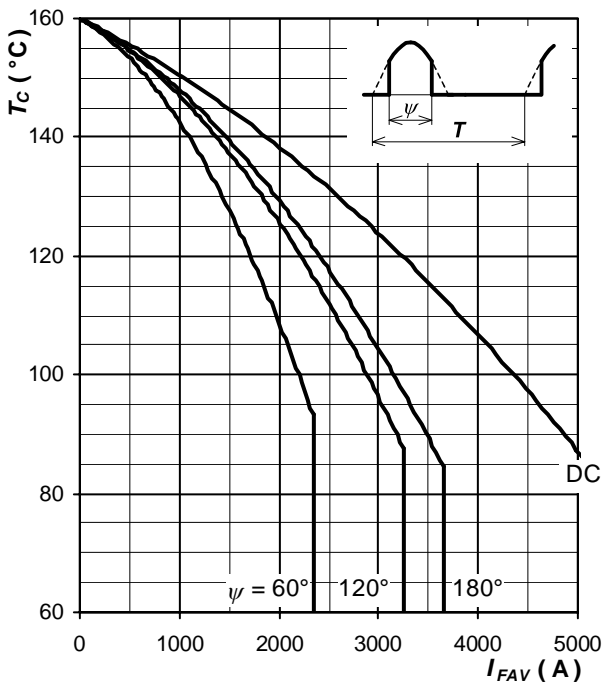
Fig. 8 Max. case temperature vs. aver. forward
current, sine waveform, f = 50 Hz, T = 1/f
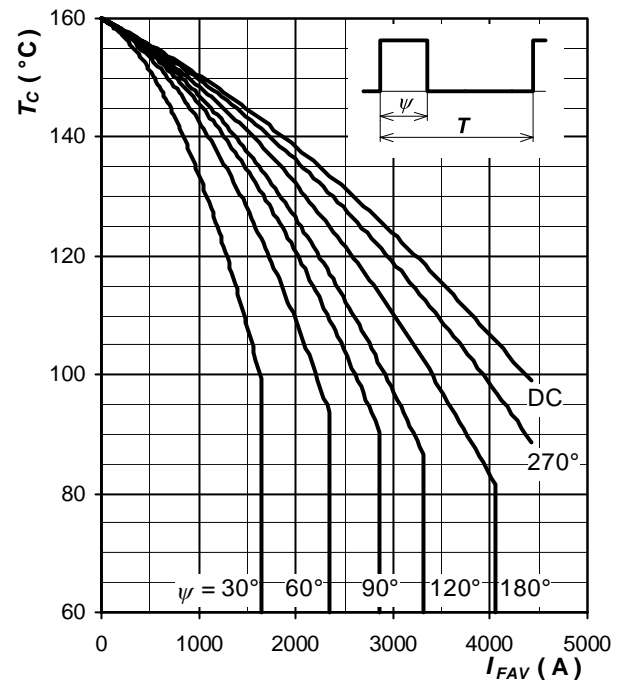

Fig. 9 Max.case temperature vs. aver. forward
current, square waveform, f = 50 Hz, T = 1/f

Notes:

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