



# 5SDD 40H4000

Old part no. DV 889-4000-40

## Rectifier Diode

### Properties

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

### Key Parameters

$V_{RRM}$	=	4 000	V
$I_{FAVm}$	=	3 847	A
$I_{FSM}$	=	46 000	A
$V_{TO}$	=	0.900	V
$r_T$	=	0.133	m $\Omega$

### Types

	$V_{RRM}$
<b>5SDD 40H4000</b>	<b>4 000 V</b>
Conditions:	$T_j = -40 \div 160$ °C, half sine waveform, $f = 50$ Hz

### Mechanical Data

$F_m$	Mounting force	<b>50 <math>\pm</math> 5 kN</b>
$m$	Weight	<b>0.9 kg</b>
$D_s$	Surface creepage distance	<b>40 mm</b>
$D_a$	Air str ke distance	<b>20 mm</b>

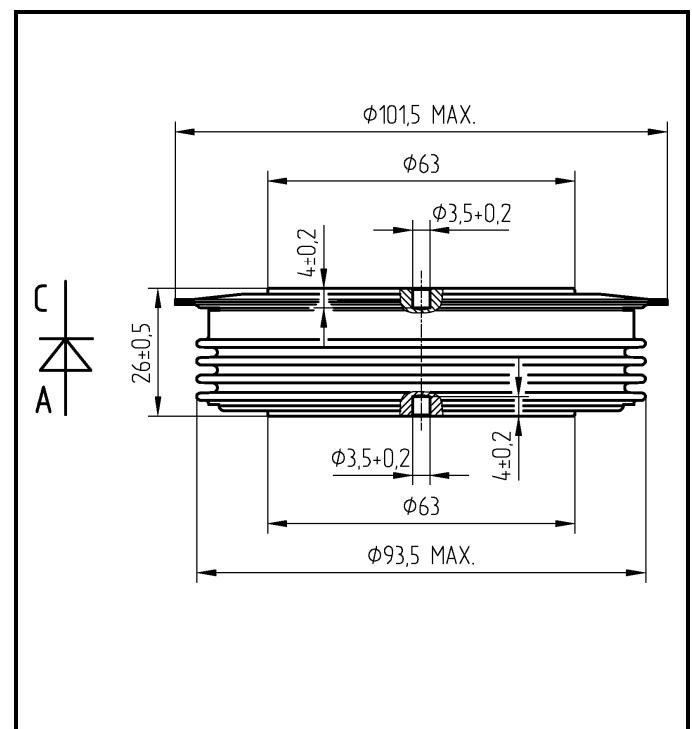


Fig. 1 Case



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<b>Maximum Ratings</b>		<b>Maximum Limits</b>	<b>Unit</b>	
$V_{RRM}$	<b>Repetitive peak reverse voltage</b> $T_j = -40 \div 160 \text{ }^\circ\text{C}$	<b>4 000</b>	<b>V</b>	
$I_{FAVM}$	<b>Average forward current</b> $T_c = 85 \text{ }^\circ\text{C}$	<b>3 847</b>	<b>A</b>	
$I_{FRMS}$	<b>RMS forward current</b> $T_c = 85 \text{ }^\circ\text{C}$	<b>6 043</b>	<b>A</b>	
$I_{RRM}$	<b>Repetitive reverse current</b> $V_R = V_{RRM}$	<b>100</b>	<b>mA</b>	
$I_{FSM}$	<b>Non repetitive peak surge current</b> $V_R = 0 \text{ V, half sine pulse}$	$t_p = 8.3 \text{ ms}$	<b>49 000</b>	<b>A</b>
		$t_p = 10 \text{ ms}$	<b>46 000</b>	<b>A</b>
$I^2t$	<b>Limiting load integral</b> $V_R = 0 \text{ V, half sine pulse}$	$t_p = 8.3 \text{ ms}$	<b>10 020 000</b>	<b>A<sup>2</sup>s</b>
		$t_p = 10 \text{ ms}$	<b>10 580 000</b>	<b>A<sup>2</sup>s</b>
$T_{jmin} - T_{jmax}$	<b>Operating temperature range</b>	<b>-40 ÷ 160</b>	<b>°C</b>	
$T_{STG}$	<b>Storage temperature range</b>	<b>-40 ÷ 160</b>	<b>°C</b>	

Unless otherwise specified  $T_j = 160 \text{ }^\circ\text{C}$

<b>Characteristics</b>		<b>Value</b>			<b>Unit</b>
		<i>min</i>	<i>typ</i>	<i>max</i>	
$V_{T0}$	<b>Threshold voltage</b>			<b>0.900</b>	<b>V</b>
$r_T$	<b>Forward slope resistance</b> $I_{F1} = 6\,283 \text{ A, } I_{F2} = 18\,850 \text{ A}$			<b>0.133</b>	<b>mΩ</b>
$V_{FM}$	<b>Maximum forward voltage</b> $I_{FM} = 4\,000 \text{ A}$			<b>1.41</b>	<b>V</b>
$Q_{rr}$	<b>Recovered charge</b> $V_R = 100 \text{ V, } I_{FM} = 2000 \text{ A, } di_F/dt = -30 \text{ A}/\mu\text{s}$		<b>4 600</b>		<b>μC</b>

Unless otherwise specified  $T_j = 160 \text{ }^\circ\text{C}$

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Thermal Parameters			Value	Unit
$R_{thjc}$	Thermal resistance junction to case	double side cooling	8.0	K/kW
		anode side cooling	14.5	
		cathode side cooling	18.0	
$R_{thch}$	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:	1.0 K/kW
120° sine:	1.5 K/kW
60° sine:	2.5 K/kW
180° rectangular:	0.9 K/kW
120° rectangular:	1.5 K/kW
60° rectangular:	2.5 K/kW

$i$	1	2	3	4
$\tau_i$ (s)	0.4406	0.1045	0.0092	0.0022
$R_i$ (K/kW)	4.533	2.255	0.868	0.345

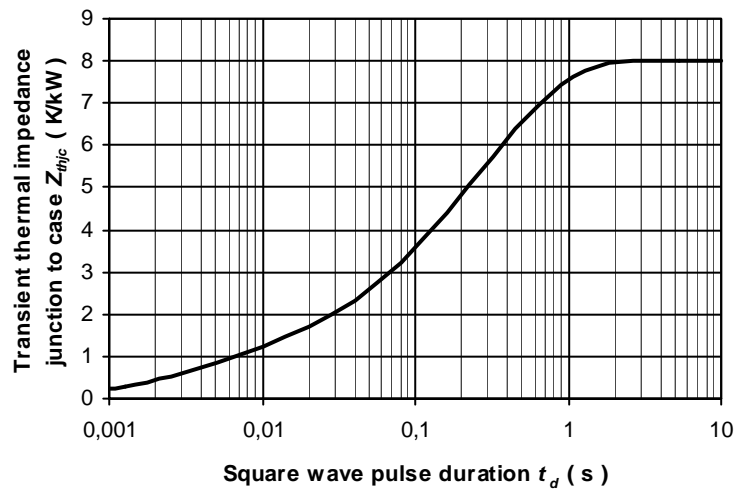


Fig. 2 Dependence transient thermal impedance junction to case on square pulse

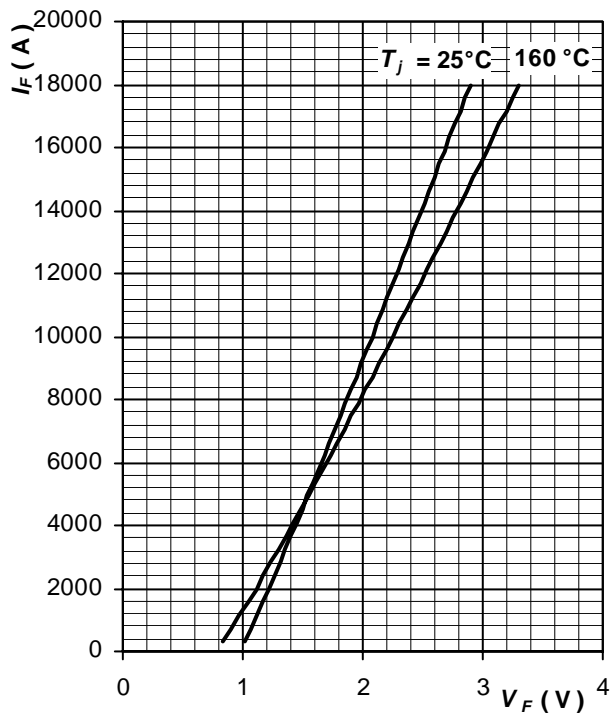


Fig. 3 Maximum forward voltage drop characteristics

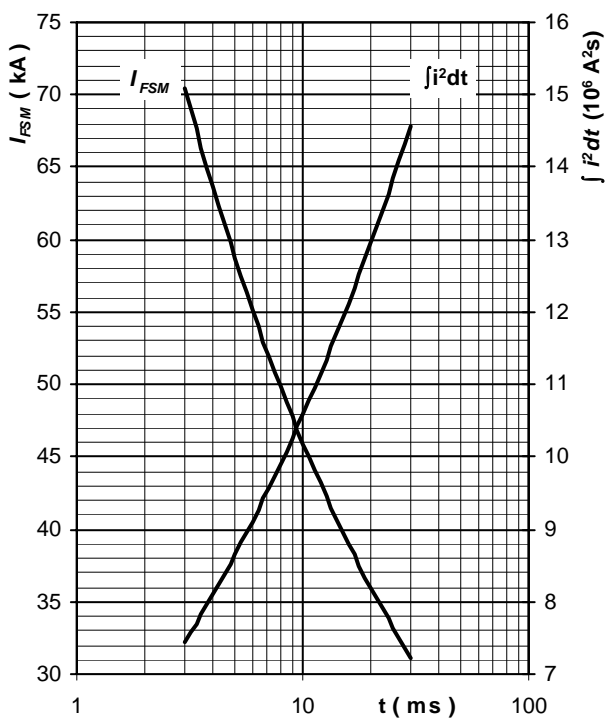


Fig. 4 Surge forward current vs. pulse length, half sine wave, single pulse,  $V_R = 0 \text{ V}$ ,  $T_j = T_{jmax}$

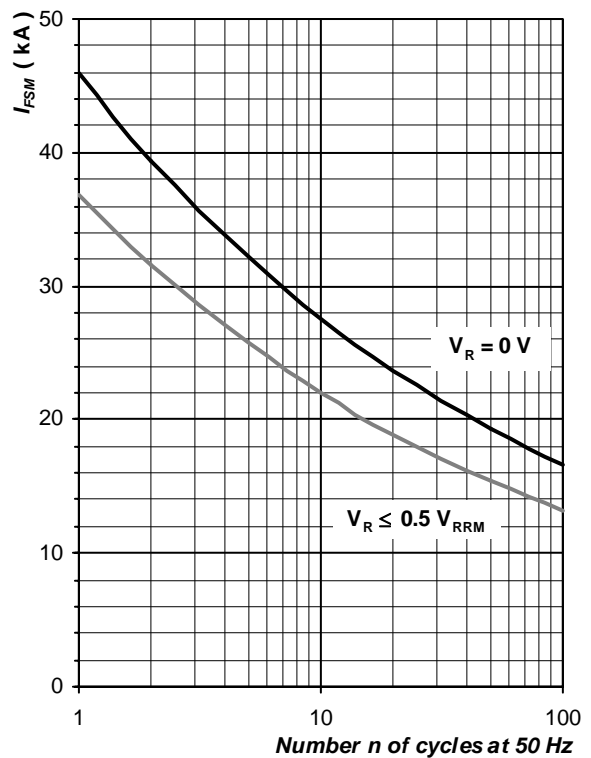


Fig. 5 Surge forward current vs. number of pulses, half sine wave,  $T_j = T_{jmax}$

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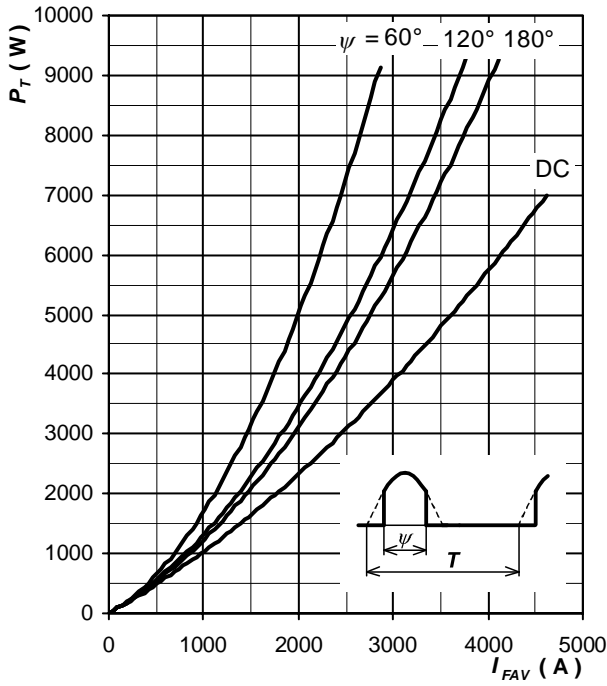


Fig. 6 Forward power loss vs. average forward current, sine waveform,  $f = 50$  Hz,  $T = 1/f$

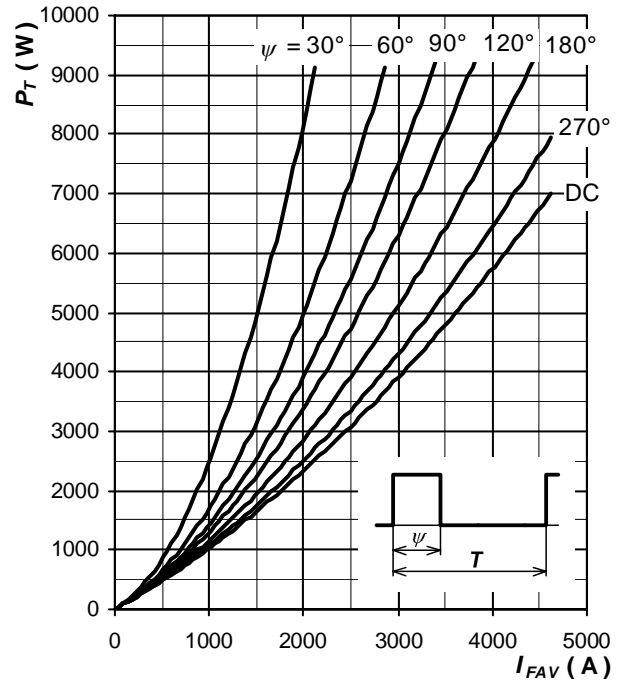


Fig. 7 Forward power loss vs. average forward current, square waveform,  $f = 50$  Hz,  $T = 1/f$

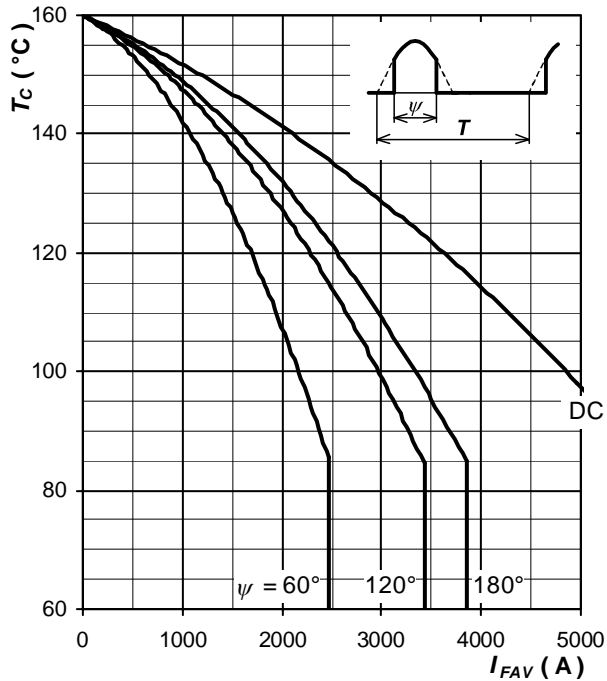


Fig. 8 Max. case temperature vs. aver. forward current, sine waveform,  $f = 50$  Hz,  $T = 1/f$

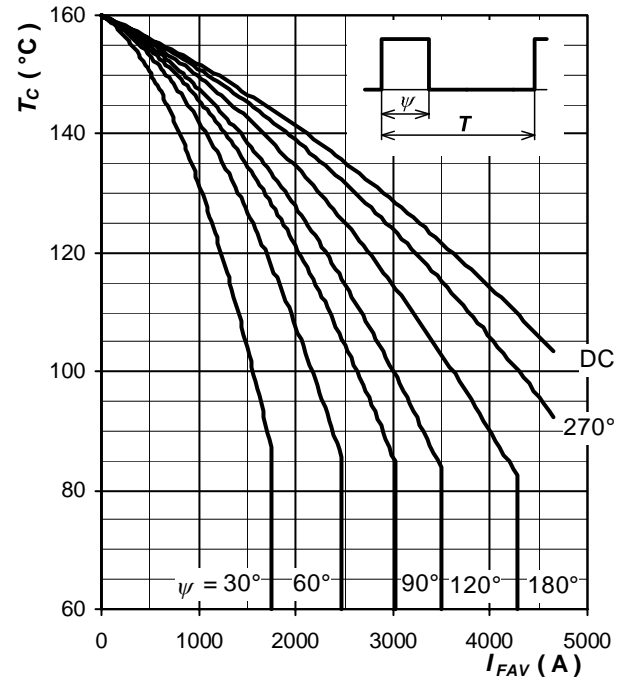


Fig. 9 Max. case temperature vs. aver. forward current, square waveform,  $f = 50$  Hz,  $T = 1/f$

Notes:

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