

# 5SDA 27F2002

Old part no. DA 808-2700-20

$V_{RRM}$	=	2 000 V
$I_{FAVm}$	=	2 700 A
$I_{FSM}$	=	31 000 A
$V_{TO}$	=	0.790 V
$r_T$	=	0.090 mΩ

## Avalanche Diode

### Properties

- low on-state voltage
- avalanche reverse characteristics
- high operational reliability
- suitable for parallel operation

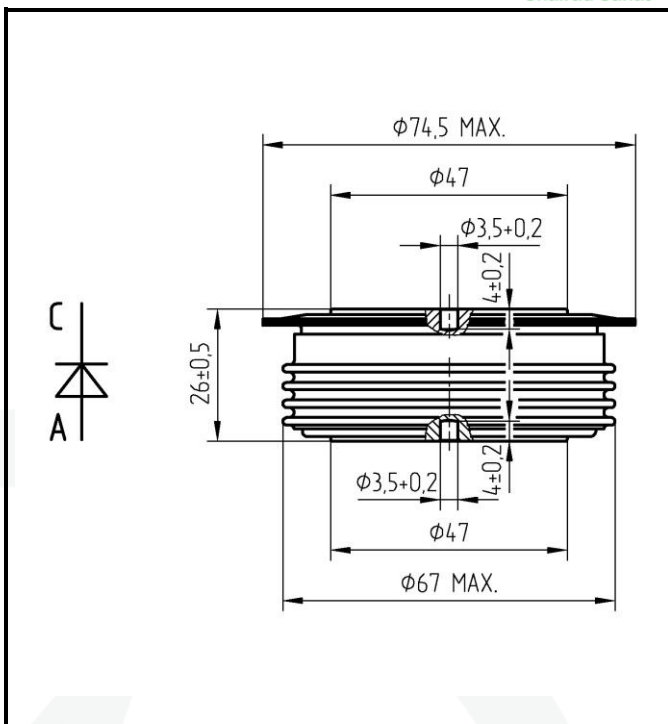
### Key Parameters

	$V_{RRM}$
<b>5SDA 27F2002</b>	<b>2 000 V</b>
Conditions:	$T_j = -40 \div 160 \text{ }^\circ\text{C}$ , half sine waveform, $f = 50 \text{ Hz}$

$F_m$	<b>Mounting force</b>	22 ± 2 kN
$m$	<b>Weight</b>	0.46 kg
$D_s$	<b>Surface creepage distance</b>	30 mm
$D_a$	<b>Air strike distance</b>	20.5 mm

# Types

## Mechanical Data



Maximum Ratings		Maximum Limits	Unit	
$V_{RRM}$	Repetitive peak reverse voltage $T_j = -40 \div 160 \text{ }^\circ\text{C}$	2 000	V	
$I_{FAVm}$	Average forward current $T_c = 85 \text{ }^\circ\text{C}$	2 700	A	
$I_{FRMS}$	RMS forward current $T_c = 85 \text{ }^\circ\text{C}$	4 240	A	
$I_{RRM}$	Repetitive reverse current $V_R = V_{RRM}$	50	mA	
$I_{FSM}$	Non repetitive peak surge current $V_R = 0 \text{ V, half sine pulse}$	$t_p = 8.3 \text{ ms}$	33 100	A
		$t_p = 10 \text{ ms}$	31 000	A
$I^2t$	Limiting load integral $V_R = 0 \text{ V, half sine pulse}$	$t_p = 8.3 \text{ ms}$	4 550 000	A <sup>2</sup> s
		$t_p = 10 \text{ ms}$	4 805 000	A <sup>2</sup> s
$P_{RSM}$	Maximum avalanche power dissipation <i>rectangular pulse 20 <math>\mu</math>s</i>	100	kW	
$T_{jmin} - T_{jmax}$	Operating temperature range	-40 $\div$ 160	$^\circ\text{C}$	
$T_{STG}$	Storage temperature range	-40 $\div$ 160	$^\circ\text{C}$	

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

Characteristics	Value	Unit
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		<i>min</i>	<i>typ</i>	<i>max</i>	
$V_{TO}$	<b>Threshold voltage</b>			<b>0.790</b>	<b>V</b>
	<b>Forward slope resistance</b> $I_F = 2000 \div 6000 \text{ A}$			<b>0.090</b>	<b>m<math>\Omega</math></b>
$V_{FM}$	<b>Maximum forward voltage</b> $I_{FM} = 4000 \text{ A}$			<b>1.200</b>	<b>V</b>
$Q_{rr}$	<b>Recovered charge</b> $V_R = 100 \text{ V}, I_{FM} = 2000 \text{ A}, di_F/dt = -5 \text{ A}/\mu\text{s}$		<b>1900</b>		<b><math>\mu\text{C}</math></b>

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

<b>Thermal Parameters</b>			<b>Value</b>	<b>Unit</b>
$R_{thjc}$	<b>Thermal resistance junction to case</b>	<i>double side cooling</i>	<b>20</b>	<b>K/kW</b>
		<i>anode side cooling</i>	<b>34</b>	
		<i>cathode side cooling</i>	<b>48</b>	
$R_{thch}$	<b>Thermal resistance case to heatsink</b>	<i>double side cooling</i>	<b>5</b>	<b>K/kW</b>
		<i>single side cooling</i>	<b>10</b>	

### Transient Thermal Impedance

Analytical function for transient thermal impedance

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

Conditions:

$F_m = 22 \pm 2 \text{ kN}$ , Double side cooled

<i>i</i>	1	2	3	4
$R_i$ (K/kW)	<b>11.83</b>	<b>4.26</b>	<b>1.63</b>	<b>2.28</b>
$\tau_i$ (s)	<b>0.432</b>	<b>0.071</b>	<b>0.01</b>	<b>0.0054</b>

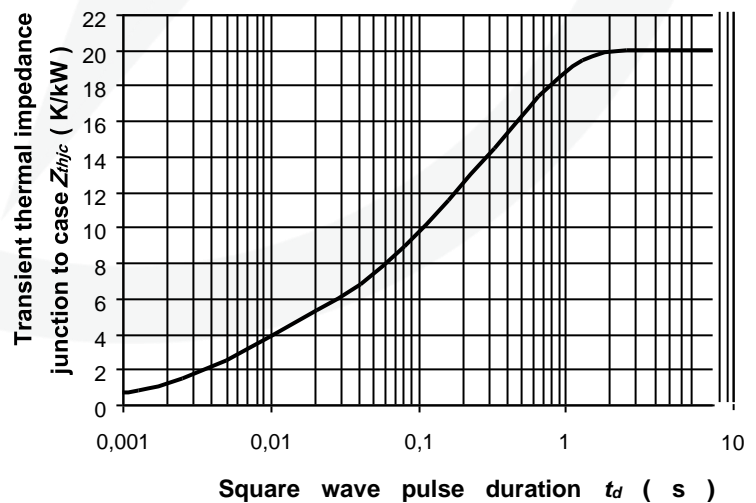


Fig. Transient thermal impedance junction to case

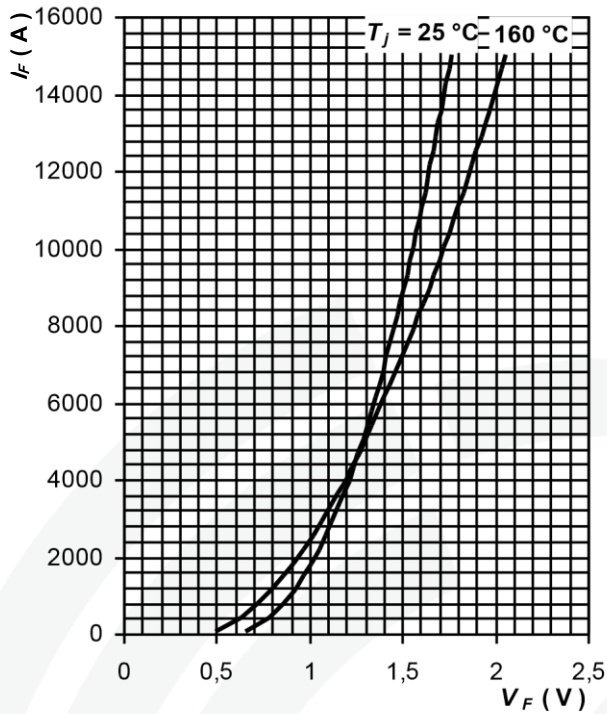


Fig. 3 Maximum forward voltage drop characteristics

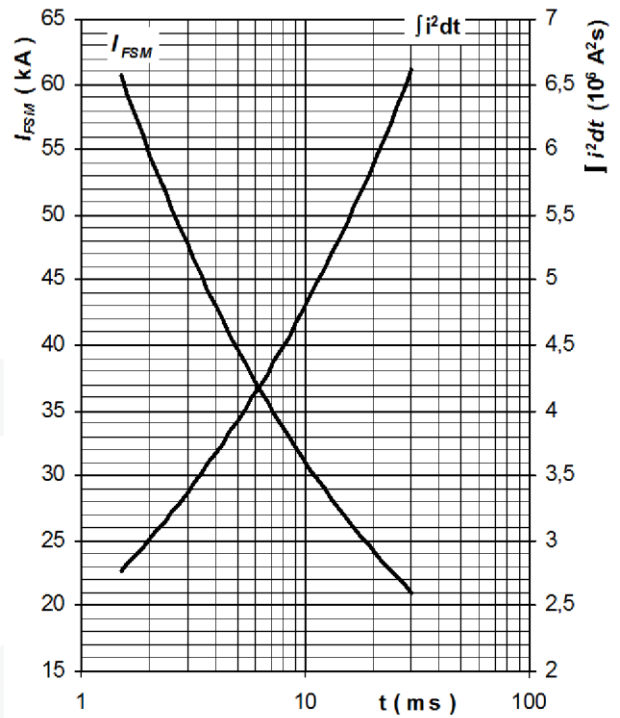


Fig. 4 Surge forward current vs. pulse length, half sine wave, single pulse,  $V_R = 0 V, T_j = T_{jmax}$

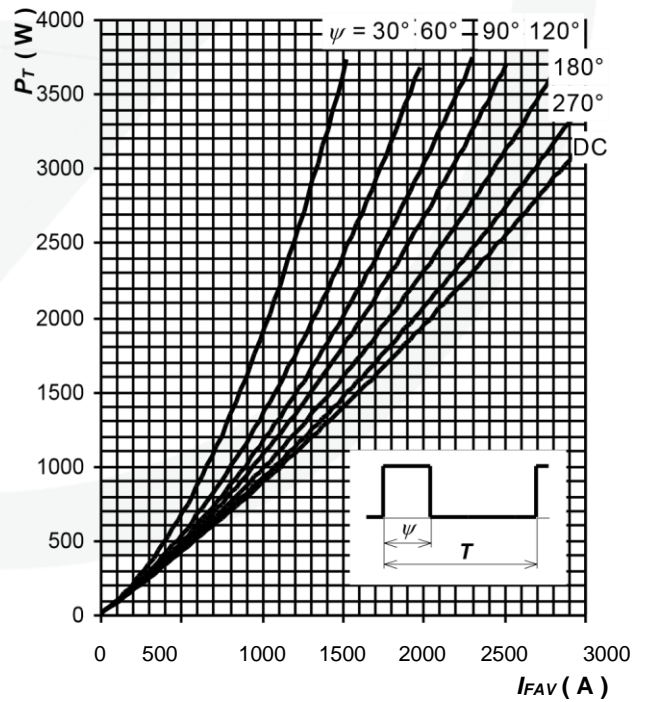
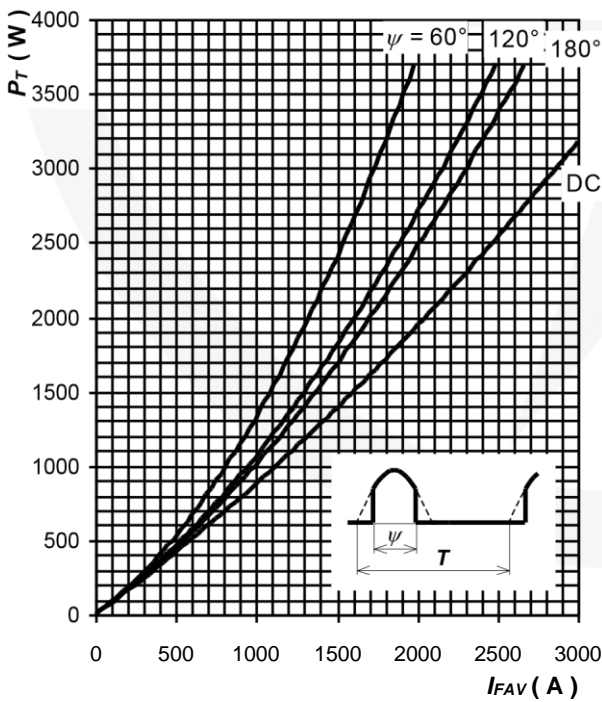


Fig. 5 Forward power loss vs. average forward current, sine waveform,  $f = 50 \text{ Hz}$ ,  $T = 1/f$

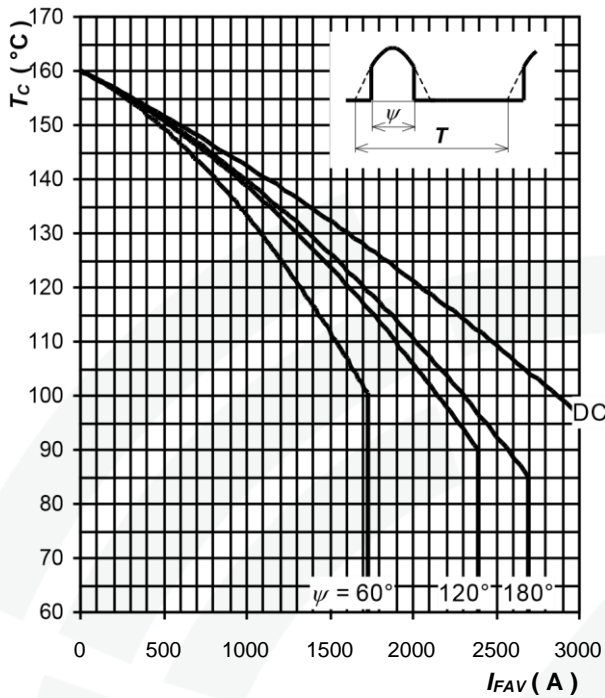


Fig. 6 Forward power loss vs. average forward current, square waveform,  $f = 50 \text{ Hz}$ ,  $T = 1/f$

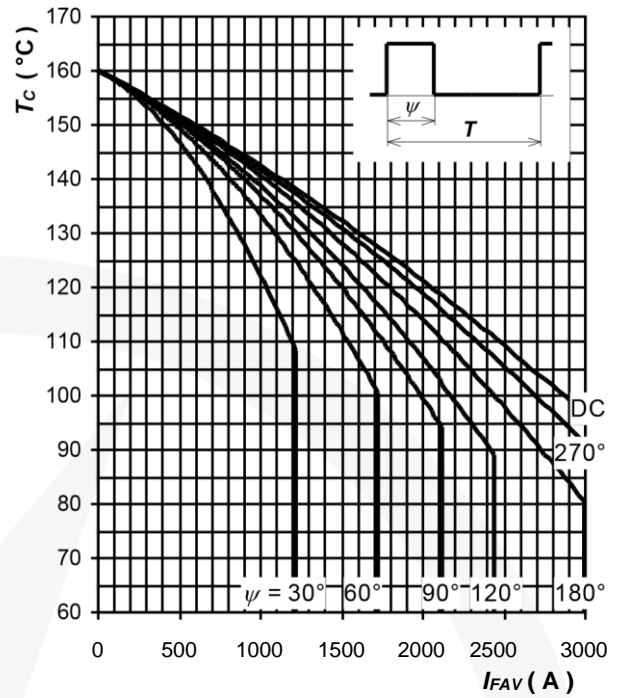


Fig. 7 Max. case temperature vs. aver. forward current, sine waveform,  $f = 50 \text{ Hz}$ ,  $T = 1/f$

Notes:

Fig. 8 Max. case temperature vs. aver. forward current, square waveform,  $f = 50 \text{ Hz}$ ,  $T = 1/f$