



5SDA 14F5007

Old part no. DA 808-1410-50

Avalanche Diode

Properties

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

Key Parameters

V_{RRM}	=	5 000	V
I_{FAVm}	=	1 410	A
I_{FSM}	=	17 500	A
V_{TO}	=	1.130	V
r_T	=	0.440	mΩ

Types

	V_{RRM}
5SDA 14F5007	5 000 V
5SDA 14F4407	4 400 V
Conditions: $T_j = -40 \div 160 \text{ }^\circ\text{C}$, half sine waveform, $f = 50 \text{ Hz}$	

Mechanical Data

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

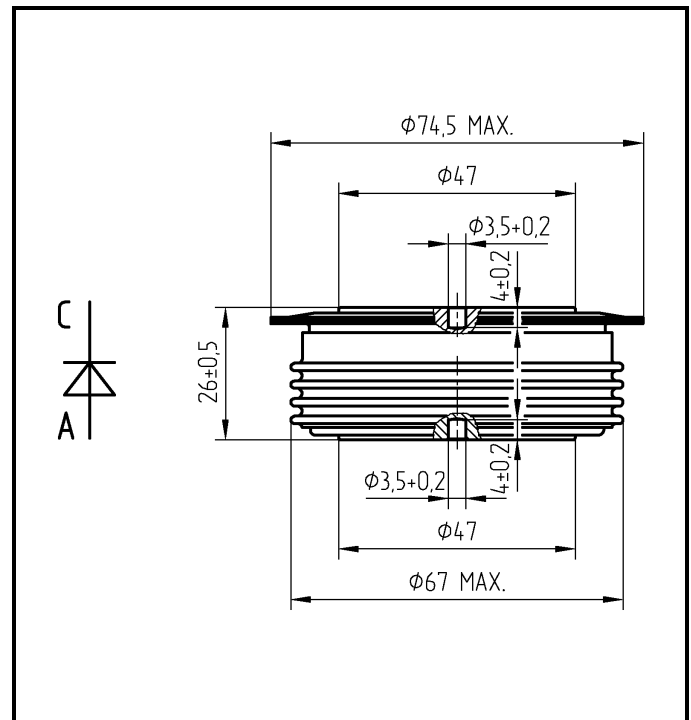


Fig. 1 Case



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Maximum Ratings			Maximum Limits	Unit
V_{RRM}	Repetitive peak reverse voltage $T_j = -40 \div 160 \text{ }^\circ\text{C}$	5SDA 14F5007 5SDA 14F4407	5 000 4 400	V
I_{FAVm}	Average forward current $T_c = 85 \text{ }^\circ\text{C}$		1 410	A
I_{FRMS}	RMS forward current $T_c = 85 \text{ }^\circ\text{C}$		2 210	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	$t_p = 8.3 \text{ ms}$	18 700	A
		$t_p = 10 \text{ ms}$	17 500	A
I^2t	Limiting load integral $V_R = 0 \text{ V}$, half sine pulse	$t_p = 8.3 \text{ ms}$	1 450 000	A²s
		$t_p = 10 \text{ ms}$	1 531 000	A²s
P_{RSM}	Maximum avalanche power dissipation <i>rectangular pulse 20 μs</i>		50	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
		<i>min</i>	<i>typ</i>	<i>max</i>	
V_{TO}	Threshold voltage			1.130	V
r_T	Forward slope resistance $I_F = 1000 \div 3000 \text{ A}$			0.440	mΩ
V_{FM}	Maximum forward voltage $I_{FM} = 4\,000 \text{ A}$			2.880	V
Q_{rr}	Recovered charge $V_R = 100 \text{ V}$, $I_{FM} = 2\,000 \text{ A}$, $di_F/dt = -5 \text{ A}/\mu\text{s}$		4 250		μC

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

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

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Transient Thermal Impedance

Analytical function for transient thermal impedance

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

Conditions:

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

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

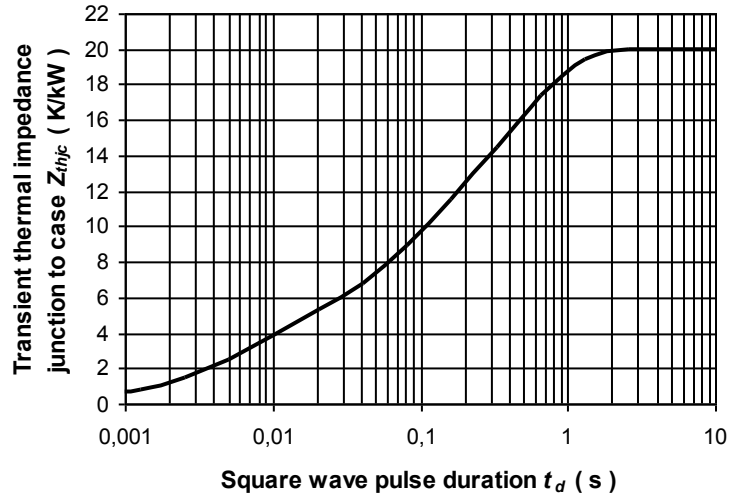


Fig. 2 Transient thermal impedance junction to case

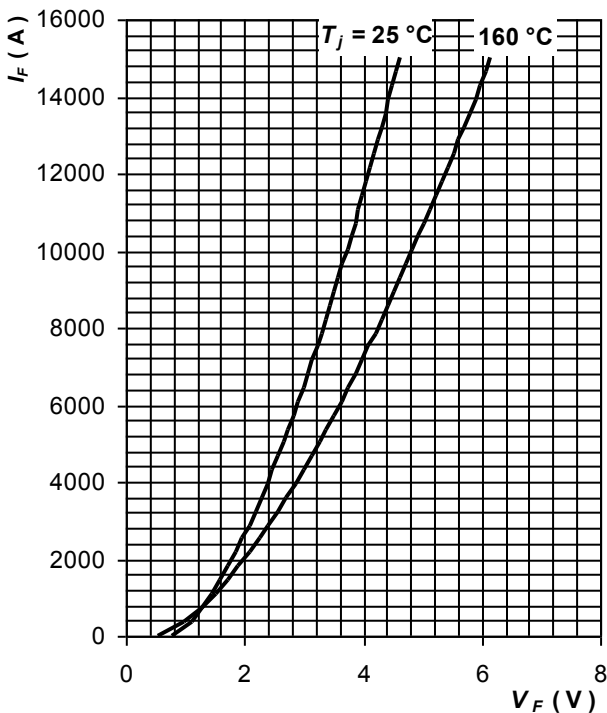


Fig. 3 Maximum forward voltage drop characteristics

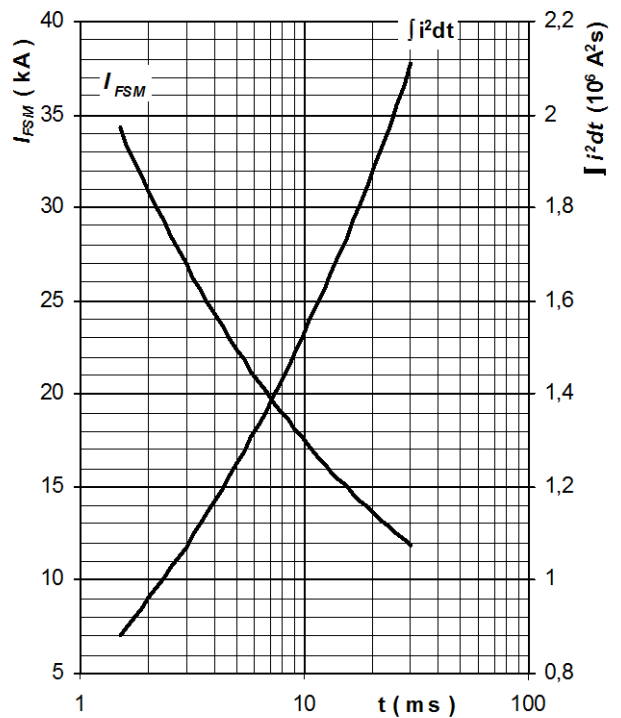


Fig. 4 Surge forward current vs. pulse length, half sine wave, single pulse, $V_R = 0$ V, $T_j = T_{jmax}$

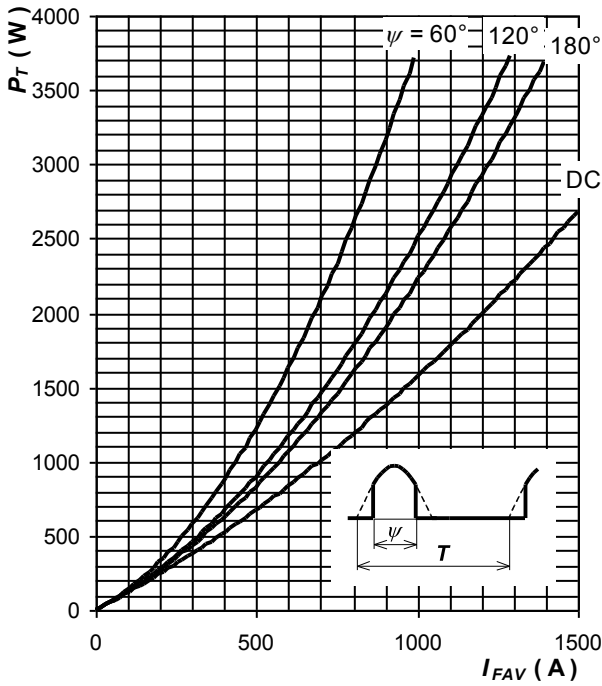


Fig. 5 Forward power loss vs. average forward current, sine waveform, $f = 50 \text{ Hz}$, $T = 1/f$

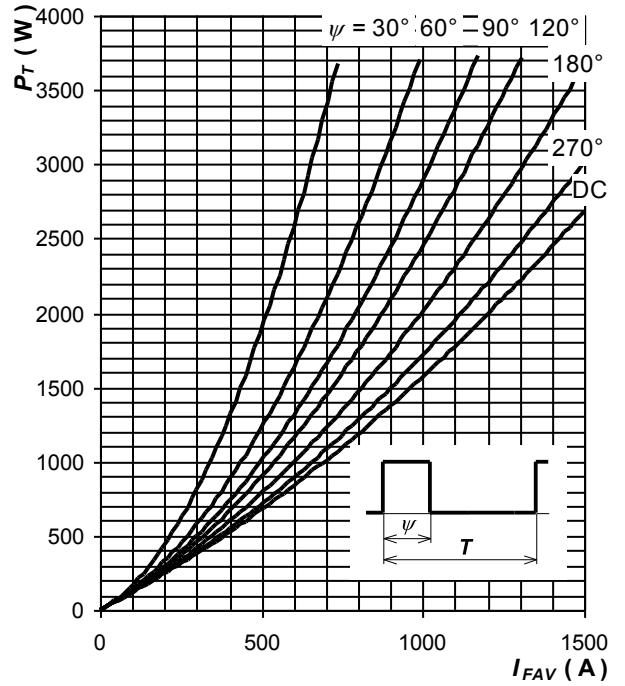


Fig. 6 Forward power loss vs. average forward current, square waveform, $f = 50 \text{ Hz}$, $T = 1/f$

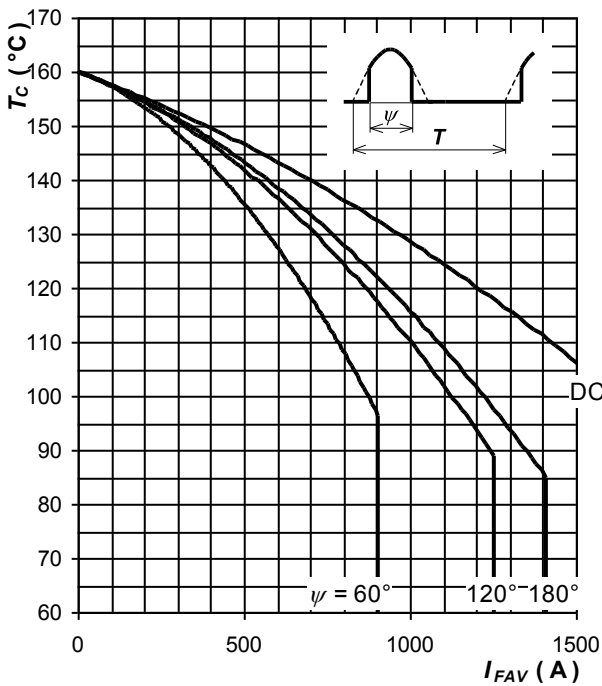


Fig. 7 Max. case temperature vs. aver. forward current, sine waveform, $f = 50 \text{ Hz}$, $T = 1/f$

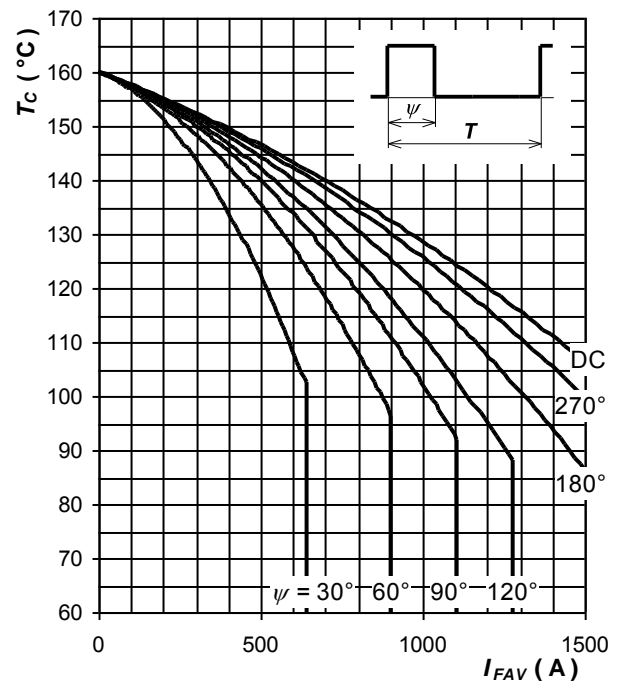


Fig. 8 Max. case temperature vs. aver. forward current, square waveform, $f = 50 \text{ Hz}$, $T = 1/f$

Notes:

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