

DA 807-970-23

Avalanche Diode

Properties

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

Key Parameters

V_{RRM}	=	2 300	V
I_{FAVm}	=	1 140	A
I_{FSM}	=	13 500	A
V_{TO}	=	0.830	V
r_T	=	0.300	$\text{m}\Omega$

Types

	V_{RRM}
DA 807-970-23	2 300 V
DA 807-970-20	2 000 V
DA 807-970-17	1 700 V

Conditions: $T_j = -40 \div 160^\circ\text{C}$,
half sine waveform,
 $f = 50 \text{ Hz}$

Mechanical Data

F_m	Mounting force	$11 \pm 1 \text{ kN}$
m	Weight	0.23 kg
D_s	Surface creepage distance	30 mm
D_a	Air strike distance	20.5 mm

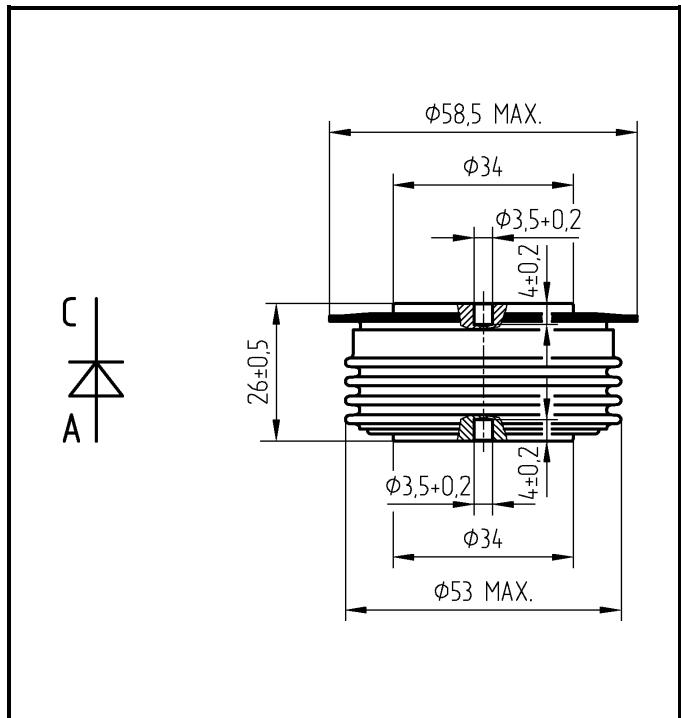


Fig. 1 Case

Maximum Ratings			Maximum Limits	Unit
V_{RRM}	Repetitive peak reverse voltage $T_j = -40 \div 160^\circ\text{C}$	DA 807-970-23 DA 807-970-20 DA 807-970-17	2 300 2 000 1 700	V
I_{FAVm}	Average forward current $T_c = 85^\circ\text{C}$		1 140	A
I_{FRMS}	RMS forward current $T_c = 85^\circ\text{C}$		1 790	A
I_{RRM}	Repetitive reverse current $V_R = V_{RRM}$		50	mA
I_{FSM}	Non repetitive peak surge current $V_R = 0 \text{ V, half sine pulse}$	$t_p = 8.3 \text{ ms}$	14 400	A
		$t_p = 10 \text{ ms}$	13 500	A
I^2t	Limiting load integral $V_R = 0 \text{ V, half sine pulse}$	$t_p = 8.3 \text{ ms}$	860 000	A^2s
		$t_p = 10 \text{ ms}$	911 000	A^2s
P_{RSM}	Maximum avalanche power dissipation rectangular pulse 20 μs		50	kW
$T_{jmin} \text{ - } T_{jmax}$	Operating temperature range		-40 \div 160	$^\circ\text{C}$
T_{STG}	Storage temperature range		-40 \div 160	$^\circ\text{C}$

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

Characteristics			Value	Unit		
			<i>min</i>	<i>typ</i>	<i>max</i>	
V_{T0}	Threshold voltage				0.830	V
r_T	Forward slope resistance $I_F = 1000 \div 3000 \text{ A}$				0.300	$\text{m}\Omega$
V_{FM}	Maximum forward voltage $I_{FM} = 1 800 \text{ A, } T_j = 25^\circ\text{C}$				1.350	V
Q_{rr}	Recovered charge $V_R = 100 \text{ V, } I_{FM} = 1 000 \text{ A, } di_F/dt = -5 \text{ A}/\mu\text{s}$			640		μC

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

Thermal Parameters			Value	Unit
R_{thjc}	Thermal resistance junction to case	<i>double side cooling</i>	40	K/kW
		<i>anode side cooling</i>	65	
		<i>cathode side cooling</i>	104	
R_{thch}	Thermal resistance case to heatsink	<i>double side cooling</i>	10	K/kW
		<i>single side cooling</i>	20	

Transient Thermal Impedance

Analytical function for transient thermal impedance

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

Conditions:

$F_m = 11 \pm 1 \text{ kN}$, Double side cooled

i	1	2	3	4
$R_i (\text{K/kW})$	20.95	10.57	7.15	1.33
$\tau_i (\text{s})$	0.396	0.072	0.009	0.0044

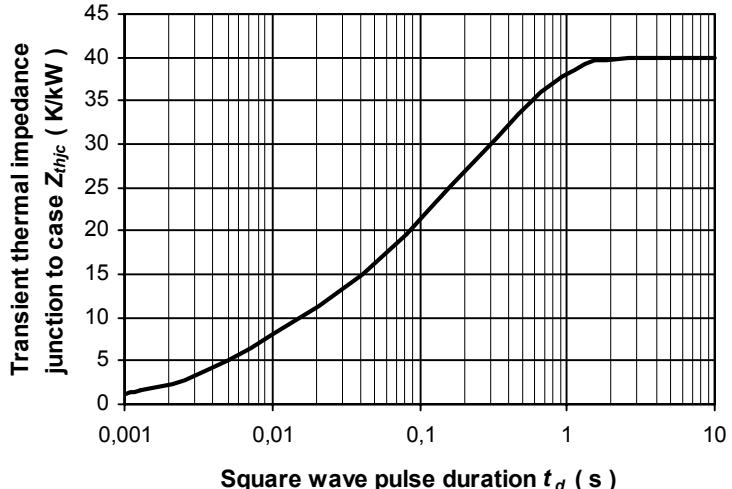


Fig. 2 Transient thermal impedance junction to case

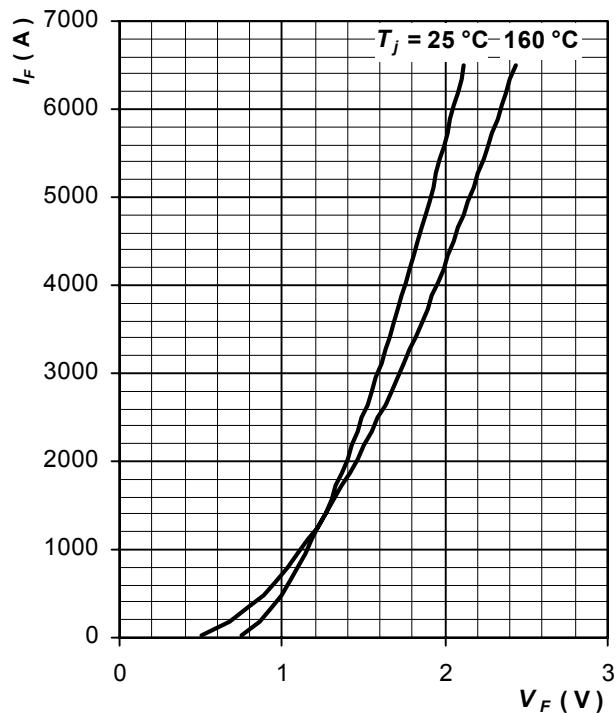


Fig. 3 Maximum forward voltage drop characteristics

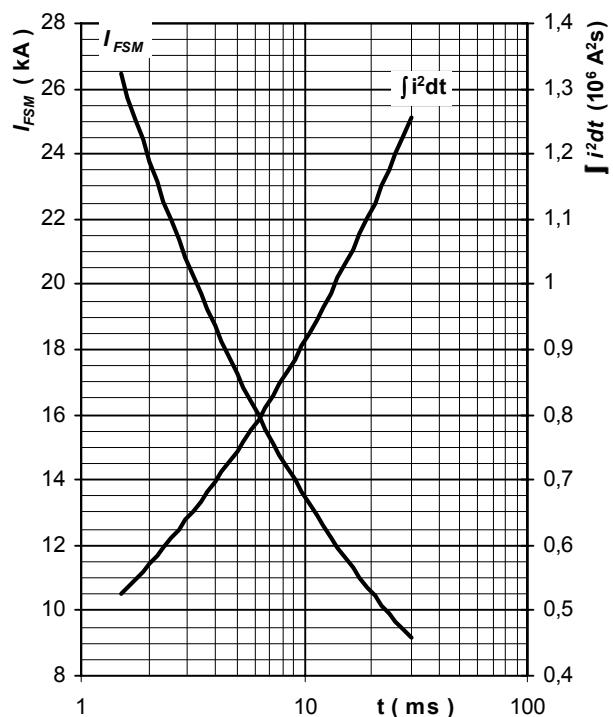


Fig. 4 Surge forward current vs. pulse length, half sine wave, single pulse,
 $V_R = 0 \text{ V}$, $T_j = T_{jmax}$

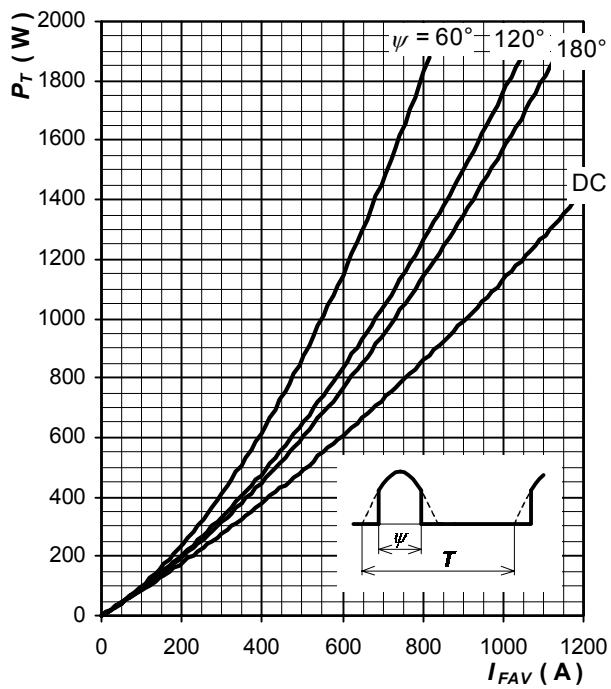


Fig. 5 Forward power loss vs. average forward current, sine waveform, $f = 50$ Hz, $T = 1/f$

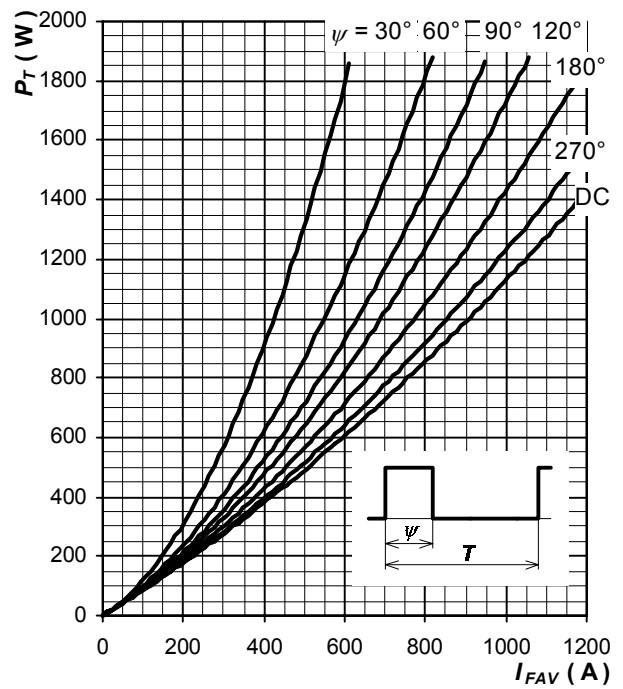


Fig. 6 Forward power loss vs. average forward current, square waveform, $f = 50$ Hz, $T = 1/f$

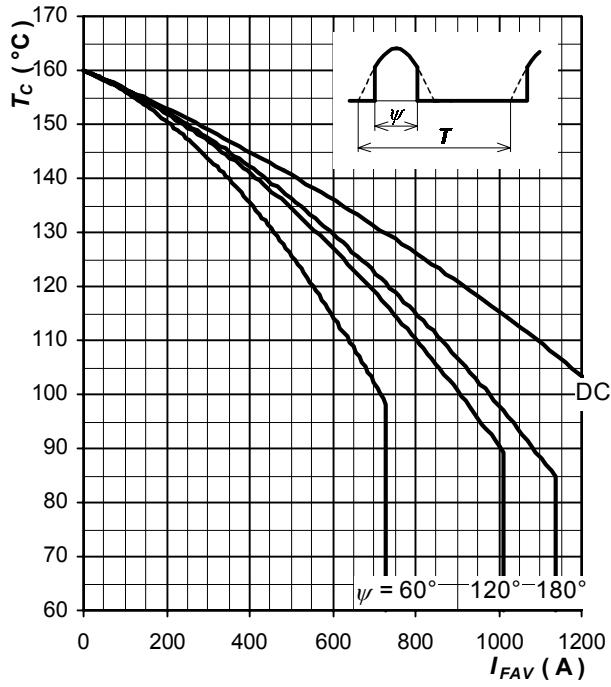


Fig. 7 Max. case temperature vs. aver. forward current, sine waveform, $f = 50$ Hz, $T = 1/f$

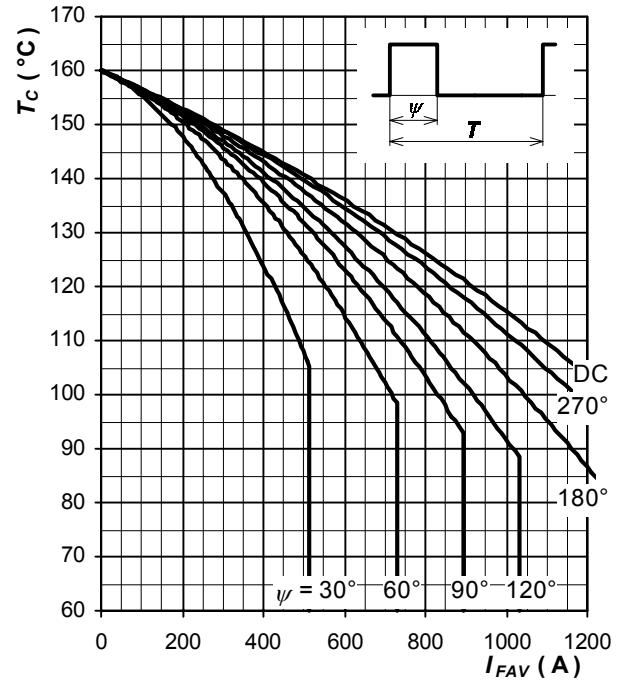


Fig. 8 Max. case temperature vs. aver. forward current, square waveform, $f = 50$ Hz, $T = 1/f$

Notes