Key Parameters

V_{RRM} = 3800 V
I_{FAVM} = 790 A
I_{FSM} = 7.6 kA
V_{F0} = 1.01 V
r_F = 0.72 mΩ

Avalanche Rectifier Diode
5SDA 07D3806

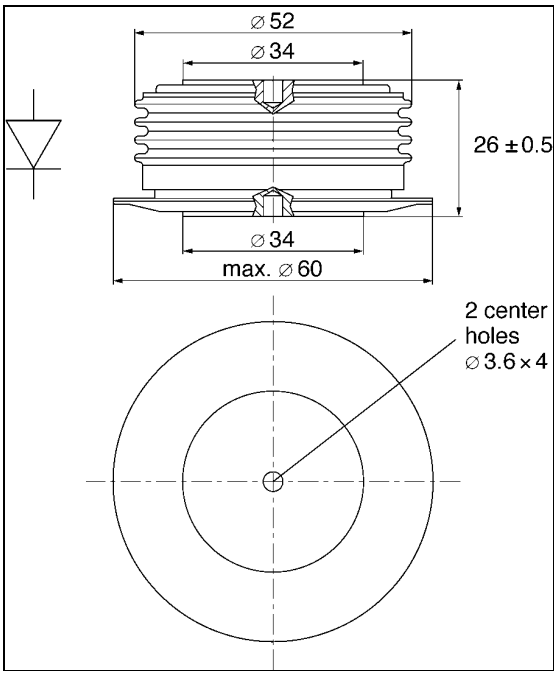
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Features

- **Optimized for line frequency rectifiers**
- **Low on-state voltage, narrow V_F-bands for parallel operation**
- **Self protected against transient overvoltages**
- **Guaranteed maximum avalanche power dissipation**
- **Industry standard housing**

Blocking

Part number	5SDA 07D3806	5SDA 0763206	Condition
V_{RRM}	3800	3200	f = 50 Hz t_P = 10 ms
V_{RSM}	4180	3520	t_P = 10 ms T_j = 160°C
I_{RRM}	≤ 50 mA		V_{RRM} T_j = 160°C
P_{RSM}	≤ 70 kW		t_P = 20 µs T_j = 45°C
	≤ 50 kW		t_P = 20 µs T_j = 160°C



Mechanical data

F_M	Mounting force	min.	10	kN
		max.	12	kN
a	Acceleration			
	Device unclamped		50	m/s^2
	Device clamped		200	m/s^2
m	Weight		0.25	kg
D_S	Surface creepage distance		30	mm
D_a	Air strike distance		20.5	mm

On-state

I_{FAVM}	Max. average on-state current	790 A	Half sine wave, T_C = 85°C				
I_{FRMS}	Max. RMS on-state current	1240 A					
I_{FSM}	Max. peak non-repetitive surge current	7.6 kA	tp	=	10 ms	T_j =	160°C
		8.2 kA	tp	=	8.3 ms	After surge:	
I^2t	Limiting load integral	$290 \cdot 10^3$ A^2s	tp	=	10 ms	$V_D = V_R$ = 0V	
		$280 \cdot 10^3$ A^2s	tp	=	8.3 ms		
V_{F0}	Threshold voltage	1.01 V	I_F	=	800 - 2400 A	T_j =	160°C
r_F	Slope resistance	0.72 mΩ					
$V_{F\,min}$	On-state voltage	1.70 V	I_F	=	1800 A	T_j =	25°C
$V_{F\,max}$	On-state voltage	2.00 V					

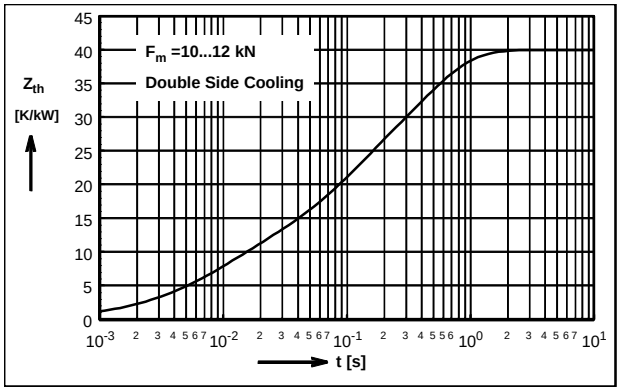
Thermal

T_j	Storage and operating junction temperature range	-40...160°C	
R_{thJC}	Thermal resistance junction to case	80 K/kW	Anode side cooled
		80 K/kW	Cathode side cooled
		40 K/kW	Double side cooled
R_{thCH}	Thermal resistance case to heat sink	16 K/kW	Single side cooled
		8 K/kW	Double side cooled

Analytical function for transient thermal impedance:

$$Z_{thJC}(t) = \sum_{i=1}^{4} R_i(1 - e^{-t/t_i})$$

i	1	2	3	4
$R_{(K/kW)}$	20.95	10.57	7.15	1.33
τ_i (s)	0.396	0.072	0.009	0.0044



For a given case temperature T_c at ambient temperature T_a the maximum on-state current can be calculated as follows:

$$I_{FAVM} = \frac{-V_{F0} + \sqrt{(V_{F0})^2 + 4 * f^2 * r_f * P}}{2 * f^2 * r_f}$$

where $P = \frac{T_{J\,max} - T_C}{R_{thjc}}$ or $P = \frac{T_{J\,max} - T_A}{R_{thja}}$

I_{FAVM} (A) P (W) V_{F0} (V) r_F (Ω)
T_{max} (°C) T_c (°C) T_a (°C)
R_{thja} (K/kW) R_{thJC} (K/kW)

f^2 = 1 for DC current
2.5 for half-sine wave
3.1 for 120°el., sine
6 for 60° el., sine

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