Contact diameter	=	**143 mm**
V_{RSM}	=	**8500 V**
$I_{F(AV)M}$	=	**6720 A**
$I_{F(RMS)}$	=	**10'560 A**
I_{FSM}	=	**$121 \cdot 10^3$ A**
V_{F0}	=	**0.945 V**
r_F	=	**0.118 mΩ**

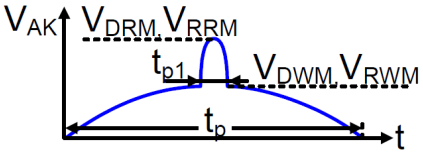
Rectifier Diode
5SDD 75Y8500

Doc. No. 5SYA 1189-02 Mar. 20

- **Patented free-floating silicon technology**
- **Low on-state and switching losses**
- **Optimum power handling capability**

Blocking

Maximum rated values [1)]

Parameter	Symbol	Conditions		Value	Unit
Max repetitive peak reverse voltage	V_{RRM}	f = 50 Hz, t_p = 10 ms, t_{p1} = 250 µs, T_{vj} = 0…150 °C, Note 1, Note 2		8500	V
Max non-repetitive peak reverse voltage	V_{RSM}	t_p = 10 ms, f = 5 Hz T_{vj} = 0 … 150 °C, Note 1		8500	V
Max. crest working reverse voltage	V_{RWM}	f = 50 Hz, t_p = 10 ms, t_{p1} = 250 µs, T_{vj} = 0…150 °C, Note 1, Note 2		5700	V

Characteristic values

Parameter	Symbol	Conditions	min	typ	max	Unit
Reverse leakage current	I_{RRM}	V_{RRM}, T_{vj} = 150 °C			2000	mA

Note 1: Voltage derating factor of 0.11% per °C is applicable for Tvj below +25 °C.
Note 2: Recommended minimum ratio of VRRM / VRWM = 2. See Application Note 5SYA 2051

Mechanical data

Maximum rated values [1)]

Parameter	Symbol	Conditions	min	typ	max	Unit
Mounting force	F_M		170	190	210	kN
Acceleration	a	Device unclamped			50	m/s^2
Acceleration	a	Device clamped			100	m/s^2

Characteristic values

Parameter	Symbol	Conditions	min	typ	max	Unit
Weight	m				5.14	kg
Housing thickness	H	F_M = 190 kN, T_a = 25 °C	34.54		35.00	mm
Surface creepage distance	D_S		56			mm
Air strike distance	D_a		22			mm

1) Maximum rated values indicate limits beyond which damage to the device may occur

On-state

Maximum rated values [1)]

Parameter	Symbol	Conditions	min	typ	max	Unit
Average on-state current	$I_{F(AV)M}$	Half sine wave, Tc = 90°C			6720	A
RMS on-state current	$I_{F(RMS)}$				10’560	A
Peak non-repetitive surge current	I_{FSM}	t_p = 10 ms, T_{vj} = 150 °C, sine half wave, V_R= 0 V, after surge			$121 \cdot 10^3$	A
Limiting load integral	I^2t				$73.2 \cdot 10^6$	A^2s

Characteristic values

Parameter	Symbol	Conditions	min	typ	max	Unit
On-state voltage	V_F	I_F = 6000 A, T_{vj} = 150 °C			1.65	V
Threshold voltage	V_{F0}	T_{vj} = 150 °C, I_F = 4000...8000 A			0.945	V
Slope resistance	r_F				0.118	mΩ

Switching

Characteristic values

Parameter	Symbol	Conditions	min	typ	max	Unit
Reverse recovery charge	Q_{rr}	di_F/dt = -10 A/µs, V_R = 200 V, I_F = 4000 A, T_{vj} = 150 °C			45’000	µAs
Reverse recovery current	I_{RM}				650	A

Thermal

Maximum rated values [1)]

Parameter	Symbol	Conditions	min	typ	max	Unit
Operating junction temperature range	T_{vj}		0		150	°C
Storage temperature range	T_{stg}		-40		150	°C

Characteristic values

Parameter	Symbol	Conditions	min	typ	max	Unit
Thermal resistance junction to case	$R_{th(j-c)}$	Double-side cooled F_m = 170... 210 kN			3	K/kW
	$R_{th(j-c)A}$	Anode-side cooled F_m = 170... 210 kN			6	K/kW
	$R_{th(j-c)C}$	Cathode-side cooled F_m = 170... 210 kN			6	K/kW
Thermal resistance case to heatsink	$R_{th(c-h)}$	Double-side cooled F_m = 170... 210 kN			0.6	K/kW
	$R_{th(c-h)}$	Single-side cooled F_m = 170... 210 kN			1.2	K/kW

Analytical function for transient thermal impedance:

$$Z_{th(j-c)}(t) = \sum_{i=1}^{n} R_i(1 - e^{-t/\tau_i})$$

i	1	2	3	4
R_i(K/kW)	2.010	0.615	0.279	0.097
τ_i(s)	0.9165	0.1284	0.0152	0.0037

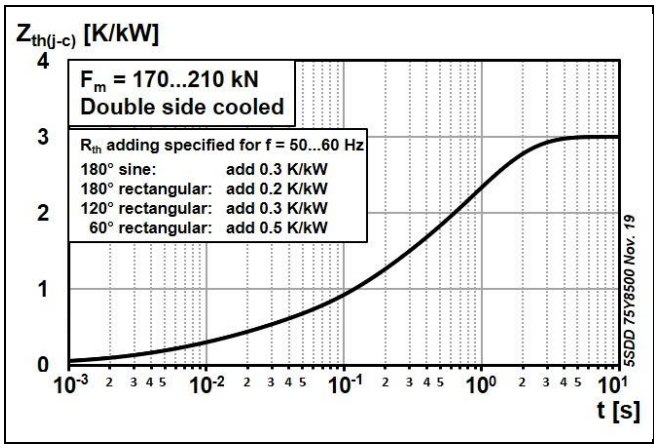


Fig. 1 Transient thermal impedance (junction-to-case) vs. time

Max. on-state characteristic model:

$$V_{F25} = A_{Tvj} + B_{Tvj} \cdot I_F + C_{Tvj} \cdot \ln(I_F + 1) + D_{Tvj} \cdot \sqrt{I_F}$$

Valid for I_F = 200-120000 A

A_{25}	B_{25}	C_{25}	D_{25}
$349.4 \cdot 10^{-3}$	$47.04 \cdot 10^{-6}$	$84.56 \cdot 10^{-3}$	$1.468 \cdot 10^{-3}$

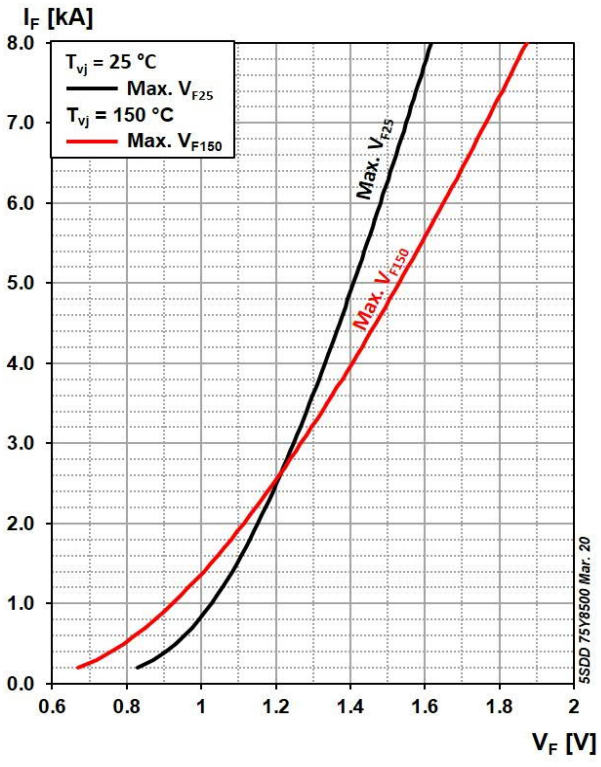


Fig. 2 On-state voltage characteristics

Max. on-state characteristic model:

$$V_{F150} = A_{Tvj} + B_{Tvj} \cdot I_F + C_{Tvj} \cdot \ln(I_F + 1) + D_{Tvj} \cdot \sqrt{I_F}$$

Valid for I_F = 200-120000 A

A_{150}	B_{150}	C_{150}	D_{150}
$294.6 \cdot 10^{-3}$	$61.05 \cdot 10^{-6}$	$48.88 \cdot 10^{-3}$	$7.279 \cdot 10^{-3}$

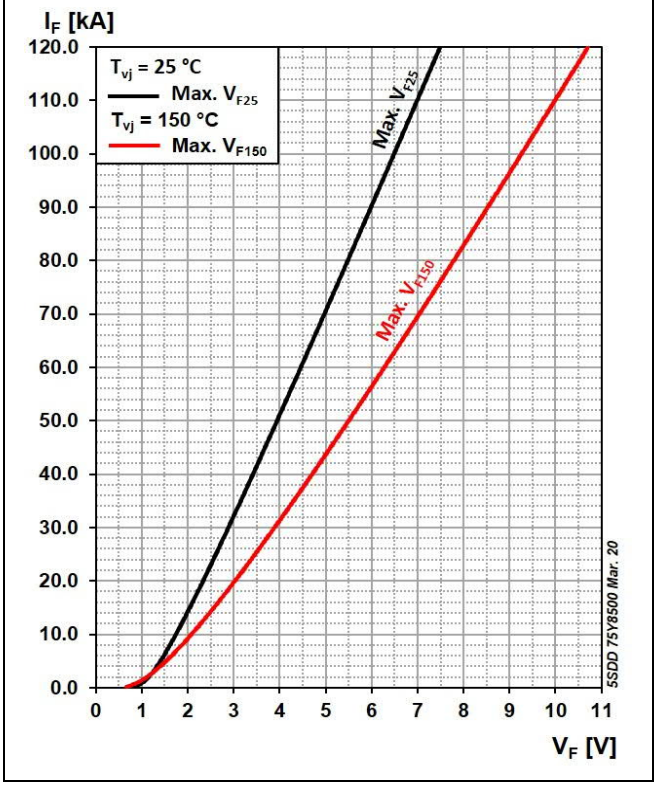


Fig. 3 On-state voltage characteristics

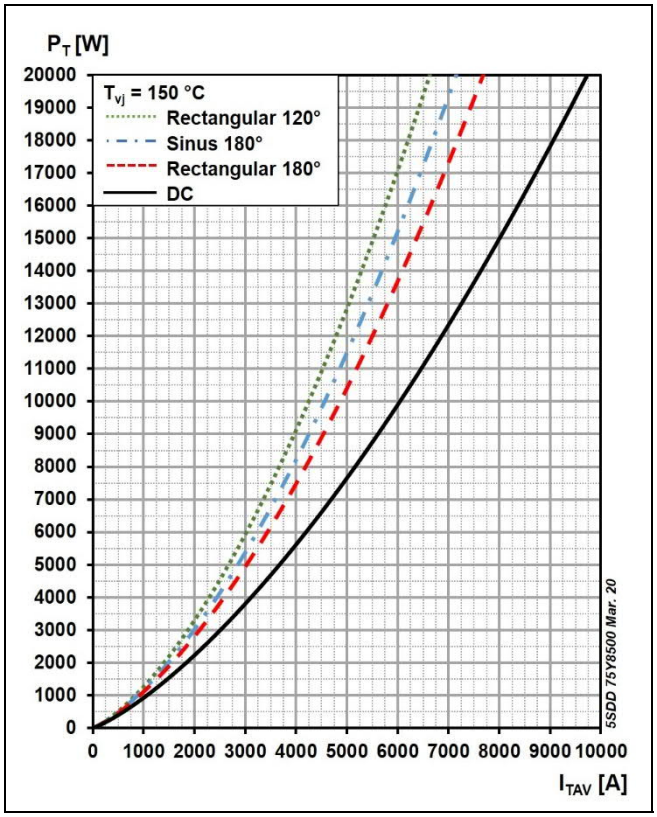


Fig. 4 On-state power dissipation vs. mean on-state current

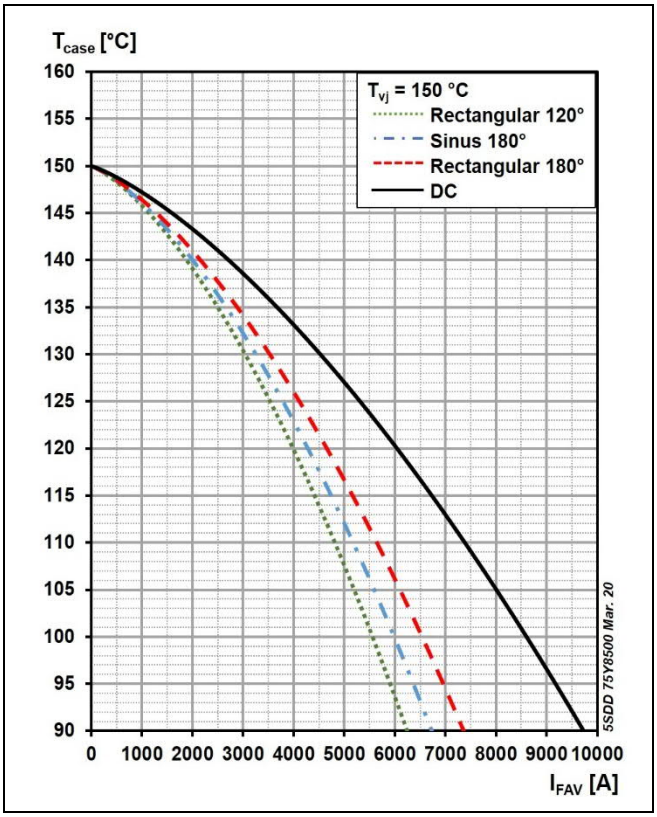


Fig. 5 Max. permissible case temperature vs. mean on-state current

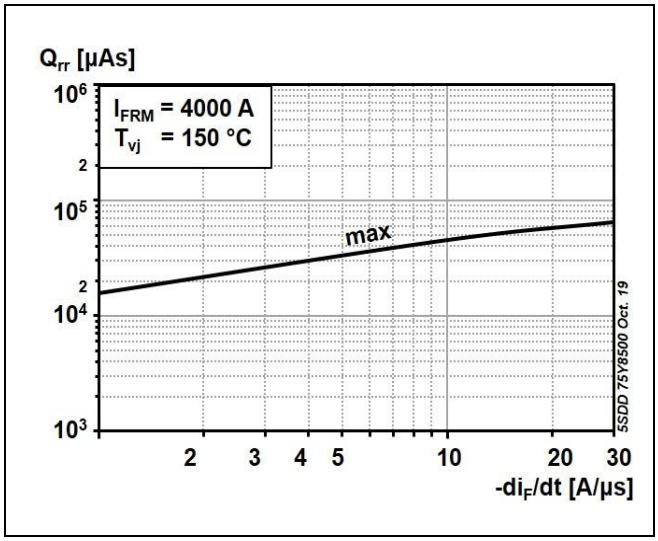


Fig. 6 Reverse recovery charge vs. decay rate of on-state current

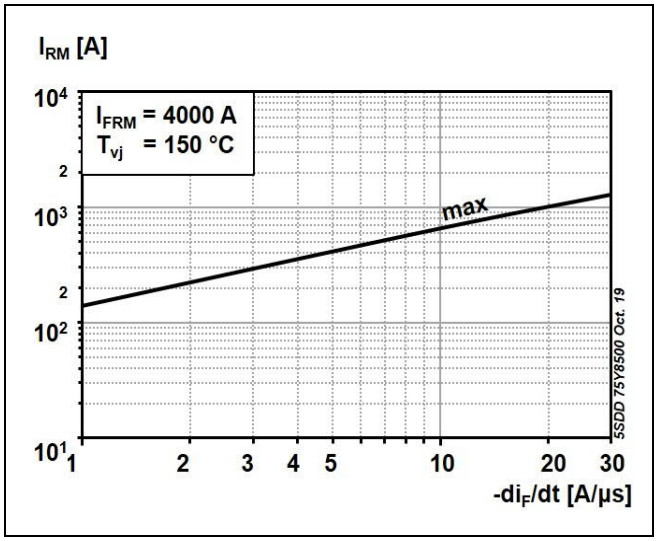


Fig. 7 Peak reverse recovery current vs. decay rate of on-state current

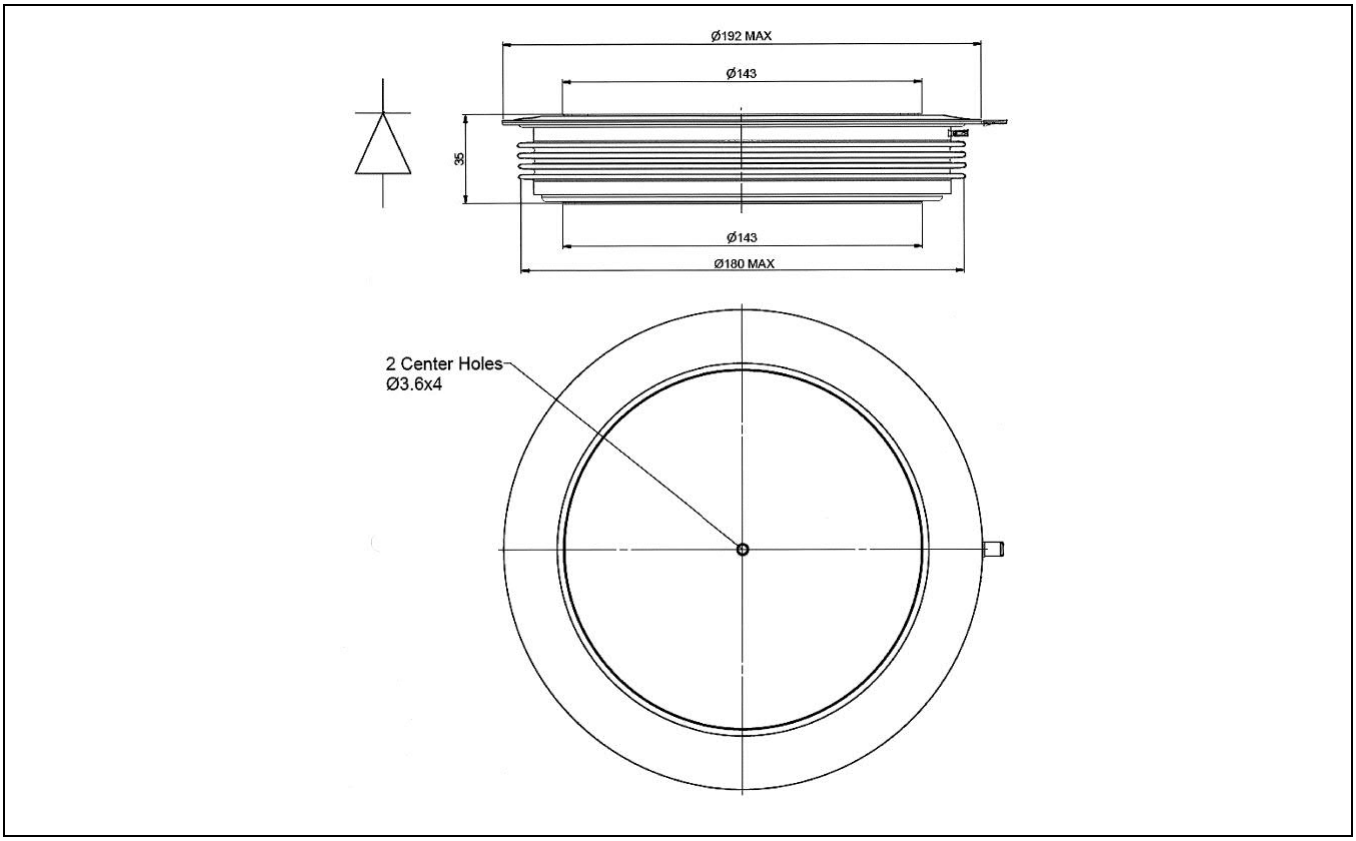


Fig. 8 Device Outline Drawing

Related documents:

5SYA 2029	High Power Rectifier Diodes
5SYA 2036	Recommendations regarding mechanical clamping of Press Pack High Power Semiconductors
5SYA 2048	Field Measurements on High Power Press-Pack Semiconductors
5SYA 2051	Voltage Ratings of High Power Semiconductors
5SZK 9118	General Environmental Conditions for High Power Semiconductors

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