

<b>Contact diameter</b>	=	<b>143 mm</b>
<b>V<sub>RSM</sub></b>	=	<b>8500 V</b>
<b>I<sub>F(AV)M</sub></b>	=	<b>6720 A</b>
<b>I<sub>F(RMS)</sub></b>	=	<b>10'560 A</b>
<b>I<sub>FSM</sub></b>	=	<b>121·10<sup>3</sup> A</b>
<b>V<sub>F0</sub></b>	=	<b>0.945 V</b>
<b>r<sub>F</sub></b>	=	<b>0.118 mΩ</b>

# 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 <sup>1)</sup>

Parameter	Symbol	Conditions		Value	Unit
Max repetitive peak reverse voltage	V <sub>RRM</sub>	f = 50 Hz, t <sub>p</sub> = 10 ms, t <sub>p1</sub> = 250 μs, T <sub>vj</sub> = 0...150 °C, Note 1, Note 2		8500	V
Max non-repetitive peak reverse voltage	V <sub>RSM</sub>	t <sub>p</sub> = 10 ms, f = 5 Hz T <sub>vj</sub> = 0 ... 150 °C, Note 1		8500	V
Max. crest working reverse voltage	V <sub>RWM</sub>	f = 50 Hz, t <sub>p</sub> = 10 ms, t <sub>p1</sub> = 250 μs, T <sub>vj</sub> = 0...150 °C, Note 1, Note 2		5700	V

### Characteristic values

Parameter	Symbol	Conditions	min	typ	max	Unit
Reverse leakage current	I <sub>RRM</sub>	V <sub>RRM</sub> , T <sub>vj</sub> = 150 °C			2000	mA

Note 1: Voltage derating factor of 0.11% per °C is applicable for T<sub>vj</sub> below +25 °C.

Note 2: Recommended minimum ratio of V<sub>RRM</sub> / V<sub>RWM</sub> = 2. See Application Note 5SYA 2051

## Mechanical data

### Maximum rated values <sup>1)</sup>

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

### Characteristic values

Parameter	Symbol	Conditions	min	typ	max	Unit
Weight	m				5.14	kg
Housing thickness	H	$F_M = 190 \text{ kN}$ , $T_a = 25 \text{ °C}$	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 <sup>1)</sup>

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

### Characteristic values

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

## Switching

### Characteristic values

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

## Thermal

### Maximum rated values <sup>1)</sup>

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
$\tau_i$ (s)	0.9165	0.1284	0.0152	0.0037

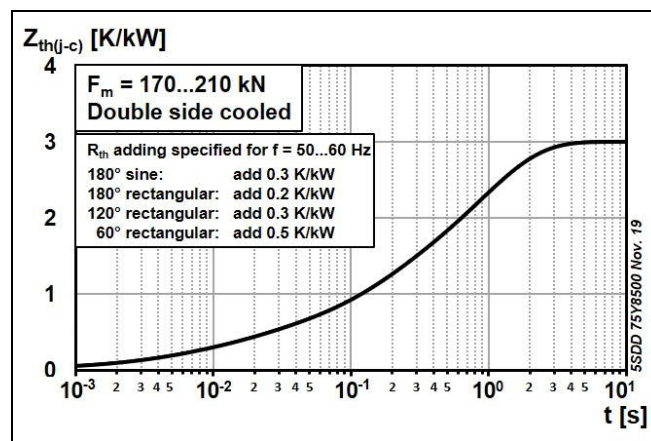
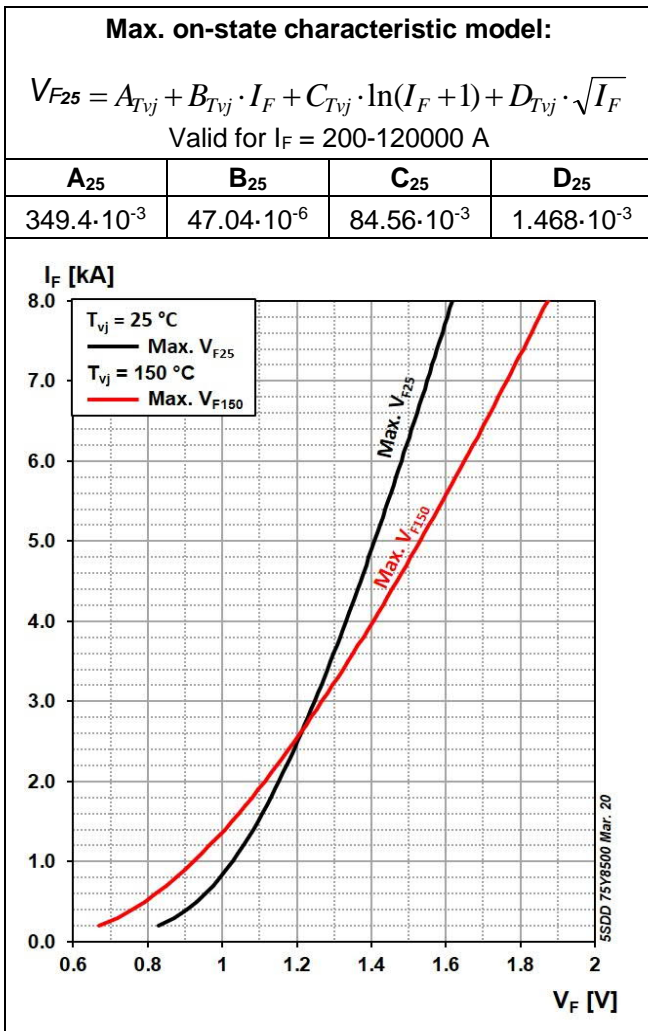
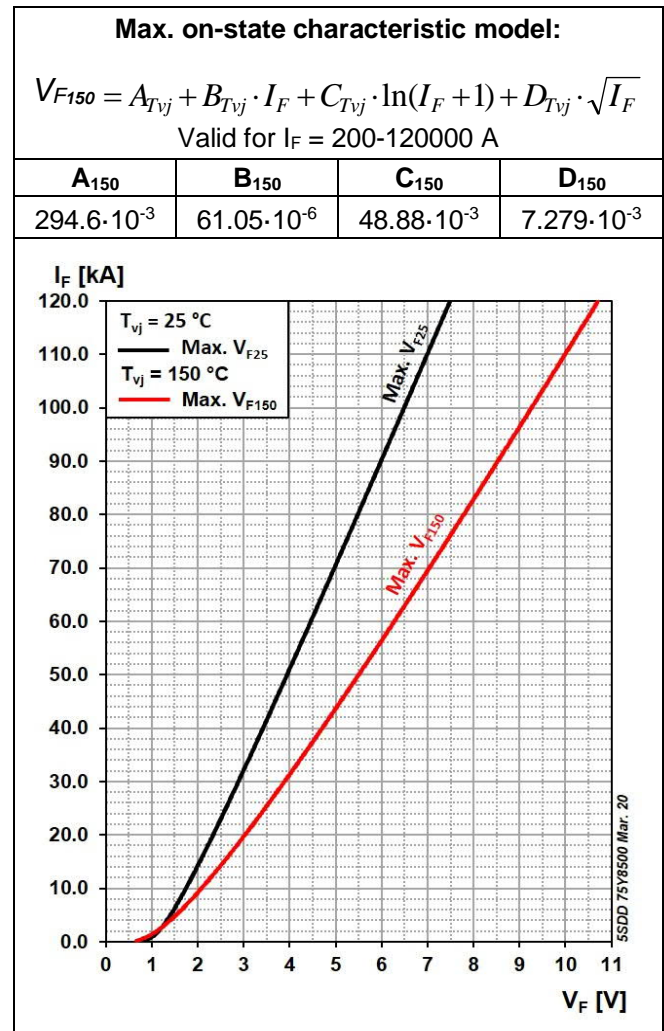


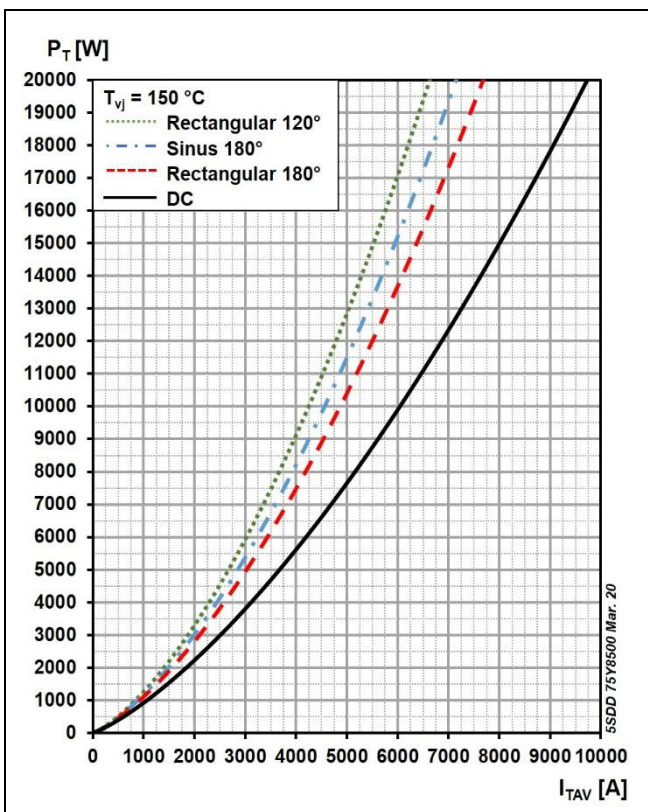
Fig. 1 Transient thermal impedance (junction-to-case) vs. time



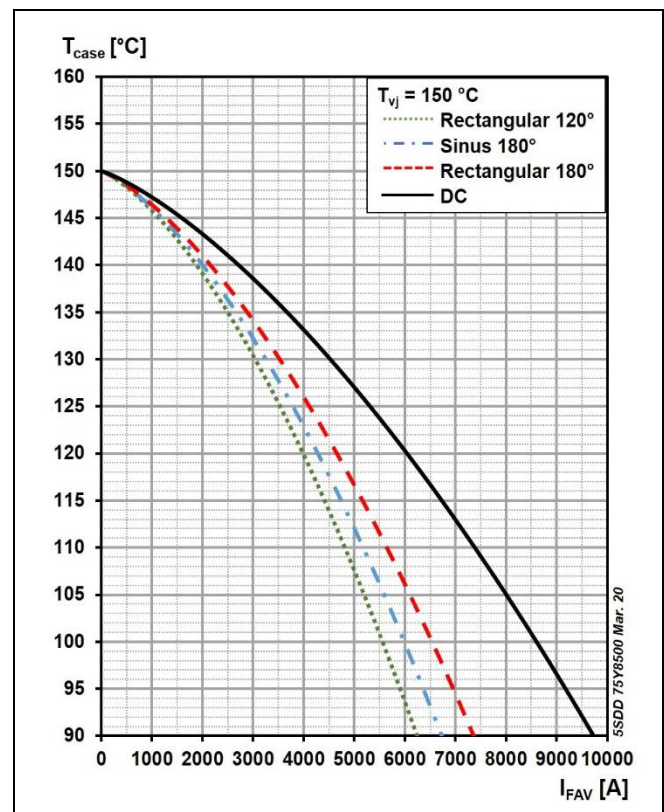
**Fig. 2** On-state voltage characteristics



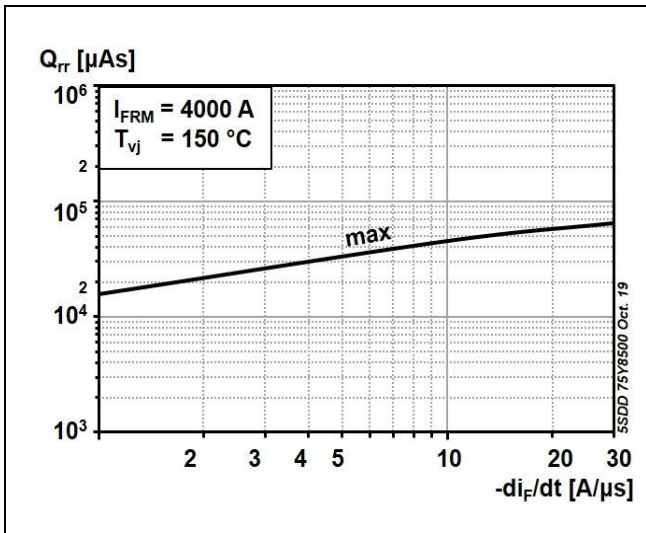
**Fig. 3** On-state voltage characteristics



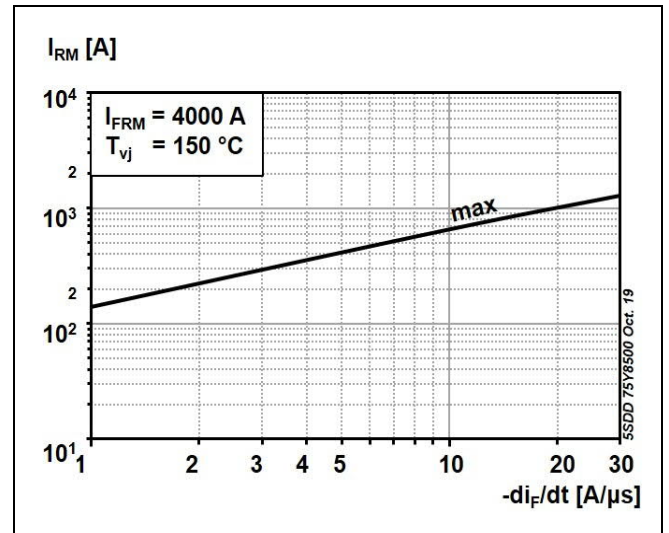
**Fig. 4** On-state power dissipation vs. mean on-state current



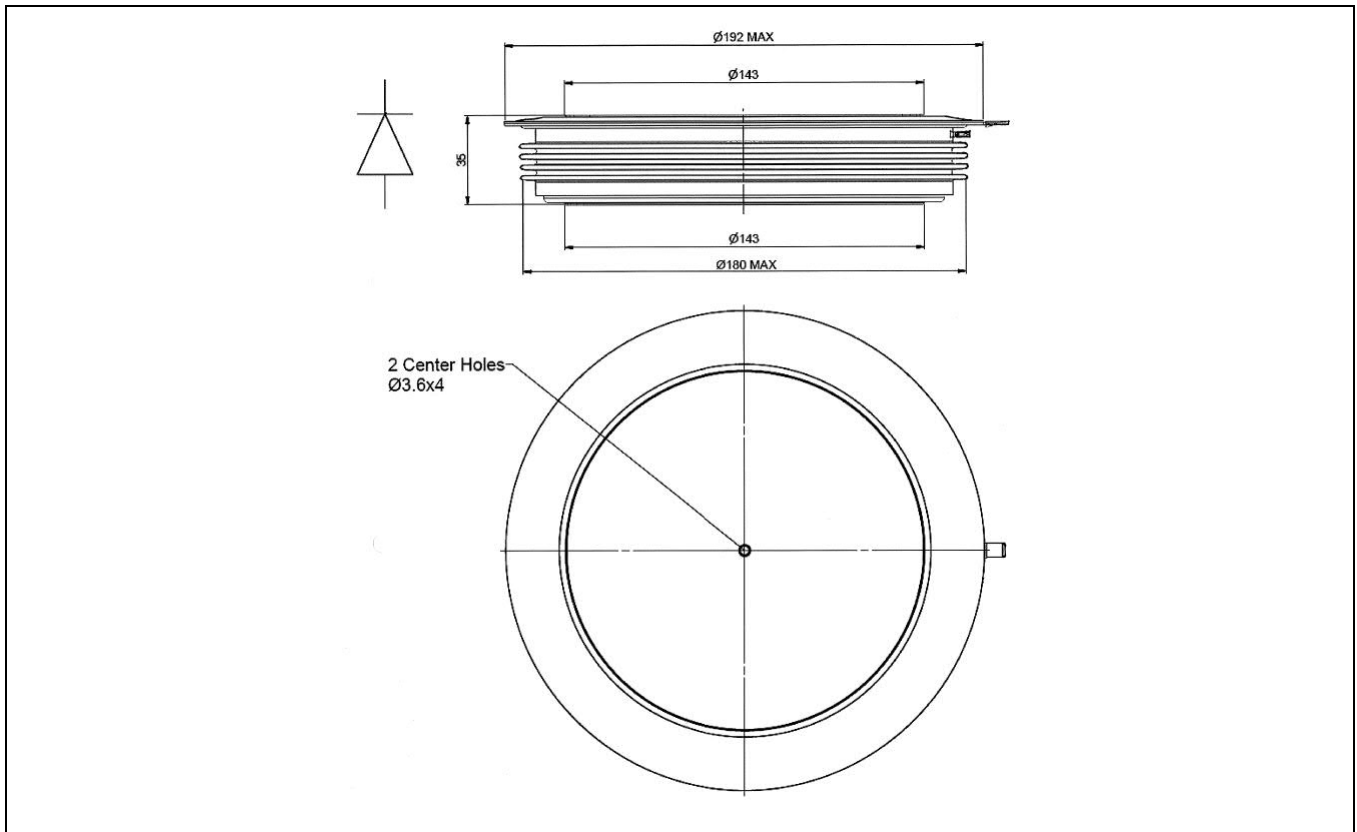
**Fig. 5** Max. permissible case temperature vs. mean on-state current



**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

Please refer to <http://www.hitachiabb-powergrids.com/semiconductors> for current version of documents.

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