V_{RSM}	=	2800	V
$I_{F(AV)M}$	=	7385	A
$I_{F(RMS)}$	=	11600	A
I_{FSM}	=	87×10^{3}	A
V_{F0}	=	0.8	V
r_F	=	0.05	mW

Rectifier Diode
5SDD 60Q2800

Doc. No. 5SYA1161-01 Feb. 05

- **Patented free-floating silicon technology**
- **Very low on-state losses**
- **Optimum power handling capability**

Blocking

Maximum rated values 1)

Parameter	Symbol	Conditions	Value	Unit
Repetitive peak reverse voltage	V_{RRM}	f = 50 Hz, t_p = 10ms, T_j = 160°C	2000	V
Non-repetitive peak reverse voltage	V_{RSM}	f = 5 Hz, t_p = 10ms, T_j = 160°C	2800	V

Characteristic values

Parameter	Symbol	Conditions	min	typ	max	Unit
Max. (reverse) leakage current	I_{RRM}	V_{RRM}, Tj = 160°C			400	mA

Mechanical data

Maximum rated values 1)

Parameter	Symbol	Conditions	min	typ	max	Unit
Mounting force	F_M		81	90	108	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			2.1		kg
Housing thickness	H	F_M = 90 kN, T_a = 25 °C	25.8		26.2	mm
Surface creepage distance	D_S		36			mm
Air strike distance	D_a		15			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
Max. average on-state current	$I_{F(AV)M}$	50 Hz, Half sine wave, T_C = 90 °C			7385	A
Max. RMS on-state current	$I_{F(RMS)}$				11600	A
Max. peak non-repetitive surge current	I_{FSM}	t_p = 10 ms, T_j = 160°C, V_R = 0 V			87×10^3	A
Limiting load integral	I^2t				38.5×10^6	A^2s
Max. peak non-repetitive surge current	I_{FSM}	t_p = 8.3 ms, T_j = 160°C, V_R = 0 V			95×10^3	A
Limiting load integral	I^2t				38×10^6	A^2s

Characteristic values

Parameter	Symbol	Conditions	min	typ	max	Unit
On-state voltage	V_F	I_F = 5000 A, T_j = 160°C		1.05		V
Threshold voltage	$V_{(T0)}$	T_j = 160°C, I_T = 2500...7500 A			0.8	V
Slope resistance	r_T				0.05	mΩ

Switching

Characteristic values

Parameter	Symbol	Conditions	min	typ	max	Unit
Recovery charge	Q_{rr}	di_F/dt = -10 A/µs, V_R = 200 V, I_{FRM} = 4000 A, T_j = 160°C			6300	µAs

Thermal

Maximum rated values [1)]

Parameter	Symbol	Conditions	min	typ	max	Unit
Operating junction temperature range	T_{vj}				160	°C
Storage temperature range	T_{stg}		-40		175	°C

Characteristic values

Parameter	Symbol	Conditions	min	typ	max	Unit
Thermal resistance junction to case	$R_{th(j-c)}$	Double-side cooled F_m = 81...108 kN			5	K/kW
	$R_{th(j-c)A}$	Anode-side cooled F_m = 81...108 kN			10	K/kW
	$R_{th(j-c)C}$	Cathode-side cooled F_m = 81...108 kN			10	K/kW
Thermal resistance case to heatsink	$R_{th(c-h)}$	Double-side cooled F_m = 81...108 kN			1	K/kW
	$R_{th(c-h)}$	Single-side cooled F_m = 81...108 kN			2	K/kW

Analytical function for transient thermal impedance:

$$Z_{th(j-c)}(t) = \sum_{i=1}^{n} R_{th\,i}\left(1 - e^{-t/t_i}\right)$$

i	1	2	3	4
$R_{th\,i}$(K/kW)	3.378	0.919	0.426	0.280
τ_i(s)	0.4710	0.0707	0.0074	0.0014

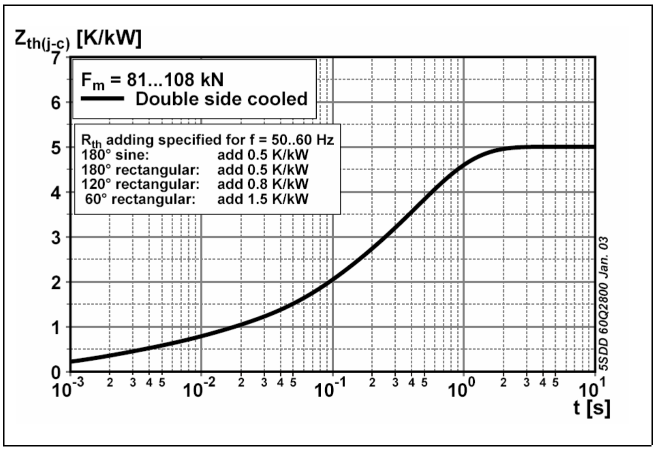

Fig. 1 Transient thermal impedance junction-to-case.

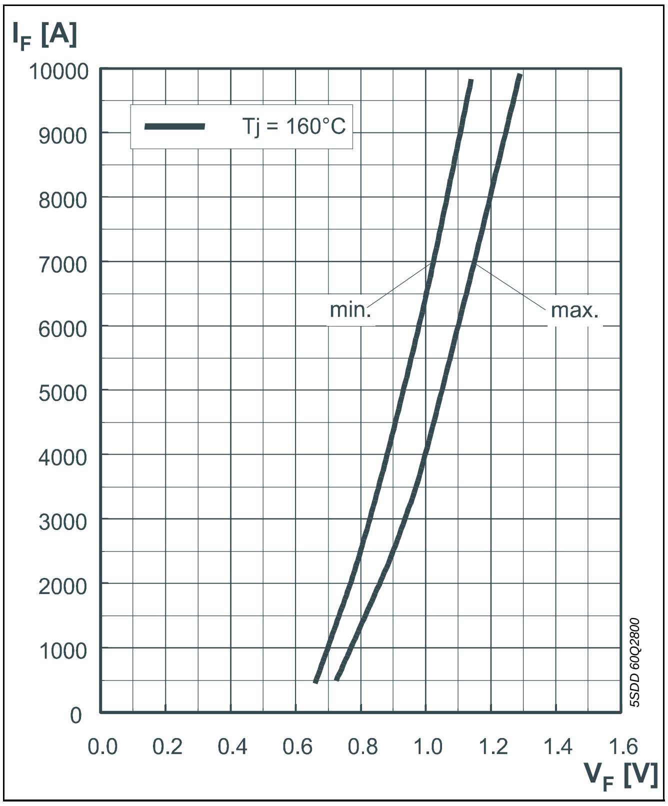

Fig. 2 On-state characteristics.

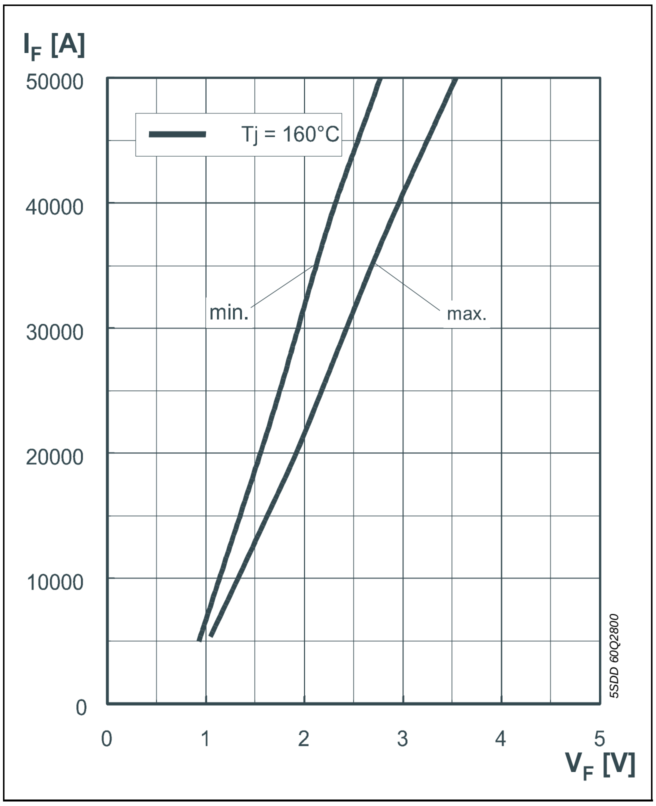

Fig. 3 On-state characteristics.

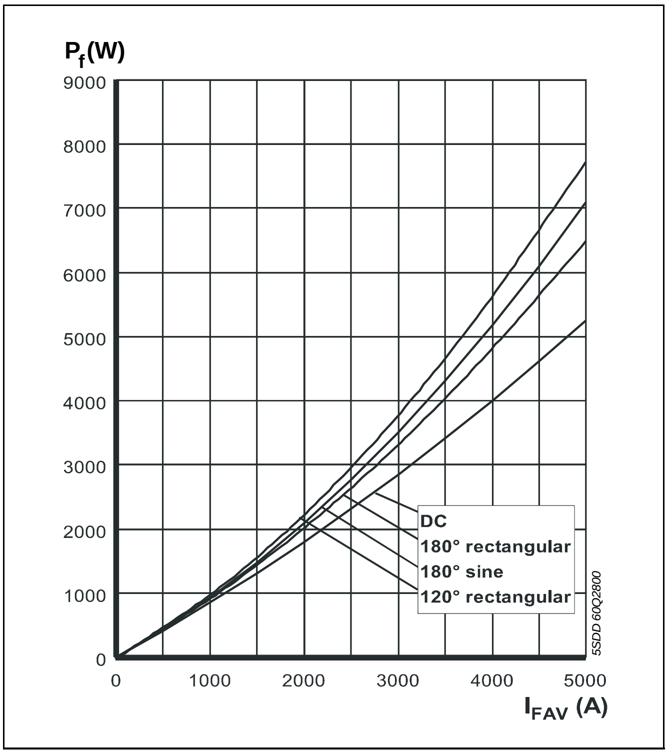

Fig. 4 On-state power losses vs average on-state current.

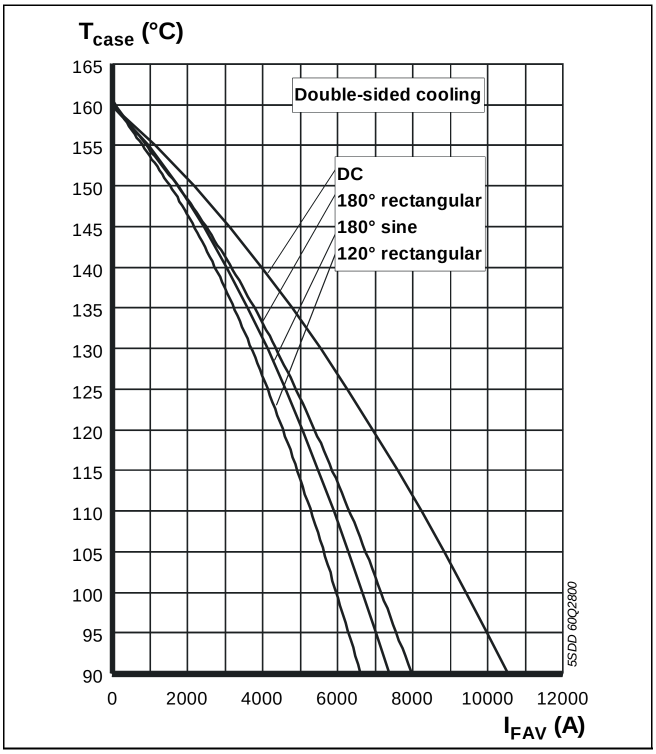

Fig. 5 Max. permissible case temperature vs average on-state current.

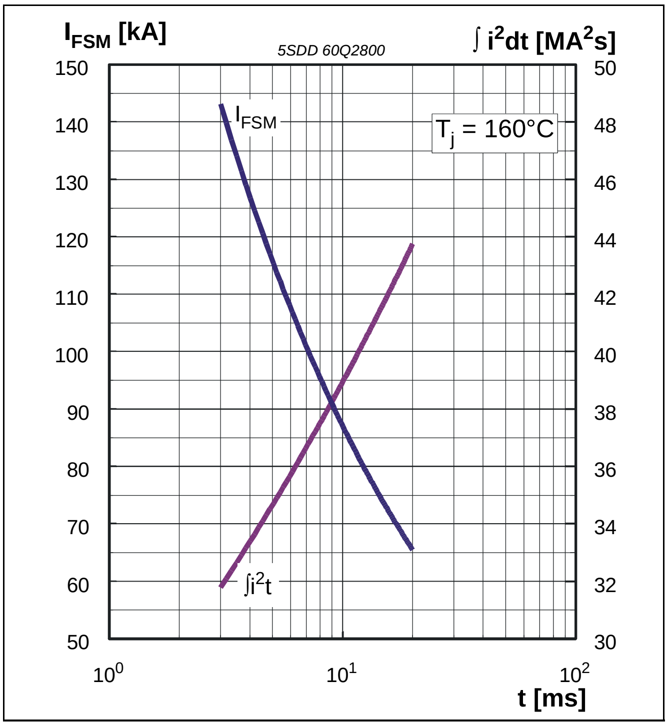

Fig. 6 Surge on-state current vs. pulse length. Half-sine wave.

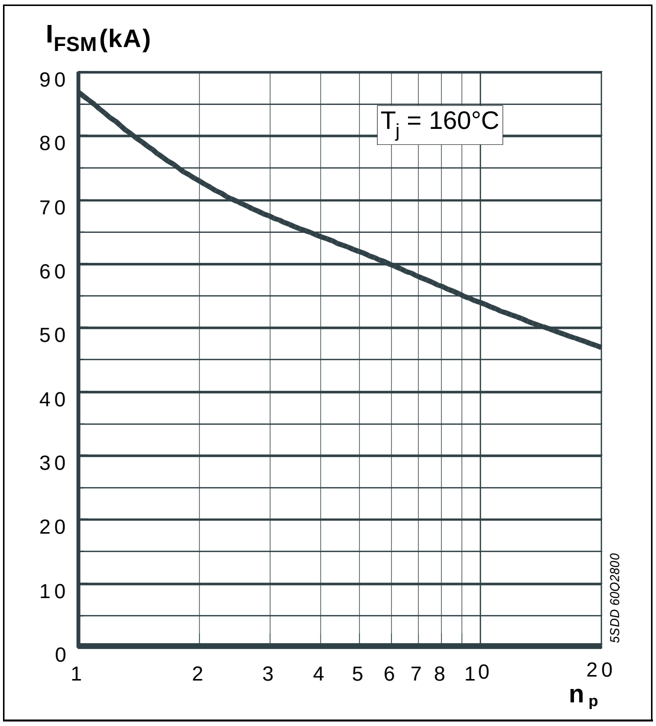

Fig. 7 Surge on-state current vs. number of pulses. Half-sine wave, 10 ms, 50Hz.

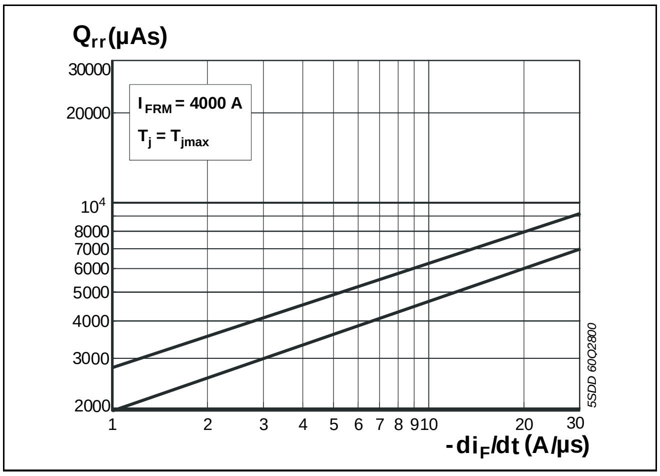

Fig. 8 Recovery charge vs. decay rate of on-state current.

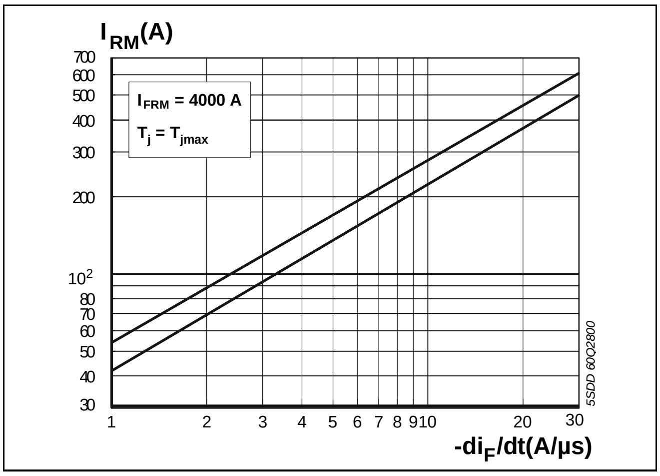

Fig. 9 Peak reverse recovery current vs. decay rate of on-state current.

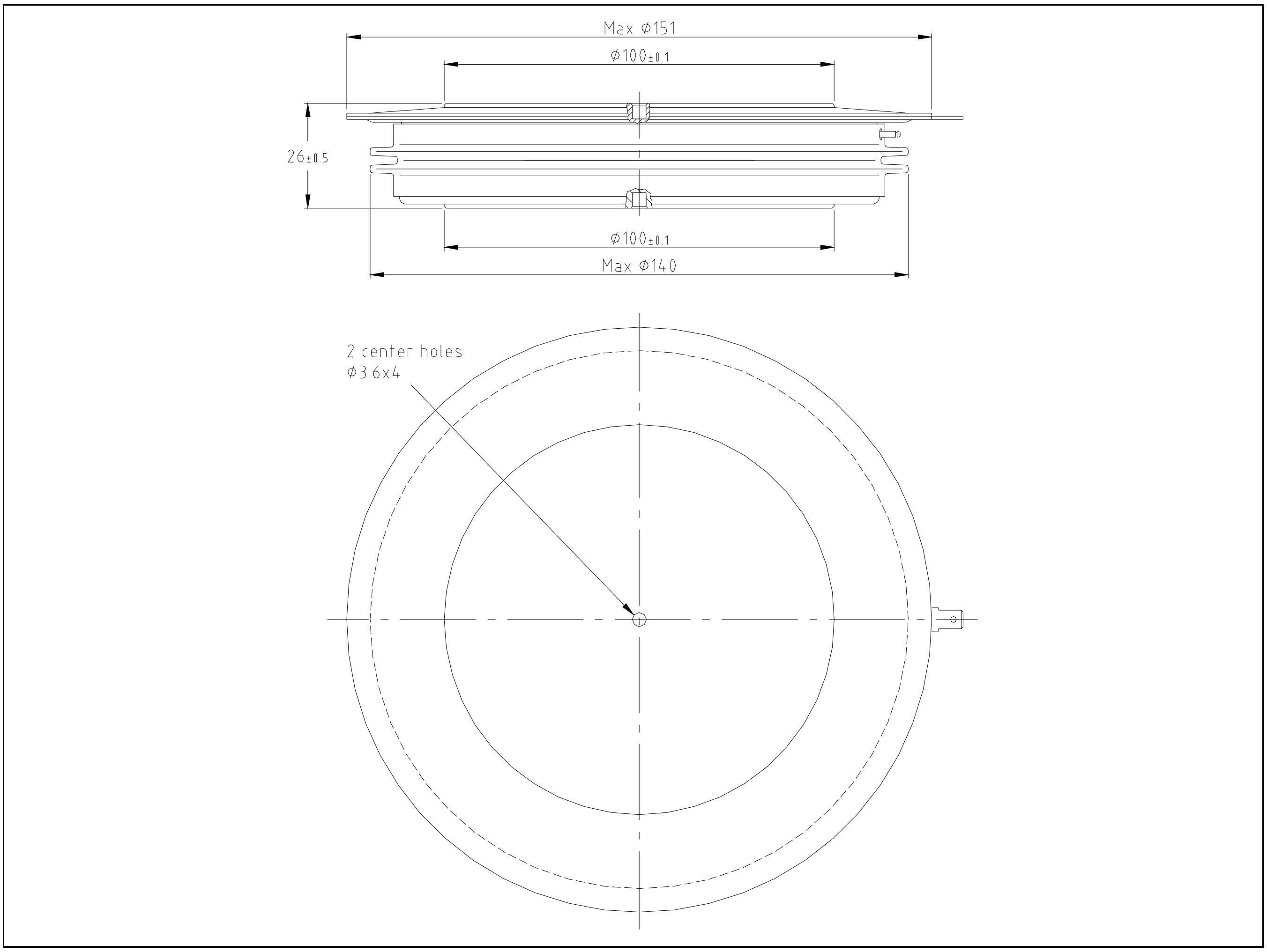

Fig. 10 Outline drawing. All dimensions are in millimeters and represent nominal values unless stated otherwise.

Related application notes:

Doc. Nr	Titel
5SYA 2020	Design of RC-Snubbers for Phase Control Applications
5SYA 2029	Designing Large Rectifiers with High Power Diodes
5SYA 2036	Recommendations regarding mechanical clamping of Press Pack High Power Semiconductors

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