V_{RRM}	=	200 V
I_{FAVM}	=	6130 A
I_{FRMS}	=	9620 A
I_{FSM}	=	45000 A
V_{F0}	=	0.80 V
r_F	=	0.030 mW

Rectifier Diode

5SDD 40B0200

Doc. No. 5SYA1154-02 July 06

- **Optimized for high current rectifiers**
- **Very low on-state voltage**
- **Very low thermal resistance**

Blocking

V_{RRM}	Repetitive peak reverse voltage	200 V	Half sine wave, t_P = 10 ms, f = 50 Hz
V_{RSM}	Maximum peak reverse voltage	300 V	Half sine wave, t_P = 10 ms
I_{RRM}	Repetitive peak reverse current	≤ 50 mA	T_j = 170 °C $V_R = V_{RRM}$

Mechanical

F_M	Mounting force	min.	20 kN
		max.	24 kN
a	Acceleration:		
	Device unclamped		50 m/s^2
	Device clamped		200 m/s^2
m	Weight		0.14 kg
D_S	Surface creepage distance		4 mm
D_a	Air strike distance		4 mm

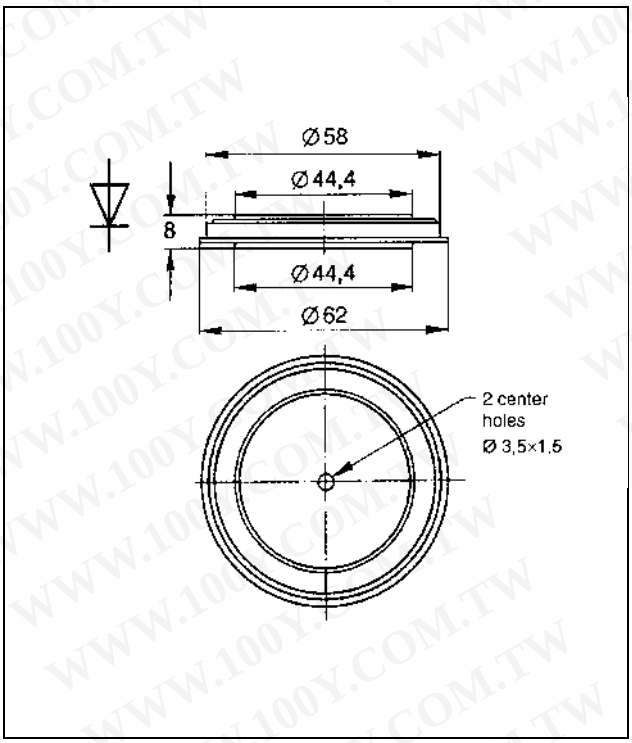


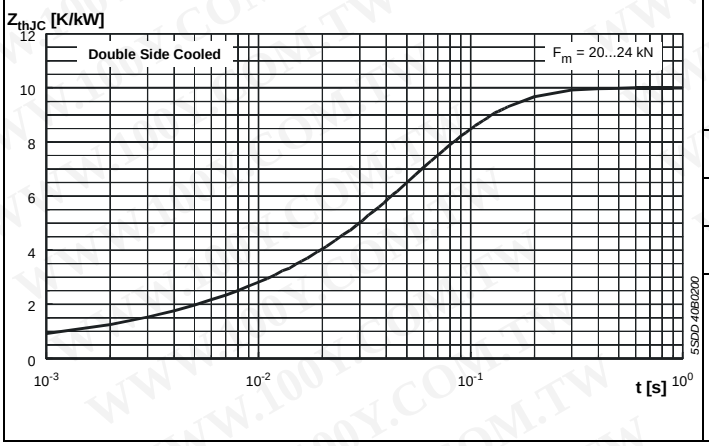
Fig. 1
Outline drawing.
All dimensions are in millimeters and represent nominal values unless stated otherwise.

On-state

I_{FAVM}	Max. average on-state current	6130 A	Half sine wave, T_c = 85 °C	
I_{FRMS}	Max. RMS on-state current	9620 A		
I_{FSM}	Max. peak non-repetitive surge current	45000 A	t_p = 10 ms	Before surge
		48000 A	t_p = 8.3 ms	T_j = 170 °C
$\int I^2dt$	Max. surge current integral	10125 kA^2s	t_p = 10 ms	After surge:
		9600 kA^2s	t_p = 8.3 ms	$V_R \approx 0V$
$V_{F\,max}$	Maximum on-state voltage	≤ 1.15 V	I_F = 5000 A	T_j = 25 °C
V_{F0}	Threshold voltage	0.80 V	Approximation for	T_j = 170 °C
r_F	Slope resistance	0.030 mΩ	I_F = 5 - 15 kA	

Thermal characteristics

T_j	Operating junction temperature range	-40...170 °C		
T_{stg}	Storage temperature range	-40…170 °C		
$R_{th(j-c)}$	Thermal resistance junction to case	≤ 20 K/kW	Anode side cooled	F_M = 20…24 kN
		≤ 20 K/kW	Cathode side cooled	
		≤ 10 K/kW	Double side cooled	
$R_{th(c-h)}$	Thermal resistance case to heatsink	≤ 10 K/kW	Single side cooled	
		≤ 5 K/kW	Double side cooled	



$$Z_{th\,(j\text{-}c)}(t) = \sum_{i=1}^{4} R_i\left(1 - e^{-t/\tau_i}\right)$$

i	1	2	3	4
R_i (K/kW)	5.28	3.30	0.87	0.55
τ_i (s)	0.07	0.039	0.0034	0.00013

F_M = 20… 24 kN
Double side cooled

Fig. 2 Transient thermal impedance (junction-to-case) vs. time in analytical and graphical forms.

On-state characteristics

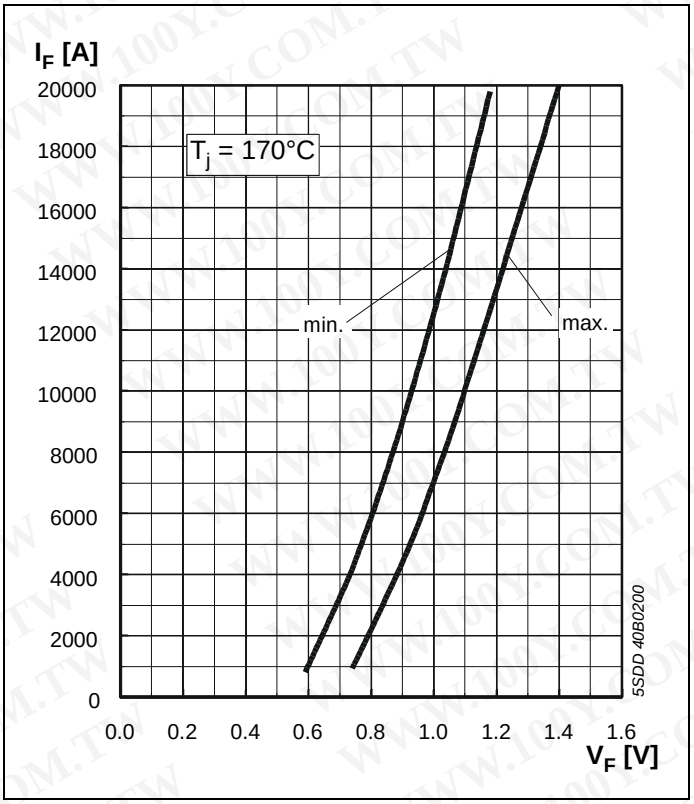


Fig. 3 Forward current vs. forward voltage (min. and max. values).

Surge current characteristics

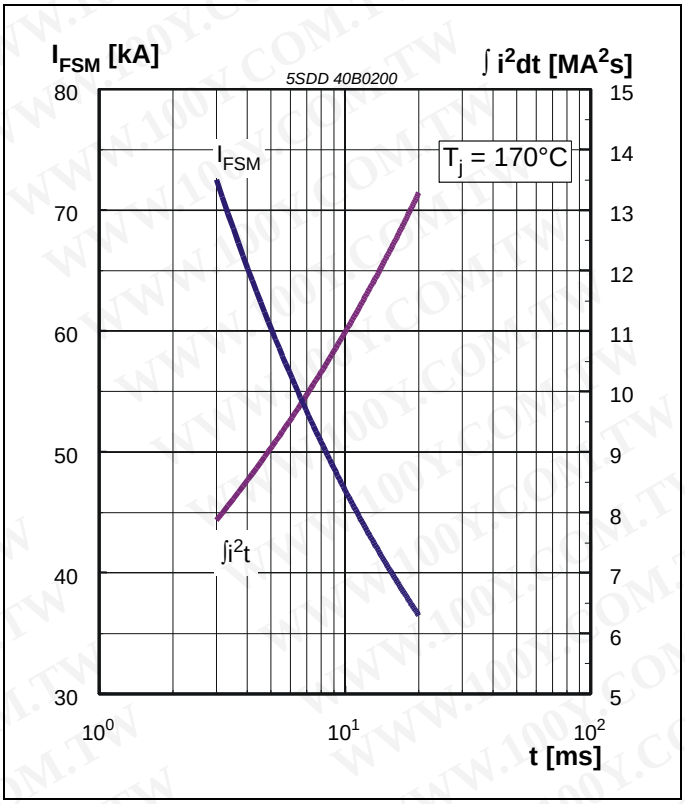


Fig. 4 Surge current and fusing integral vs. pulse width (max. values) for non-repetitive, half-sinusoidal surge current pulses.

Current load capability

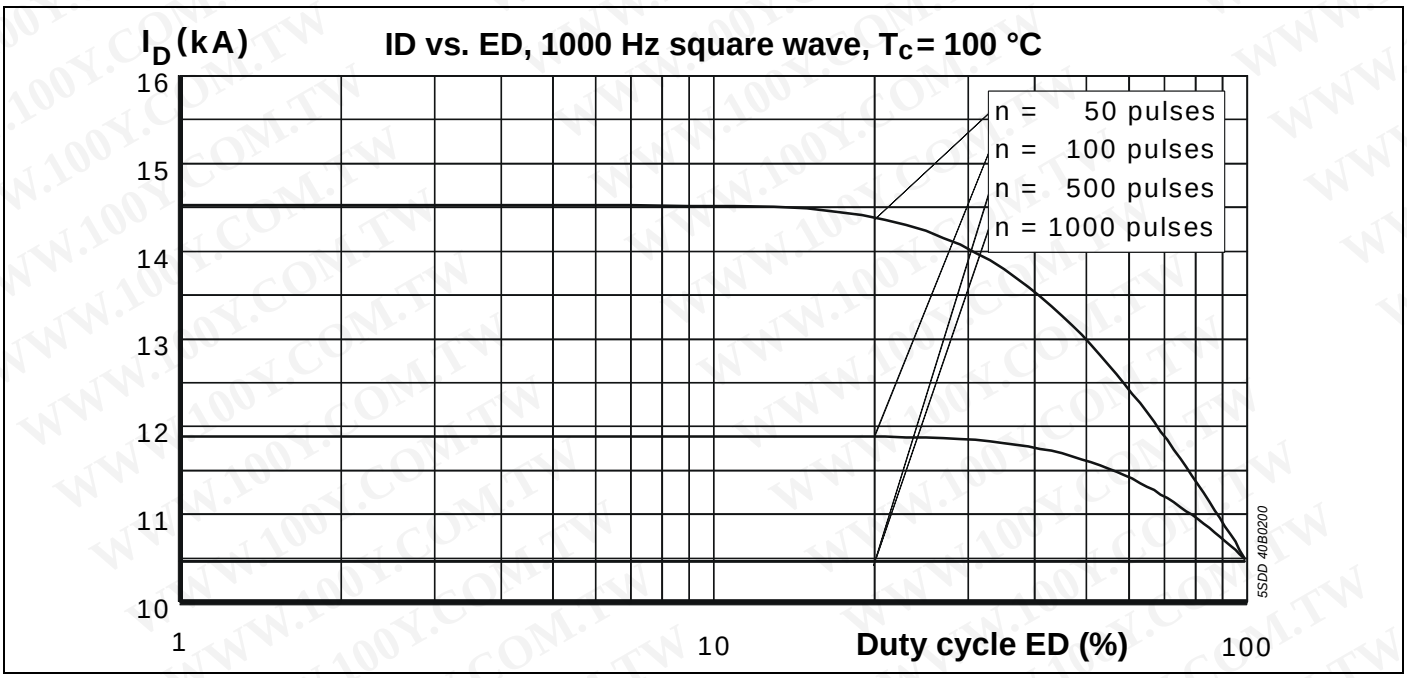


Fig. 5 DC-output current with single-phase centre tap

Current load capacity, cont.

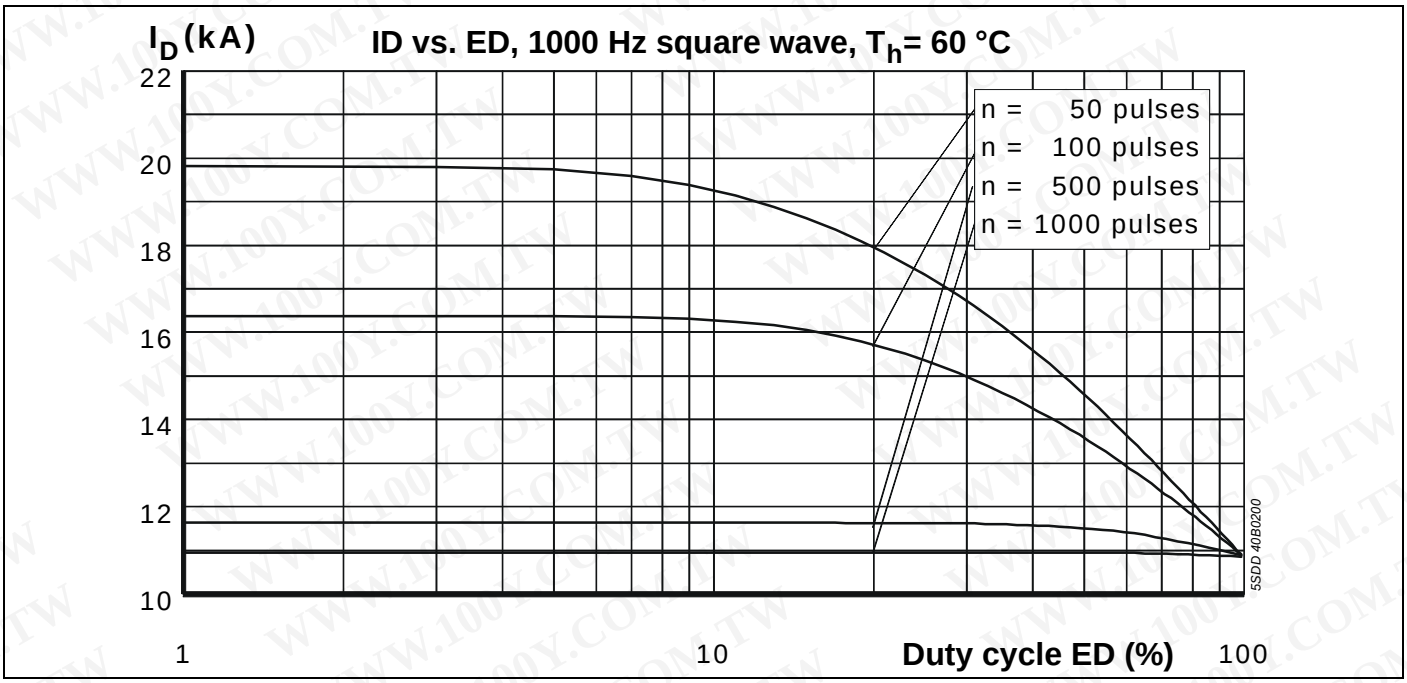


Fig. 6 DC-output current with single-phase centre tap

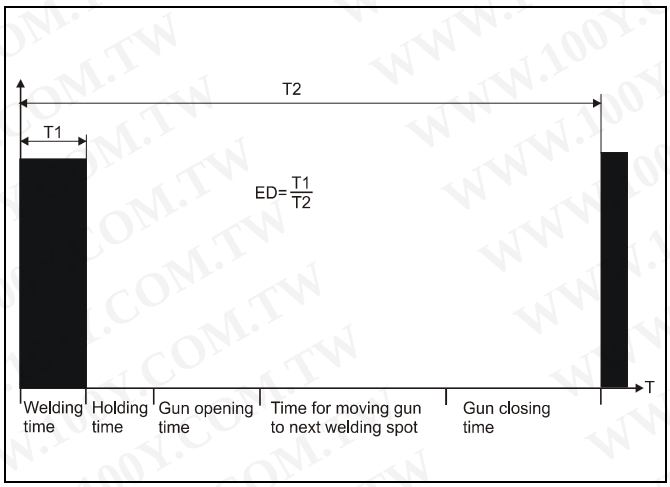


Fig. 7 Definition of ED for typical welding sequence

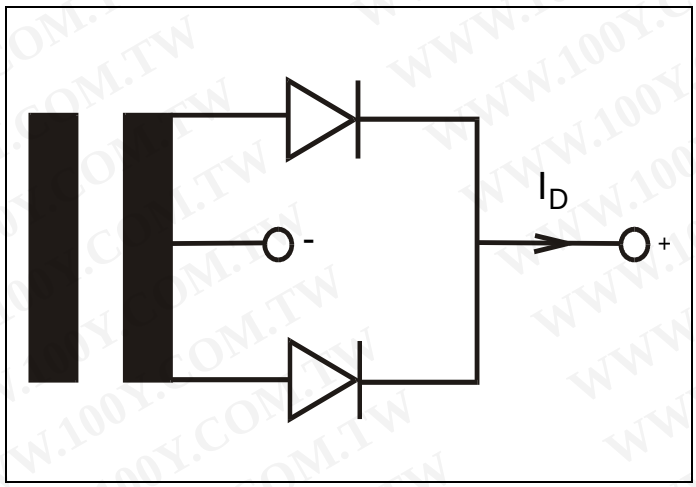


Fig. 8 Definition of ID for single-phase centre tap