

|            |   |          |
|------------|---|----------|
| $V_{RRM}$  | = | 400 V    |
| $I_{FAVM}$ | = | 9244 A   |
| $I_{FRMS}$ | = | 14520 A  |
| $I_{FSM}$  | = | 60000 A  |
| $V_{F0}$   | = | 0.780 V  |
| $r_F$      | = | 0.031 mW |

## Housingless Welding Diode

# 5SDD 92Z0400

## PRELIMINARY

Doc. No. 5SYA1178-00 March 07

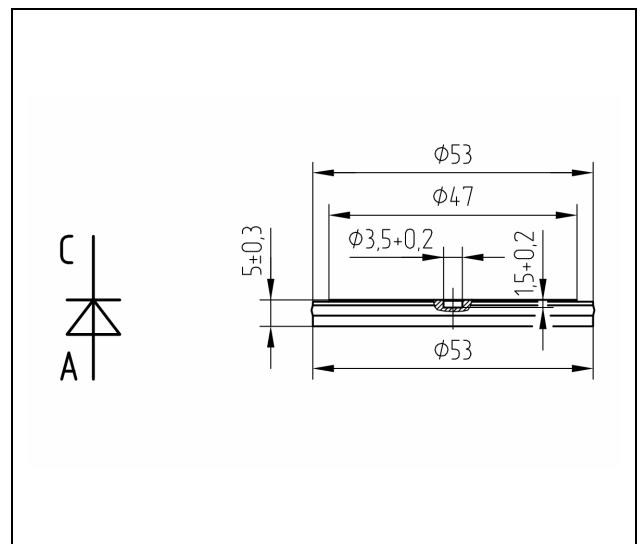
- High forward current capability
- Low forward and reverse recovery losses
- High current application up to 2000 Hz
- For parallel connection, please contact factory

### Blocking

|           |                                 |       |   |
|-----------|---------------------------------|-------|---|
| $V_{RRM}$ | Repetitive peak reverse voltage | 400 V | Half sine waveform, $f = 50$ Hz<br>$T_j = -40 \dots 180$ °C |
| $I_{RRM}$ | Repetitive peak reverse current | 50 mA | $V_R = V_{RRM}$   |

### Mechanical

|       |                           |            |
|-------|---------------------------|------------|
| $F_M$ | Mounting force            | 22 ..50 kN |
| m     | Weight                    | 0.10 kg    |
| $D_S$ | Surface creepage distance | 2 mm       |
| $D_a$ | Air strike distance       | 2 mm       |



**Fig. 1**

Outline drawing.

All dimensions are in millimeters and represent nominal values unless stated otherwise.

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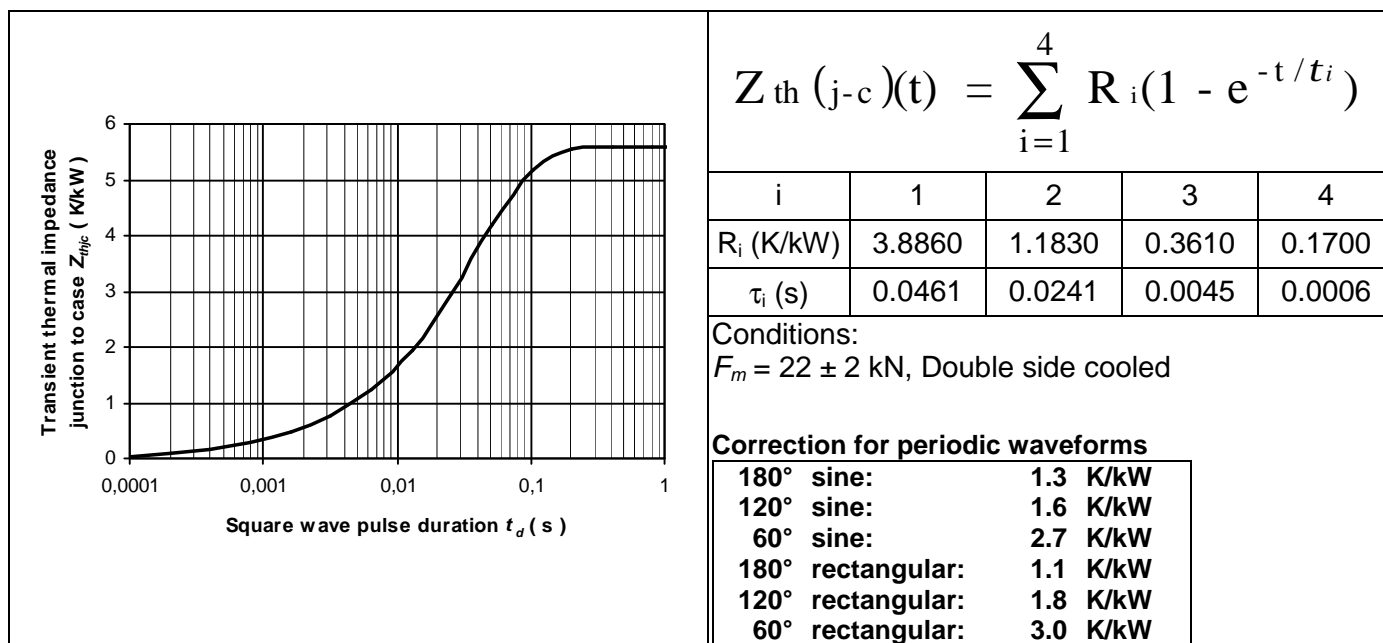
## On-state

|               |  |                         |  |                    |
|---------------|--|-------------------------|--|--------------------|
| $I_{FAVM}$    | Max. average on-state current          | 9244 A                  | $T_c = 85\text{ °C}$   | Half sine pulse    |
| $I_{FRMS}$    | Max. RMS on-state current              | 14520 A                 | $T_c = 85\text{ °C}$   | Half sine pulse    |
| $I_{FSM}$     | Max. peak non-repetitive surge current | 64000 A                 | $t_p = 8.3\text{ ms}$  | $V_R = 0\text{ V}$ |
|               |  | 60000 A                 | $t_p = 10\text{ ms}$   | Half sine pulse    |
| $\int I^2 dt$ | Max. surge current integral            | 17049 kA <sup>2</sup> s | $t_p = 8.3\text{ ms}$  | $V_R = 0\text{ V}$ |
|               |  | 18000 kA <sup>2</sup> s | $t_p = 10\text{ ms}$   | Half sine pulse    |
| $V_{Fmax}$    | Max. on-state voltage                  | 0.920 V                 | $I_F = 5000\text{ A}$  |                    |
|               |  | 1.030 V                 | $I_F = 8000\text{ A}$  |                    |
| $V_{F0}$      | Max. Threshold voltage                 | 0.780 V                 |  |                    |
| $r_F$         | Max. Slope resistance                  | 0.031 mΩ                | $I_F = 7\ 000...21\ 000\text{ A}$  |                    |
| $Q_{rr}$      | Typ. Recovered charge                  | 400 μC                  | $I_F = 1\ 000\text{ A}$ , $di/dt = -30\text{ A}/\mu\text{s}$ ,<br>$V_R = 100\text{ V}$ |                    |

Unless otherwise specified  $T_j = 180\text{ °C}$

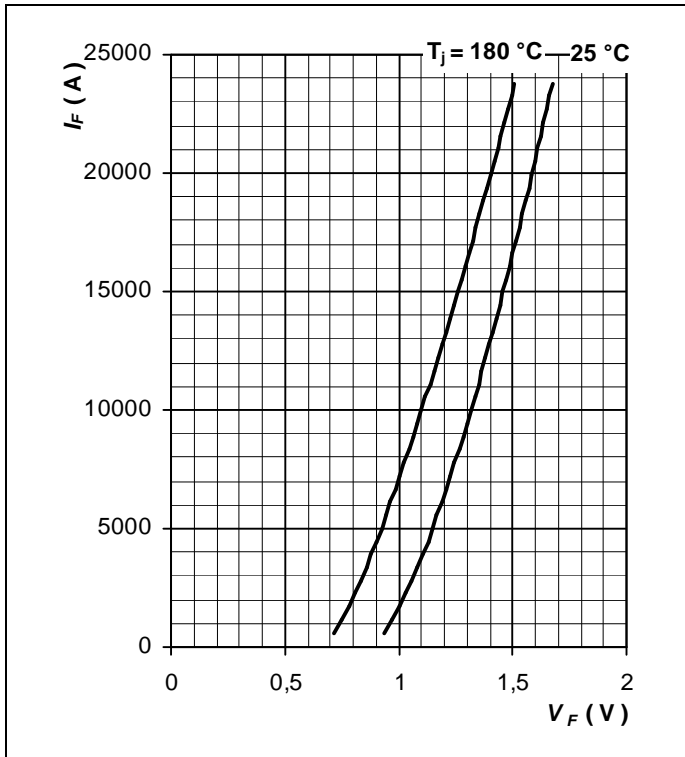
## Thermal characteristics

|               |                                      |              |                     |
|---------------|--------------------------------------|--------------|---------------------|
| $T_j$         | Operating junction temperature range | -40...180 °C |                     |
| $T_{stg}$     | Storage temperature range            | -40...180 °C |                     |
| $R_{th(j-c)}$ | Thermal resistance junction to case  | 7.4 K/kW     | Anode side cooled   |
|               |                                      | 23.5 K/kW    | Cathode side cooled |
|               |                                      | 5.6 K/kW     | Double side cooled  |
| $R_{th(c-h)}$ | Thermal resistance case to heatsink  | 6.7 K/kW     | Anode side cooled   |
|               |                                      | 8.0 K/kW     | Cathode side cooled |
|               |                                      | 3.6 K/kW     | Double side cooled  |



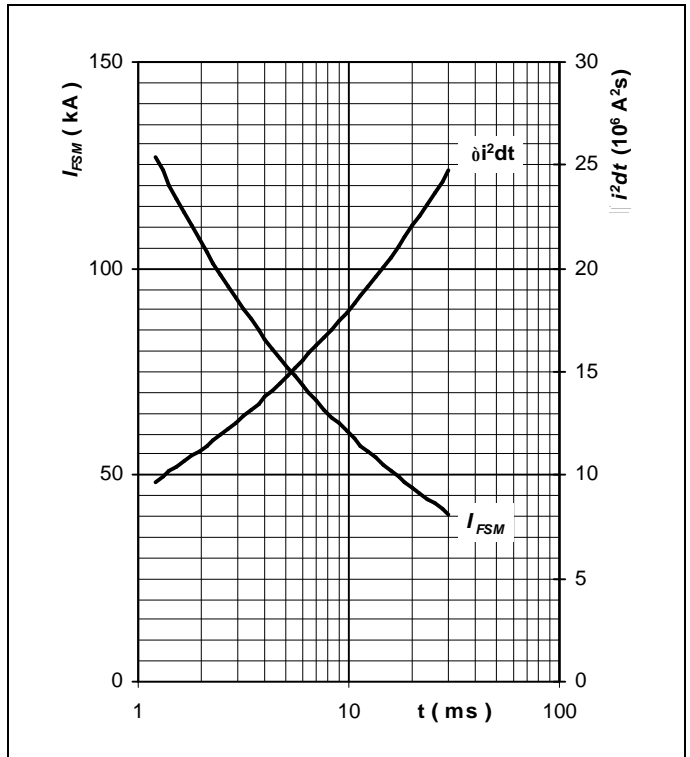
**Fig. 2** Transient thermal impedance (junction-to-case) vs. time in analytical and graphical forms.

**On-state characteristics**



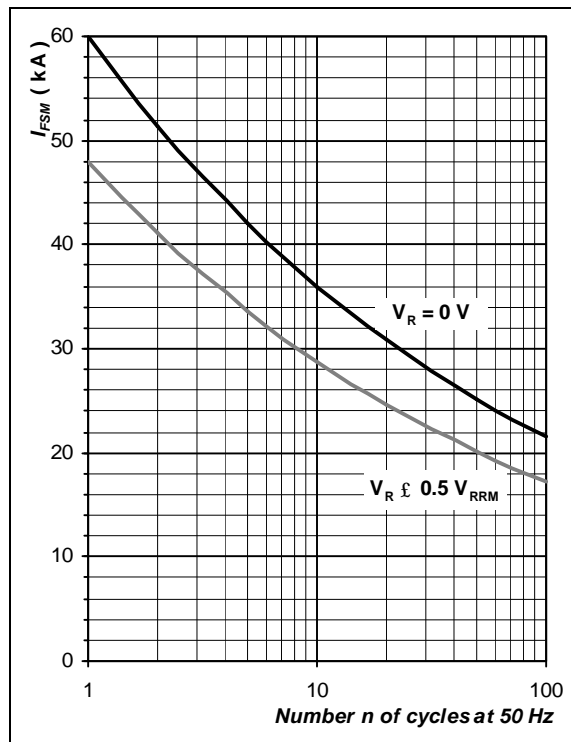
**Fig. 3** Forward current vs. forward voltage (max. values).

**Surge current characteristics**



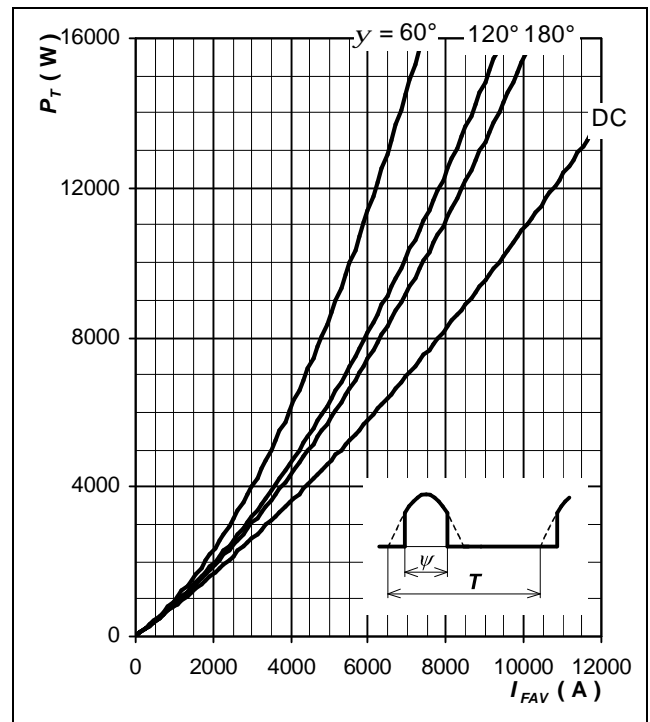
**Fig. 4** Surge forward current vs. pulse length, half sine wave, single pulse,  $V_R = 0\text{ V}$ ,  $T_j = T_{jmax}$

**Surge current characteristics**



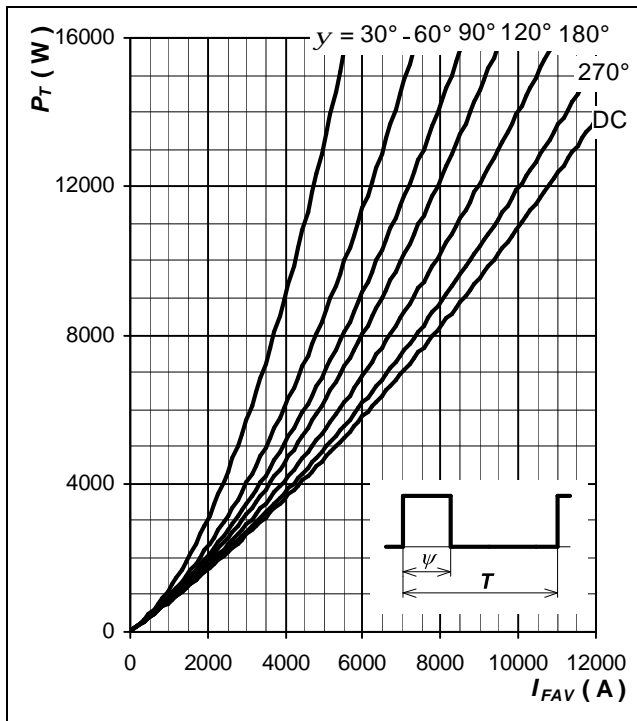
**Fig. 5** Surge forward current vs. number of pulses, half sine wave,  $T_j = T_{jmax}$

**Forward power loss**

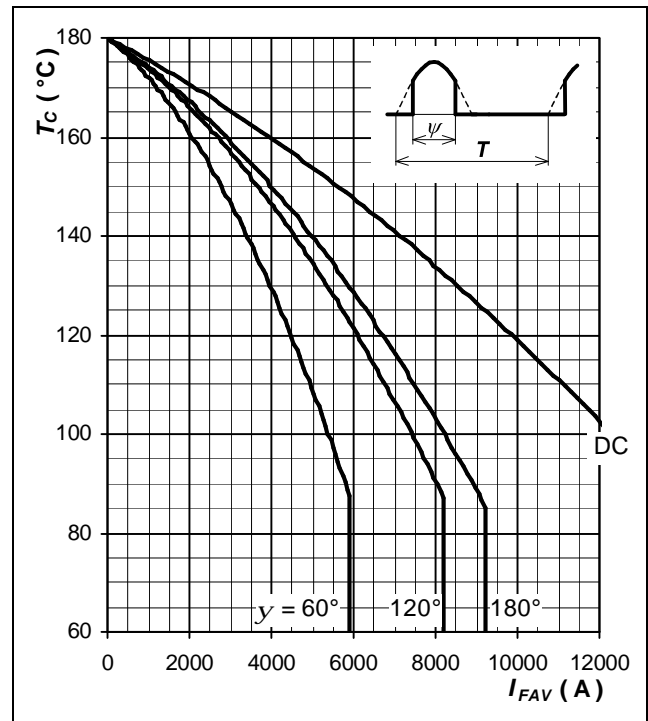


**Fig. 6** Forward power loss vs. average forward current, sine waveform,  $f = 50\text{ Hz}$ ,  $T = 1/f$

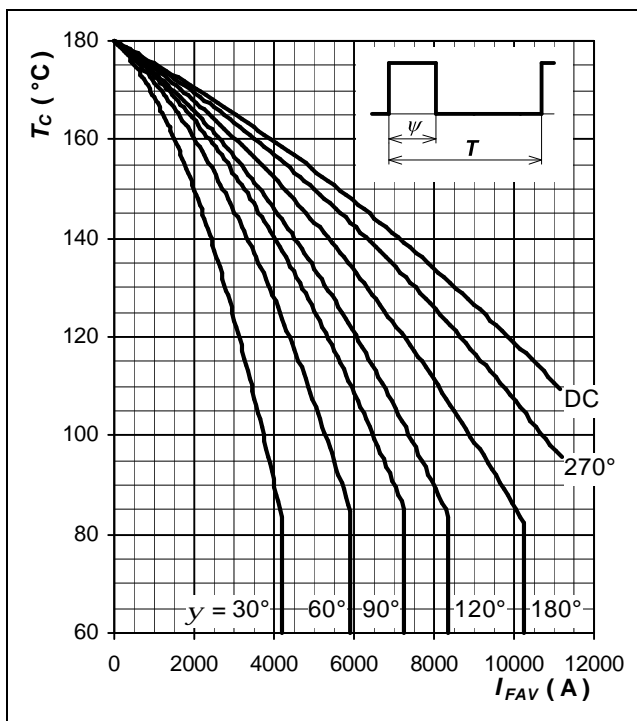
**Forward power loss**



**Fig. 7** Forward power loss vs. average forward current, square waveform,  $f = 50 \text{ Hz}$ ,  $T = 1/f$



**Fig. 8** Forward power loss vs. average forward current, sine waveform,  $f = 50 \text{ Hz}$ ,  $T = 1/f$



**Fig. 9** Max. case temperature vs. aver. forward current, square waveform,  $f = 50 \text{ Hz}$ ,  $T = 1/f$

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