



# 5SDD 10F6000

Old part no. DV 808-1000-60

## High Voltage Diode

### Properties

- Low forward voltage drop
- Low recovery charge
- High operating temperature
- Low leakage current

### Applications

- Rectifier bridges

### Key Parameters

|            |   |        |    |
|------------|---|--------|----|
| $V_{RRM}$  | = | 6 000  | V  |
| $I_{FAVm}$ | = | 1 363  | A  |
| $I_{FSM}$  | = | 17 500 | A  |
| $V_{TO}$   | = | 1.015  | V  |
| $r_T$      | = | 0.407  | mΩ |

### Types

|                     |   |
|---------------------|---|
|                     | $V_{RRM}$   |
| <b>5SDD 10F6000</b> | <b>6 000 V</b>  |
| Conditions:         | $T_j = -40 \div 150 \text{ }^\circ\text{C}$ ,<br>half sine waveform,<br>$f = 50 \text{ Hz}$ |

### Mechanical Data

|       |                           |            |    |
|-------|---------------------------|------------|----|
| $F_m$ | Mounting force            | $22 \pm 2$ | kN |
| $m$   | Weight                    | 0.46       | kg |
| $D_s$ | Surface creepage distance | 30         | mm |
| $D_a$ | Air strike distance       | 20.5       | mm |

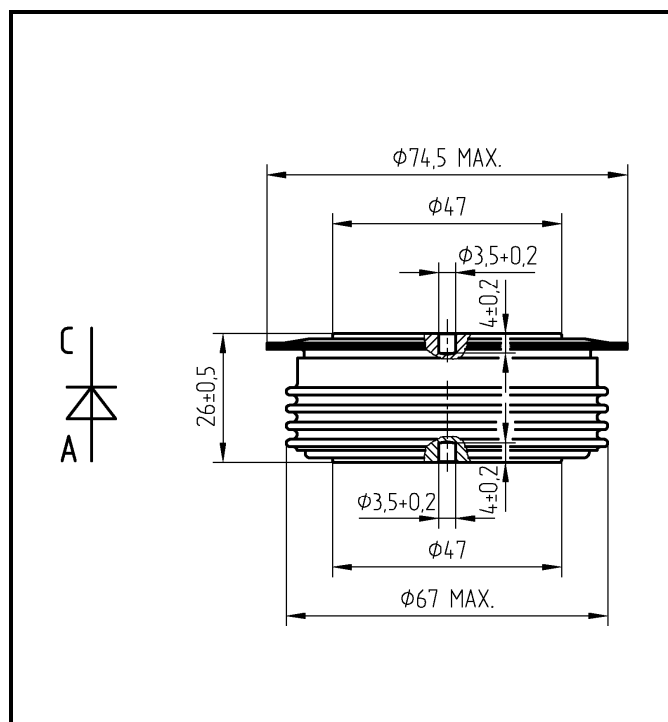


Fig. 1 Case



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| <b>Maximum Ratings</b> |  | <b>Maximum Limits</b>            | <b>Unit</b>                        |                       |
|------------------------|--|----------------------------------|------------------------------------|-----------------------|
| $V_{RRM}$              | <b>Repetitive peak reverse voltage</b><br>$T_j = -40 \div 150 \text{ }^\circ\text{C}$                              | <b>6 000</b>                     | <b>V</b>                           |                       |
| $I_{FAVM}$             | <b>Average forward current</b><br>$T_c = 85 \text{ }^\circ\text{C}$  | <b>1 363</b>                     | <b>A</b>                           |                       |
| $I_{FRMS}$             | <b>RMS forward current</b>   | <b>2 142</b>                     | <b>A</b>                           |                       |
| $I_{RRM}$              | <b>Repetitive reverse current,</b><br>$V_R = V_{RRM}$  | <b>75</b>                        | <b>mA</b>                          |                       |
| $I_{FSM}$              | <b>Non repetitive peak surge current</b><br>$V_R = 0 \text{ V, half sine pulse, } T_j = 25 \text{ }^\circ\text{C}$ | $t_p = 8.3 \text{ ms}$           | <b>20 300</b>                      | <b>A</b>              |
|                        |  | $t_p = 10 \text{ ms}$            | <b>19 000</b>                      | <b>A</b>              |
|                        | <b>Non repetitive peak surge current</b><br>$V_R = 0 \text{ V, half sine pulse}$                                   | $t_p = 8.3 \text{ ms}$           | <b>18 700</b>                      | <b>A</b>              |
|                        |  | $t_p = 10 \text{ ms}$            | <b>17 500</b>                      | <b>A</b>              |
| $I^2t$                 | <b>Limiting load integral</b><br>$V_R = 0 \text{ V, half sine pulse, } T_j = 25 \text{ }^\circ\text{C}$            | $t_p = 8.3 \text{ ms}$           | <b>1 710 000</b>                   | <b>A<sup>2</sup>s</b> |
|                        |  | $t_p = 10 \text{ ms}$            | <b>1 805 000</b>                   | <b>A<sup>2</sup>s</b> |
|                        | <b>Limiting load integral</b><br>$V_R = 0 \text{ V, half sine pulse}$  | $t_p = 8.3 \text{ ms}$           | <b>1 450 000</b>                   | <b>A<sup>2</sup>s</b> |
|                        |  | $t_p = 10 \text{ ms}$            | <b>1 531 250</b>                   | <b>A<sup>2</sup>s</b> |
| $T_{jmin} - T_{jmax}$  | <b>Operating temperature range</b>   | <b>-40 <math>\div</math> 150</b> | <b><math>^\circ\text{C}</math></b> |                       |
| $T_{STG}$              | <b>Storage temperature range</b>   | <b>-40 <math>\div</math> 150</b> | <b><math>^\circ\text{C}</math></b> |                       |

Unless otherwise specified  $T_j = 150 \text{ }^\circ\text{C}$

| <b>Characteristics</b> |  | <b>Value</b> |              |              | <b>Unit</b>                     |
|------------------------|--|--------------|--------------|--------------|---------------------------------|
|                        |  | <b>min</b>   | <b>typ</b>   | <b>max</b>   |                                 |
| $V_{T0}$               | <b>Threshold voltage</b><br>$I_{F1} = 2\,142 \text{ A, } I_{F2} = 6\,425 \text{ A}$                                |              |              | <b>1.015</b> | <b>V</b>                        |
| $r_T$                  | <b>Forward slope resistance</b>  |              |              | <b>0.407</b> | <b>m<math>\Omega</math></b>     |
| $V_{FM}$               | <b>Maximum forward voltage</b><br>$I_{FM} = 1\,500 \text{ A}$  |              |              | <b>1.60</b>  | <b>V</b>                        |
| $Q_{rr}$               | <b>Recovered charge</b><br>$V_R = 100 \text{ V, } I_{FM} = 1\,000 \text{ A, } di_F/dt = -10 \text{ A}/\mu\text{s}$ |              | <b>3 000</b> | <b>4 000</b> | <b><math>\mu\text{C}</math></b> |

Unless otherwise specified  $T_j = 150 \text{ }^\circ\text{C}$

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| Thermal Parameters |                                     |                      | Value | Unit |
|--------------------|-------------------------------------|----------------------|-------|------|
| $R_{thjc}$         | Thermal resistance junction to case | double side cooling  | 20    | K/kW |
|                    |                                     | anode side cooling   | 34    |      |
|                    |                                     | cathode side cooling | 48    |      |
| $R_{thch}$         | Thermal resistance case to heatsink | double side cooling  | 5     | K/kW |
|                    |                                     | single side cooling  | 10    |      |

**Transient Thermal Impedance**

Analytical function for transient thermal impedance

$$Z_{thjc} = \sum_{i=1}^4 R_i (1 - \exp(-t / \tau_i))$$

Conditions:  
 $F_m = 22 \pm 2$  kN, Double side cooled

| $i$          | 1     | 2     | 3    | 4      |
|--------------|-------|-------|------|--------|
| $R_i$ (K/kW) | 11.83 | 4.26  | 1.63 | 2.28   |
| $\tau_i$ (s) | 0.432 | 0.071 | 0.01 | 0.0054 |

Fig. 2 Dependence transient thermal impedance junction to case on square pulse

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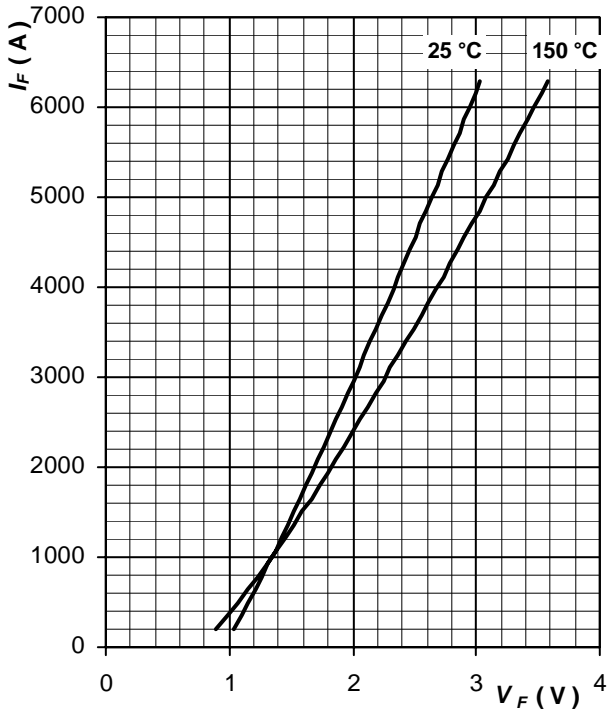


Fig. 3 Maximum forward voltage drop characteristics

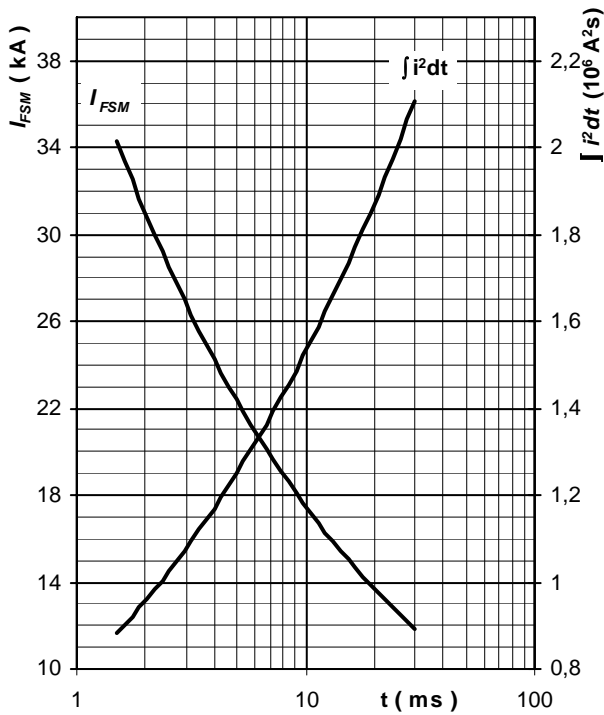


Fig. 4 Surge forward current vs. pulse length, half sine wave, single pulse,  $V_R = 0 V$ ,  $T_j = T_{jmax}$

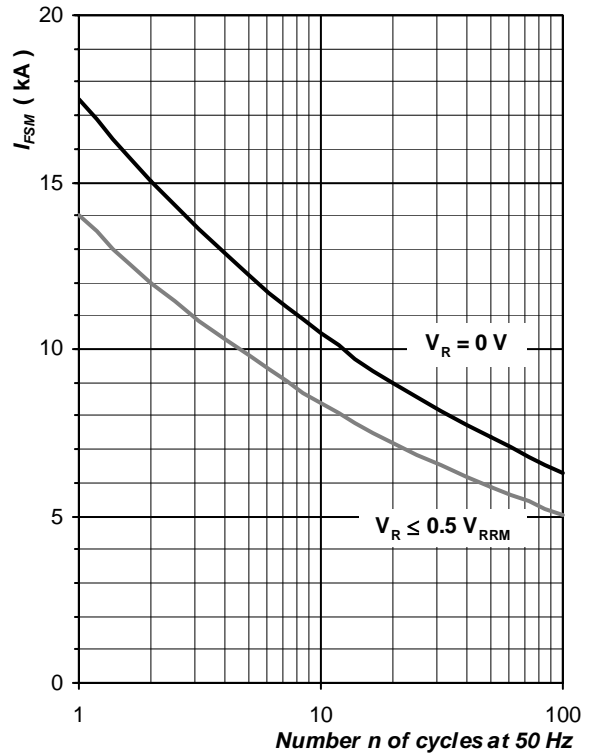


Fig. 5 Surge forward current vs. number of pulses, half sine wave,  $T_j = T_{jmax}$

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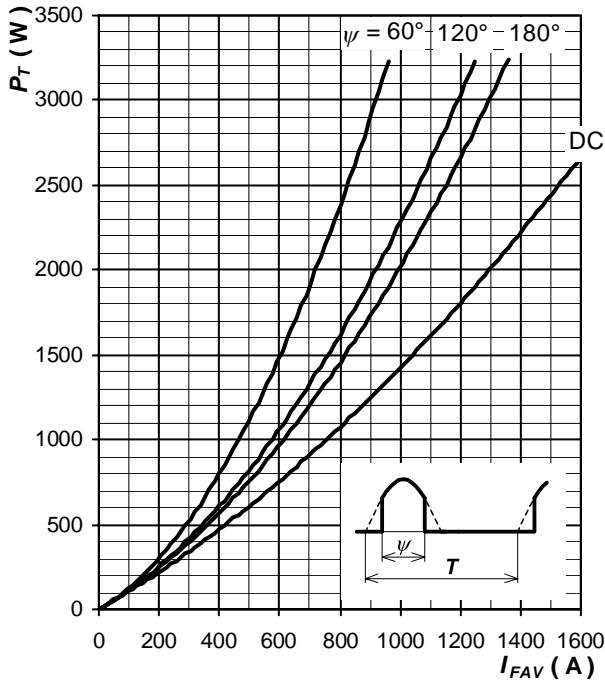


Fig. 6 Forward power loss vs. average forward current, sine waveform,  $f = 50$  Hz,  $T = 1/f$

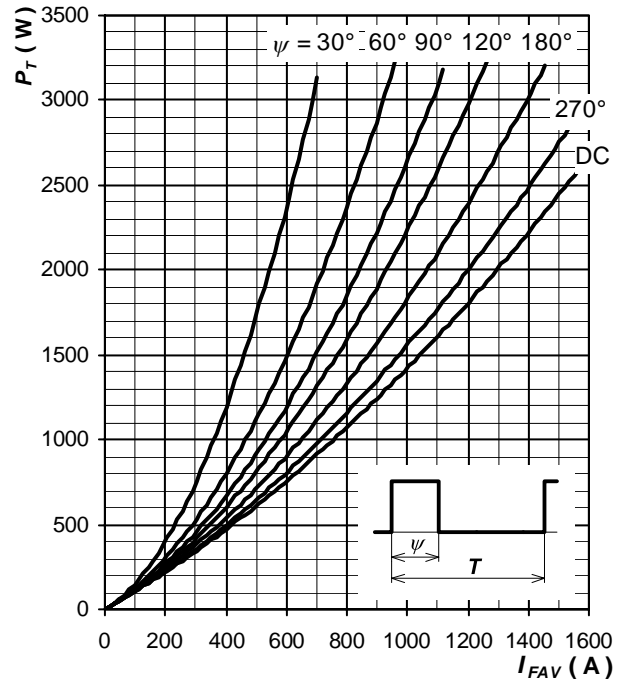


Fig. 7 Forward power loss vs. average forward current, square waveform,  $f = 50$  Hz,  $T = 1/f$

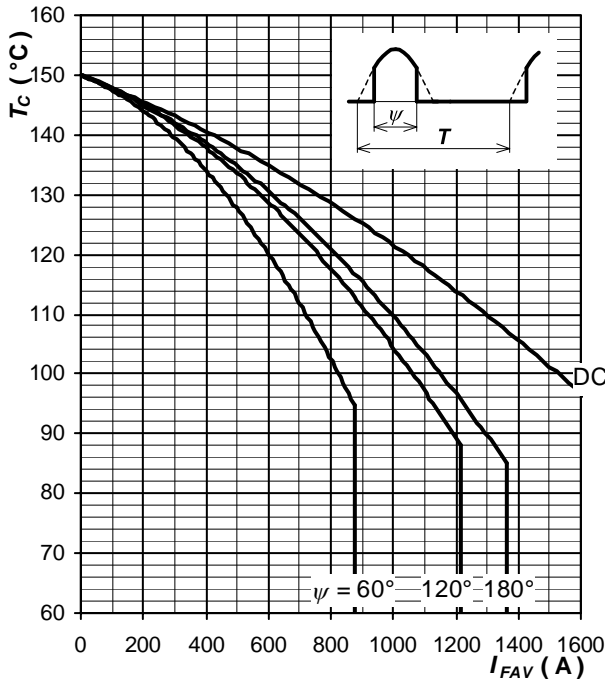


Fig. 8 Max. case temperature vs. aver. forward current, sine waveform,  $f = 50$  Hz,  $T = 1/f$

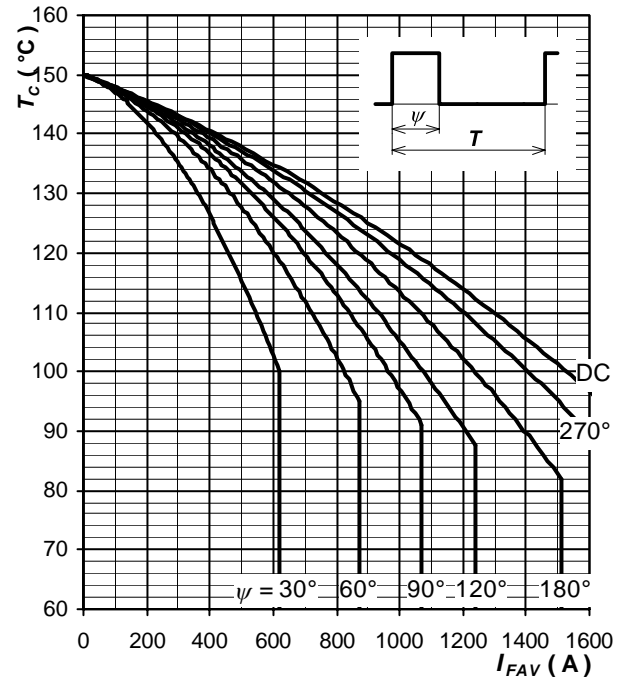


Fig. 9 Max. case temperature vs. aver. forward current, square waveform,  $f = 50$  Hz,  $T = 1/f$

Notes:

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