

# DV 817-630-60

## 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  |
| $I_{FAVm}$ | = | 662    | A  |
| $I_{FSM}$  | = | 10 500 | A  |
| $V_{TO}$   | = | 1.066  | V  |
| $r_T$      | = | 0.778  | mΩ |

### Types

|   | $V_{RRM}$ |
|---|-----------|
| DV 817-630-60   | 6 000 V   |
| DV 817-630-58   | 5 800 V   |
| DV 817-630-56   | 5 600 V   |
| 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            | $11 \pm 1$ | kN |
| $m$   | Weight                    | 0.25       | kg |
| $D_s$ | Surface creepage distance | 30         | mm |
| $D_a$ | Air strike distance       | 18.5       | mm |

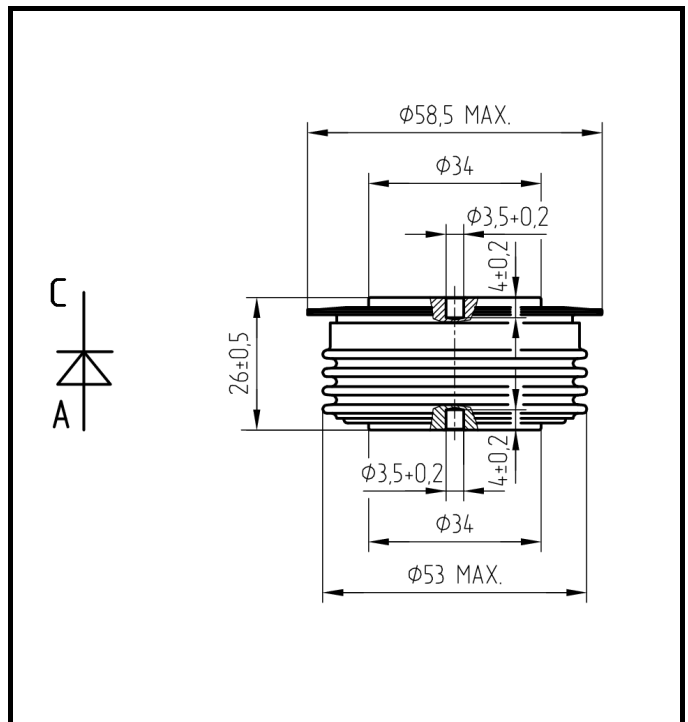


Fig. 1 Case

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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>DV 817-630-60</b>   | <b>6 000</b>                     | <b>V</b>                           |
|                        |  | <b>DV 817-630-58</b>   | <b>5 800</b>                     |                                    |
|                        |  | <b>DV 817-630-56</b>   | <b>5 600</b>                     |                                    |
| $I_{FAVm}$             | <b>Average forward current</b><br>$T_c = 85 \text{ }^\circ\text{C}$  |                        | <b>662</b>                       | <b>A</b>                           |
| $I_{FRMS}$             | <b>RMS forward current</b>   |                        | <b>1 040</b>                     | <b>A</b>                           |
| $I_{RRM}$              | <b>Repetitive reverse current</b><br>$V_R = V_{RRM}$   |                        | <b>50</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>12 500</b>                    | <b>A</b>                           |
|                        |  | $t_p = 10 \text{ ms}$  | <b>11 700</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>11 200</b>                    | <b>A</b>                           |
|                        |  | $t_p = 10 \text{ ms}$  | <b>10 500</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>648 000</b>                   | <b>A<sup>2</sup>s</b>              |
|                        |  | $t_p = 10 \text{ ms}$  | <b>684 450</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>522 000</b>                   | <b>A<sup>2</sup>s</b>              |
|                        |  | $t_p = 10 \text{ ms}$  | <b>551 250</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>                     |
|------------------------|--|--------------|--------------|--------------|---------------------------------|
|                        |  | <i>min</i>   | <i>typ</i>   | <i>max</i>   |                                 |
| $V_{T0}$               | <b>Threshold voltage,</b><br>$I_{F1} = 1\,040 \text{ A, } I_{F2} = 3\,120 \text{ A;}$                              |              |              | <b>1.066</b> | <b>V</b>                        |
| $r_T$                  | <b>Forward slope resistance</b>  |              |              | <b>0.778</b> | <b>m<math>\Omega</math></b>     |
| $V_{FM}$               | <b>Maximum forward voltage</b><br>$I_{FM} = 900 \text{ A}$   |              |              | <b>1.750</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>2 000</b> |              | <b><math>\mu\text{C}</math></b> |

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

| Thermal Parameters |                                     |                      | Value | Unit |
|--------------------|-------------------------------------|----------------------|-------|------|
| $R_{thjc}$         | Thermal resistance junction to case | double side cooling  | 42    | K/kW |
|                    |                                     | anode side cooling   | 70    |      |
|                    |                                     | cathode side cooling | 105   |      |
| $R_{thch}$         | Thermal resistance case to heatsink | double side cooling  | 8     | K/kW |
|                    |                                     | single side cooling  | 16    |      |

**Transient Thermal Impedance**

Analytical function for transient thermal impedance

$$Z_{thjc} = \sum_{i=1}^5 R_i (1 - \exp(-t/\tau_i))$$

Conditions:  
 $F_m = 11 \pm 1$  kN, Double side cooled

| $i$          | 1      | 2      | 3      | 4      | 5      |
|--------------|--------|--------|--------|--------|--------|
| $R_i$ (K/kW) | 23.59  | 14.17  | 1.33   | 2.79   | 0.12   |
| $\tau_i$ (s) | 0.4271 | 0.1337 | 0.0366 | 0.0050 | 0.0009 |

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

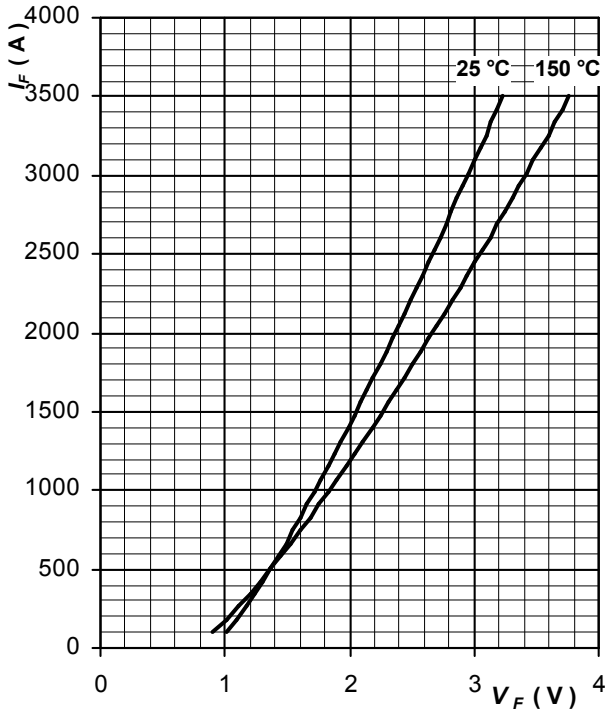


Fig. 3 Maximum forward voltage drop characteristics

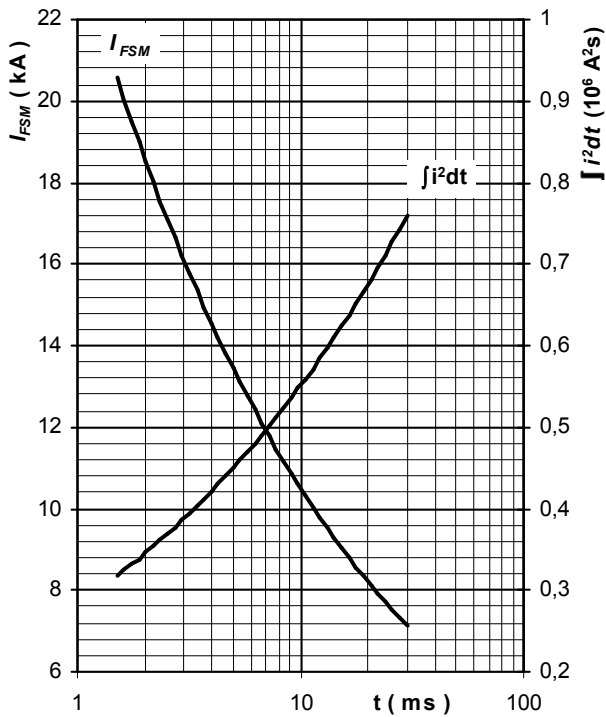


Fig. 4 Surge forward current vs. pulse length, half sine wave, single pulse,  $V_R = 0 V$ ,  $T_j = T_{jmax}$

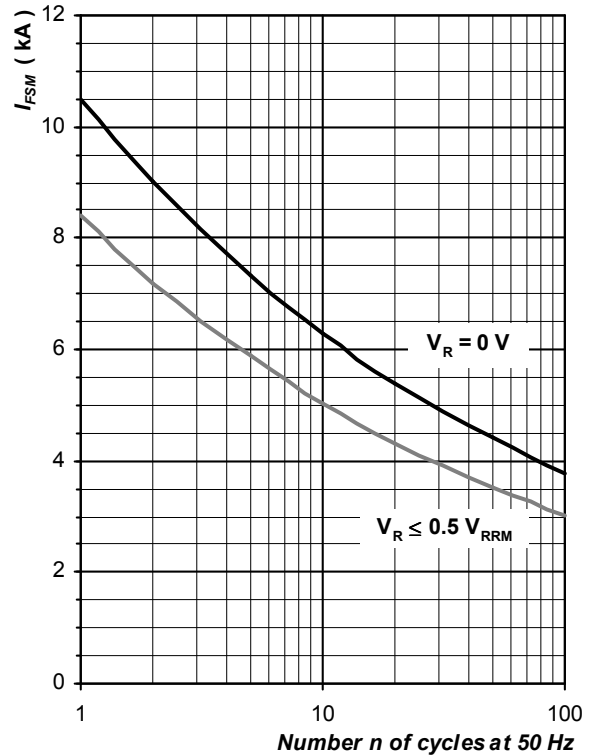


Fig. 5 Surge forward current vs. number of pulses, half sine wave,  $T_j = T_{jmax}$

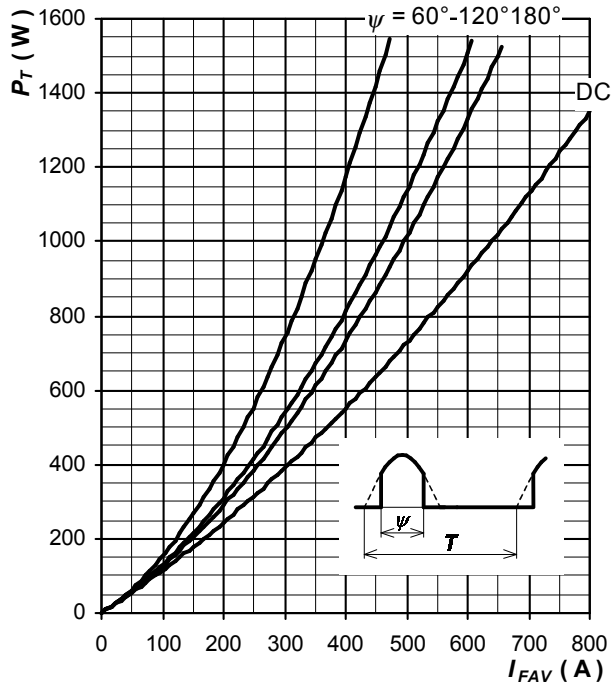


Fig. 6 Forward power loss vs. average forward current, sine waveform,  $f = 50 \text{ Hz}$ ,  $T = 1/f$

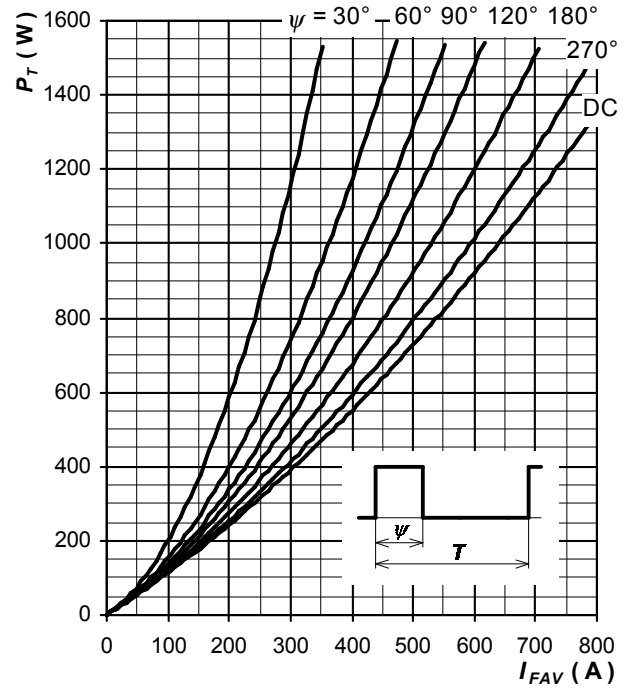


Fig. 7 Forward power loss vs. average forward current, square waveform,  $f = 50 \text{ Hz}$ ,  $T = 1/f$

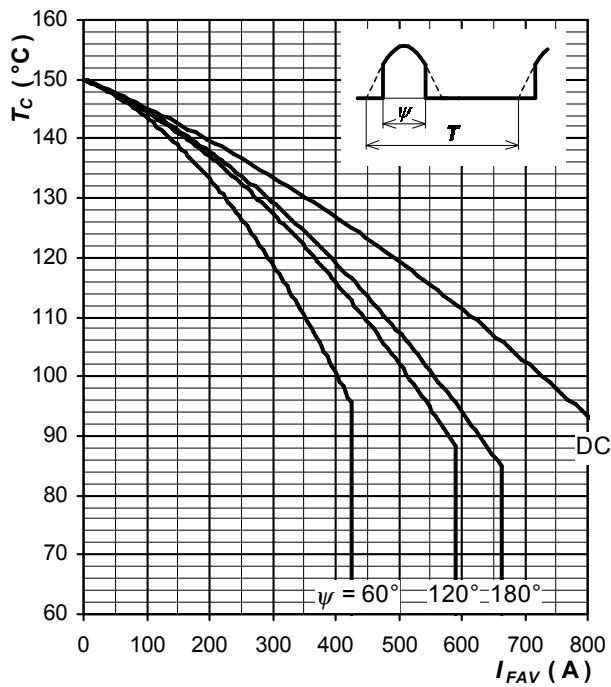


Fig. 8 Max. case temperature vs. aver. forward current, sine waveform,  $f = 50 \text{ Hz}$ ,  $T = 1/f$

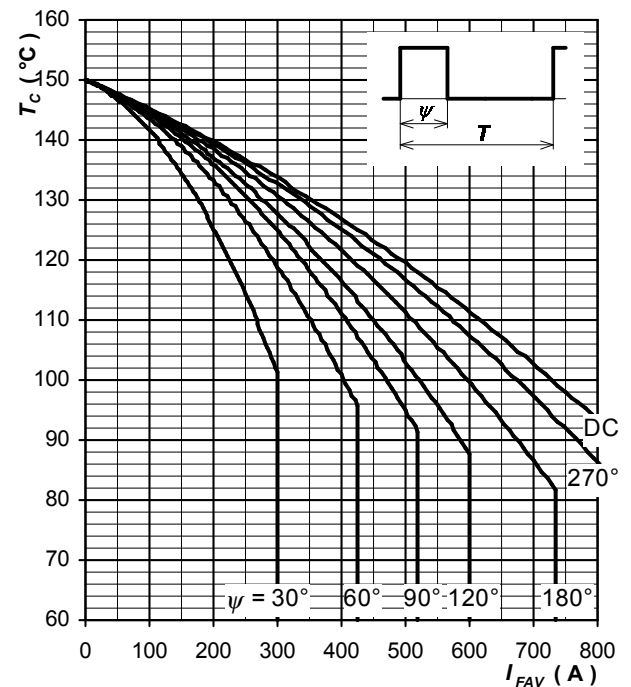


Fig. 9 Max. case temperature vs. aver. forward current, square waveform,  $f = 50 \text{ Hz}$ ,  $T = 1/f$

Notes