# 5SDD 10T1800

## Old part no. D 806C-1010-18

## Rectifier Diode

### Properties

- Industry standard housing
- Suitable for parallel operation
- High operating temperature
- Low forward voltage drop

### Key Parameters

| | | | |
|---|---|---|---|
| $V_{RRM}$ | = | 1 800 | V |
| $I_{FAVm}$ | = | 1 013 | A |
| $I_{FSM}$ | = | 13 500 | A |
| $V_{TO}$ | = | 0.934 | V |
| $r_T$ | = | 0.257 | mΩ |

### Types

| | $V_{RRM}$ |
|---|---|
| **5SDD 10T1800** | **1 800 V** |
| Conditions: | *$T_j$ = -40 ÷ 150 °C, half sine waveform, f = 50 Hz* |

### Mechanical Data

| | | |
|---|---|---|
| $F_m$ | **Mounting force** | **9 ± 3 kN** |
| $m$ | **Weight** | **0.11 kg** |
| $D_S$ | **Surface creepage distance** | **16 mm** |
| $D_a$ | **Air strike distance** | **9.7 mm** |

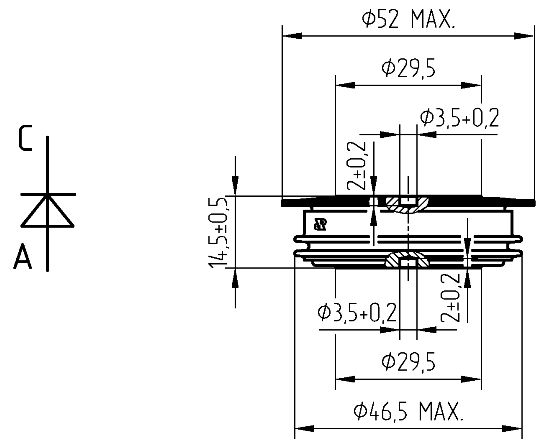


*Fig. 1 Case*

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| *Major Ratings* | | | *Value* | *Unit* |
|---|---|---|---|---|
| $V_{RRM}$ | **Repetitive peak reverse voltage**<br>*$T_j$ = -40 ÷ 150 °C* | | **1 800** | **V** |
| $I_{FAVm}$ | **Average forward current**<br>*$T_c$ = 85 °C* | | **1 013** | **A** |
| $I_{FRMS}$ | **RMS forward current**<br>*$T_c$ = 85 °C* | | **1 592** | **A** |
| $I_{RRM}$ | **Repetitive reverse current**<br>*$V_R = V_{RRM}$* | | **30** | **mA** |
| $I_{FSM}$ | **Non repetitive peak surge current**<br>*half sine pulse, $V_R$ = 0 V* | $t_p$ = 10 ms | **13 500** | **A** |
| | | $t_p$ = 8.3 ms | **14 400** | |
| $I_{FSM}$ | **Non repetitive peak surge current**<br>*half sine pulse, $V_R = 0.7\ V_{RRM}$* | $t_p$ = 10 ms | **10 800** | **A** |
| | | $t_p$ = 8.3 ms | **11 500** | |
| $I^2t$ | **Limiting load integral**<br>*half sine pulse, $V_R$ = 0 V* | $t_p$ = 10 ms | **910 000** | **$A^2s$** |
| | | $t_p$ = 8.3 ms | **860 000** | |
| $I^2t$ | **Limiting load integral**<br>*half sine pulse, $V_R = 0.7\ V_{RRM}$* | $t_p$ = 10 ms | **583 000** | **$A^2s$** |
| | | $t_p$ = 8.3 ms | **549 000** | |
| $T_{jmin}$ - $T_{jmax}$ | **Operating temperature range** | | **-40 ÷ 150** | **°C** |
| $T_{STG}$ | **Storage temperature range** | | **-40 ÷ 175** | **°C** |

*Unless otherwise specified $T_j$ = 150 °C*

| *Characteristics* | | *Value* | | | *Unit* |
|---|---|---|---|---|---|
| | | *min* | *typ* | *max* | |
| $V_{T0}$ | **Threshold voltage** | | | **0.934** | **V** |
| $r_T$ | ***Forward slope resistance***<br>*$I_{F1}$ = 1 600 A, $I_{F2}$ = 4 000 A* | | | **0.257** | **mΩ** |
| $V_{FM}$ | **Maximum forward voltage**<br>*$I_{FM}$ =2000 A* | | | **1.46** | **V** |
| $Q_{rr}$ | **Recovered charge**<br>*$V_R$ = 100 V, $I_{FM}$ = 1000 A, di/dt = -30 A/µs* | | **550** | | **µC** |

*Unless otherwise specified $T_j$ = 150 °C*

| *Thermal Parameters* | | | **Value** | **Unit** |
|---|---|---|---|---|
| $R_{thjc}$ | **Thermal resistance junction to case** | *double side cooling* | **38** | **K/kW** |
| | | *anode side cooling* | **58** | |
| | | *cathode side cooling* | **110** | |
| $R_{thch}$ | **Thermal resistance case to heatsink** | *double side cooling* | **12** | **K/kW** |
| | | *single side cooling* | **24** | |

### *Transient Thermal Impedance*

**Analytical function for transient thermal impedance**

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

Conditions:
$F_m$ = 9 ± 3 kN, Double side cooled

**Correction for periodic waveforms**

| | | | |
|---|---|---|---|
| 180° | sine: | 2.7 | K/kW |
| 180° | rectangular: | 5.0 | K/kW |
| 120° | rectangular: | 8.6 | K/kW |
| 60° | rectangular: | 16.3 | K/kW |

| *i* | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| $\tau_i$ ( s ) | 0.2912 | 0.0890 | 0.0153 | 0.0018 |
| $R_i$( K/kW ) | 8.82 | 24.43 | 1.88 | 2.87 |

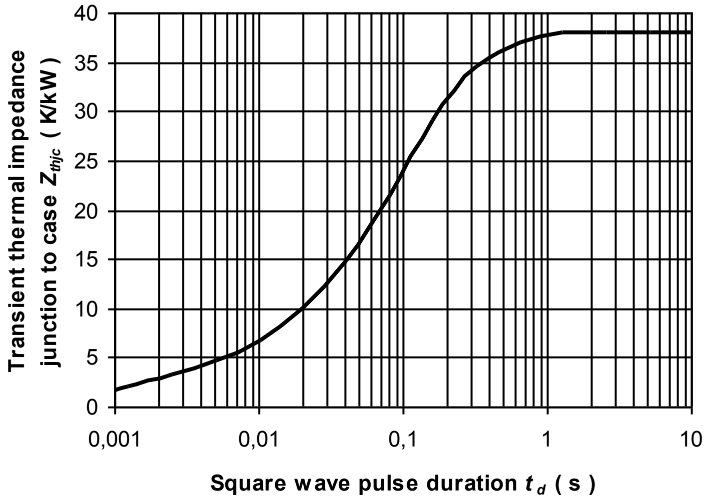


*Fig. 2 Dependence transient thermal impedance junction to case on square pulse*

**_Maximum forward voltage drop characteristics_**

**Analytical function for maximum forward drop characteristics**

$$V_F = A + B \cdot I_F + C \cdot \sqrt{I_F} + D \cdot \ln(I_F + 1)$$

Conditions:
$F_m$ = 9 ± 3 kN, halfsine pulse 8.3 ÷ 10 ms

| $T_j$ ( °C ) | *A* | *B* | *C* | *D* |
|---|---|---|---|---|
| **25** | **0.19567** | **1.938E-04** | **-0.00762** | **0.15181** |
| **150** | **0.28526** | **1.767E-04** | **0.00529** | **0.07669** |

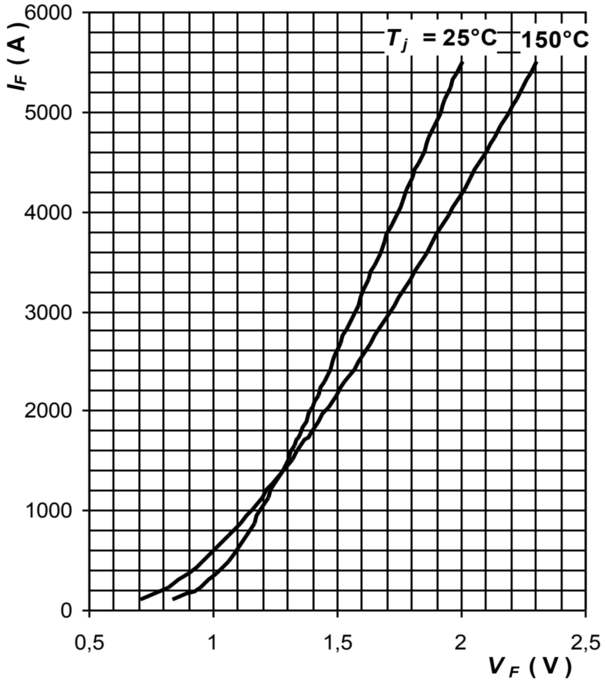


*Fig. 3 Maximum forward voltage drop characteristics*

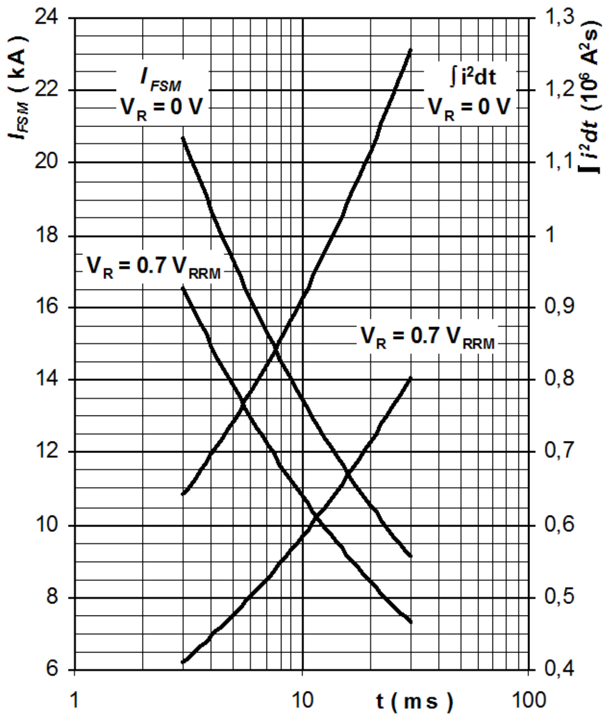


*Fig. 4 Surge forward current vs. pulse length, half sine wave, single pulse, $T_j = T_{jmax}$*

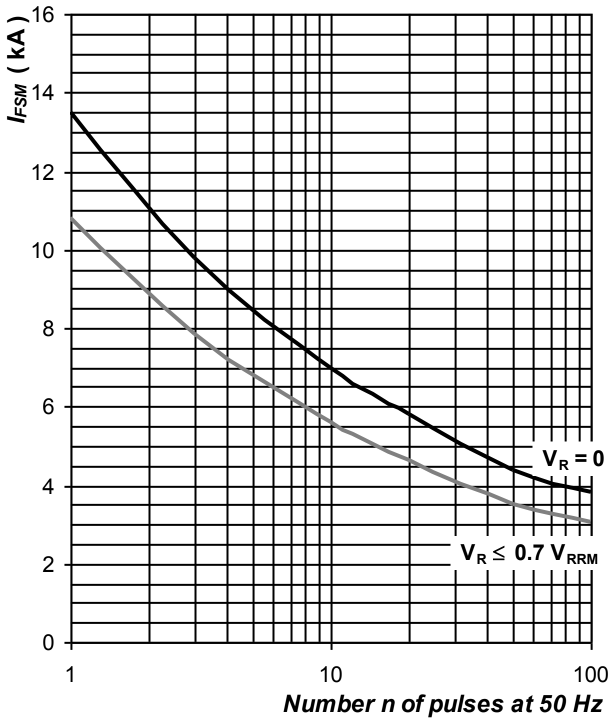


*Fig. 5 Surge forward current vs. number of pulses, half sine wave, $T_j = T_{jmax}$*

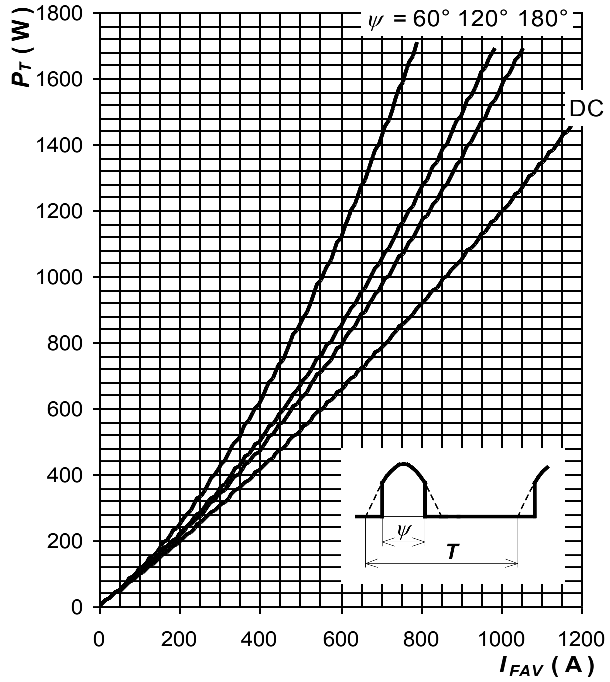


*Fig. 6 Forward power loss vs. average forward current, sine waveform, f = 50 Hz, T = 1/f*

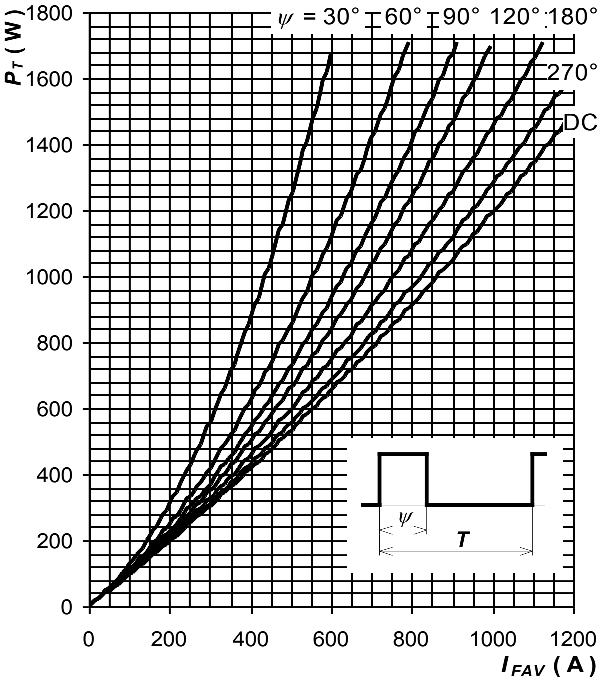


*Fig. 7 Forward power loss vs. average forward current, square waveform, f = 50 Hz, T = 1/f*

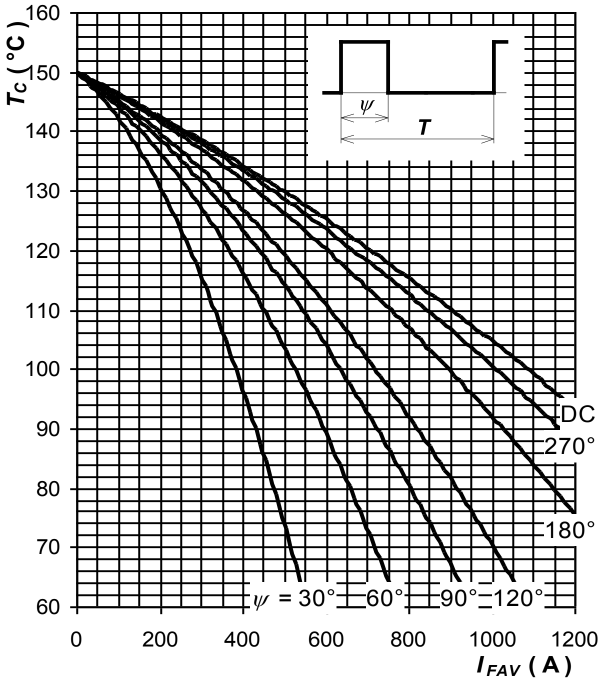


*Fig. 8 Max. case temperature vs. aver. forward current, sine waveform, f = 50 Hz, T = 1/f*

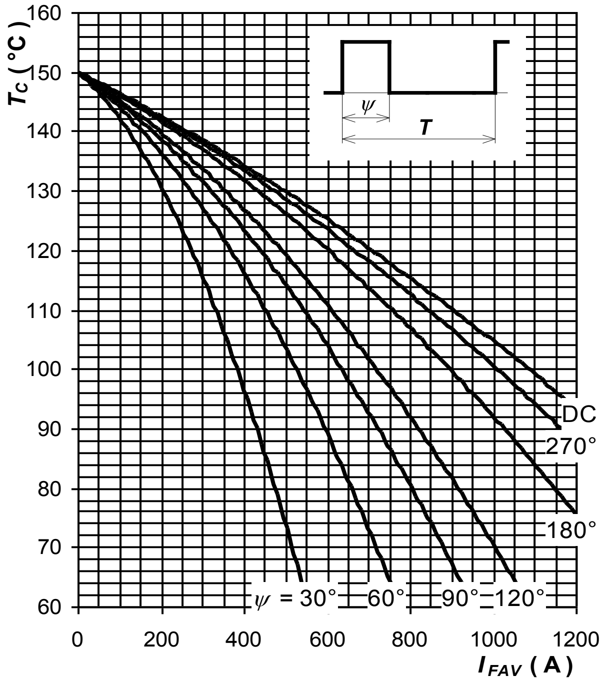


*Fig. 9 Max.case temperature vs. aver. forward current, square waveform, f = 50 Hz, T = 1/f*

Notes: