



5SDA 09D2604

Old part no. DA 807-880-26

Avalanche Diode

Properties

- low on-state voltage
- avalanche reverse characteristics
- high operational reliability
- suitable for parallel operation

Key Parameters

| | | | |
|------------|---|--------|----|
| V_{RRM} | = | 2 600 | V |
| I_{FAVm} | = | 1 020 | A |
| I_{FSM} | = | 11 500 | A |
| V_{TO} | = | 0.870 | V |
| r_T | = | 0.390 | mΩ |

Types

| | V_{RRM} |
|--|-----------|
| 5SDA 09D2604 | 2 600 V |
| 5SDA 09D2304 | 2 300 V |
| Conditions: $T_j = -40 \div 160$ °C, half sine waveform, $f = 50$ Hz | |

Mechanical Data

| | | |
|-------|---------------------------|-----------|
| F_m | Mounting force | 11 ± 1 kN |
| m | Weight | 0.23 kg |
| D_s | Surface creepage distance | 30 mm |
| D_a | Air strike distance | 20.5 mm |

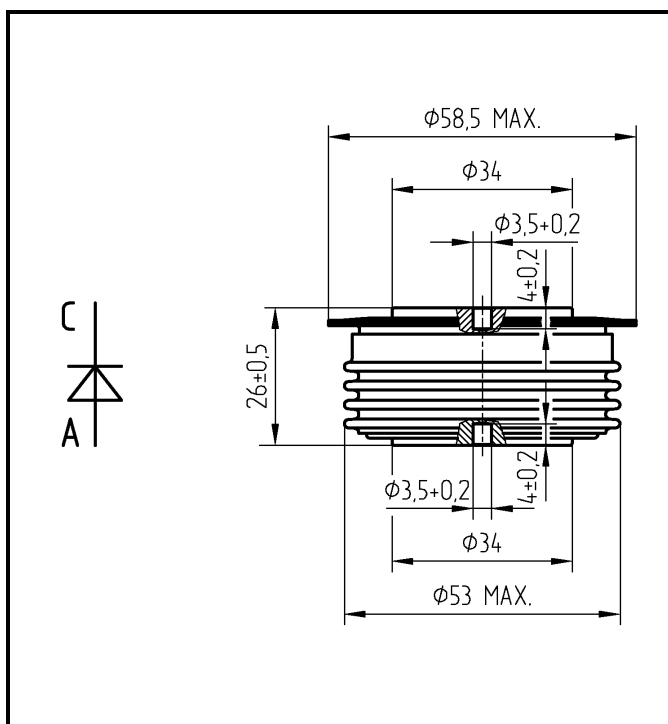


Fig. 1 Case



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| Maximum Ratings | | | Maximum Limits | Unit |
|------------------------|---|--|----------------------------------|------------------------------------|
| V_{RRM} | Repetitive peak reverse voltage $T_j = -40 \div 160 \text{ }^\circ\text{C}$ | 5SDA 09D2604 5SDA 09D2304 | 2 600 2 300 | V |
| I_{FAVm} | Average forward current $T_c = 85 \text{ }^\circ\text{C}$ | | 1 020 | A |
| I_{FRMS} | RMS forward current $T_c = 85 \text{ }^\circ\text{C}$ | | 1 600 | A |
| I_{RRM} | Repetitive reverse current $V_R = V_{RRM}$ | | 50 | mA |
| I_{FSM} | Non repetitive peak surge current $V_R = 0 \text{ V, half sine pulse}$ | $t_p = 8.3 \text{ ms}$ | 12 300 | A |
| | | $t_p = 10 \text{ ms}$ | 11 500 | A |
| I^2t | Limiting load integral $V_R = 0 \text{ V, half sine pulse}$ | $t_p = 8.3 \text{ ms}$ | 630 000 | A²s |
| | | $t_p = 10 \text{ ms}$ | 661 000 | A²s |
| P_{RSM} | Maximum avalanche power dissipation <i>rectangular pulse 20 μs</i> | | 50 | kW |
| $T_{jmin} - T_{jmax}$ | Operating temperature range | | -40 \div 160 | $^\circ\text{C}$ |
| T_{STG} | Storage temperature range | | -40 \div 160 | $^\circ\text{C}$ |

Unless otherwise specified $T_j = 160 \text{ }^\circ\text{C}$

| Characteristics | | Value | | | Unit |
|------------------------|---|--------------|------------|--------------|---------------------------------|
| | | <i>min</i> | <i>typ</i> | <i>max</i> | |
| V_{TO} | Threshold voltage | | | 0.870 | V |
| r_T | Forward slope resistance $I_F = 1000 \div 3000 \text{ A}$ | | | 0.390 | mΩ |
| V_{FM} | Maximum forward voltage $I_{FM} = 1\,800 \text{ A}$ | | | 1.600 | V |
| Q_{rr} | Recovered charge $V_R = 100 \text{ V, } I_{FM} = 1\,000 \text{ A, } di_F/dt = -5 \text{ A}/\mu\text{s}$ | | 810 | | μC |

Unless otherwise specified $T_j = 160 \text{ }^\circ\text{C}$

| Thermal Parameters | | | Value | Unit |
|---------------------------|--|-----------------------------|--------------|-------------|
| R_{thjc} | Thermal resistance junction to case | <i>double side cooling</i> | 40 | K/kW |
| | | <i>anode side cooling</i> | 65 | |
| | | <i>cathode side cooling</i> | 104 | |
| R_{thch} | Thermal resistance case to heatsink | <i>double side cooling</i> | 10 | K/kW |
| | | <i>single side cooling</i> | 20 | |

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Transient Thermal Impedance

Analytical function for transient thermal impedance

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

Conditions:

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

| i | 1 | 2 | 3 | 4 |
|--------------|-------|-------|-------|--------|
| R_i (K/kW) | 20.95 | 10.57 | 7.15 | 1.33 |
| τ_i (s) | 0.396 | 0.072 | 0.009 | 0.0044 |

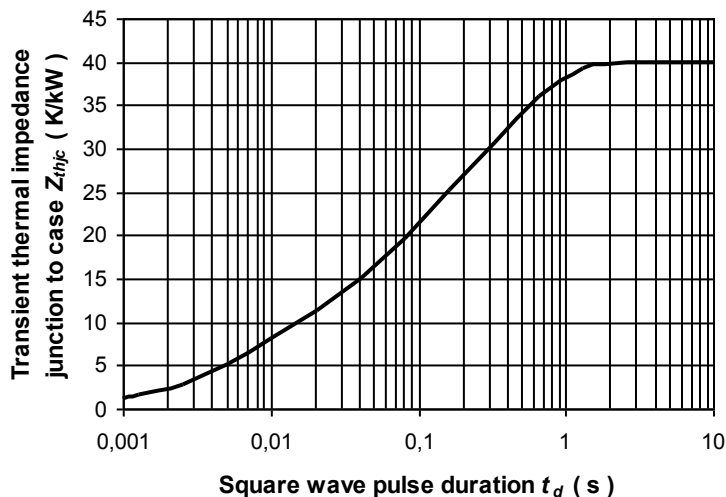


Fig. 2 Transient thermal impedance junction to case

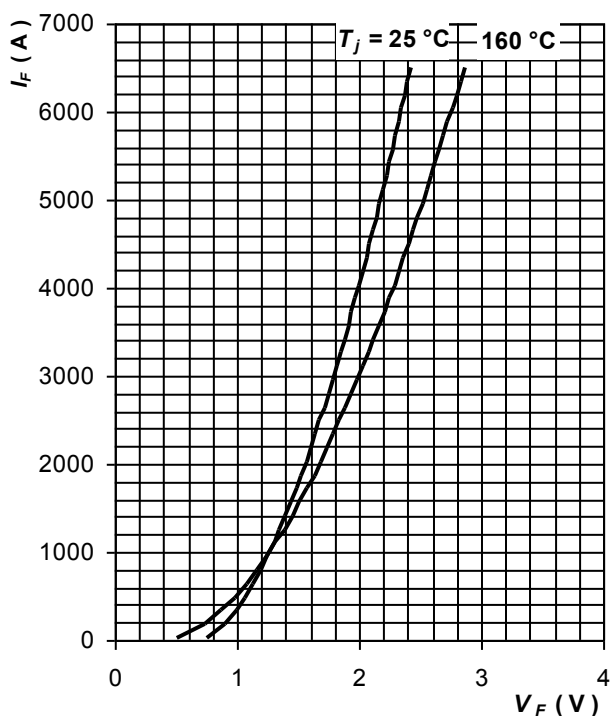


Fig. 3 Maximum forward voltage drop characteristics

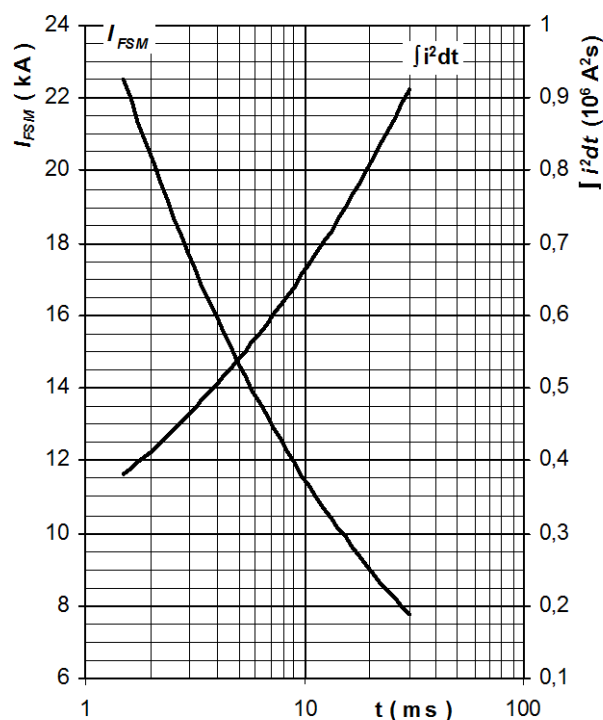


Fig. 4 Surge forward current vs. pulse length, half sine wave, single pulse, $V_R = 0$ V, $T_j = T_{jmax}$

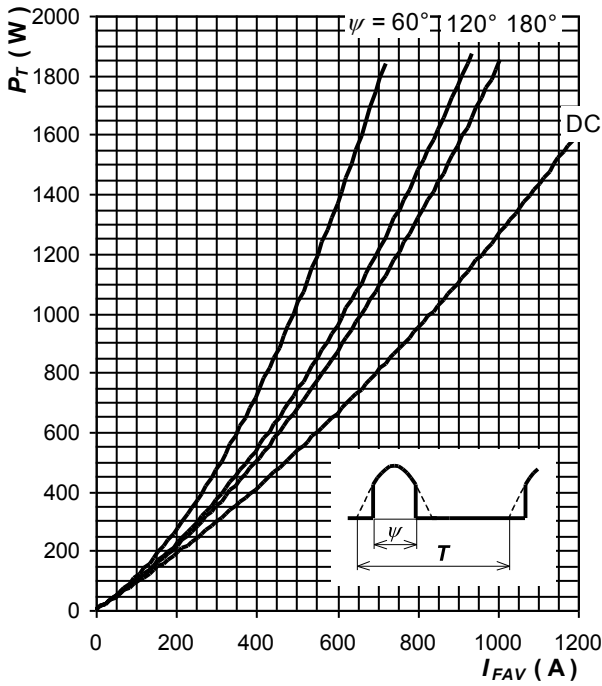


Fig. 5 Forward power loss vs. average forward current, sine waveform, $f = 50 \text{ Hz}$, $T = 1/f$

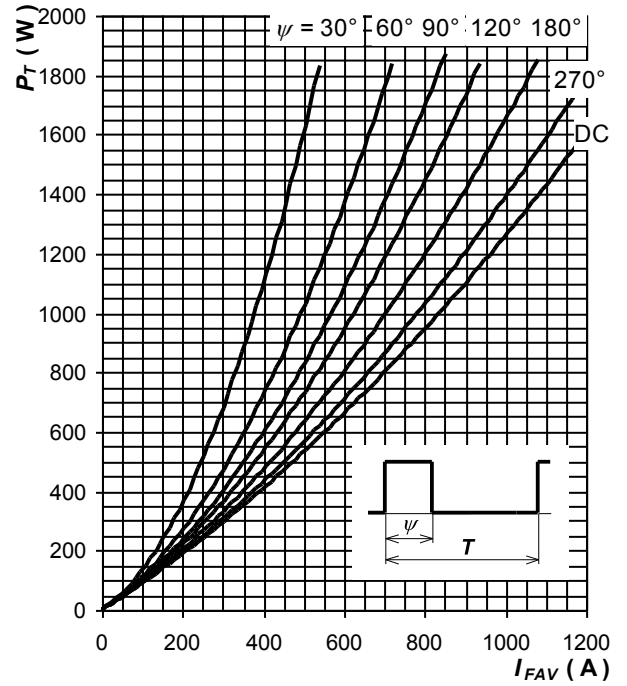


Fig. 6 Forward power loss vs. average forward current, square waveform, $f = 50 \text{ Hz}$, $T = 1/f$

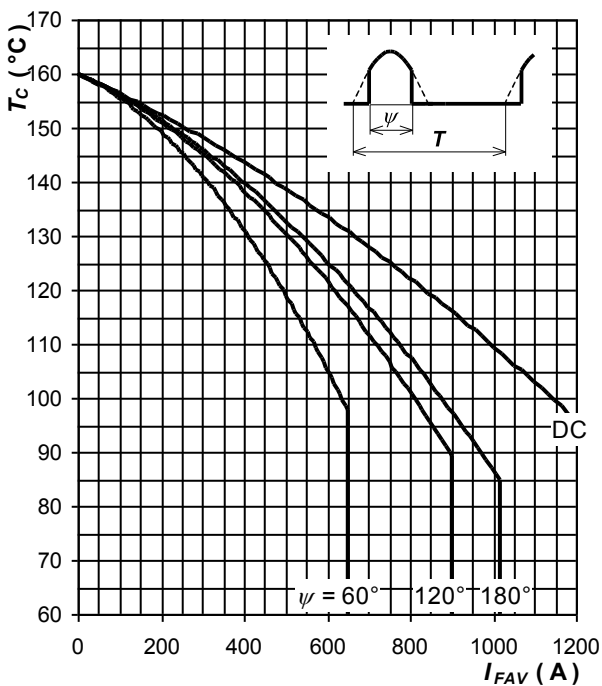


Fig. 7 Max. case temperature vs. aver. forward current, sine waveform, $f = 50 \text{ Hz}$, $T = 1/f$

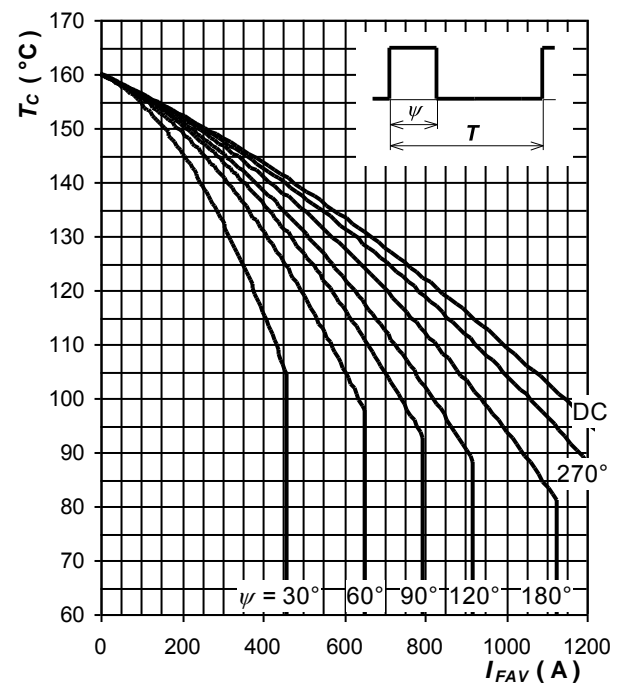


Fig. 8 Max. case temperature vs. aver. forward current, square waveform, $f = 50 \text{ Hz}$, $T = 1/f$

Notes: