

| | | |
|--------------|---|--------------------|
| V_{RRM} | = | 3200 V |
| $I_{F(AV)M}$ | = | 4700 A |
| $I_{F(RMS)}$ | = | 7390 A |
| I_{FSM} | = | 61×10^3 A |
| V_{F0} | = | 0.992 V |
| r_F | = | 0.067 mW |

Rectifier Diode

5SDD 48H3200

Doc. No. 5SYA1182-00 Sept. 07

- Optimum power handling capability
- Very low on-state losses

Blocking

Maximum rated values ^{Note 1}

| Parameter | Symbol | Conditions | Value | Unit |
|---------------------------------|-----------|--|-------|------|
| Repetitive peak reverse voltage | V_{RRM} | $f = 50$ Hz, $t_p = 10$ ms, $T_j = -40 \dots 160$ °C | 3200 | V |

Characteristic values

| Parameter | Symbol | Conditions | min | typ | max | Unit |
|--------------------------------|-----------|----------------------------|-----|-----|-----|------|
| Max. (reverse) leakage current | I_{RRM} | V_{RRM} , $T_j = 160$ °C | | | 100 | mA |

Derating factor of 0.13% per °C is applicable for T_j below 0 °C.

Mechanical data

Maximum rated values ^{Note 1}

| Parameter | Symbol | Conditions | min | typ | max | Unit |
|----------------|--------|------------------|-----|-----|-----|------------------|
| Mounting force | F_M | | 45 | 50 | 55 | kN |
| Acceleration | a | Device unclamped | | | 50 | m/s ² |
| Acceleration | a | Device clamped | | | 100 | m/s ² |

Characteristic values

| Parameter | Symbol | Conditions | min | typ | max | Unit |
|---------------------------|--------|------------------------------|------|-----|------|------|
| Weight | m | | | 0.9 | | kg |
| Housing thickness | H | $F_M = 50$ kN, $T_a = 25$ °C | 25.5 | | 26.5 | mm |
| Surface creepage distance | D_S | | 40 | | | mm |
| Air strike distance | D_a | | 20 | | | mm |

Note 1 Maximum rated values indicate limits beyond which damage to the device may occur

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On-state

Maximum rated values Note 1

| Parameter | Symbol | Conditions | min | typ | max | Unit |
|--|--------------|---|-----|-----|--------------------|----------------------|
| Max. average on-state current | $I_{F(AV)M}$ | 50 Hz, Half sine wave, $T_C = 85\text{ }^\circ\text{C}$ | | | 4700 | A |
| Max. RMS on-state current | $I_{F(RMS)}$ | | | | 7390 | A |
| Max. peak non-repetitive surge current | I_{FSM} | $t_p = 10\text{ ms}$, $T_j = 160\text{ }^\circ\text{C}$, $V_R = 0\text{ V}$ | | | 61×10^3 | A |
| Limiting load integral | I^2t | | | | 18.6×10^6 | A^2s |
| Max. peak non-repetitive surge current | I_{FSM} | $t_p = 8.3\text{ ms}$, $T_j = 160\text{ }^\circ\text{C}$, $V_R = 0\text{ V}$ | | | 65×10^3 | A |
| Limiting load integral | I^2t | | | | 17.6×10^6 | A^2s |

Characteristic values

| Parameter | Symbol | Conditions | min | typ | max | Unit |
|-------------------|------------|--|-----|-----|-------|------------------|
| On-state voltage | V_F | $I_F = 4000\text{ A}$, $T_j = 160\text{ }^\circ\text{C}$ | | | 1.20 | V |
| Threshold voltage | $V_{(T0)}$ | $T_j = 160\text{ }^\circ\text{C}$ $I_T = 7000 \dots 22000\text{ A}$ | | | 0.992 | V |
| Slope resistance | r_T | | | | 0.067 | $\text{m}\Omega$ |

Switching

Characteristic values

| Parameter | Symbol | Conditions | min | typ | max | Unit |
|-----------------|----------|--|-----|------|-----|----------------|
| Recovery charge | Q_{rr} | $di_F/dt = -30\text{ A}/\mu\text{s}$, $V_R = 100\text{ V}$ $I_F = 2000\text{ A}$, $T_j = 160\text{ }^\circ\text{C}$ | | 4000 | | μAs |

Thermal

Maximum rated values ¹⁾

| Parameter | Symbol | Conditions | min | typ | max | Unit |
|--------------------------------------|-----------|------------|-----|-----|-----|------|
| Operating junction temperature range | T_{vj} | | -40 | | 160 | °C |
| Storage temperature range | T_{stg} | | -40 | | 160 | °C |

Characteristic values

| Parameter | Symbol | Conditions | min | typ | max | Unit |
|-------------------------------------|----------------|---|-----|-----|------|------|
| Thermal resistance junction to case | $R_{th(j-c)}$ | Double-side cooled $F_m = 45...55$ kN | | | 8 | K/kW |
| | $R_{th(j-c)A}$ | Anode-side cooled $F_m = 45...55$ kN | | | 14.5 | K/kW |
| | $R_{th(j-c)C}$ | Cathode-side cooled $F_m = 45...55$ kN | | | 18.0 | K/kW |
| Thermal resistance case to heatsink | $R_{th(c-h)}$ | Double-side cooled $F_m = 45...55$ kN | | | 2.5 | K/kW |
| | $R_{th(c-h)}$ | Single-side cooled $F_m = 45...55$ kN | | | 5.0 | K/kW |

Analytical function for transient thermal impedance:

$$Z_{th(j-c)}(t) = \sum_{i=1}^n R_{th i} (1 - e^{-t/\tau_i})$$

| i | 1 | 2 | 3 | 4 |
|-------------------|--------|--------|--------|--------|
| $R_{th i}$ (K/kW) | 4.533 | 2.255 | 0.868 | 0.345 |
| τ_i (s) | 0.4406 | 0.1045 | 0.0092 | 0.0022 |

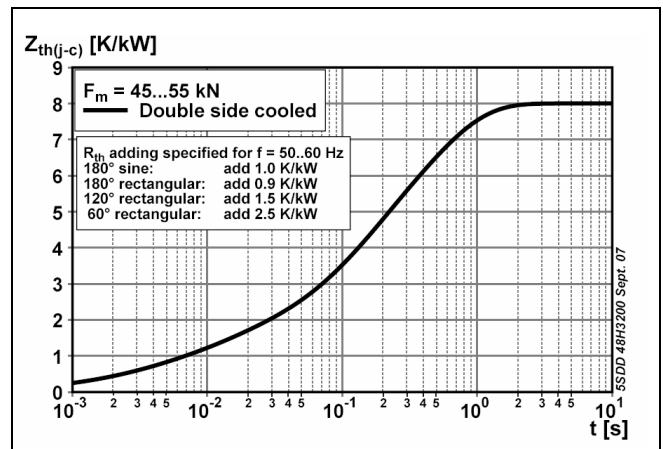


Fig. 1 Transient thermal impedance junction-to-case

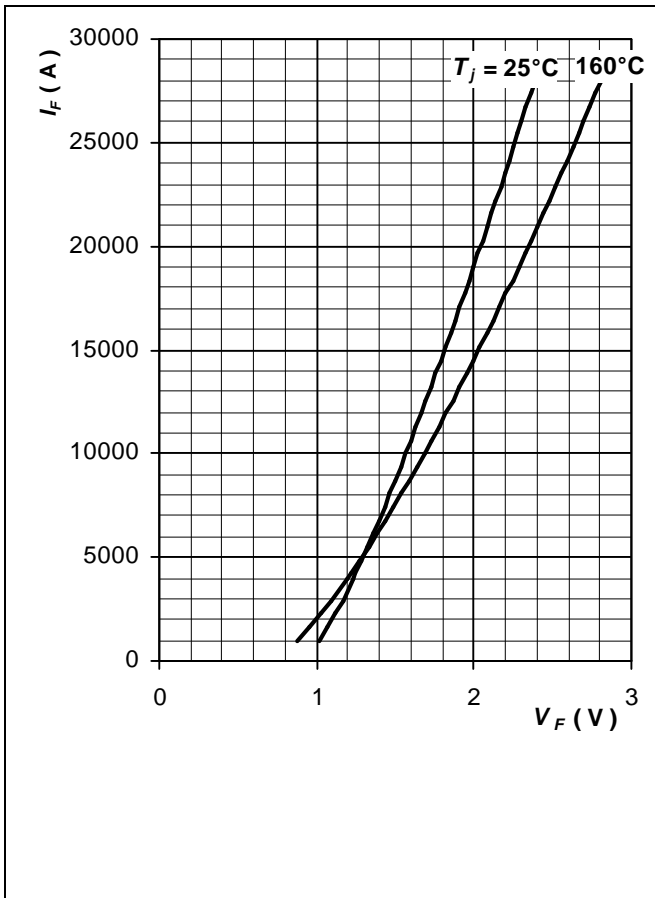


Fig. 2 Max. on-state characteristics

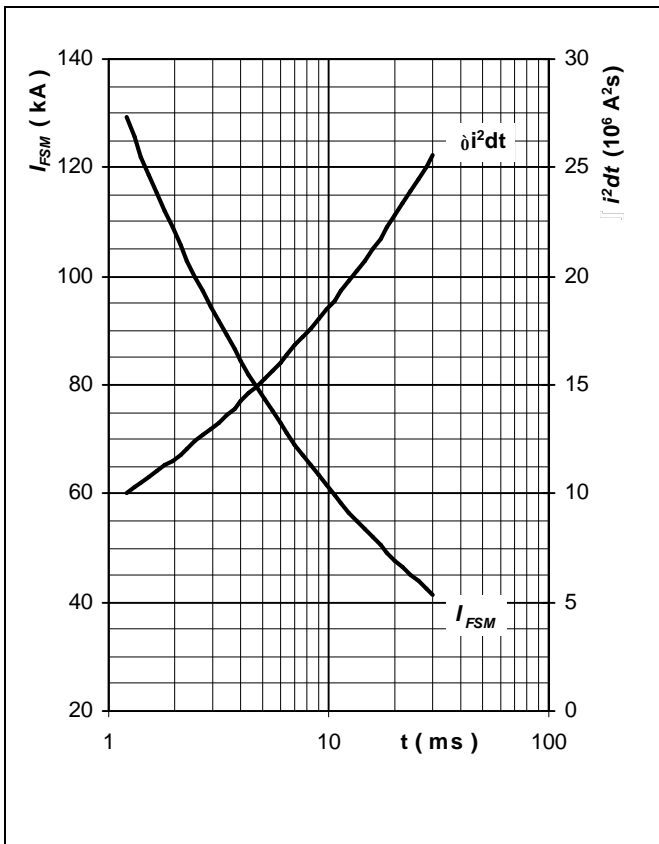


Fig. 3 Surge forward current vs. pulse length, half sine wave, single pulse, $V_R = 0$ V

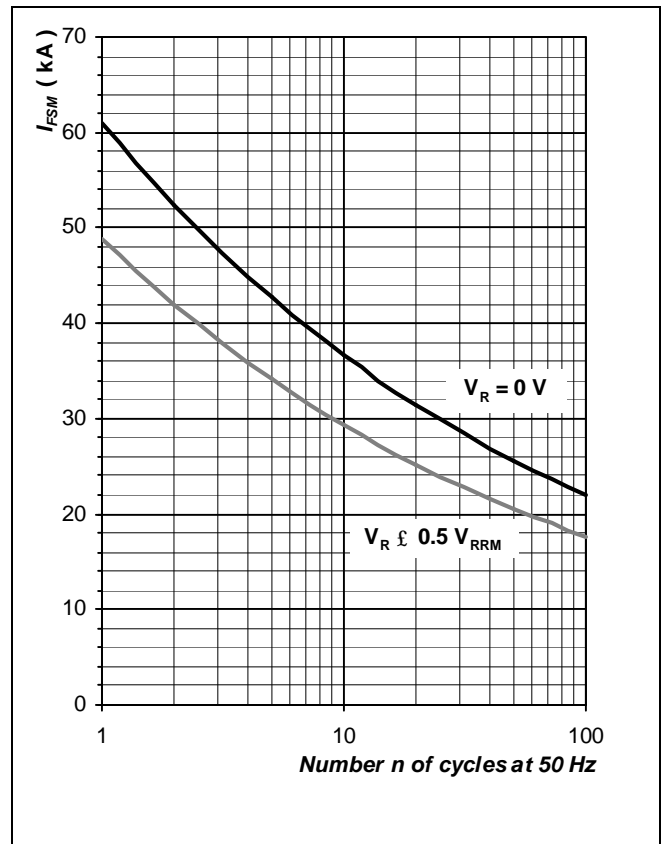


Fig. 4 Surge forward current vs. number of pulses, half sine wave

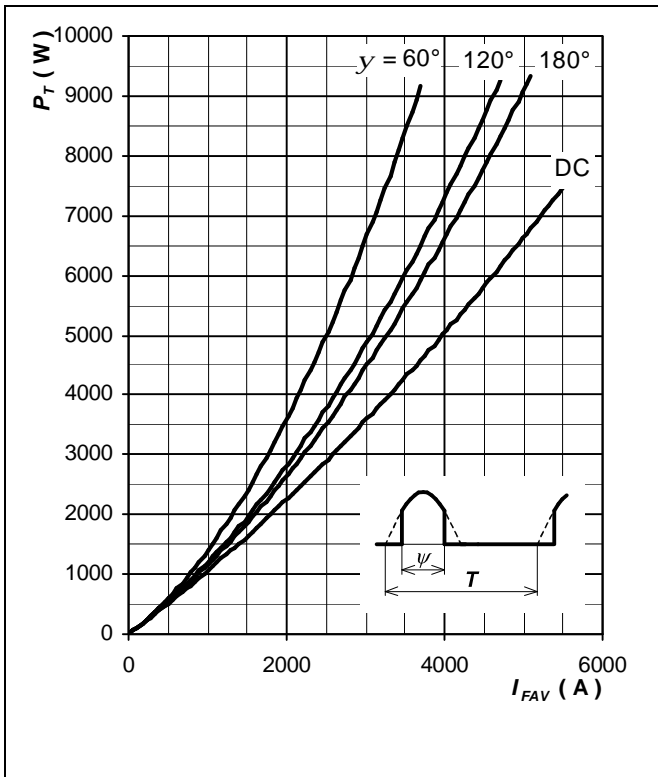


Fig. 5 Forward power loss vs. average forward current, sine waveform, $f = 50$ Hz

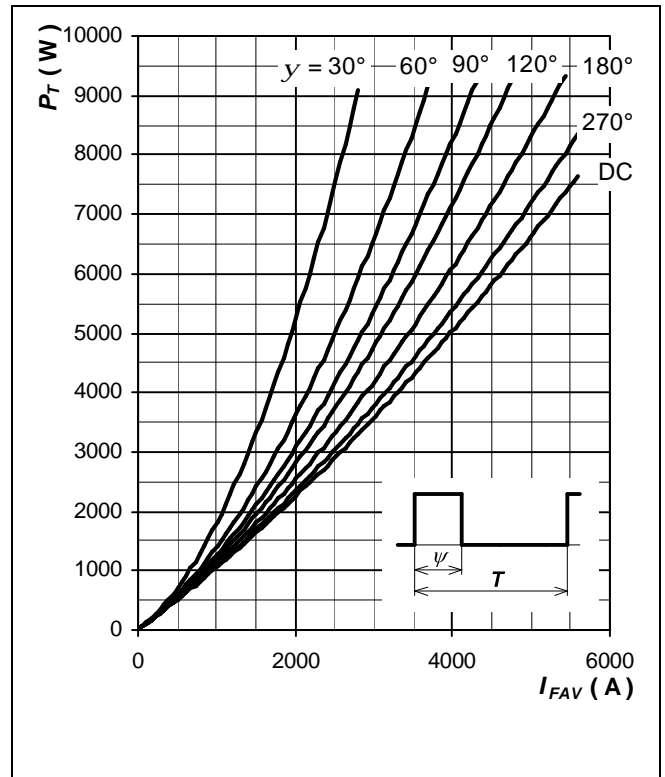


Fig. 6 Forward power loss vs. average forward current, square waveform, $f = 50$ Hz

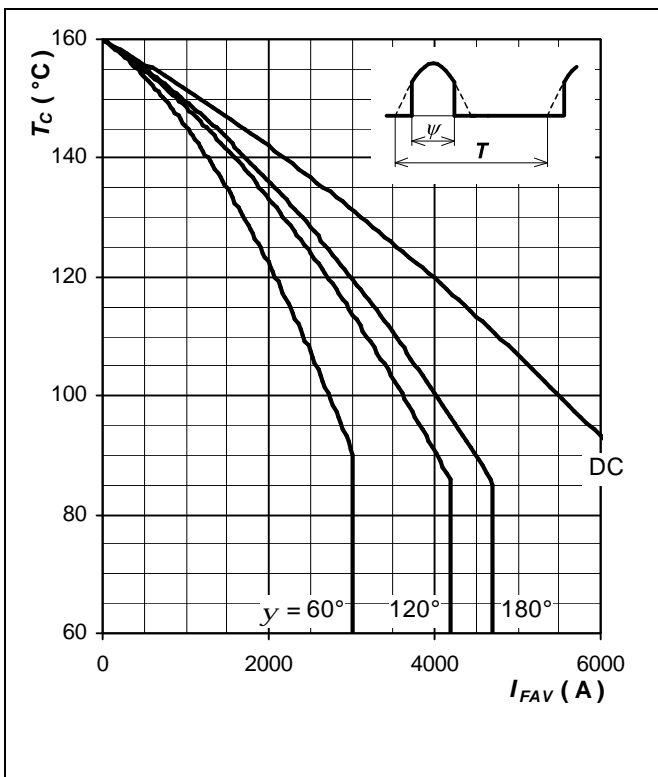


Fig. 7 Max. case temperature vs. aver. forward current, sine waveform, $f = 50$ Hz

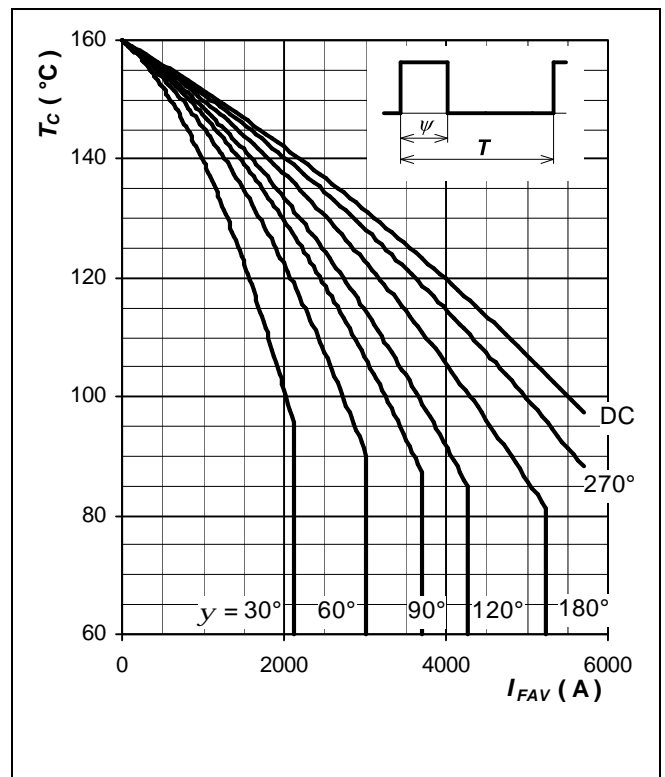


Fig. 8 Max. case temperature vs. aver. forward current, square waveform, $f = 50$ Hz

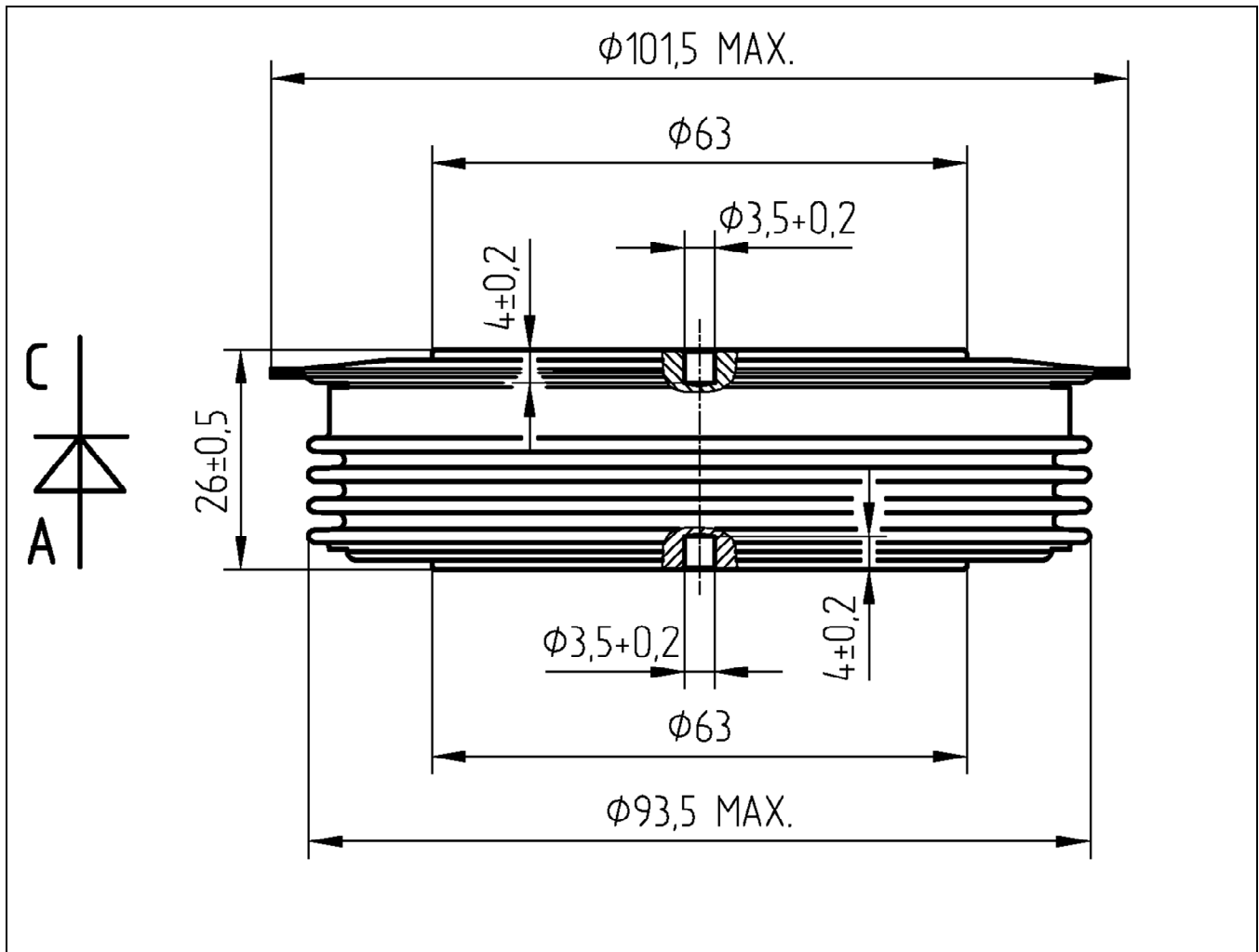


Fig. 9 Outline drawing; all dimensions are in millimeters and represent nominal values unless stated otherwise

Related documents:

| | |
|-----------|---|
| 5SYA 2020 | Design of RC-Snubbers for Phase Control Applications |
| 5SYA 2029 | High Power Rectifier Diodes |
| 5SYA 2036 | Recommendations regarding mechanical clamping of Press Pack High Power Semiconductors |
| 5SZK 9104 | Specification of environmental class for pressure contact diodes, PCTs and GTO, STORAGE available on request, please contact factory |
| 5SZK 9105 | Specification of environmental class for pressure contact diodes, PCTs and GTO, TRANSPORTATION available on request, please contact factory |

Please refer to <http://www.abb.com/semiconductors> for current version of documents.

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