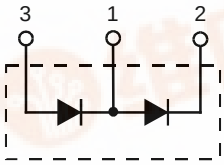
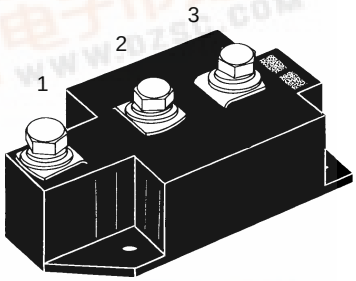
# High Power Diode Modules

$I_{FRMS}$ = 2x 480 A
$I_{FAVM}$ = 2x 305 A
$V_{RRM}$ = 800-2200 V

| $V_{RSM}$ V | $V_{RRM}$ V | Type |
|---|---|---|
| 900 | 800 | MDD 310-08N1 |
| 1300 | 1200 | MDD 310-12N1 |
| 1500 | 1400 | MDD 310-14N1 |
| 1700 | 1600 | MDD 310-16N1 |
| 2100 | 2000 | MDD 310-20N1 |
| 2300 | 2200 | MDD 310-22N1 |




| Symbol | Test Conditions | | Maximum Ratings | |
|---|---|---|---|---|
| $I_{FRMS}$ | $T_{VJ} = T_{VJM}$ | | 480 | A |
| $I_{FAVM}$ | $T_C$ = 100°C; 180° sine | | 305 | A |
| $I_{FSM}$ | $T_{VJ}$ = 45°C; | t = 10 ms (50 Hz), sine | 11 500 | A |
| | $V_R$ = 0 | t = 8.3 ms (60 Hz), sine | 12 200 | A |
| | $T_{VJ} = T_{VJM}$ | t = 10 ms (50 Hz), sine | 9 600 | A |
| | $V_R$ = 0 | t = 8.3 ms (60 Hz), sine | 10 200 | A |
| $\int i^2dt$ | $T_{VJ}$ = 45°C | t = 10 ms (50 Hz), sine | 662 000 | $A^2s$ |
| | $V_R$ = 0 | t = 8.3 ms (60 Hz), sine | 620 000 | $A^2s$ |
| | $T_{VJ} = T_{VJM}$ | t = 10 ms (50 Hz), sine | 460 000 | $A^2s$ |
| | $V_R$ = 0 | t = 8.3 ms (60 Hz), sine | 430 000 | $A^2s$ |
| $T_{VJ}$ | | | -40...+150 | °C |
| $T_{VJM}$ | | | 150 | °C |
| $T_{stg}$ | | | -40...+125 | °C |
| $V_{ISOL}$ | 50/60 Hz, RMS | t = 1 min | 3000 | V~ |
| | $I_{ISOL} \leq$ 1 mA | t = 1 s | 3600 | V~ |
| $M_d$ | Mounting torque (M5) | | 2.5-5/22-44 | Nm/lb.in. |
| | Terminal connection torque (M8) | | 12-15/106-132 | Nm/lb.in. |
| Weight | Typical including screws | | 320 | g |

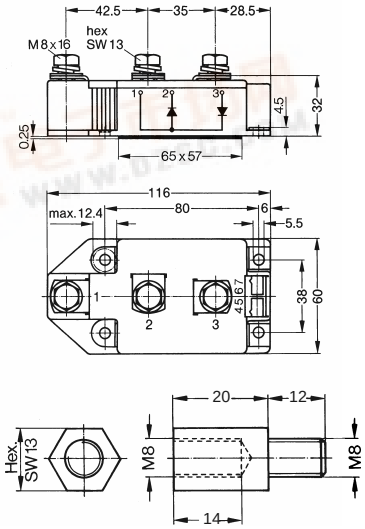
| Symbol | Test Conditions | | Characteristic Values | |
|---|---|---|---|---|
| $I_{RRM}$ | $T_{VJ} = T_{VJM}$; $V_R = V_{RRM}$ | | 40 | mA |
| $V_F$ | $I_F$ = 600 A; $T_{VJ}$ = 25°C | | 1.2 | V |
| $V_{T0}$ | For power-loss calculations only | | 0.75 | V |
| $r_T$ | $T_{VJ} = T_{VJM}$ | | 0.63 | mΩ |
| $R_{thJC}$ | per diode; DC current | other values see Fig. 6/7 | 0.129 | K/W |
| | per module | | 0.065 | K/W |
| $R_{thJK}$ | per diode; DC current | | 0.169 | K/W |
| | per module | | 0.0845 | K/W |
| $Q_S$ | $T_{VJ}$ = 125°C, $I_F$ = 400 A; -di/dt = 50 A/µs | | 760 | µC |
| $I_{RM}$ | | | 275 | A |
| $d_S$ | Creepage distance on surface | | 12.7 | mm |
| $d_A$ | Strike distance through air | | 9.6 | mm |
| a | Maximum allowable acceleration | | 50 | $m/s^2$ |

### Features
- Direct copper bonded $Al_2O_3$ -ceramic base plate
- Planar passivated chips
- Isolation voltage 3600 V~
- UL registered, E 72873

### Applications
- Supplies for DC power equipment
- DC supply for PWM inverter
- Field supply for DC motors
- Battery DC power supplies

### Advantages
- Space and weight savings
- Simple mounting
- Improved temperature and power cycling
- Reduced protection circuits

### Dimensions in mm (1 mm = 0.0394")




Threaded spacer for higher Anode/Cathode construction: Type **ZY 250**, material brass

Data according to IEC 60747 and refer to a single diode unless otherwise stated.
IXYS reserves the right to change limits, test conditions and dimensions

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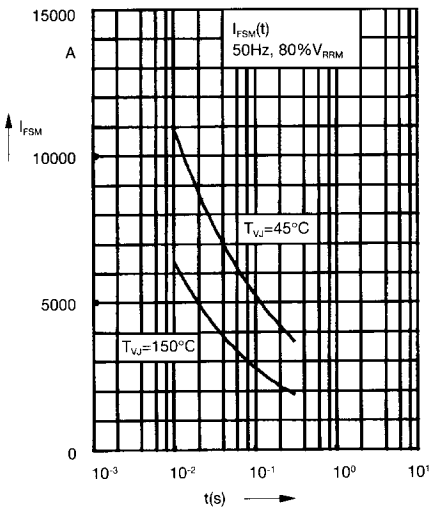


Fig. 1 Surge overload current
$I_{FSM}$: Crest value, t: duration

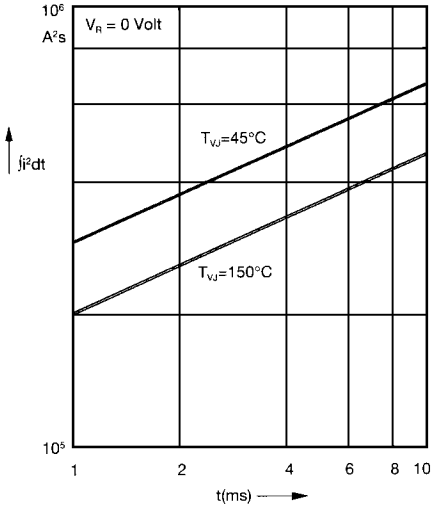


Fig. 2 $\int i^2dt$ versus time (1-10 ms)

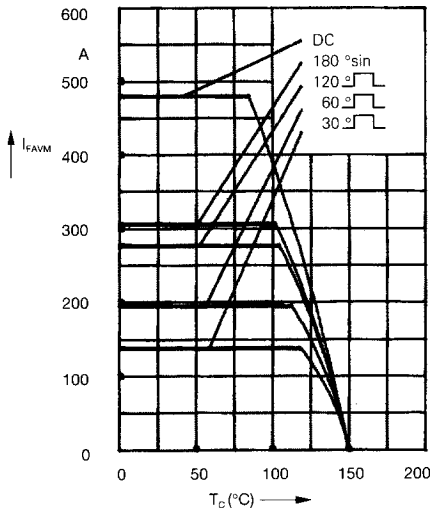


Fig. 2a Maximum forward current at case temperature

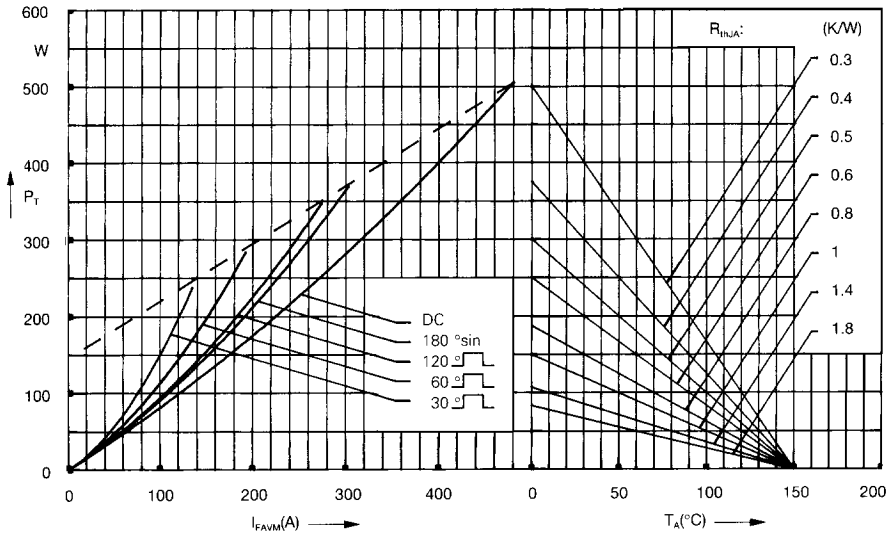


Fig. 3 Power dissipation versus forward current and ambient temperature (per diode)

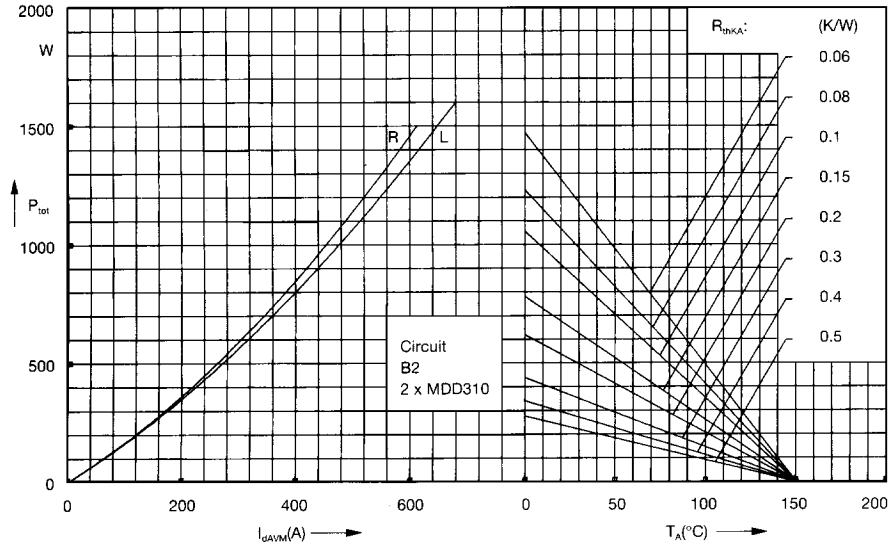


Fig. 4 Single phase rectifier bridge: Power dissipation versus direct output current and ambient temperature
R = resistive load
L = inductive load

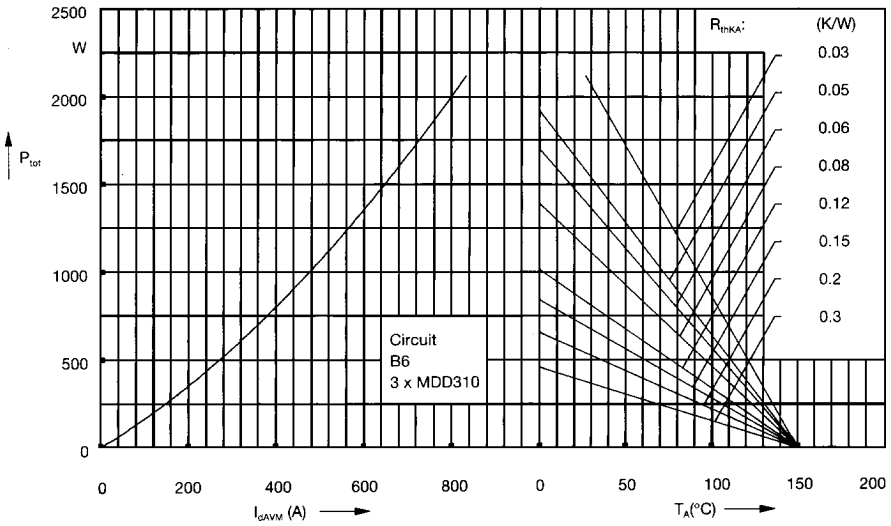


Fig. 5 Three phase rectifier bridge: Power dissipation versus direct output current and ambient temperature

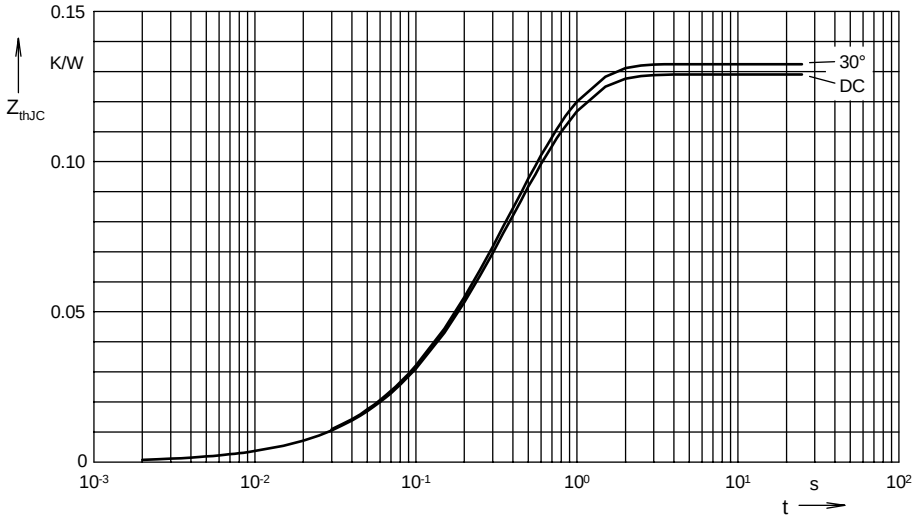


Fig. 6 Transient thermal impedance junction to case (per diode)

$R_{thJC}$ for various conduction angles d:

| d | $R_{thJC}$ (K/W) |
|---|---|
| DC | 0.129 |
| 180° | 0.131 |
| 120° | 0.132 |
| 60° | 0.132 |
| 30° | 0.133 |

Constants for $Z_{thJC}$ calculation:

| i | $R_{thi}$ (K/W) | $t_i$ (s) |
|---|---|---|
| 1 | 0.0035 | 0.0099 |
| 2 | 0.0165 | 0.168 |
| 3 | 0.1091 | 0.456 |

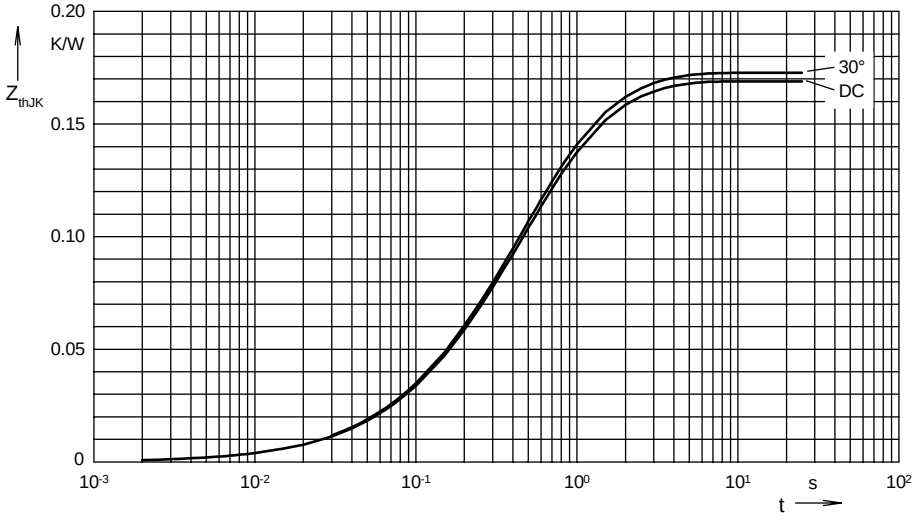


Fig. 7 Transient thermal impedance junction to heatsink (per diode)

$R_{thJK}$ for various conduction angles d:

| d | $R_{thJK}$ (K/W) |
|---|---|
| DC | 0.169 |
| 180° | 0.171 |
| 120° | 0.172 |
| 60° | 0.172 |
| 30° | 0.173 |

Constants for $Z_{thJK}$ calculation:

| i | $R_{thi}$ (K/W) | $t_i$ (s) |
|---|---|---|
| 1 | 0.0035 | 0.0099 |
| 2 | 0.0165 | 0.168 |
| 3 | 0.1091 | 0.456 |
| 4 | 0.04 | 1.36 |

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