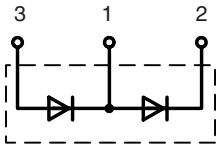
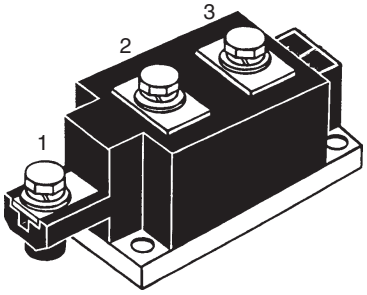
# High Power Diode Modules

$I_{FRMS}$ = 2x520 A
$I_{FAVM}$ = 2x310 A
$V_{RRM}$ = 1200-2200 V

| $V_{RSM}$ $V_{DSM}$ V | $V_{RRM}$ $V_{DRM}$ V | Type |
|---|---|---|
| 1300 | 1200 | MDD 312-12N1 |
| 1500 | 1400 | MDD 312-14N1 |
| 1700 | 1600 | MDD 312-16N1 |
| 1900 | 1800 | MDD 312-18N1 |
| 2100 | 2000 | MDD 312-20N1 |
| 2300 | 2200 | MDD 312-22N1 |




| Symbol | Conditions | | Maximum Ratings | |
|---|---|---|---|---|
| $I_{FRMS}$ | $T_{VJ} = T_{VJM}$ | | 520 | A |
| $I_{FAVM}$ | $T_C$ = 100°C; 180° sine | | 310 | A |
| $I_{FSM}$ | $T_{VJ}$ = 45°C; | t = 10 ms (50 Hz) | 10500 | A |
| | $V_R$ = 0 | t = 8.3 ms (60 Hz) | 11200 | A |
| | $T_{VJ} = T_{VJM}$ | t = 10 ms (50 Hz) | 9200 | A |
| | $V_R$ = 0 | t = 8.3 ms (60 Hz) | 9800 | A |
| $\int i^2dt$ | $T_{VJ}$ = 45°C | t = 10 ms (50 Hz) | 551000 | $A^2s$ |
| | $V_R$ = 0 | t = 8.3 ms (60 Hz) | 527000 | $A^2s$ |
| | $T_{VJ} = T_{VJM}$ | t = 10 ms (50 Hz) | 423 000 | $A^2s$ |
| | $V_R$ = 0 | t = 8.3 ms (60 Hz) | 403 000 | $A^2s$ |
| $T_{VJ}$ | | | -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 (M6) | | 4.5-7/40-62 | Nm/lb.in. |
| | Terminal connection torque (M8) | | 11-13/97-115 | Nm/lb.in. |
| Weight | Typical including screws | | 750 | g |

| Symbol | Conditions | Characteristic Values | |
|---|---|---|---|
| $I_{RRM}$ | $T_{VJ} = T_{VJM}$; $V_R = V_{RRM}$ | 30 | mA |
| $V_F$ | $I_F$ = 600 A; $T_{VJ}$ = 25°C | 1.32 | V |
| $V_{T0}$ | For power-loss calculations only | 0.8 | V |
| $r_T$ | $T_{VJ} = T_{VJM}$ | 0.6 | mΩ |
| $R_{thJC}$ | per diode; DC current | 0.12 | K/W |
| | per module | 0.06 | K/W |
| $R_{thJK}$ | per diode; DC current | 0.16 | K/W |
| | per module | 0.08 | K/W |
| $Q_S$ | $T_{VJ}$ = 125°C; $I_F$ = 400 A; -di/dt = 50 A/µs | 700 | µC |
| $I_{RM}$ | | 260 | A |
| $d_S$ | Creeping distance on surface | 12.7 | mm |
| $d_A$ | Creepage distance in air | 9.6 | mm |
| a | Maximum allowable acceleration | 50 | $m/s^2$ |

Data according to IEC 60747 and refer to a single diode unless otherwise stated.

### Features

- International standard package
- Direct copper bonded $Al_2O_3$-ceramic with copper base plate
- Planar passivated chips
- Isolation voltage 3600 V~
- UL registered E 72873

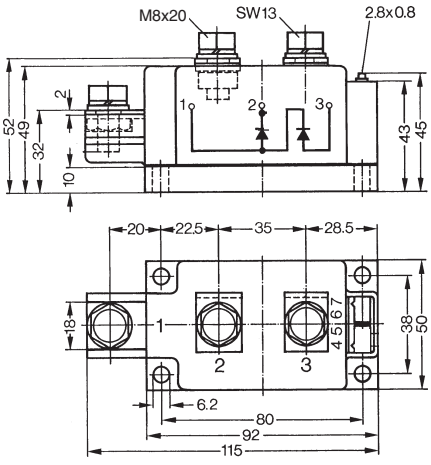
### Applications

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

### Advantages

- Simple mounting
- Improved temperature and power cycling
- Reduced protection circuits

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

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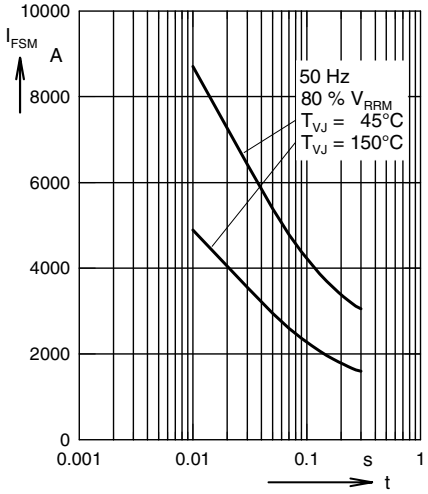


Fig. 1 Surge overload current
$I_{FSM}$: Crest value, t: duration

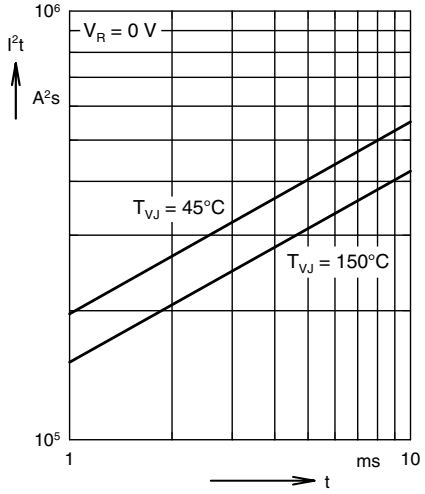


Fig. 2 $I^2t$ versus time (1-10 ms)

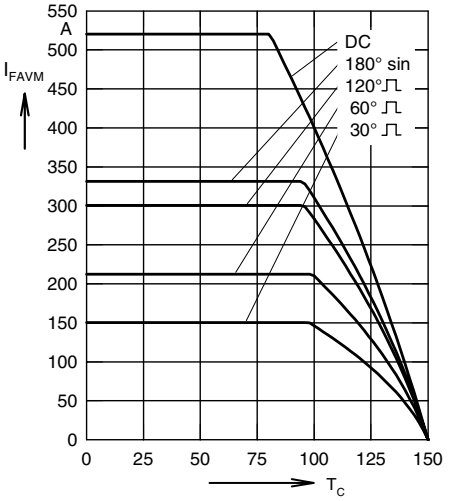


Fig. 3 Maximum forward current at case temperature

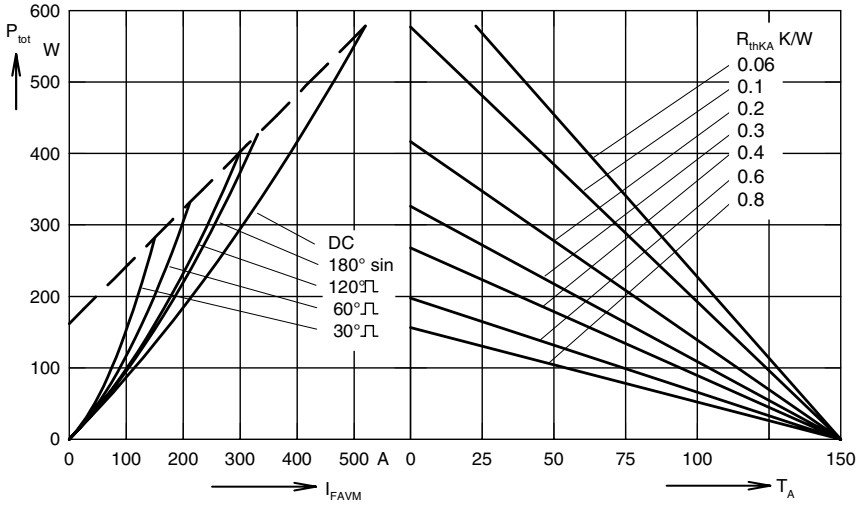


Fig. 4 Power dissipation vs. forward current and ambient temperature (per diode)

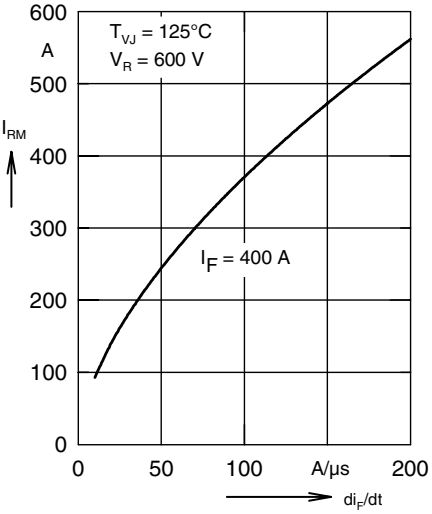


Fig. 5 Typ. peak reverse current
$I_{RM}$ versus $-di_F/dt$

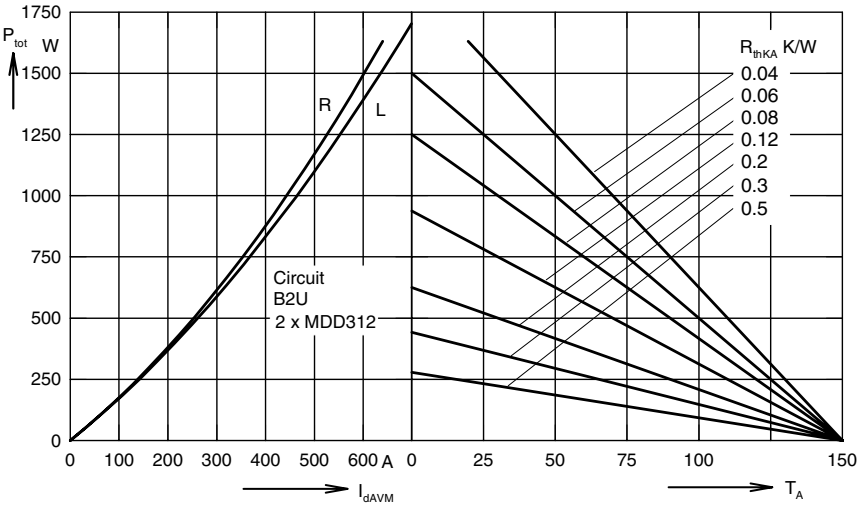


Fig. 6 Single phase rectifier bridge: Power dissipation vs. direct output current and ambient temperature R = resistive load, L = inductive load

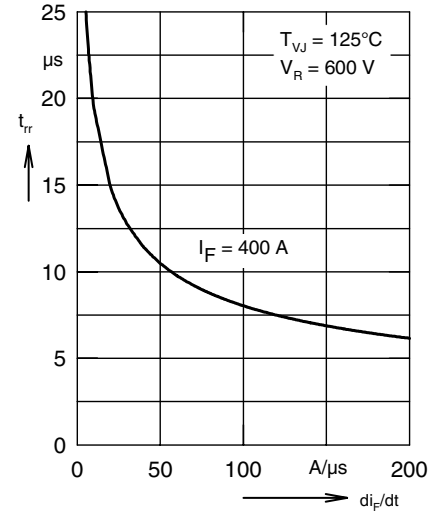


Fig. 7 Typ. recovery time $t_{rr}$ versus $-di_F/dt$

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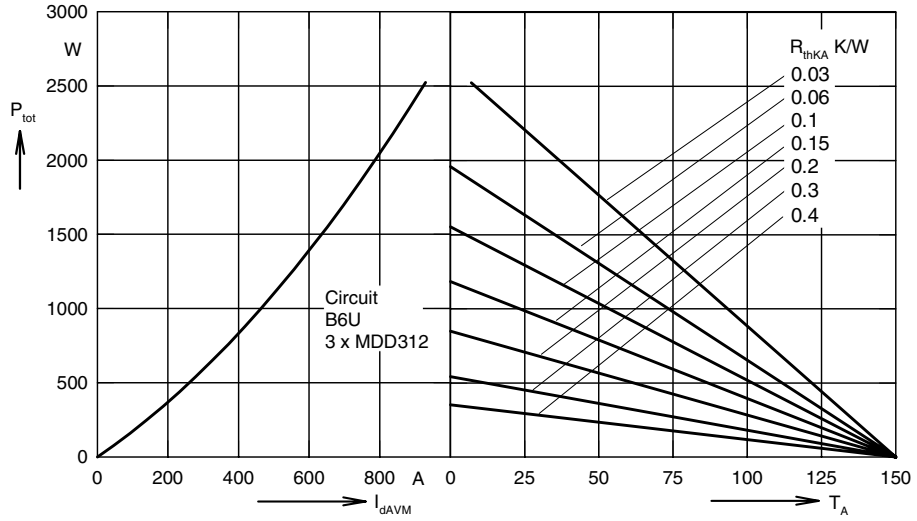


Fig. 8 Three phase rectifier bridge: Power dissipation versus direct output current and ambient temperature

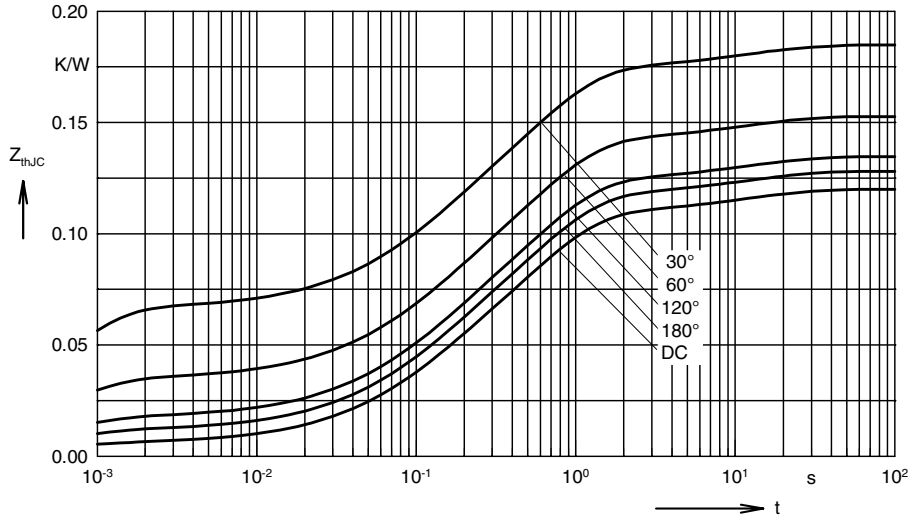


Fig. 9 Transient thermal impedance junction to case (per diode)

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

| d | $R_{thJC}$ (K/W) |
|---|---|
| DC | 0.120 |
| 180°C | 0.128 |
| 120°C | 0.135 |
| 60°C | 0.153 |
| 30°C | 0.185 |

Constants for $Z_{thJC}$ calculation:

| i | $R_{thi}$ (K/W) | $t_i$ (s) |
|---|---|---|
| 1 | 0.0058 | 0.00054 |
| 2 | 0.031 | 0.098 |
| 3 | 0.072 | 0.54 |
| 4 | 0.0112 | 12 |

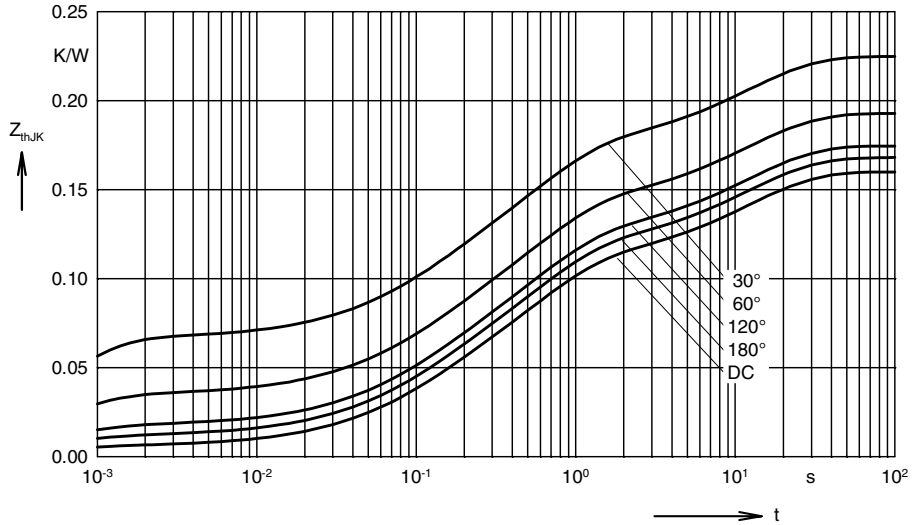


Fig. 10 Transient thermal impedance junction to heatsink (per diode)

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

| d | $R_{thJK}$ (K/W) |
|---|---|
| DC | 0.160 |
| 180°C | 0.168 |
| 120°C | 0.175 |
| 60°C | 0.193 |
| 30°C | 0.225 |

Constants for $Z_{thJK}$ calculation:

| i | $R_{thi}$ (K/W) | $t_i$ (s) |
|---|---|---|
| 1 | 0.0058 | 0.00054 |
| 2 | 0.031 | 0.098 |
| 3 | 0.072 | 0.54 |
| 4 | 0.0112 | 12 |
| 5 | 0.04 | 12 |

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