# ☐IXYS

# MDD 172

# High Power Diode Modules

$I_{FRMS}$ = 2x 300 A
$I_{FAVM}$ = 2x 190 A
$V_{RRM}$ = 800-1800 V

| $V_{RSM}$ | $V_{RRM}$ | Type |
|---|---|---|
| V | V | |
| 900 | 800 | MDD 172-08N1 |
| 1300 | 1200 | MDD 172-12N1 |
| 1500 | 1400 | MDD 172-14N1 |
| 1700 | 1600 | MDD 172-16N1 |
| 1900 | 1800 | MDD 172-18N1 |
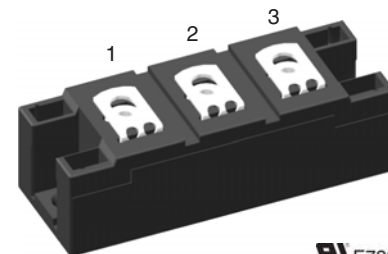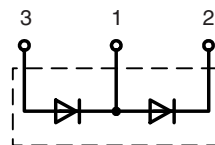


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| Symbol | Conditions | | Maximum Ratings | |
|---|---|---|---|---|
| $I_{FRMS}$ | $T_{VJ} = T_{VJM}$ | | 300 | A |
| $I_{FAVM}$ | $T_C = 100°C$; 180° sine | | 190 | A |
| $I_{FSM}$ | $T_{VJ} = 45°C$; | t = 10 ms (50 Hz), sine | 6600 | A |
| | $V_R = 0$ | t = 8.3 ms (60 Hz), sine | 7290 | A |
| | $T_{VJ} = T_{VJM}$ | t = 10 ms (50 Hz), sine | 5600 | A |
| | $V_R = 0$ | t = 8.3 ms (60 Hz), sine | 6200 | A |
| $I^2dt$ | $T_{VJ} = 45°C$ | t = 10 ms (50 Hz), sine | 218 000 | $A^2s$ |
| | $V_R = 0$ | t = 8.3 ms (60 Hz), sine | 221 000 | $A^2s$ |
| | $T_{VJ} = T_{VJM}$ | t = 10 ms (50 Hz), sine | 157 000 | $A^2s$ |
| | $V_R = 0$ | t = 8.3 ms (60 Hz), sine | 160 000 | $A^2s$ |
| $T_{VJ}$ | | | -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) | | 2.25-2.75/20-25 | Nm/lb.in. |
| | Terminal connection torque (M6) | | 4.5-5.5/40-48 | Nm/lb.in. |
| Weight | Typical including screws | | 120 | g |

| Symbol | Conditions | | Characteristic Values | |
|---|---|---|---|---|
| $I_R$ | $T_{VJ} = T_{VJM}$; $V_R = V_{RRM}$ | | 20 | mA |
| $V_F$ | $I_F = 300 A$; $T_{VJ} = 25°C$ | | 1.15 | V |
| $V_{T0}$ | For power-loss calculations only | | 0.8 | V |
| $r_T$ | $T_{VJ} = T_{VJM}$ | | 0.8 | mΩ |
| $Q_S$ | $T_{VJ} = 125°C$; $I_F = 300 A$, -di/dt = 50 A/μs | | 550 | μC |
| $I_{RM}$ | | | 235 | A |
| $R_{thJC}$ | per diode; DC current | other values | 0.21 | K/W |
| | per module | see Fig. 6/7 | 0.105 | K/W |
| $R_{thJK}$ | per diode; DC current | | 0.31 | K/W |
| | per module | | 0.155 | K/W |
| $d_S$ | Creepage distance on surface | | 12.7 | mm |
| $d_A$ | Strike distance through air | | 9.6 | mm |
| a | Maximum allowable acceleration | | 50 | m/s² |

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 base plate
- Planar passivated chips
- Isolation voltage 3600 V~
- UL registered, E 72873

## Applications

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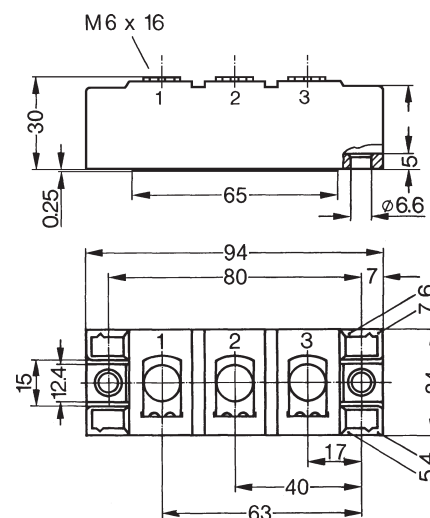- Field supply for DC motors
- Battery DC power supplies

## Advantages

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

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



IXYS reserves the right to change limits, test conditions and dimensions

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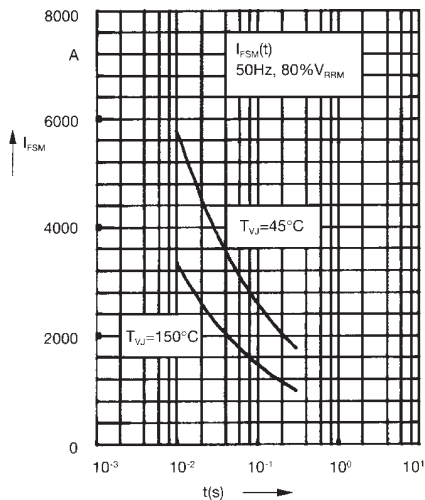
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Fig. 1  Surge overload current
$I_{FSM}$: Crest value, t: duration

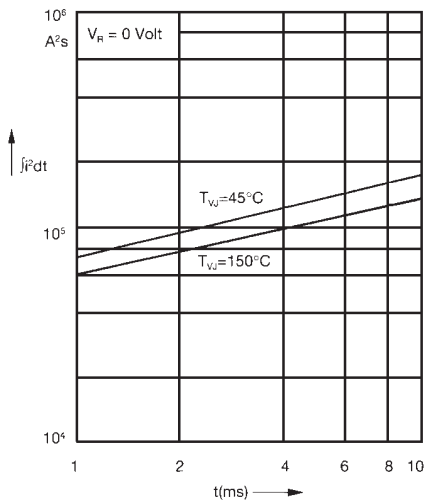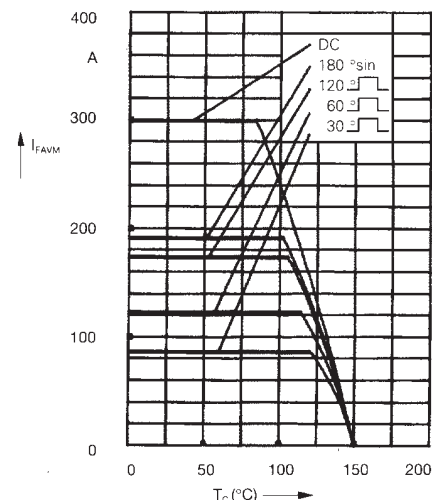

Fig. 2  I²dt versus time (1-10 ms)



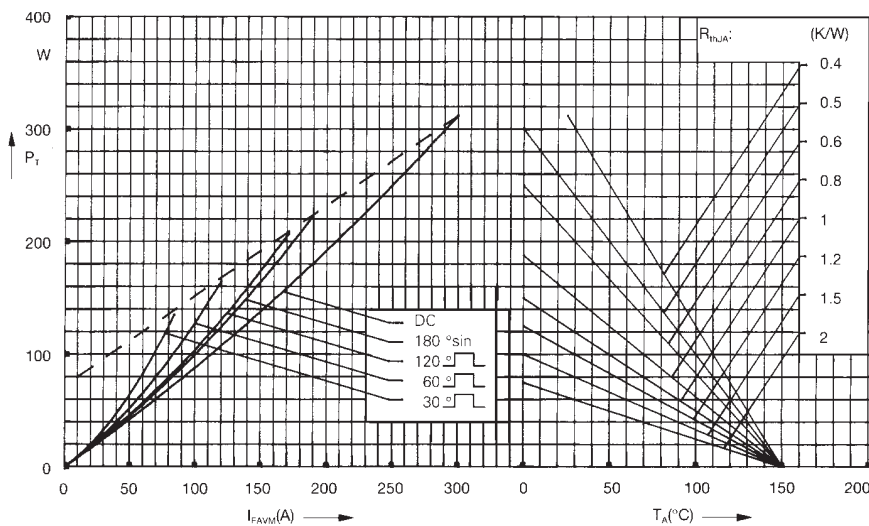Fig. 2a Maximum forward current
at case temperature



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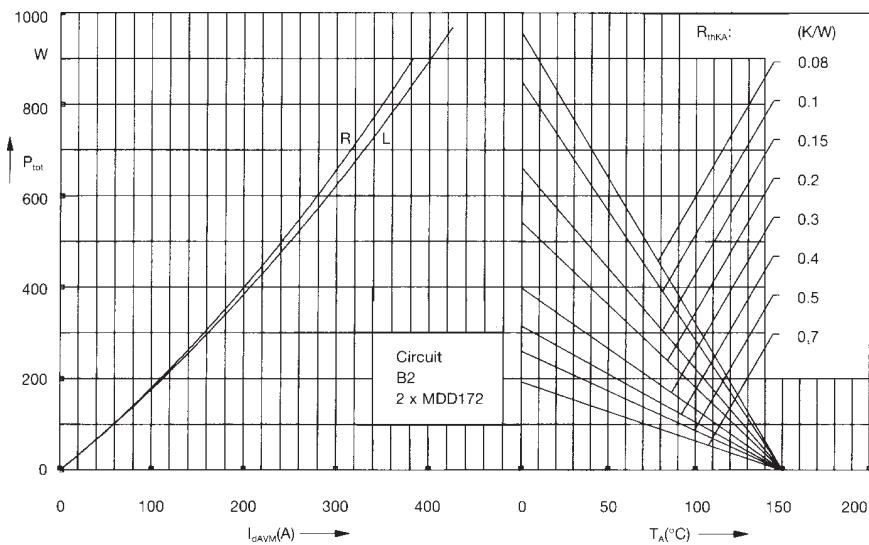


Fig. 4 Single phase rectifier bridge:Power dissipation vs. direct output current and ambient temperature
R = resistive load,     L = inductive load

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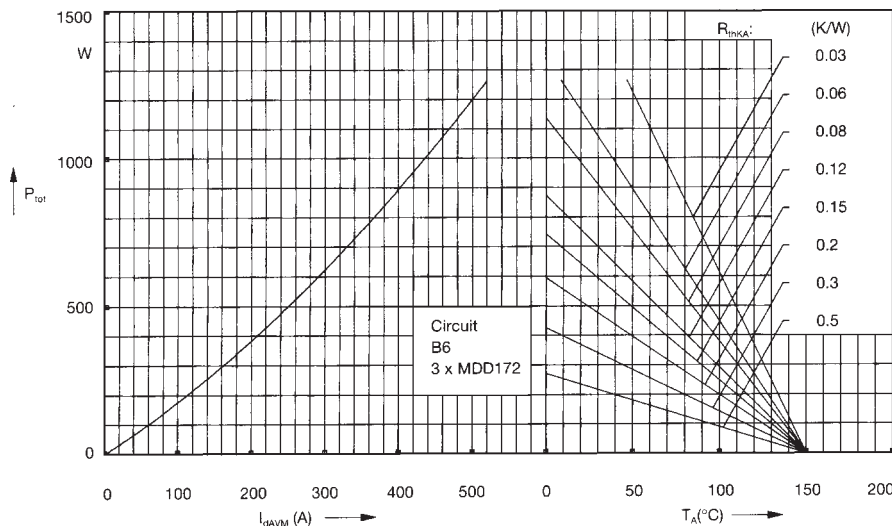
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Fig. 5  Three phase rectifier bridge: Power dissipation vs. direct output current and ambient temperature
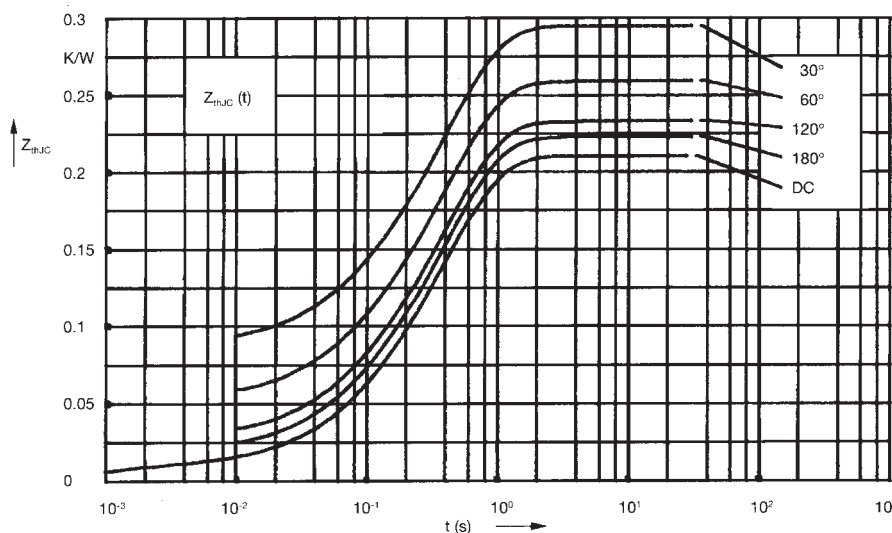


Fig. 6  Transient thermal impedance junction to case (per diode)

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

| d | $R_{thJC}$ (K/W) |
|------|-----------|
| DC | 0.210 |
| 180° | 0.223 |
| 120° | 0.233 |
| 60° | 0.260 |
| 30° | 0.295 |

Constants for $Z_{thJC}$ calculation:

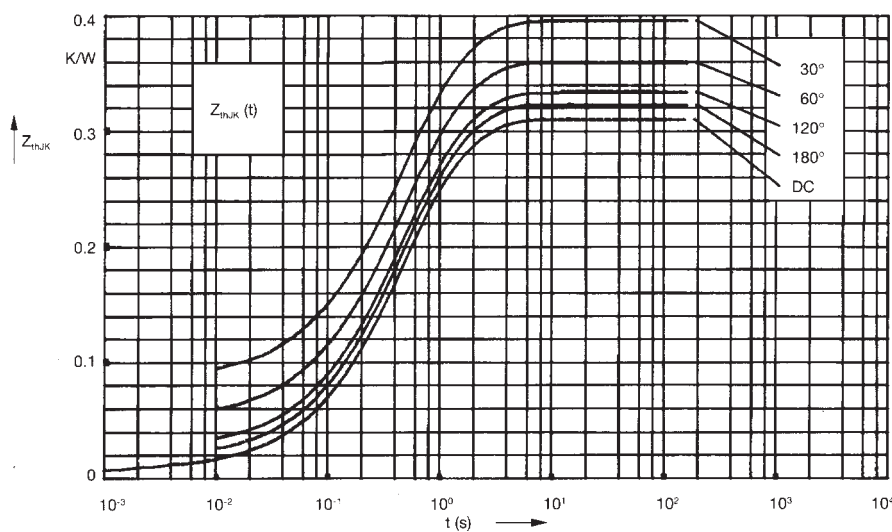| i | $R_{thi}$ (K/W) | $t_i$ (s) |
|---|---------|---------|
| 1 | 0.0087 | 0.001 |
| 2 | 0.0163 | 0.065 |
| 3 | 0.185 | 0.4 |



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

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

| d | $R_{thJK}$ (K/W) |
|------|-----------|
| DC | 0.31 |
| 180° | 0.323 |
| 120° | 0.333 |
| 60° | 0.360 |
| 30° | 0.395 |

Constants for $Z_{thJK}$ calculation:

| i | $R_{thi}$ (K/W) | $t_i$ (s) |
|---|---------|---------|
| 1 | 0.0087 | 0.001 |
| 2 | 0.0163 | 0.065 |
| 3 | 0.185 | 0.4 |
| 4 | 0.1 | 1.29 |

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