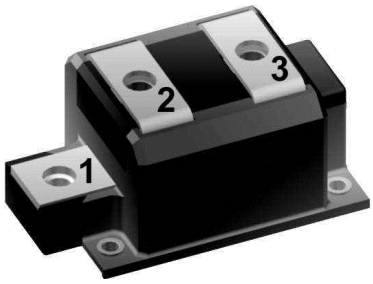
# High Voltage Standard Rectifier Module

| | | |
|---|---|---|
| $V_{RRM}$ | = | 2x 2200 V |
| $I_{FAV}$ | = | 700 A |
| $V_F$ | = | 1.05 V |

Phase leg

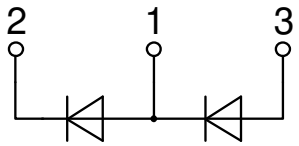
**Part number**

**MDNA700P2200CC**




Backside: isolated

E72873




**Features / Advantages:**

- Package with DCB ceramic
- Improved temperature and power cycling
- Planar passivated chips
- Very low forward voltage drop
- Very low leakage current

**Applications:**

- Diode for main rectification
- For single and three phase bridge configurations
- Supplies for DC power equipment
- Input rectifiers for PWM inverter
- Battery DC power supplies
- Field supply for DC motors

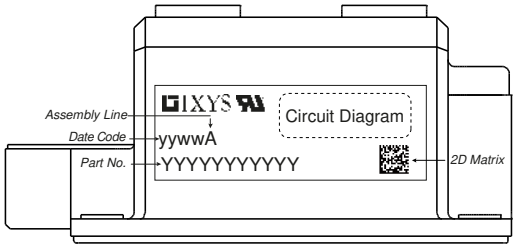
**Package:** ComPack

- Isolation Voltage: 4800 V~
- Industry standard outline
- RoHS compliant
- Base plate: Copper internally DCB isolated
- Advanced power cycling
- Phase Change Material available

## Rectifier

| Symbol | Definition | Conditions | | Ratings min. | typ. | max. | Unit |
|---|---|---|---|---|---|---|---|
| $V_{RSM}$ | *max. non-repetitive reverse blocking voltage* | | $T_{VJ}$ = 25°C | | | 2300 | V |
| $V_{RRM}$ | *max. repetitive reverse blocking voltage* | | $T_{VJ}$ = 25°C | | | 2200 | V |
| $I_R$ | *reverse current* | $V_R$ = 2200 V | $T_{VJ}$ = 25°C | | | 500 | µA |
| | | $V_R$ = 2200 V | $T_{VJ}$ = 150°C | | | 20 | mA |
| $V_F$ | *forward voltage drop* | $I_F$ = 700 A | $T_{VJ}$ = 25°C | | | 1.14 | V |
| | | $I_F$ = 1400 A | | | | 1.35 | V |
| | | $I_F$ = 700 A | $T_{VJ}$ = 125°C | | | 1.05 | V |
| | | $I_F$ = 1400 A | | | | 1.30 | V |
| $I_{FAV}$ | *average forward current* | $T_C$ = 100°C | $T_{VJ}$ = 150°C | | | 700 | A |
| | | rectangular d = 0.5 | | | | | |
| $V_{F0}$ | *threshold voltage* } *for power loss calculation only* | | $T_{VJ}$ = 150°C | | | 0.78 | V |
| $r_F$ | *slope resistance* } | | | | | 0.35 | mΩ |
| $R_{thJC}$ | *thermal resistance junction to case* | | | | | 0.055 | K/W |
| $R_{thCH}$ | *thermal resistance case to heatsink* | | | | 0.02 | | K/W |
| $P_{tot}$ | *total power dissipation* | | $T_C$ = 25°C | | | 2270 | W |
| $I_{FSM}$ | *max. forward surge current* | t = 10 ms; (50 Hz), sine | $T_{VJ}$ = 45°C | | | 20.0 | kA |
| | | t = 8,3 ms; (60 Hz), sine | $V_R$ = 0 V | | | 21.6 | kA |
| | | t = 10 ms; (50 Hz), sine | $T_{VJ}$ = 150°C | | | 17.0 | kA |
| | | t = 8,3 ms; (60 Hz), sine | $V_R$ = 0 V | | | 18.4 | kA |
| $I^2t$ | *value for fusing* | t = 10 ms; (50 Hz), sine | $T_{VJ}$ = 45°C | | | 2.00 | MA²s |
| | | t = 8,3 ms; (60 Hz), sine | $V_R$ = 0 V | | | 1.94 | MA²s |
| | | t = 10 ms; (50 Hz), sine | $T_{VJ}$ = 150°C | | | 1.45 | MA²s |
| | | t = 8,3 ms; (60 Hz), sine | $V_R$ = 0 V | | | 1.40 | MA²s |
| $C_J$ | *junction capacitance* | $V_R$ = 400 V; f = 1 MHz | $T_{VJ}$ = 25°C | | 781 | | pF |

| Package ComPack | | | | Ratings | | | |
|---|---|---|---|---|---|---|---|
| **Symbol** | **Definition** | **Conditions** | | **min.** | **typ.** | **max.** | **Unit** |
| $I_{RMS}$ | *RMS current* | per terminal | | | | 1200 | A |
| $T_{VJ}$ | *virtual junction temperature* | | | -40 | | 150 | °C |
| $T_{op}$ | *operation temperature* | | | -40 | | 125 | °C |
| $T_{stg}$ | *storage temperature* | | | -40 | | 125 | °C |
| **Weight** | | | | | 500 | | g |
| $M_D$ | *mounting torque* | | | 3 | | 5 | Nm |
| $M_T$ | *terminal torque* | | | 12 | | 14 | Nm |
| $d_{Spp/App}$ | *creepage distance on surface \| striking distance through air* | | *terminal to terminal* | 21.0 | | | mm |
| $d_{Spb/Apb}$ | | | *terminal to backside* | 18.0 | | | mm |
| $V_{ISOL}$ | *isolation voltage* | t = 1 second | 50/60 Hz, RMS; $I_{ISOL}$ ≤ 1 mA | 4800 | | | V |
| | | t = 1 minute | | 4000 | | | V |



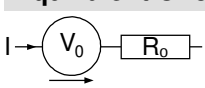

### Part description

M = Module
D = Diode
N = High Voltage Standard Rectifier
A = (>= 2000V)
700 = Current Rating [A]
P = Phase leg
2200 = Reverse Voltage [V]
CC = ComPack

| Ordering | Ordering Number | Marking on Product | Delivery Mode | Quantity | Code No. |
|---|---|---|---|---|---|
| Standard | MDNA700P2200CC | MDNA700P2200CC | Box | 3 | 526027 |

## Equivalent Circuits for Simulation

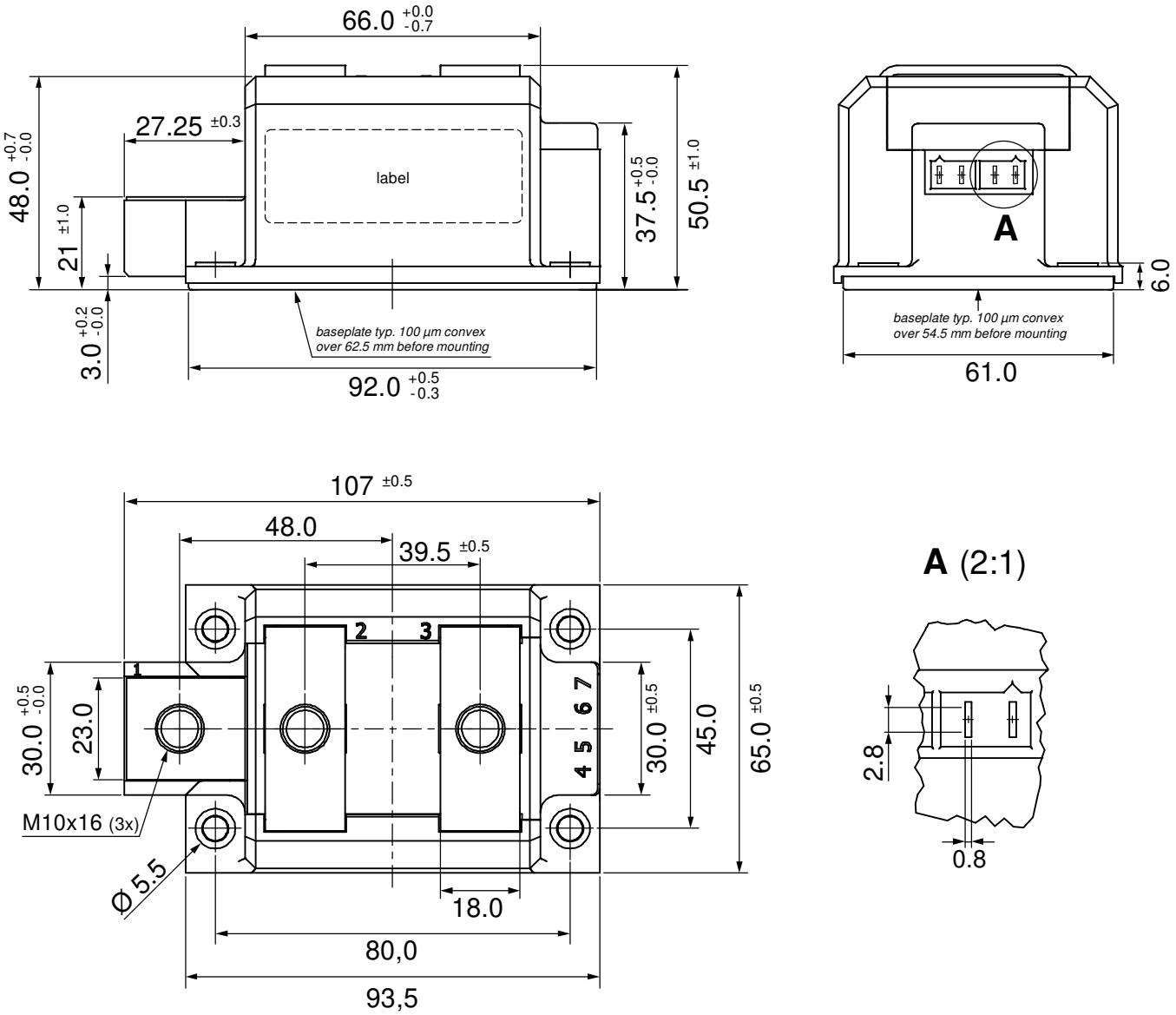
** on die level* $T_{VJ}$ = 150 °C

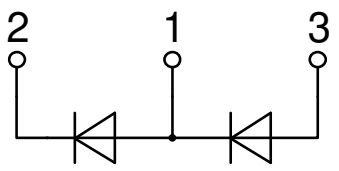



**Rectifier**

| | | | |
|---|---|---|---|
| $V_{0\,max}$ | *threshold voltage* | 0.78 | V |
| $R_{0\,max}$ | *slope resistance ** | 0.16 | mΩ |

## Outlines ComPack



## Rectifier

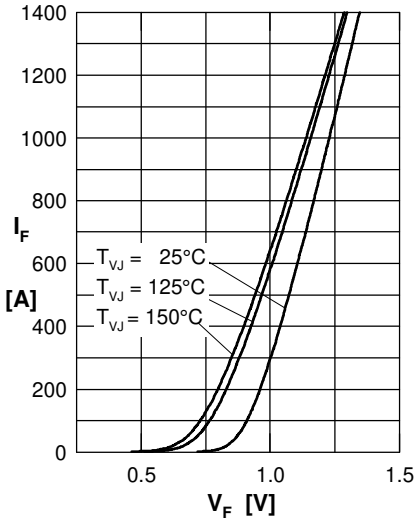



Fig. 1 Forward current versus voltage drop per diode

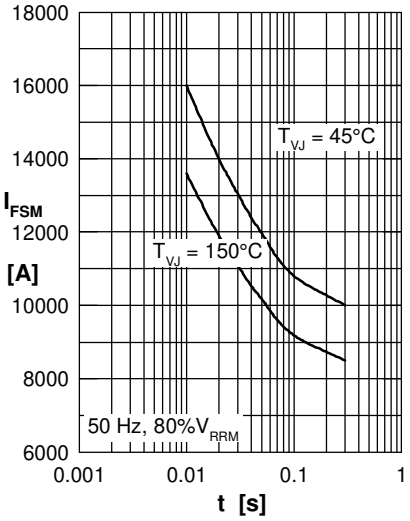



Fig. 2 Surge overload current vs. time per diode

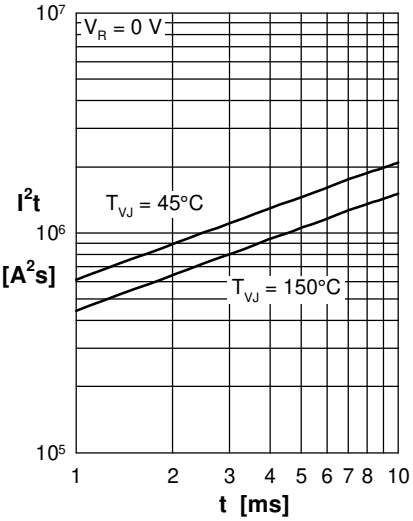



Fig. 3 $I^2t$ versus time per diode

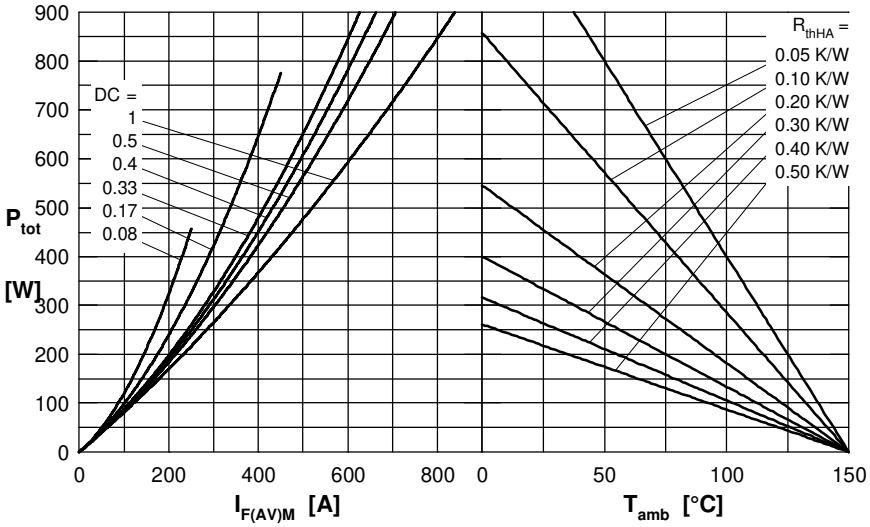



Fig. 4 Power dissipation vs. forward current and ambient temperature per diode

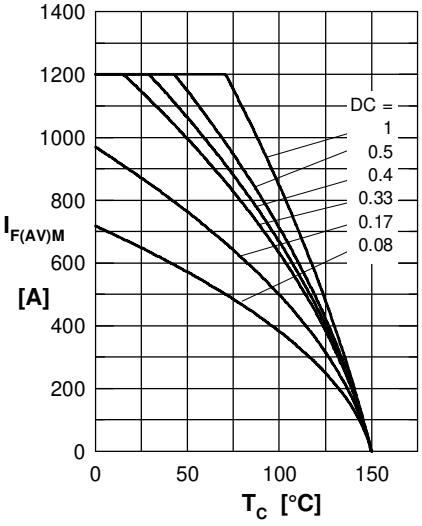



Fig. 5 Max. forward current vs. case temperature per diode

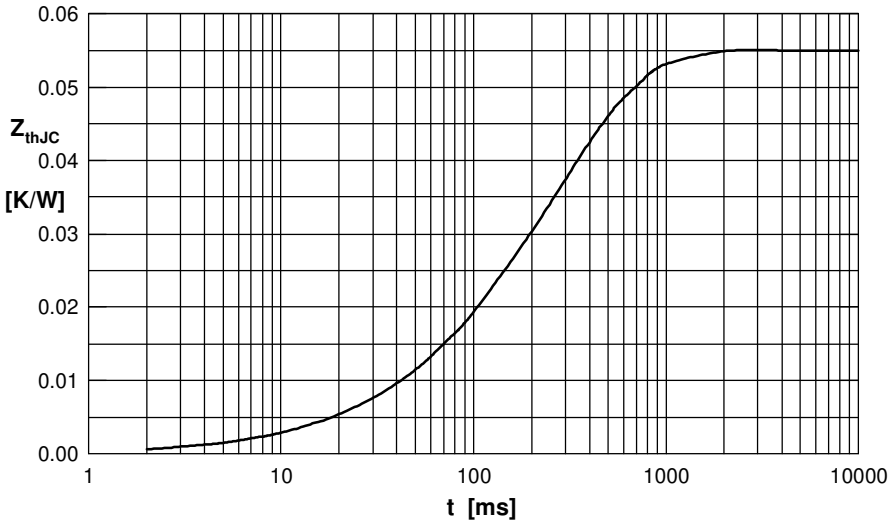



Fig. 6 Transient thermal impedance junction to case vs. time per diode

Constants for $Z_{thJC}$ calculation:

| i | $R_{thi}$ (K/W) | $t_i$ (s) |
|---|---|---|
| 1 | 0.001 | 0.0150 |
| 2 | 0.004 | 0.0600 |
| 3 | 0.017 | 0.2000 |
| 4 | 0.033 | 0.3400 |

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