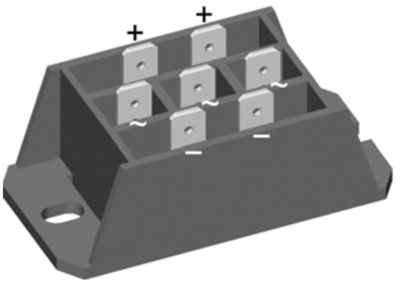
# Standard Rectifier Module

| 3~ Rectifier | | |
|---|---|---|
| $V_{RRM}$ | = | 1200 V |
| $I_{DAV}$ | = | 75 A |
| $I_{FSM}$ | = | 700 A |

3~ Rectifier Bridge

**Part number**

VUO60-12NO3

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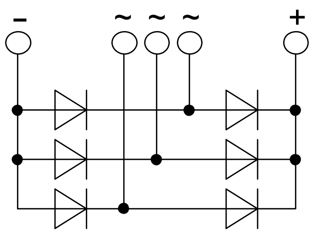



**Features / Advantages:**

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

**Applications:**

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

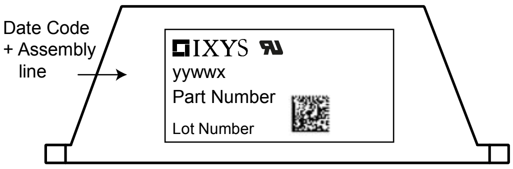
**Package:** FO-F-B

- Isolation Voltage: 3600 V~
- Industry standard outline
- RoHS compliant
- ¼" fast-on terminals
- Easy to mount with two screws
- Base plate: DCB ceramic
- Reduced weight
- Advanced power cycling

| Rectifier | | | | Ratings | | | |
|---|---|---|---|---|---|---|---|
| Symbol | Definition | Conditions | | min. | typ. | max. | Unit |
| $V_{RSM}$ | *max. non-repetitive reverse blocking voltage* | | $T_{VJ}$ = 25°C | | | 1300 | V |
| $V_{RRM}$ | *max. repetitive reverse blocking voltage* | | $T_{VJ}$ = 25°C | | | 1200 | V |
| $I_R$ | *reverse current* | $V_R$ = 1200 V | $T_{VJ}$ = 25°C | | | 100 | µA |
| | | $V_R$ = 1200 V | $T_{VJ}$ = 150°C | | | 1.5 | mA |
| $V_F$ | *forward voltage drop* | $I_F$ = 25 A | $T_{VJ}$ = 25°C | | | 1.06 | V |
| | | $I_F$ = 75 A | | | | 1.30 | V |
| | | $I_F$ = 25 A | $T_{VJ}$ = 125°C | | | 0.96 | V |
| | | $I_F$ = 75 A | | | | 1.27 | V |
| $I_{DAV}$ | *bridge output current* | $T_C$ = 110°C<br>rectangular d = ⅓ | $T_{VJ}$ = 150°C | | | 75 | A |
| $V_{F0}$ | *threshold voltage* | *for power loss calculation only* | $T_{VJ}$ = 150°C | | | 0.77 | V |
| $r_F$ | *slope resistance* | *for power loss calculation only* | | | | 6.5 | mΩ |
| $R_{thJC}$ | *thermal resistance junction to case* | | | | | 1.2 | K/W |
| $R_{thCH}$ | *thermal resistance case to heatsink* | | | | 0.4 | | K/W |
| $P_{tot}$ | *total power dissipation* | | $T_C$ = 25°C | | | 100 | W |
| $I_{FSM}$ | *max. forward surge current* | t = 10 ms; (50 Hz), sine | $T_{VJ}$ = 45°C | | | 700 | A |
| | | t = 8,3 ms; (60 Hz), sine | $V_R$ = 0 V | | | 755 | A |
| | | t = 10 ms; (50 Hz), sine | $T_{VJ}$ = 150°C | | | 595 | A |
| | | t = 8,3 ms; (60 Hz), sine | $V_R$ = 0 V | | | 645 | A |
| $I^2t$ | *value for fusing* | t = 10 ms; (50 Hz), sine | $T_{VJ}$ = 45°C | | | 2.45 | kA²s |
| | | t = 8,3 ms; (60 Hz), sine | $V_R$ = 0 V | | | 2.37 | kA²s |
| | | t = 10 ms; (50 Hz), sine | $T_{VJ}$ = 150°C | | | 1.77 | kA²s |
| | | t = 8,3 ms; (60 Hz), sine | $V_R$ = 0 V | | | 1.73 | kA²s |
| $C_J$ | *junction capacitance* | $V_R$ = 400 V; f = 1 MHz | $T_{VJ}$ = 25°C | | 25 | | pF |

## Package FO-F-B

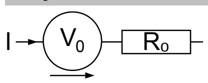
| Symbol | Definition | Conditions | | | Ratings min. | typ. | max. | Unit |
|---|---|---|---|---|---|---|---|---|
| $I_{RMS}$ | *RMS current* | per terminal | | | | | 100 | A |
| $T_{stg}$ | *storage temperature* | | | | -40 | | 125 | °C |
| $T_{VJ}$ | *virtual junction temperature* | | | | -40 | | 150 | °C |
| Weight | | | | | | 45 | | g |
| $M_D$ | *mounting torque* | | | | 2 | | 2.5 | Nm |
| $d_{Spp/App}$ | *creepage distance on surface \| striking distance through air* | | *terminal to terminal* | 18.0 | 6.0 | | | mm |
| $d_{Spb/Apb}$ | | | *terminal to backside* | 26.0 | 20.0 | | | mm |
| $V_{ISOL}$ | *isolation voltage* | t = 1 second | 50/60 Hz, RMS; $I_{ISOL} \le 1$ mA | | 3600 | | | V |
| | | t = 1 minute | | | 3000 | | | V |




| Ordering | Part Number | Marking on Product | Delivery Mode | Quantity | Code No. |
|---|---|---|---|---|---|
| Standard | VUO60-12NO3 | VUO60-12NO3 | Box | 10 | 465313 |

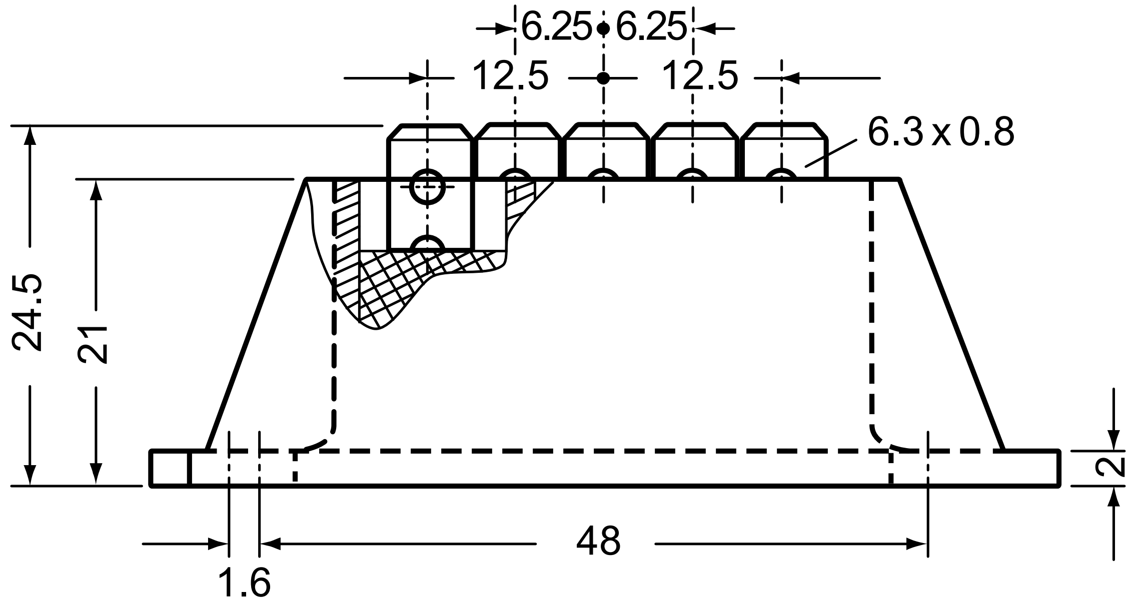
## Equivalent Circuits for Simulation

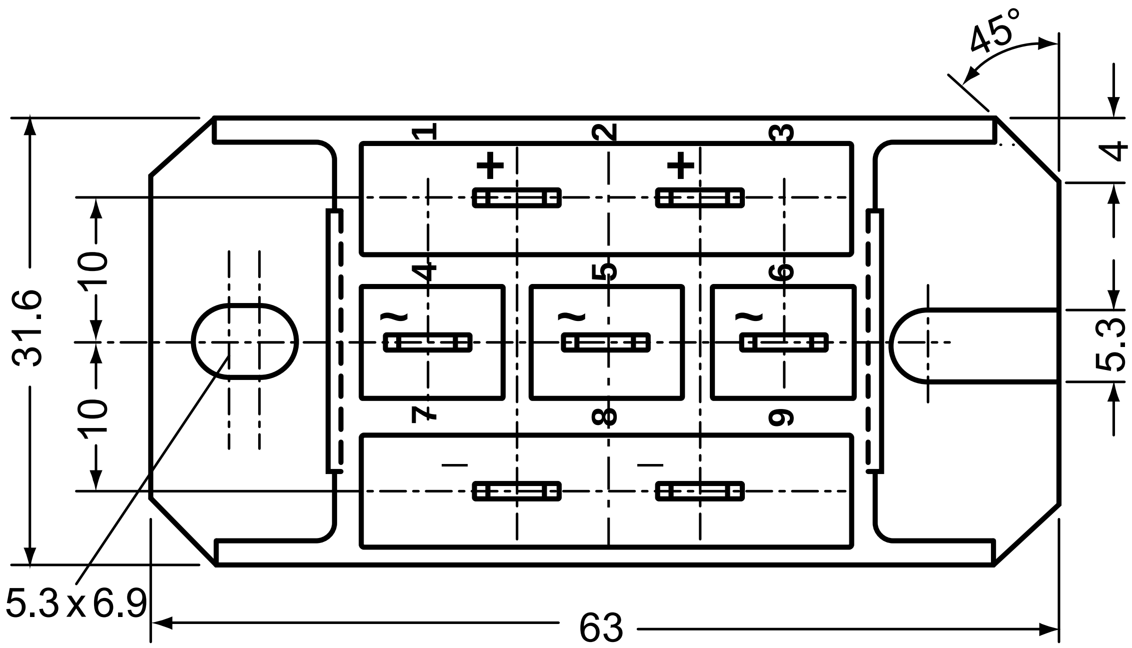
** on die level* $T_{VJ} = 150\,°C$

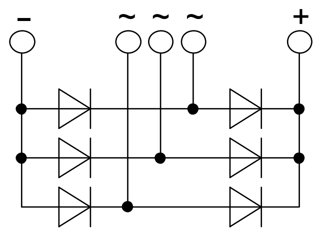



| | | Rectifier | |
|---|---|---|---|
| $V_{0\,max}$ | *threshold voltage* | 0.77 | V |
| $R_{0\,max}$ | *slope resistance ** | 5.3 | mΩ |

**Outlines FO-F-B**



## Rectifier

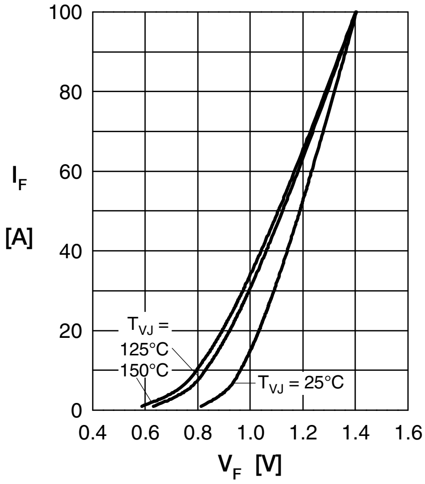



Fig. 1 Forward current vs. voltage drop per diode

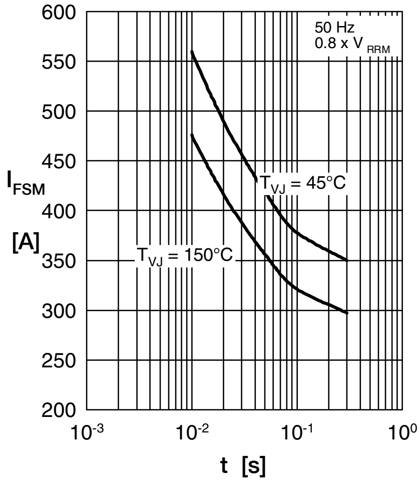



Fig. 2 Surge overload current vs. time per diode

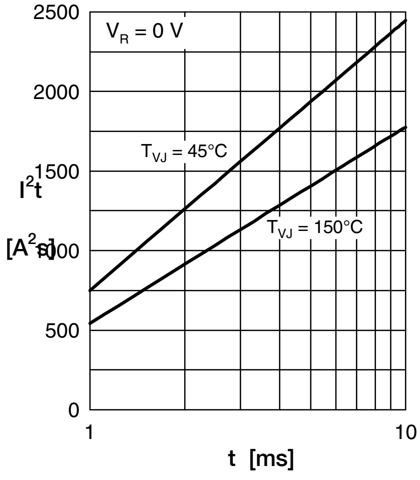



Fig. 3 $I^2t$ vs. time per diode

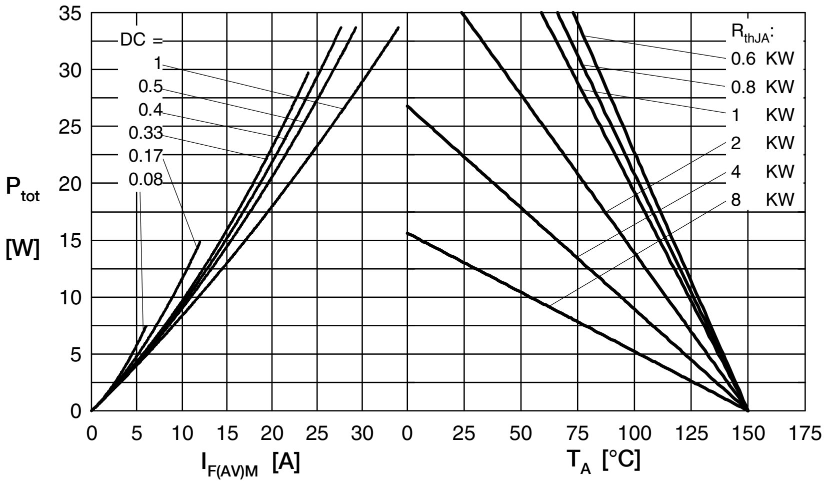



Fig. 4 Power dissipation vs. forward current and ambient temperature per diode

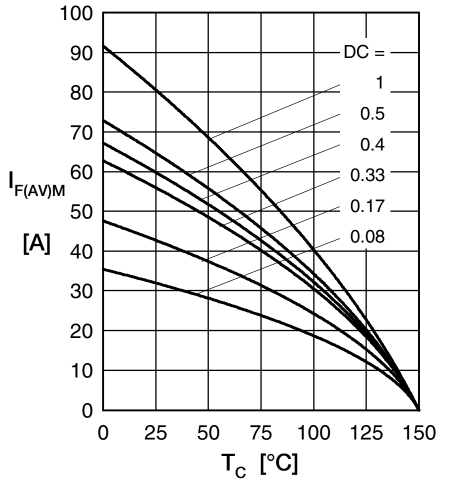



Fig. 5 Max. forward current vs. case temperature per diode

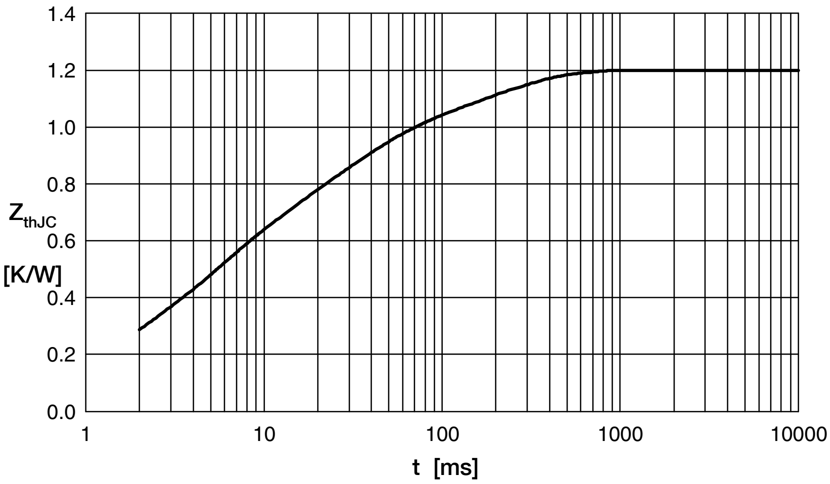



Fig. 6 Transient thermal impedance junction to case vs. time per diode

Constants for $Z_{thJC}$ calculation:

| i | $R_{th}$ (K/W) | $t_i$ (s) |
|---|---|---|
| 1 | 0.0607 | 0.00040 |
| 2 | 0.1330 | 0.00256 |
| 3 | 0.3305 | 0.00450 |
| 4 | 0.4130 | 0.02420 |
| 5 | 0.2628 | 0.18000 |