

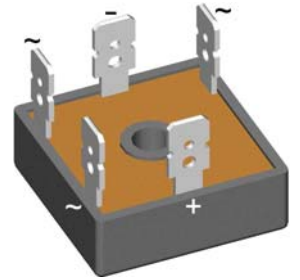
## Standard Rectifier Module


|                         |          |
|-------------------------|----------|
| <b>3~<br/>Rectifier</b> |          |
| $V_{RRM}$               | = 1800 V |
| $I_{DAV}$               | = 20 A   |
| $I_{FSM}$               | = 380 A  |

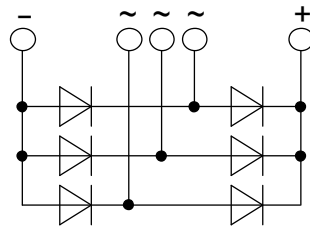
### 3~ Rectifier Bridge

Part number

VUO25-18NO8



 E72873



#### Features / Advantages:

- Planar passivated chips
- Very low leakage current
- Very low forward voltage drop
- Improved thermal behaviour

#### Applications:

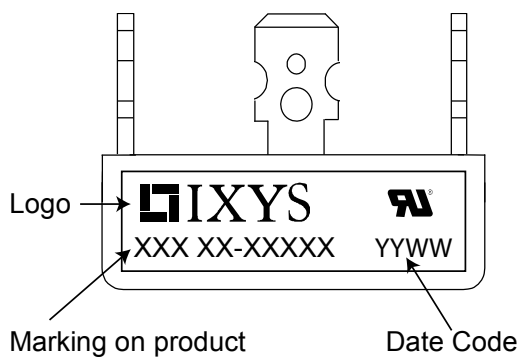
- Diode for main rectification
- For three phase bridge configurations
- Supplies for DC power equipment
- Input rectifiers for PWM inverter
- Battery DC power supplies
- Field supply for DC motors

#### Package: FO-B

- Industry standard outline
- RoHS compliant
- ¼" fast-on terminals
- Easy to mount with one screw

| Rectifier  |  |   |                                | Ratings |      |                  |
|------------|--|---|--------------------------------|---------|------|------------------|
| Symbol     | Definition                                   | Conditions  | min.                           | typ.    | max. | Unit             |
| $V_{RSM}$  | max. non-repetitive reverse blocking voltage | $T_{VJ} = 25^{\circ}\text{C}$                               |                                |         | 1900 | V                |
| $V_{RRM}$  | max. repetitive reverse blocking voltage     | $T_{VJ} = 25^{\circ}\text{C}$                               |                                |         | 1800 | V                |
| $I_R$      | reverse current                              | $V_R = 1800\text{ V}$                                       | $T_{VJ} = 25^{\circ}\text{C}$  |         | 40   | $\mu\text{A}$    |
|            |  | $V_R = 1800\text{ V}$                                       | $T_{VJ} = 150^{\circ}\text{C}$ |         | 1.5  | mA               |
| $V_F$      | forward voltage drop                         | $I_F = 10\text{ A}$   | $T_{VJ} = 25^{\circ}\text{C}$  |         | 1.05 | V                |
|            |  |   |                                |         | 1.25 | V                |
|            |  | $I_F = 30\text{ A}$   | $T_{VJ} = 125^{\circ}\text{C}$ |         | 0.94 | V                |
|            |  |   |                                |         | 1.21 | V                |
| $I_{DAV}$  | bridge output current                        | $T_C = 85^{\circ}\text{C}$<br>rectangular $d = \frac{1}{3}$ | $T_{VJ} = 150^{\circ}\text{C}$ |         | 20   | A                |
|            |  |   |                                |         |      |                  |
| $V_{FO}$   | threshold voltage                            |   | $T_{VJ} = 150^{\circ}\text{C}$ |         | 0.77 | V                |
| $r_F$      | slope resistance                             |   |                                |         |      |                  |
| $R_{thJC}$ | thermal resistance junction to case          |   |                                |         | 8    | K/W              |
| $R_{thCH}$ | thermal resistance case to heatsink          |   |                                | 1       |      | K/W              |
| $P_{tot}$  | total power dissipation                      |   | $T_C = 25^{\circ}\text{C}$     |         | 15   | W                |
| $I_{FSM}$  | max. forward surge current                   | $t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$            | $T_{VJ} = 45^{\circ}\text{C}$  |         | 380  | A                |
|            |  | $t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$           | $V_R = 0\text{ V}$             |         | 410  | A                |
|            |  | $t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$            | $T_{VJ} = 150^{\circ}\text{C}$ |         | 325  | A                |
|            |  | $t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$           | $V_R = 0\text{ V}$             |         | 350  | A                |
| $I^2t$     | value for fusing                             | $t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$            | $T_{VJ} = 45^{\circ}\text{C}$  |         | 720  | A <sup>2</sup> s |
|            |  | $t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$           | $V_R = 0\text{ V}$             |         | 700  | A <sup>2</sup> s |
|            |  | $t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$            | $T_{VJ} = 150^{\circ}\text{C}$ |         | 530  | A <sup>2</sup> s |
|            |  | $t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$           | $V_R = 0\text{ V}$             |         | 510  | A <sup>2</sup> s |
| $C_J$      | junction capacitance                         | $V_R = 400\text{ V}; f = 1\text{ MHz}$                      | $T_{VJ} = 25^{\circ}\text{C}$  |         | 10   | pF               |

| Package FO-B  |  | Ratings   |      |      |      |      |
|---------------|--|---|------|------|------|------|
| Symbol        | Definition   | Conditions  | 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   |
| <b>Weight</b> |  |   |      | 20   |      | g    |
| $M_D$         | mounting torque  |   | 1.8  |      | 2.2  | Nm   |
| $d_{Spp/App}$ | creepage distance on surface   striking distance through air | terminal to terminal                                | 9.0  | 7.0  |      | mm   |
| $d_{Spb/Apb}$ |  | terminal to backside                                | 10.0 | 10.0 |      | mm   |
| $V_{ISOL}$    | isolation voltage  | t = 1 second  | 3000 |      |      | V    |
|               |  | t = 1 minute<br>50/60 Hz, RMS; $I_{ISOL} \leq 1$ mA | 2500 |      |      | V    |

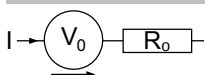


| Ordering | Part Number | Marking on Product | Delivery Mode | Quantity | Code No. |
|----------|-------------|--------------------|---------------|----------|----------|
| Standard | VUO25-18NO8 | VUO25-18NO8        | Box           | 50       | 465135   |

### Equivalent Circuits for Simulation

\* on die level

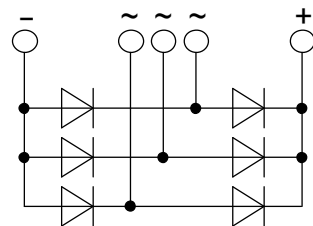
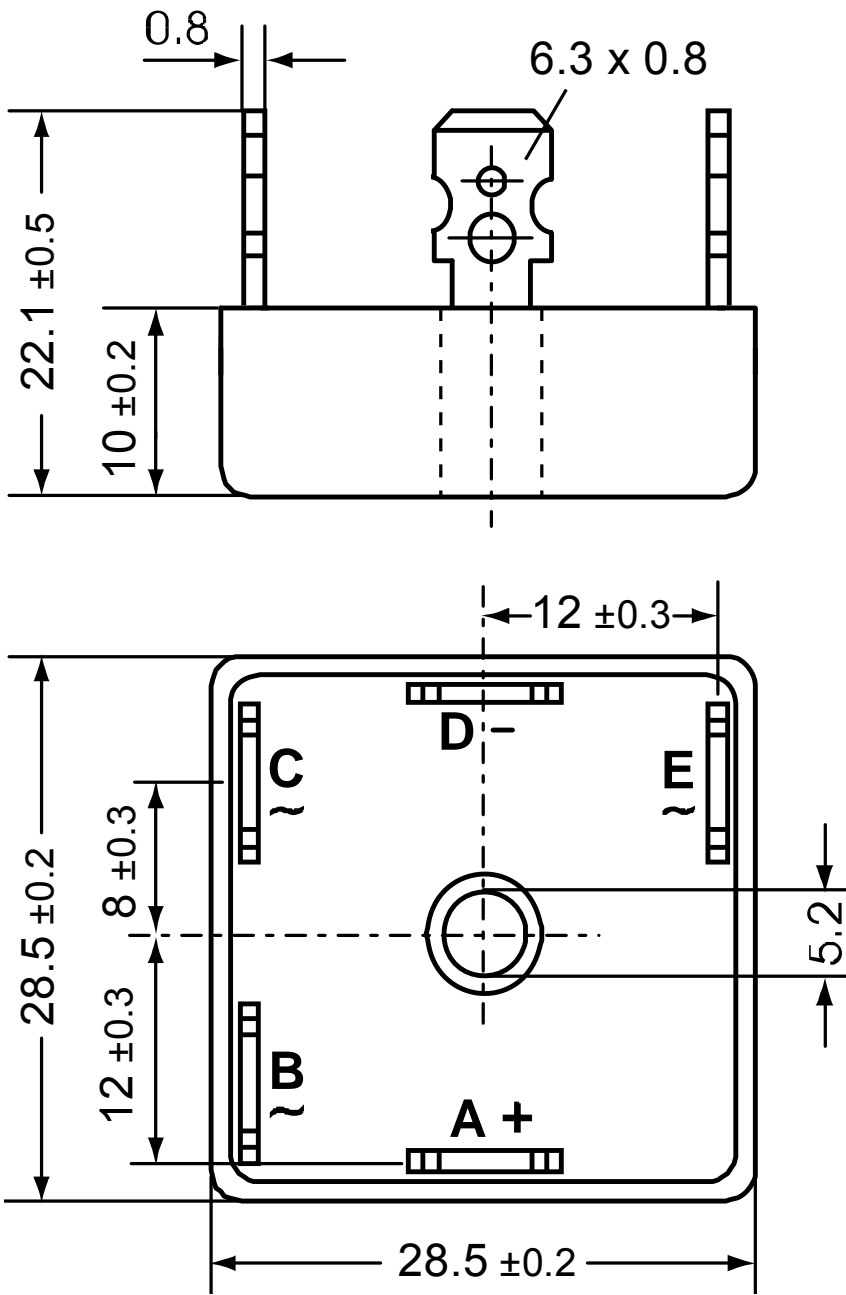
$T_{VJ} = 150^\circ\text{C}$



Rectifier

|             |                    |      |    |
|-------------|--------------------|------|----|
| $V_{0\max}$ | threshold voltage  | 0.77 | V  |
| $R_{0\max}$ | slope resistance * | 13   | mΩ |

Outlines FO-B



**Rectifier**

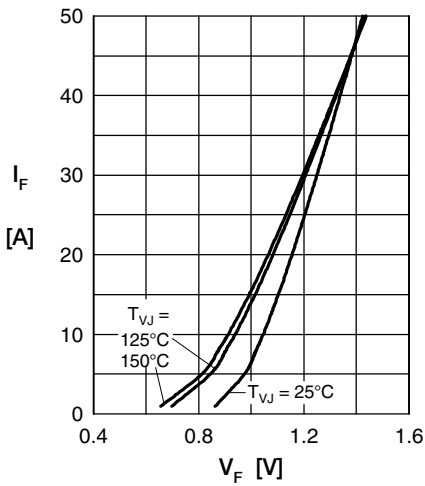


Fig. 1 Forward current vs. voltage drop per diode

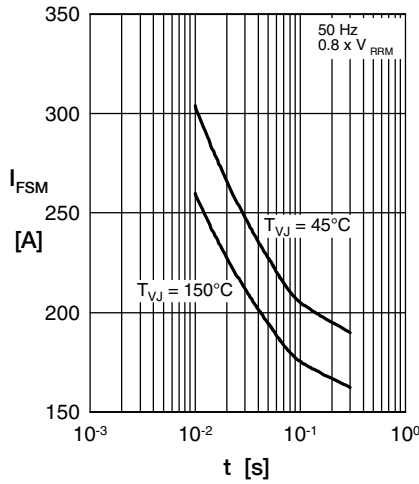


Fig. 2 Surge overload current vs. time per diode

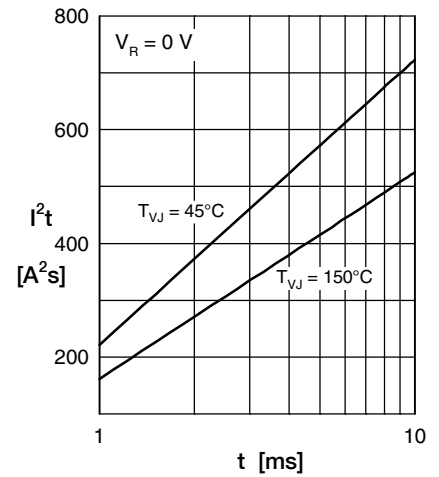


Fig. 3  $I^2t$  vs. time per diode

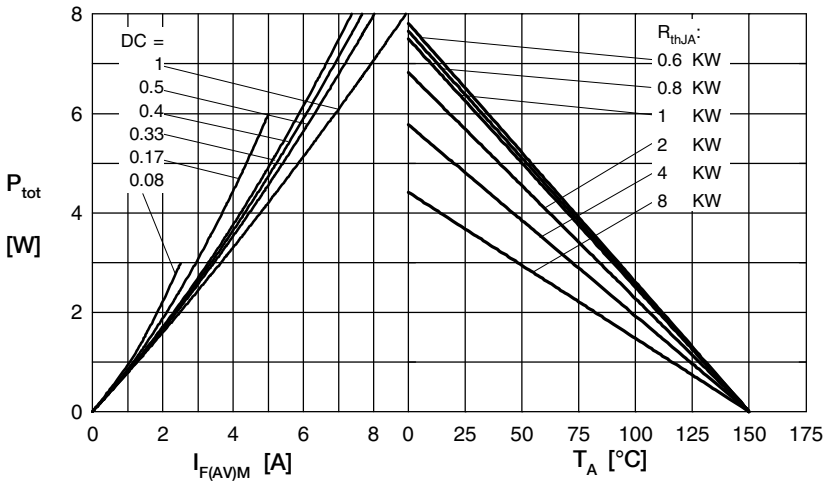


Fig. 4 Power dissipation vs. forward current and ambient temperature per diode

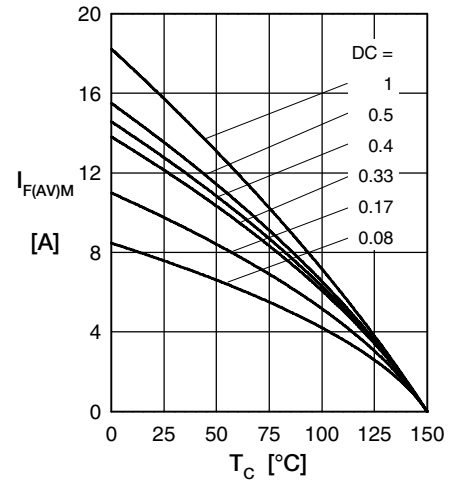


Fig. 5 Max. forward current vs. case temperature per diode

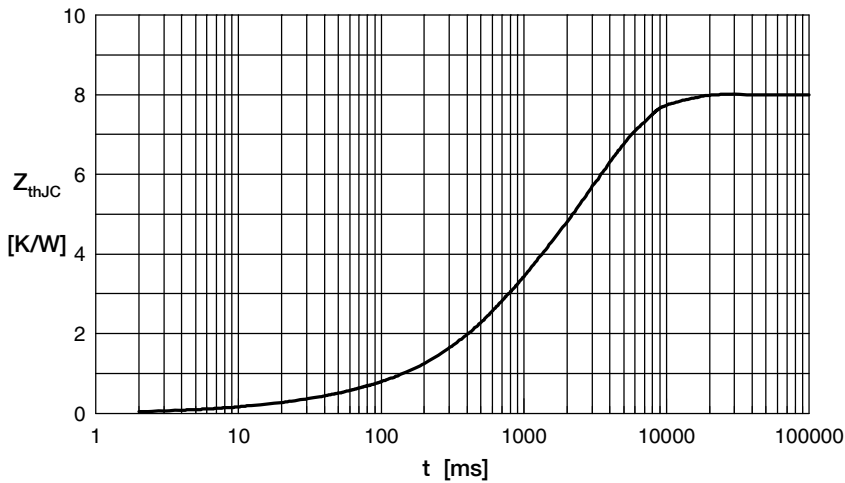


Fig. 6 Transient thermal impedance junction to case vs. time per diode

Constants for  $Z_{thJC}$  calculation:

| i | $R_{th}$ (K/W) | $t_i$ (s) |
|---|----------------|-----------|
| 1 | 0.040          | 0.005     |
| 2 | 0.250          | 0.030     |
| 3 | 1.810          | 0.500     |
| 4 | 5.900          | 3.200     |

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