

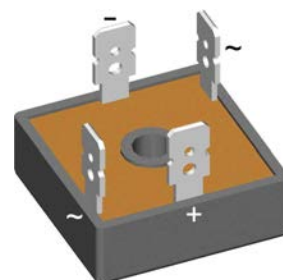
# Standard Rectifier Module

| 1~<br>Rectifier |          |
|-----------------|----------|
| $V_{RRM}$       | = 1200 V |
| $I_{DAV}$       | = 18 A   |
| $I_{FSM}$       | = 550 A  |

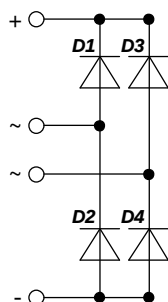
## 1~ Rectifier Bridge

Part number

**VBO36-12NO8**



 E72873



### Features / Advantages:

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

### Applications:

- Diode for main rectification
- For one 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

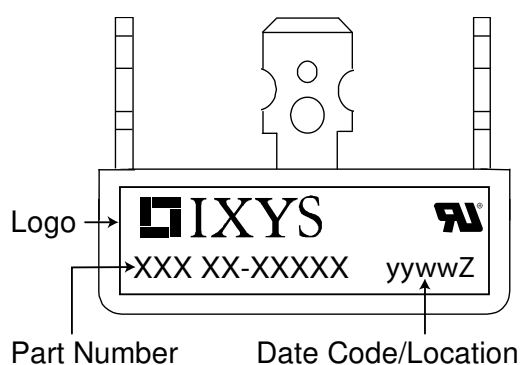
- Isolation Voltage: 3000 V~
- Industry standard outline
- RoHS compliant
- 1/4" fast-on terminals
- Easy to mount with one screw

### Disclaimer Notice

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| Rectifier  |                                                     |                                           |                                           | Ratings                        |      |      |                   |
|------------|-----------------------------------------------------|-------------------------------------------|-------------------------------------------|--------------------------------|------|------|-------------------|
| Symbol     | Definition                                          | Conditions                                |                                           | min.                           | typ. | max. | Unit              |
| $V_{RSM}$  | <b>max. non-repetitive reverse blocking voltage</b> | $T_{VJ} = 25^{\circ}\text{C}$             |                                           |                                |      | 1300 | V                 |
| $V_{RRM}$  | <b>max. repetitive reverse blocking voltage</b>     | $T_{VJ} = 25^{\circ}\text{C}$             |                                           |                                |      | 1200 | V                 |
| $I_R$      | <b>reverse current</b>                              | $V_R = 1200\text{ V}$                     | $T_{VJ} = 25^{\circ}\text{C}$             |                                |      | 40   | $\mu\text{A}$     |
|            |                                                     | $V_R = 1200\text{ V}$                     | $T_{VJ} = 150^{\circ}\text{C}$            |                                |      | 1,5  | mA                |
| $V_F$      | <b>forward voltage drop</b>                         | $I_F = 15\text{ A}$                       | $T_{VJ} = 25^{\circ}\text{C}$             |                                |      | 1,04 | V                 |
|            |                                                     | $I_F = 30\text{ A}$                       |                                           |                                |      | 1,14 | V                 |
|            |                                                     | $I_F = 15\text{ A}$                       | $T_{VJ} = 125^{\circ}\text{C}$            |                                |      | 0,93 | V                 |
|            |                                                     | $I_F = 30\text{ A}$                       |                                           |                                |      | 1,06 | V                 |
| $I_{DAV}$  | <b>bridge output current</b>                        | $T_C = 85^{\circ}\text{C}$<br>rectangular | $T_{VJ} = 150^{\circ}\text{C}$<br>d = 0.5 |                                |      | 18   | A                 |
| $V_{F0}$   | <b>threshold voltage</b>                            | } <b>for power loss calculation only</b>  |                                           | $T_{VJ} = 150^{\circ}\text{C}$ |      | 0,76 | V                 |
| $r_F$      | <b>slope resistance</b>                             |                                           |                                           |                                |      | 9,1  | m $\Omega$        |
| $R_{thJC}$ | <b>thermal resistance junction to case</b>          |                                           |                                           |                                |      | 7    | K/W               |
| $R_{thCH}$ | <b>thermal resistance case to heatsink</b>          |                                           |                                           |                                | 1    |      | K/W               |
| $P_{tot}$  | <b>total power dissipation</b>                      | $T_C = 25^{\circ}\text{C}$                |                                           |                                |      | 17   | W                 |
| $I_{FSM}$  | <b>max. forward surge current</b>                   | t = 10 ms; (50 Hz), sine                  | $T_{VJ} = 45^{\circ}\text{C}$             |                                |      | 550  | A                 |
|            |                                                     | t = 8,3 ms; (60 Hz), sine                 | $V_R = 0\text{ V}$                        |                                |      | 595  | A                 |
|            |                                                     | t = 10 ms; (50 Hz), sine                  | $T_{VJ} = 150^{\circ}\text{C}$            |                                |      | 470  | A                 |
|            |                                                     | t = 8,3 ms; (60 Hz), sine                 | $V_R = 0\text{ V}$                        |                                |      | 505  | A                 |
| $I^2t$     | <b>value for fusing</b>                             | t = 10 ms; (50 Hz), sine                  | $T_{VJ} = 45^{\circ}\text{C}$             |                                |      | 1,52 | kA <sup>2</sup> s |
|            |                                                     | t = 8,3 ms; (60 Hz), sine                 | $V_R = 0\text{ V}$                        |                                |      | 1,48 | kA <sup>2</sup> s |
|            |                                                     | t = 10 ms; (50 Hz), sine                  | $T_{VJ} = 150^{\circ}\text{C}$            |                                |      | 1,11 | kA <sup>2</sup> s |
|            |                                                     | t = 8,3 ms; (60 Hz), sine                 | $V_R = 0\text{ V}$                        |                                |      | 1,06 | kA <sup>2</sup> s |
| $C_J$      | <b>junction capacitance</b>                         | $V_R = 400\text{ V}; f = 1\text{ MHz}$    |                                           |                                | 18   |      | pF                |

| Package FO-B         |                                                                     |                             |                                         | Ratings |      |      |      |   |
|----------------------|---------------------------------------------------------------------|-----------------------------|-----------------------------------------|---------|------|------|------|---|
| Symbol               | Definition                                                          | Conditions                  |                                         | min.    | typ. | max. | Unit |   |
| I <sub>RMS</sub>     | <i>RMS current</i>                                                  | per terminal                |                                         |         |      | 100  | A    |   |
| T <sub>VJ</sub>      | <i>virtual junction temperature</i>                                 |                             |                                         | -40     |      | 150  | °C   |   |
| T <sub>op</sub>      | <i>operation temperature</i>                                        |                             |                                         | -40     |      | 125  | °C   |   |
| T <sub>stg</sub>     | <i>storage temperature</i>                                          |                             |                                         | -40     |      | 125  | °C   |   |
| Weight               |                                                                     |                             |                                         |         | 19   |      | g    |   |
| M <sub>D</sub>       | <i>mounting torque</i>                                              |                             |                                         | 1,8     |      | 2,2  | Nm   |   |
| d <sub>Spp/App</sub> | <i>creepage distance on surface   striking distance through air</i> | <i>terminal to terminal</i> | 9,0                                     | 7,0     |      |      | mm   |   |
| d <sub>Spb/Apb</sub> |                                                                     | <i>terminal to backside</i> | 10,0                                    | 10,0    |      |      | mm   |   |
| V <sub>ISOL</sub>    | <i>isolation voltage</i>                                            | t = 1 second                | 50/60 Hz, RMS; I <sub>ISOL</sub> ≤ 1 mA |         | 3000 |      |      | V |
|                      |                                                                     | t = 1 minute                |                                         |         | 2500 |      |      | V |

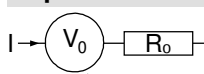


| Ordering | Ordering Number | Marking on Product | Delivery Mode | Quantity | Code No. |
|----------|-----------------|--------------------|---------------|----------|----------|
| Standard | VBO36-12NO8     | VBO36-12NO8        | Box           | 50       | 471984   |

### Equivalent Circuits for Simulation

\* on die level

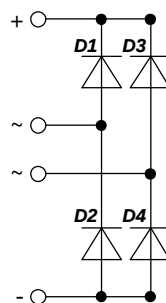
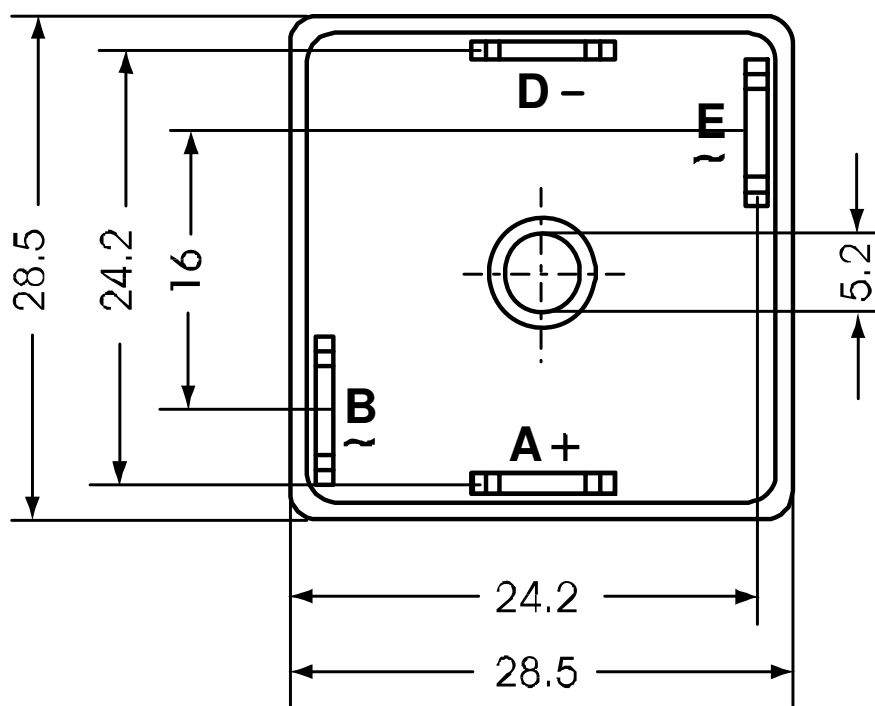
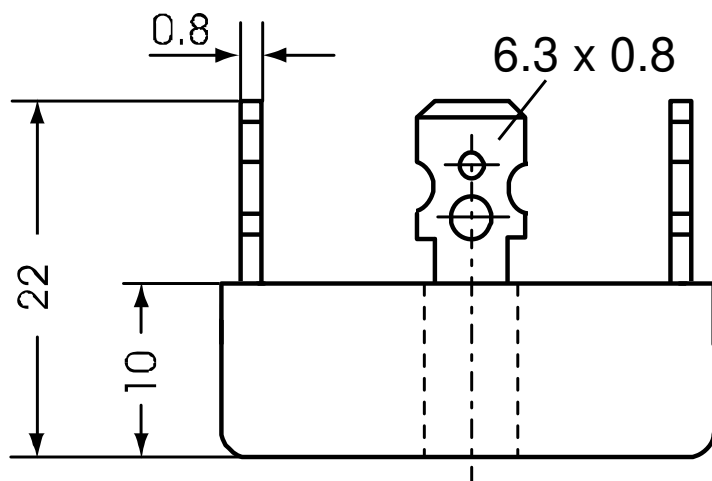
$T_{VJ} = 150^{\circ}\text{C}$



Rectifier

|              |                           |      |    |
|--------------|---------------------------|------|----|
| $V_{0 \max}$ | <i>threshold voltage</i>  | 0,76 | V  |
| $R_{0 \max}$ | <i>slope resistance *</i> | 7,9  | mΩ |

**Outlines FO-B**



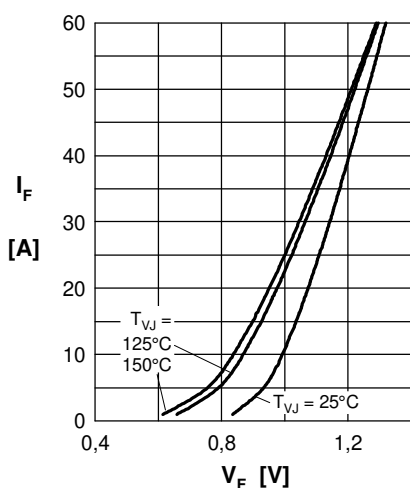
**Rectifier**


Fig. 1 Forward current vs. voltage drop per diode

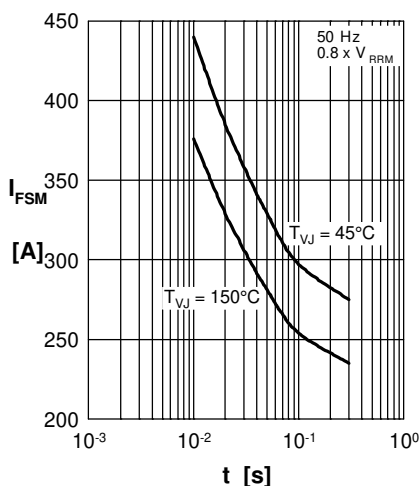


Fig. 2 Surge overload current vs. time per diode

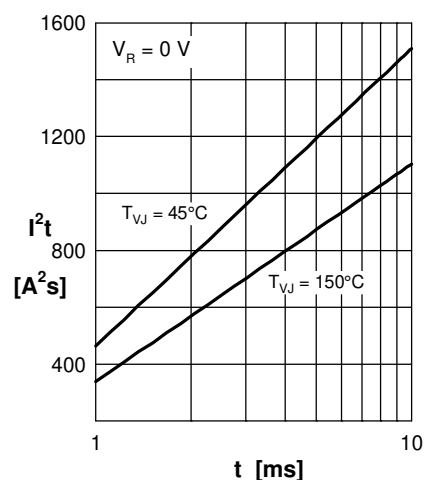


Fig. 3  $I^2t$  vs. time per diode

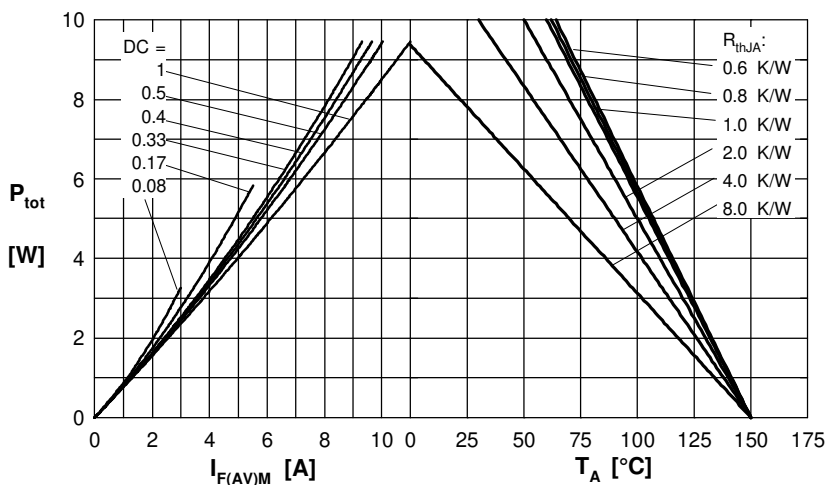


Fig. 4 Power dissipation vs. forward current and ambient temperature per diode

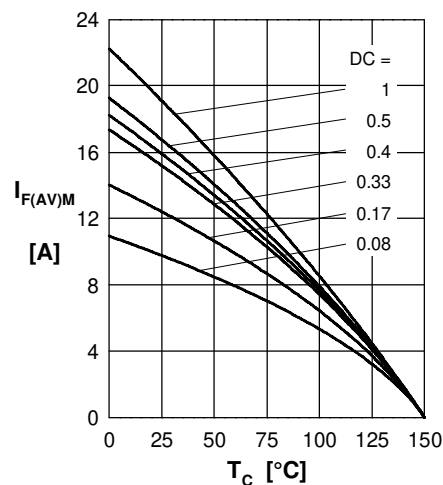


Fig. 5 Max. forward current vs. case temperature per diode

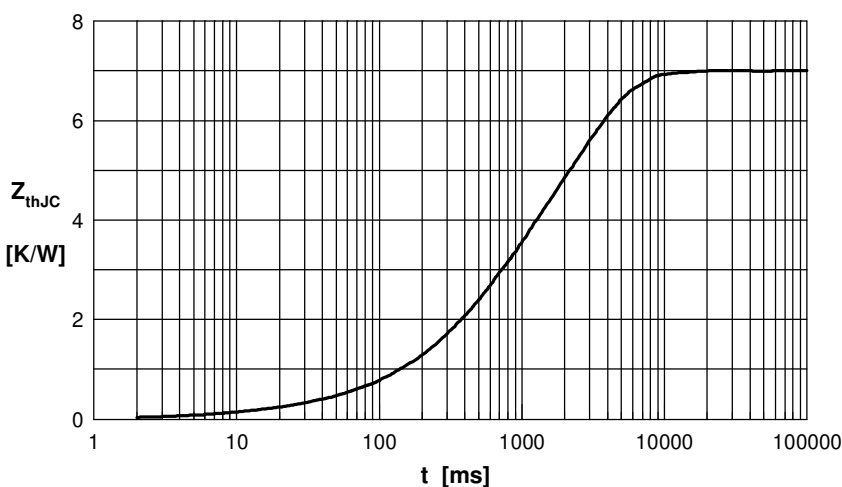


Fig. 6 Transient thermal impedance junction to case vs. time per diode

Constants for  $Z_{thJC}$  calculation:

| i | $R_{th}$ (K/W) | $t_i$ (s) |
|---|----------------|-----------|
| 1 | 0.040          | 0.005     |
| 2 | 0.150          | 0.030     |
| 3 | 1.710          | 0.400     |
| 4 | 5.100          | 2.300     |