

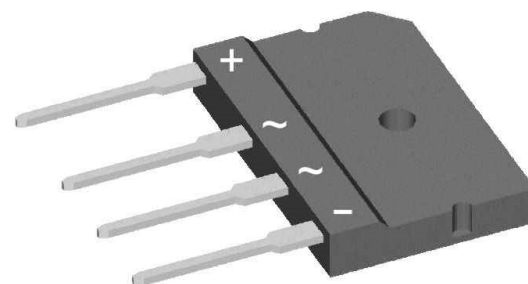
# Standard Rectifier

| 1~<br>Rectifier |          |
|-----------------|----------|
| $V_{RRM}$       | = 1200 V |
| $I_{DAV}$       | = 25 A   |
| $I_{FSM}$       | = 370 A  |

## 1~ Rectifier Bridge

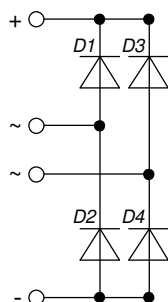
Part number

**GBO25-12NO1**



Backside: isolated

 E72873



### Features / Advantages:

- Low forward voltage drop
- Planar passivated chips
- Easy to mount with one screw
- Space and weight savings

### Applications:

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

### Package: GBFP

- Isolation Voltage: 2500 V~
- Industry standard outline
- RoHS compliant
- Epoxy meets UL 94V-0
- Soldering pins for PCB mounting
- Base plate: Plastic overmolded tab
- Reduced weight

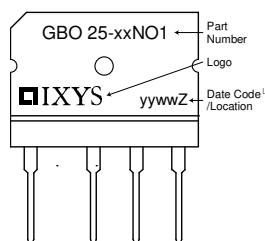
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| Rectifier  |                                              |                                            |                                           | Ratings                        |      |      |                  |
|------------|----------------------------------------------|--------------------------------------------|-------------------------------------------|--------------------------------|------|------|------------------|
| Symbol     | Definition                                   | Conditions                                 |                                           | min.                           | typ. | max. | Unit             |
| $V_{RSM}$  | max. non-repetitive reverse blocking voltage | $T_{VJ} = 25^{\circ}\text{C}$              |                                           |                                |      | 1300 | V                |
| $V_{RRM}$  | max. repetitive reverse blocking voltage     | $T_{VJ} = 25^{\circ}\text{C}$              |                                           |                                |      | 1200 | V                |
| $I_R$      | reverse current                              | $V_R = 1200\text{ V}$                      | $T_{VJ} = 25^{\circ}\text{C}$             |                                |      | 40   | $\mu\text{A}$    |
|            |                                              | $V_R = 1200\text{ V}$                      | $T_{VJ} = 150^{\circ}\text{C}$            |                                |      | 1.5  | mA               |
| $V_F$      | forward voltage drop                         | $I_F = 10\text{ A}$                        | $T_{VJ} = 25^{\circ}\text{C}$             |                                |      | 1.06 | V                |
|            |                                              | $I_F = 20\text{ A}$                        |                                           |                                |      | 1.17 | V                |
|            |                                              | $I_F = 10\text{ A}$                        | $T_{VJ} = 150^{\circ}\text{C}$            |                                |      | 0.92 | V                |
|            |                                              | $I_F = 20\text{ A}$                        |                                           |                                |      | 1.09 | V                |
| $I_{DAV}$  | bridge output current                        | $T_C = 105^{\circ}\text{C}$<br>rectangular | $T_{VJ} = 175^{\circ}\text{C}$<br>d = 0.5 |                                |      | 25   | A                |
| $V_{F0}$   | threshold voltage                            | } for power loss calculation only          |                                           | $T_{VJ} = 175^{\circ}\text{C}$ |      | 0.74 | V                |
| $r_F$      | slope resistance                             |                                            |                                           |                                |      | 16.3 | m $\Omega$       |
| $R_{thJC}$ | thermal resistance junction to case          |                                            |                                           |                                |      | 4.3  | K/W              |
| $R_{thCH}$ | thermal resistance case to heatsink          |                                            |                                           |                                | 0.5  |      | K/W              |
| $P_{tot}$  | total power dissipation                      | $T_C = 25^{\circ}\text{C}$                 |                                           |                                |      | 35   | W                |
| $I_{FSM}$  | max. forward surge current                   | t = 10 ms; (50 Hz), sine                   | $T_{VJ} = 45^{\circ}\text{C}$             |                                |      | 370  | A                |
|            |                                              | t = 8,3 ms; (60 Hz), sine                  | $V_R = 0\text{ V}$                        |                                |      | 400  | A                |
|            |                                              | t = 10 ms; (50 Hz), sine                   | $T_{VJ} = 150^{\circ}\text{C}$            |                                |      | 315  | A                |
|            |                                              | t = 8,3 ms; (60 Hz), sine                  | $V_R = 0\text{ V}$                        |                                |      | 340  | A                |
| $I^2t$     | value for fusing                             | t = 10 ms; (50 Hz), sine                   | $T_{VJ} = 45^{\circ}\text{C}$             |                                |      | 685  | A <sup>2</sup> s |
|            |                                              | t = 8,3 ms; (60 Hz), sine                  | $V_R = 0\text{ V}$                        |                                |      | 665  | A <sup>2</sup> s |
|            |                                              | t = 10 ms; (50 Hz), sine                   | $T_{VJ} = 150^{\circ}\text{C}$            |                                |      | 495  | A <sup>2</sup> s |
|            |                                              | t = 8,3 ms; (60 Hz), sine                  | $V_R = 0\text{ V}$                        |                                |      | 480  | A <sup>2</sup> s |
| $C_J$      | junction capacitance                         | $V_R = 400\text{ V}; f = 1\text{ MHz}$     |                                           |                                | 10   |      | pF               |

| Package GBFP         |                                                              |                                         | Ratings |      |      |      |
|----------------------|--------------------------------------------------------------|-----------------------------------------|---------|------|------|------|
| Symbol               | Definition                                                   | Conditions                              | min.    | typ. | max. | Unit |
| I <sub>RMS</sub>     | RMS current                                                  | per terminal                            |         |      | 70   | A    |
| T <sub>VJ</sub>      | virtual junction temperature                                 |                                         | -40     |      | 175  | °C   |
| T <sub>op</sub>      | operation temperature                                        |                                         | -40     |      | 150  | °C   |
| T <sub>stg</sub>     | storage temperature                                          |                                         | -40     |      | 150  | °C   |
| Weight               |                                                              |                                         |         | 7    |      | g    |
| M <sub>D</sub>       | mounting torque                                              |                                         | 0.5     |      | 0.8  | Nm   |
| F <sub>C</sub>       | mounting force with clip                                     |                                         | 20      |      | 120  | N    |
| d <sub>Spp/App</sub> | creepage distance on surface   striking distance through air |                                         | 4.9     |      |      | mm   |
| d <sub>Spb/Apb</sub> | terminal to backside                                         |                                         | 2.5     |      |      | mm   |
| V <sub>ISOL</sub>    | isolation voltage                                            | t = 1 second                            | 2500    |      |      | V    |
|                      |                                                              | t = 1 minute                            | 2100    |      |      | V    |
|                      |                                                              | 50/60 Hz, RMS; I <sub>ISOL</sub> ≤ 1 mA |         |      |      |      |
| R <sub>thJA</sub>    | thermal resistance junction to ambient                       |                                         |         | 50   |      | K/W  |

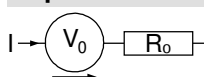


| Ordering | Ordering Number | Marking on Product | Delivery Mode | Quantity | Code No. |
|----------|-----------------|--------------------|---------------|----------|----------|
| Standard | GBO25-12NO1     | GBO25-12NO1        | Tube          | 16       | 500233   |

### Equivalent Circuits for Simulation

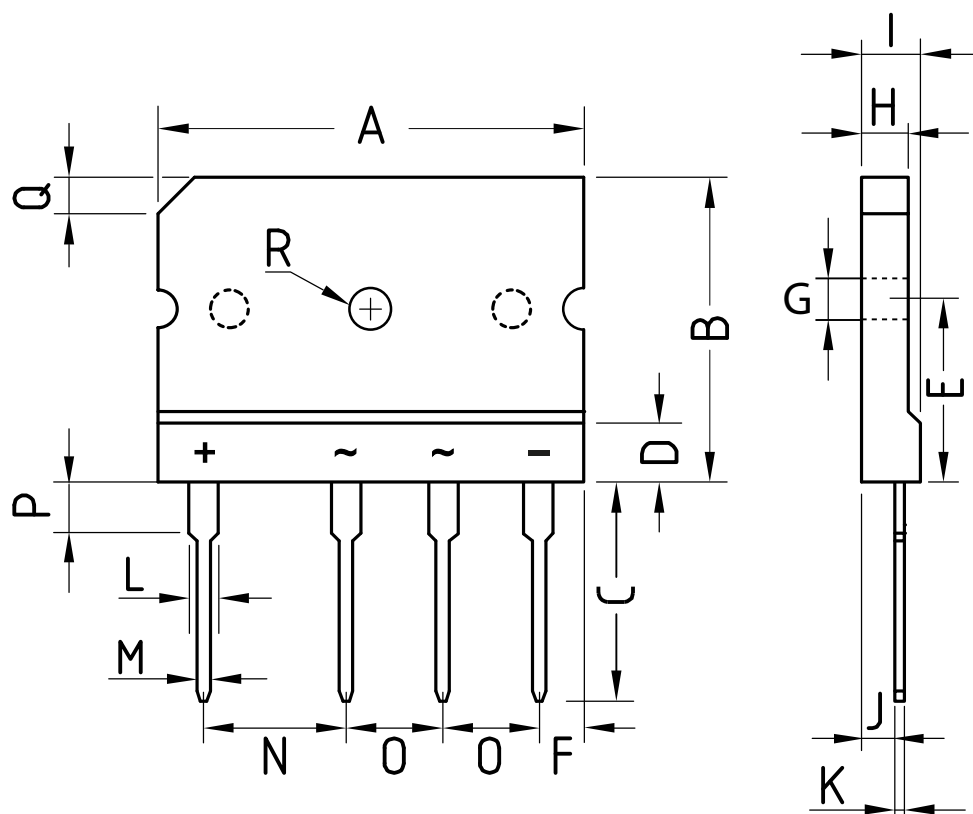
\* on die level

$T_{VJ} = 175^{\circ}\text{C}$



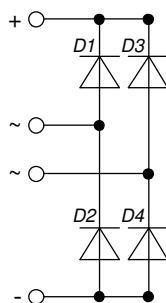
Rectifier

|              |                    |      |    |
|--------------|--------------------|------|----|
| $V_{0 \max}$ | threshold voltage  | 0.74 | V  |
| $R_{0 \max}$ | slope resistance * | 13.7 | mΩ |

**Outlines GBFP**


| DIM.  | MIN.        | MAX. |
|-------|-------------|------|
| A     | 29.7        | 30.3 |
| B     | 19.7        | 20.3 |
| C     | 17.0        | 18.0 |
| D     | 4.7         | 4.9  |
| E     | 10.8        | 11.2 |
| F     | 2.3         | 2.7  |
| G     | 3.1         | 3.4  |
| H     | 3.4         | 3.8  |
| I     | 4.4         | 4.8  |
| J     | 2.5         | 2.9  |
| K     | 0.6         | 0.8  |
| L     | 2.0         | 2.4  |
| M     | 0.9         | 1.1  |
| N     | 9.8         | 10.2 |
| O     | 7.3         | 7.7  |
| P     | 3.8         | 4.2  |
| Q     | (3.0) x 45° |      |
| R (Ø) | 3.1         | 3.4  |

All Dimensions in millimeter



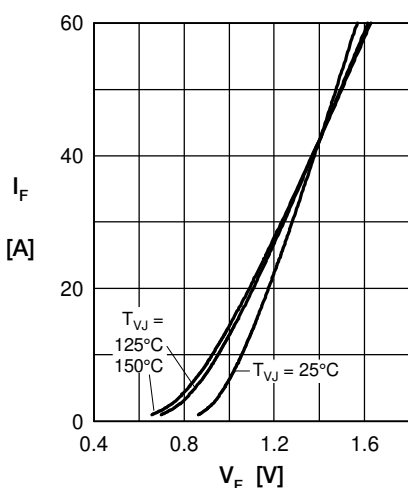
**Rectifier**


Fig. 1 Forward current vs. voltage drop per diode

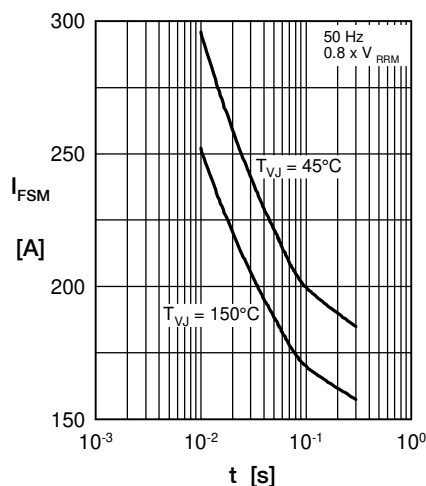


Fig. 2 Surge overload current vs. time per diode

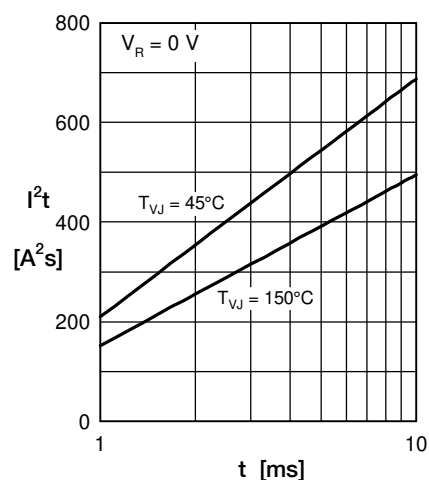


Fig. 3  $I^2t$  vs. time per diode

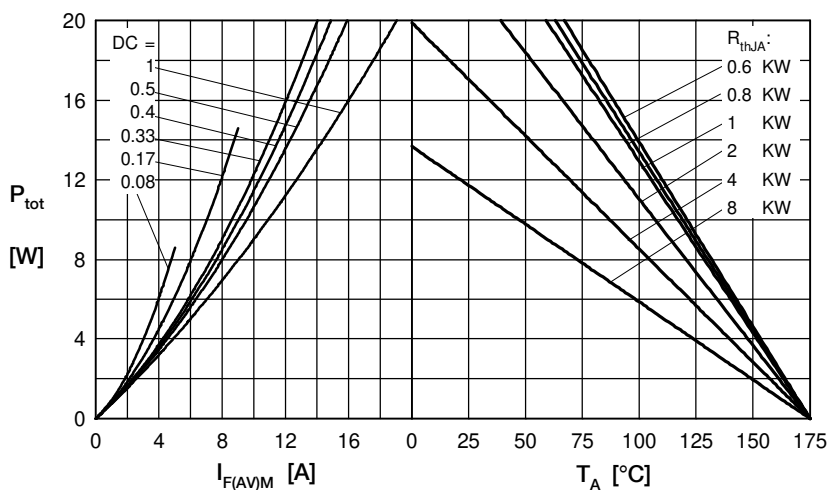


Fig. 4 Power dissipation vs. forward current and ambient temperature per diode

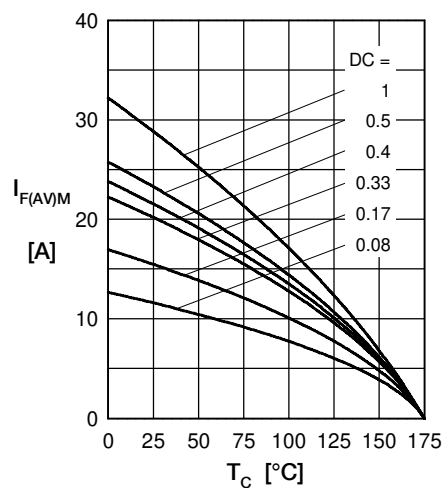


Fig. 5 Max. forward current vs. case temperature per diode

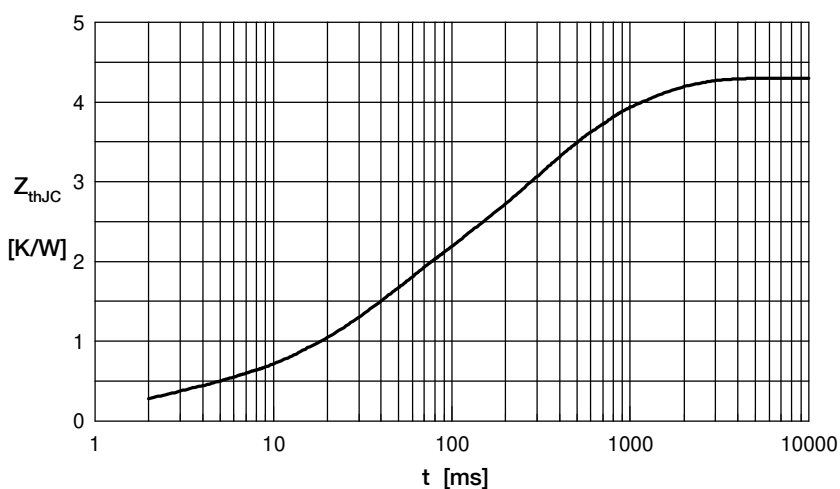


Fig. 6 Transient thermal impedance junction to case vs. time per diode

Constants for  $Z_{thJC}$  calculation:

| i | $R_{th}$ (K/W) | $t_i$ (s) |
|---|----------------|-----------|
| 1 | 0.302          | 0.002     |
| 2 | 1.252          | 0.032     |
| 3 | 1.582          | 0.227     |
| 4 | 1.164          | 0.820     |

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