

# Standard Rectifier Module

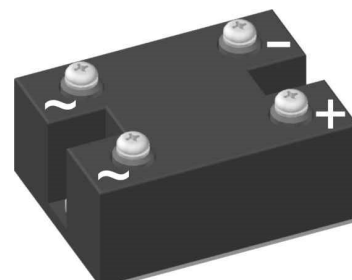
# PHASE OUT

1~ Rectifier Bridge

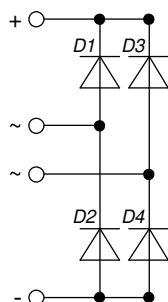
| 1~<br>Rectifier |          |
|-----------------|----------|
| $V_{RRM}$       | = 800 V  |
| $I_{DAV}$       | = 125 A  |
| $I_{FSM}$       | = 1800 A |

Part number

**VBO125-08NO7**



 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 one phase bridge configurations
- Supplies for DC power equipment
- Input rectifiers for PWM inverter
- Battery DC power supplies
- Field supply for DC motors

## Package: PWS-C

- Isolation Voltage: 3000 V~
- Industry standard outline
- RoHS compliant
- Easy to mount with two screws
- Base plate: Copper internally DCB isolated
- Advanced power cycling

**Recommended replacement: VBO130-08NO7**

## Disclaimer Notice

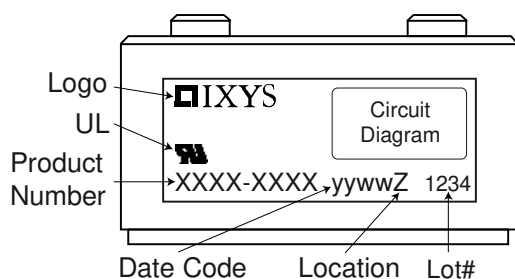
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| Rectifier  |                                              |                                                   |                                             | Ratings                        |      |      |                   |
|------------|----------------------------------------------|---------------------------------------------------|---------------------------------------------|--------------------------------|------|------|-------------------|
| Symbol     | Definition                                   | Conditions                                        |                                             | min.                           | typ. | max. | Unit              |
| $V_{RSM}$  | max. non-repetitive reverse blocking voltage | $T_{VJ} = 25^{\circ}\text{C}$                     |                                             |                                |      | 900  | V                 |
| $V_{RRM}$  | max. repetitive reverse blocking voltage     | $T_{VJ} = 25^{\circ}\text{C}$                     |                                             |                                |      | 800  | V                 |
| $I_R$      | reverse current                              | $V_R = 800\text{ V}$                              | $T_{VJ} = 25^{\circ}\text{C}$               |                                |      | 200  | $\mu\text{A}$     |
|            |                                              | $V_R = 800\text{ V}$                              | $T_{VJ} = 150^{\circ}\text{C}$              |                                |      | 2    | mA                |
| $V_F$      | forward voltage drop                         | $I_F = 50\text{ A}$                               | $T_{VJ} = 25^{\circ}\text{C}$               |                                |      | 1.07 | V                 |
|            |                                              | $I_F = 100\text{ A}$                              |                                             |                                |      | 1.21 | V                 |
|            |                                              | $I_F = 50\text{ A}$                               | $T_{VJ} = 125^{\circ}\text{C}$              |                                |      | 0.97 | V                 |
|            |                                              | $I_F = 100\text{ A}$                              |                                             |                                |      | 1.15 | V                 |
| $I_{DAV}$  | bridge output current                        | $T_C = 105^{\circ}\text{C}$<br>rectangular        | $T_{VJ} = 150^{\circ}\text{C}$<br>$d = 0.5$ |                                |      | 125  | A                 |
| $V_{F0}$   | threshold voltage                            | } for power loss calculation only                 |                                             | $T_{VJ} = 150^{\circ}\text{C}$ |      | 0.76 | V                 |
| $r_F$      | slope resistance                             |                                                   |                                             |                                |      | 3.6  | m $\Omega$        |
| $R_{thJC}$ | thermal resistance junction to case          |                                                   |                                             |                                |      | 0.6  | K/W               |
| $R_{thCH}$ | thermal resistance case to heatsink          |                                                   |                                             |                                | 0.3  |      | K/W               |
| $P_{tot}$  | total power dissipation                      | $T_C = 25^{\circ}\text{C}$                        |                                             |                                |      | 205  | W                 |
| $I_{FSM}$  | max. forward surge current                   | $t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$  | $T_{VJ} = 45^{\circ}\text{C}$               |                                |      | 1.80 | kA                |
|            |                                              | $t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$ | $V_R = 0\text{ V}$                          |                                |      | 1.95 | kA                |
|            |                                              | $t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$  | $T_{VJ} = 150^{\circ}\text{C}$              |                                |      | 1.53 | kA                |
|            |                                              | $t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$ | $V_R = 0\text{ V}$                          |                                |      | 1.65 | kA                |
| $I^2t$     | value for fusing                             | $t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$  | $T_{VJ} = 45^{\circ}\text{C}$               |                                |      | 16.2 | kA <sup>2</sup> s |
|            |                                              | $t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$ | $V_R = 0\text{ V}$                          |                                |      | 15.7 | kA <sup>2</sup> s |
|            |                                              | $t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$  | $T_{VJ} = 150^{\circ}\text{C}$              |                                |      | 11.7 | kA <sup>2</sup> s |
|            |                                              | $t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$ | $V_R = 0\text{ V}$                          |                                |      | 11.3 | kA <sup>2</sup> s |
| $C_J$      | junction capacitance                         | $V_R = 400\text{ V}; f = 1\text{ MHz}$            |                                             |                                | 58   |      | pF                |

# PHASE OUT

Phase out

| Package PWS-C |                                                              |                      |                                     | Ratings |      |      |      |
|---------------|--------------------------------------------------------------|----------------------|-------------------------------------|---------|------|------|------|
| Symbol        | Definition                                                   | Conditions           |                                     | min.    | typ. | max. | Unit |
| $I_{RMS}$     | RMS current                                                  | per terminal         |                                     |         |      | 150  | A    |
| $T_{VJ}$      | virtual junction temperature                                 |                      |                                     | -40     |      | 150  | °C   |
| $T_{op}$      | operation temperature                                        |                      |                                     | -40     |      | 125  | °C   |
| $T_{stg}$     | storage temperature                                          |                      |                                     | -40     |      | 125  | °C   |
| <b>Weight</b> |                                                              |                      |                                     |         | 237  |      | g    |
| $M_D$         | mounting torque                                              |                      |                                     | 4.25    |      | 5.75 | Nm   |
| $M_T$         | terminal torque                                              |                      |                                     | 4.25    |      | 5.75 | Nm   |
| $d_{Spp/Apb}$ | creepage distance on surface   striking distance through air | terminal to terminal |                                     | 26.0    |      |      | mm   |
| $d_{Spb/Apb}$ |                                                              | terminal to backside |                                     | 14.0    |      |      | mm   |
| $V_{ISOL}$    | isolation voltage                                            | t = 1 second         | 50/60 Hz, RMS; $I_{ISOL} \leq 1$ mA | 3000    |      |      | V    |
|               |                                                              | t = 1 minute         |                                     | 2500    |      |      | V    |

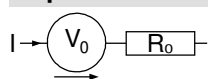


| Ordering | Ordering Number | Marking on Product | Delivery Mode | Quantity | Code No. |
|----------|-----------------|--------------------|---------------|----------|----------|
| Standard | VBO125-08NO7    | VBO125-08NO7       | Box           | 10       | 485136   |

### Equivalent Circuits for Simulation

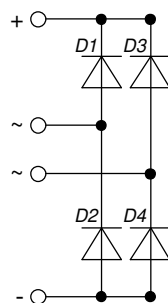
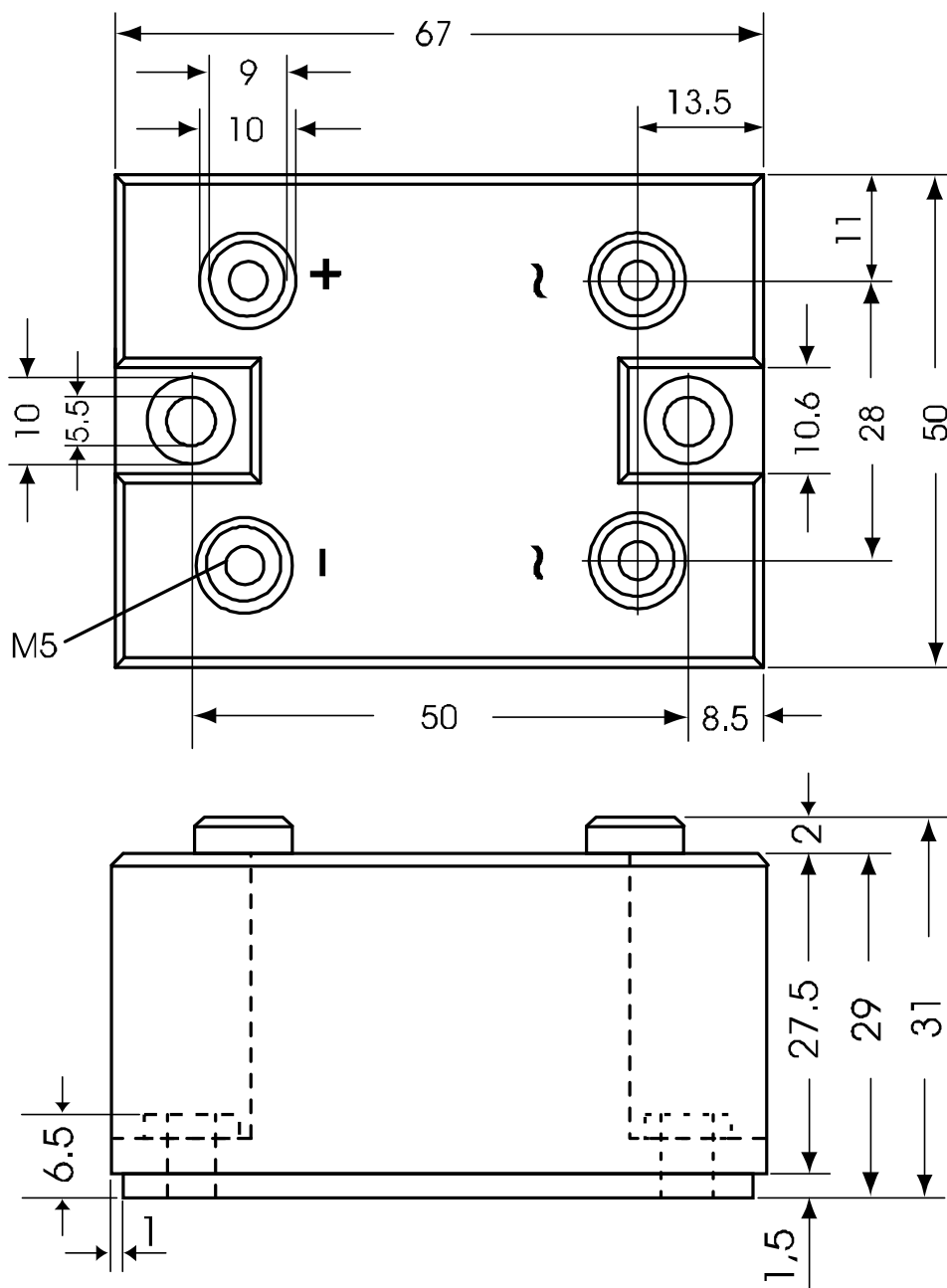
\* on die level

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

|                                                                                     |                    |                  |    |
|-------------------------------------------------------------------------------------|--------------------|------------------|----|
|  |                    | <b>Rectifier</b> |    |
| $V_{0\max}$                                                                         | threshold voltage  | 0.76             | V  |
| $R_{0\max}$                                                                         | slope resistance * | 3.6              | mΩ |



Outlines PWS-C



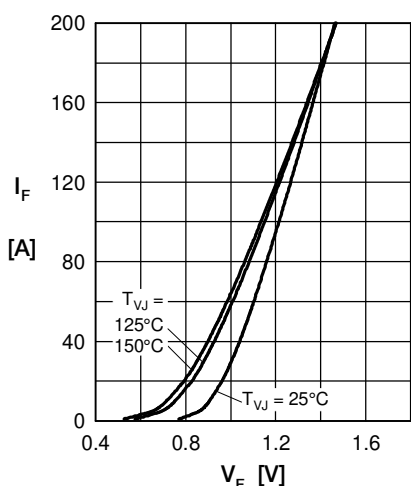
**Rectifier**


Fig. 1 Forward current versus voltage drop per diode

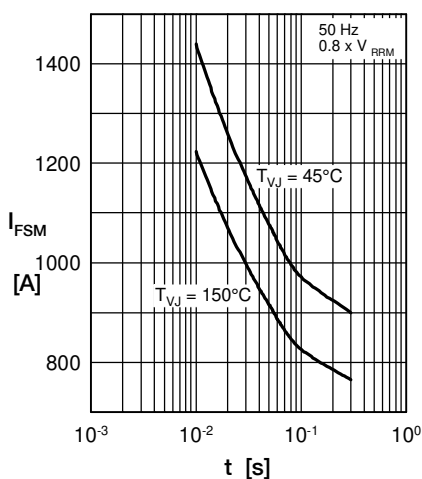


Fig. 2 Surge overload current vs. time per diode

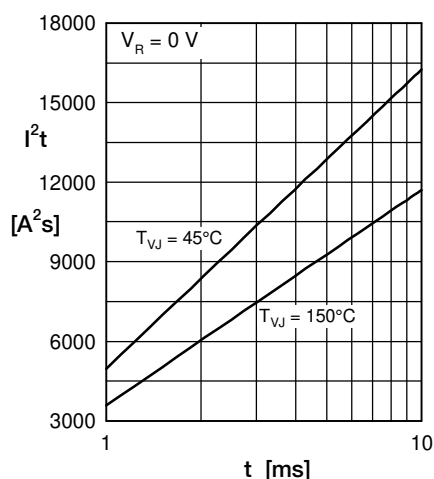
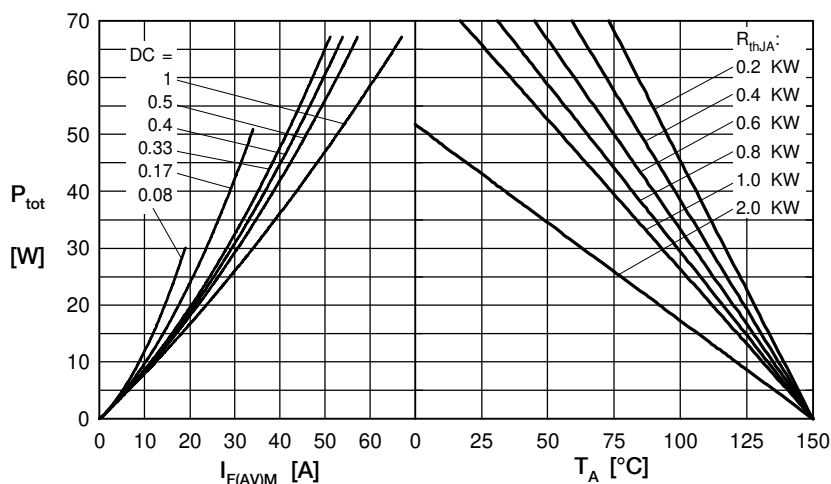

 Fig. 3  $I^2t$  versus time per diode


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

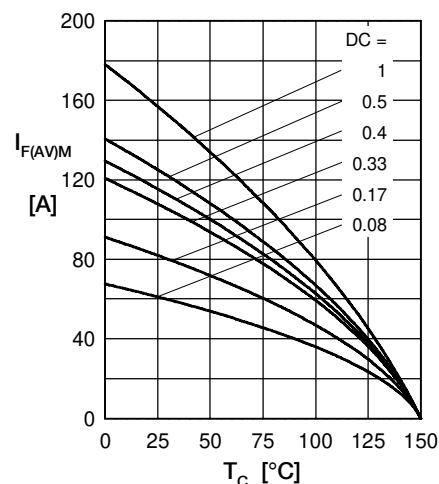


Fig. 5 Max. forward current vs. case temperature per diode

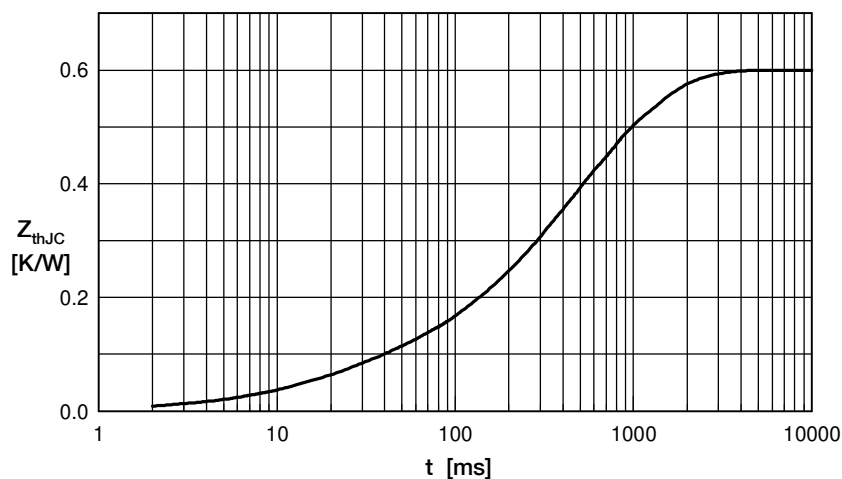


Fig. 6 Transient thermal impedance junction to case vs. time per diode

 Constants for  $Z_{thJC}$  calculation:

| i | $R_{th}$ (K/W) | $t_i$ (s) |
|---|----------------|-----------|
| 1 | 0.060          | 0.020     |
| 2 | 0.003          | 0.010     |
| 3 | 0.150          | 0.225     |
| 4 | 0.243          | 0.800     |
| 5 | 0.144          | 0.580     |