

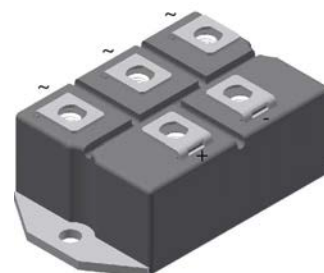
# Standard Rectifier Module

| 3~<br>Rectifier |          |
|-----------------|----------|
| $V_{RRM}$       | = 1600 V |
| $I_{DAV}$       | = 60 A   |
| $I_{FSM}$       | = 550 A  |

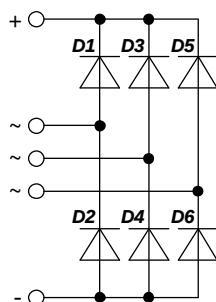
## 3~ Rectifier Bridge

Part number

**VUO62-16NO7**



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

### Package: PWS-D

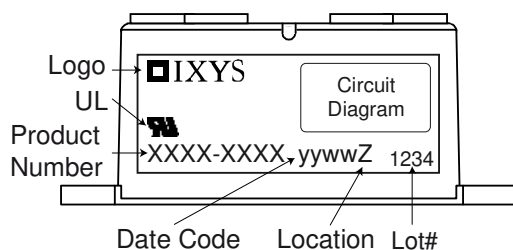
- Isolation Voltage: 3000 V~
- Industry standard outline
- RoHS compliant
- Easy to mount with two screws
- Base plate: Copper internally DCB isolated
- Advanced power cycling

### Disclaimer Notice

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| Rectifier  |                                                     |                                                   |                                                     | Ratings                        |      |      |                   |
|------------|-----------------------------------------------------|---------------------------------------------------|-----------------------------------------------------|--------------------------------|------|------|-------------------|
| Symbol     | Definition                                          | Conditions                                        |                                                     | min.                           | typ. | max. | Unit              |
| $V_{RSM}$  | <i>max. non-repetitive reverse blocking voltage</i> | $T_{VJ} = 25^{\circ}\text{C}$                     |                                                     |                                |      | 1700 | V                 |
| $V_{RRM}$  | <i>max. repetitive reverse blocking voltage</i>     | $T_{VJ} = 25^{\circ}\text{C}$                     |                                                     |                                |      | 1600 | V                 |
| $I_R$      | <i>reverse current</i>                              | $V_R = 1600\text{ V}$                             | $T_{VJ} = 25^{\circ}\text{C}$                       |                                |      | 40   | $\mu\text{A}$     |
|            |                                                     | $V_R = 1600\text{ V}$                             | $T_{VJ} = 150^{\circ}\text{C}$                      |                                |      | 1,5  | mA                |
| $V_F$      | <i>forward voltage drop</i>                         | $I_F = 20\text{ A}$                               | $T_{VJ} = 25^{\circ}\text{C}$                       |                                |      | 1,07 | V                 |
|            |                                                     | $I_F = 60\text{ A}$                               |                                                     |                                |      | 1,30 | V                 |
|            |                                                     | $I_F = 20\text{ A}$                               | $T_{VJ} = 125^{\circ}\text{C}$                      |                                |      | 0,96 | V                 |
|            |                                                     | $I_F = 60\text{ A}$                               |                                                     |                                |      | 1,27 | V                 |
| $I_{DAV}$  | <i>bridge output current</i>                        | $T_C = 120^{\circ}\text{C}$<br>rectangular        | $T_{VJ} = 150^{\circ}\text{C}$<br>$d = \frac{1}{3}$ |                                |      | 60   | A                 |
| $V_{F0}$   | <i>threshold voltage</i>                            | } <i>for power loss calculation only</i>          |                                                     | $T_{VJ} = 150^{\circ}\text{C}$ |      | 0,78 | V                 |
| $r_F$      | <i>slope resistance</i>                             |                                                   |                                                     |                                |      | 8,1  | m $\Omega$        |
| $R_{thJC}$ | <i>thermal resistance junction to case</i>          |                                                   |                                                     |                                |      | 1,1  | K/W               |
| $R_{thCH}$ | <i>thermal resistance case to heatsink</i>          |                                                   |                                                     |                                | 0,4  |      | K/W               |
| $P_{tot}$  | <i>total power dissipation</i>                      | $T_C = 25^{\circ}\text{C}$                        |                                                     |                                |      | 110  | W                 |
| $I_{FSM}$  | <i>max. forward surge current</i>                   | $t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$  | $T_{VJ} = 45^{\circ}\text{C}$                       |                                |      | 550  | A                 |
|            |                                                     | $t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$ | $V_R = 0\text{ V}$                                  |                                |      | 595  | A                 |
|            |                                                     | $t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$  | $T_{VJ} = 150^{\circ}\text{C}$                      |                                |      | 470  | A                 |
|            |                                                     | $t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$ | $V_R = 0\text{ V}$                                  |                                |      | 505  | A                 |
| $I^2t$     | <i>value for fusing</i>                             | $t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$  | $T_{VJ} = 45^{\circ}\text{C}$                       |                                |      | 1,52 | kA <sup>2</sup> s |
|            |                                                     | $t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$ | $V_R = 0\text{ V}$                                  |                                |      | 1,48 | kA <sup>2</sup> s |
|            |                                                     | $t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$  | $T_{VJ} = 150^{\circ}\text{C}$                      |                                |      | 1,11 | kA <sup>2</sup> s |
|            |                                                     | $t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$ | $V_R = 0\text{ V}$                                  |                                |      | 1,06 | kA <sup>2</sup> s |
| $C_J$      | <i>junction capacitance</i>                         | $V_R = 400\text{ V}; f = 1\text{ MHz}$            |                                                     |                                | 19   |      | pF                |

| Package PWS-D |                                                                     |                             |                                     | Ratings |      |      |      |
|---------------|---------------------------------------------------------------------|-----------------------------|-------------------------------------|---------|------|------|------|
| Symbol        | Definition                                                          | Conditions                  |                                     | min.    | typ. | max. | Unit |
| $I_{RMS}$     | <b>RMS current</b>                                                  | per terminal                |                                     |         |      | 150  | A    |
| $T_{VJ}$      | <b>virtual junction temperature</b>                                 |                             |                                     | -40     |      | 150  | °C   |
| $T_{op}$      | <b>operation temperature</b>                                        |                             |                                     | -40     |      | 125  | °C   |
| $T_{stg}$     | <b>storage temperature</b>                                          |                             |                                     | -40     |      | 125  | °C   |
| <b>Weight</b> |                                                                     |                             |                                     |         | 159  |      | g    |
| $M_D$         | <b>mounting torque</b>                                              |                             |                                     | 4,25    |      | 5,75 | Nm   |
| $M_T$         | <b>terminal torque</b>                                              |                             |                                     | 4,25    |      | 5,75 | Nm   |
| $d_{Spp/App}$ | <b>creepage distance on surface   striking distance through air</b> | <b>terminal to terminal</b> |                                     | 9,5     |      |      | mm   |
| $d_{Spb/Apb}$ |                                                                     | <b>terminal to backside</b> |                                     | 26,0    |      |      | mm   |
| $V_{ISOL}$    | <b>isolation voltage</b>                                            | t = 1 second                | 50/60 Hz, RMS; $I_{ISOL} \leq 1$ mA | 3000    |      |      | V    |
|               |                                                                     | t = 1 minute                |                                     | 2500    |      |      | V    |

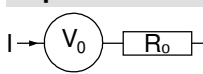


| Ordering | Ordering Number | Marking on Product | Delivery Mode | Quantity | Code No. |
|----------|-----------------|--------------------|---------------|----------|----------|
| Standard | VUO62-16NO7     | VUO62-16NO7        | Box           | 10       | 460478   |

### Equivalent Circuits for Simulation

\* on die level

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



Rectifier

|              |                           |      |    |
|--------------|---------------------------|------|----|
| $V_{0 \max}$ | <b>threshold voltage</b>  | 0,78 | V  |
| $R_{0 \max}$ | <b>slope resistance *</b> | 6,9  | mΩ |

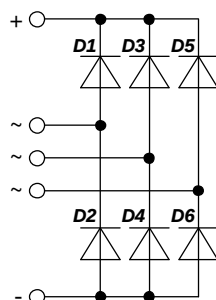
Technical drawing of a 5-pin DIN connector, showing two views: a side view (top) and a front view (bottom).

**Side View (Top):**

- Overall width: 30 mm
- Overall height: 7 mm
- Pin diameter: 2.5 mm
- Pin length: 3 mm

**Front View (Bottom):**

- Overall width: 48 mm
- Overall height: 21.6 mm
- Pin diameter: M5
- Pin length: 2.5 mm
- Pin spacing: 20 mm
- Pin positions: 2.5 mm, 18 mm, 2.5 mm
- Pin labels: ~, ~, ~, +, -
- Pin diameter: 10 mm
- Pin diameter: 23 mm
- Pin diameter: 48 mm
- Pin diameter: 54 mm
- Pin diameter: 60 mm
- Pin diameter: 72 mm
- Pin diameter: 13.3 mm
- Pin diameter: 5.3 mm



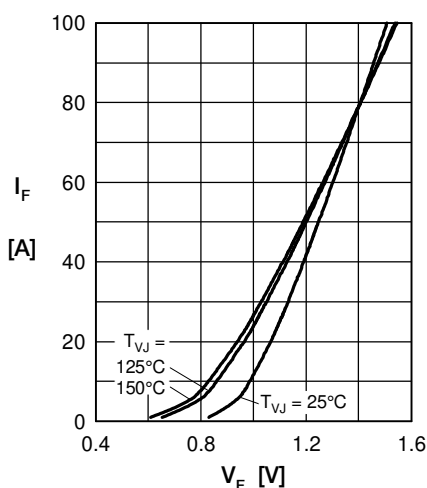
**Rectifier**


Fig. 1 Forward current vs. voltage drop per diode

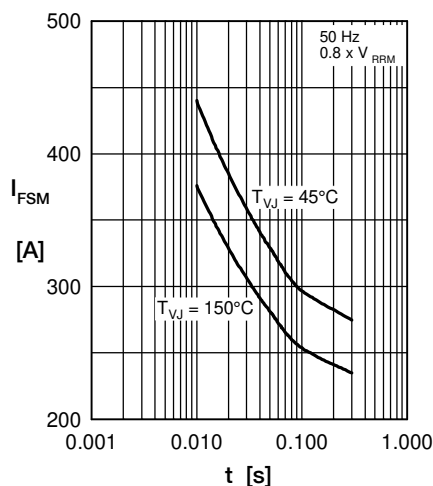


Fig. 2 Surge overload current vs. time per diode

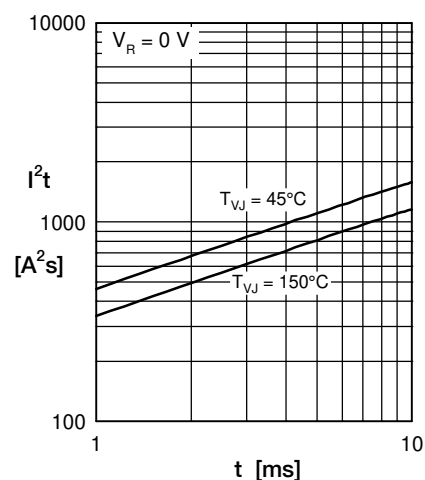


Fig. 3  $I^2t$  vs. time per diode

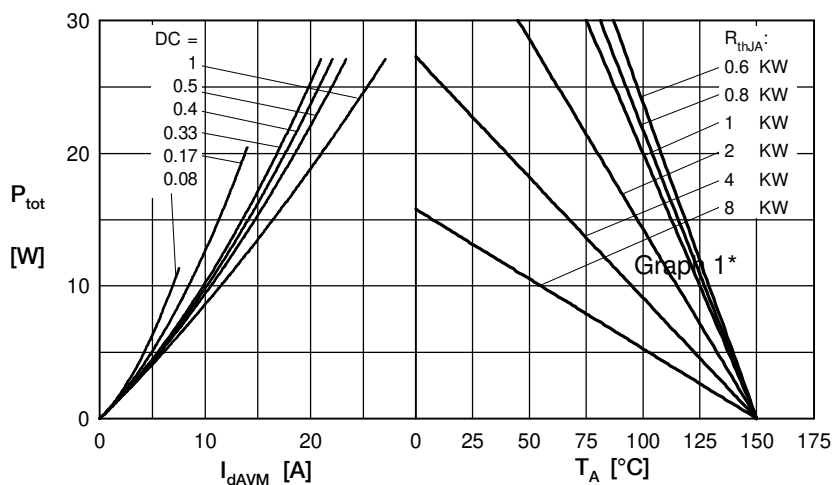


Fig. 4 Power dissipation vs. forward current and ambient temperature per diode

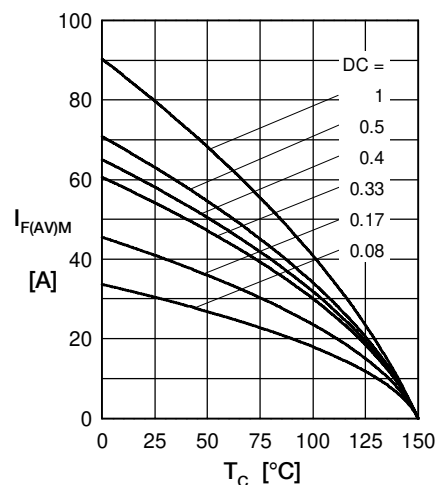


Fig. 5 Max. forward current vs. case temperature per diode

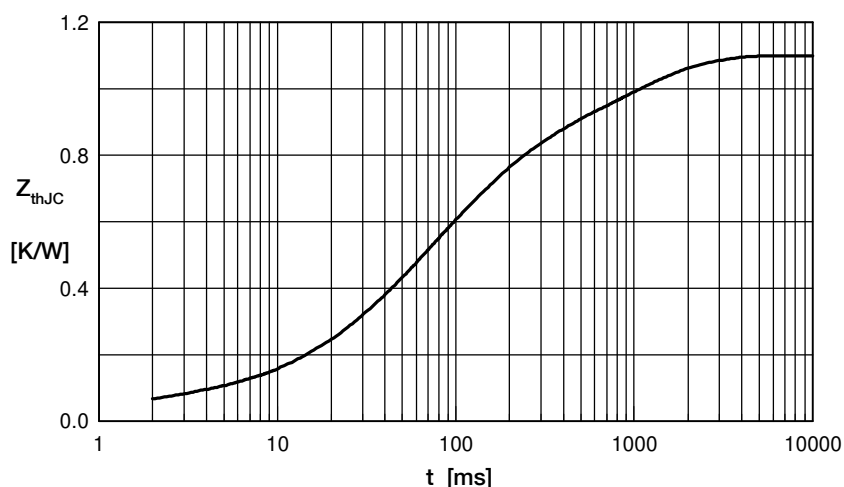


Fig. 6 Transient thermal impedance junction to case vs. time per diode

Constants for  $Z_{thJC}$  calculation:

| i | $R_{th}$ (K/W) | $t_i$ (s) |
|---|----------------|-----------|
| 1 | 0.05           | 0.001     |
| 2 | 0.14           | 0.030     |
| 3 | 0.25           | 0.060     |
| 4 | 0.35           | 0.130     |
| 5 | 0.31           | 0.920     |