

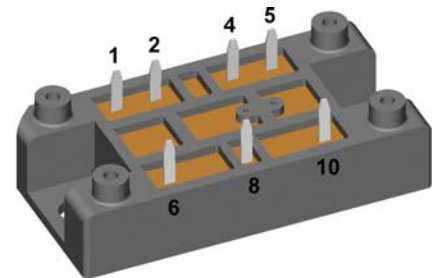
## Standard Rectifier Module

|                         |          |
|-------------------------|----------|
| <b>3~<br/>Rectifier</b> |          |
| $V_{RRM}$               | = 1600 V |
| $I_{DAV}$               | = 45 A   |
| $I_{FSM}$               | = 300 A  |

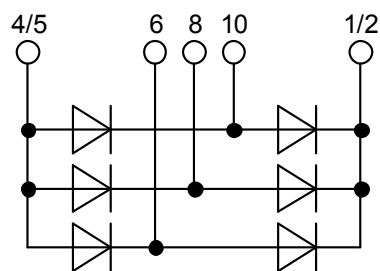
### 3~ Rectifier Bridge

Part number

VUO34-16NO1



 E72873



#### Features / Advantages:

- Package with DCB ceramic
- Reduced weight
- Improved temperature and power cycling
- Planar passivated chips
- Very low forward voltage drop
- Very low leakage current

#### Applications:

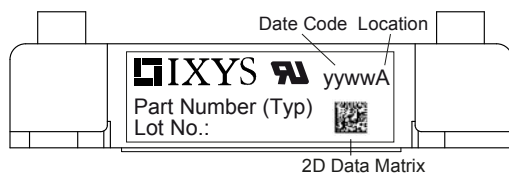
- Diode for main rectification
- For three phase bridge configurations
- Supplies for DC power equipment
- Input rectifiers for PWM inverter
- Battery DC power supplies
- Field supply for DC motors

#### Package: V1-A-Pack

- Isolation Voltage: 3600V~
- Industry standard outline
- RoHS compliant
- Soldering pins for PCB mounting
- Height: 17 mm
- Base plate: DCB ceramic
- Reduced weight
- Advanced power cycling

| Rectifier  |  |   |                         | Ratings |      |                  |
|------------|--|---|-------------------------|---------|------|------------------|
| Symbol     | Definition                                   | Conditions  | min.                    | typ.    | max. | Unit             |
| $V_{RSM}$  | max. non-repetitive reverse blocking voltage | $T_{VJ} = 25^{\circ}C$                                |                         |         | 1700 | V                |
| $V_{RRM}$  | max. repetitive reverse blocking voltage     | $T_{VJ} = 25^{\circ}C$                                |                         |         | 1600 | V                |
| $I_R$      | reverse current                              | $V_R = 1600 V$  | $T_{VJ} = 25^{\circ}C$  |         | 20   | $\mu A$          |
|            |  | $V_R = 1600 V$  | $T_{VJ} = 150^{\circ}C$ |         | 1    | mA               |
| $V_F$      | forward voltage drop                         | $I_F = 15 A$  | $T_{VJ} = 25^{\circ}C$  |         | 1.13 | V                |
|            |  | $I_F = 45 A$  |                         |         | 1.46 | V                |
|            |  | $I_F = 15 A$  | $T_{VJ} = 125^{\circ}C$ |         | 1.06 | V                |
|            |  | $I_F = 45 A$  |                         |         | 1.48 | V                |
| $I_{DAV}$  | bridge output current                        | $T_C = 110^{\circ}C$<br>rectangular $d = \frac{1}{3}$ | $T_{VJ} = 150^{\circ}C$ |         | 45   | A                |
| $V_{FO}$   | threshold voltage                            | } for power loss calculation only                     | $T_{VJ} = 150^{\circ}C$ |         | 0.81 | V                |
| $r_F$      | slope resistance                             |   |                         |         | 14.9 | m $\Omega$       |
| $R_{thJC}$ | thermal resistance junction to case          |   |                         |         | 1.7  | K/W              |
| $R_{thCH}$ | thermal resistance case to heatsink          |   |                         | 0.4     |      | K/W              |
| $P_{tot}$  | total power dissipation                      |   | $T_C = 25^{\circ}C$     |         | 70   | W                |
| $I_{FSM}$  | max. forward surge current                   | $t = 10 ms; (50 Hz), sine$                            | $T_{VJ} = 45^{\circ}C$  |         | 300  | A                |
|            |  | $t = 8,3 ms; (60 Hz), sine$                           | $V_R = 0 V$             |         | 325  | A                |
|            |  | $t = 10 ms; (50 Hz), sine$                            | $T_{VJ} = 150^{\circ}C$ |         | 255  | A                |
|            |  | $t = 8,3 ms; (60 Hz), sine$                           | $V_R = 0 V$             |         | 275  | A                |
| $I^2t$     | value for fusing                             | $t = 10 ms; (50 Hz), sine$                            | $T_{VJ} = 45^{\circ}C$  |         | 450  | A <sup>2</sup> s |
|            |  | $t = 8,3 ms; (60 Hz), sine$                           | $V_R = 0 V$             |         | 440  | A <sup>2</sup> s |
|            |  | $t = 10 ms; (50 Hz), sine$                            | $T_{VJ} = 150^{\circ}C$ |         | 325  | A <sup>2</sup> s |
|            |  | $t = 8,3 ms; (60 Hz), sine$                           | $V_R = 0 V$             |         | 315  | A <sup>2</sup> s |
| $C_J$      | junction capacitance                         | $V_R = 400 V; f = 1 MHz$                              | $T_{VJ} = 25^{\circ}C$  |         | 11   | pF               |

| Package V1-A-Pack |  |   | 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>     |  |   |         | 37   |      | g    |
| $M_D$             | mounting torque  |   | 2       |      | 2.5  | Nm   |
| $d_{Spp/App}$     | creepage distance on surface   striking distance through air | terminal to terminal                                | 6.0     |      |      | mm   |
| $d_{Spb/Apb}$     |  | terminal to backside                                | 12.0    |      |      | mm   |
| $V_{ISOL}$        | isolation voltage  | t = 1 second  | 3600    |      |      | V    |
|                   |  | t = 1 minute<br>50/60 Hz, RMS; $I_{ISOL} \leq 1$ mA | 3000    |      |      | V    |

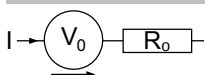


| Ordering | Part Number | Marking on Product | Delivery Mode | Quantity | Code No. |
|----------|-------------|--------------------|---------------|----------|----------|
| Standard | VUO34-16NO1 | VUO34-16NO1        | Box           | 10       | 461148   |

### Equivalent Circuits for Simulation

\* on die level

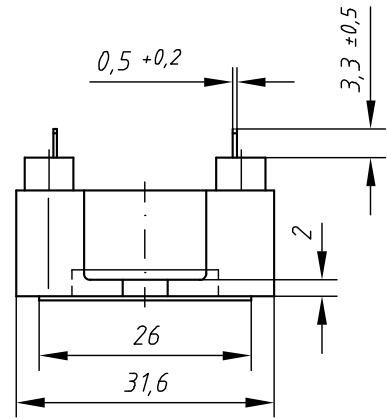
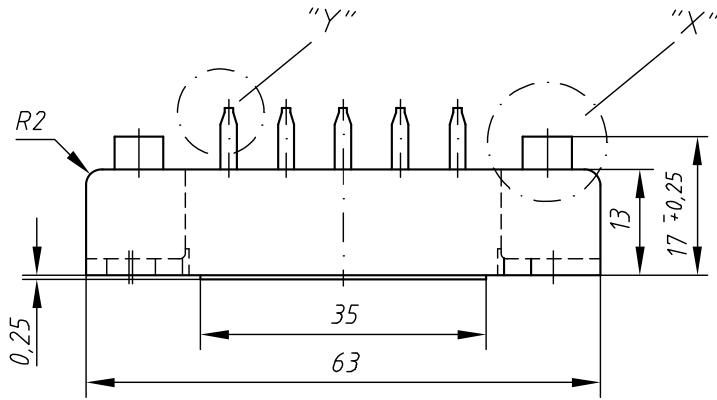
$T_{VJ} = 150^\circ\text{C}$



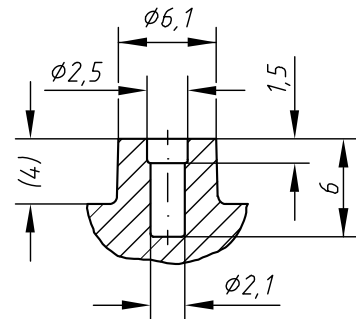
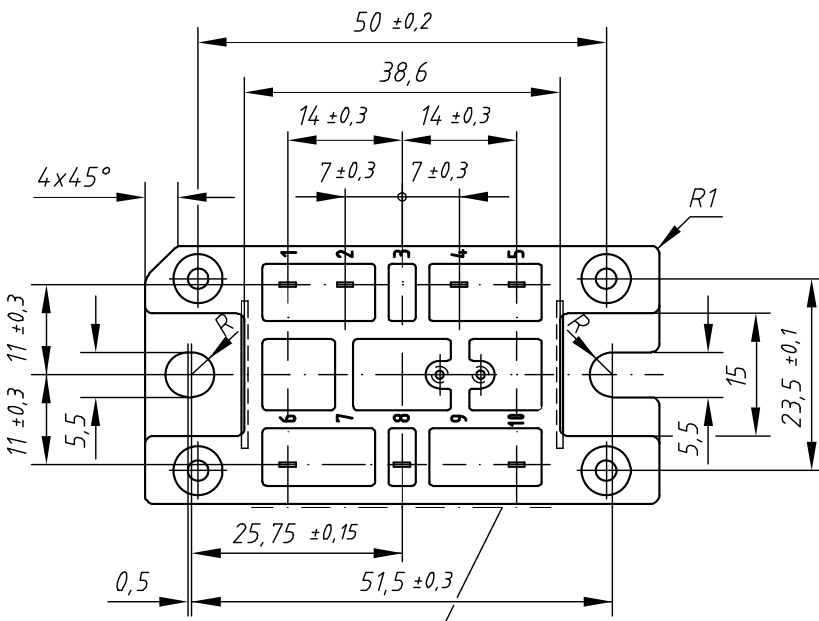
Rectifier

|             |                    |      |    |
|-------------|--------------------|------|----|
| $V_{0\max}$ | threshold voltage  | 0.81 | V  |
| $R_{0\max}$ | slope resistance * | 13.7 | mΩ |

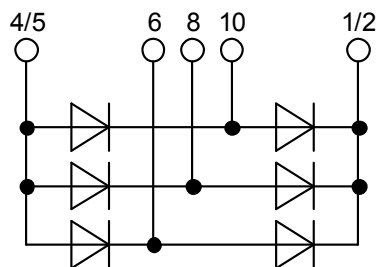
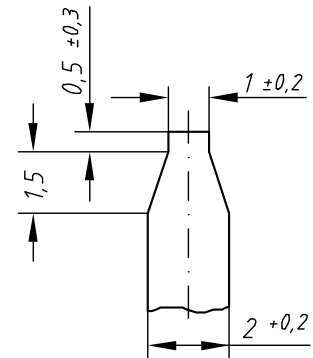
**Outlines V1-A-Pack**



Detail "X" M 2:1



Detail "Y" M 5:1



Rectifier

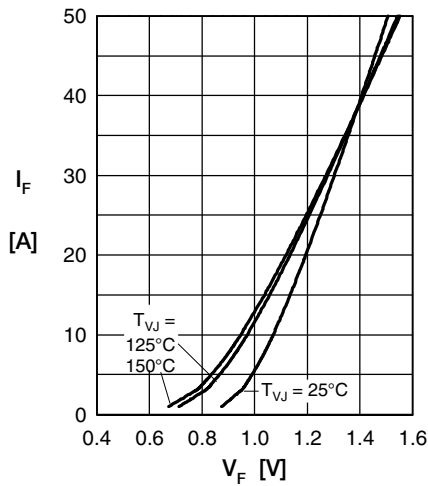


Fig. 1 Forward current vs. voltage drop per diode

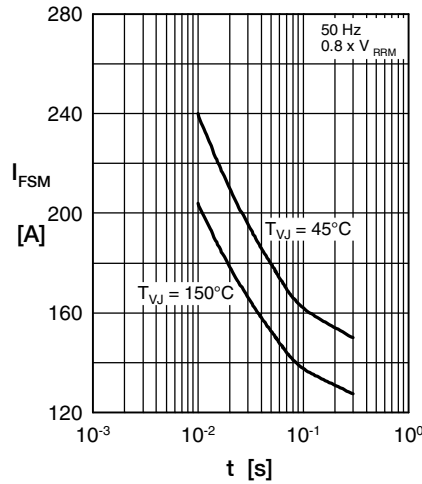


Fig. 2 Surge overload current vs. time per diode

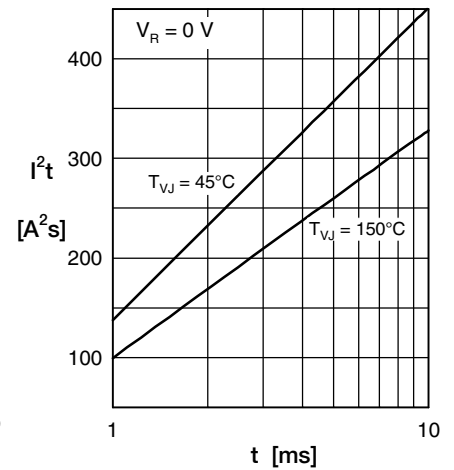


Fig. 3  $I^2t$  vs. time per diode

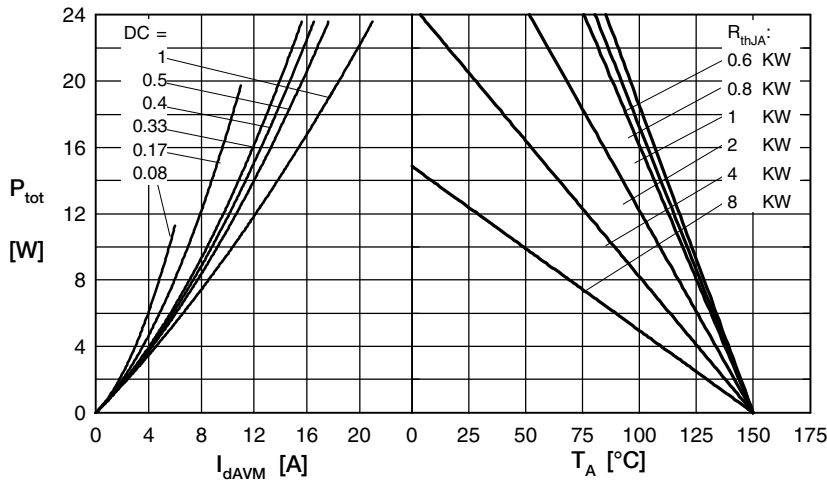


Fig. 4 Power dissipation vs. forward current and ambient temperature per diode

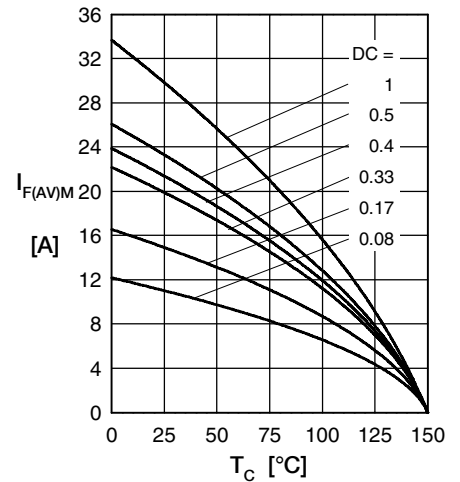


Fig. 5 Max. forward current vs. case temperature per diode

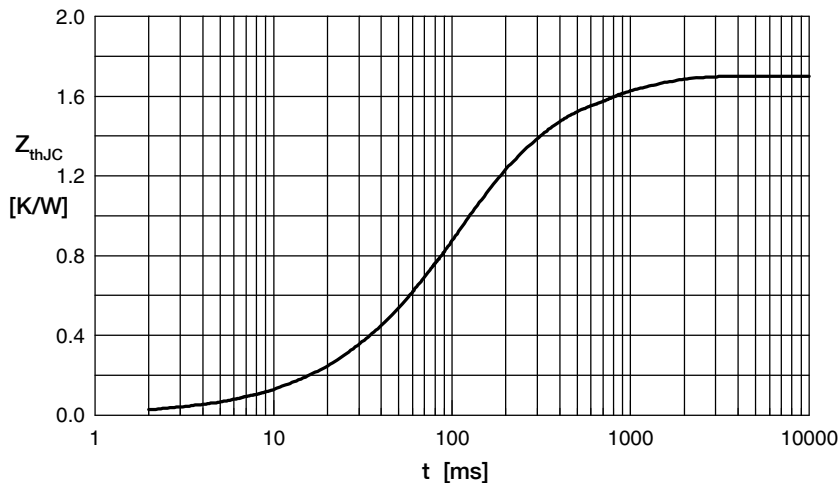


Fig. 6 Transient thermal impedance junction to case vs. time per diode

Constants for  $Z_{thJC}$  calculation:

| i | $R_{th}$ (K/W) | $t_i$ (s) |
|---|----------------|-----------|
| 1 | 1.150          | 0.1015    |
| 2 | 0.150          | 0.1026    |
| 3 | 0.100          | 0.4919    |
| 4 | 0.300          | 0.6200    |