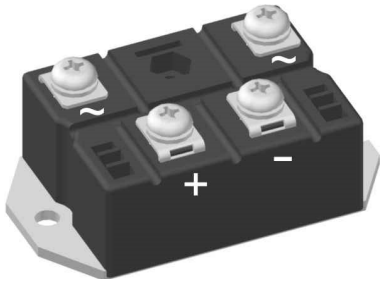
# Standard Rectifier Module

| 1~ Rectifier | | |
|---|---|---|
| $V_{RRM}$ | = | 1200 V |
| $I_{DAV}$ | = | 130 A |
| $I_{FSM}$ | = | 1800 A |

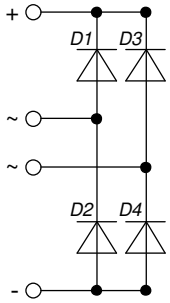
## 1~ Rectifier Bridge

**Part number**

**VBO130-12NO7**




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

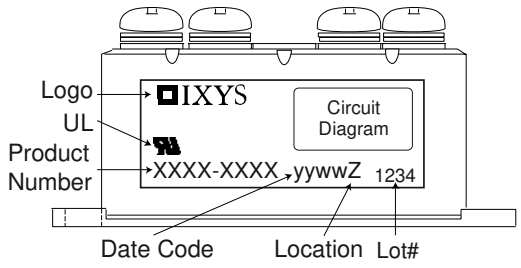
**Package:** PWS-E

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

## Rectifier

| Symbol | Definition | Conditions | | Ratings min. | typ. | max. | Unit |
|---|---|---|---|---|---|---|---|
| $V_{RSM}$ | *max. non-repetitive reverse blocking voltage* | | $T_{VJ}$ = 25°C | | | 1300 | V |
| $V_{RRM}$ | *max. repetitive reverse blocking voltage* | | $T_{VJ}$ = 25°C | | | 1200 | V |
| $I_R$ | *reverse current* | $V_R$ = 1200 V | $T_{VJ}$ = 25°C | | | 200 | µA |
| | | $V_R$ = 1200 V | $T_{VJ}$ = 150°C | | | 2 | mA |
| $V_F$ | *forward voltage drop* | $I_F$ = 120 A | $T_{VJ}$ = 25°C | | | 1.10 | V |
| | | $I_F$ = 240 A | | | | 1.26 | V |
| | | $I_F$ = 120 A | $T_{VJ}$ = 125°C | | | 1.00 | V |
| | | $I_F$ = 240 A | | | | 1.21 | V |
| $I_{DAV}$ | *bridge output current* | $T_C$ = 110°C | $T_{VJ}$ = 150°C | | | 130 | A |
| | | rectangular d = 0.5 | | | | | |
| $V_{F0}$ | *threshold voltage* } *for power loss calculation only* | | $T_{VJ}$ = 150°C | | | 0.77 | V |
| $r_F$ | *slope resistance* } | | | | | 3.4 | mΩ |
| $R_{thJC}$ | *thermal resistance junction to case* | | | | | 0.5 | K/W |
| $R_{thCH}$ | *thermal resistance case to heatsink* | | | | 0.2 | | K/W |
| $P_{tot}$ | *total power dissipation* | | $T_C$ = 25°C | | | 250 | W |
| $I_{FSM}$ | *max. forward surge current* | t = 10 ms; (50 Hz), sine | $T_{VJ}$ = 45°C | | | 1.80 | kA |
| | | t = 8,3 ms; (60 Hz), sine | $V_R$ = 0 V | | | 1.95 | kA |
| | | t = 10 ms; (50 Hz), sine | $T_{VJ}$ = 150°C | | | 1.53 | kA |
| | | t = 8,3 ms; (60 Hz), sine | $V_R$ = 0 V | | | 1.65 | kA |
| $I^2t$ | *value for fusing* | t = 10 ms; (50 Hz), sine | $T_{VJ}$ = 45°C | | | 16.2 | kA²s |
| | | t = 8,3 ms; (60 Hz), sine | $V_R$ = 0 V | | | 15.7 | kA²s |
| | | t = 10 ms; (50 Hz), sine | $T_{VJ}$ = 150°C | | | 11.7 | kA²s |
| | | t = 8,3 ms; (60 Hz), sine | $V_R$ = 0 V | | | 11.3 | kA²s |
| $C_J$ | *junction capacitance* | $V_R$ = 400 V; f = 1 MHz | $T_{VJ}$ = 25°C | | 35 | | pF |

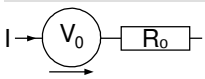
| Package PWS-E | | | | Ratings | | | |
|---|---|---|---|---|---|---|---|
| **Symbol** | **Definition** | **Conditions** | | **min.** | **typ.** | **max.** | **Unit** |
| $I_{RMS}$ | *RMS current* | per terminal | | | | 200 | A |
| $T_{VJ}$ | *virtual junction temperature* | | | -40 | | 150 | °C |
| $T_{op}$ | *operation temperature* | | | -40 | | 125 | °C |
| $T_{stg}$ | *storage temperature* | | | -40 | | 125 | °C |
| **Weight** | | | | | 273 | | g |
| $M_D$ | *mounting torque* | | | 4.25 | | 5.75 | Nm |
| $M_T$ | *terminal torque* | | | 4.25 | | 5.75 | Nm |
| $d_{Spp/App}$ | *creepage distance on surface \| striking distance through air* | | *terminal to terminal* | 12.0 | | | mm |
| $d_{Spb/Apb}$ | | | *terminal to backside* | 26.0 | | | mm |
| $V_{ISOL}$ | *isolation voltage* | t = 1 second | 50/60 Hz, RMS; $I_{ISOL}$ ≤ 1 mA | 3000 | | | V |
| | | t = 1 minute | | 2500 | | | V |




| Ordering | Ordering Number | Marking on Product | Delivery Mode | Quantity | Code No. |
|---|---|---|---|---|---|
| Standard | VBO130-12NO7 | VBO130-12NO7 | Box | 5 | 474010 |

## Equivalent Circuits for Simulation

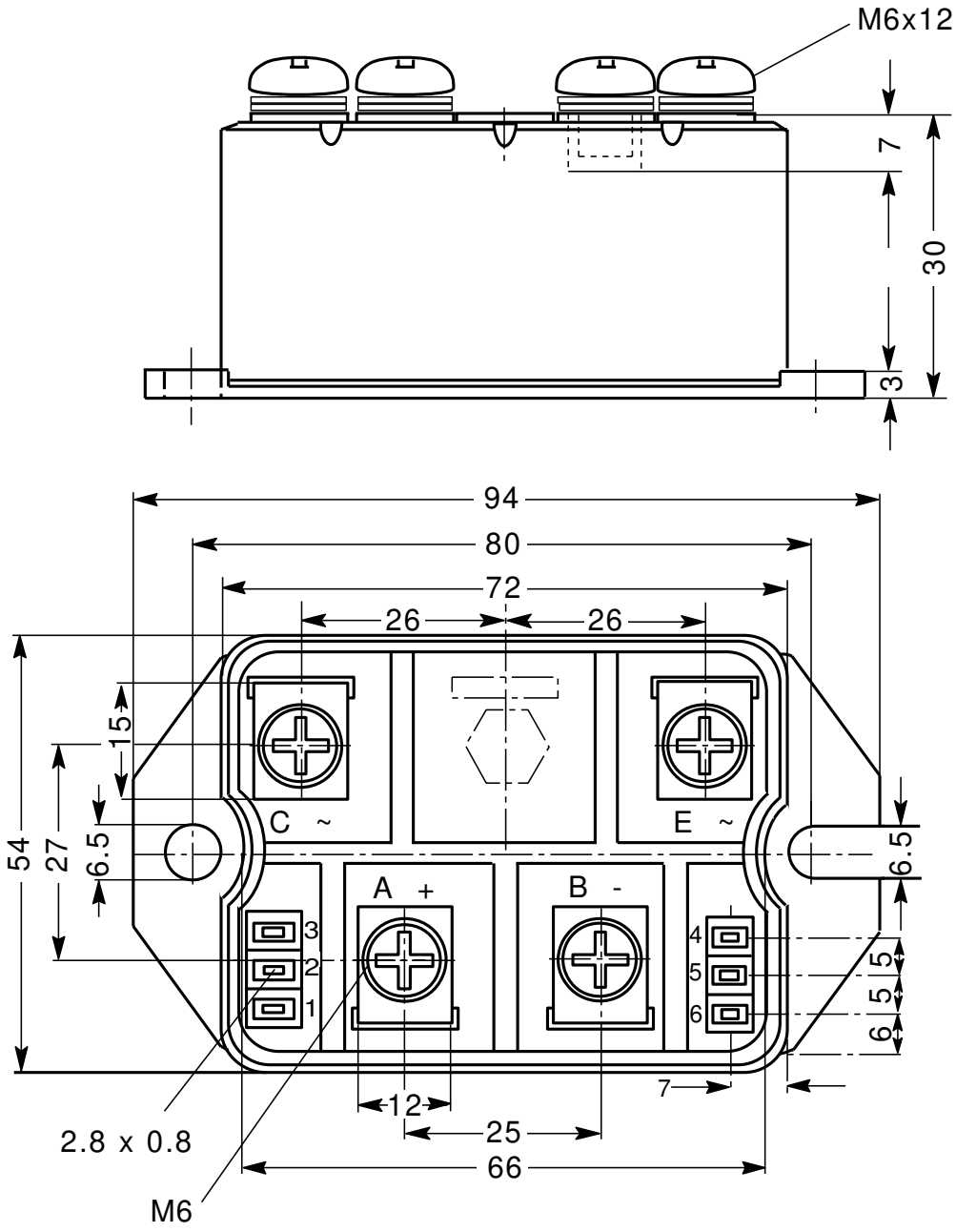
** on die level* $T_{VJ}$ = 150°C

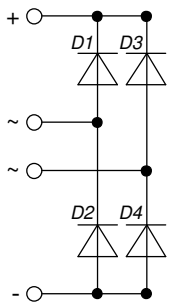



**Rectifier**

| | | | |
|---|---|---|---|
| $V_{0\,max}$ | *threshold voltage* | 0.77 | V |
| $R_{0\,max}$ | *slope resistance ** | 2.2 | mΩ |

## Outlines PWS-E



## Rectifier

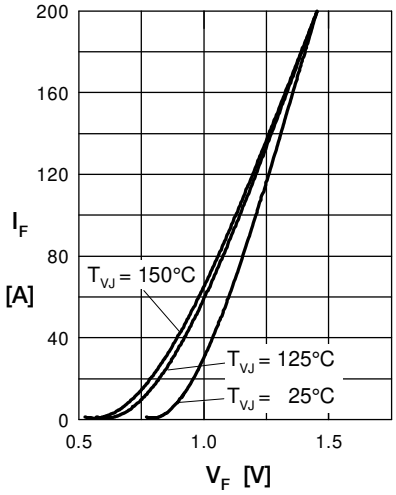



Fig. 1 Forward current vs. voltage drop per diode

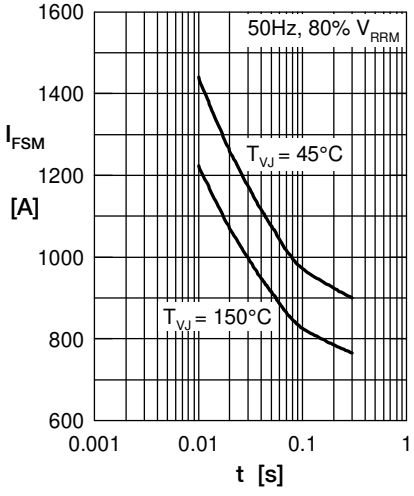



Fig. 2 Surge overload current vs. time per diode

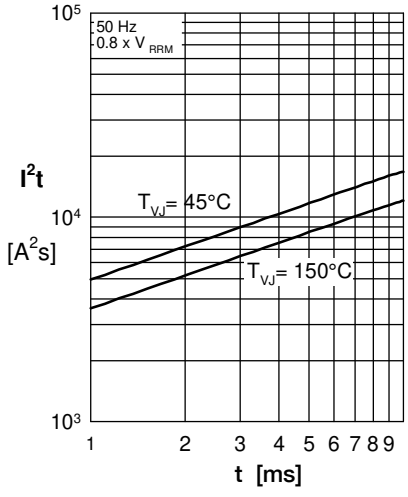



Fig. 3 $I^2t$ vs. time per diode

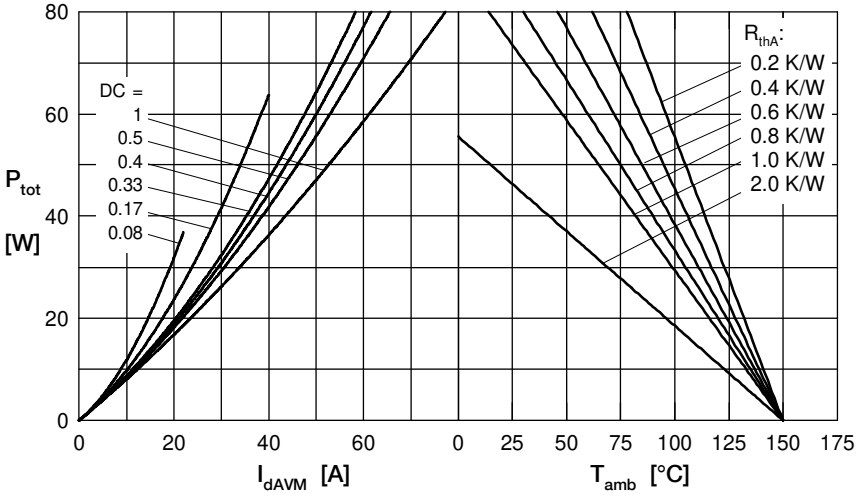



Fig. 4 Power dissipation vs. forward current and ambient temperature per diode

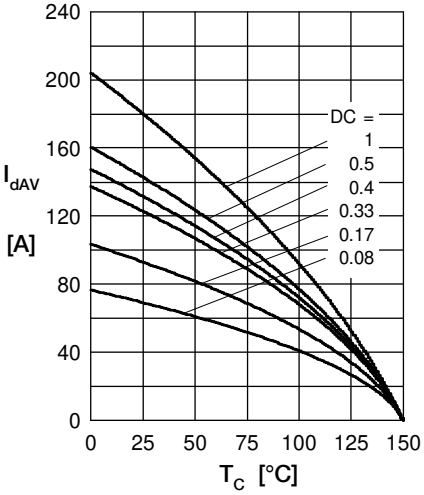
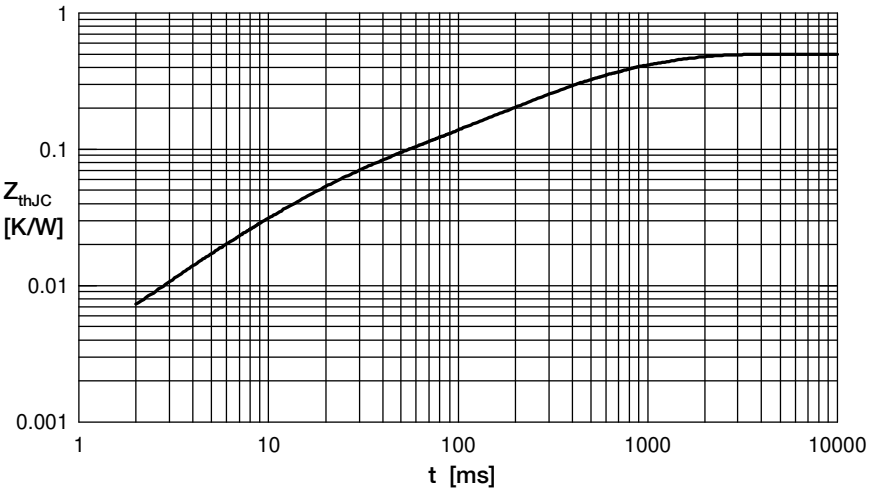



Fig. 5 Max. forward current vs. case temperature per diode




| $R_i$ | $t_i$ |
|---|---|
| 0.050 | 0.02 |
| 0.003 | 0.01 |
| 0.120 | 0.225 |
| 0.217 | 0.8 |
| 0.110 | 0.58 |

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