

Standard Rectifier Module

| 1~ Rectifier | |
|-----------------|---------|
| V_{RRM} | = 800 V |
| I_{DAV} | = 20 A |
| I_{FSM} | = 120 A |

1~ Rectifier Bridge

Part number

VBO21-08NO7



 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: ECO-PAC1

- Isolation Voltage: 3000 V~
- Industry standard outline
- RoHS compliant
- Soldering pins for PCB mounting
- Height: 9 mm
- Base plate: DCB ceramic
- Reduced weight
- Advanced power cycling

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| Rectifier | | | | Ratings | | | |
|------------|--|---|-----------|------------------------------|------|-----------------------------------|------------------|
| Symbol | Definition | Conditions | | min. | typ. | max. | Unit |
| V_{RSM} | max. non-repetitive reverse blocking voltage | | | | | 900 | V |
| V_{RRM} | max. repetitive reverse blocking voltage | | | | | 800 | V |
| I_R | reverse current | $V_R = 800\text{ V}$ | | $T_{VJ} = 25^\circ\text{C}$ | | 10 | μA |
| | | $V_R = 800\text{ V}$ | | $T_{VJ} = 150^\circ\text{C}$ | | 0.7 | mA |
| V_F | forward voltage drop | $I_F = 10\text{ A}$ | | $T_{VJ} = 25^\circ\text{C}$ | | 1.20 | V |
| | | $I_F = 20\text{ A}$ | | | | 1.41 | V |
| | | $I_F = 10\text{ A}$ | | $T_{VJ} = 125^\circ\text{C}$ | | 1.14 | V |
| | | $I_F = 20\text{ A}$ | | | | 1.42 | V |
| I_{DAV} | bridge output current | $T_C = 115^\circ\text{C}$ | | $T_{VJ} = 150^\circ\text{C}$ | | 20 | A |
| | | rectangular | $d = 0.5$ | | | | |
| V_{F0} | threshold voltage | | | $T_{VJ} = 150^\circ\text{C}$ | | 0.84 | V |
| r_F | slope resistance | | | | | 28.8 | m Ω |
| | | | | | | } for power loss calculation only | |
| R_{thJC} | thermal resistance junction to case | | | | | 2.5 | K/W |
| R_{thCH} | thermal resistance case to heatsink | | | | 0.4 | | K/W |
| P_{tot} | total power dissipation | | | $T_C = 25^\circ\text{C}$ | | 50 | W |
| I_{FSM} | max. forward surge current | $t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$ | | $T_{VJ} = 45^\circ\text{C}$ | | 120 | A |
| | | $t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$ | | $V_R = 0\text{ V}$ | | 130 | A |
| | | $t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$ | | $T_{VJ} = 150^\circ\text{C}$ | | 100 | A |
| | | $t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$ | | $V_R = 0\text{ V}$ | | 110 | A |
| I^2t | value for fusing | $t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$ | | $T_{VJ} = 45^\circ\text{C}$ | | 72 | A ² s |
| | | $t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$ | | $V_R = 0\text{ V}$ | | 70 | A ² s |
| | | $t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$ | | $T_{VJ} = 150^\circ\text{C}$ | | 50 | A ² s |
| | | $t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$ | | $V_R = 0\text{ V}$ | | 50 | A ² s |
| C_J | junction capacitance | $V_R = 400\text{ V}; f = 1\text{ MHz}$ | | $T_{VJ} = 25^\circ\text{C}$ | | 4 | pF |



| Package ECO-PAC1 | | Ratings | | | | |
|------------------|--|----------------------|------|------|------|------|
| Symbol | Definition | Conditions | min. | typ. | max. | Unit |
| I_{RMS} | RMS current | per terminal | | | 100 | A |
| T_{VJ} | virtual junction temperature | | -40 | | 150 | °C |
| T_{op} | operation temperature | | -40 | | 125 | °C |
| T_{stg} | storage temperature | | -40 | | 125 | °C |
| Weight | | | | 19 | | g |
| M_D | mounting torque | | 1.4 | | 2 | Nm |
| $d_{Spp/App}$ | creepage distance on surface / striking distance through air | terminal to terminal | 6.0 | | | mm |
| $d_{Spb/Apb}$ | | terminal to backside | 10.0 | | | mm |
| V_{ISOL} | isolation voltage | t = 1 second | 3000 | | | V |
| | | t = 1 minute | 2500 | | | V |



| Ordering | Ordering Number | Marking on Product | Delivery Mode | Quantity | Code No. |
|----------|-----------------|--------------------|---------------|----------|----------|
| Standard | VBO21-08NO7 | VBO21-08NO7 | Box | 25 | 491411 |

Equivalent Circuits for Simulation

* on die level

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

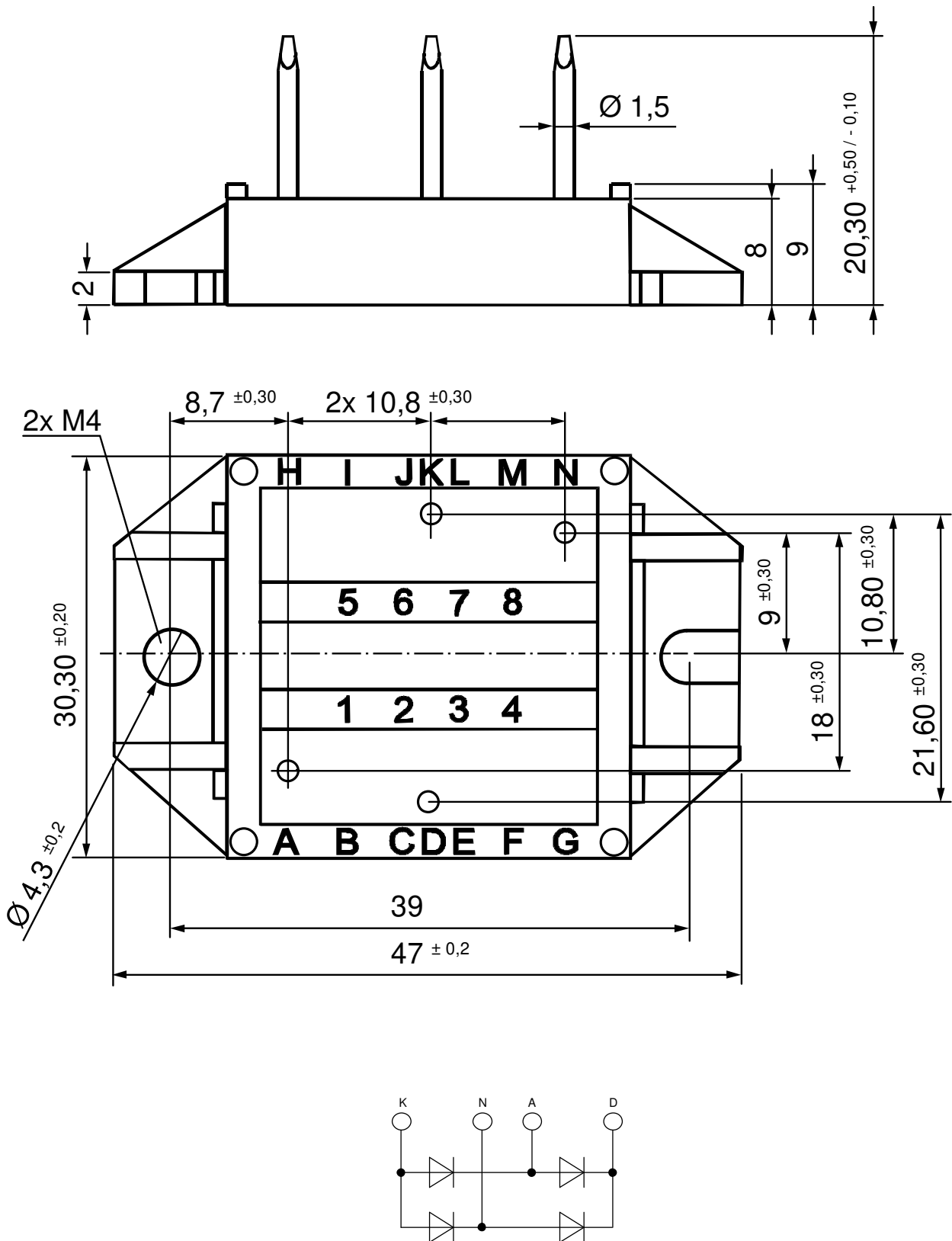


Rectifier

| | | | |
|--------------|--------------------|------|----|
| $V_{0\ max}$ | threshold voltage | 0.84 | V |
| $R_{0\ max}$ | slope resistance * | 27.6 | mΩ |



Outlines ECO-PAC1





Rectifier

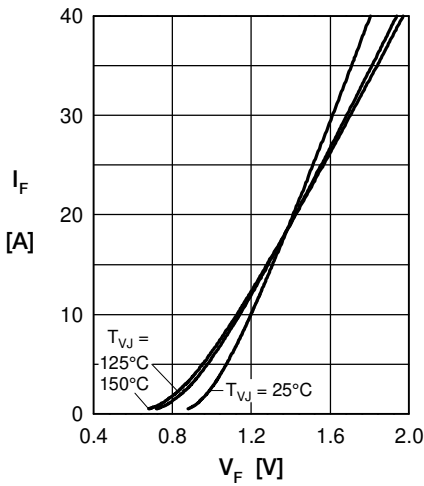


Fig. 1 Forward current vs. voltage drop per diode

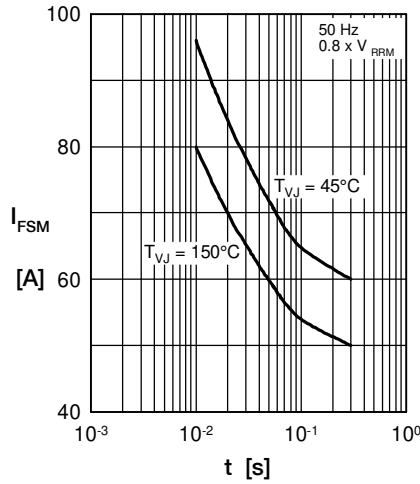


Fig. 2 Surge overload current vs. time per diode

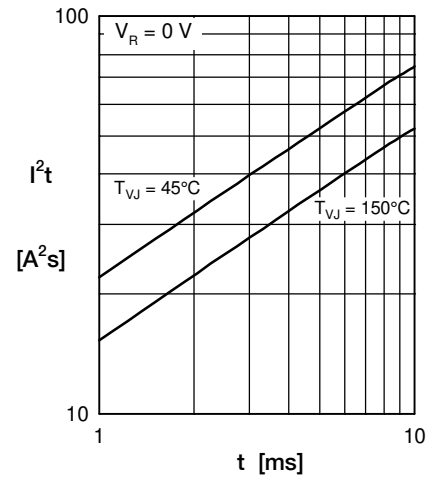


Fig. 3 I^2t vs. time per diode

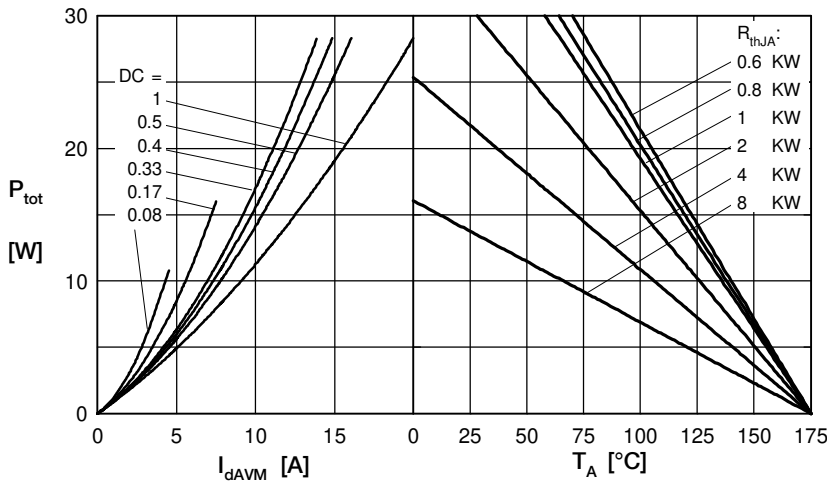


Fig. 4 Power dissipation vs. forward current and ambient temperature per diode

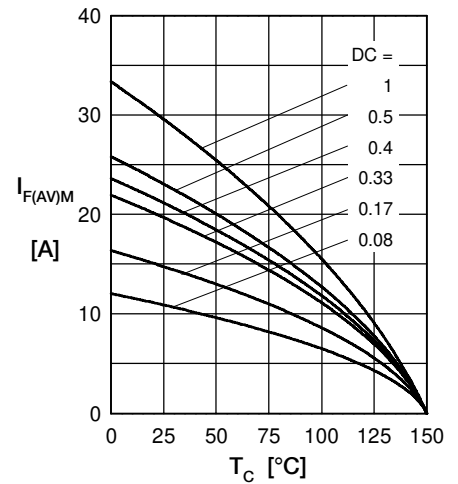


Fig. 5 Max. forward current vs. case temperature per diode

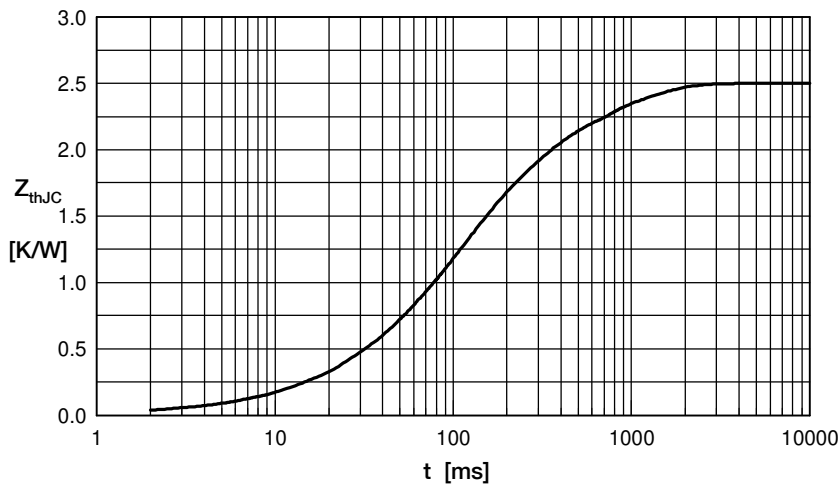


Fig. 6 Transient thermal impedance junction to case vs. time per diode

Constants for Z_{thJC} calculation:

| i | R_{th} (K/W) | t_i (s) |
|---|----------------|-----------|
| 1 | 1.359 | 0.1015 |
| 2 | 0.3286 | 0.1026 |
| 3 | 0.1651 | 0.4919 |
| 4 | 0.6473 | 0.62 |