

Standard Rectifier Module

| | |
|-------------------------|----------|
| 3~ Rectifier | |
| V_{RRM} | = 1400 V |
| I_{DAV} | = 90 A |
| I_{FSM} | = 750 A |

3~ Rectifier Bridge

Part number

VUO82-14NO7



 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

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| Rectifier | | | | Ratings | | | |
|------------|--|-----------------------------------|-------------------|------------------------------|------|------|-------------------|
| Symbol | Definition | Conditions | | min. | typ. | max. | Unit |
| V_{RSM} | max. non-repetitive reverse blocking voltage | | | | | 1500 | V |
| V_{RRM} | max. repetitive reverse blocking voltage | | | | | 1400 | V |
| I_R | reverse current | $V_R = 1400$ V | | $T_{VJ} = 25^\circ\text{C}$ | | 100 | μA |
| | | $V_R = 1400$ V | | $T_{VJ} = 150^\circ\text{C}$ | | 1.5 | mA |
| V_F | forward voltage drop | $I_F = 30$ A | | $T_{VJ} = 25^\circ\text{C}$ | | 1.08 | V |
| | | $I_F = 90$ A | | | | 1.35 | V |
| | | $I_F = 30$ A | | $T_{VJ} = 125^\circ\text{C}$ | | 0.99 | V |
| | | $I_F = 90$ A | | | | 1.33 | V |
| I_{DAV} | bridge output current | $T_C = 115^\circ\text{C}$ | rectangular | $T_{VJ} = 150^\circ\text{C}$ | | 90 | A |
| | | | $d = \frac{1}{3}$ | | | | |
| V_{FO} | threshold voltage | } for power loss calculation only | | | | 0.78 | V |
| r_F | slope resistance | | | | | 6 | m Ω |
| R_{thJC} | thermal resistance junction to case | | | | | 0.9 | K/W |
| R_{thCH} | thermal resistance case to heatsink | | | | | 0.4 | K/W |
| P_{tot} | total power dissipation | | | $T_C = 25^\circ\text{C}$ | | 135 | W |
| I_{FSM} | max. forward surge current | $t = 10$ ms; (50 Hz), sine | | $T_{VJ} = 45^\circ\text{C}$ | | 750 | A |
| | | $t = 8,3$ ms; (60 Hz), sine | | $V_R = 0$ V | | 810 | A |
| | | $t = 10$ ms; (50 Hz), sine | | $T_{VJ} = 150^\circ\text{C}$ | | 640 | A |
| | | $t = 8,3$ ms; (60 Hz), sine | | $V_R = 0$ V | | 690 | A |
| I^2t | value for fusing | $t = 10$ ms; (50 Hz), sine | | $T_{VJ} = 45^\circ\text{C}$ | | 2.82 | kA ² s |
| | | $t = 8,3$ ms; (60 Hz), sine | | $V_R = 0$ V | | 2.73 | kA ² s |
| | | $t = 10$ ms; (50 Hz), sine | | $T_{VJ} = 150^\circ\text{C}$ | | 2.05 | kA ² s |
| | | $t = 8,3$ ms; (60 Hz), sine | | $V_R = 0$ V | | 1.98 | kA ² s |
| C_J | junction capacitance | $V_R = 400$ V; $f = 1$ MHz | | $T_{VJ} = 25^\circ\text{C}$ | | 27 | pF |



| Package PWS-D | | 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 |
| Weight | | | | 159 | | 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 | 9.5 | | | mm |
| $d_{Spb/Apb}$ | | terminal to backside | 26.0 | | | 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 | VUO82-14NO7 | VUO82-14NO7 | Box | 10 | 461695 |

Equivalent Circuits for Simulation

** on die level*

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



Rectifier

| | | | |
|--------------|--------------------|------|----|
| $V_{0\ max}$ | threshold voltage | 0.78 | V |
| $R_{0\ max}$ | slope resistance * | 4.8 | mΩ |



Outlines PWS-D





Rectifier



Fig. 1 Forward current versus voltage drop per diode



Fig. 2 Surge overload current



Fig. 3 I^2t versus time per diode



Fig. 4 Power dissipation vs. direct output current & ambient temperature



Fig. 5 Max. forward current vs. case temperature



Fig. 6 Transient thermal impedance junction to case

Constants for Z_{thJC} calculation:

| i | R_{th} (K/W) | t_i (s) |
|---|----------------|-----------|
| 1 | 0.05 | 0.001 |
| 2 | 0.14 | 0.030 |
| 3 | 0.18 | 0.070 |
| 4 | 0.28 | 0.150 |
| 5 | 0.25 | 0.950 |