

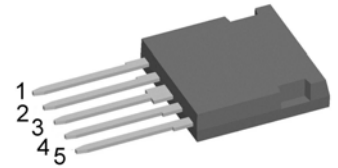
# Standard Rectifier

|                         |          |
|-------------------------|----------|
| <b>3~<br/>Rectifier</b> |          |
| $V_{RRM}$               | = 1200 V |
| $I_{DAV}$               | = 30 A   |
| $I_{FSM}$               | = 150 A  |

## 3~ Rectifier Bridge

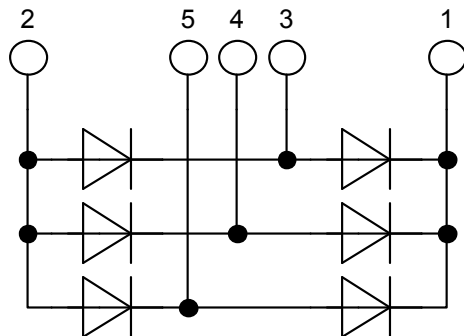
Part number

**FUO22-12N**



Backside: isolated

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:

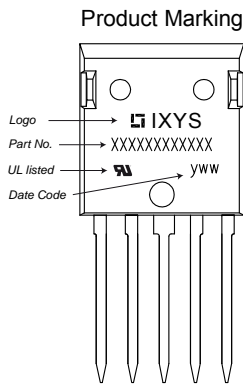
- Diode for main rectification
- For single and three phase bridge configurations

### Package: i4-Pac

- Isolation Voltage: 3000V~
- Industry convenient outline
- RoHS compliant
- Epoxy meets UL 94V-0
- Soldering pins for PCB mounting
- Backside: DCB ceramic
- Reduced weight
- Advanced power cycling

| Rectifier  |  |  |                              | Ratings                  |      |      |                  |
|------------|--|--|------------------------------|--------------------------|------|------|------------------|
| Symbol     | Definition                                   | Conditions                               |                              | min.                     | typ. | max. | Unit             |
| $V_{RSM}$  | max. non-repetitive reverse blocking voltage |  |                              |                          |      | 1300 | V                |
| $V_{RRM}$  | max. repetitive reverse blocking voltage     |  |                              |                          |      | 1200 | V                |
| $I_R$      | reverse current, drain current               | $V_R = 1200$ V                           | $T_{VJ} = 25^\circ\text{C}$  |                          |      | 10   | $\mu\text{A}$    |
|            |  | $V_R = 1200$ V                           | $T_{VJ} = 150^\circ\text{C}$ |                          |      | 1    | mA               |
| $V_F$      | forward voltage drop                         | $I_F = 10$ A                             | $T_{VJ} = 25^\circ\text{C}$  |                          |      | 1.20 | V                |
|            |  |  |                              |                          |      | 1.62 | V                |
|            |  | $I_F = 30$ A                             | $T_{VJ} = 150^\circ\text{C}$ |                          |      | 1.12 | V                |
|            |  |  |                              |                          |      | 1.73 | V                |
| $I_{DAV}$  | bridge output current                        | $T_C = 120^\circ\text{C}$<br>rectangular | $T_{VJ} = 175^\circ\text{C}$ |                          |      | 30   | A                |
|            |  |  |                              |                          |      |      |                  |
| $V_{FO}$   | threshold voltage                            |  |                              |                          |      | 0.81 | V                |
| $r_F$      | slope resistance                             |  |                              |                          |      | 31   | m $\Omega$       |
|            |  | } for power loss calculation only        |                              |                          |      |      |                  |
| $R_{thJC}$ | thermal resistance junction to case          |  |                              |                          |      | 3    | K/W              |
| $R_{thCH}$ | thermal resistance case to heatsink          |  |                              |                          | 0.20 |      | K/W              |
| $P_{tot}$  | total power dissipation                      |  |                              | $T_C = 25^\circ\text{C}$ |      | 50   | W                |
| $I_{FSM}$  | max. forward surge current                   | $t = 10$ ms; (50 Hz), sine               | $T_{VJ} = 45^\circ\text{C}$  |                          |      | 150  | A                |
|            |  | $t = 8,3$ ms; (60 Hz), sine              | $V_R = 0$ V                  |                          |      | 160  | A                |
|            |  | $t = 10$ ms; (50 Hz), sine               | $T_{VJ} = 150^\circ\text{C}$ |                          |      | 130  | A                |
|            |  | $t = 8,3$ ms; (60 Hz), sine              | $V_R = 0$ V                  |                          |      | 140  | A                |
| $I^2t$     | value for fusing                             | $t = 10$ ms; (50 Hz), sine               | $T_{VJ} = 45^\circ\text{C}$  |                          |      | 115  | A <sup>2</sup> s |
|            |  | $t = 8,3$ ms; (60 Hz), sine              | $V_R = 0$ V                  |                          |      | 105  | A <sup>2</sup> s |
|            |  | $t = 10$ ms; (50 Hz), sine               | $T_{VJ} = 150^\circ\text{C}$ |                          |      | 85   | A <sup>2</sup> s |
|            |  | $t = 8,3$ ms; (60 Hz), sine              | $V_R = 0$ V                  |                          |      | 82   | A <sup>2</sup> s |
| $C_J$      | junction capacitance                         | $V_R = 400$ V; $f = 1$ MHz               | $T_{VJ} = 25^\circ\text{C}$  |                          | 4    |      | pF               |

| Package i4-Pac |  | Ratings              |      |      |      |      |
|----------------|--|----------------------|------|------|------|------|
| Symbol         | Definition   | Conditions           | min. | typ. | max. | Unit |
| $I_{RMS}$      | RMS current  | per terminal         |      |      | 35   | A    |
| $T_{stg}$      | storage temperature  |                      | -55  |      | 150  | °C   |
| $T_{VJ}$       | virtual junction temperature                                 |                      | -55  |      | 175  | °C   |
| <b>Weight</b>  |  |                      |      | 9    |      | g    |
| $F_C$          | mounting force with clip                                     |                      | 20   |      | 120  | N    |
| $d_{Spp/App}$  | creepage distance on surface   striking distance through air | terminal to terminal | 1.7  |      |      | mm   |
| $d_{Spb/Apb}$  |  | terminal to backside | 5.1  |      |      | mm   |
| $V_{ISOL}$     | isolation voltage  | t = 1 second         | 3000 |      |      | V    |
|                |  | t = 1 minute         | 2500 |      |      | V    |



| Ordering | Part Number | Marking on Product | Delivery Mode | Quantity | Code No. |
|----------|-------------|--------------------|---------------|----------|----------|
| Standard | FUO22-12N   | FUO22-12N          | Tube          | 25       | 492426   |

### Equivalent Circuits for Simulation

\* on die level

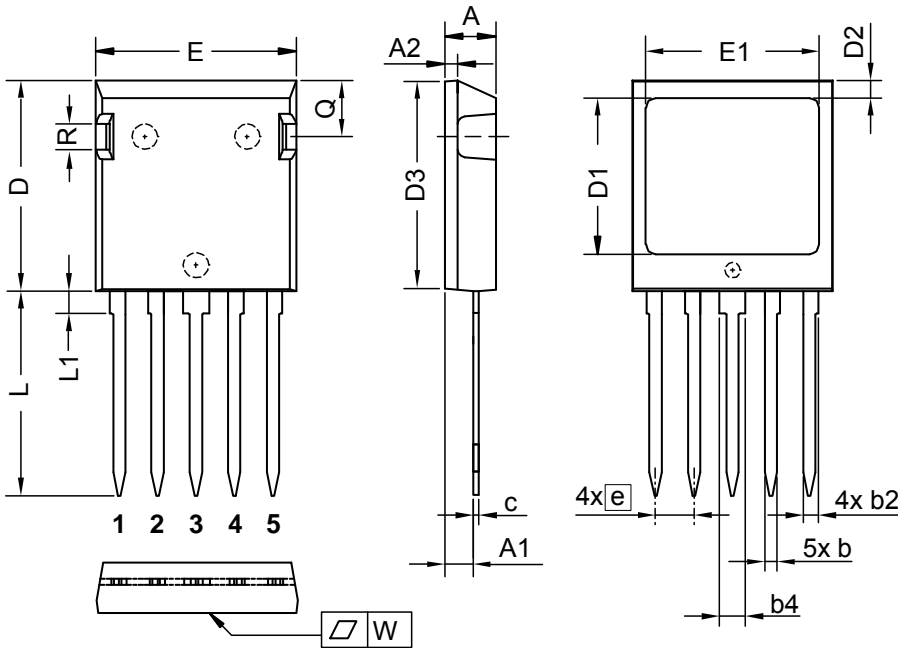
$T_{VJ} = 175^{\circ}C$



Rectifier

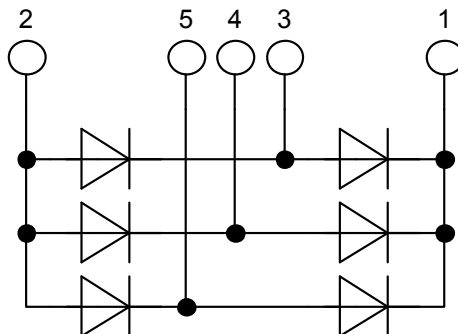
|              |                    |      |    |
|--------------|--------------------|------|----|
| $V_{0\ max}$ | threshold voltage  | 0.81 | V  |
| $R_{0\ max}$ | slope resistance * | 28   | mΩ |

## Outlines i4-Pac



| Dim. | Millimeter |       | Inches    |       |
|------|------------|-------|-----------|-------|
|      | min        | max   | min       | max   |
| A    | 4.83       | 5.21  | 0.190     | 0.205 |
| A1   | 2.59       | 3.00  | 0.102     | 0.118 |
| A2   | 1.17       | 2.16  | 0.046     | 0.085 |
| b    | 1.14       | 1.40  | 0.045     | 0.055 |
| b2   | 1.47       | 1.73  | 0.058     | 0.068 |
| b4   | 2.54       | 2.79  | 0.100     | 0.110 |
| c    | 0.51       | 0.74  | 0.020     | 0.029 |
| D    | 20.80      | 21.34 | 0.819     | 0.840 |
| D1   | 14.99      | 15.75 | 0.590     | 0.620 |
| D2   | 1.65       | 2.03  | 0.065     | 0.080 |
| D3   | 20.30      | 20.70 | 0.799     | 0.815 |
| E    | 19.56      | 20.29 | 0.770     | 0.799 |
| E1   | 16.76      | 17.53 | 0.660     | 0.690 |
| e    | 3.81 BSC   |       | 0.150 BSC |       |
| L    | 19.81      | 21.34 | 0.780     | 0.840 |
| L1   | 2.11       | 2.59  | 0.083     | 0.102 |
| Q    | 5.33       | 6.20  | 0.210     | 0.244 |
| R    | 2.54       | 4.57  | 0.100     | 0.180 |
| W    | -          | 0.10  | -         | 0.004 |

Die konvexe Form des Substrates ist typ. < 0.05 mm über der Kunststoffoberfläche der Bauteilunterseite  
 The convexbow of substrate is typ. < 0.05 mm over plastic surface level of device bottom side



**Rectifier**

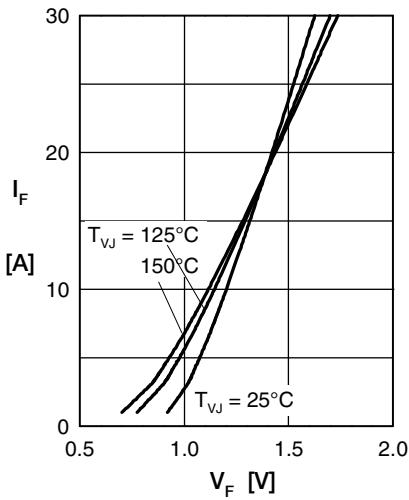


Fig. 1 Forward current versus voltage drop per diode

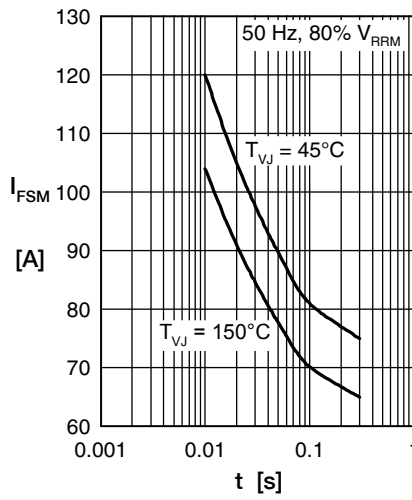


Fig. 2 Surge overload current

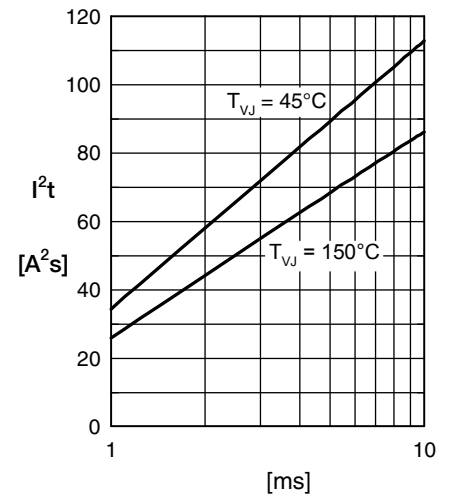


Fig. 3  $I^2t$  versus time per diode

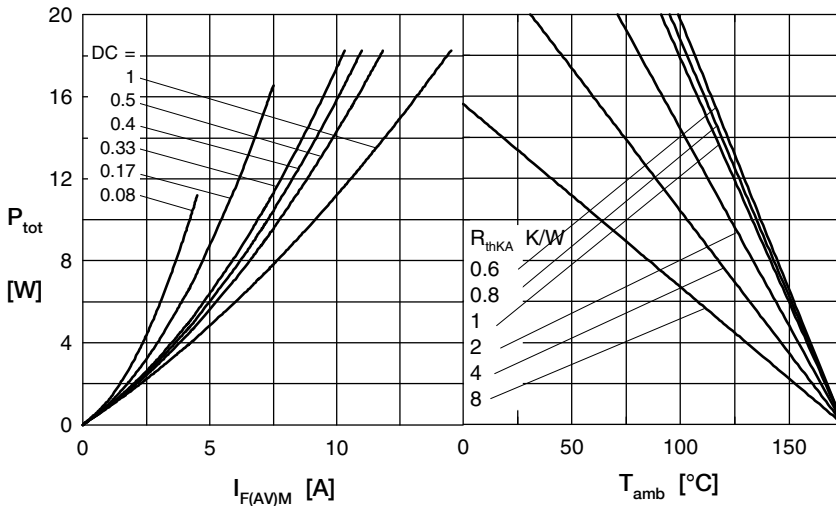


Fig. 4 Power dissipation vs. direct output current & ambient temperature

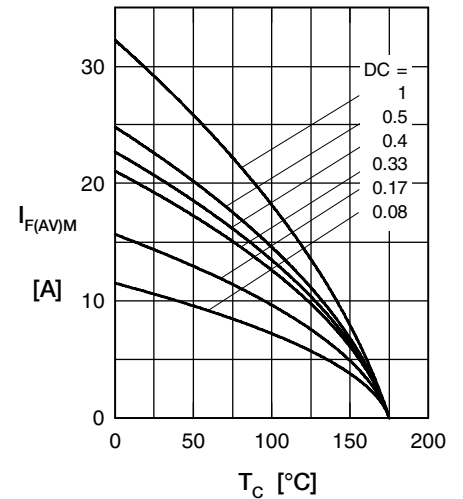


Fig. 5 Max. forward current vs. case temperature

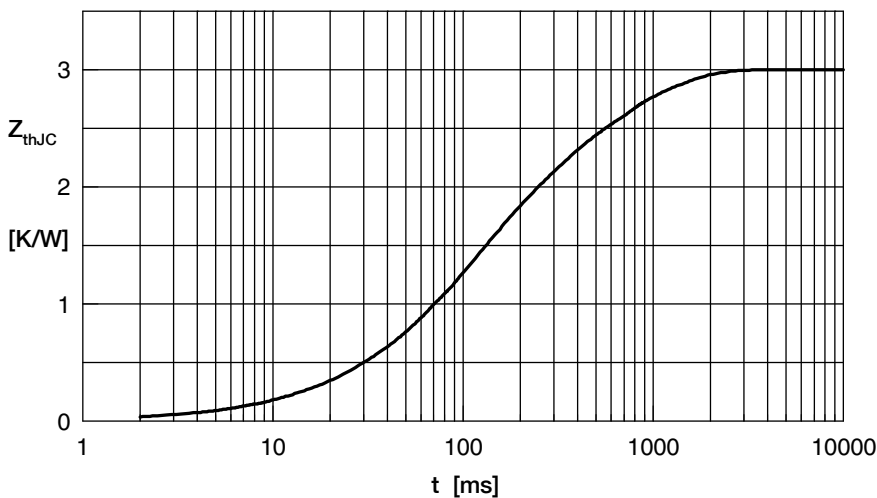


Fig. 6 Transient thermal impedance junction to case

Constants for  $Z_{thJC}$  calculation:

| i | $R_{thi}$ (K/W) | $t_i$ (s) |
|---|-----------------|-----------|
| 1 | 1.359           | 0.1015    |
| 2 | 0.3286          | 0.1026    |
| 3 | 0.4651          | 0.4919    |
| 4 | 0.8473          | 0.62      |