



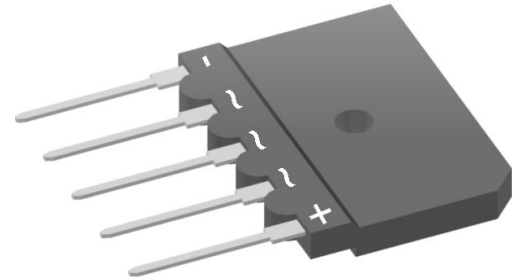
High Voltage Standard Rectifier

| | |
|-------------------------|----------|
| 3~ Rectifier | |
| V_{RRM} | = 2200 V |
| I_{DAV} | = 40 A |
| I_{FSM} | = 370 A |

3~ Rectifier Bridge

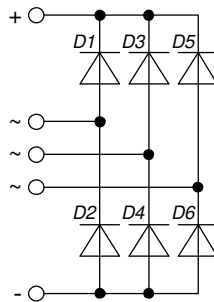
Part number

DNA40U2200GU



Backside: isolated

E72873



Features / Advantages:

- Low forward voltage drop
- Planar passivated chips
- Easy to mount with one screw
- Space and weight savings

Applications:

- Supplies for DC power equipment
- Input rectifiers for PWM inverter
- Battery DC power supplies
- Field supply for DC motors

Package: GUPF

- Isolation Voltage: 2500 V~
- Industry standard outline
- RoHS compliant
- Epoxy meets UL 94V-0
- Soldering pins for PCB mounting
- Base plate: Plastic overmolded tab
- Reduced weight

Disclaimer Notice

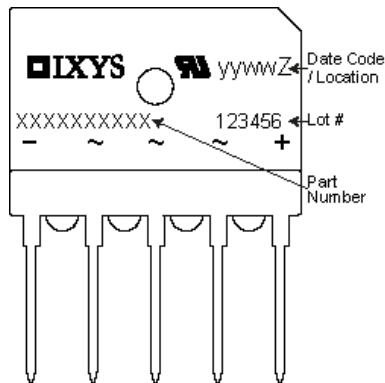
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| Rectifier | | | | Ratings | | | |
|------------|--|-----------------------------------|-------------------|------------------------------|------|------|------------------|
| Symbol | Definition | Conditions | | min. | typ. | max. | Unit |
| V_{RSM} | max. non-repetitive reverse blocking voltage | | | | | 2300 | V |
| V_{RRM} | max. repetitive reverse blocking voltage | | | | | 2200 | V |
| I_R | reverse current | $V_R = 2200$ V | | $T_{VJ} = 25^\circ\text{C}$ | | 40 | μA |
| | | $V_R = 2200$ V | | $T_{VJ} = 150^\circ\text{C}$ | | 1.5 | mA |
| V_F | forward voltage drop | $I_F = 10$ A | | $T_{VJ} = 25^\circ\text{C}$ | | 1.06 | V |
| | | $I_F = 30$ A | | | | 1.28 | V |
| | | $I_F = 10$ A | | $T_{VJ} = 150^\circ\text{C}$ | | 0.92 | V |
| | | $I_F = 30$ A | | | | 1.23 | V |
| I_{DAV} | bridge output current | $T_C = 90^\circ\text{C}$ | | $T_{VJ} = 175^\circ\text{C}$ | | 40 | A |
| | | rectangular | $d = \frac{1}{3}$ | | | | |
| V_{F0} | threshold voltage | | | $T_{VJ} = 175^\circ\text{C}$ | | 0.74 | V |
| r_F | slope resistance | } for power loss calculation only | | | | 16.3 | m Ω |
| R_{thJC} | thermal resistance junction to case | | | | | 4.3 | K/W |
| R_{thCH} | thermal resistance case to heatsink | | | | 0.5 | | K/W |
| P_{tot} | total power dissipation | | | $T_C = 25^\circ\text{C}$ | | 35 | W |
| I_{FSM} | max. forward surge current | $t = 10$ ms; (50 Hz), sine | | $T_{VJ} = 45^\circ\text{C}$ | | 370 | A |
| | | $t = 8,3$ ms; (60 Hz), sine | | $V_R = 0$ V | | 400 | A |
| | | $t = 10$ ms; (50 Hz), sine | | $T_{VJ} = 150^\circ\text{C}$ | | 315 | A |
| | | $t = 8,3$ ms; (60 Hz), sine | | $V_R = 0$ V | | 340 | A |
| I^2t | value for fusing | $t = 10$ ms; (50 Hz), sine | | $T_{VJ} = 45^\circ\text{C}$ | | 685 | A ² s |
| | | $t = 8,3$ ms; (60 Hz), sine | | $V_R = 0$ V | | 665 | A ² s |
| | | $t = 10$ ms; (50 Hz), sine | | $T_{VJ} = 150^\circ\text{C}$ | | 495 | A ² s |
| | | $t = 8,3$ ms; (60 Hz), sine | | $V_R = 0$ V | | 480 | A ² s |
| C_J | junction capacitance | $V_R = 700$ V; $f = 1$ MHz | | $T_{VJ} = 25^\circ\text{C}$ | | 7 | pF |



| Package GUPF | | Ratings | | | | |
|---------------|--|----------------------|-------------------------------------|------|------|------|
| Symbol | Definition | Conditions | min. | typ. | max. | Unit |
| I_{RMS} | RMS current | per terminal | | | 70 | A |
| T_{VJ} | virtual junction temperature | | -40 | | 175 | °C |
| T_{op} | operation temperature | | -40 | | 150 | °C |
| T_{stg} | storage temperature | | -40 | | 150 | °C |
| Weight | | | | 8.5 | | g |
| M_D | mounting torque | | 0.8 | | 1.2 | Nm |
| F_C | mounting force with clip | | 20 | | 120 | N |
| $d_{Spp/App}$ | creepage distance on surface striking distance through air | terminal to terminal | 6.7 | 5.4 | | mm |
| $d_{Spb/Apb}$ | | terminal to backside | 10.0 | 8.0 | | mm |
| V_{ISOL} | isolation voltage | t = 1 second | | 2500 | | V |
| | | t = 1 minute | 50/60 Hz, RMS; $I_{ISOL} \leq 1$ mA | 2100 | | V |



Part description

- D = Diode
- N = High Voltage Standard Rectifier
- A = (>= 2000V)
- 40 = Current Rating [A]
- U = 3- Rectifier Bridge
- 2200 = Reverse Voltage [V]
- GU = GUPF

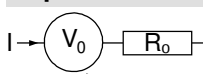
| Ordering | Ordering Number | Marking on Product | Delivery Mode | Quantity | Code No. |
|----------|-----------------|--------------------|---------------|----------|----------|
| Standard | DNA40U2200GU | DNA40U2200GU | Tube | 14 | 514970 |

| Similar Part | Package | Voltage class |
|--------------|---------|---------------|
| DMA40U1800GU | GUPF | 1800 |
| GUO40-16NO1 | GUPF | 1600 |
| GUO40-12NO1 | GUPF | 1200 |
| GUO40-08NO1 | GUPF | 800 |

Equivalent Circuits for Simulation

* on die level

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



Rectifier

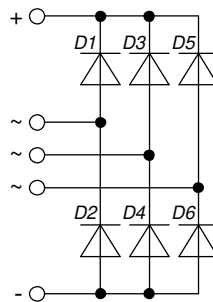
| | | | |
|--------------|--------------------|------|----|
| $V_{0\ max}$ | threshold voltage | 0.74 | V |
| $R_{0\ max}$ | slope resistance * | 13.7 | mΩ |



Outlines GUPF



| Dim. | Millimeter | | | Inches | | |
|-------------------|------------|-------|-------|-----------|-------|-------|
| | min | typ. | max | min | typ. | max |
| A | 5.40 | 5.50 | 5.60 | 0.213 | 0.217 | 0.221 |
| A2 | 3.90 | 4.00 | 4.10 | 0.154 | 0.158 | 0.162 |
| A3 | 0.95 | 1.00 | 1.10 | 0.037 | 0.039 | 0.043 |
| A4 | 0.95 | 1.00 | 1.05 | 0.037 | 0.039 | 0.041 |
| A5 | 1.60 | 1.70 | 1.80 | 0.063 | 0.067 | 0.071 |
| A6 | 1.25 | 1.30 | 1.35 | 0.049 | 0.051 | 0.053 |
| b | 0.95 | 1.00 | 1.05 | 0.037 | 0.039 | 0.041 |
| b2 | 1.95 | 2.00 | 2.05 | 0.077 | 0.079 | 0.081 |
| C | 0.45 | 0.50 | 0.55 | 0.018 | 0.020 | 0.022 |
| D | 24.80 | 25.00 | 25.20 | 0.977 | 0.985 | 0.993 |
| E | 34.70 | 35.00 | 35.30 | 1.367 | 1.379 | 1.391 |
| e | BSC 7.50 | | | BSC 0.296 | | |
| F | 2.40 | 2.50 | 2.60 | 0.095 | 0.099 | 0.102 |
| L | 20.30 | 20.40 | 20.50 | 0.800 | 0.804 | 0.808 |
| L1 | 3.70 | 3.75 | 3.80 | 0.146 | 0.148 | 0.150 |
| O | 17.40 | 17.50 | 17.60 | 0.686 | 0.690 | 0.693 |
| $\varnothing P$ | 4.10 | 4.20 | 4.30 | 0.162 | 0.165 | 0.169 |
| Q | 9.20 | 9.30 | 9.40 | 0.362 | 0.366 | 0.370 |
| $\varnothing/2 R$ | | 1.77 | | | 0.070 | |
| s1 | 3.45 | 3.50 | 3.55 | 0.136 | 0.138 | 0.140 |
| s2 | 1.45 | 1.50 | 1.55 | 0.057 | 0.059 | 0.061 |
| t1 | 0.95 | 1.00 | 1.05 | 0.037 | 0.039 | 0.041 |
| t2 | 0.95 | 1.00 | 1.05 | 0.037 | 0.039 | 0.041 |
| x1 | 3.20 | 3.30 | 3.40 | 0.126 | 0.130 | 0.134 |
| x2 | 1.90 | 2.00 | 2.10 | 0.075 | 0.079 | 0.083 |
| y1 | 1.60 | 1.65 | 1.70 | 0.063 | 0.065 | 0.067 |
| y2 | 4.65 | 4.70 | 4.75 | 0.183 | 0.185 | 0.187 |
| z1 | 2.80 | 2.90 | 3.00 | 0.110 | 0.114 | 0.118 |



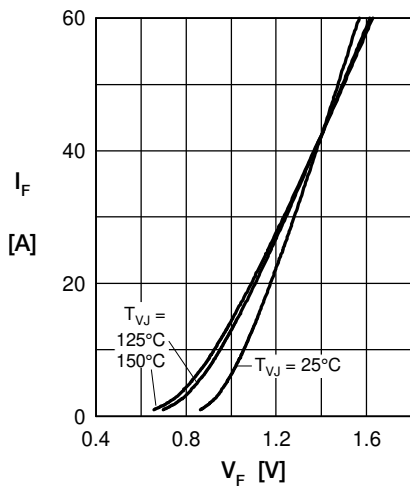
Rectifier


Fig. 1 Forward current vs. voltage drop per diode

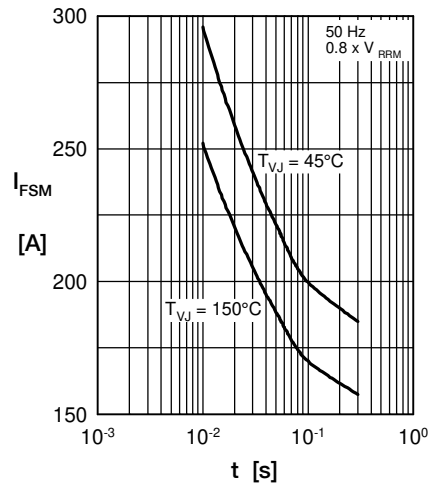


Fig. 2 Surge overload current vs. time per diode

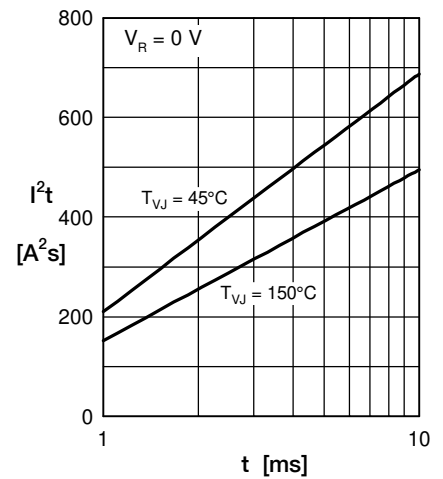
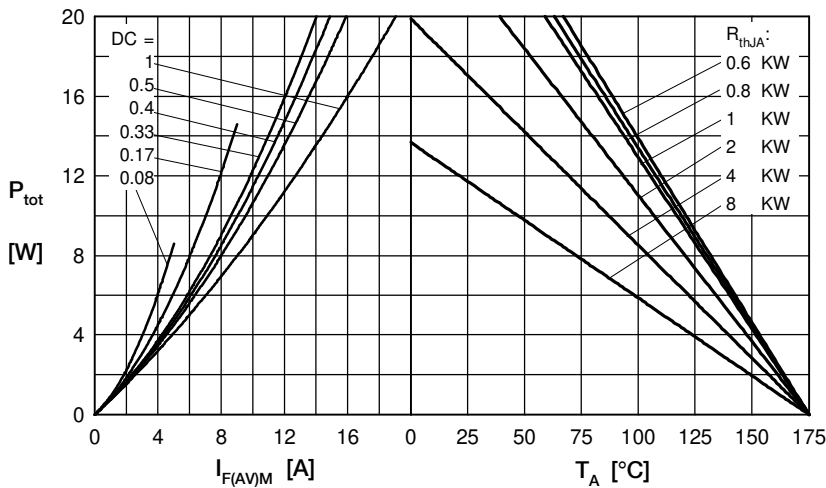

 Fig. 3 I^2t vs. time per diode


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

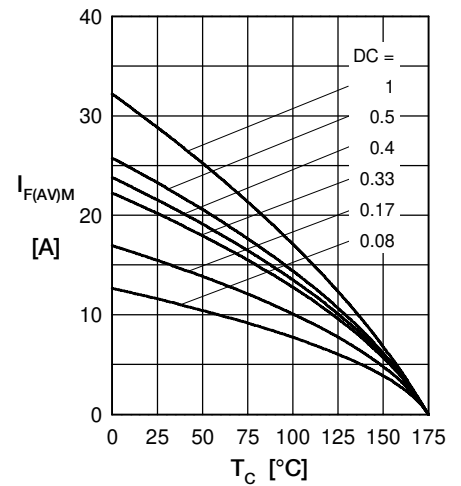


Fig. 5 Max. forward current vs. case temperature per diode

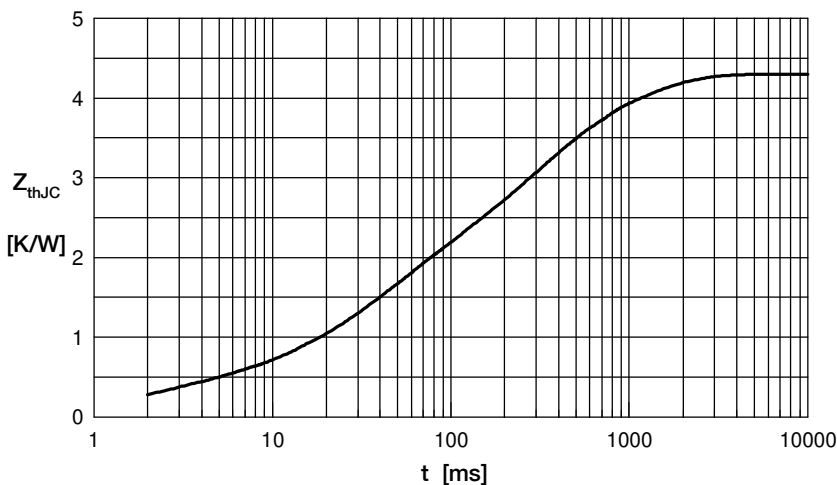


Fig. 6 Transient thermal impedance junction to case vs. time per diode

 Constants for Z_{thJC} calculation:

| i | R_{th} (K/W) | t_i (s) |
|---|----------------|-----------|
| 1 | 0.302 | 0.002 |
| 2 | 1.252 | 0.032 |
| 3 | 1.582 | 0.227 |
| 4 | 1.164 | 0.820 |