

**GBL406 THRU GBL410**

General Bridge Rectifiers



**Voltage:** 600~1000 Volts

**Current:** 4.0 Amperes

**Package:** GBL

**Features**

- NH'S Standard Rectifier Chip Technology
- Low Forward Voltage Drop For High Efficiency
- Low Leakage Current For High Reliability
- High Surge Capability For High Reliability

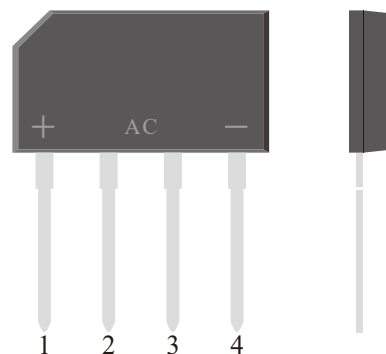
**Mechanical Data**

- **Case:** Molded With UL-94 ClassV-0 Recognized, RoHS-Compliant
- **Polarity:** Look At The Diagram And Polarity On The Right
- **Terminals:** Tin Plated Leads,Solderable Per J-STD-002 And JESD22-B102

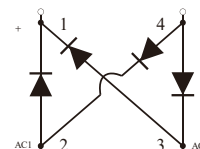
**Typical Applications**

- Switch Mode Power Supplies (SMPS)
- Fast Chargers
- LED Driver And Monitor Lighting
- Automotive Electronics And Charging Posts

**Diagram:**



**Polarity:**



Single Phase,Half Wave,60Hz,Resistive Or Inductive Load.For Capacitive Load,Derate Current By 20%

**Maximum Ratings (Ta=25°C Unless Otherwise Specified)**

| Parameter                                 | Test Conditions                                       | Symbol      | GBL 406 | GBL 408 | GBL 410 | Unit               |
|-------------------------------------------|-------------------------------------------------------|-------------|---------|---------|---------|--------------------|
| Maximum Repetitive Peak Reverse Voltage   |                                                       | $V_{RRM}$   | 600     | 800     | 1000    | V                  |
| Maximum RMS Voltag                        |                                                       | $V_{RMS}$   | 420     | 560     | 700     | V                  |
| Maximum DC Blocking Voltage               |                                                       | $V_{DC}$    | 600     | 800     | 1000    | V                  |
| Maximum Average Forward Rectified Current |                                                       | $I_{F(AV)}$ | 4.0     |         |         | A                  |
| Peak Forward Surge Current Per Diode      | 8.3ms Single Half Sine-wave Superimposed On Rate Load | $I_{FSM}$   | 135     |         |         | A                  |
| Current Squared Time Per Diode            | $t < 8.3ms$                                           | $I^2t$      | 75.6    |         |         | A <sup>2</sup> sec |

**Electrical Characteristics (Ta=25°C Unless Otherwise Specified )**

| Parameter                                               | Test Conditions                                                | Symbol    | GBL 406  | GBL 408 | GBL 410 | Unit |
|---------------------------------------------------------|----------------------------------------------------------------|-----------|----------|---------|---------|------|
| Instanteous Forward Voltage Per Diode                   | $I_F = 4.0 A$                                                  | $V_F$     | 1.05     |         |         | V    |
| Maximum DC Reverse Current at Rated DC Blocking Voltage | Ta=25°C , $V_R = V_{RRM}$<br>Ta=125°C , $V_R = V_{RRM} * 80\%$ | $I_{RRM}$ | 5<br>500 |         |         | uA   |
| Typical Junction Capacitance Per Diode                  | 4 V,1MHz                                                       | $C_J$     | 40       |         |         | pF   |

**Thermal Characteristics (Ta=25°C Unless Otherwise Specified )**

| Parameter                                                | Test Conditions                                     | Symbol           | GBL 406 | GBL 408 | GBL 410 | Unit |
|----------------------------------------------------------|-----------------------------------------------------|------------------|---------|---------|---------|------|
| Operating Junction Temperature Range                     |                                                     | T <sub>J</sub>   | -55~150 |         |         | ℃    |
| Storage Temperature Range                                |                                                     | T <sub>STD</sub> | -55~150 |         |         |      |
| Thermal Resistance Junction To Ambient With Steady-State | Still Air Environment<br>With Ta=25℃                | R <sub>θJA</sub> | 45.0    |         |         | ℃/W  |
| Thermal Resistance Junction-Case With Steady-State       | Device Mounted On<br>75mm x 45mm x 2.5mm Alu. Heat. | R <sub>θJC</sub> | 4.2     |         |         |      |

Notes: 1.Pulse Test: 300 Us Pulse Width,1% Duty Cycle

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Typical Characteristics Curves

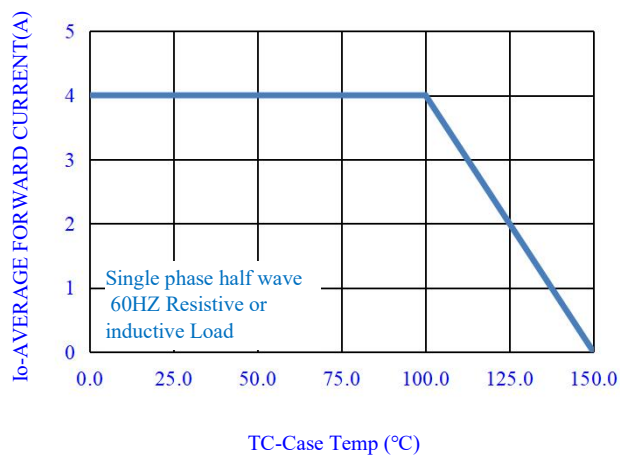


Fig.1-FORWARD CURRENT DERATING CURVE

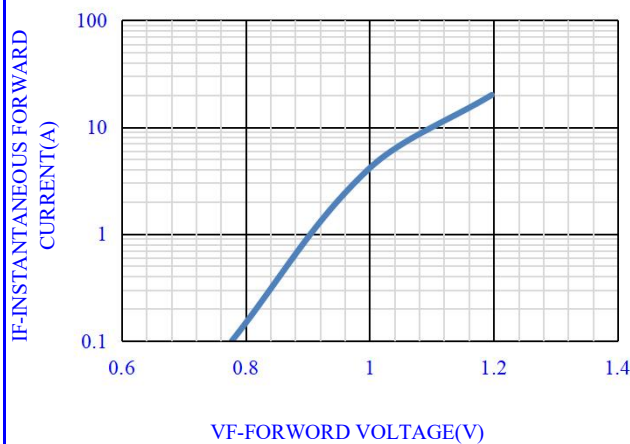


Fig.2- TYPICAL INSTANTANEOUS FORWARD

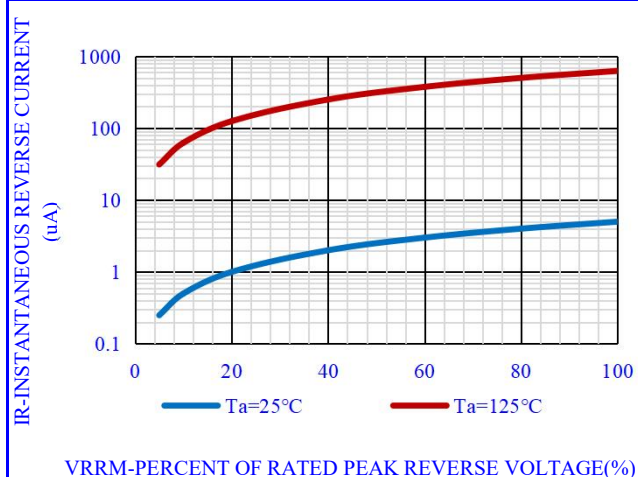


Fig.3- TYPICAL REVERSE CHARACTERISTICS

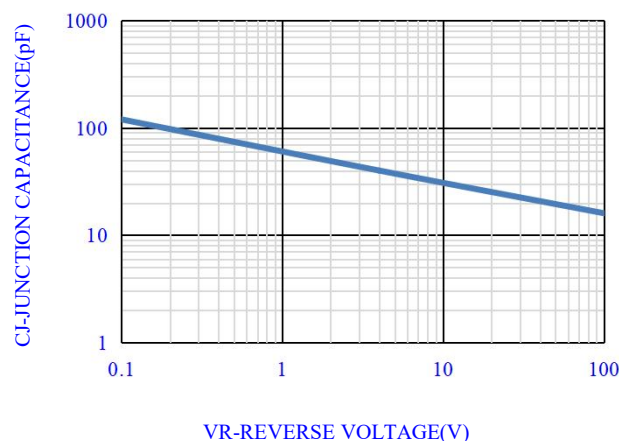


Fig.4- TYPICAL JUNCTION CAPACITANCE

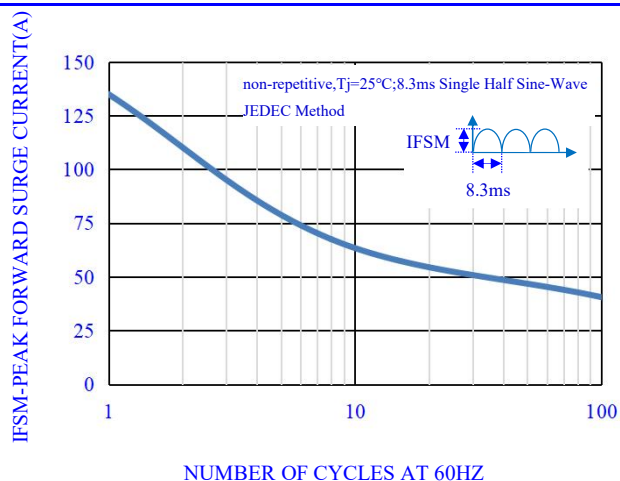


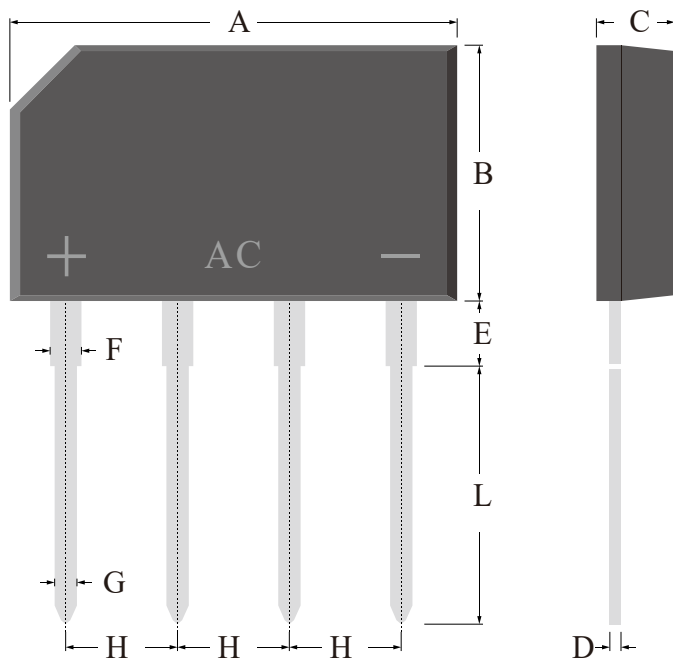
Fig.5-MAX. NON-REPETITIVE SURGE CURRENT

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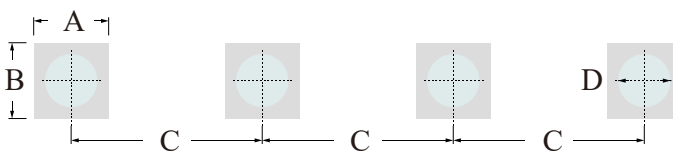
OUTLINE DRAWINGS



GBL

| OUTLINE DIMENSIONS |            |      |       |        |      |        |
|--------------------|------------|------|-------|--------|------|--------|
| Dim.               | Milimeters |      |       | Inches |      |        |
|                    | Min.       | Typ. | Max.  | Min.   | Typ. | Max.   |
| A                  | 19.00      | -    | 21.00 | 0.7480 | -    | 0.8268 |
| B                  | 10.50      | -    | 11.50 | 0.4134 | -    | 0.4528 |
| C                  | 3.25       | -    | 3.75  | 0.1280 | -    | 0.1476 |
| D                  | 0.35       | -    | 0.65  | 0.0138 | -    | 0.0256 |
| E                  | 2.60       | -    | 3.00  | 0.1024 | -    | 0.1181 |
| F                  | 1.20       | -    | 1.60  | 0.0472 | -    | 0.0630 |
| G                  | 0.80       | -    | 1.20  | 0.0315 | -    | 0.0472 |
| H                  | 4.70       | -    | 5.30  | 0.1850 | -    | 0.2087 |
| L                  | 10.00      | -    | 12.00 | 0.3937 | -    | 0.4724 |

RECOMMEDND LAYOUT DRAWINGS



GBL

| OUTLINE DIMENSIONS |            |      |      |        |        |      |
|--------------------|------------|------|------|--------|--------|------|
| Dim.               | Milimeters |      |      | Inches |        |      |
|                    | Min.       | Typ. | Max. | Min.   | Typ.   | Max. |
| A                  | -          | 2.00 | -    | -      | 0.0787 | -    |
| B                  | -          | 2.00 | -    | -      | 0.0787 | -    |
| C                  | -          | 5.00 | -    | -      | 0.1969 | -    |
| D                  | -          | 1.20 | -    | -      | 0.0472 | -    |

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MARKING



MARKING INSTRUCTION

NH=Niuhang Trademark  
FF=Product Line Code,According To Actual Changes  
YWW=Date Code,According To Actual Changes  
LLWWF=Inernal Code,According To Actual Changes  
GBL4xx=Model,xx=06,08,10

PACKING INFORMATION

| Package Type | Package Code | Product Weight<br>Approx(g/Pcs) | Package Method | Quantity<br>(Pcs/Min. Pack.) | Quantity<br>(Pcs/Inner Box) | Quantity<br>(Pcs/Carton) |
|--------------|--------------|---------------------------------|----------------|------------------------------|-----------------------------|--------------------------|
| GBL          | P1           | 2.212                           | Box            | 500                          | 500                         | 5000                     |

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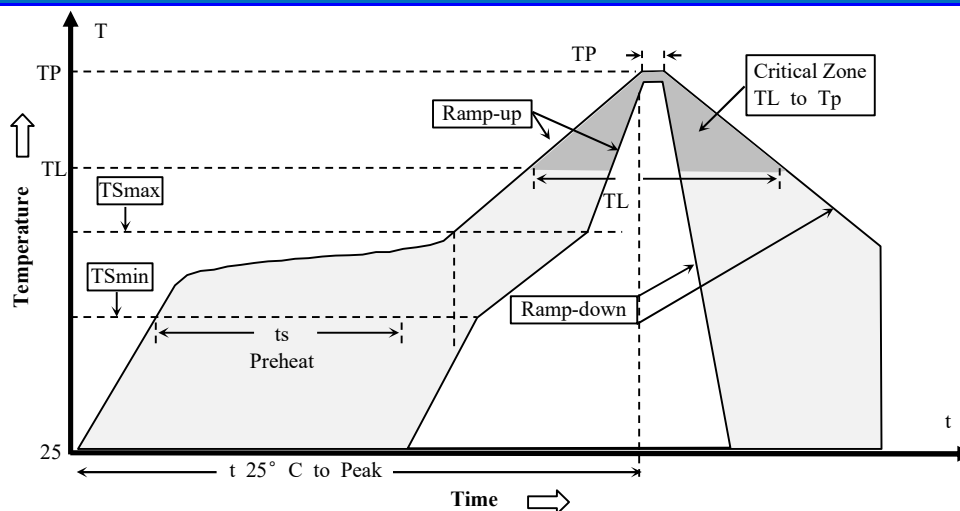
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**Recommended wave soldering condition**

| Product         | Peak Temperature | Soldering Time  |
|-----------------|------------------|-----------------|
| Pb-free devices | 260 +0/-5 °C     | 5 +1/-1 seconds |

**Recommended temperature profile for IR reflow**



| Profile feature                                                                            | Sn-Pb eutectic Assembly          | Pb-free Assembly                 |
|--------------------------------------------------------------------------------------------|----------------------------------|----------------------------------|
| Average ramp-up rate (T <sub>smax</sub> to T <sub>p</sub> )                                | 3°C/second max.                  | 3°C/second max.                  |
| Preheat<br>-Temperature Min(TS min)<br>-Temperature Max(TS max)<br>-Time(ts min to ts max) | 100°C<br>150°C<br>60-120 seconds | 150°C<br>200°C<br>60-180 seconds |
| Time maintained above:<br>-Temperature (TL)<br>- Time (tL)                                 | 183°C<br>60-150 seconds          | 217°C<br>60-150 seconds          |
| Peak Temperature(TP)                                                                       | 240 +0/-5 °C                     | 260 +0/-5 °C                     |
| Time within 5°C of actual peak temperature(tp)                                             | 10-30 seconds                    | 20-40 seconds                    |
| Ramp down rate                                                                             | 6°C/second max.                  | 6°C/second max.                  |
| Time 25 °C to peak temperature                                                             | 6 minutes max.                   | 8 minutes max.                   |

Note : All temperatures refer to topside of the package, measured on the package body surface.

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