

## Rectifier Diode Series Ultrafast Recovery

Rev. V2

### Features

- Popular JEDEC registered series
- Void-less hermetically sealed glass package
- Extremely robust construction
- Internal “Category I” Metallurgical bonds
- JAN, JANTX, JANTXV, and JANS available per MIL-PRF-19500/477



MELF



Axial

### Description

These “Ultrafast Recovery” rectifier diodes are military qualified to MIL-PRF-19500/477 and are ideal for high reliability applications. These industry recognized 2.5 amp rated rectifiers for working peak reverse voltages from 50 to 150 volts are hermetically sealed with void-less glass construction using an internal “Category I” metallurgical bond. These devices are available in both axial leaded and MELF package configurations.

### Applications / Benefits

- Ultrafast recovery 2.5 Amp rectifier series 50 to 150 V
- Military, space and other high-reliability applications
- Switching power supplies
- Applications requiring extremely fast switching & low forward loss
- High forward surge current capability
- Low thermal resistance
- Controlled avalanche with peak reverse power capability

### Electrical Specifications @ +25°C

| Part #             | Working Peak Reverse Voltage (V <sub>RWM</sub> ) | Breakdown Voltage (V <sub>BR</sub> ) @100 μA | Average Rectified Current (I <sub>R</sub> ) |   | Forward Voltage (V <sub>F</sub> ) @ 1 A (8.3 ms pulse) |       | Reverse Current (I <sub>R</sub> ) @ V <sub>RWM</sub> |       | Surge Current <sup>3</sup> (I <sub>FSM</sub> ) | Reverse Recovery Time <sup>4</sup> (T <sub>RR</sub> ) |
|--------------------|--|--|---|---|--|-------|--|-------|--|---|
|                    | Min.   | Min.   | Max.  |   | Max.   |       | Max.   |       | Max.   | Max.  |
|                    |  |  | I <sub>OL</sub> @ T <sub>L</sub> = 75°C     | I <sub>O1</sub> @ T <sub>A</sub> = 55°C | -65°C  | +25°C | 25°C   | 125°C |  |   |
|                    | (V)  | (mA)   | A   |   | V  |       | μA   |       | A  | ns  |
| 1N5802<br>1N5802US | 50   | 60   | 2.5   | 1.0                                     | 0.800  | 0.875 | 1  | 175   | 35   | 25  |
| 1N5804<br>1N5804US | 100  | 110  | 2.5   | 1.0                                     | 0.800  | 0.875 | 1  | 175   | 35   | 25  |
| 1N5806<br>1N5806US | 150  | 160  | 2.5   | 1.0                                     | 0.800  | 0.875 | 1  | 175   | 35   | 25  |

1. I<sub>OL</sub> is rated @ T<sub>L</sub> = 75°C @ 3/8 inch lead length. Derate @ 25 mA/°C for T<sub>L</sub> above 75°C.
2. I<sub>O1</sub> is rated @ T<sub>A</sub> = 55°C for PC boards where thermal resistance from mounting point to ambient is sufficiently controlled where T<sub>J(max)</sub> does not exceed 175°C. Derate @ 8.33 mA/°C for T<sub>A</sub> above 55°C.
3. T<sub>A</sub> = 25°C @ I<sub>O</sub> = 1 A and V<sub>RWM</sub> = rated, 8.3 ms surges at 1 minute intervals.
4. I<sub>F</sub> = 0.5 A, I<sub>RM</sub> = 0.5 A, I<sub>R(REC)</sub> = 0.05 A, di/dt = 65 A/μs minimum.

## Absolute Maximum Ratings<sup>5,6</sup>

| Parameter  | Absolute Maximum   |
|--|--|
| Capacitance                                      | 25 pF @ $V_R = 10\text{ V}$ , 1MHz                       |
| Forward Surge Current ( $I_{FSM}$ )              | 35 A @ 8.3 ms half-sine                                  |
| Average Rectified Forward Current ( $I_{O(L)}$ ) | 2.5 A @ $T_L = +75^\circ\text{C}$ @ 3/8 inch lead length |
| Storage Temperature                              | $-65^\circ\text{C}$ to $+175^\circ\text{C}$              |
| Junction Temperature                             | $-65^\circ\text{C}$ to $+175^\circ\text{C}$              |
| Solder Temperature                               | $260^\circ\text{C}$ for 10 seconds max.                  |

5. Exceeding any one or combination of these limits may cause permanent damage to this device.

6. MACOM does not recommend sustained operation near these survivability limits.

## Thermal Characteristics

| Parameter                              | Test Conditions                  | Maximum              |
|--|----------------------------------|----------------------|
| Thermal Resistance ( $R\theta_{JL}$ )  | junction to lead (L = 0.375 in.) | $36^\circ\text{C/W}$ |
| Thermal Resistance ( $R\theta_{JEC}$ ) | junction to end cap              | $13^\circ\text{C/W}$ |
| Thermal Impedance ( $Z\theta_{JX}$ )   | 10 ms heating time               | $4^\circ\text{C/W}$  |

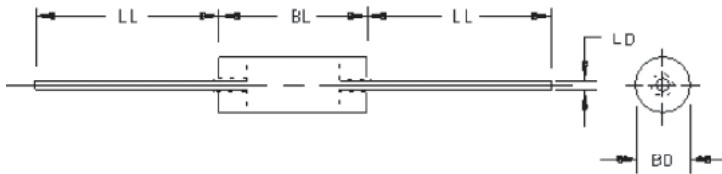
# 1N5802(US), 1N5804(US), 1N5806(US)



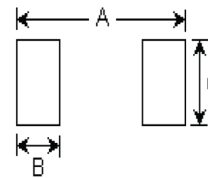
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### Outline Drawings<sup>7,8,9</sup>



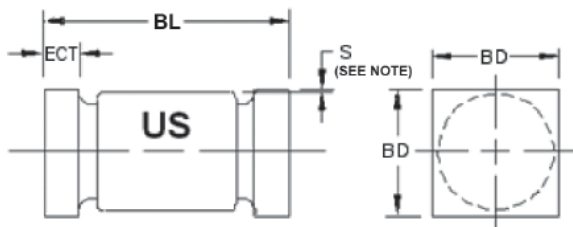
| Dimensions       | Inches |       | Millimeters |       |
|------------------|--------|-------|-------------|-------|
|                  | Min.   | Max.  | Min.        | Max.  |
| BD <sup>10</sup> | 0.065  | 0.085 | 1.65        | 2.16  |
| BL <sup>11</sup> | 0.125  | 0.250 | 3.18        | 6.35  |
| LD               | 0.027  | 0.032 | 0.69        | 0.81  |
| LL               | 0.700  | 1.30  | 17.78       | 33.02 |



US Pad Layout

| Dimensions | Inches | mm   |
|------------|--------|------|
| A          | 0.246  | 6.25 |
| B          | 0.067  | 1.70 |
| C          | 0.105  | 2.67 |

Note: If mounting requires adhesive separate from the solder, an additional 0.060 inch diameter contact may be placed in the center between the pads as an optional spot for cement.



| Dimensions      | Inches |       | Millimeters |      |
|-----------------|--------|-------|-------------|------|
|                 | Min.   | Max.  | Min.        | Max. |
| BD              | 0.091  | 0.103 | 2.31        | 2.62 |
| BL              | 0.168  | 0.200 | 4.27        | 5.08 |
| ECT             | 0.019  | 0.028 | 0.48        | 0.71 |
| S <sup>12</sup> | 0.003  | —     | 0.08        | —    |

7. Dimensions are in inches. Millimeters are given for general information only.
8. Dimensions are pre-solder dip.
9. In accordance with ASME Y14.5M, diameters are equivalent to  $\Phi x$  symbology.
10. Dimension BD shall be measured at the largest diameter.
11. Dimension BL shall include the entire body including slugs and sections of the lead over which the diameter is uncontrolled. This uncontrolled area is defined as the zone between the edge of the diode body and extending 0.050 inch (1.27 mm) onto the leads.
12. Minimum clearance of glass body to mounting surface on all orientations.

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