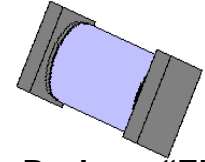


**SURFACE MOUNT VOIDLESS-HERMETICALLY-SEALED ULTRA FAST RECOVERY GLASS RECTIFIERS**

**DESCRIPTION**

This "Ultrafast Recovery" surface mount rectifier diode series is military qualified to MIL-PRF-19500/477 and is ideal for high-reliability applications where a failure cannot be tolerated. These industry-recognized 6.0 Amp rated rectifiers for working peak reverse voltages from 50 to 150 volts are hermetically sealed with voidless-glass construction using an internal "Category I" metallurgical bond. These devices are also available in axial-leaded package configurations (see separate data sheet for 1N5807 thru 1N5811). Microsemi also offers numerous other rectifier products to meet higher and lower current ratings with various recovery time speed requirements including standard, fast, and ultrafast device types in both through-hole and surface mount packages.

**APPEARANCE**



**Package "E" or D-5B**

**IMPORTANT:** For the most current data, consult MICROSEMI's website: <http://www.microsemi.com>

**FEATURES**

- Surface mount package series equivalent to the JEDEC registered 1N5807 to 1N5811 series
- Voidless-hermetically-sealed glass package
- Extremely robust construction
- Triple-layer passivation
- Internal "Category I" Metallurgical bonds
- JAN, JANTX, JANTXV, and JANS available per MIL-PRF-19500/477
- Axial-leaded equivalents also available (see separate data sheet for 1N5807 thru 1N5811)

**APPLICATIONS / BENEFITS**

- Ultrafast recovery 6 Amp rectifiers series 50 to 150 V
- Military and other high-reliability applications
- Switching power supplies or other applications requiring extremely fast switching & low forward loss
- High forward surge current capability
- Low thermal resistance
- Controlled avalanche with peak reverse power capability
- Inherently radiation hard as described in Microsemi MicroNote 050

**MAXIMUM RATINGS**

- Operating Temperature: -65°C to +175°C.
- Storage Temperature: -65°C to +175°C.
- Average Rectified Forward Current ( $I_O$ ): 6 Amps @  $T_{EC} = 75^\circ\text{C}$  End Cap temperature (see note 1)
- Thermal Resistance: 6.5 °C/W junction to end cap
- Thermal Impedance: 1.5 °C/W @ 10 ms heating time
- Forward Surge Current (8.3 ms half sine) 125 Amps
- Capacitance: 60 pF at 10 volts,  $f = 1$  MHz
- Solder temperature: 260°C for 10 s (maximum)

**MECHANICAL AND PACKAGING**

- CASE: Hermetically sealed voidless hard glass with Tungsten slugs
- TERMINALS: End caps are Copper with Tin/Lead (Sn/Pb) finish. Note: Previous inventory had solid Silver end caps with Tin/Lead (Sn/Pb) finish.
- MARKING & POLARITY: Cathode band only
- Tape & Reel option: Standard per EIA-481-B
- Weight: 539 mg
- See package dimensions and recommended pad layout on last page

**ELECTRICAL CHARACTERISTICS**

| TYPE     | WORKING PEAK REVERSE VOLTAGE<br>$V_{RWM}$ | BREAKDOWN VOLTAGE (MIN.)<br>@ 100µA<br>$V_{BR}$ | AVERAGE RECTIFIED CURRENT<br>$I_{O1}$<br>@ $T_{EC}=75^\circ\text{C}$<br>(Note 1) | AVERAGE RECTIFIED CURRENT<br>$I_{O2}$<br>@ $T_A=55^\circ\text{C}$<br>(Note 2) | MAXIMUM FORWARD VOLTAGE<br>@ 4 A<br>(8.3 ms pulse)<br>$V_F$ |       | REVERSE CURRENT (MAX)<br>@ $V_{RWM}$<br>$I_R$ |       | SURGE CURRENT (MAX)<br>$I_{FSM}$<br>(NOTE 3) | REVERSE RECOVERY TIME (MAX)<br>(NOTE 4)<br>$t_{rr}$ |
|----------|-------------------------------------------|-------------------------------------------------|----------------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------|-------|-----------------------------------------------|-------|----------------------------------------------|-----------------------------------------------------|
|          |                                           |                                                 |                                                                                  |                                                                               | VOLTS                                                       |       | µA                                            |       |                                              |                                                     |
|          |                                           |                                                 |                                                                                  |                                                                               | 25°C                                                        | 100°C | 25°C                                          | 125°C |                                              |                                                     |
| 1N5807US | 50                                        | 60                                              | 6.0                                                                              | 3.0                                                                           | 0.875                                                       | 0.800 | 5                                             | 525   | 125                                          | 30                                                  |
| 1N5809US | 100                                       | 110                                             | 6.0                                                                              | 3.0                                                                           | 0.875                                                       | 0.800 | 5                                             | 525   | 125                                          | 30                                                  |
| 1N5811US | 150                                       | 160                                             | 6.0                                                                              | 3.0                                                                           | 0.875                                                       | 0.800 | 5                                             | 525   | 125                                          | 30                                                  |

**NOTE 1:** Rated at  $T_{EC} = 75^\circ\text{C}$ . Derate at 60 mA/°C for  $T_{EC}$  above 75°C

**NOTE 2:** Derate linearly at 25 mA/°C above  $T_A = 55^\circ\text{C}$ . This rating is typical for PC boards where thermal resistance from mounting point to ambient is sufficiently controlled where  $T_{J(max)}$  does not exceed 175°C

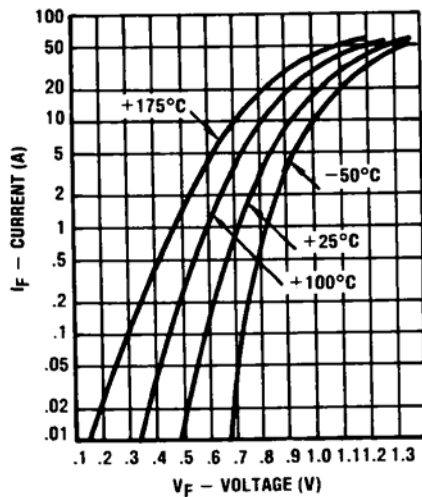
**NOTE 3:**  $T_A = 25^\circ\text{C}$  @  $I_O = 3.0$  A and  $V_{RWM}$  for ten 8.3 ms surges at 1 minute intervals

**NOTE 4:**  $I_F = 1.0$  A,  $I_{RM} = 1.0$  A,  $I_{R(REC)} = 0.10$  A and  $di/dt = 100$  A/µs min

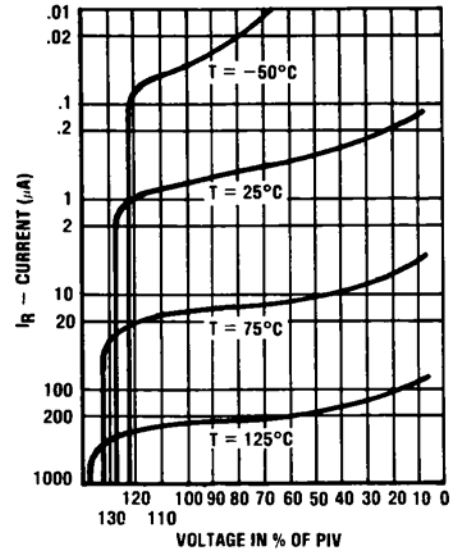
**SYMBOLS & DEFINITIONS**

| Symbol    | Definition                                                                                                                                                                                                                                   |
|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| $V_{BR}$  | Minimum Breakdown Voltage: The minimum voltage the device will exhibit at a specified current.                                                                                                                                               |
| $V_{RWM}$ | Working Peak Reverse Voltage: The maximum peak voltage that can be applied over the operating temperature range.                                                                                                                             |
| $V_F$     | Maximum Forward Voltage: The maximum forward voltage the device will exhibit at a specified current.                                                                                                                                         |
| $I_R$     | Maximum Leakage Current: The maximum leakage current that will flow at the specified voltage and temperature.                                                                                                                                |
| C         | Capacitance: The capacitance in pF at a frequency of 1 MHz and specified voltage                                                                                                                                                             |
| $t_{rr}$  | Reverse Recovery Time: The time interval between the instant the current passes through zero when changing from the forward direction to the reverse direction and a specified recovery decay point after a peak reverse current is reached. |

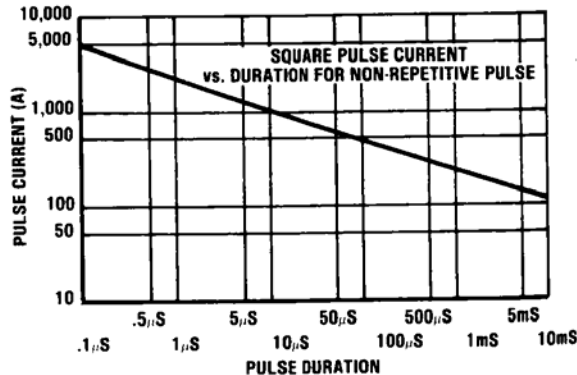
**GRAPHS**



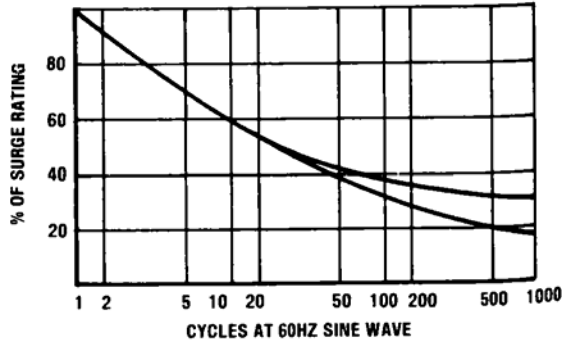
**FIGURE 1**  
TYPICAL FORWARD CURRENT  
vs. FORWARD VOLTAGE



**FIGURE 2**  
TYPICAL REVERSE CURRENT vs. VOLTAGE

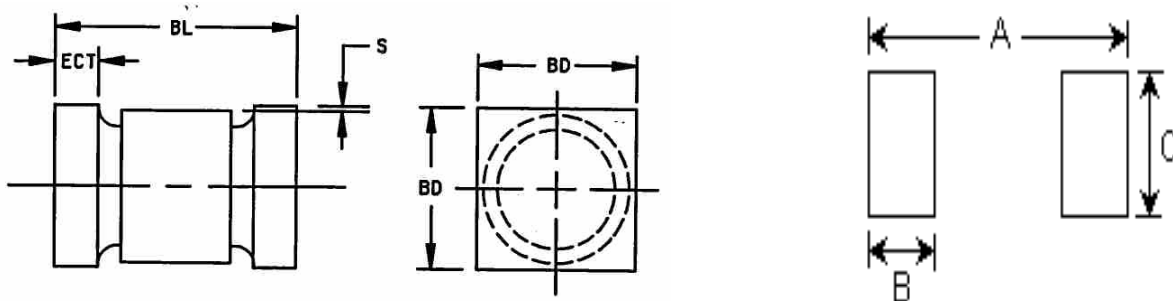


**FIGURE 3**  
FORWARD PULSE CURRENT vs. DURATION



**FIGURE 4**  
MULTIPLE SURGE CURRENT vs. DURATION

**PACKAGE DIMENSIONS AND PAD LAYOUT**



NOTE: This Package Outline has also previously been identified as "D-5B"

|            | INCHES |      | mm   |       |
|------------|--------|------|------|-------|
|            | MIN    | MAX  | MIN  | MAX   |
| <b>BL</b>  | .205   | .225 | 5.21 | 5.72  |
| <b>BD</b>  | .137   | .142 | 3.48 | 3.61  |
| <b>ECT</b> | .019   | .028 | 0.48 | 0.711 |
| <b>S</b>   | .003   | ---  | 0.08 | ---   |

**PAD LAYOUT**

|          | INCHES | mm   |
|----------|--------|------|
| <b>A</b> | 0.288  | 7.32 |
| <b>B</b> | 0.070  | 1.78 |
| <b>C</b> | 0.155  | 3.94 |

Note: If mounting requires adhesive separate from the solder, an additional 0.080 inch diameter contact may be placed in the center between the pads as an optional spot for cement.