

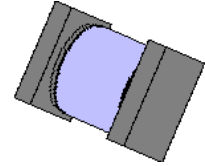
**VOIDLESS-HERMETICALLY SEALED
SURFACE MOUNT FAST RECOVERY
GLASS RECTIFIERS**

DESCRIPTION

This "fast recovery" rectifier diode series is military qualified to MIL-PRF-19500/411 and is ideal for high-reliability applications where a failure cannot be tolerated. These industry-recognized 3.0 Amp rated rectifiers for working peak reverse voltages from 50 to 600 volts are hermetically sealed with voidless-glass construction using an internal "Category I" metallurgical bond. These devices are also available in axial-leaded packages for thru-hole mounting (see separate data sheet for 1N5415 thru 1N5420). Microsemi also offers numerous other rectifier products to meet higher and lower current ratings with various recovery time speeds.

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 1N5415 to 1N5420 series
- Voidless hermetically sealed glass package
- Triple-Layer Passivation
- Internal "Category I" Metallurgical bonds
- Working Peak Reverse Voltage 50 to 600 Volts.
- JAN, JANTX, JANTXV, and JANS available per MIL-PRF-19500/411
- Axial-leaded equivalents also available (see separate data sheet for 1N5415 thru 1N5420)

APPLICATIONS / BENEFITS

- Fast recovery 3 Amp rectifiers 50 to 600 V
- Military and other high-reliability applications
- General rectifier applications including bridges, half-bridges, catch diodes, etc.
- High forward surge current capability
- Extremely robust construction
- Low thermal resistance
- Controlled avalanche with peak reverse power capability
- Inherently radiation hard as described in Microsemi MicroNote 050

MAXIMUM RATINGS

- Junction Temperature: -65°C to +175°C
- Storage Temperature: -65°C to +175°C
- Thermal Resistance: 10°C/W junction to endcap
- Thermal Impedance: 1.5°C/W @ 10 ms heating time
- Average Rectified Forward Current (I_o): 3 Amps @ $T_A = 55^\circ\text{C}$ and 2 Amps @ $T_A = 100^\circ\text{C}$ (see Note 1)
- Forward Surge Current (8.3 ms half sine): 80 Amps
- Solder temperatures: 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 with Tin/Lead (Sn/Pb) finish. Tin/Lead (Sn/Pb) finish
- MARKING: Cathode band only
- POLARITY: Cathode indicated by band
- TAPE & REEL option: Standard per EIA-481-B
- WEIGHT: 539 mg
- See package dimensions and recommended pad layout on last page

ELECTRICAL CHARACTERISTICS

| TYPE | V_{RWM} | MINIMUM BREAKDOWN VOLTAGE V_{BR} @ 50 μA VOLTS | FORWARD VOLTAGE V_F @ 9 A | | MAXIMUM REVERSE CURRENT I_R @ V_{RWM} | | MAXIMUM REVERSE RECOVERY TIME t_{rr} (NOTE 2) ns | AVERAGE RECTIFIED CURRENT I_o (NOTE 1) | |
|----------|-----------|--|-----------------------------|------------|---|---------------------|---|--|------------|
| | | | MIN. VOLTS | MAX. VOLTS | 25°C μA | 100°C μA | | 55°C AMPS | 100°C AMPS |
| 1N5415US | 50V | 55V | 0.6 | 1.5 | 1.0 | 20 | 150 | 3.0 | 2.0 |
| 1N5416US | 100V | 110V | 0.6 | 1.5 | 1.0 | 20 | 150 | 3.0 | 2.0 |
| 1N5417US | 200V | 220V | 0.6 | 1.5 | 1.0 | 20 | 150 | 3.0 | 2.0 |
| 1N5418US | 400V | 440V | 0.6 | 1.5 | 1.0 | 20 | 150 | 3.0 | 2.0 |
| 1N5419US | 500V | 550V | 0.6 | 1.5 | 1.0 | 20 | 250 | 3.0 | 2.0 |
| 1N5420US | 600V | 660V | 0.6 | 1.5 | 1.0 | 20 | 400 | 3.0 | 2.0 |

NOTE 1: From 3.0 Amps at $T_A = 55^\circ\text{C}$, derate linearly at 22 mA/ $^\circ\text{C}$ to 2.0 Amps at $T_A = 100^\circ\text{C}$. Above $T_A = 100^\circ\text{C}$, derate linearly to zero at $T_A = 175^\circ\text{C}$. These ambient ratings are for PC boards where thermal resistance from mounting point to ambient is sufficiently controlled where $T_{J(max)}$ does not exceed 175°C.

NOTE 2: $I_F = 0.5\text{A}$, $I_{RM} = 1\text{A}$, $I_{R(REC)} = 0.250\text{A}$

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 excluding all transient voltages (ref JESD282-B). |
| I_O | Average Rectified Output Current: The Output Current averaged over a full cycle with a 50 Hz or 60 Hz sine-wave input and a 180 degree conduction angle. |
| V_F | Maximum Forward Voltage: The maximum forward voltage the device will exhibit at a specified current. |
| I_R | Maximum Reverse Current: The maximum reverse (leakage) current that will flow at the specified voltage and temperature. |
| 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 decay point after a peak reverse current occurs. |

GRAPHS

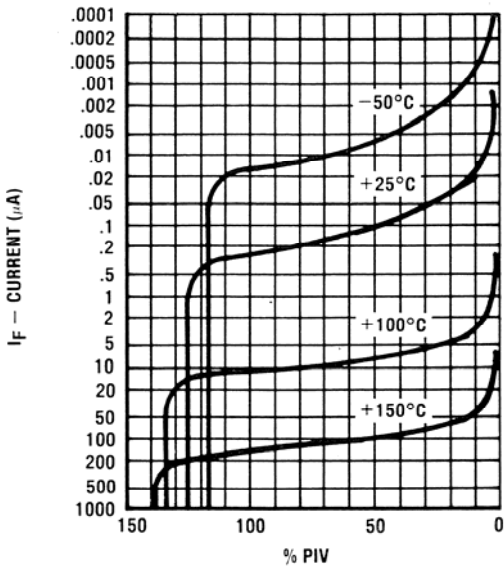


FIGURE 1 – Typical Reverse Current vs. PIV

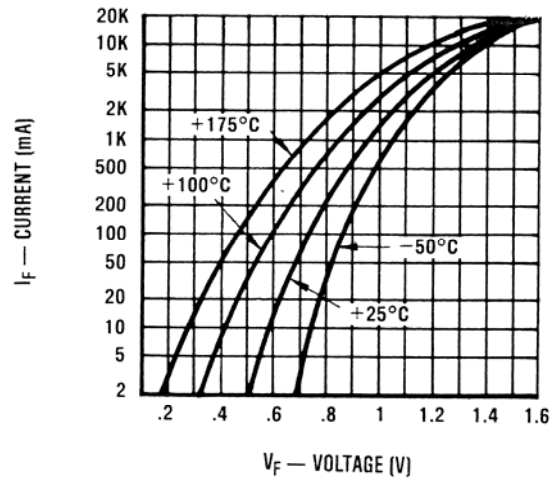
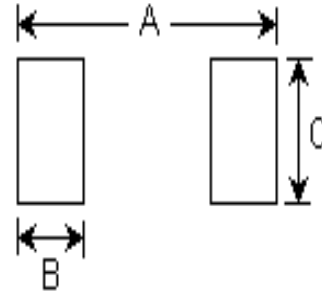
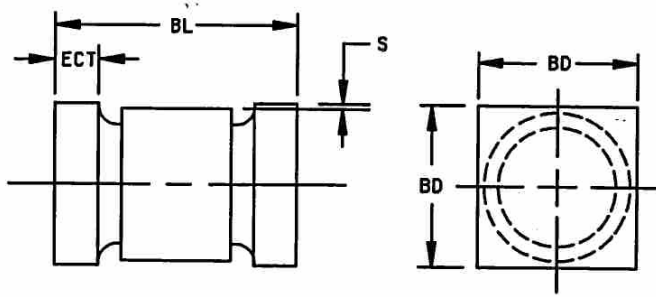


FIGURE 2 – Typical Forward Current vs. Forward Voltage

PACKAGE DIMENSIONS AND LAYOUT



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

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

PAD LAYOUT

| | INCHES | mm |
|----------|--------|------|
| A | 0.288 | 7.32 |
| B | 0.070 | 1.78 |
| C | 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.