

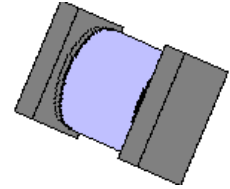
### DESCRIPTION

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 by deleting the "US" suffix (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 speed requirements including fast and ultrafast device types in both through-hole and surface mount packages.

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

### APPEARANCE

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



### 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 solid Silver with 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 $V_{BR} @ 50\mu\text{A}$  VOLTS	FORWARD VOLTAGE $V_F @ 9\text{ A}$		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 $\mu\text{A}$	100°C $\mu\text{A}$		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/°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**

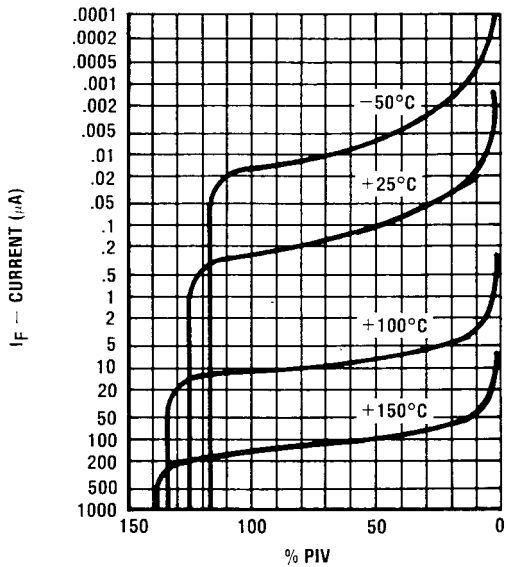


FIGURE 1 – Typical Reverse Current vs. PIV

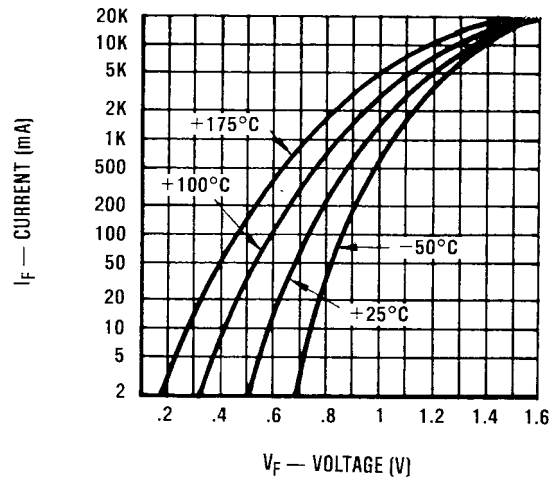
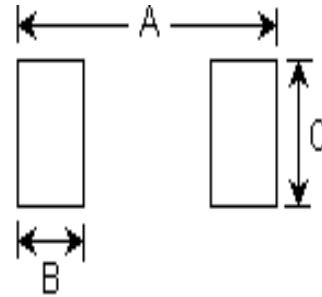
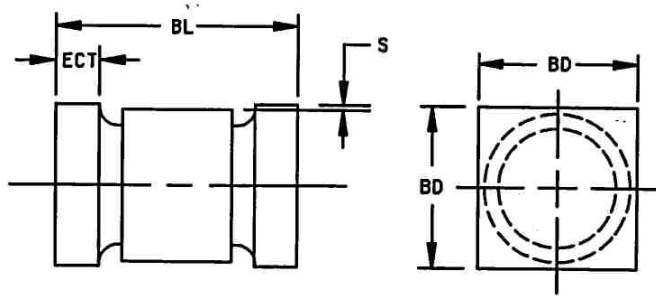


FIGURE 2 – Typical Forward Current vs. Forward Voltage

**PACKAGE DIMENSIONS AND LAYOUT**



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

**PAD LAYOUT**

	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	---

	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.