



## VOIDLESS HERMETICALLY SEALED SWITCHING DIODES

Qualified per MIL-PRF-19500/578

Qualified Levels:  
JAN, JANTX,  
JANTXV and JANS

### DESCRIPTION

This popular surface mount equivalent JEDEC registered switching/signal diodes are military qualified and available with internal metallurgical bonded construction. These small low capacitance diodes with very fast switching speeds are hermetically sealed and bonded into a "D-5D" package. They may be used in a variety of fast switching applications including computers and peripheral equipment such as magnetic cores, thin-film memories, plated-wire memories, as well as decoding or encoding applications, etc. Microsemi also offers a variety of other switching/signal diodes.

**Important:** For the latest information, visit our website <http://www.microsemi.com>.

### FEATURES

- JEDEC registered surface mount equivalents of 1N6638, 1N6642, and 1N6643.
- Ultra fast recovery time.
- Very low capacitance.
- Metallurgically bonded.
- Non-cavity glass package.
- JAN, JANTX, JANTXV and JANS qualifications are available per MIL-PRF-19500/578.
- Replacements for 1N4148UR, 1N4148UR-1, 1N4150UR-1, and 1N914UR.
- RoHS compliant devices available (commercial grade only).

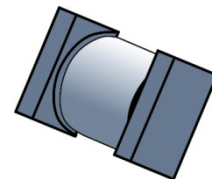
### APPLICATIONS / BENEFITS

- Small size for high density mounting (see package illustration).
- Ideal for:
  - High frequency data lines
  - RS-232 & RS-422 Interface Networks
  - Ethernet: 10 Base T
  - Switching core drivers
  - LAN
  - Computers

### MAXIMUM RATINGS @ $T_A = +25^\circ\text{C}$ unless otherwise noted.

| Parameters/Test Conditions                                                                                                                 | Symbol              | Value            | Unit               |
|--------------------------------------------------------------------------------------------------------------------------------------------|---------------------|------------------|--------------------|
| Junction and Storage Temp                                                                                                                  | $T_J$ and $T_{STG}$ | -65 to +175      | $^\circ\text{C}$   |
| Thermal Resistance Junction-to-End Cap                                                                                                     | $R_{\theta JEC}$    | 40               | $^\circ\text{C/W}$ |
| Thermal Resistance Junction-to-Ambient <sup>(1)</sup>                                                                                      | $R_{\theta JA}$     | 250              | $^\circ\text{C/W}$ |
| Peak Forward Surge Current @ $T_A = +25^\circ\text{C}$<br>(Test pulse = 8.3 ms, half-sine wave.)                                           | $I_{FSM}$           | 2.5              | A                  |
| Average Rectified Forward Current @ $T_A = +75^\circ\text{C}$<br>(Derate at 4.6 mA/ $^\circ\text{C}$ Above $T_{EC} = +110^\circ\text{C}$ ) | $I_O$               | 300              | mA                 |
| Breakdown Voltage:                                                                                                                         | $V_{BR}$            | 150<br>100<br>75 | V                  |
| Working Peak Reverse Voltage:                                                                                                              | $V_{RWM}$           | 125<br>75<br>50  | V                  |

**NOTES:** 1.  $T_A = +75^\circ\text{C}$  on printed circuit board (PCB), PCB = FR4 - .0625 inch (1.59 mm) 1-layer 1-Oz Cu, horizontal, in still air; pads for US = .061 inch (1.55 mm) x .105 inch (2.67 mm);  $R_{\theta JA}$  with a defined PCB thermal resistance condition included, is measured at  $I_O = 300$  mA.



**"D" SQ-MELF  
(D-5D) Package**

Also available in:

**"D" Package**

(axial-leaded)

 [1N6638 42 43](#)

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[www.microsemi.com](http://www.microsemi.com)

**MECHANICAL and PACKAGING**

- CASE: Voidless hermetically sealed hard glass.
- TERMINALS: Tin-Lead plate with >3% Lead. Solder dip is available upon request.
- MARKING: Body painted and alpha numeric.
- POLARITY: Cathode indicated by band.
- Tape & Reel option: Standard per EIA-481-1-A with 12 mm tape. Consult factory for quantities.
- See [Package Dimensions](#) on last page.

**PART NOMENCLATURE**

**JAN 1N6638 US (e3)**

**Reliability Level**

JAN = JAN Level  
JANTX = JANTX Level  
JANTXV = JANTXV Level  
JANS = JANS Level  
Blank = commercial

**JEDEC type number**

See [Electrical Characteristics](#) table

**RoHS Compliance**

e3 = RoHS compliant (available on commercial grade only)  
Blank = non-RoHS compliant

**Surface Mount Package**
**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 Reverse Current: The maximum reverse (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. |

**ELECTRICAL CHARACTERISTICS @ 25°C unless otherwise noted.**

| TYPE NUMBER | MAXIMUM FORWARD VOLTAGE<br>$V_F$ @ $I_F$ |                | MAXIMUM DC REVERSE CURRENT |               |                                                |                                           | REVERSE RECOVERY TIME<br>$t_{rr}$<br>(Note 1) | MAXIMUM FORWARD RECOVERY VOLTAGE AND TIME<br>$I_F=200mA, t_r=1ns$ |    | MAXIMUM JUNCTION CAPACITANCE<br>$f = 1 \text{ MHz}$<br>$V_{sig} = 50 \text{ mV}$<br>(p-p) |     |
|-------------|------------------------------------------|----------------|----------------------------|---------------|------------------------------------------------|-------------------------------------------|-----------------------------------------------|-------------------------------------------------------------------|----|-------------------------------------------------------------------------------------------|-----|
|             |                                          |                | $I_{R1}$                   | $I_{R2}$      | $I_{R3}$                                       | $I_{R4}$                                  |                                               |                                                                   |    |                                                                                           |     |
|             |                                          |                | $V_R=20 \text{ V}$         | $V_R=V_{RWM}$ | $V_R=20 \text{ V}$<br>$T_A=+150^\circ\text{C}$ | $V_R=V_{RWM}$<br>$T_A=+150^\circ\text{C}$ |                                               |                                                                   |    |                                                                                           |     |
|             | V @ mA                                   | V @ mA         | nA                         | nA            | $\mu A$                                        | $\mu A$                                   | ns                                            | V                                                                 | ns | pf                                                                                        | pf  |
| 1N6638US    | 0.8 V @ 10 mA                            | 1.1 V @ 200 mA | 35                         | 500           | 50                                             | 100                                       | 4.5                                           | 5.0                                                               | 20 | 2.5                                                                                       | 2.0 |
| 1N6642US    | 0.8 V @ 10 mA                            | 1.2 V @ 100 mA | 25                         | 500           | 50                                             | 100                                       | 5.0                                           | 5.0                                                               | 20 | 5.0                                                                                       | 2.8 |
| 1N6643US    | 0.8 V @ 10 mA                            | 1.2 V @ 100 mA | 50                         | 500           | 75                                             | 100                                       | 6.0                                           | 5.0                                                               | 20 | 5.0                                                                                       | 2.8 |

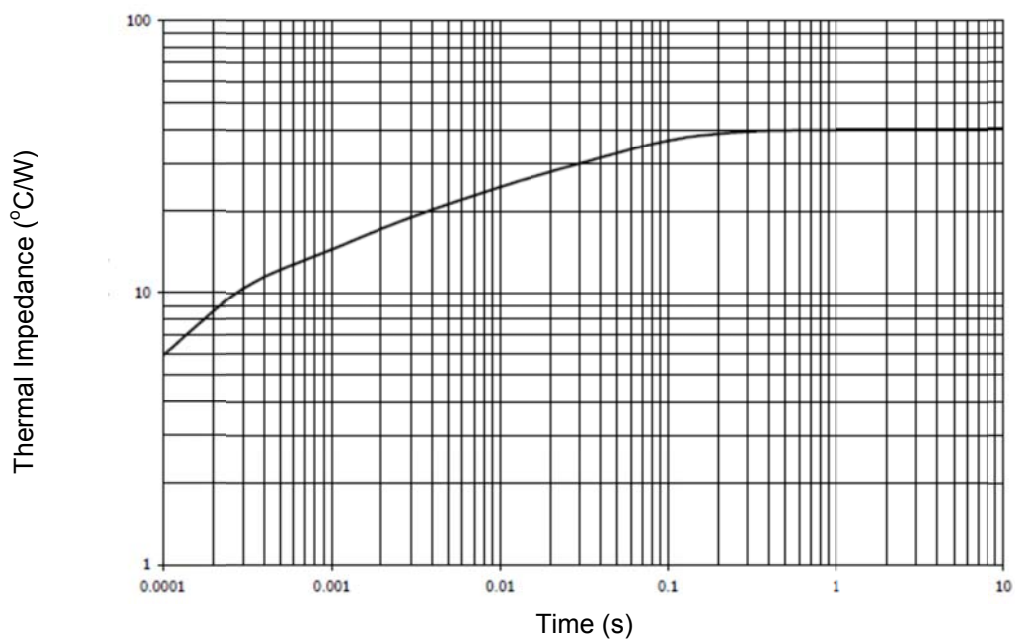
**NOTE:** 1. Reverse Recovery Time Test Conditions –  $I_F=I_R=10 \text{ mA}$ ,  $I_{R(REC)} = 1.0 \text{ mA}$ ,  $C=3 \text{ pF}$ ,  $R_L = 100 \text{ ohms}$ .

**GRAPHS**

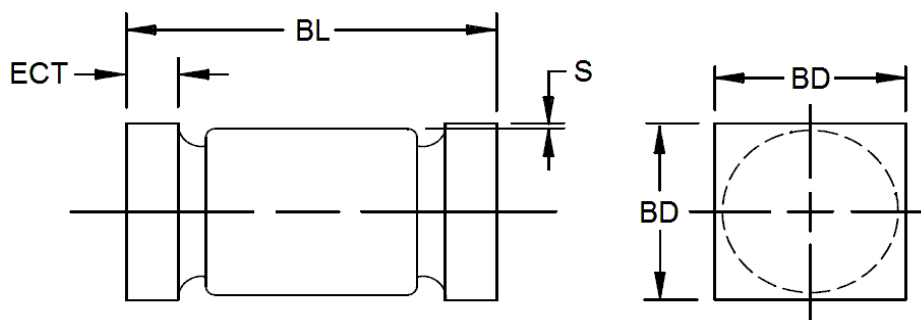

**FIGURE 1**  
Temperature – Current Derating



**FIGURE 2**  
Maximum Thermal Impedance at  $T_A = 55^\circ\text{C}$

**GRAPHS (continued)**


**FIGURE 3**  
Maximum Thermal Impedance at  $T_{EC} = 25\text{ }^{\circ}\text{C}$

**PACKAGE DIMENSIONS**
**D-5D**


| DIM | INCH       |       | MILLIMETERS |      |
|-----|------------|-------|-------------|------|
|     | MIN        | MAX   | MIN         | MAX  |
| BD  | 0.070      | 0.085 | 1.78        | 2.16 |
| ECT | 0.019      | 0.028 | 0.48        | 0.71 |
| BL  | 0.165      | 0.195 | 4.19        | 4.95 |
| S   | 0.003 MIN. |       | 0.08 MIN.   |      |

**NOTES:**

1. Dimensions are in inches. Millimeters are given for general information only.
2. Dimensions are pre-solder dip.
3. U-suffix parts are structurally identical to the US-suffix parts.
4. In accordance with ASME Y14.5M, diameters are equivalent to  $\Phi$ x symbology.