



## 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-5B" 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).

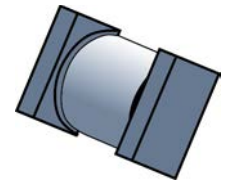
### APPLICATIONS / BENEFITS

- 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<sub>A</sub> = +25 °C unless otherwise noted.

| Parameters/Test Conditions  | Symbol                              | Value            | Unit |   |
|---|-------------------------------------|------------------|------|---|
| Junction and Storage Temp   | T <sub>J</sub> and T <sub>STG</sub> | -65 to +175      | °C   |   |
| Thermal Resistance Junction-to-End Cap  | R <sub>ΘJEC</sub>                   | 40               | °C/W |   |
| Thermal Resistance Junction-to-Ambient <sup>(1)</sup>   | R <sub>ΘJA</sub>                    | 250              | °C/W |   |
| Peak Forward Surge Current @ T <sub>A</sub> = +25 °C<br>(Test pulse = 8.3 ms, half-sine wave.)                        | I <sub>FSM</sub>                    | 2.5              | A    |   |
| Average Rectified Forward Current @ T <sub>A</sub> = +75 °C<br>(Derate at 4.6 mA/°C Above T <sub>EC</sub> = + 110 °C) | I <sub>O</sub>                      | 300              | mA   |   |
| Breakdown Voltage:  | 1N6638US                            | V <sub>BR</sub>  | 150  | V |
|   | 1N6642US                            |                  | 100  |   |
|   | 1N6643US                            |                  | 75   |   |
| Working Peak Reverse Voltage:   | 1N6638US                            | V <sub>RWM</sub> | 125  | V |
|   | 1N6642US                            |                  | 75   |   |
|   | 1N6643US                            |                  | 50   |   |


**NOTES:** 1. T<sub>A</sub> = +75 °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<sub>ΘJA</sub> with a defined PCB thermal resistance condition included, is measured at I<sub>O</sub> = 300 mA.



### "B" SQ-MELF (D-5B) Package

Also available in:

**"D" Package**  
(axial-leaded)

 [1N6638 42 43](#)

#### MSC – Lawrence

6 Lake Street,  
Lawrence, MA 01841  
1-800-446-1158  
Tel: (978) 620-2600  
Fax: (978) 689-0803

#### MSC – Ireland

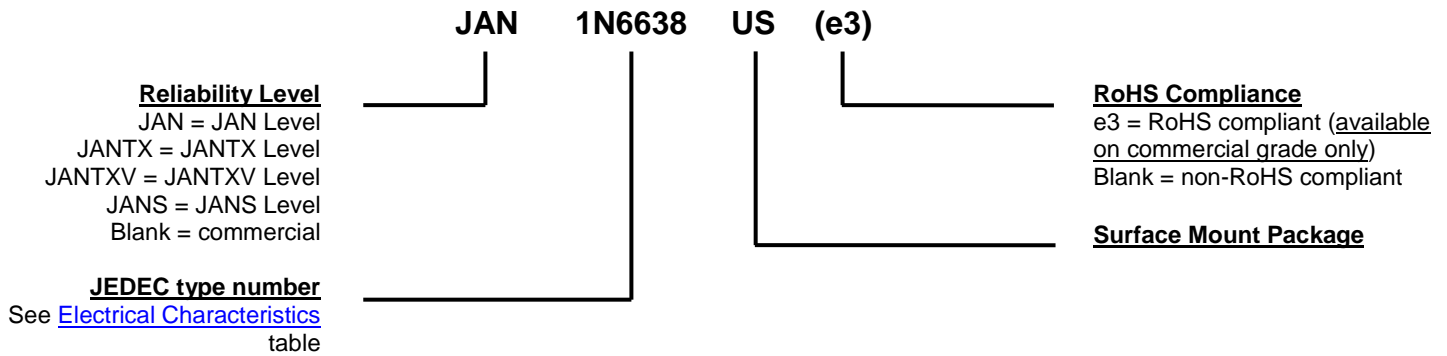
Gort Road Business Park,  
Ennis, Co. Clare, Ireland  
Tel: +353 (0) 65 6840044  
Fax: +353 (0) 65 6822298

**Website:**

[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.

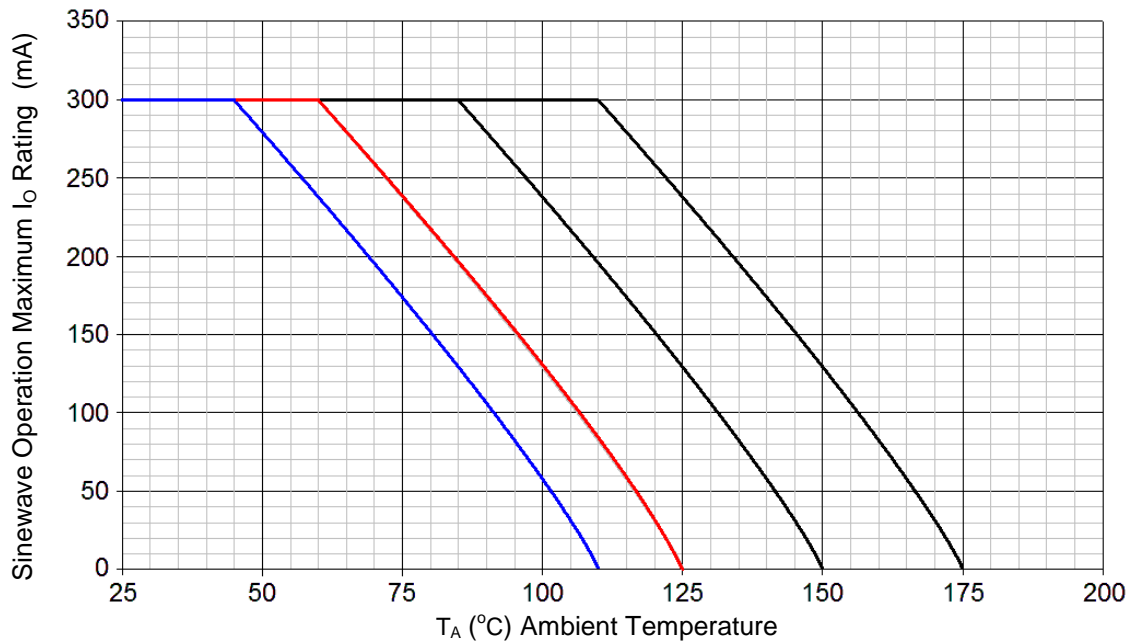
**PART NOMENCLATURE**

**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. |

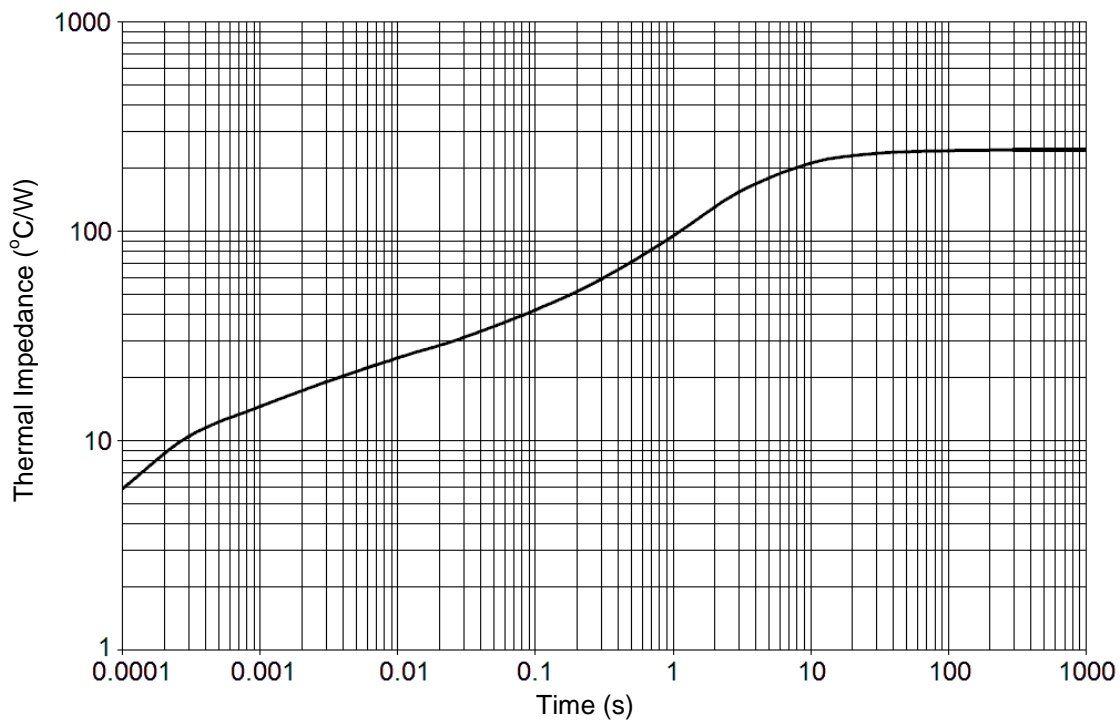
**ELECTRICAL CHARACTERISTICS @ 25°C unless otherwise noted.**

| 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>$V_{sig} = 50 \text{ mV (p-p)}$ |                     |
|-------------|--|----------------|----------------------------|---------------|--|---|---|---|----------|--|---------------------|
|             |  |                | $I_{R1}$                   | $I_{R2}$      | $I_{R3}$                                       | $I_{R4}$                                  |   | $V_{FRM}$   | $t_{fr}$ | $V_R=0 \text{ V}$  | $V_R=1.5 \text{ V}$ |
|             |  |                | $V_R=20 \text{ V}$         | $V_R=V_{RWM}$ | $V_R=20 \text{ V}$<br>$T_A=+150^\circ\text{C}$ | $V_R=V_{RWM}$<br>$T_A=+150^\circ\text{C}$ |   |   |          |  |                     |
|             | V @ mA                                 | V @ mA         | nA                         | nA            | $\mu\text{A}$                                  | $\mu\text{A}$                             | 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 –  $I_F=I_R=10 \text{ mA}$ ,  $I_{R(REC)} = 1.0 \text{ mA}$ ,  $C=3 \text{ pF}$ ,  $R_L = 100 \text{ ohms}$ .

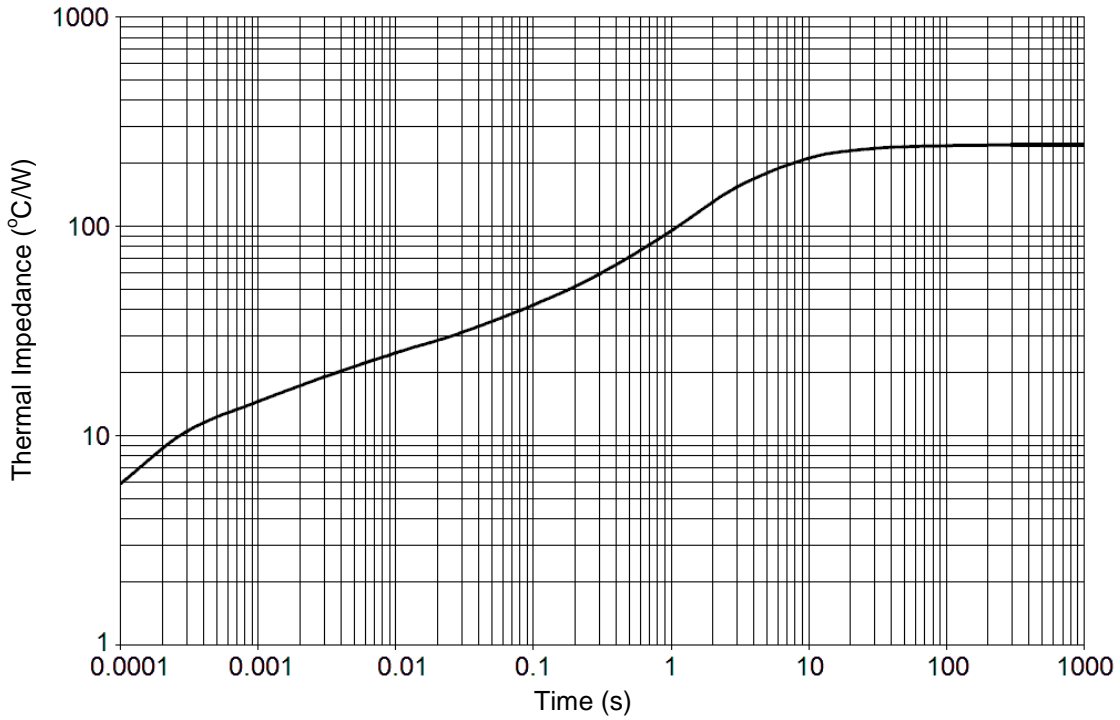
**GRAPHS**


**FIGURE 1**  
Temperature – Current Derating

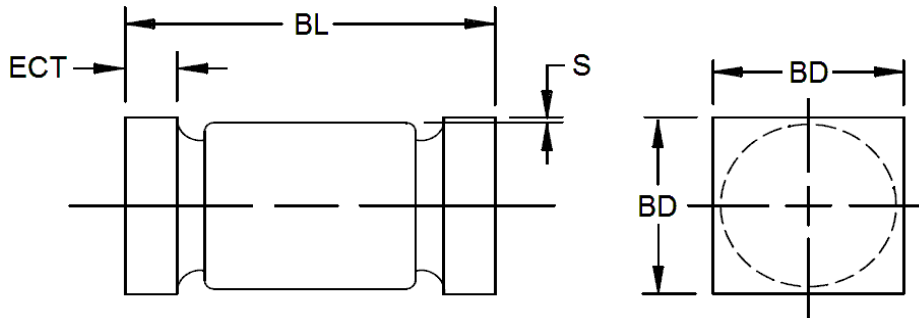


**FIGURE 2**  
Maximum Thermal Impedance at T<sub>A</sub> = 55 °C

GRAPHS (continued)



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

**PACKAGE DIMENSIONS**


| 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.

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