



## VOIDLESS HERMETICALLY SEALED SWITCHING DIODES

Qualified per MIL-PRF-19500/578

Qualified Levels:  
JAN, JANTX,  
JANTXV and JANS

### DESCRIPTION

These popular 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” 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 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 1N4148, 1N4148-1, 1N4150, 1N4150-1, and 1N914.
- RoHS compliant devices available (commercial grade only).

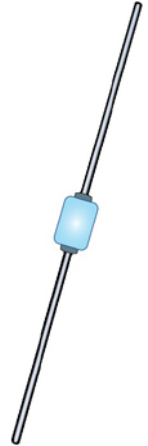
### APPLICATIONS / BENEFITS

- Small size for high density mounting using flexible thru-hole leads (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-Lead = 0.375 inch <sup>(1)</sup>	R <sub>θJL</sub>	150	°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 (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 (Derate at 3.0 mA/°C above T <sub>L</sub> = +75 °C @ L = 3/8")	I <sub>O</sub>	300	mA
Breakdown Voltage:	V <sub>BR</sub>	1N6638	150
		1N6642	100
		1N6643	75
Working Peak Reverse Voltage:	V <sub>RWM</sub>	1N6638	125
		1N6642	75
		1N6643	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 axial = .092 inch (2.34 mm) diameter, strip = .030 inch (0.76 mm) x 1 inch (25.4 mm) long, lead length L ≤ .187 inch (≤ 4.75 mm); R<sub>θJA</sub> with a defined PCB thermal resistance condition included, is measured at I<sub>O</sub> = 300 mA.



“D” Package

Also available in:

“B” SQ MELF or  
D-5B Package  
(surface mount)

 [1N6638US](#) [42US](#) [43US](#)

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**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-296. Consult factory for quantities.
- See [Package Dimensions](#) on last page.

**PART NOMENCLATURE**
**JAN 1N6638 (e3)**
**Reliability Level**

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

**RoHS Compliance**

e3 = RoHS compliant ([available in commercial grade only](#))  
 Blank = non-RoHS compliant

**JEDEC type number**

See [Electrical Characteristics](#) table

**SYMBOLS & DEFINITIONS**

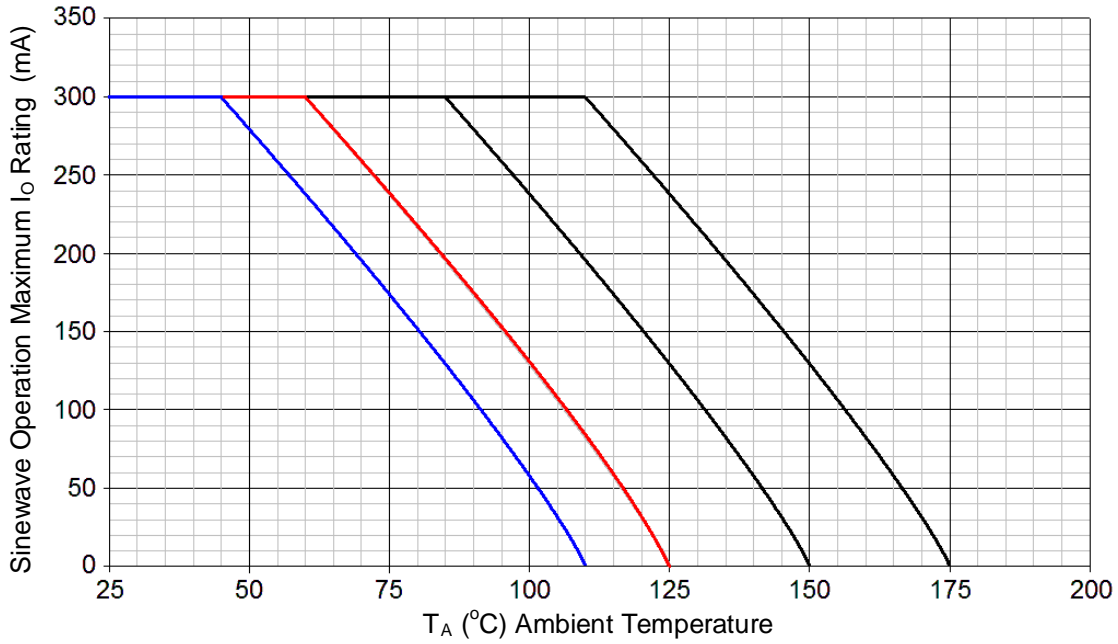
Symbol	Definition
$V_{BR}$	Minimum Breakdown Voltage: The minimum voltage the device will exhibit at a specified current.
$V_{RWM}$	Working Peak Reverse Voltage: The maximum peak voltage that can be applied over the operating temperature range.
$V_F$	Maximum Forward Voltage: The maximum forward voltage the device will exhibit at a specified current.
$I_F$	Forward Current: The forward current dc value, no alternating component.
$I_R$	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.**

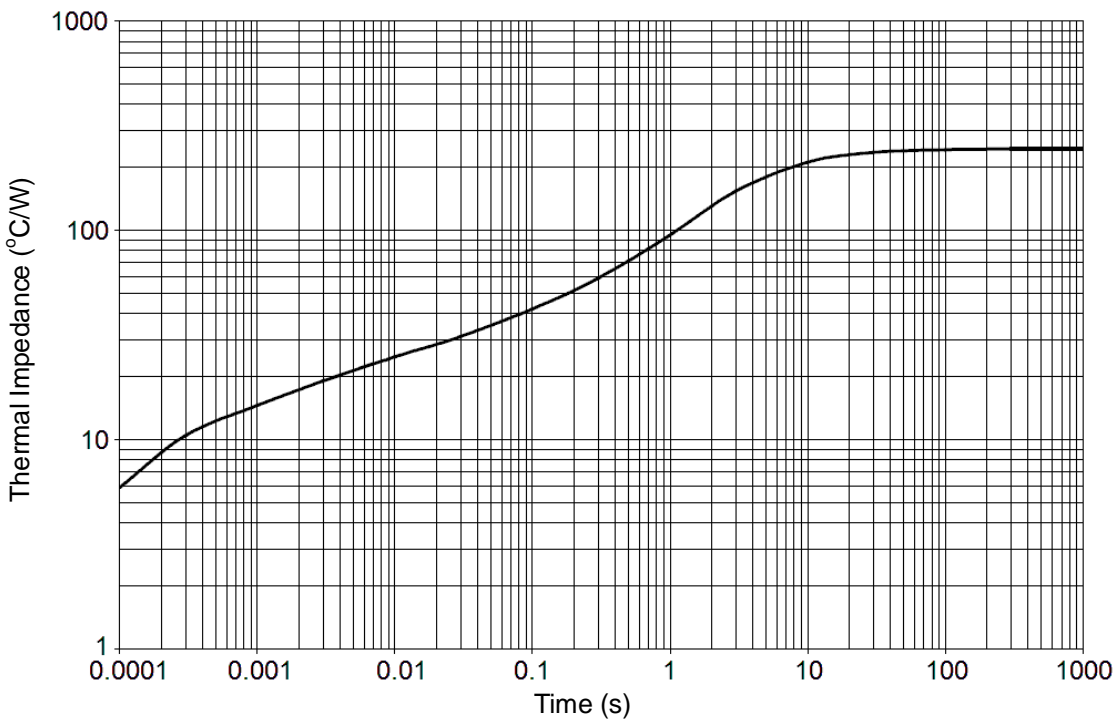
TYPE NUMBER	MAXIMUM FORWARD VOLTAGE $V_F @ I_F$		MAXIMUM DC REVERSE CURRENT				REVERSE RECOVERY TIME $t_{rr}$ (Note 1)	MAXIMUM FORWARD RECOVERY VOLTAGE AND TIME $I_F=200\text{mA}, t_r=1\text{ns}$		MAXIMUM JUNCTION CAPACITANCE $f = 1 \text{ MHz}$ $V_{sig} = 50 \text{ mV}$ (p-p)	
			$I_{R1}$	$I_{R2}$	$I_{R3}$	$I_{R4}$		$V_{FRM}$	$t_{fr}$	$V_R=0 \text{ V}$	$V_R=1.5 \text{ V}$
			$V_R=20 \text{ V}$	$V_R=V_{RWM}$	$V_R=20 \text{ V}$ $T_A=+150 \text{ }^\circ\text{C}$	$V_R=V_{RWM}$ $T_A=+150 \text{ }^\circ\text{C}$					
	V @ mA	V @ mA	nA	nA	$\mu\text{A}$	$\mu\text{A}$	ns	V	ns	pf	pf
1N6638	0.8 V @ 10 mA	1.1 V @ 200 mA	35	500	50	100	4.5	5.0	20	2.5	2.0
1N6642	0.8 V @ 10 mA	1.2 V @ 100 mA	25	500	50	100	5.0	5.0	20	5.0	2.8
1N6643	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

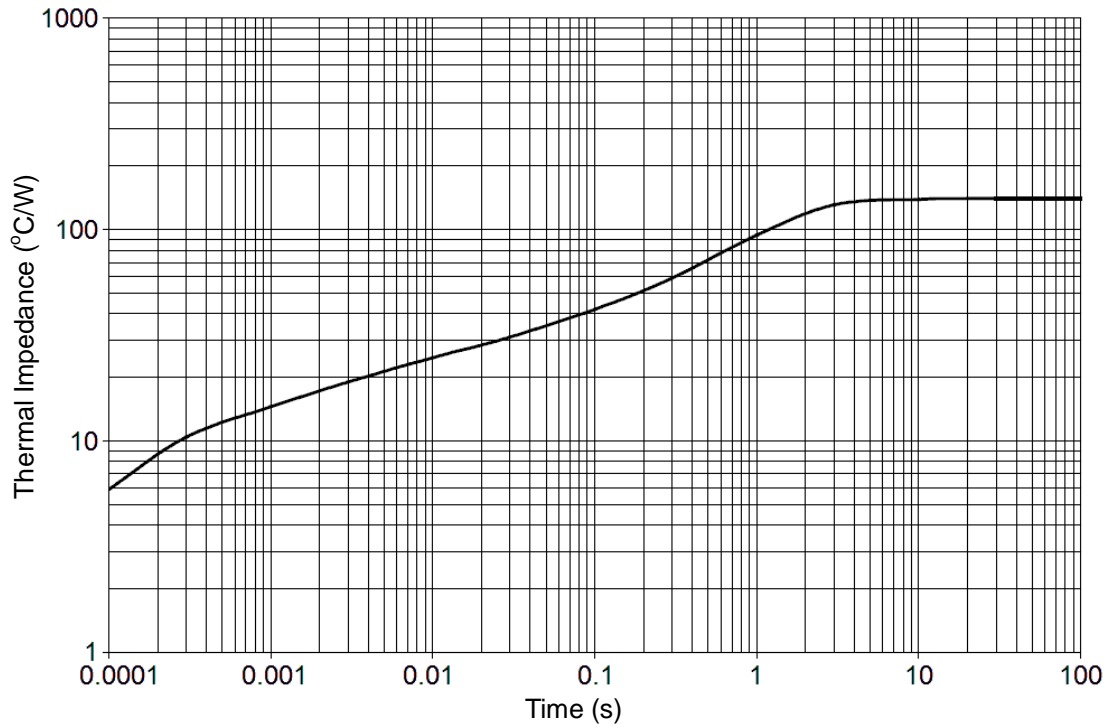


**FIGURE 1**  
Temperature - Current Derating

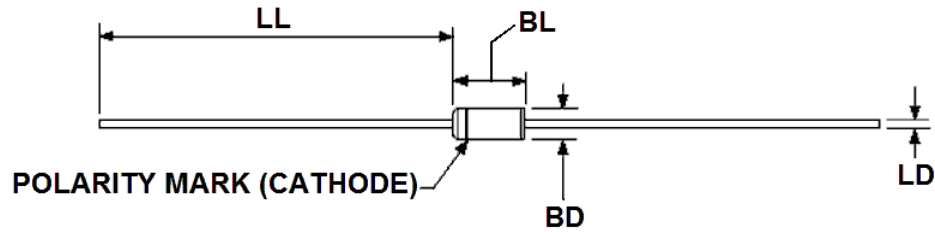


**FIGURE 2**  
Maximum Thermal Impedance at T<sub>A</sub> = 55 °C

GRAPHS (continued)



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

**PACKAGE DIMENSIONS**


DIM	INCH		MILLIMETERS		NOTES
	MIN	MAX	MIN	MAX	
BD	0.056	0.080	1.42	2.03	2
BL	0.130	0.180	3.30	4.57	
LD	0.018	0.022	0.46	0.56	3
LL	1.00	1.50	25.40	38.10	

**NOTES:**

1. Dimensions are in inches. Millimeters are given for general information only.
2. Dimension BD shall be measured at the largest diameter.
3. The specified lead diameter applies in the zone between .050 inch (1.27 mm) from the diode body to the end of the lead. Outside of this zone lead shall not exceed BD.
4. In accordance with ASME Y14.5M, diameters are equivalent to  $\Phi$ x symbology.