



## 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>.



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

Also available in:

#### "D" Package

(axial-leaded)

 [1N6638 42 43](#)

### 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 (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 4.6 mA/°C Above T <sub>EC</sub> = + 110 °C)	I <sub>O</sub>	300	mA	
Breakdown Voltage:	V <sub>BR</sub>	1N6638US	150	V
		1N6642US	100	
		1N6643US	75	
Working Peak Reverse Voltage:	V <sub>RWM</sub>	1N6638US	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.

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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-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 $V_F @ I_F$		MAXIMUM DC REVERSE CURRENT				REVERSE RECOVERY TIME $t_{rr}$ (Note 1)	MAXIMUM FORWARD RECOVERY VOLTAGE AND TIME $I_F=200mA, t_r=1ns$		MAXIMUM JUNCTION CAPACITANCE $f = 1 MHz$ $V_{sig} = 50 mV$ (p-p)	
			$I_{R1}$	$I_{R2}$	$I_{R3}$	$I_{R4}$		$V_{FRM}$	$t_{fr}$	$V_R=0 V$	$V_R=1.5 V$
			$V_R=20 V$	$V_R=V_{RWM}$	$V_R=20 V$ $T_A=+150 ^\circ C$	$V_R=V_{RWM}$ $T_A=+150 ^\circ C$					
	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 –  $I_F=I_R=10 mA, I_{R(REC)} = 1.0 mA, C=3 pF, R_L = 100 ohms$ .

**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**
**D-5D**


DIM	INCH		MILLIMETERS	
	MIN	MAX	MIN	MAX
<b>BD</b>	0.070	0.085	1.78	2.16
<b>ECT</b>	0.019	0.028	0.48	0.71
<b>BL</b>	0.165	0.195	4.19	4.95
<b>S</b>	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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