

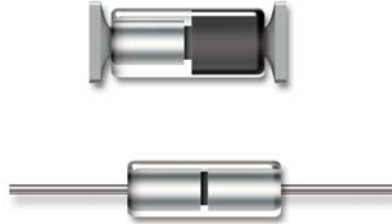
# Switching Diodes 1N6638 Series

1N6638, 1N6639, 1N6640, 1N6641, 1N6642, 1N6643,  
1N6638U & US, 1N6639U & US, 1N6640U & US,  
1N6641U & US 1N6642U & US, 1N6643U & US



## Features

- Available in JAN, JANS, JANTX, JANTXV per MIL-PRF-19500/578 & /609
- Switching Diodes
- Non-Cavity Glass Plackage
- Category I Metallurgically Bonded



## Maximum Ratings

Operating Temperature: -65°C to +175°C  
Storage Temperature: -65°C to +175°C  
Operating Current: 300mA  
Derating: See Figure 5  
Surge Current:  $I_{FSM} = 2.5A$ , half sine wave,  
 $P_W = 8.3ms$

Thermal Resistance:  
( $R_{\theta JC}$ ): U & US 40 °C/W maximum at L = 0"  
See Figure 6  
( $R_{\theta JL}$ ): Leaded 150 °C/W maximum at L = .375"  
See Figure 7  
Thermal Impedance: ( $Z_{\theta JX}$ ): 25 °C/W maximum

## Electrical Specifications @ $T_A = + 25\text{ }^\circ\text{C}$ ( Unless Otherwise Specified )

TYPES	$V_{BR} @ I_R$		$V_{WRM}$	$V_{FR} / t_{fr} @ I_F = 200\text{ mA}$		$C_{T1}$ $V_R = 0\text{ V}$	$C_{T2}$ $V_R = 1.5\text{ V}$	$t_{rr}$ $I_R = 10\text{mA}$ $I_F = 10\text{mA}$	$I_{R1}$ $V_R = V_{RWM}$ $T_A = 150^\circ\text{C}$	$I_{R2}$ $V_R = 20\text{V}$ $T_A = 150^\circ\text{C}$	$I_{R3}$ $V_R = 20\text{V}$	$I_{R4}$ $V_R = V_{RWM}$
	V(pk)	$\mu\text{A}$	V(pk)	$V_{FR}$ V(pk)	$t_{fr}$ ns	pF	pF	ns	nA dc	nA dc	$\mu\text{A dc}$	$\mu\text{A dc}$
1N6638, U & US	150	100	125	5.0	20	2.5	2.0	4.5	35	500	50	100
1N6639, U & US	100	10	75	5.0	10	2.5	-	4.0	-	100	-	90
1N6640, U & US	75	10	50	5.0	10	2.5	-	4.0	-	100	-	90
1N6641, U & US	75	10	50	5.0	10	3.0	-	5.0	-	100	-	90
1N6642, U & US	100	100	75	5.0	20	5.0	2.8	5.0	25	500	50	100
1N6643, U & US	75	100	50	5.0	20	5.0	2.8	6.0	50	500	75	100

TYPES	$V_F @ I_F$		$V_{F2} @ I_F$ $T_A = -55^\circ\text{C}$	$I_F$
	V dc (min)	V dc (max)	V dc (max)	mA (pulsed)
1N6638, U & US	-	1.1	1.2	200
	-	0.8	-	10
1N6639, U & US	-	1.2	1.3	500
1N6640, U & US	0.54	0.62	-	1
	0.76	0.86	-	50
	0.82	0.92	-	100
	0.87	1.0	1.1	200
1N6641, U & US	-	1.1	1.2	200
1N6642, U & US	-	0.8	-	10
	-	1.2	1.2	100
1N6643, U & US	-	0.8	-	10
	-	1.2	1.4	100



## Outline Drawing

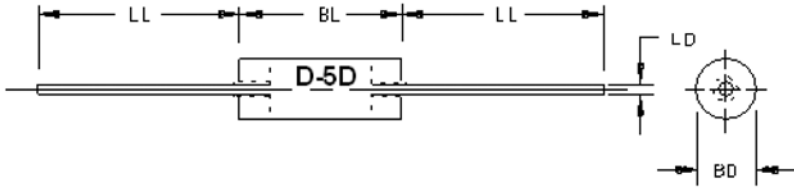


FIGURE 1

Symbol	Dimensions				Notes
	Inches		Millimeters		
	Min	Max	Min	Max	
BD	.056	.080	1.42	2.03	2
BL	.130	.180	3.30	4.57	
LD	.018	.022	.046	0.56	3
LL	1.00	1.50	25.40	38.10	

### LEADED DESIGN DATA

**CASE:** D-5D, Hermetically sealed glass case, per MIL-PRF-19500/578 & /609

**LEAD FINISH:** Tin/Lead

**LEAD MATERIAL:** Copper clad steel

**POLARITY:** Cathode end is banded.

**PACKAGE WEIGHT:** 0.150g

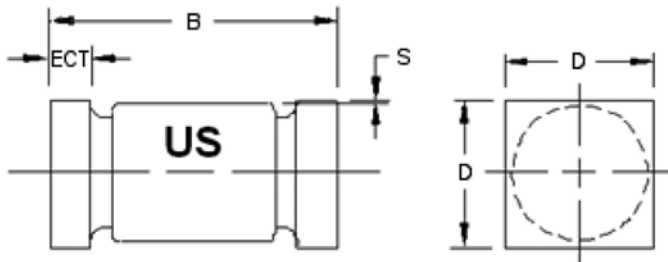


FIGURE 2

Symbol	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
D	.070	.085	1.78	2.16
B	.165	.195	4.19	4.95
ECT	.019	.028	.048	0.71
S	.003		0.08	

### U & US DESIGN DATA

**CASE:** D-5D, Hermetically sealed glass case, per MIL-PRF-19500/578 & /609

**LEAD FINISH:** Tin/Lead

**END CAP MATERIAL (U, US):** Copper

**POLARITY:** Cathode end is banded.

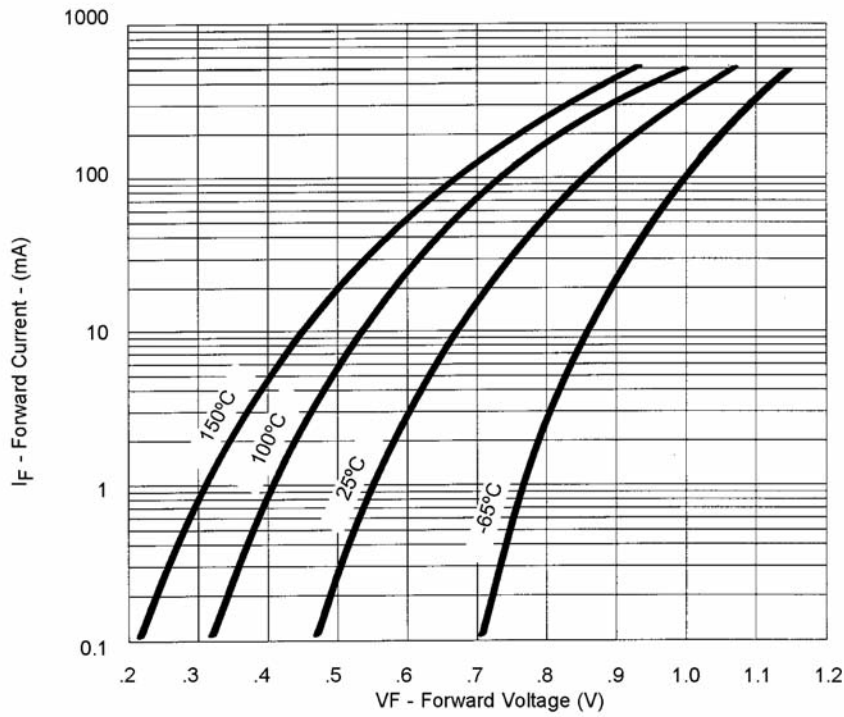
**PACKAGE WEIGHT:** 0.095g

**MOUNTING SURFACE SELECTION:** The Axial Coefficient of Expansion (COE) of this device is approximately +4PPM/°C. The COE of the Mounting Surface System should be selected to provide a suitable match with this device.

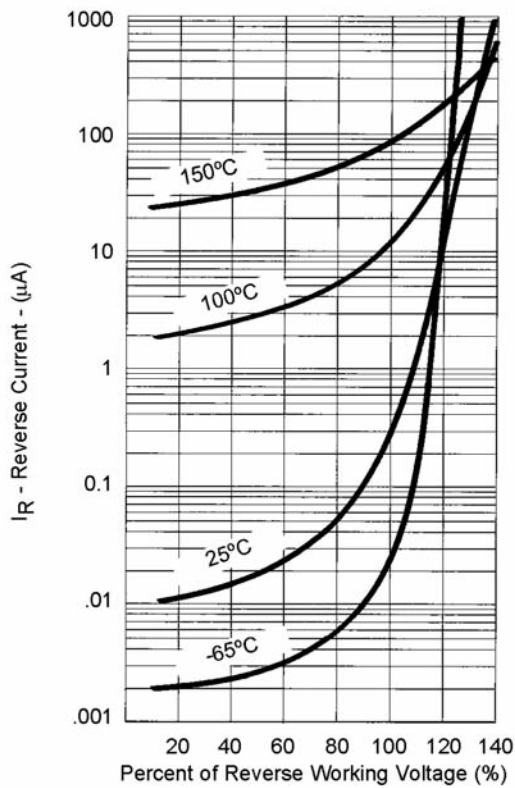
### NOTES:

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.
5. U-suffix parts are structurally identical to the US-suffix parts.

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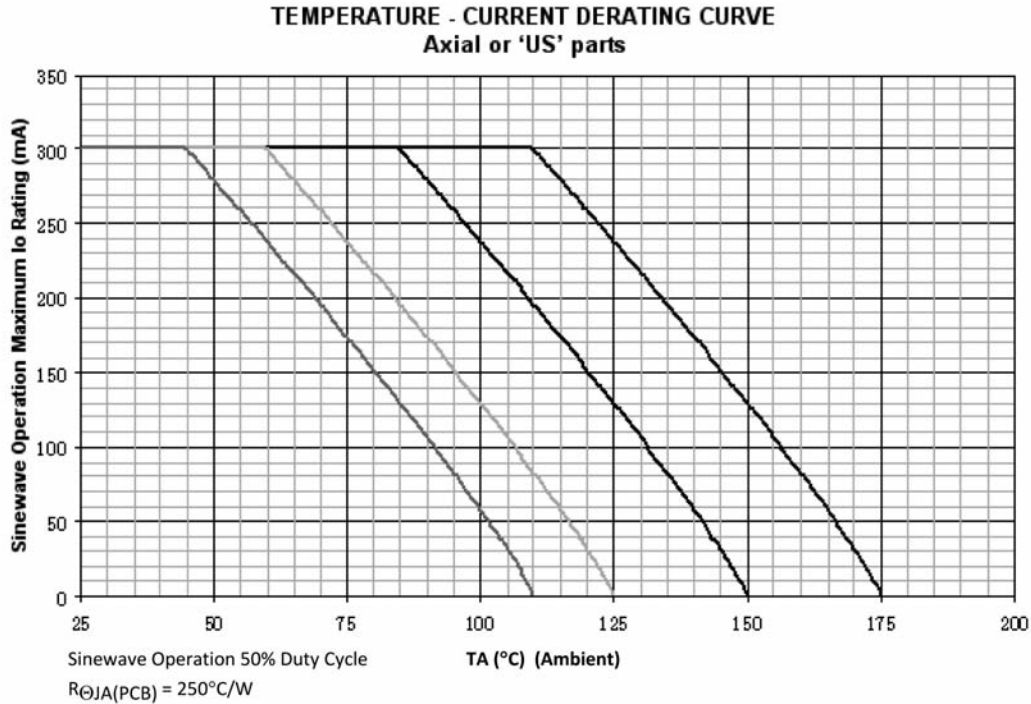


**FIGURE 3**  
Typical Forward Current vs Forward Voltage



**FIGURE 4**  
Typical Reverse Current vs Reverse Voltage

**Note:**  
All temperatures shown on graphs are junction temperatures



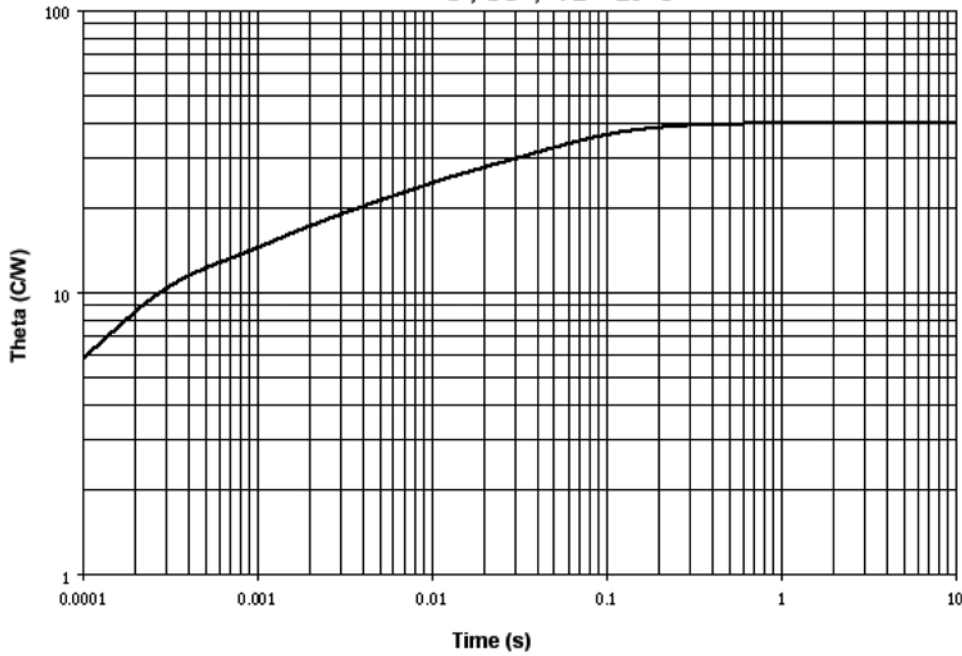
**NOTES:**

1. All devices are capable of operating at  $\leq T_J$  specified on this curve. Any parallel line to this curve will intersect the appropriate current for the desired maximum  $T_J$  allowed.
2. Derate design curve constrained by the maximum junction temperatures and current rating specified. (See 1.3.)
3. Derate design curve chosen at  $T_J \leq 150^\circ\text{C}$ , where the maximum temperature of electrical test is performed.
4. Derate design curves chosen at  $T_J \leq 125^\circ\text{C}$ , and  $110^\circ\text{C}$  to show current rating where most users want to limit  $T_J$  in their application.

# Switching Diodes 1N6638 Series



**Maximum Thermal Impedance Plots  
'U','US' , TL = 25°C**



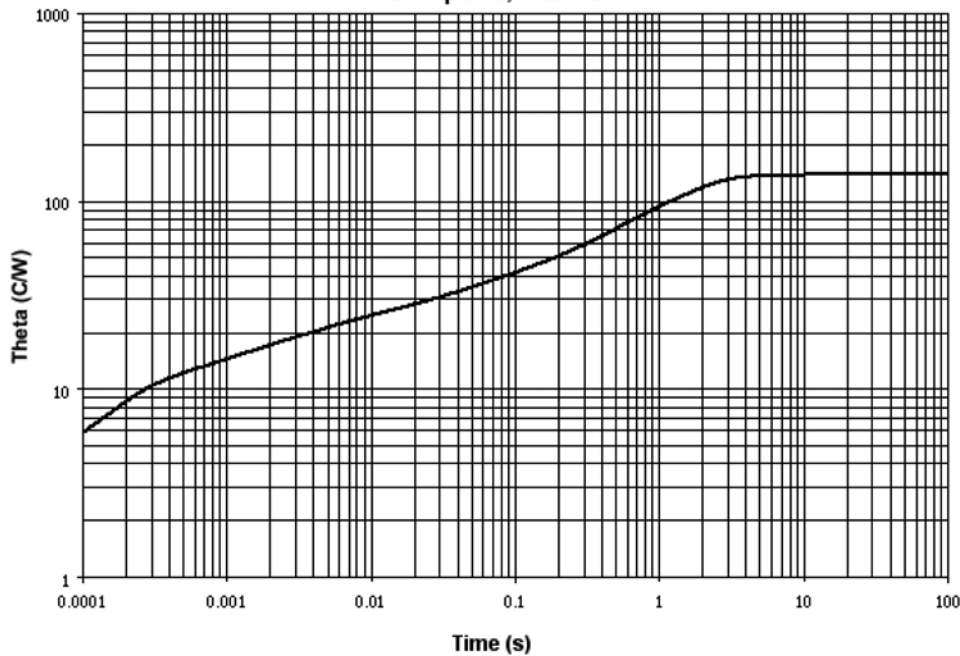
**FIGURE 6. Thermal impedance –  
all U and US devices.**

$R_{\Theta JL} = 40^{\circ}\text{C/W}$

$Z_{\Theta JX} = 25^{\circ}\text{C/W}$  maximum at  $t_H = 10\text{ms}$

Lead spacing = .375 inch mounted to an infinite heat dissipater

**Maximum Thermal Impedance Plots  
Axial parts, TL = 25°C**



**FIGURE 7. Thermal impedance (axial leads).**

$R_{\Theta JL} = 150^{\circ}\text{C/W}$

$Z_{\Theta JX} = 25^{\circ}\text{C/W}$  maximum at  $t_H = 10\text{ms}$

Lead spacing = 0 inch mounted to an infinite heat dissipater

Suggested Minimum Footprints  
D-5D (D-BODY) U, US DIODES

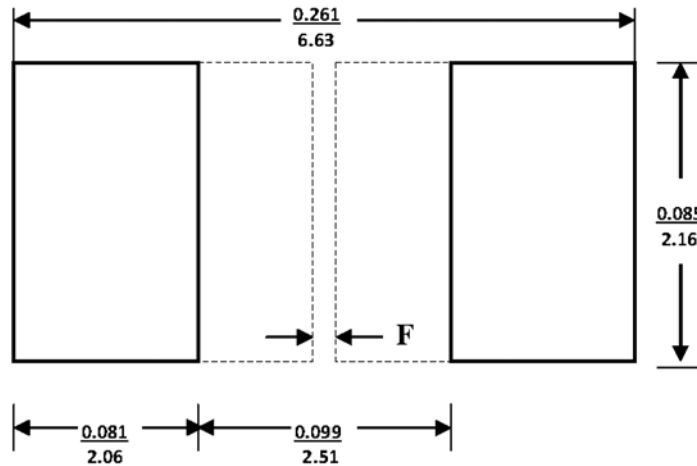


FIGURE 8

NOTES:

1. Dimensions are in inches / mm.
2. The dimensions listed will match the device terminals based on worst-case package outline drawings and assuming accuracy of device placements is within 0.005 inches. Footprints also provide for solder filets at the outer ends of the device at least as wide as the terminals.
3. F designates recommendation to fill unused area with an extended copper pad in order to reduce the CTE difference between the device and the PC board. The extended area may be coated with a solder mask. the width of F depends upon your PCB design rules.

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