

# 1N66xx Series



## Switching Diodes

Rev. V6

### Features

- JAN, JANTX, JANTXV and JANS available per MIL-PRF-19500/578 &/609
- Non-Cavity Glass Package
- Category I Metallurgically Bonded
- Replacement for 1N4148-1, 1N4150-1, 1N914
- Very Low Capacitance
- Ultra Fast Recovery Time



MELF (US)



Axial

### Electrical Specifications

| Part #         | $V_{BR} @ I_R$ |         | $V_{RWM}$ | $V_{FR} / t_{FR}$        |       | $C_{T1}$              | $C_{T2}$              | trr |
|----------------|----------------|---------|-----------|--------------------------|-------|-----------------------|-----------------------|-----|
|                | V(pk)          | $\mu A$ |           | @ $I_F = 200 \text{ mA}$ |       | $V_R = 0.0 \text{ V}$ | $V_R = 1.5 \text{ V}$ |     |
|                |                |         | V(pk)     | $\mu A$                  | V(pk) | ns                    | pF                    | pF  |
| 1N6638, U & US | 150            | 100     | 125       | 5                        | 20    | 2.5                   | 2.0                   | 4.5 |
| 1N6639, U & US | 100            | 10      | 75        | 5                        | 10    | 2.5                   | —                     | 4   |
| 1N6640, U & US | 75             | 10      | 50        | 5                        | 10    | 2.5                   | —                     | 4   |
| 1N6641, U & US | 75             | 10      | 50        | 5                        | 10    | 3.0                   | —                     | 5   |
| 1N6642, U & US | 100            | 100     | 75        | 5                        | 20    | 5.0                   | 2.8                   | 5   |
| 1N6643, U & US | 75             | 100     | 50        | 5                        | 20    | 5.0                   | 2.8                   | 6   |

| Part #         | $I_R$                |                 |  |   | $V_F @ I_F$                  |                             |                            |                           | $I_F$                 |
|----------------|----------------------|-----------------|--|---|------------------------------|-----------------------------|----------------------------|---------------------------|-----------------------|
|                | $V_R = 20 \text{ V}$ | $V_R = V_{RWM}$ | $V_R = 20 \text{ V}$<br>$T_A = +150^\circ\text{C}$ | $V_R = V_{RWM}$<br>$T_A = +150^\circ\text{C}$ |                              |                             | $T_A = +150^\circ\text{C}$ | $T_A = -55^\circ\text{C}$ |                       |
|                | nA                   | nA              | $\mu A$  | $\mu A$                                       | V                            | V                           | V                          | V                         |                       |
|                |                      |                 |  |   | Min.                         | Max.                        | Max.                       | Max.                      | (pulsed)              |
| 1N6638, U & US | 35                   | 500             | 50   | 100   | —                            | 1.1<br>0.8                  | —<br>0.65                  | 1.2<br>—                  | 200<br>10             |
| 1N6639, U & US | —                    | 100             | —  | 90  | —                            | 1.2                         | —                          | 1.3                       | 500                   |
| 1N6640, U & US | —                    | 100             | —  | 90  | 0.54<br>0.76<br>0.82<br>0.87 | 0.62<br>0.86<br>0.92<br>1.0 | —<br>—<br>—<br>—           | —<br>—<br>—<br>1.1        | 1<br>50<br>100<br>200 |
| 1N6641, U & US | —                    | 100             | —  | 90  | 0.87                         | 1.1                         | —                          | 1.2                       | 200                   |
| 1N6642, U & US | 25                   | 500             | 50   | 100   | —                            | 0.8<br>1.2                  | 0.8<br>—                   | —<br>1.2                  | 10<br>100             |
| 1N6643, U & US | 50                   | 500             | 75   | 100   | —                            | 0.8<br>1.2                  | 0.8<br>—                   | —<br>1.4                  | 10<br>100             |

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### Absolute Maximum Ratings<sup>1,2</sup>

| Parameter             | Absolute Maximum |
|-----------------------|------------------|
| Operating Temperature | -65°C to +175°C  |

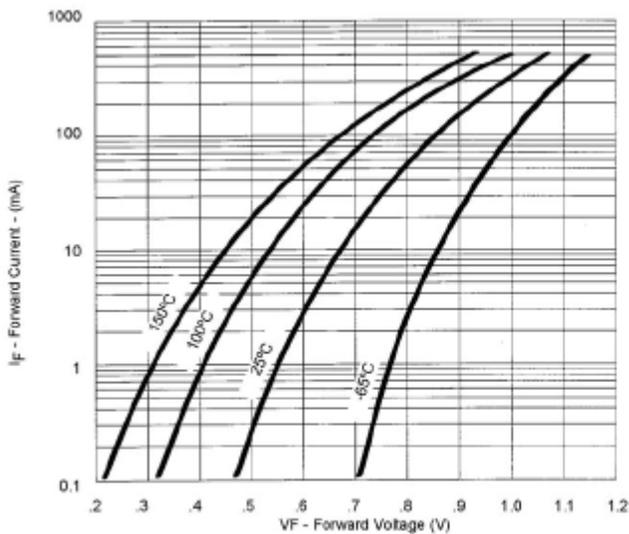
1. Exceeding any one or combination of these limits may cause permanent damage to this device.
2. VPT Components does not recommend sustained operation near these survivability limits.

### Handling Procedures

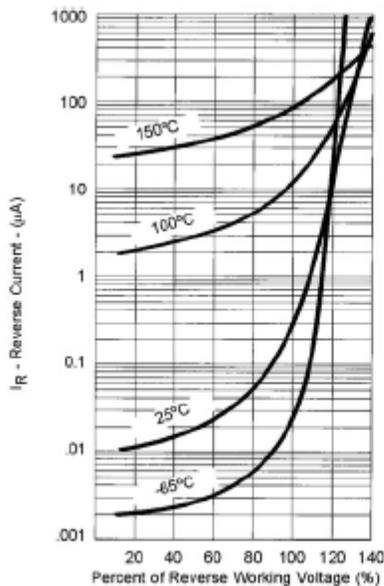
Please observe the following precautions to avoid damage:

### Static Sensitivity

These electronic devices are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Proper ESD control techniques should be used when handling these devices.

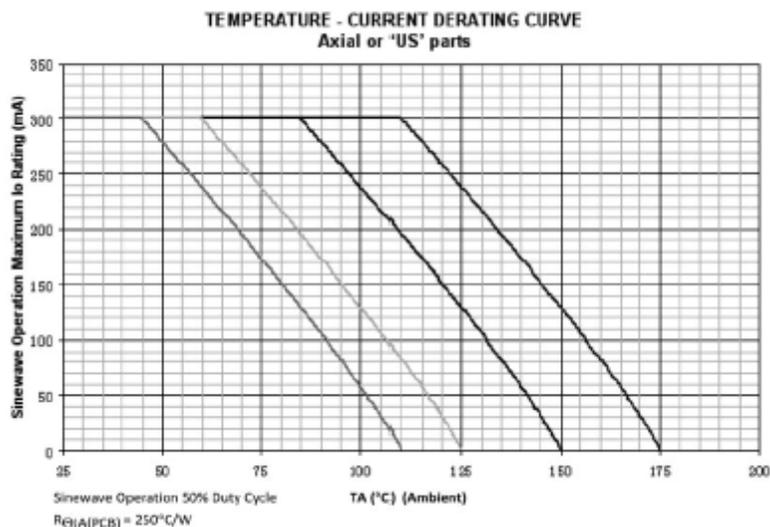


**FIGURE 3**  
Typical Forward Current vs Forward Voltage



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

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



### NOTES:

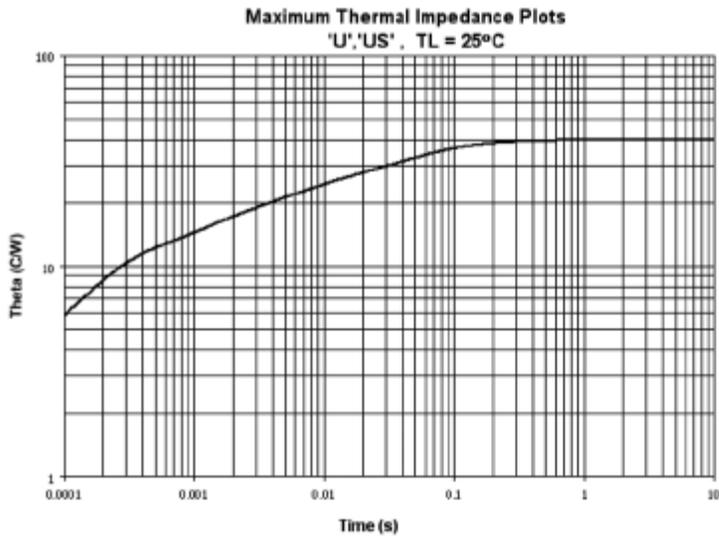
1. All devices are capable of operating at  $\leq T_J$  specified on this curve. Any parallel line to this curve will intersect the appropriate current for the desired maximum  $T_J$  allowed.
2. Derate design curve constrained by the maximum junction temperatures and current rating specified. (See 1.3.)
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.

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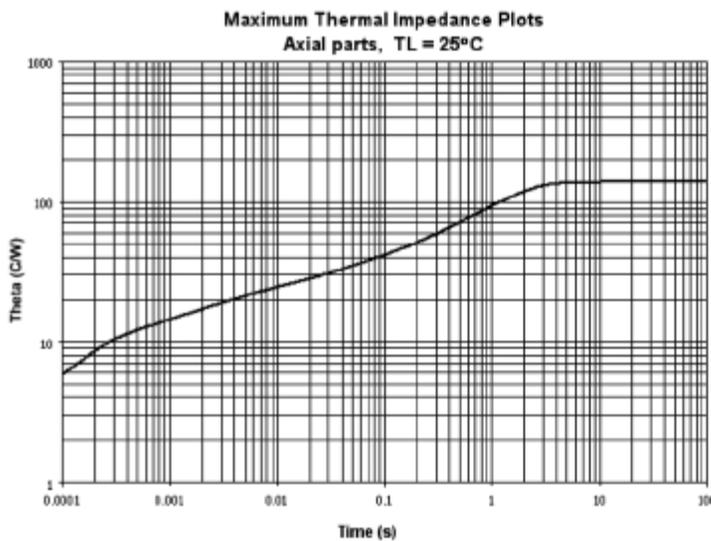


**FIGURE 6.** Thermal impedance – all U and US devices.

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

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

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



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

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

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

Lead spacing = 0 inch mounted to an infinite heat dissipater

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### Outline Drawing

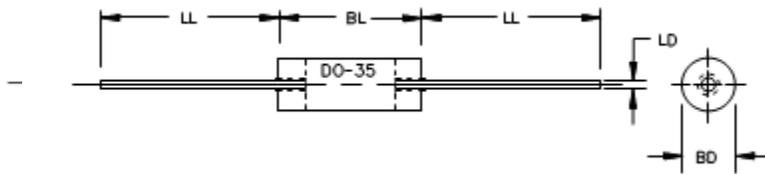


FIGURE 1

| 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

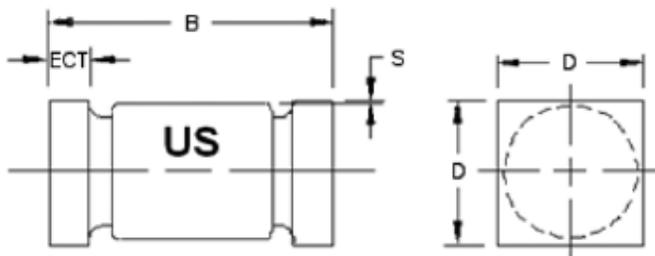


FIGURE 2

| 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 ASMEY14.5M, diameters are equivalent to  $\Phi$ x symbology.
5. U-suffix parts are structurally identical to the US-suffix parts.

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

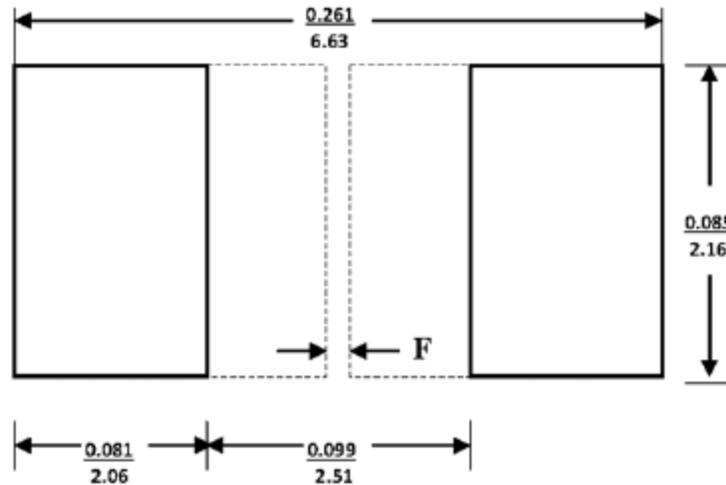


FIGURE 8

#### 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 fillets 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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