



## Glass MELF Switching Diode

Qualified per MIL-PRF-19500/116

Qualified Levels:  
JAN, JANTX, and  
JANTXV

### DESCRIPTION

This popular 1N4148UR-1 JEDEC registered switching/signal diode features internal metallurgical bonded construction for military grade products per MIL-PRF-19500/116. Previously listed as a CDLL4148 this small low capacitance diode, with very fast switching speeds, is hermetically sealed and bonded into a double-plug DO-213AA package. It may be used in a variety of very high speed applications including switchers, detectors, transient OR'ing, logic arrays, blocking, as well as low-capacitance steering diodes, etc. Microsemi also offers a variety of other switching/signal diodes.

**Important:** For the latest information, visit our website <http://www.microsemi.com>.

### FEATURES

- Surface mount equivalent of popular JEDEC registered 1N4148 number.
- Hermetically sealed glass construction.
- Metallurgically bonded.
- Double plug construction.
- Very low capacitance.
- Very fast switching speeds with minimal reverse recovery times.
- JAN, JANTX, and JANTXV qualification is available per MIL-PRF-19500/116. (See [part nomenclature](#) for all available options.)
- RoHS compliant version available (commercial grade only).

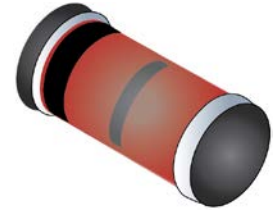
### APPLICATIONS / BENEFITS

- High frequency data lines.
- Small size for high density mounting using the surface mount method (see package illustration).
- RS-232 & RS-422 interface networks.
- Ethernet 10 Base T.
- Low capacitance steering or blocking.
- LAN.
- Computers.

### MAXIMUM RATINGS @ 25 °C


| Parameters/Test Conditions  | Symbol                            | Value       | Unit   |
|---|-----------------------------------|-------------|--------|
| Junction and Storage Temperature                                  | T <sub>J</sub> & T <sub>STG</sub> | -65 to +175 | °C     |
| Thermal Resistance Junction-to-Ambient <sup>(1)</sup>             | R <sub>θJA</sub>                  | 325         | °C/W   |
| Thermal Resistance Junction-to-Endcap <sup>(2)</sup>              | R <sub>θJEC</sub>                 | 100         | °C/W   |
| Maximum Breakdown Voltage   | V <sub>(BR)</sub>                 | 100         | V      |
| Working Peak Reverse Voltage                                      | V <sub>RWM</sub>                  | 75          | V      |
| Average Rectified Current @ T <sub>A</sub> = 75 °C <sup>(3)</sup> | I <sub>O</sub>                    | 200         | mA     |
| Non-Repetitive Sinusoidal Surge Current (tp = 8.3 ms)             | I <sub>FSM</sub>                  | 2           | A (pk) |


- 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 = .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> = 200 mA dc.
  2. See [Figure 2](#) for thermal impedance curves.
  3. See [Figure 1](#) for derating.




### DO-213AA Package

Also available in:

**DO-35 package**  
(axial-leaded)  
 [1N4148-1](#)

**UB package**  
(surface mount)  
 [1N4148UB](#)

**UB2 package**  
(2-Pin surface mount)  
 [1N4148UB2](#)

**UBC package**  
(Ceramic Lid surface mount)  
 [1N4148UBC](#)

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**MECHANICAL and PACKAGING**

- CASE: Hermetically sealed glass case package.
- TERMINALS: Tin/lead plated or RoHS compliant matte-tin (on commercial grade only) over copper clad steel. Solderable per MIL-STD-750, method 2026.
- POLARITY: Cathode end is banded.
- MOUNTING: The axial coefficient of expansion (COE) of this device is approximately +6PPM/°C. The COE of the mounting surface system should be selected to provide a suitable match with this device.
- MARKING: Part number.
- TAPE & REEL option: Standard per EIA-296. Consult factory for quantities.
- WEIGHT: 0.2 grams.
- See [Package Dimensions](#) on last page.

**PART NOMENCLATURE**
**JAN 1N4148 UR -1 (e3)**
**Reliability Level**

JAN = JAN level  
 JANTX = JANTX level  
 JANTXV = JANTXV level  
 See **1N6642US** for JANS level  
 Blank = Commercial grade

**JEDEC type number**

(see [Electrical Characteristics](#) table)

**RoHS Compliance**

e3 = RoHS compliant (on commercial grade only)  
 Blank = non-RoHS compliant

**Metallurgically Bonded**
**MELF Surface Mount**
**SYMBOLS & DEFINITIONS**

| Symbol    | Definition  |
|-----------|---|
| $I_R$     | Reverse Current: The maximum reverse (leakage) current that will flow at the specified voltage and temperature.   |
| $I_o$     | Average Rectified Forward Current: The output current averaged over a full cycle with a 50 Hz or 60 Hz sine-wave input and a 180 degree conduction angle.   |
| $t_{rr}$  | 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 decay point after a peak reverse current occurs. |
| $V_F$     | Forward Voltage: The forward voltage the device will exhibit at a specified current (typically shown as maximum value).   |
| $V_R$     | Reverse Voltage: The reverse voltage dc value, no alternating component.  |
| $V_{RWM}$ | Working Peak Reverse Voltage: The maximum peak voltage that can be applied over the operating temperature range excluding all transient voltages (ref JESD282-B). Also sometimes known as PIV.                                  |

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

| FORWARD VOLTAGE<br>$V_{F1}$ @<br>$I_F=10$ mA | FORWARD VOLTAGE<br>$V_{F2}$ @<br>$I_F=100$ mA | REVERSE RECOVERY TIME<br>$t_{rr}$<br>(Note 1) | FORWARD RECOVERY TIME<br>$t_{fr}$<br>(Note 2) | REVERSE CURRENT<br>$I_{R1}$ @ 20 V | REVERSE CURRENT<br>$I_{R2}$ @ 75 V | REVERSE CURRENT<br>$I_{R3}$ @ 20 V<br>$T_A=150^\circ\text{C}$ | REVERSE CURRENT<br>$I_{R4}$ @ 75 V<br>$T_A=150^\circ\text{C}$ | CAPACITANCE<br>C<br>(Note 3) | CAPACITANCE<br>C<br>(Note 4) |
|--|---|---|---|------------------------------------|------------------------------------|---|---|------------------------------|------------------------------|
| V  | V   | ns  | ns  | nA                                 | $\mu\text{A}$                      | $\mu\text{A}$   | $\mu\text{A}$   | pF                           | pF                           |
| 0.8  | 1.2   | 5   | 20  | 25                                 | 0.5                                | 35  | 75  | 4.0                          | 2.8                          |

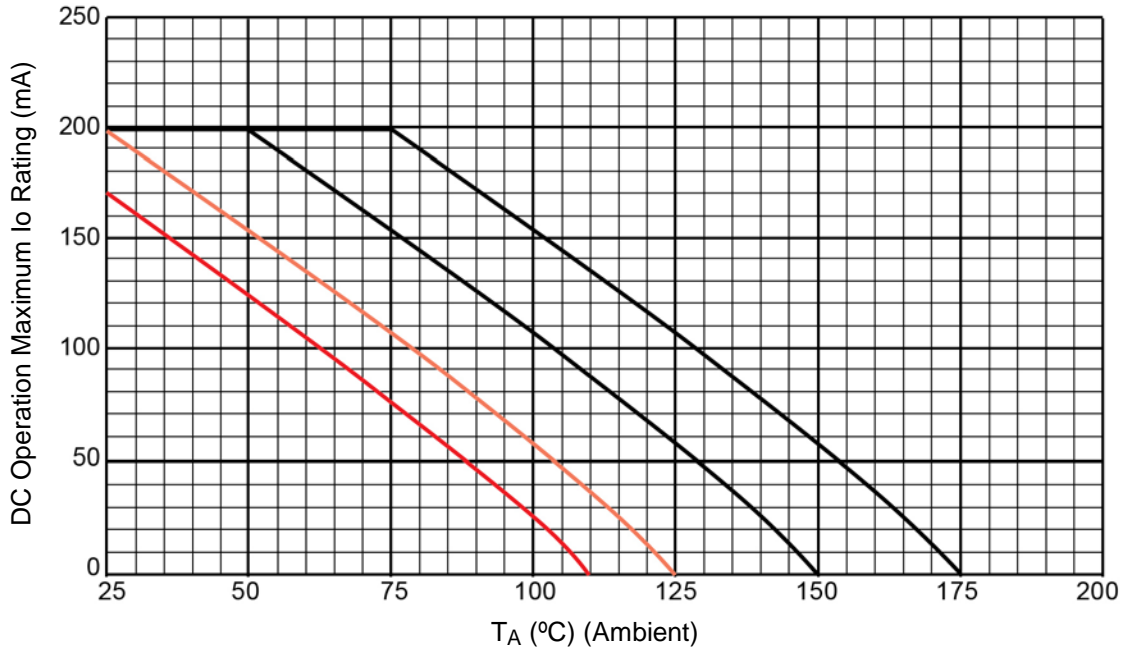
**NOTE 1:**  $I_F = I_R = 10$  mA,  $R_L = 100$  Ohms.

**NOTE 2:**  $I_F = 50$  mA.

**NOTE 3:**  $V_R = 0$  V,  $f = 1$  MHz,  $V_{SIG} = 50$  mV (pk to pk).

**NOTE 4:**  $V_R = 1.5$  V,  $f = 1$  MHz,  $V_{SIG} = 50$  mV (pk to pk).

**GRAPHS**



**FIGURE 1 – Temperature – Current Derating**



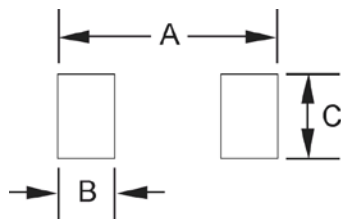
**FIGURE 2 – Thermal Impedance**

**PACKAGE DIMENSIONS**


| DIM        | INCH     |       | MILLIMETERS |      |
|------------|----------|-------|-------------|------|
|            | MIN      | MAX   | MIN         | MAX  |
| <b>BD</b>  | 0.063    | 0.067 | 1.60        | 1.70 |
| <b>BL</b>  | 0.130    | 0.146 | 3.30        | 3.71 |
| <b>ECT</b> | 0.016    | 0.022 | 0.41        | 0.56 |
| <b>S</b>   | .001 min |       | 0.03 min    |      |

**NOTES:**

1. Dimensions are in inches. Millimeters are given for general information only.
2. Dimensions are pre-solder dip.
3. Referencing to dimension S, minimum clearance of glass body to mounting surface on all orientations.
4. In accordance with ASME Y14.5M, diameters are equivalent to  $\Phi x$  symbology.

**PAD LAYOUT**


|          | INCH | mm   |
|----------|------|------|
| <b>A</b> | .200 | 5.08 |
| <b>B</b> | .055 | 1.40 |
| <b>C</b> | .080 | 2.03 |

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