



## Glass MELF Switching Diode

**Qualified per MIL-PRF-19500/116**

### 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

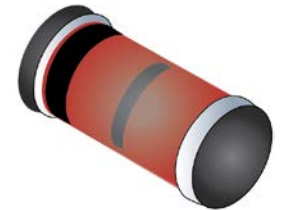
- High frequency data lines.
- Small size for high density mounting using the surface mount method (see package illustration).
- RS-232 & RS-422 interface networks.
- Ethernet 10 Base T.
- Low capacitance steering or blocking.
- LAN.
- Computers.

### MAXIMUM RATINGS @ 25 °C

| Parameters/Test Conditions                               | Symbol            | Value       | Unit   |
|----------------------------------------------------------|-------------------|-------------|--------|
| Junction and Storage Temperature                         | $T_J$ & $T_{STG}$ | -65 to +175 | °C     |
| Thermal Resistance Junction-to-Ambient <sup>(1)</sup>    | $R_{\theta JA}$   | 325         | °C/W   |
| Thermal Resistance Junction-to-Endcap <sup>(2)</sup>     | $R_{\theta JEC}$  | 100         | °C/W   |
| Maximum Breakdown Voltage                                | $V_{(BR)}$        | 100         | V      |
| Working Peak Reverse Voltage                             | $V_{RWM}$         | 75          | V      |
| Average Rectified Current @ $T_A = 75$ °C <sup>(3)</sup> | $I_O$             | 200         | mA     |
| Non-Repetitive Sinusoidal Surge Current (tp = 8.3 ms)    | $I_{FSM}$         | 2           | A (pk) |

- NOTES:**
1.  $T_A = +75$ °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);  $R_{\theta JA}$  with a defined PCB thermal resistance condition included, is measured at  $I_O = 200$  mA dc.
  2. See [Figure 2](#) for thermal impedance curves.
  3. See [Figure 1](#) for derating.

Qualified Levels:  
JAN, JANTX, and  
JANTXV



### 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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[www.microsemi.com](http://www.microsemi.com)

## 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

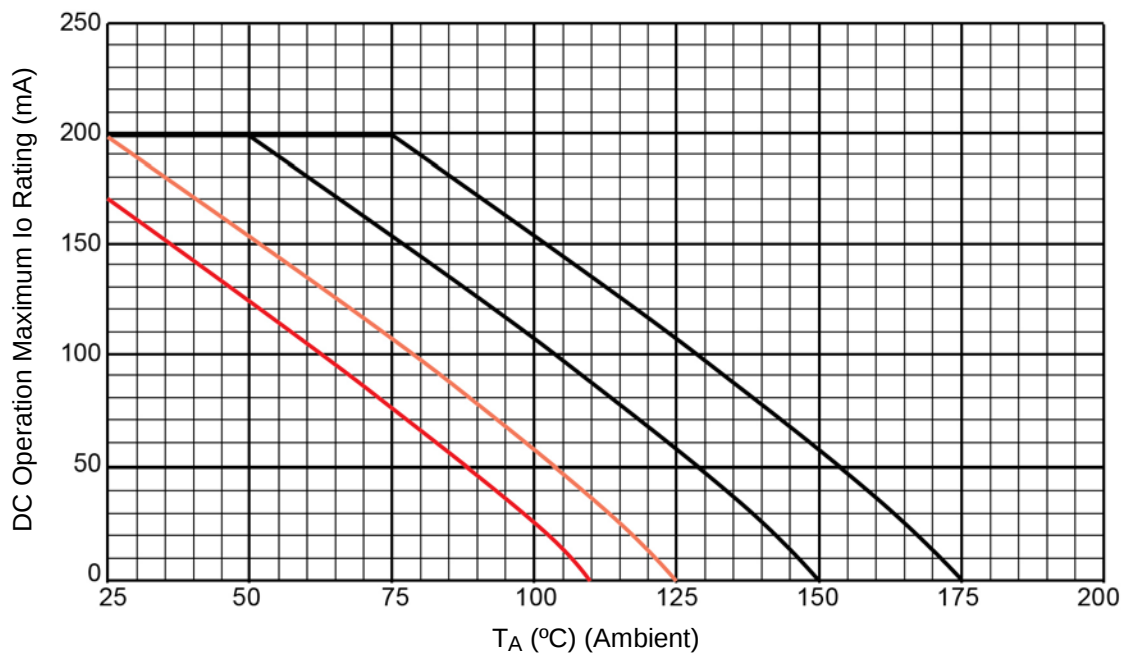
| FORWARD VOLTAGE<br>$V_{F1}$ @<br>$I_F=10$ mA | FORWARD VOLTAGE<br>$V_{F2}$ @<br>$I_F=100$ mA | REVERSE RECOVERY TIME<br>$t_{rr}$<br>(Note 1) | FORWARD RECOVERY TIME<br>$t_{fr}$<br>(Note 2) | REVERSE CURRENT<br>$I_{R1}$ @ 20 V | REVERSE CURRENT<br>$I_{R2}$ @ 75 V | REVERSE CURRENT<br>$I_{R3}$ @ 20 V<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.

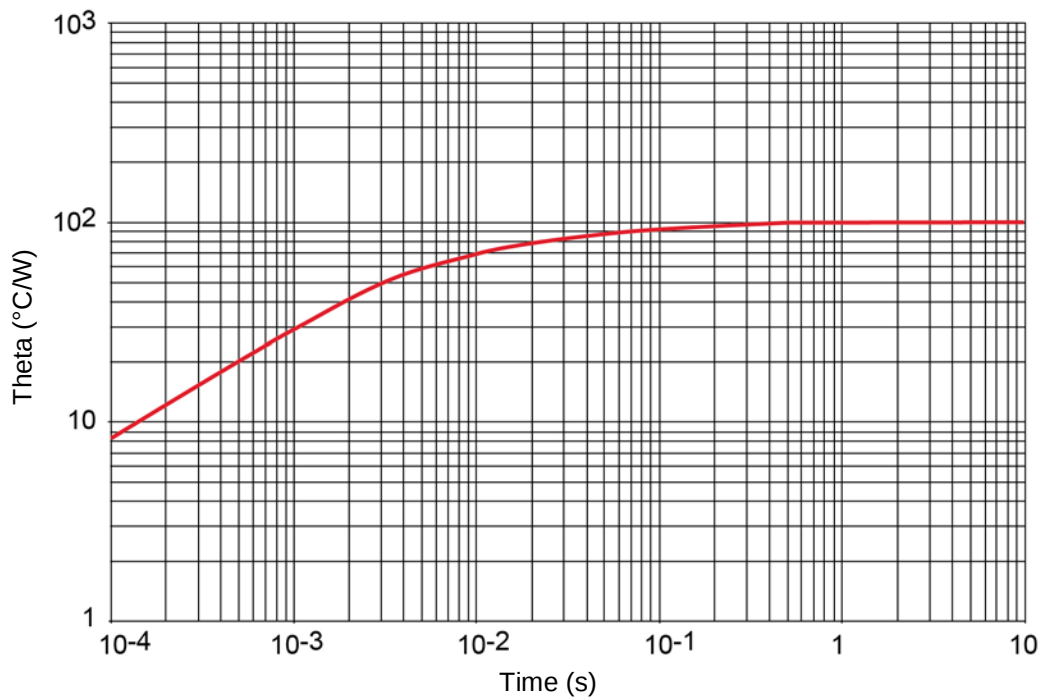
**NOTE 2:**  $I_F = 50$  mA.

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

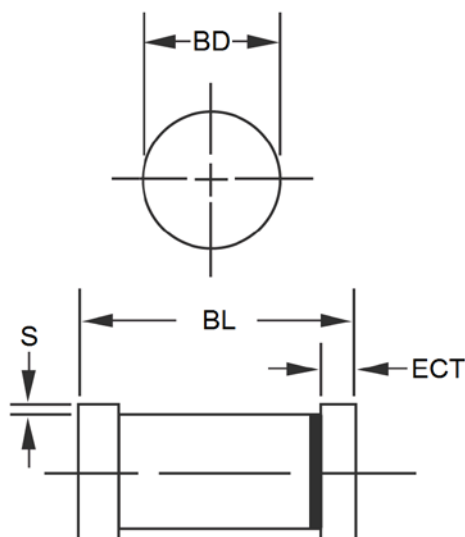
**NOTE 4:**  $V_R = 1.5$  V,  $f = 1$  MHz,  $V_{SIG} = 50$  mV (pk to pk).

**GRAPHS**


**FIGURE 1 – Temperature – Current Derating**



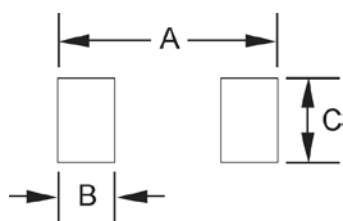
**FIGURE 2 – Thermal Impedance**

**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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