RoHS
*Available on commercial versions*

# 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.



**DO-213AA Package**

## 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 ºC

| Parameters/Test Conditions | Symbol | Value | Unit |
|---|---|---|---|
| Junction and Storage Temperature | $T_J$ & $T_{STG}$ | -65 to +175 | °C |
| Thermal Resistance Junction-to-Ambient (1) | $R_{\Theta JA}$ | 325 | °C/W |
| Thermal Resistance Junction-to-Endcap (2) | $R_{\Theta JEC}$ | 100 | °C/W |
| Maximum Breakdown Voltage | $V_{(BR)}$ | 100 | V |
| Working Peak Reverse Voltage | $V_{RWM}$ | 75 | V |
| Average Rectified Current @ $T_A$ = 75 ºC (3) | $I_O$ | 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.

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

**MSC – Lawrence**
6 Lake Street,
Lawrence, MA 01841
Tel: 1-800-446-1158 or
(978) 620-2600
Fax: (978) 689-0803

**MSC – Ireland**
Gort Road Business Park,
Ennis, Co. Clare, Ireland
Tel: +353 (0) 65 6840044
Fax: +353 (0) 65 6822298

**Website:**
www.microsemi.com


©2012 Microsemi Corporation

## 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 ºC unless otherwise noted

| FORWARD VOLTAGE $V_{F1}$ @ $I_F$=10 mA | FORWARD VOLTAGE $V_{F2}$ @ $I_F$=100 mA | REVERSE RECOVERY TIME $t_{rr}$ (Note 1) | FORWARD RECOVERY TIME $t_{fr}$ (Note 2) | REVERSE CURRENT $I_{R1}$ @ 20 V | REVERSE CURRENT $I_{R2}$ @ 75 V | REVERSE CURRENT $I_{R3}$ @ 20 V $T_A$=150°C | REVERSE CURRENT $I_{R4}$ @ 75 V $T_A$=150°C | CAPACI-TANCE C (Note 3) | CAPACI-TANCE C (Note 4) |
|---|---|---|---|---|---|---|---|---|---|
| V | V | ns | ns | nA | µA | µA | µA | 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).


©2012 Microsemi Corporation

## GRAPHS

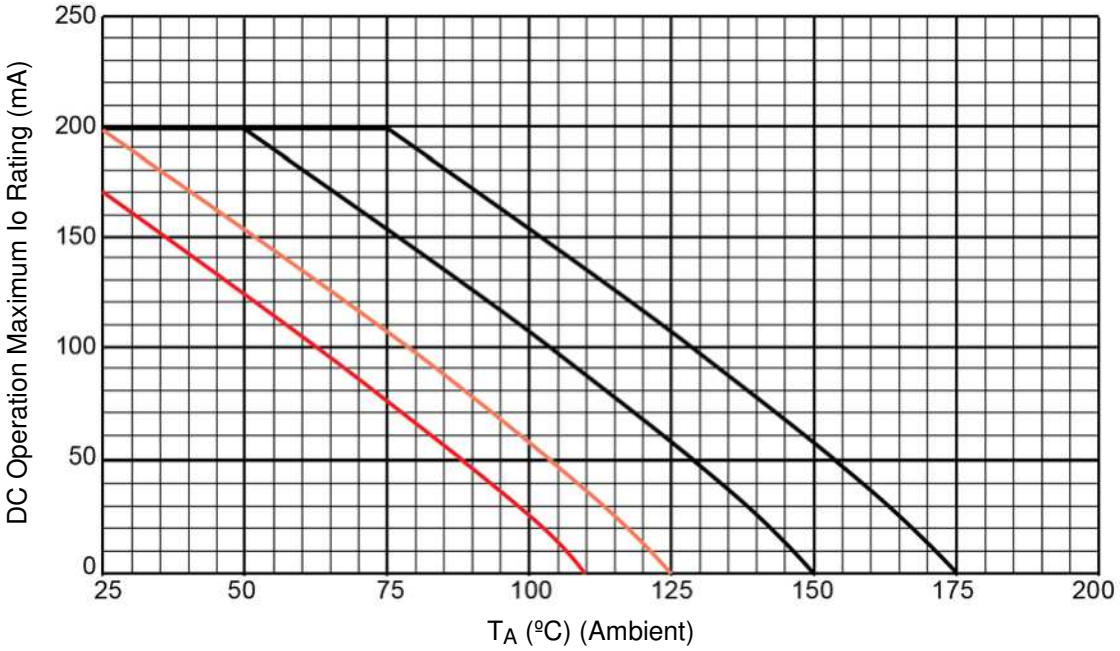



**FIGURE 1 –** Temperature – Current Derating

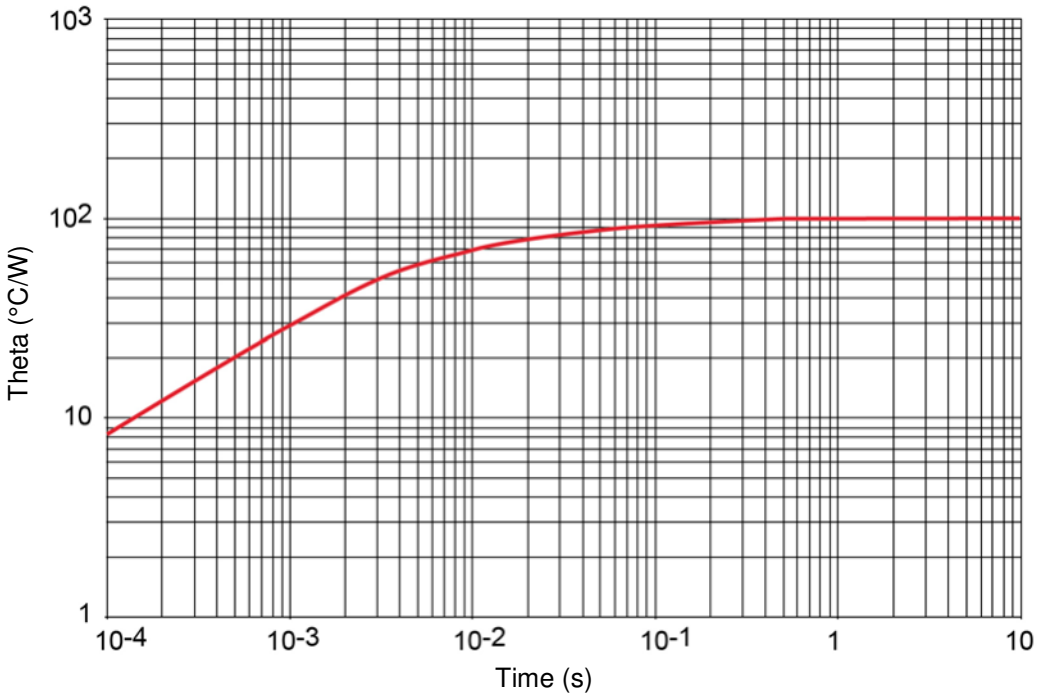
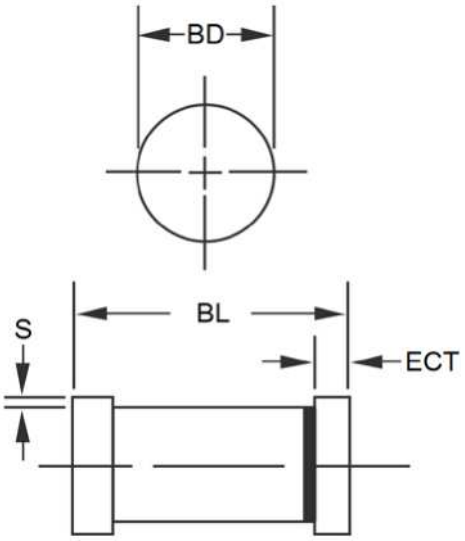



**FIGURE 2** – Thermal Impedance


©2012 Microsemi Corporation

## PACKAGE DIMENSIONS

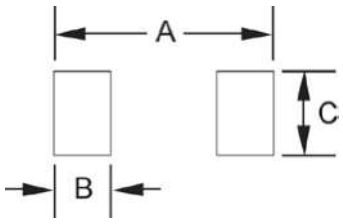



| DIM | INCH | | MILLIMETERS | |
|---|---|---|---|---|
| | MIN | MAX | MIN | MAX |
| BD | 0.063 | 0.067 | 1.60 | 1.70 |
| BL | 0.130 | 0.146 | 3.30 | 3.71 |
| ECT | 0.016 | 0.022 | 0.41 | 0.56 |
| S | .001 min | | 0.03 min | |

**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 Φx symbology.

## PAD LAYOUT




| | INCH | mm |
|---|---|---|
| A | .200 | 5.08 |
| B | .055 | 1.40 |
| C | .080 | 2.03 |


©2012 Microsemi Corporation