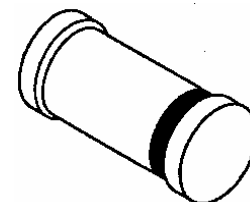


## DESCRIPTION

This surface mountable 1 watt Zener diode series is electrically equivalent to the 1N4728A thru 1N4764A registration in the DO-41 equivalent package except that it meets the JEDEC surface mount outline DO-213AB. It is an ideal selection for applications of high density and low parasitic requirements for voltage regulation. Standard voltage tolerance is +/- 5% with tighter tolerances available down to 1%. With its glass hermetic qualities, it may also be used for high reliability applications when required by a source control drawing (SCD).

**IMPORTANT:** For the most current data, consult MICROSEMI's website: <http://www.microsemi.com>

## APPEARANCE



**DO-213AB**

## FEATURES

- Electrically similar to the JEDEC registered 1N4728 thru 1N4764 zener series
- Zener voltages available 3.3V to 100V
- Standard voltage tolerances are +/- 5% with "A" suffix and 10 % with no suffix identification
- Tight tolerances available in plus or minus 2% or 1% with C or D suffix respectively
- Options for screening in accordance with MIL-PRF-19500 for JAN, JANTX, JANTXV, and JANS are available by adding MQ, MX, MV, or MSP prefixes respectively to part numbers.
- Surface mount equivalents also available as SMAJ4728A to SMAJ4764A and SMAJ4728A to SMAJ4764A
- RoHS Compliant devices also available by adding e3 suffix
- Plastic body axial-leaded Zener equivalents are also available as 1N4728A to 1N4764A

## APPLICATIONS / BENEFITS

- Regulates voltage over a broad operating current and temperature range
- Wide selection from 3.3 to 100 V
- Leadless package for surface mounting
- Ideal for high density mounting
- Nonsensitive to ESD
- Hermetically sealed glass package
- Specified capacitance (see Figure 2)
- Inherently radiation hard per MicroNote 050

## MAXIMUM RATINGS

- Power dissipation at 25°C: 1.0 watts (also see derating in Figure 1).
- Operating and Storage temperature: -65°C to +175°C
- Thermal Resistance: 50°C/W junction to end cap, or 130°C/W junction to ambient when mounted on FR4 PC board (1 oz Cu) with recommended footprint (see last page)
- Steady-State Power: 1.00 watts at  $T_{EC} \leq 125^{\circ}\text{C}$ , or 1.00 watts at  $T_A \leq 45^{\circ}\text{C}$  when mounted on FR4 PC board and recommended footprint as described for thermal resistance (also see Figure 1)
- Forward voltage @200 mA: 1.2 volts (maximum)
- Solder Temperatures: 260°C for 10 s (max)

## MECHANICAL AND PACKAGING

- CASE: Hermetically sealed DO-213AB glass MELF
- TERMINALS: Tin-Lead or RoHS Compliant annealed matte-Tin plating solderable per MIL-STD-750, method 2026
- POLARITY: Cathode indicated by band. Diode to be operated with the banded end positive with respect to the opposite end for Zener regulation
- MARKING: Cathode band only
- TAPE & REEL optional: Standard per EIA-481-B with 12 mm tape, 1500 per 7 inch reel or 5000 per 13 inch reel (add "TR" suffix to part number)
- WEIGHT: 0.05 grams
- See package dimensions & recommended mounting pad on last page

**ELECTRICAL CHARACTERISTICS @ T<sub>c</sub> = 30°C**

| TYPE<br>NUMBER<br>(NOTE 1 & 5) | ZENER<br>VOLTAGE<br>(NOTE 4)<br>V <sub>Z</sub> | TEST<br>CURRENT<br>I <sub>ZT</sub> | MAXIMUM<br>DYNAMIC<br>IMPEDANCE<br>(Note 2)<br>Z <sub>ZT</sub> @ I <sub>ZT</sub> | MAXIMUM<br>REVERSE<br>CURRENT<br>I <sub>R</sub> @ V <sub>R</sub> | TEST<br>VOLTAGE<br>V <sub>R</sub> | MAXIMUM<br>REGULATOR<br>CURRENT<br>T <sub>A</sub> = 50°C<br>I <sub>ZM</sub> | MAXIMUM<br>KNEE<br>IMPEDANCE<br>(NOTE2)<br>Z <sub>ZK</sub> @ I <sub>ZK</sub> | TEST<br>CURRENT<br>I <sub>ZK</sub> | MAXIMUM<br>(SURGE)<br>CURRENT<br>(NOTE 3)<br>I <sub>S</sub> |
|--------------------------------|------------------------------------------------|------------------------------------|----------------------------------------------------------------------------------|------------------------------------------------------------------|-----------------------------------|-----------------------------------------------------------------------------|------------------------------------------------------------------------------|------------------------------------|-------------------------------------------------------------|
|                                | Volts                                          | mA                                 | Ohms                                                                             | μA                                                               | Volts                             | mA                                                                          | Ohms                                                                         | mA                                 | mA                                                          |
| 1N4728AUR                      | 3.3                                            | 76                                 | 10                                                                               | 100                                                              | 1                                 | 276                                                                         | 400                                                                          | 1.0                                | 1380                                                        |
| 1N4729AUR                      | 3.6                                            | 69                                 | 10                                                                               | 100                                                              | 1                                 | 252                                                                         | 400                                                                          | 1.0                                | 1260                                                        |
| 1N4730AUR                      | 3.9                                            | 64                                 | 9                                                                                | 50                                                               | 1                                 | 234                                                                         | 400                                                                          | 1.0                                | 1190                                                        |
| 1N4731AUR                      | 4.3                                            | 58                                 | 9                                                                                | 10                                                               | 1                                 | 217                                                                         | 400                                                                          | 1.0                                | 1070                                                        |
| 1N4732AUR                      | 4.7                                            | 53                                 | 8                                                                                | 10                                                               | 1                                 | 193                                                                         | 500                                                                          | 1.0                                | 970                                                         |
| 1N4733AUR                      | 5.1                                            | 49                                 | 7                                                                                | 10                                                               | 1                                 | 178                                                                         | 550                                                                          | 1.0                                | 890                                                         |
| 1N4734AUR                      | 5.6                                            | 45                                 | 5                                                                                | 10                                                               | 2                                 | 162                                                                         | 600                                                                          | 1.0                                | 810                                                         |
| 1N4735AUR                      | 6.2                                            | 41                                 | 2                                                                                | 10                                                               | 3                                 | 146                                                                         | 700                                                                          | 1.0                                | 730                                                         |
| 1N4736AUR                      | 6.8                                            | 37                                 | 3.5                                                                              | 10                                                               | 4                                 | 133                                                                         | 700                                                                          | 1.0                                | 660                                                         |
| 1N4737AUR                      | 7.5                                            | 34                                 | 4.0                                                                              | 10                                                               | 5                                 | 121                                                                         | 700                                                                          | 0.5                                | 605                                                         |
| 1N4738AUR                      | 8.2                                            | 31                                 | 4.5                                                                              | 10                                                               | 6                                 | 110                                                                         | 700                                                                          | 0.5                                | 550                                                         |
| 1N4739AUR                      | 9.1                                            | 28                                 | 5.0                                                                              | 10                                                               | 7                                 | 100                                                                         | 700                                                                          | 0.5                                | 500                                                         |
| 1N4740AUR                      | 10                                             | 25                                 | 7                                                                                | 10                                                               | 7.6                               | 91                                                                          | 700                                                                          | 0.25                               | 454                                                         |
| 1N4741AUR                      | 11                                             | 23                                 | 8                                                                                | 5                                                                | 8.4                               | 83                                                                          | 700                                                                          | 0.25                               | 414                                                         |
| 1N4742AUR                      | 12                                             | 21                                 | 9                                                                                | 5                                                                | 9.1                               | 76                                                                          | 700                                                                          | 0.25                               | 380                                                         |
| 1N4743AUR                      | 13                                             | 19                                 | 10                                                                               | 5                                                                | 9.9                               | 69                                                                          | 700                                                                          | 0.25                               | 344                                                         |
| 1N4744AUR                      | 15                                             | 17                                 | 14                                                                               | 5                                                                | 11.4                              | 61                                                                          | 700                                                                          | 0.25                               | 304                                                         |
| 1N4745AUR                      | 16                                             | 15.5                               | 16                                                                               | 5                                                                | 12.2                              | 57                                                                          | 700                                                                          | 0.25                               | 285                                                         |
| 1N4746AUR                      | 18                                             | 14                                 | 20                                                                               | 5                                                                | 13.7                              | 50                                                                          | 750                                                                          | 0.25                               | 250                                                         |
| 1N4747AUR                      | 20                                             | 12.5                               | 22                                                                               | 5                                                                | 15.2                              | 45                                                                          | 750                                                                          | 0.25                               | 225                                                         |
| 1N4748AUR                      | 22                                             | 11.5                               | 23                                                                               | 5                                                                | 16.7                              | 41                                                                          | 750                                                                          | 0.25                               | 205                                                         |
| 1N4749AUR                      | 24                                             | 10.5                               | 25                                                                               | 5                                                                | 18.2                              | 38                                                                          | 750                                                                          | 0.25                               | 190                                                         |
| 1N4750AUR                      | 27                                             | 9.5                                | 35                                                                               | 5                                                                | 20.6                              | 34                                                                          | 750                                                                          | 0.25                               | 170                                                         |
| 1N4751AUR                      | 30                                             | 8.5                                | 40                                                                               | 5                                                                | 22.8                              | 30                                                                          | 1000                                                                         | 0.25                               | 150                                                         |
| 1N4752AUR                      | 33                                             | 7.5                                | 45                                                                               | 5                                                                | 25.1                              | 27                                                                          | 1000                                                                         | 0.25                               | 135                                                         |
| 1N4753AUR                      | 36                                             | 7.0                                | 50                                                                               | 5                                                                | 27.4                              | 25                                                                          | 1000                                                                         | 0.25                               | 125                                                         |
| 1N4754AUR                      | 39                                             | 6.5                                | 60                                                                               | 5                                                                | 29.7                              | 23                                                                          | 1000                                                                         | 0.25                               | 115                                                         |
| 1N4755AUR                      | 43                                             | 6.0                                | 70                                                                               | 5                                                                | 32.7                              | 22                                                                          | 1500                                                                         | 0.25                               | 110                                                         |
| 1N4756AUR                      | 47                                             | 5.5                                | 80                                                                               | 5                                                                | 35.8                              | 19                                                                          | 1500                                                                         | 0.25                               | 95                                                          |
| 1N4757AUR                      | 51                                             | 5.0                                | 95                                                                               | 5                                                                | 38.8                              | 18                                                                          | 1500                                                                         | 0.25                               | 90                                                          |
| 1N4758AUR                      | 56                                             | 4.5                                | 110                                                                              | 5                                                                | 42.6                              | 16                                                                          | 2000                                                                         | 0.25                               | 80                                                          |
| 1N4759AUR                      | 62                                             | 4.0                                | 125                                                                              | 5                                                                | 47.1                              | 14                                                                          | 2000                                                                         | 0.25                               | 70                                                          |
| 1N4760AUR                      | 68                                             | 3.7                                | 150                                                                              | 5                                                                | 51.7                              | 13                                                                          | 2000                                                                         | 0.25                               | 65                                                          |
| 1N4761AUR                      | 75                                             | 3.3                                | 175                                                                              | 5                                                                | 56.0                              | 12                                                                          | 2000                                                                         | 0.25                               | 60                                                          |
| 1N4762AUR                      | 82                                             | 3.0                                | 200                                                                              | 5                                                                | 62.2                              | 11                                                                          | 3000                                                                         | 0.25                               | 55                                                          |
| 1N4763AUR                      | 91                                             | 2.8                                | 250                                                                              | 5                                                                | 69.2                              | 10                                                                          | 3000                                                                         | 0.25                               | 50                                                          |
| 1N4764AUR                      | 100                                            | 2.5                                | 350                                                                              | 5                                                                | 76.0                              | 9                                                                           | 3000                                                                         | 0.25                               | 45                                                          |

**NOTE 1:** The type numbers shown with an "A" suffix have a +/-5% tolerance on the nominal Zener voltage. Also available with suffix "C" for +/-2%, and "D" for +/-1%, while the absence of a suffix letter denotes +/- 10% tolerance.

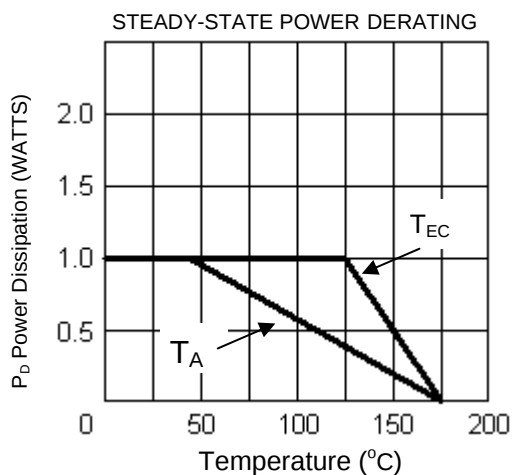
**NOTE 2:** The Zener impedance is derived from the 60Hz ac voltage, which results when an ac current having an rms value equal to 10% of the dc Zener current (I<sub>ZT</sub> or I<sub>ZK</sub>) is superimposed on I<sub>ZT</sub> or I<sub>ZK</sub>. Zener impedance is measured at two points to ensure a sharp knee on the breakdown curve and eliminate unstable units.

**NOTE 3:** The reverse surge current is measured at 25°C ambient using a ½ square wave or equivalent sine wave pulse 1/120 second duration superimposed on I<sub>ZT</sub>.

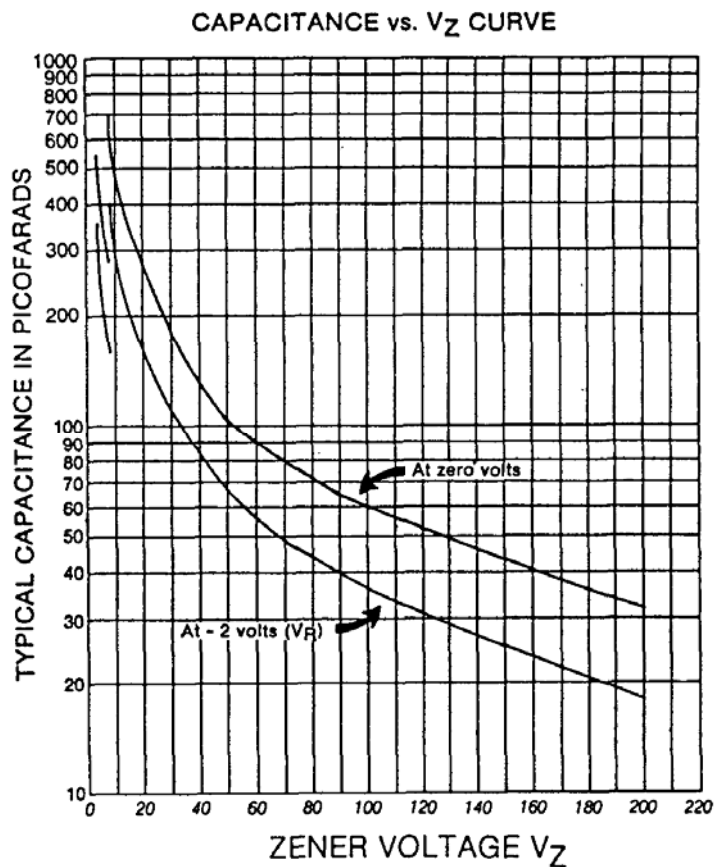
**NOTE 4:** Voltage measurements to be performed 90 seconds after application of dc current.

**NOTE 5:** This product series has also been previously identified as the MLL4728A thru MLL4764A series. This alternate name may still be used.

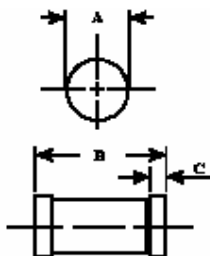
## GRAPHS



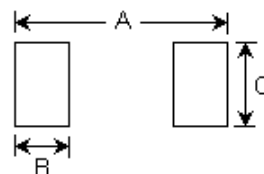
Power Derating Curve Where  $T_{EC}$  is End Cap Temp and  $T_A$  is Ambient Temperature on FR4 PC board.



## PACKAGE DIMENSIONS



| DIM | INCHES |       | MILLIMETERS |      |
|-----|--------|-------|-------------|------|
|     | MIN    | MAX   | MIN         | MAX  |
| A   | 0.094  | 0.105 | 2.39        | 2.66 |
| B   | 0.189  | 0.205 | 4.80        | 5.20 |
| C   | 0.016  | 0.022 | 0.41        | 0.55 |



PAD LAYOUT

|   | INCHES | mm   |
|---|--------|------|
| A | .276   | 7.00 |
| B | 0.070  | 1.8  |
| C | 0.110  | 2.8  |

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[1N4736CPe3/TR12](#) [1N4735CP/TR8](#) [1N4729UR-1](#) [1N4735P/TR12](#) [1N4734e3/TR13](#) [1N4735CPe3/TR12](#) [1N4758UR-](#)  
[1](#) [1N4751AUR/TR](#) [1N4736AUR/TR](#) [1N4733AURe3](#) [1N4750AUR/TR](#) [1N4747AUR/TR](#) [1N4738AURe3](#)  
[1N4752AUR/TR](#) [1N4733AUR/TR](#) [1N4735AUR/TR](#) [1N4742AUR/TR](#) [1N4757AUR/TR](#) [1N4738AURe3/TR](#)  
[1N4731AUR/TR](#) [1N4733AURe3/TR](#) [1N4749AUR/TR](#) [1N4759AUR/TR](#) [1N4740AUR/TR](#)

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