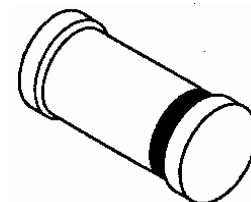


### DESCRIPTION

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).

### APPEARANCE



**DO-213AB**

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

### 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 @  $T_c = 30^\circ\text{C}$** 

| TYPE<br>NUMBER<br>(NOTE 1 & 5) | ZENER<br>VOLTAGE<br>(NOTE 4)<br>$V_Z$ | TEST<br>CURRENT<br>$I_{ZT}$ | MAXIMUM<br>DYNAMIC<br>IMPEDANCE<br>(Note 2)<br>$Z_{ZT} @ I_{ZT}$ | MAXIMUM<br>REVERSE<br>CURRENT<br>$I_R @ V_R$ | TEST<br>VOLTAGE<br>$V_R$ | MAXIMUM<br>REGULATOR<br>CURRENT<br>$T_A = 50^\circ\text{C}$<br>$I_{ZM}$ | MAXIMUM<br>KNEE<br>IMPEDANCE<br>(NOTE2)<br>$Z_{ZK} @ I_{ZK}$ | TEST<br>CURRENT<br>$I_{ZK}$ | MAXIMUM<br>(SURGE)<br>CURRENT<br>(NOTE 3)<br>$I_S$ |
|--------------------------------|---------------------------------------|-----------------------------|------------------------------------------------------------------|----------------------------------------------|--------------------------|-------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------|----------------------------------------------------|
|                                | Volts                                 | mA                          | Ohms                                                             | $\mu\text{A}$                                | 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.

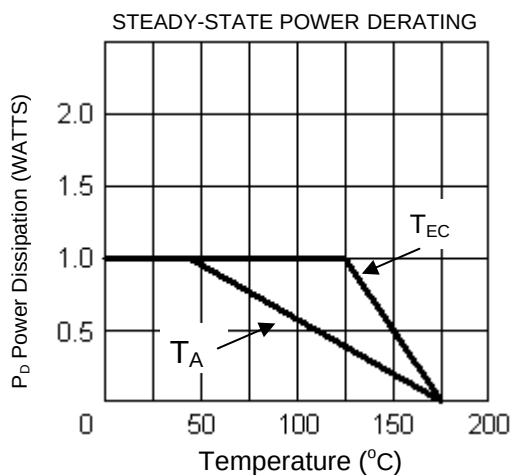
**NOTE 2:** The Zener impedance is derived from the 60Hz ac voltage, which results when an ac current having an rms value equal to 10% of the dc Zener current ( $I_{ZT}$  or  $I_{ZK}$ ) is superimposed on  $I_{ZT}$  or  $I_{ZK}$ . Zener impedance is measured at two points to ensure a sharp knee on the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

**NOTE 3:** The reverse surge current is measured at  $25^\circ\text{C}$  ambient using a  $\frac{1}{2}$  square wave or equivalent sine wave pulse 1/120 second duration superimposed on  $I_{ZT}$ .

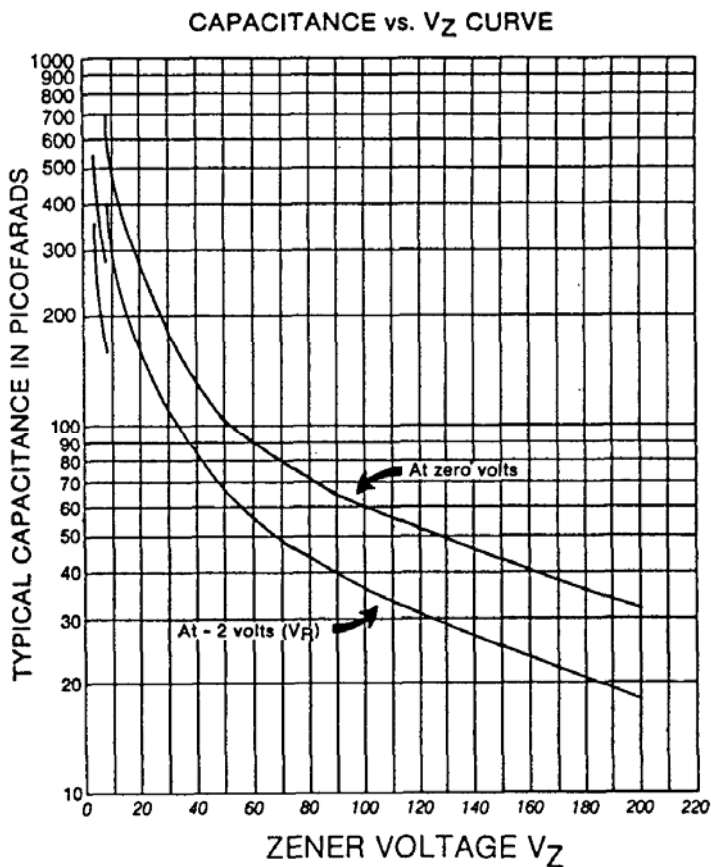
**NOTE 4:** Voltage measurements to be performed 90 seconds after application of dc current.

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

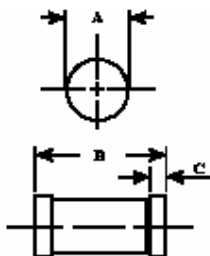
## GRAPHS



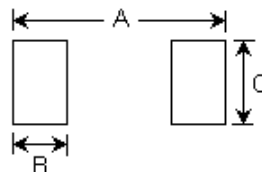
Power Derating Curve Where  $T_{EC}$  is End Cap Temp and  $T_A$  is Ambient Temperature on FR4 PC board.



## 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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[1N4735Pe3/TR8](#) [1N4736P/TR8](#) [1N4734UR-1](#) [1N4732UR-1](#) [1N4734CPe3/TR8](#) [1N4734Pe3/TR12](#) [1N4735Ce3/TR13](#)  
[1N4735UR-1](#) [1N4734Pe3/TR8](#) [1N4736P/TR12](#) [1N4730UR-1](#) [1N4736Pe3/TR8](#) [1N4736CP/TR12](#)  
[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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