Microsemi
SCOTTSDALE DIVISION

# 1N4728UR thru 1N4764AUR,e3
# (or MLL4728A thru MLL4764A,e3)

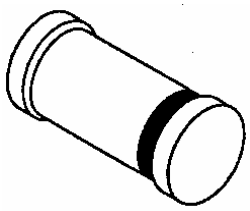
## SURFACE MOUNT 1.0 W GLASS ZENER DIODES

## 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 $T_{EC} \leq 125^{o}C$, or 1.00 watts at $T_A \leq 45^{o}C$ 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



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# 1N4728UR thru 1N4764AUR,e3
# (or MLL4728A thru MLL4764A,e3)

## SURFACE MOUNT 1.0 W GLASS ZENER DIODES



## ELECTRICAL CHARACTERISTICS @ $T_C$ = 30°C

| TYPE NUMBER (NOTE 1 & 5) | ZENER VOLTAGE (NOTE 4) $V_Z$ | TEST CURRENT $I_{ZT}$ | MAXIMUM DYNAMIC IMPEDANCE (Note 2) $Z_{ZT}$ @ $I_{ZT}$ | MAXIMUM REVERSE CURRENT $I_R$ @ $V_R$ | TEST VOLTAGE $V_R$ | MAXIMUM REGULATOR CURRENT $T_A$ = 50°C $I_{ZM}$ | MAXIMUM KNEE IMPEDANCE (NOTE2) $Z_{ZK}$ @ $I_{ZK}$ | TEST CURRENT $I_{ZK}$ | MAXIMUM (SURGE) CURRENT (NOTE 3) $I_S$ |
|---|---|---|---|---|---|---|---|---|---|
| | 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 ($I_{ZT}$ 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°C ambient using a ½ 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.



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## GRAPHS

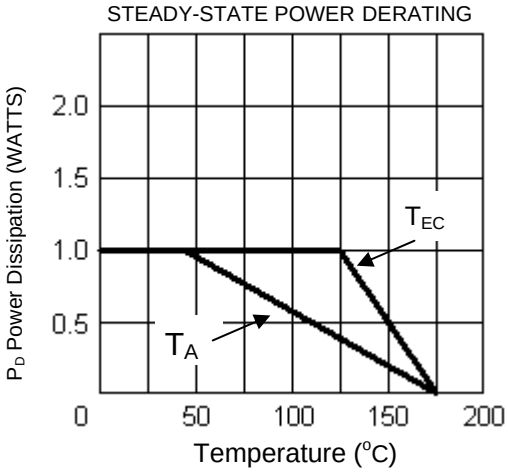



**FIGURE 1**

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

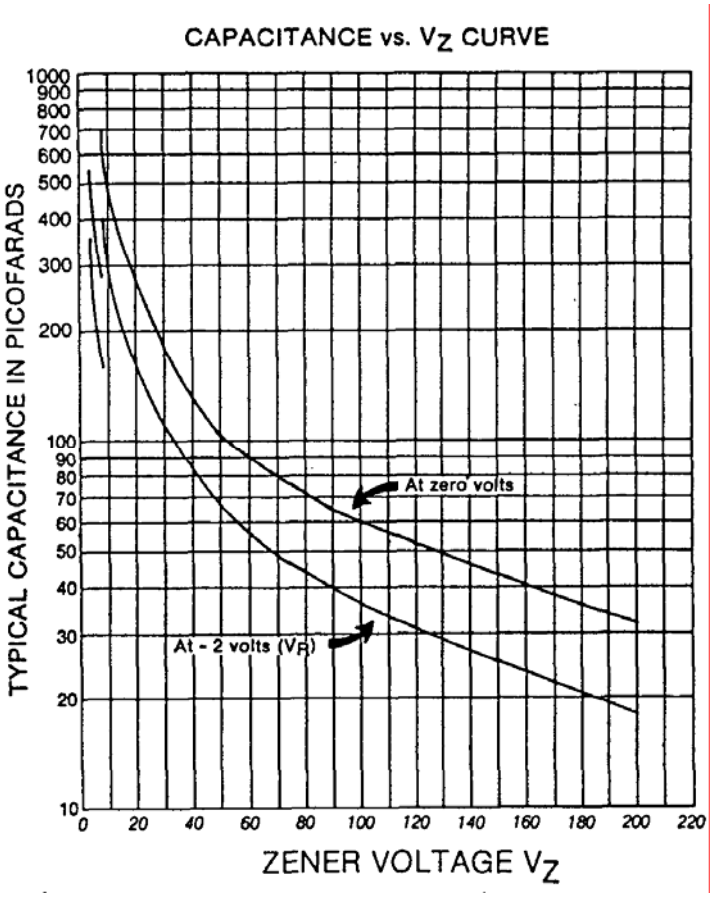
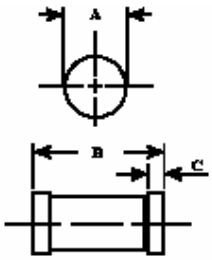
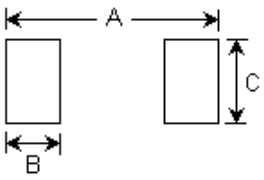



**FIGURE 2**

## 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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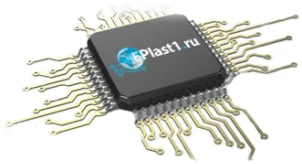


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