# 1N4728AG thru 1N4764AG, e3 (Glass)

## Silicon 1 Watt Zener Diodes

ALSO AVAILABLE IN SURFACE MOUNT

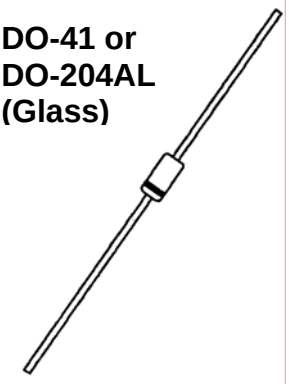
Microsemi
SCOTTSDALE DIVISION

## DESCRIPTION

The popular 1N4728AG thru 1N4764AG glass body series of 1.0 watt Zeners provides voltage regulation in a selection from 3.3 to 100 volts in 5% tolerances with other tighter tolerances also available as identified by different suffix letters on the part number. These glass encapsulated Zeners with a G suffix provide hermetic-sealed qualities and higher rated temperature when required beyond that optionally provided in the same size DO-41 plastic-body (P suffix) for these JEDEC part numbers. Both of these package options are available by Microsemi including RoHS Compliant devices with an "e3" suffix. A variety of other Zener product offerings and packages are available by Microsemi to meet higher and lower power or test current applications.

## APPEARANCE

**DO-41 or DO-204AL (Glass)**



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

## FEATURES

- JEDEC registered 1N4728A to 1N4764A
- 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 available as SMAJ4728A to SMAJ4764A and MLL4728A to MLL4764A (consult factory for others)
- Plastic body axial-leaded Zener equivalents are also available as 1N4728AP to 1N4764AP
- RoHS Compliant devices available by adding "e3" suffix

## APPLICATIONS / BENEFITS

- Regulates voltage over a broad operating current and temperature range
- Extensive voltage selection from 3.3 to 100 V
- Flexible axial-lead mounting terminals
- Standard voltage tolerances are plus/minus 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
- Nonsensitive to ESD per MIL-STD-750 Method 1020
- Hermetically sealed glass body construction

## 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: 80 °C/W junction to lead at 3/8 (10 mm) lead length from body, or 140°C/W junction to ambient when mounted on FR4 PC board (1 oz Cu) with 4 $mm^2$ copper pads and track width 1 mm, length 25 mm
- Steady-State Power: 1.0 watts at $T_L \leq 95°C$ 3/8 inch (10 mm) from body or 1.00 watt at $T_A \leq 35°C$ when mounted on FR4 PC board as described for thermal resistance above (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 axial-lead glass package
- TERMINALS: Tin-Lead (Sn/Pb) or RoHS Compliant annealed matte-Tin plated 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: Part number
- TAPE & REEL option: Standard per EIA-296 (add "TR" suffix to part number)
- WEIGHT: 0.4 grams
- See package dimensions on last page



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## ELECTRICAL CHARACTERISTICS*

| JEDEC TYPE NUMBER (Note 1) | ZENER VOLTAGE (Note 4) (Vz) | 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 $T_A = 50^oC$ ($I_{ZM}$) | MAXIMUM KNEE IMPEDANCE (Note 2) ($Z_{ZK}$ @ $I_{ZK}$) | TEST CURRENT ($I_{ZK}$) | MAXIMUM (SURGE) CURRENT (Note 3) ($I_S$) |
|---|---|---|---|---|---|---|---|---|---|
| | VOLTS | mA | OHMS | µA | VOLTS | mA | OHMS | mA | mA |
| 1N4728A | 3.3 | 76 | 10 | 100 | 1 | 276 | 400 | 1.0 | 1380 |
| 1N4729A | 3.6 | 69 | 10 | 100 | 1 | 252 | 400 | 1.0 | 1260 |
| 1N4730A | 3.9 | 64 | 9 | 50 | 1 | 234 | 400 | 1.0 | 1190 |
| 1N4731A | 4.3 | 58 | 9 | 10 | 1 | 217 | 400 | 1.0 | 1070 |
| 1N4732A | 4.7 | 53 | 8 | 10 | 1 | 193 | 500 | 1.0 | 970 |
| 1N4733A | 5.1 | 49 | 7 | 10 | 1 | 178 | 550 | 1.0 | 890 |
| 1N4734A | 5.6 | 45 | 5 | 10 | 2 | 162 | 600 | 1.0 | 810 |
| 1N4735A | 6.2 | 41 | 2 | 10 | 3 | 146 | 700 | 1.0 | 730 |
| 1N4736A | 6.8 | 37 | 3.5 | 10 | 4 | 133 | 700 | 1.0 | 660 |
| 1N4737A | 7.5 | 34 | 4.0 | 10 | 5 | 121 | 700 | 0.5 | 605 |
| 1N4738A | 8.2 | 31 | 4.5 | 10 | 6 | 110 | 700 | 0.5 | 550 |
| 1N4739A | 9.1 | 28 | 5.0 | 10 | 7 | 100 | 700 | 0.5 | 500 |
| 1N4740A | 10 | 25 | 7 | 10 | 7.6 | 91 | 700 | 0.25 | 454 |
| 1N4741A | 11 | 23 | 8 | 5 | 8.4 | 83 | 700 | 0.25 | 414 |
| 1N4742A | 12 | 21 | 9 | 5 | 9.1 | 76 | 700 | 0.25 | 380 |
| 1N4743A | 13 | 19 | 10 | 5 | 9.9 | 69 | 700 | 0.25 | 344 |
| 1N4744A | 15 | 17 | 14 | 5 | 11.4 | 61 | 700 | 0.25 | 304 |
| 1N4745A | 16 | 15.5 | 16 | 5 | 12.2 | 57 | 700 | 0.25 | 285 |
| 1N4746A | 18 | 14 | 20 | 5 | 13.7 | 50 | 750 | 0.25 | 250 |
| 1N4747A | 20 | 12.5 | 22 | 5 | 15.2 | 45 | 750 | 0.25 | 225 |
| 1N4748A | 22 | 11.5 | 23 | 5 | 16.7 | 41 | 750 | 0.25 | 205 |
| 1N4749A | 24 | 10.5 | 25 | 5 | 18.2 | 38 | 750 | 0.25 | 190 |
| 1N4750A | 27 | 9.5 | 35 | 5 | 20.6 | 34 | 750 | 0.25 | 170 |
| 1N4751A | 30 | 8.5 | 40 | 5 | 22.8 | 30 | 1000 | 0.25 | 150 |
| 1N4752A | 33 | 7.5 | 45 | 5 | 25.1 | 27 | 1000 | 0.25 | 135 |
| 1N4753A | 36 | 7.0 | 50 | 5 | 27.4 | 25 | 1000 | 0.25 | 125 |
| 1N4754A | 39 | 6.5 | 60 | 5 | 29.7 | 23 | 1000 | 0.25 | 115 |
| 1N4755A | 43 | 6.0 | 70 | 5 | 32.7 | 22 | 1500 | 0.25 | 110 |
| 1N4756A | 47 | 5.5 | 80 | 5 | 35.8 | 19 | 1500 | 0.25 | 95 |
| 1N4757A | 51 | 5.0 | 95 | 5 | 38.8 | 18 | 1500 | 0.25 | 90 |
| 1N4758A | 56 | 4.5 | 110 | 5 | 42.6 | 16 | 2000 | 0.25 | 80 |
| 1N4759A | 62 | 4.0 | 125 | 5 | 47.1 | 14 | 2000 | 0.25 | 70 |
| 1N4760A | 68 | 3.7 | 150 | 5 | 51.7 | 13 | 2000 | 0.25 | 65 |
| 1N4761A | 75 | 3.3 | 175 | 5 | 56.0 | 12 | 2000 | 0.25 | 60 |
| 1N4762A | 82 | 3.0 | 200 | 5 | 62.2 | 11 | 3000 | 0.25 | 55 |
| 1N4763A | 91 | 2.8 | 250 | 5 | 69.2 | 10 | 3000 | 0.25 | 50 |
| 1N4764A | 100 | 2.5 | 350 | 5 | 76.0 | 9 | 3000 | 0.25 | 45 |

*JEDEC Registered Data

**NOTES:**

1. The JEDEC type numbers shown with an A suffix have a 5% tolerance on nominal zener voltage. No suffix signifies a 10% tolerance, C signifies 2%, and D signifies 1% tolerance. Also add a G suffix for designating glass construction (P suffix designates plastic body options described by separate data sheet)..
2. The Zener impedance is derived from the 60 Hz ac voltage that 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. See MicroNote 202 for zener impedance variation with different operating currents.
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 $I_{ZT}$.
4. Zener voltage ($V_Z$) is measured at $T_L$ = 25ºC (+8, -2ºC) and 90 seconds after application of dc current.



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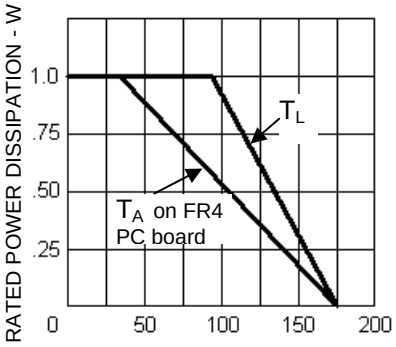
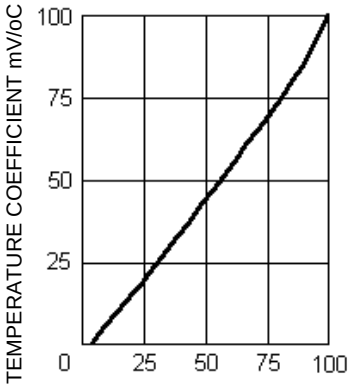
## GRAPHS




$T_L$, LEAD TEMP. (°C) 3/8" from body or $T_A$ on FR4 PC Board

**FIGURE 1**
Power Derating Curve




NOMINAL ZENER VOLTAGE (VOLTS)

**FIGURE 2**
Temp. Coeff. vs. Zener Voltage

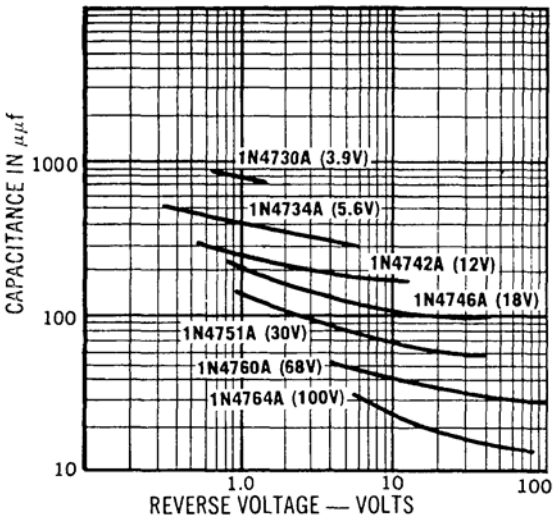
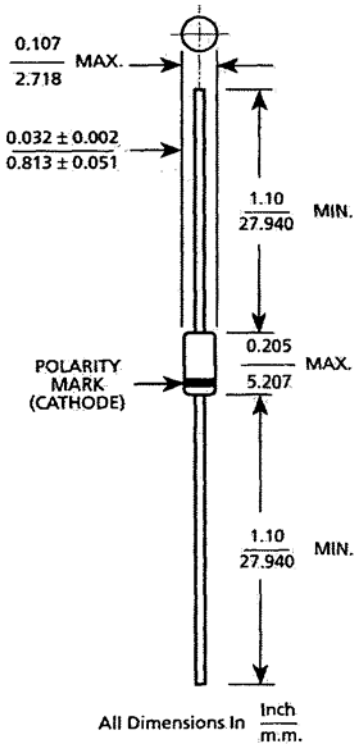



**FIGURE 3**
Capacitance vs. Voltage
for Representative Types

## PACKAGE DIMENSIONS (DO-41 or DO-204AL)

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