

## DESCRIPTION

The SMBJ4728A-4764A and SMBG4728A-4764A series of surface mount 2.0 watt Zeners provides voltage regulation in a selection from 3.3 to 100 volts with different tolerances as identified by suffix letter on the part number as well as RoHS Compliant with an e3 suffix. This surface mount product series with lower thermal resistance features is equivalent to the JEDEC registered 1N4728 thru 1N4764A with identical electrical characteristics except it is rated at 2.0 W instead of 1.0 W. It is available in J-bend design (SMBJ) with the DO-214AA package for greater PC board mounting density or in Gull-wing design (SMBG) in the DO-215AA for visible solder connections. Microsemi also offers numerous other Zener products to meet higher and lower power applications.

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

## APPEARANCE



DO-215AA



DO-214AA

NOTE: All SMB series are equivalent to prior SMS package identifications.

## FEATURES

- Surface mount equivalent to 1N4728 to 1N4764A
- Ideal for high-density and low-profile mounting
- Zener voltage available 3.3V to 200V
- 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
- Options for screening in accordance with MIL-PRF-19500 for JAN, JANTX, and JANTXV are available by adding MQ, MX, or MV prefixes respectively to part numbers.
- RoHS compliant devices available by adding an e3 suffix.

## APPLICATIONS / BENEFITS

- Regulates voltage over a broad operating current and temperature range
- Wide selection from 3.3 to 100 V
- Popular DO-214AA or DO-215AA packages and footprints for either high density J-bend or Gull-wing designs for visible solder joints
- Nonsensitive to ESD per MIL-STD-750 Method 1020
- Moisture classification: Level 1 per IPC/JEDEC J-STD-020B with no dry pack required

## MAXIMUM RATINGS

- Power dissipation at 25°C: 2.0 watts (also see derating in Figure 1).
- Operating and Storage temperature: -65°C to +150°C
- Thermal Resistance: 35°C/W junction to lead, or 100°C/W junction to ambient when mounted on FR4 PC board (1oz Cu) with recommended footprint (see last page)
- Steady-State Power: 2 watts at  $T_L \leq 80^\circ\text{C}$ , or 1.25 watts at  $T_A = 25^\circ\text{C}$  when mounted on FR4 PC board with recommended footprint (also see Figure 1)
- Forward voltage @200 mA: 1.2 volts (maximum)
- Solder Temperatures: 260°C for 10 s (maximum)

## MECHANICAL AND PACKAGING

- CASE: Void-free transfer molded thermosetting epoxy body meeting UL94V-0
- TERMINALS: Gull-wing or C-bend (modified J-bend) leads, tin-lead plated 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 opposite end for Zener regulation
- MARKING: Includes part number without prefix (e.g. 4728A, 4728Ae3, 4734C, 4764D, etc.)
- TAPE & REEL option: Standard per EIA-481-1-A with 12 mm tape, 750 per 7 inch reel or 2500 per 13 inch reel (add "TR" suffix to part number)
- WEIGHT: 0.1 grams
- See package dimensions on last page

**ELECTRICAL CHARACTERISTICS\***

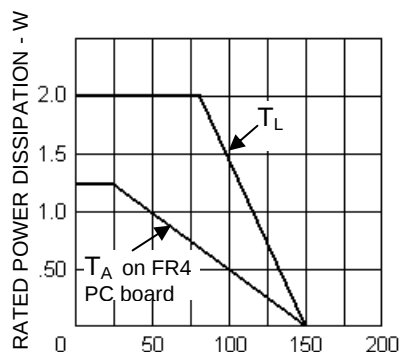
| JEDEC<br>TYPE NUMBER<br>(Note 1) |                      | ZENER<br>VOLTAGE<br>(V <sub>Z</sub> )<br>(Note 4) | TEST<br>CURRENT<br>(I <sub>ZT</sub> ) | MAXIMUM<br>DYNAMIC<br>IMPEDANCE<br>(Z <sub>DT</sub> @ I <sub>ZT</sub> )<br>(Note 2) | MAXIMUM<br>REVERSE<br>CURRENT<br>(I <sub>R</sub> @ V <sub>R</sub> ) | TEST<br>VOLTAGE<br>(V <sub>R</sub> ) | MAXIMUM<br>REGULATOR<br>CURRENT<br>(I <sub>ZM</sub> )<br>TA = 50°C | MAXIMUM<br>KNEE<br>IMPEDANCE<br>(Z <sub>ZK</sub> @ I <sub>ZK</sub> )<br>(Note 2) | TEST<br>CURRENT<br>(I <sub>ZK</sub> ) | MAXIMUM<br>(SURGE)<br>CURRENT<br>(I <sub>S</sub> )<br>(Note 3) |
|----------------------------------|----------------------|---------------------------------------------------|---------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------|--------------------------------------|--------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------|----------------------------------------------------------------|
| GULL-WING<br>LEAD                | C-BEND<br>(MOD. "J") | VOLTS                                             | mA                                    | OHMS                                                                                | μA                                                                  | VOLTS                                | mA                                                                 | OHMS                                                                             | mA                                    | mA                                                             |
| SMBG4728A                        | SMBJ4728A            | 3.3                                               | 76                                    | 10                                                                                  | 100                                                                 | 1                                    | 276                                                                | 400                                                                              | 1.0                                   | 1380                                                           |
| SMBG4729A                        | SMBJ4729A            | 3.6                                               | 69                                    | 10                                                                                  | 100                                                                 | 1                                    | 252                                                                | 400                                                                              | 1.0                                   | 1260                                                           |
| SMBG4730A                        | SMBJ4730A            | 3.9                                               | 64                                    | 9                                                                                   | 50                                                                  | 1                                    | 234                                                                | 400                                                                              | 1.0                                   | 1190                                                           |
| SMBG4731A                        | SMBJ4731A            | 4.3                                               | 58                                    | 9                                                                                   | 10                                                                  | 1                                    | 217                                                                | 400                                                                              | 1.0                                   | 1070                                                           |
| SMBG4732A                        | SMBJ4732A            | 4.7                                               | 53                                    | 8                                                                                   | 10                                                                  | 1                                    | 193                                                                | 500                                                                              | 1.0                                   | 970                                                            |
| SMBG4733A                        | SMBJ4733A            | 5.1                                               | 49                                    | 7                                                                                   | 10                                                                  | 1                                    | 178                                                                | 550                                                                              | 1.0                                   | 890                                                            |
| SMBG4734A                        | SMBJ4734A            | 5.6                                               | 45                                    | 5                                                                                   | 10                                                                  | 2                                    | 162                                                                | 600                                                                              | 1.0                                   | 810                                                            |
| SMBG4735A                        | SMBJ4735A            | 6.2                                               | 41                                    | 2                                                                                   | 10                                                                  | 3                                    | 146                                                                | 700                                                                              | 1.0                                   | 730                                                            |
| SMBG4736A                        | SMBJ4736A            | 6.8                                               | 37                                    | 3.5                                                                                 | 10                                                                  | 4                                    | 133                                                                | 700                                                                              | 1.0                                   | 660                                                            |
| SMBG4737A                        | SMBJ4737A            | 7.5                                               | 34                                    | 4.0                                                                                 | 10                                                                  | 5                                    | 121                                                                | 700                                                                              | 0.5                                   | 605                                                            |
| SMBG4738A                        | SMBJ4738A            | 8.2                                               | 31                                    | 4.5                                                                                 | 10                                                                  | 6                                    | 110                                                                | 700                                                                              | 0.5                                   | 550                                                            |
| SMBG4739A                        | SMBJ4739A            | 9.1                                               | 28                                    | 5.0                                                                                 | 10                                                                  | 7                                    | 100                                                                | 700                                                                              | 0.5                                   | 500                                                            |
| SMBG4740A                        | SMBJ4740A            | 10                                                | 25                                    | 7                                                                                   | 10                                                                  | 7.6                                  | 91                                                                 | 700                                                                              | 0.25                                  | 454                                                            |
| SMBG4741A                        | SMBJ4741A            | 11                                                | 23                                    | 8                                                                                   | 5                                                                   | 8.4                                  | 83                                                                 | 700                                                                              | 0.25                                  | 414                                                            |
| SMBG4742A                        | SMBJ4742A            | 12                                                | 21                                    | 9                                                                                   | 5                                                                   | 9.1                                  | 76                                                                 | 700                                                                              | 0.25                                  | 380                                                            |
| SMBG4743A                        | SMBJ4743A            | 13                                                | 19                                    | 10                                                                                  | 5                                                                   | 9.9                                  | 69                                                                 | 700                                                                              | 0.25                                  | 344                                                            |
| SMBG4744A                        | SMBJ4744A            | 15                                                | 17                                    | 14                                                                                  | 5                                                                   | 11.4                                 | 61                                                                 | 700                                                                              | 0.25                                  | 304                                                            |
| SMBG4745A                        | SMBJ4745A            | 16                                                | 15.5                                  | 16                                                                                  | 5                                                                   | 12.2                                 | 57                                                                 | 700                                                                              | 0.25                                  | 285                                                            |
| SMBG4746A                        | SMBJ4746A            | 18                                                | 14                                    | 20                                                                                  | 5                                                                   | 13.7                                 | 50                                                                 | 750                                                                              | 0.25                                  | 250                                                            |
| SMBG4747A                        | SMBJ4747A            | 20                                                | 12.5                                  | 22                                                                                  | 5                                                                   | 15.2                                 | 45                                                                 | 750                                                                              | 0.25                                  | 225                                                            |
| SMBG4748A                        | SMBJ4748A            | 22                                                | 11.5                                  | 23                                                                                  | 5                                                                   | 16.7                                 | 41                                                                 | 750                                                                              | 0.25                                  | 205                                                            |
| SMBG4749A                        | SMBJ4749A            | 24                                                | 10.5                                  | 25                                                                                  | 5                                                                   | 18.2                                 | 38                                                                 | 750                                                                              | 0.25                                  | 190                                                            |
| SMBG4750A                        | SMBJ4750A            | 27                                                | 9.5                                   | 35                                                                                  | 5                                                                   | 20.6                                 | 34                                                                 | 750                                                                              | 0.25                                  | 170                                                            |
| SMBG4751A                        | SMBJ4751A            | 30                                                | 8.5                                   | 40                                                                                  | 5                                                                   | 22.8                                 | 30                                                                 | 1000                                                                             | 0.25                                  | 150                                                            |
| SMBG4752A                        | SMBJ4752A            | 33                                                | 7.5                                   | 45                                                                                  | 5                                                                   | 25.1                                 | 27                                                                 | 1000                                                                             | 0.25                                  | 135                                                            |
| SMBG4753A                        | SMBJ4753A            | 36                                                | 7.0                                   | 50                                                                                  | 5                                                                   | 27.4                                 | 25                                                                 | 1000                                                                             | 0.25                                  | 125                                                            |
| SMBG4754A                        | SMBJ4754A            | 39                                                | 6.5                                   | 60                                                                                  | 5                                                                   | 29.7                                 | 23                                                                 | 1000                                                                             | 0.25                                  | 115                                                            |
| SMBG4755A                        | SMBJ4755A            | 43                                                | 6.0                                   | 70                                                                                  | 5                                                                   | 32.7                                 | 22                                                                 | 1500                                                                             | 0.25                                  | 110                                                            |
| SMBG4756A                        | SMBJ4756A            | 47                                                | 5.5                                   | 80                                                                                  | 5                                                                   | 35.8                                 | 19                                                                 | 1500                                                                             | 0.25                                  | 95                                                             |
| SMBG4757A                        | SMBJ4757A            | 51                                                | 5.0                                   | 95                                                                                  | 5                                                                   | 38.8                                 | 18                                                                 | 1500                                                                             | 0.25                                  | 90                                                             |
| SMBG4758A                        | SMBJ4758A            | 56                                                | 4.5                                   | 110                                                                                 | 5                                                                   | 42.6                                 | 16                                                                 | 2000                                                                             | 0.25                                  | 80                                                             |
| SMBG4759A                        | SMBJ4759A            | 62                                                | 4.0                                   | 125                                                                                 | 5                                                                   | 47.1                                 | 14                                                                 | 2000                                                                             | 0.25                                  | 70                                                             |
| SMBG4760A                        | SMBJ4760A            | 68                                                | 3.7                                   | 150                                                                                 | 5                                                                   | 51.7                                 | 13                                                                 | 2000                                                                             | 0.25                                  | 65                                                             |
| SMBG4761A                        | SMBJ4761A            | 75                                                | 3.3                                   | 175                                                                                 | 5                                                                   | 56.0                                 | 12                                                                 | 2000                                                                             | 0.25                                  | 60                                                             |
| SMBG4762A                        | SMBJ4762A            | 82                                                | 3.0                                   | 200                                                                                 | 5                                                                   | 62.2                                 | 11                                                                 | 3000                                                                             | 0.25                                  | 55                                                             |
| SMBG4763A                        | SMBJ4763A            | 91                                                | 2.8                                   | 250                                                                                 | 5                                                                   | 69.2                                 | 10                                                                 | 3000                                                                             | 0.25                                  | 50                                                             |
| SMBG4764A                        | SMBJ4764A            | 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 P suffix for designating plastic construction (or G suffix for glass body). Add an e3 suffix for RoHS compliant devices.
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<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. See MicroNote 202 for zener impedance variation with different operating currents.
3. The reverse surge current is measured at 25°C ambient using a square wave or equivalent half-sine wave pulse 1/120 second duration superimposed on I<sub>ZT</sub>.
4. Zener voltage (V<sub>Z</sub>) is measured at T<sub>L</sub> = 25°C (+8, -2°C) and 90 seconds after application of dc current.

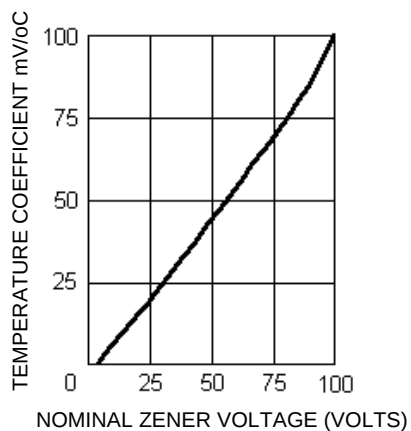
**GRAPHS**



$T_L$ , LEAD TEMP. (°C) or  
 $T_A$  on FR4 PC Board

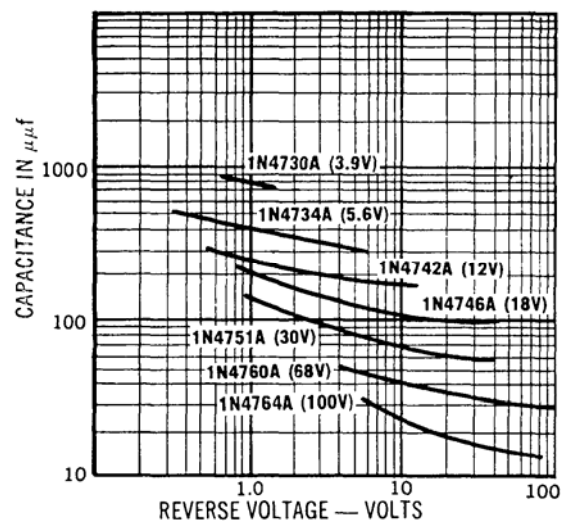
**FIGURE 1**

Power Derating Curve



**FIGURE 2**

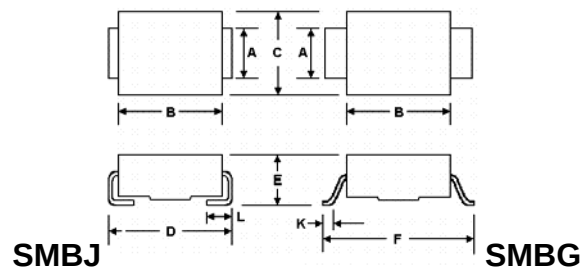
Temp. Coeff. vs. Zener Voltage



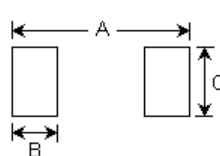
**FIGURE 3**

Typical Capacitance vs. Voltage  
for Representative Types

**PACKAGE DIMENSIONS & PAD LAYOUT**



|                                  | A    | B    | C    | D    | E    | F    | K    | L     |
|----------------------------------|------|------|------|------|------|------|------|-------|
| MIN                              | .077 | .160 | .130 | .205 | .077 | .235 | .015 | .030  |
| MAX                              | .083 | .180 | .155 | .220 | .104 | .255 | .030 | .060  |
| <b>DIMENSIONS IN MILLIMETERS</b> |      |      |      |      |      |      |      |       |
| MIN                              | 1.96 | 4.06 | 3.30 | 5.21 | 1.95 | 5.97 | .381 | .760  |
| MAX                              | 2.10 | 4.57 | 3.94 | 5.59 | 2.65 | 6.48 | .762 | 1.520 |



|                  | INCHES | mm   |
|------------------|--------|------|
| A                | 0.320  | 8.13 |
| B                | 0.085  | 2.16 |
| C                | 0.110  | 2.79 |
| <b>INCHES mm</b> |        |      |
| A                | .260   | 6.60 |
| B                | .085   | 2.16 |
| C                | .110   | 2.79 |

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