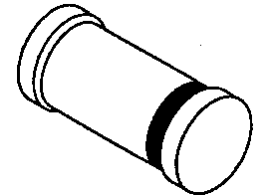


DESCRIPTION

The 1N4678UR-1 thru 1N4717UR-1 series of 0.5 watt glass surface mount DO-213AA Zener voltage regulators provides a selection from 1.8 to 43 volts in standard 5% tolerances as well as tighter tolerances with a very low test current of 50 μ A. These have an internal-metallurgical-bond option as identified with the "-1" suffix. This type of internally bonded Zener package construction is also available with equivalent military screening as described in the Features section. Microsemi also offers numerous other Zener products to meet higher and lower power applications.

APPEARANCE



DO-213AA

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

FEATURES

- Surface mount equivalent to JEDEC registered 1N4678 thru 1N4717 series
- Internal metallurgical bond with the "-1" suffix
- Options for screening in accordance with MIL-PRF-19500 for JAN, JANTX, JANTXV, and JANS are available by adding MQ, MX, MV, MSP respectively to part numbers; (e.g. MX1N4678UR-1, MV1N4701UR-1, MSP1N4709DUR-1, etc.)
- Nonbonded types also available without the "-1" suffix for both the axial and surface mount packages
- DO-7 or DO-35 glass body axial-leaded Zener equivalents also available per JEDEC registration with part numbers 1N4678 thru 1N4717 on separate data sheets

APPLICATIONS / BENEFITS

- Regulates voltage over a broad operating current and temperature range
- Extensive selection from 1.8 to 43 V
- Standard voltage tolerances are plus/minus 5% with no suffix
- Tight tolerances available in plus or minus 2% or 1% with additional C or D suffix respectively
- Hermetically sealed surface mount package
- Nonsensitive to ESD per MIL-STD-750 Method 1020
- Minimal capacitance (see Figure 3)
- Inherently radiation hard as described in Microsemi MicroNote 050

MAXIMUM RATINGS

- Operating and Storage temperature: -65°C to $+175^{\circ}\text{C}$
- Thermal Resistance: 100°C/W junction to end cap, or 250°C/W junction to ambient when mounted on FR4 PC board (1 oz Cu) with recommended footprint (see last page Figure 1)
- Steady-State Power: 0.5 watts at end cap temperature $T_{\text{EC}} \leq 125^{\circ}\text{C}$ or at ambient $T_{\text{A}} \leq 50^{\circ}\text{C}$ when mounted on FR4 PC board as described for thermal resistance above (see Figure 2 for derating)
- Forward voltage @100 mA: 1.5 volts
- Solder Temperatures: 260°C for 10 s (max)

MECHANICAL AND PACKAGING

- CASE: Hermetically sealed glass DO-213AA (SOD80 or MLL34) MELF style package
- TERMINALS: End caps tin-lead plated solderable per MIL-STD-750, method 2026
- POLARITY: Cathode indicated by band where diode is to be operated with the banded end positive with respect to the opposite end for Zener regulation
- MARKING: cathode band only
- TAPE & REEL option: Standard per EIA-481-1-B with 12 mm tape, 2000 per 7 inch reel or 5000 per 13 inch reel (add "TR" suffix to part number)
- WEIGHT: 0.04 grams
- See package dimensions on last page

*** ELECTRICAL CHARACTERISTICS @ 25°C**

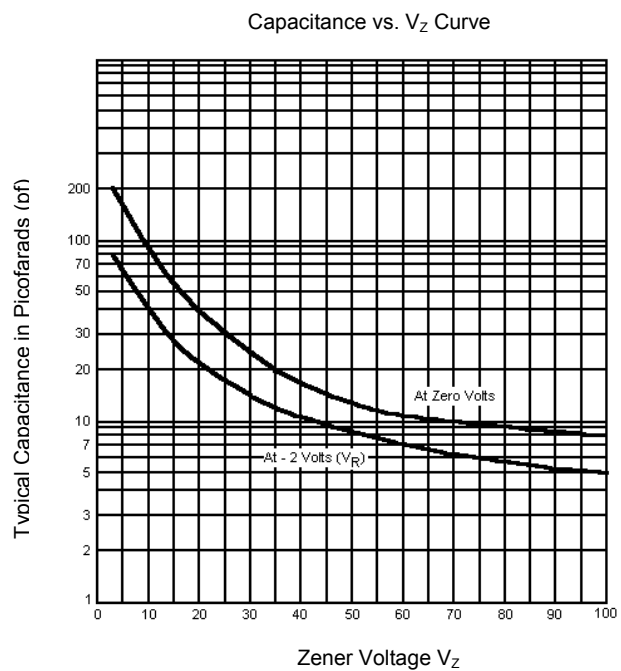
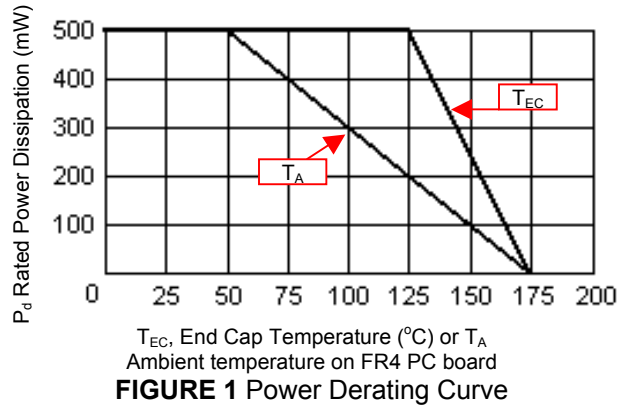
| INDUSTRY PART NUMBER (Note 1) | MICROSEMI PART NUMBER (Note 1) | NOMINAL ZENER VOLTAGE (Note 2) | ZENER TEST CURRENT | MAXIMUM VOLTAGE REGULATION (Note 3) | MAXIMUM REVERSE LEAKAGE CURRENT | | MAXIMUM DC ZENER CURRENT* |
|--|---|---|--------------------------|--|--|-------|---------------------------------|
| | | V_Z | I_{ZT} | ΔV_Z | $I_R @ V_R$ | | I_{ZM} |
| | | VOLTS | μA | VOLTS | μA | VOLTS | mA |
| 1N4678UR-1 | MLL4678-1 | 1.8 | 50 | 0.70 | 7.5 | 1.0 | 240 |
| 1N4679UR-1 | MLL4679-1 | 2.0 | 50 | 0.70 | 5.0 | 1.0 | 220 |
| 1N4680UR-1 | MLL4680-1 | 2.2 | 50 | 0.75 | 4.0 | 1.0 | 200 |
| 1N4681UR-1 | MLL4681-1 | 2.4 | 50 | 0.80 | 2.0 | 1.0 | 190 |
| 1N4682UR-1 | MLL4682-1 | 2.7 | 50 | 0.85 | 1.0 | 1.0 | 180 |
| 1N4683UR-1 | MLL4683-1 | 3.0 | 50 | 0.90 | 0.8 | 1.0 | 170 |
| 1N4684UR-1 | MLL4684-1 | 3.3 | 50 | 0.95 | 7.5 | 1.5 | 160 |
| 1N4685UR-1 | MLL4685-1 | 3.6 | 50 | 0.95 | 7.5 | 2.0 | 150 |
| 1N4686UR-1 | MLL4686-1 | 3.9 | 50 | 0.97 | 5.0 | 2.0 | 140 |
| 1N4687UR-1 | MLL4687-1 | 4.3 | 50 | 0.99 | 4.0 | 2.0 | 130 |
| 1N4688UR-1 | MLL4688-1 | 4.7 | 50 | 0.99 | 10.0 | 3.0 | 120 |
| 1N4689UR-1 | MLL4689-1 | 5.1 | 50 | 0.97 | 10.0 | 3.0 | 110 |
| 1N4690UR-1 | MLL4690-1 | 5.6 | 50 | 0.96 | 10.0 | 4.0 | 100 |
| 1N4691UR-1 | MLL4691-1 | 6.2 | 50 | 0.95 | 10.0 | 5.0 | 90 |
| 1N4692UR-1 | MLL4692-1 | 6.8 | 50 | 0.90 | 10.0 | 5.1 | 70 |
| 1N4693UR-1 | MLL4693-1 | 7.5 | 50 | 0.75 | 10.0 | 5.7 | 63.6 |
| 1N4694UR-1 | MLL4694-1 | 8.2 | 50 | 0.50 | 1.0 | 6.2 | 58.0 |
| 1N4695UR-1 | MLL4695-1 | 8.7 | 50 | 0.10 | 1.0 | 6.6 | 54.8 |
| 1N4696UR-1 | MLL4696-1 | 9.1 | 50 | 0.08 | 1.0 | 6.9 | 52.4 |
| 1N4697UR-1 | MLL4697-1 | 10.0 | 50 | 0.10 | 1.0 | 7.6 | 49.6 |
| 1N4698UR-1 | MLL4698-1 | 11.0 | 50 | 0.11 | 0.05 | 8.4 | 43.2 |
| 1N4699UR-1 | MLL4699-1 | 12.0 | 50 | 0.12 | 0.05 | 9.1 | 40.8 |
| 1N4700UR-1 | MLL4700-1 | 13.0 | 50 | 0.13 | 0.05 | 9.8 | 38.0 |
| 1N4701UR-1 | MLL4701-1 | 14.0 | 50 | 0.14 | 0.05 | 10.6 | 35.0 |
| 1N4702UR-1 | MLL4702-1 | 15.0 | 50 | 0.15 | 0.05 | 11.4 | 32.6 |
| 1N4703UR-1 | MLL4703-1 | 16.0 | 50 | 0.16 | 0.05 | 12.1 | 30.8 |
| 1N4704UR-1 | MLL4704-1 | 17.0 | 50 | 0.17 | 0.05 | 12.9 | 29.0 |
| 1N4705UR-1 | MLL4705-1 | 18.0 | 50 | 0.18 | 0.05 | 13.6 | 26.4 |
| 1N4706UR-1 | MLL4706-1 | 19.0 | 50 | 0.19 | 0.05 | 14.4 | 25.0 |
| 1N4707UR-1 | MLL4707-1 | 20.0 | 50 | 0.20 | 0.01 | 15.2 | 23.8 |
| 1N4708UR-1 | MLL4708-1 | 22.0 | 50 | 0.22 | 0.01 | 16.7 | 21.6 |
| 1N4709UR-1 | MLL4709-1 | 24.0 | 50 | 0.24 | 0.01 | 18.2 | 19.8 |
| 1N4710UR-1 | MLL4710-1 | 25.0 | 50 | 0.25 | 0.01 | 19.0 | 19.0 |
| 1N4711UR-1 | MLL4711-1 | 27.0 | 50 | 0.27 | 0.01 | 20.4 | 17.6 |
| 1N4712UR-1 | MLL4712-1 | 28.0 | 50 | 0.28 | 0.01 | 21.2 | 17.0 |
| 1N4713UR-1 | MLL4713-1 | 30.0 | 50 | 0.30 | 0.01 | 22.8 | 15.8 |
| 1N4714UR-1 | MLL4714-1 | 33.0 | 50 | 0.33 | 0.01 | 25.0 | 14.4 |
| 1N4715UR-1 | MLL4715-1 | 36.0 | 50 | 0.36 | 0.01 | 27.3 | 13.2 |
| 1N4716UR-1 | MLL4716-1 | 39.0 | 50 | 0.39 | 0.01 | 29.6 | 12.2 |
| 1N4717UR-1 | MLL4717-1 | 43.0 | 50 | 0.43 | 0.01 | 32.6 | 11.0 |

*JEDEC registered data except I_{ZM} has been increased (doubled) for 500 mW power dissipation capabilities

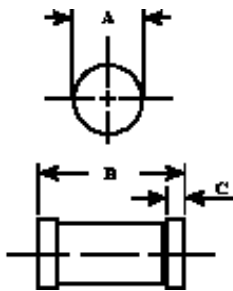
- NOTES:**
1. These may be ordered as either 1N4678UR-1 through 1N4717UR-1, or as the MLL4678-1 through MLL4717-1.
 2. All types as shown are +/-5% tolerance. Also available in 2% and 1% tolerance with added suffix C and D respectively.
 3. $\Delta V_Z @ 100\mu A$ minus $V_Z @ 10\mu A$.

The electrical characteristics are measured after allowing the device to stabilize for 20 seconds when mounted with 3/8" minimum lead length from the base.

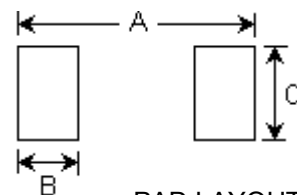
GRAPHS



PACKAGE DIMENSIONS



| DIM | INCHES | | MILLIMETERS | |
|-----|--------|-------|-------------|------|
| | MIN | MAX | MIN | MAX |
| A | 0.063 | 0.067 | 1.60 | 1.70 |
| B | 0.130 | 0.146 | 3.30 | 3.70 |
| C | 0.016 | 0.022 | 0.41 | 0.55 |



| | INCHES | mm |
|---|--------|------|
| A | .200 | 5.08 |
| B | .055 | 1.40 |
| C | .080 | 2.03 |