

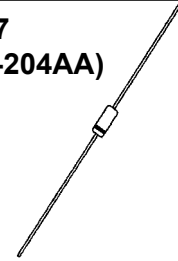
ALSO
AVAILABLE IN
SURFACE
MOUNT

DESCRIPTION

The 1N4678 thru 1N4717 series of 0.5 watt Zener Voltage Regulators provides a selection from 1.8 to 43 volts in standard 5% tolerances as well as tighter tolerances identified by different suffix letters on the part number. These glass axial-leaded DO-7 Zeners also have an internal-metallurgical-bond similar to other military requirements for these packages. Microsemi also offers numerous other Zener products to meet higher and lower power applications.

APPEARANCE

DO-7
(DO-204AA)



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

FEATURES

- JEDEC registered 1N4678 thru 1N4717
- Internally solder bonded
- 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 as well as "-1" suffix
- Surface Mount available in DO-213AA package outline by adding a UR or UR-1 (see separate data sheet for 1N4678UR thru 1N4717UR-1)
- DO-35 glass body axial-leaded Zener equivalents are also available (see separate data sheet)

APPLICATIONS / BENEFITS

- Regulates voltage over a broad operating current and temperature range
- Guaranteed maximum voltage regulation 10 μ A to 100 μ A
- Voltage 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 C or D suffix respectively
- Flexible axial-lead mounting terminals
- Nonsensitive to ESD per MIL-STD-750 Method 1020
- Capacitance also specified (see Figure 3)
- Inherently radiation hard as described in Microsemi MicroNote 050

MAXIMUM RATINGS

- Operating and Storage temperature: -65°C to +175°C
- Thermal Resistance: 300°C/W junction to lead at 3/8 (10 mm) lead length from body, or 360°C/W junction to ambient when mounted on FR4 PC board (1 oz Cu) with 4 mm² copper pads and track width 1 mm, length 25 mm
- Steady-State Power: 0.5 watts at $T_L \leq 25^\circ\text{C}$ 3/8 inch (10 mm) from body or 0.417 W at $T_A \leq 25^\circ\text{C}$ when mounted on FR4 PC board as described for thermal resistance (see Figure 2 for derating)
- Forward voltage @200 mA: 1.1 volts (maximum)
- Solder Temperatures: 260°C for 10 s (max)

MECHANICAL AND PACKAGING

- CASE: Hermetically sealed axial-lead glass DO-7 (DO-204AA) package
- TERMINALS: Leads, 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: Part number
- TAPE & REEL option: Standard per EIA-296 (add "TR" suffix to part number)
- WEIGHT: 0.2 grams
- See package dimensions on last page

*** ELECTRICAL CHARACTERISTICS @ 25°C**

| JEDEC TYPE NUMBER (Note 1) | NOMINAL ZENER VOLTAGE (Note 3) | ZENER TEST CURRENT | MAXIMUM VOLTAGE REGULATION (Note 2 & 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 |
| 1N4678 | 1.8 | 50 | 0.70 | 7.5 | 1.0 | 240 |
| 1N4679 | 2.0 | 50 | 0.70 | 5.0 | 1.0 | 220 |
| 1N4680 | 2.2 | 50 | 0.75 | 4.0 | 1.0 | 200 |
| 1N4681 | 2.4 | 50 | 0.80 | 2.0 | 1.0 | 190 |
| 1N4682 | 2.7 | 50 | 0.85 | 1.0 | 1.0 | 180 |
| 1N4683 | 3.0 | 50 | 0.90 | 0.8 | 1.0 | 170 |
| 1N4684 | 3.3 | 50 | 0.95 | 7.5 | 1.5 | 160 |
| 1N4685 | 3.6 | 50 | 0.95 | 7.5 | 2.0 | 150 |
| 1N4686 | 3.9 | 50 | 0.97 | 5.0 | 2.0 | 140 |
| 1N4687 | 4.3 | 50 | 0.99 | 4.0 | 2.0 | 130 |
| 1N4688 | 4.7 | 50 | 0.99 | 10.0 | 3.0 | 120 |
| 1N4689 | 5.1 | 50 | 0.97 | 10.0 | 3.0 | 110 |
| 1N4690 | 5.6 | 50 | 0.96 | 10.0 | 4.0 | 100 |
| 1N4691 | 6.2 | 50 | 0.95 | 10.0 | 5.0 | 90 |
| 1N4692 | 6.8 | 50 | 0.90 | 10.0 | 5.1 | 70 |
| 1N4693 | 7.5 | 50 | 0.75 | 10.0 | 5.7 | 63.6 |
| 1N4694 | 8.2 | 50 | 0.50 | 1.0 | 6.2 | 58.0 |
| 1N4695 | 8.7 | 50 | 0.10 | 1.0 | 6.6 | 54.8 |
| 1N4696 | 9.1 | 50 | 0.08 | 1.0 | 6.9 | 52.4 |
| 1N4697 | 10.0 | 50 | 0.10 | 1.0 | 7.6 | 49.6 |
| 1N4698 | 11.0 | 50 | 0.11 | 0.05 | 8.4 | 43.2 |
| 1N4699 | 12.0 | 50 | 0.12 | 0.05 | 9.1 | 40.8 |
| 1N4700 | 13.0 | 50 | 0.13 | 0.05 | 9.8 | 38.0 |
| 1N4701 | 14.0 | 50 | 0.14 | 0.05 | 10.6 | 35.0 |
| 1N4702 | 15.0 | 50 | 0.15 | 0.05 | 11.4 | 32.6 |
| 1N4703 | 16.0 | 50 | 0.16 | 0.05 | 12.1 | 30.8 |
| 1N4704 | 17.0 | 50 | 0.17 | 0.05 | 12.9 | 29.0 |
| 1N4705 | 18.0 | 50 | 0.18 | 0.05 | 13.6 | 26.4 |
| 1N4706 | 19.0 | 50 | 0.19 | 0.05 | 14.4 | 25.0 |
| 1N4707 | 20.0 | 50 | 0.20 | 0.01 | 15.2 | 23.8 |
| 1N4708 | 22.0 | 50 | 0.22 | 0.01 | 16.7 | 21.6 |
| 1N4709 | 24.0 | 50 | 0.24 | 0.01 | 18.2 | 19.8 |
| 1N4710 | 25.0 | 50 | 0.25 | 0.01 | 19.0 | 19.0 |
| 1N4711 | 27.0 | 50 | 0.27 | 0.01 | 20.4 | 17.6 |
| 1N4712 | 28.0 | 50 | 0.28 | 0.01 | 21.2 | 17.0 |
| 1N4713 | 30.0 | 50 | 0.30 | 0.01 | 22.8 | 15.8 |
| 1N4714 | 33.0 | 50 | 0.33 | 0.01 | 25.0 | 14.4 |
| 1N4715 | 36.0 | 50 | 0.36 | 0.01 | 27.3 | 13.2 |
| 1N4716 | 39.0 | 50 | 0.39 | 0.01 | 29.6 | 12.2 |
| 1N4717 | 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. All types as shown are +/-5% tolerance. Also available in 2% and 1% tolerance by adding suffix C and D respectively.
 2. $\Delta V_Z @ 100\mu A$ minus $V_Z @ 10\mu A$.
 3. 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

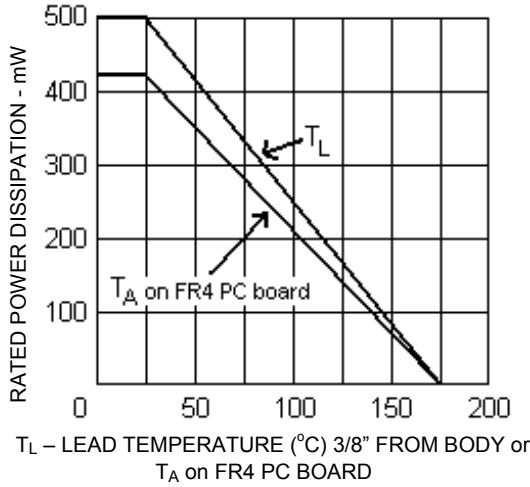


FIGURE 1
POWER DERATING CURVE

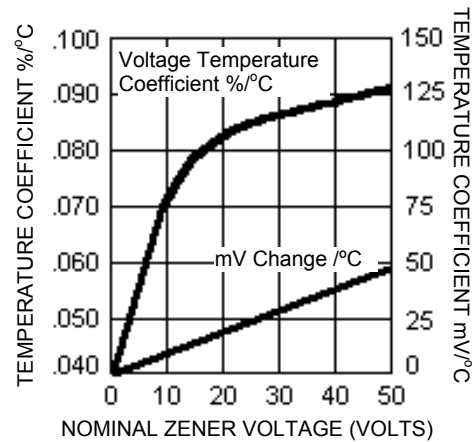


FIGURE 2
ZENER VOLTAGE TEMPERATURE
COEFFICIENT vs. ZENER VOLTAGE

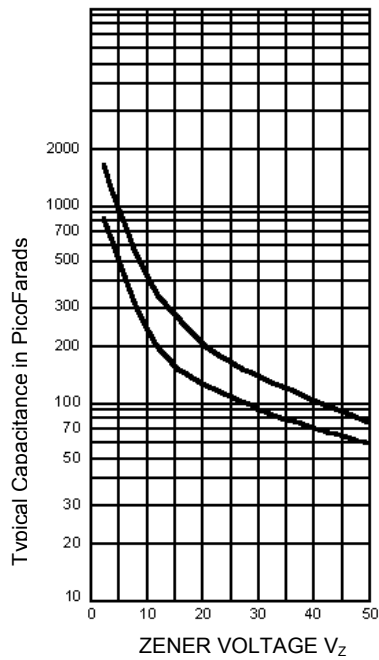


FIGURE 3
CAPACITANCE vs. V_Z CURVE

DO-7 PACKAGE DIMENSIONS

