

- 1N4099-1 THRU 1N4135-1 AVAILABLE IN JAN, JANTX, JANTXV AND JANS  
PER MIL-PRF-19500/435
- LOW CURRENT OPERATION AT 250  $\mu$  A
- LOW REVERSE LEAKAGE AND LOW NOISE CHARACTERISTICS
- METALLURGICALLY BONDED

1N4099 thru 1N4135  
and  
1N4099-1 thru 1N4135-1

## MAXIMUM RATINGS

Junction and Storage Temperature: -65°C to +175°C  
DC Power Dissipation: 500mW @ +50°C  
Power Derating: 4 mW / °C above +50°C  
Forward Voltage at 200 mA: 1.1 Volts maximum

ELECTRICAL CHARACTERISTICS @ 25°C, unless otherwise specified.

| JEDEC<br>TYPE<br>NUMBER | NOMINAL<br>ZENER<br>VOLTAGE<br>$V_Z$ @ $I_{ZT}$<br>(Note 1) | ZENER<br>TEST<br>CURRENT<br>$I_{ZT}$ | MAXIMUM<br>ZENER<br>IMPEDANCE<br>$Z_{ZT}$<br>(Note 2) | MAXIMUM REVERSE<br>LEAKAGE<br>CURRENT<br>$I_R$ @ $V_R$ |       | MAXIMUM<br>NOISE<br>DENSITY<br>$N_D$ @ $I_{ZT}$ | MAXIMUM<br>ZENER<br>CURRENT<br>$I_{ZM}$ |
|-------------------------|-------------------------------------------------------------|--------------------------------------|-------------------------------------------------------|--------------------------------------------------------|-------|-------------------------------------------------|-----------------------------------------|
|                         | VOLTS                                                       | $\mu$ A                              | OHMS                                                  | $\mu$ A                                                | VOLTS | $\mu$ V / $\sqrt{\text{Hz}}$                    | mA                                      |
| 1N4099                  | 6.8                                                         | 250                                  | 200                                                   | 10                                                     | 5.17  | 40                                              | 56                                      |
| 1N4100                  | 7.5                                                         | 250                                  | 200                                                   | 10                                                     | 5.70  | 40                                              | 51                                      |
| 1N4101                  | 8.2                                                         | 250                                  | 200                                                   | 1.0                                                    | 6.24  | 40                                              | 46                                      |
| 1N4102                  | 8.7                                                         | 250                                  | 200                                                   | 1.0                                                    | 6.61  | 40                                              | 44                                      |
| 1N4103                  | 9.1                                                         | 250                                  | 200                                                   | 1.0                                                    | 6.92  | 40                                              | 42                                      |
| 1N4104                  | 10                                                          | 250                                  | 200                                                   | 1.0                                                    | 7.60  | 40                                              | 38                                      |
| 1N4105                  | 11                                                          | 250                                  | 200                                                   | .05                                                    | 8.44  | 40                                              | 35                                      |
| 1N4106                  | 12                                                          | 250                                  | 200                                                   | .05                                                    | 9.12  | 40                                              | 32                                      |
| 1N4107                  | 13                                                          | 250                                  | 200                                                   | .05                                                    | 9.87  | 40                                              | 29                                      |
| 1N4108                  | 14                                                          | 250                                  | 200                                                   | .05                                                    | 10.65 | 40                                              | 27                                      |
| 1N4109                  | 15                                                          | 250                                  | 100                                                   | .05                                                    | 11.40 | 40                                              | 25                                      |
| 1N4110                  | 16                                                          | 250                                  | 100                                                   | .05                                                    | 12.15 | 40                                              | 24                                      |
| 1N4111                  | 17                                                          | 250                                  | 100                                                   | .05                                                    | 12.92 | 40                                              | 22                                      |
| 1N4112                  | 18                                                          | 250                                  | 100                                                   | .05                                                    | 13.67 | 40                                              | 21                                      |
| 1N4113                  | 19                                                          | 250                                  | 150                                                   | .05                                                    | 14.44 | 40                                              | 20                                      |
| 1N4114                  | 20                                                          | 250                                  | 150                                                   | .01                                                    | 15.20 | 40                                              | 19                                      |
| 1N4115                  | 22                                                          | 250                                  | 150                                                   | .01                                                    | 16.72 | 40                                              | 17                                      |
| 1N4116                  | 24                                                          | 250                                  | 150                                                   | .01                                                    | 18.25 | 40                                              | 16                                      |
| 1N4117                  | 25                                                          | 250                                  | 150                                                   | .01                                                    | 19.00 | 40                                              | 15                                      |
| 1N4118                  | 27                                                          | 250                                  | 150                                                   | .01                                                    | 20.46 | 40                                              | 14                                      |
| 1N4119                  | 28                                                          | 250                                  | 200                                                   | .01                                                    | 21.28 | 40                                              | 14                                      |
| 1N4120                  | 30                                                          | 250                                  | 200                                                   | .01                                                    | 22.80 | 40                                              | 13                                      |
| 1N4121                  | 33                                                          | 250                                  | 200                                                   | .01                                                    | 25.08 | 40                                              | 12                                      |
| 1N4122                  | 36                                                          | 250                                  | 200                                                   | .01                                                    | 27.38 | 40                                              | 11                                      |
| 1N4123                  | 39                                                          | 250                                  | 200                                                   | .01                                                    | 29.65 | 40                                              | 9.8                                     |
| 1N4124                  | 43                                                          | 250                                  | 250                                                   | .01                                                    | 32.65 | 40                                              | 8.9                                     |
| 1N4125                  | 47                                                          | 250                                  | 250                                                   | .01                                                    | 35.75 | 40                                              | 8.1                                     |
| 1N4126                  | 51                                                          | 250                                  | 300                                                   | .01                                                    | 38.76 | 40                                              | 7.5                                     |
| 1N4127                  | 56                                                          | 250                                  | 300                                                   | .01                                                    | 42.60 | 40                                              | 6.7                                     |
| 1N4128                  | 60                                                          | 250                                  | 400                                                   | .01                                                    | 45.60 | 40                                              | 6.4                                     |
| 1N4129                  | 62                                                          | 250                                  | 500                                                   | .01                                                    | 47.10 | 40                                              | 6.1                                     |
| 1N4130                  | 68                                                          | 250                                  | 700                                                   | .01                                                    | 51.68 | 40                                              | 5.6                                     |
| 1N4131                  | 75                                                          | 250                                  | 700                                                   | .01                                                    | 57.00 | 40                                              | 5.1                                     |
| 1N4132                  | 82                                                          | 250                                  | 800                                                   | .01                                                    | 62.32 | 40                                              | 4.6                                     |
| 1N4133                  | 87                                                          | 250                                  | 1000                                                  | .01                                                    | 66.12 | 40                                              | 4.4                                     |
| 1N4134                  | 91                                                          | 250                                  | 1200                                                  | .01                                                    | 69.16 | 40                                              | 4.2                                     |
| 1N4135                  | 100                                                         | 250                                  | 1500                                                  | .01                                                    | 76.00 | 40                                              | 3.8                                     |

**NOTE 1** The JEDEC type numbers shown above have a Zener voltage tolerance of  $\pm 5\%$  of the nominal Zener voltage.  $V_Z$  is measured with the device junction in thermal equilibrium at an ambient temperature of 25°C  $\pm 3^\circ$ C. A "C" suffix denotes a  $\pm 2\%$  tolerance and a "D" suffix denotes a  $\pm 1\%$  tolerance.

**NOTE 2** Zener impedance is derived by superimposing on  $I_{ZT}$ , A 60 Hz rms a.c. current equal to 10% of  $I_{ZT}$  (25  $\mu$  A a.c.).

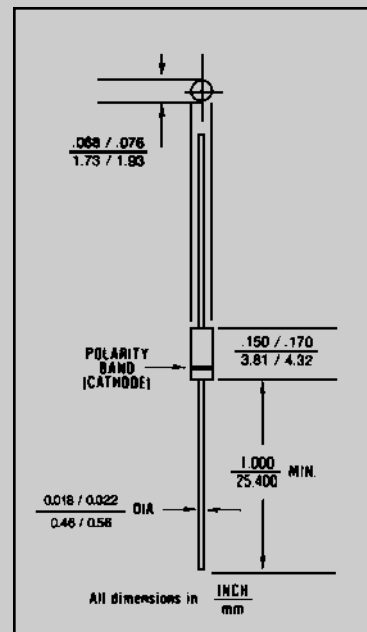


FIGURE 1

## DESIGN DATA

**CASE:** Hermetically sealed glass case. DO – 35 outline.

**LEAD MATERIAL:** Copper clad steel.

**LEAD FINISH:** Tin / Lead

**THERMAL RESISTANCE:** ( $R_{\theta JEC}$ ): 250 °C/W maximum at L = .375 inch

**THERMAL IMPEDANCE:** ( $Z_{\theta JX}$ ): 35 °C/W maximum

**POLARITY:** Diode to be operated with the banded (cathode) end positive.

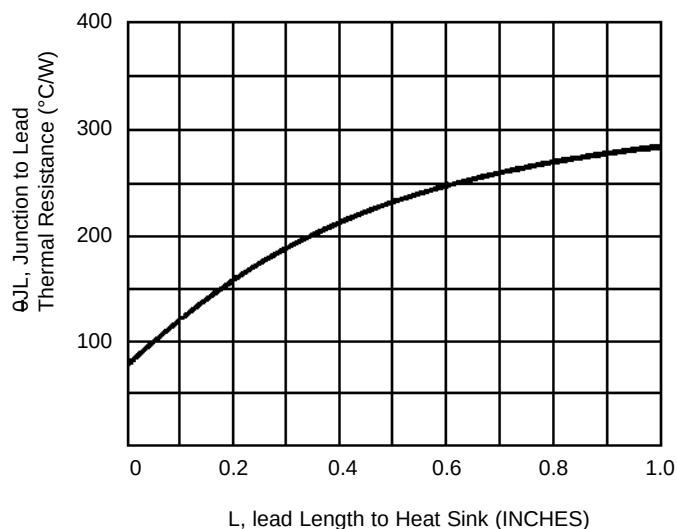
**MOUNTING POSITION:** ANY.



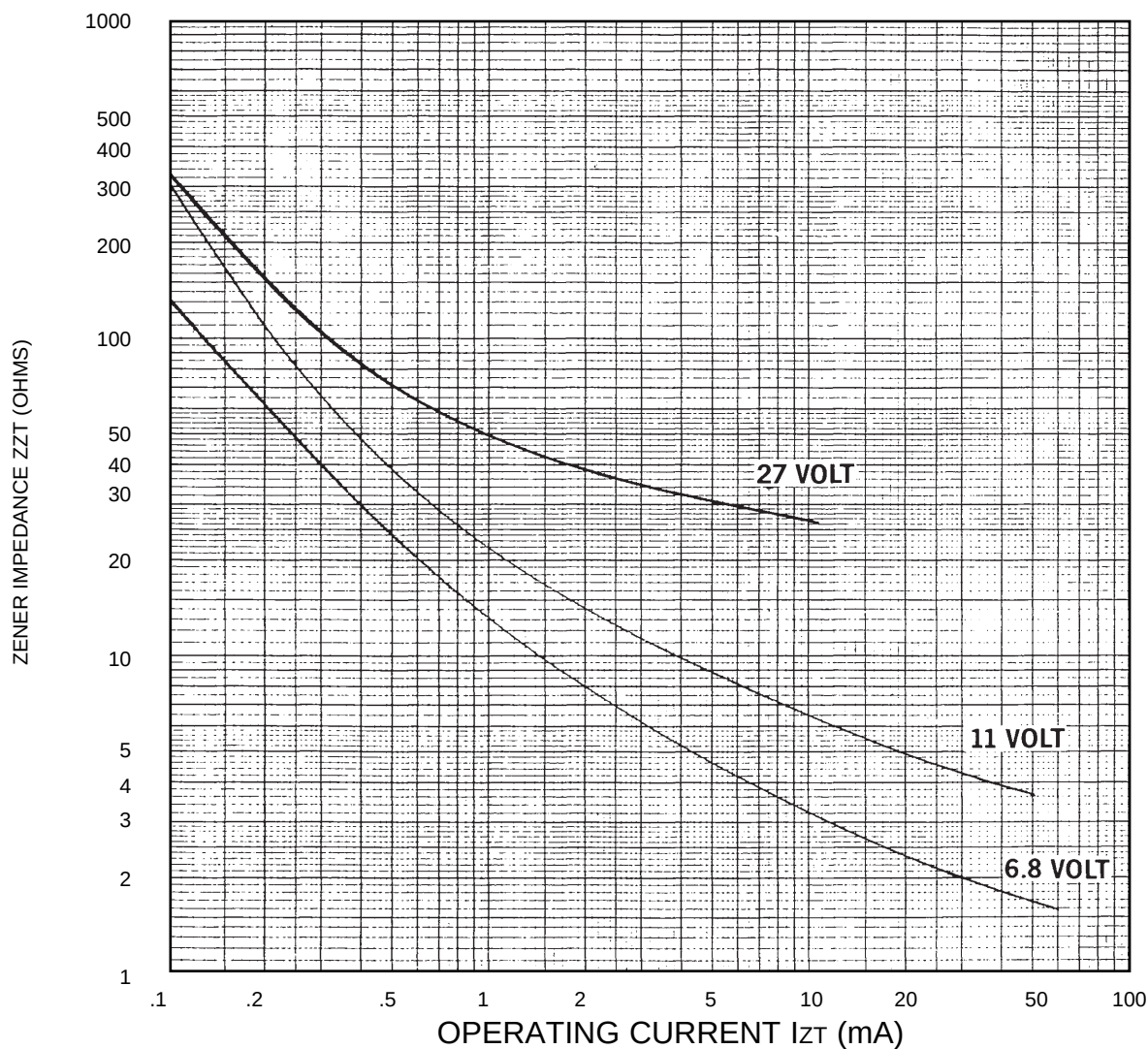
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# 1N4099 thru 1N4135 INCLUDING -1 VERSIONS



**FIGURE 2**  
**TYPICAL THERMAL RESISTANCE**



**FIGURE 3**  
**ZENER IMPEDANCE VS. OPERATING CURRENT**