



**Microsemi Corp.**

The diode experts

SCOTTSDALE, AZ

For more information call:  
(602) 941-6300

**1N5221  
thru  
1N5281  
DO-35**

## FEATURES

- 2.4 THRU 200 VOLTS
- COMPACT PACKAGE
- CONSULT FACTORY FOR VOLTAGES ABOVE 200 V

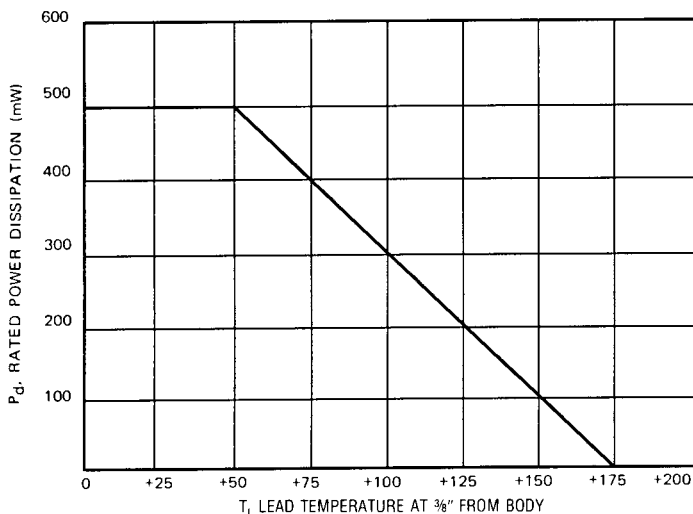
## MAXIMUM RATINGS

Operating and Storage Temperature:  $-65^{\circ}\text{C}$  to  $+200^{\circ}\text{C}$   
DC Power Dissipation: 500 mW  
Power Derating: 4.0 mW/ $^{\circ}\text{C}$  above  $50^{\circ}\text{C}$   
Forward Voltage @ 200 mA: 1.1 Volts

## ELECTRICAL CHARACTERISTICS

See following page for table of parameter values. (Fig. 3)

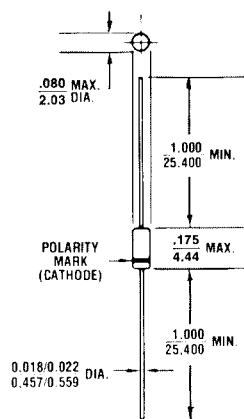
Table as shown on following page (Fig. 3) lists JEDEC type numbers, which indicate a tolerance of  $\pm 20\%$  with guaranteed limits on only  $V_Z$ ,  $I_r$ , and  $V_f$ . Devices with guaranteed limits on all six parameters are indicated by suffix 'A' for  $\pm 10\%$  tolerance and suffix 'B' for  $\pm 5\%$  tolerance. Also available with suffix C or D which indicates 2% and 1% tolerance respectively.



**FIGURE 2**

POWER DERATING CURVE

**SILICON  
500 mW  
ZENER DIODES**



**FIGURE 1**

All dimensions in  $\frac{\text{INCH}}{\text{m.m.}}$

## MECHANICAL CHARACTERISTICS

**CASE:** Hermetically sealed glass case. DO-35.

**FINISH:** All external surfaces are corrosion resistant and leads solderable.

**THERMAL RESISTANCE:**  $250^{\circ}\text{C}/\text{W}$  (Maximum) junction to lead at 0.375-inches from body.

**POLARITY:** Diode to be operated with the banded end positive with respect to the opposite end.

# 1N5221 thru 1N5281 DO-35

## \*ELECTRICAL CHARACTERISTICS @ 25°C

| JEDEC<br>Type No.<br>Note 1 | Nominal<br>Zener Voltage<br>V <sub>Z</sub> @ I <sub>ZT</sub><br>Volts | Test<br>Current<br>I <sub>ZT</sub><br>mA | Max Zener Impedance<br>A & B Suffix Only<br>Note 2 |                                                     | Max Reverse Leakage Current |                              |             |                                                                          | Max Zener Voltage<br>Temp. Coeff.<br>(A & B Suffix Only)<br>α <sub>VZ</sub> (%/°C)<br>Note 3 |
|-----------------------------|-----------------------------------------------------------------------|------------------------------------------|----------------------------------------------------|-----------------------------------------------------|-----------------------------|------------------------------|-------------|--------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|
|                             |                                                                       |                                          | Z <sub>1T</sub> @ I <sub>ZT</sub><br>Ohms          | Z <sub>2K</sub> @ I <sub>ZK</sub> = 0.25 mA<br>Ohms | A, B, C & D Suffix Only     |                              |             | Non-Suffix<br>I <sub>L</sub> @ V <sub>L</sub> Used<br>For Suffix A<br>μA |                                                                                              |
|                             |                                                                       |                                          |                                                    |                                                     | I <sub>L</sub><br>μA        | @<br>V <sub>L</sub><br>Volts | A, B, C & D |                                                                          |                                                                                              |
| 1N5221                      | 2.4                                                                   | 20                                       | 30                                                 | 1200                                                | 100                         | 0.95                         | 1.0         | 200                                                                      | -0.085                                                                                       |
| 1N5222                      | 2.5                                                                   | 20                                       | 30                                                 | 1250                                                | 100                         | 0.95                         | 1.0         | 200                                                                      | -0.085                                                                                       |
| 1N5223                      | 2.7                                                                   | 20                                       | 30                                                 | 1300                                                | 75                          | 0.95                         | 1.0         | 150                                                                      | -0.080                                                                                       |
| 1N5224                      | 2.8                                                                   | 20                                       | 30                                                 | 1400                                                | 75                          | 0.95                         | 1.0         | 150                                                                      | -0.080                                                                                       |
| 1N5225                      | 3.0                                                                   | 20                                       | 29                                                 | 1600                                                | 50                          | 0.95                         | 1.0         | 100                                                                      | -0.075                                                                                       |
| 1N5226                      | 3.3                                                                   | 20                                       | 28                                                 | 1600                                                | 25                          | 0.95                         | 1.0         | 100                                                                      | -0.070                                                                                       |
| 1N5227                      | 3.6                                                                   | 20                                       | 24                                                 | 1700                                                | 15                          | 0.95                         | 1.0         | 100                                                                      | -0.065                                                                                       |
| 1N5228                      | 3.9                                                                   | 20                                       | 23                                                 | 1900                                                | 10                          | 0.95                         | 1.0         | 75                                                                       | -0.060                                                                                       |
| 1N5229                      | 4.3                                                                   | 20                                       | 22                                                 | 2000                                                | 5.0                         | 0.95                         | 1.0         | 50                                                                       | ±0.055                                                                                       |
| 1N5230                      | 4.7                                                                   | 20                                       | 19                                                 | 1900                                                | 5.0                         | 1.9                          | 2.0         | 50                                                                       | ±0.030                                                                                       |
| 1N5231                      | 5.1                                                                   | 20                                       | 17                                                 | 1600                                                | 5.0                         | 1.9                          | 2.0         | 50                                                                       | ±0.030                                                                                       |
| 1N5232                      | 5.6                                                                   | 20                                       | 11                                                 | 1600                                                | 5.0                         | 2.9                          | 3.0         | 50                                                                       | ±0.038                                                                                       |
| 1N5233                      | 6.0                                                                   | 20                                       | 7.0                                                | 1600                                                | 5.0                         | 3.3                          | 3.5         | 50                                                                       | ±0.038                                                                                       |
| 1N5234                      | 6.2                                                                   | 20                                       | 7.0                                                | 1000                                                | 5.0                         | 3.8                          | 4.0         | 50                                                                       | ±0.045                                                                                       |
| 1N5235                      | 6.8                                                                   | 20                                       | 5.0                                                | 750                                                 | 3.0                         | 4.8                          | 5.0         | 30                                                                       | ±0.050                                                                                       |
| 1N5236                      | 7.5                                                                   | 20                                       | 6.0                                                | 500                                                 | 3.0                         | 5.7                          | 6.0         | 30                                                                       | ±0.058                                                                                       |
| 1N5237                      | 8.2                                                                   | 20                                       | 8.0                                                | 500                                                 | 3.0                         | 6.2                          | 6.5         | 30                                                                       | ±0.062                                                                                       |
| 1N5238                      | 8.7                                                                   | 20                                       | 8.0                                                | 600                                                 | 3.0                         | 6.2                          | 6.5         | 30                                                                       | ±0.065                                                                                       |
| 1N5239                      | 9.1                                                                   | 20                                       | 10                                                 | 600                                                 | 3.0                         | 6.7                          | 7.0         | 30                                                                       | ±0.068                                                                                       |
| 1N5240                      | 10                                                                    | 20                                       | 17                                                 | 600                                                 | 3.0                         | 7.6                          | 8.0         | 30                                                                       | ±0.075                                                                                       |
| 1N5241                      | 11                                                                    | 20                                       | 22                                                 | 600                                                 | 2.0                         | 8.0                          | 8.4         | 30                                                                       | ±0.076                                                                                       |
| 1N5242                      | 12                                                                    | 20                                       | 30                                                 | 600                                                 | 1.0                         | 8.7                          | 9.1         | 10                                                                       | ±0.077                                                                                       |
| 1N5243                      | 13                                                                    | 9.5                                      | 13                                                 | 600                                                 | 0.5                         | 9.4                          | 9.9         | 10                                                                       | ±0.079                                                                                       |
| 1N5244                      | 14                                                                    | 9.0                                      | 15                                                 | 600                                                 | 0.1                         | 9.5                          | 10          | 10                                                                       | ±0.082                                                                                       |
| 1N5245                      | 15                                                                    | 8.5                                      | 16                                                 | 600                                                 | 0.1                         | 10.5                         | 11          | 10                                                                       | ±0.082                                                                                       |
| 1N5246                      | 16                                                                    | 7.8                                      | 17                                                 | 600                                                 | 0.1                         | 11.4                         | 12          | 10                                                                       | ±0.083                                                                                       |
| 1N5247                      | 17                                                                    | 7.4                                      | 19                                                 | 600                                                 | 0.1                         | 12.4                         | 13          | 10                                                                       | ±0.084                                                                                       |
| 1N5248                      | 18                                                                    | 7.0                                      | 21                                                 | 600                                                 | 0.1                         | 13.3                         | 14          | 10                                                                       | ±0.085                                                                                       |
| 1N5249                      | 19                                                                    | 6.6                                      | 23                                                 | 600                                                 | 0.1                         | 13.3                         | 14          | 10                                                                       | ±0.086                                                                                       |
| 1N5250                      | 20                                                                    | 6.2                                      | 25                                                 | 600                                                 | 0.1                         | 14.3                         | 15          | 10                                                                       | ±0.086                                                                                       |
| 1N5251                      | 22                                                                    | 5.6                                      | 29                                                 | 600                                                 | 0.1                         | 16.2                         | 17          | 10                                                                       | ±0.087                                                                                       |
| 1N5252                      | 24                                                                    | 5.2                                      | 33                                                 | 600                                                 | 0.1                         | 17.1                         | 18          | 10                                                                       | ±0.088                                                                                       |
| 1N5253                      | 25                                                                    | 5.0                                      | 35                                                 | 600                                                 | 0.1                         | 18.1                         | 19          | 10                                                                       | ±0.089                                                                                       |
| 1N5254                      | 27                                                                    | 4.6                                      | 41                                                 | 600                                                 | 0.1                         | 20                           | 21          | 10                                                                       | ±0.090                                                                                       |
| 1N5255                      | 28                                                                    | 4.5                                      | 44                                                 | 600                                                 | 0.1                         | 20                           | 21          | 10                                                                       | ±0.091                                                                                       |
| 1N5256                      | 30                                                                    | 4.2                                      | 49                                                 | 600                                                 | 0.1                         | 22                           | 23          | 10                                                                       | ±0.091                                                                                       |
| 1N5257                      | 33                                                                    | 3.8                                      | 58                                                 | 700                                                 | 0.1                         | 24                           | 25          | 10                                                                       | ±0.092                                                                                       |
| 1N5258                      | 36                                                                    | 3.4                                      | 70                                                 | 700                                                 | 0.1                         | 26                           | 27          | 10                                                                       | ±0.093                                                                                       |
| 1N5259                      | 39                                                                    | 3.2                                      | 80                                                 | 800                                                 | 0.1                         | 29                           | 30          | 10                                                                       | ±0.094                                                                                       |
| 1N5260                      | 43                                                                    | 3.0                                      | 93                                                 | 900                                                 | 0.1                         | 31                           | 33          | 10                                                                       | ±0.095                                                                                       |
| 1N5261                      | 47                                                                    | 2.7                                      | 105                                                | 1000                                                | 0.1                         | 34                           | 36          | 10                                                                       | ±0.095                                                                                       |
| 1N5262                      | 51                                                                    | 2.5                                      | 125                                                | 1100                                                | 0.1                         | 37                           | 39          | 10                                                                       | ±0.096                                                                                       |
| 1N5263                      | 56                                                                    | 2.2                                      | 150                                                | 1300                                                | 0.1                         | 41                           | 43          | 10                                                                       | ±0.096                                                                                       |
| 1N5264                      | 60                                                                    | 2.1                                      | 170                                                | 1400                                                | 0.1                         | 44                           | 46          | 10                                                                       | ±0.097                                                                                       |
| 1N5265                      | 62                                                                    | 2.0                                      | 185                                                | 1400                                                | 0.1                         | 45                           | 47          | 10                                                                       | ±0.097                                                                                       |
| 1N5266                      | 68                                                                    | 1.8                                      | 230                                                | 1600                                                | 0.1                         | 49                           | 52          | 10                                                                       | ±0.097                                                                                       |
| 1N5267                      | 75                                                                    | 1.7                                      | 270                                                | 1700                                                | 0.1                         | 53                           | 56          | 10                                                                       | ±0.098                                                                                       |
| 1N5268                      | 82                                                                    | 1.5                                      | 330                                                | 2000                                                | 0.1                         | 59                           | 62          | 10                                                                       | ±0.098                                                                                       |
| 1N5269                      | 87                                                                    | 1.4                                      | 370                                                | 2200                                                | 0.1                         | 65                           | 68          | 10                                                                       | ±0.099                                                                                       |
| 1N5270                      | 91                                                                    | 1.4                                      | 400                                                | 2300                                                | 0.1                         | 66                           | 69          | 10                                                                       | ±0.099                                                                                       |
| 1N5271                      | 100                                                                   | 1.3                                      | 500                                                | 2600                                                | 0.1                         | 72                           | 76          | 10                                                                       | ±0.110                                                                                       |
| 1N5272                      | 110                                                                   | 1.1                                      | 750                                                | 3000                                                | 0.1                         | 80                           | 84          | 10                                                                       | ±0.110                                                                                       |
| 1N5273                      | 120                                                                   | 1.0                                      | 900                                                | 4000                                                | 0.1                         | 86                           | 91          | 10                                                                       | ±0.110                                                                                       |
| 1N5274                      | 130                                                                   | 0.95                                     | 1100                                               | 4500                                                | 0.1                         | 94                           | 99          | 10                                                                       | ±0.110                                                                                       |
| 1N5275                      | 140                                                                   | 0.90                                     | 1300                                               | 4500                                                | 0.1                         | 101                          | 106         | 10                                                                       | ±0.110                                                                                       |
| 1N5276                      | 150                                                                   | 0.85                                     | 1500                                               | 5000                                                | 0.1                         | 108                          | 114         | 10                                                                       | ±0.110                                                                                       |
| 1N5277                      | 160                                                                   | 0.80                                     | 1700                                               | 5500                                                | 0.1                         | 116                          | 122         | 10                                                                       | ±0.110                                                                                       |
| 1N5278                      | 170                                                                   | 0.74                                     | 1900                                               | 5500                                                | 0.1                         | 123                          | 129         | 10                                                                       | ±0.110                                                                                       |
| 1N5279                      | 180                                                                   | 0.68                                     | 2200                                               | 6000                                                | 0.1                         | 130                          | 137         | 10                                                                       | ±0.110                                                                                       |
| 1N5280                      | 190                                                                   | 0.66                                     | 2400                                               | 6500                                                | 0.1                         | 137                          | 144         | 10                                                                       | ±0.110                                                                                       |
| 1N5281                      | 200                                                                   | 0.65                                     | 2500                                               | 7000                                                | 0.1                         | 144                          | 152         | 10                                                                       | ±0.110                                                                                       |

\*JEDEC registered data

FIGURE 3

**NOTE 1** The electrical characteristics are measured after allowing the device to stabilize for 20 seconds when mounted with a 3/64" minimum lead length from the case.

**NOTE 2** The zener impedance is derived from the 60 HZ ac voltage, which results when an ac current having an r.m.s. 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 insure a sharp knee on the breakdown curve, thereby, eliminating unstable units.

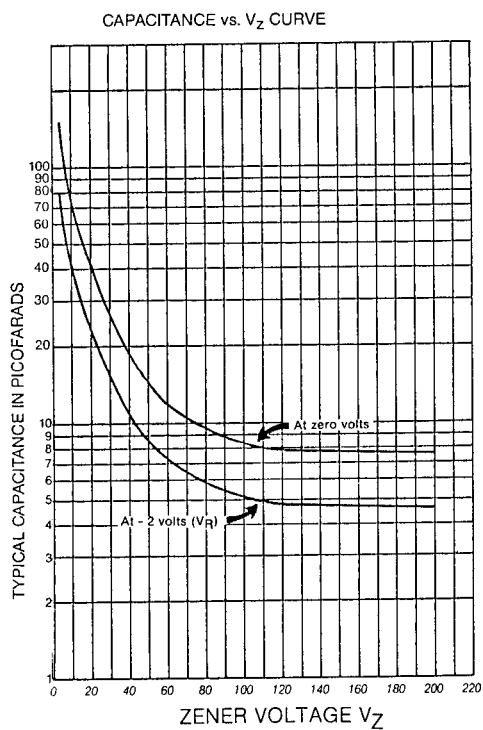
**NOTE 3** Temperature coefficient ( $\alpha_{VZ}$ ).

Test conditions for temperature coefficient are as follows:

- $I_{ZT} = 7.5$  mA,  $T_1 = 25^\circ\text{C}$ ,  
 $T_2 = 125^\circ\text{C}$  (1N5221A, B thru 1N5242A, B.)
- $I_{ZT} = \text{Rated } I_{ZT}$ ,  $T_1 = 25^\circ\text{C}$ ,  
 $T_2 = 125^\circ\text{C}$  (1N5243A, B thru 1N5281A, B.)

Device to be temperature stabilized with current applied prior to reading breakdown voltage at the specified ambient temperature.

# 1N5221 thru 1N5281 DO-35



**FIGURE 4**  
CAPACITANCE VS. ZENER VOLTAGE  
(TYPICAL)