

**1N2804 thru
1N2846B
and
1N4557B thru
1N4564B**

FEATURES

- ZENER VOLTAGE 3.9V to 200V
- AVAILABLE IN TOLERANCES OF $\pm 5\%$, $\pm 10\%$ and $\pm 20\%$
- DESIGNED FOR MILITARY ENVIRONMENTS (See Below)

MAXIMUM RATINGS

Junction and Storage Temperatures: -65°C to $+175^{\circ}\text{C}$

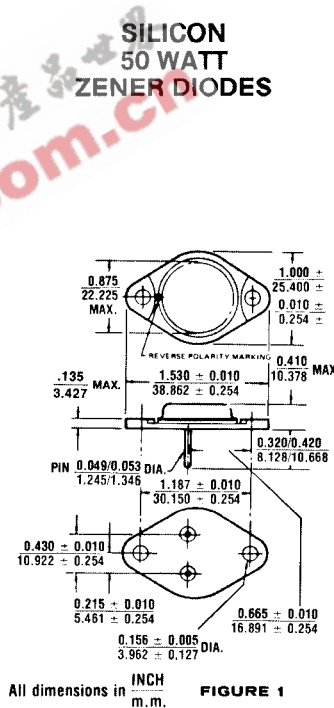
DC Power Dissipation: 50 watts

Power Derating: $0.5\text{W}/^{\circ}\text{C}$ above 75°C

Forward Voltage @ 10 A: 1.5 Volts

*** ELECTRICAL CHARACTERISTICS @ 25°C**

| JEDEC TYPE NO. (Note 1) | NOMINAL ZENER VOLTAGE V _Z @ I _Z Volts (Note 2) | ZENER TEST CURRENT (I _Z) mA | MAX. ZENER IMPEDANCE (Note 3) | | MAX. DC ZENER CURRENT (I _{ZM}) @ 75°C Case Temp. (Note 4) mA | TYPICAL ZENER VOLTAGE V _{ZT} @ I _{ZT} %/°C | MAXIMUM LEAKAGE CURRENT ** | |
|-------------------------|--|---|---------------------------------------|---|--|--|--------------------------------|--------------------------------|
| | | | Z ₀ @ I _{Z0} OHMS | Z ₅ @ 5 mA (I _{Z5}) OHMS | | | μA @ V _R | μA @ V _R |
| †1N4557B | 3.9 | 3200 | 0.16 | 490 | 11,600 | -0.046 | 150 | 0.5 |
| †1N4558B | 4.3 | 2900 | 0.16 | 500 | 10,650 | -0.033 | 150 | 0.5 |
| †1N4559B | 4.7 | 2650 | 0.12 | 600 | 9,700 | -0.015 | 100 | 1 |
| †1N4560B | 5.1 | 2450 | 0.12 | 650 | 8,900 | ± 0.010 | 20 | 1 |
| †1N4561B | 5.6 | 2250 | 0.12 | 900 | 8,100 | $+0.03$ | 20 | 1 |
| †1N4562B | 6.2 | 2000 | 0.14 | 1000 | 7,300 | $+0.049$ | 20 | 2 |
| †1N4563B | 6.8 | 1850 | 0.16 | 200 | 6,650 | $+0.053$ | 10 | 2 |
| †1N4564B | 7.5 | 1650 | 0.24 | 100 | 6,050 | $+0.057$ | 10 | 3 |
| †1N2804B | 6.8 | 1850 | 0.2 | 70 | 7,400 | .040 | 150 | 4.5 |
| †1N2805B | 7.5 | 1700 | 0.3 | 70 | 6,600 | .045 | 100 | 5 |
| †1N2806B | 8.2 | 1500 | 0.4 | 70 | 5,800 | .048 | 50 | 5.4 |
| †1N2807B | 9.1 | 1370 | 0.5 | 70 | 5,300 | .050 | 25 | 6.1 |
| †1N2808B | 10 | 1200 | 0.6 | 80 | 4,800 | .055 | 25 | 6.7 |
| †1N2809B | 11 | 1100 | 0.8 | 80 | 4,300 | .060 | 10 | 8.4 |
| †1N2810B | 12 | 1000 | 1.0 | 80 | 4,000 | .065 | 10 | 9.1 |
| †1N2811B | 13 | 960 | 1.1 | 80 | 3,700 | .065 | 10 | 9.9 |
| †1N2812B | 14 | 890 | 1.2 | 80 | 3,400 | .070 | 10 | 10.6 |
| †1N2813B | 15 | 830 | 1.4 | 80 | 3,100 | .070 | 10 | 11.4 |
| †1N2814B | 16 | 780 | 1.6 | 80 | 2,950 | .070 | 10 | 12.2 |
| †1N2815B | 17 | 740 | 1.8 | 80 | 2,750 | .075 | 10 | 13.0 |
| †1N2816B | 18 | 700 | 2.0 | 80 | 2,550 | .075 | 10 | 13.7 |
| †1N2817B | 19 | 660 | 2.2 | 80 | 2,450 | .070 | 10 | 14.4 |
| †1N2818B | 20 | 630 | 2.4 | 80 | 2,350 | .075 | 10 | 15.2 |
| †1N2819B | 22 | 570 | 2.5 | 80 | 2,100 | .080 | 10 | 16.7 |
| †1N2820B | 24 | 520 | 2.6 | 80 | 1,950 | .080 | 10 | 18.2 |
| †1N2821B | 25 | 500 | 2.7 | 90 | 1,850 | .080 | 10 | 19 |
| †1N2822B | 27 | 460 | 2.8 | 90 | 1,650 | .085 | 10 | 20.6 |
| †1N2823B | 30 | 420 | 3.0 | 90 | 1,550 | .085 | 10 | 22.8 |
| †1N2824B | 33 | 380 | 3.2 | 90 | 1,450 | .085 | 10 | 25.1 |
| †1N2825B | 36 | 350 | 3.5 | 90 | 1,300 | .085 | 10 | 27.4 |
| †1N2826B | 39 | 320 | 4.0 | 90 | 1,175 | .090 | 10 | 29.7 |
| †1N2827B | 43 | 290 | 4.5 | 90 | 1,075 | .090 | 10 | 32.7 |
| †1N2828B | 45 | 280 | 4.5 | 100 | 1,030 | .090 | 10 | 34.2 |
| †1N2829B | 47 | 270 | 5.0 | 100 | 980 | .090 | 10 | 35.8 |
| †1N2830B | 50 | 250 | 5.0 | 100 | 935 | .090 | 10 | 38 |
| †1N2831B | 51 | 245 | 5.2 | 100 | 925 | .090 | 10 | 38.8 |
| †1N2832B | 56 | 220 | 6 | 110 | 825 | .090 | 10 | 42.6 |
| †1N2833B | 62 | 200 | 7 | 120 | 735 | .090 | 10 | 47.1 |
| †1N2834B | 68 | 180 | 8 | 140 | 670 | .090 | 10 | 51.7 |
| †1N2835B | 75 | 170 | 9 | 150 | 600 | .090 | 10 | 56 |
| †1N2836B | 82 | 150 | 11 | 160 | 550 | .090 | 10 | 62.2 |
| †1N2837B | 91 | 140 | 15 | 180 | 470 | .090 | 10 | 69.2 |
| †1N2838B | 100 | 120 | 20 | 200 | 450 | .090 | 10 | 76 |
| †1N2839B | 105 | 120 | 25 | 210 | 430 | .095 | 10 | 79.8 |
| †1N2840B | 110 | 110 | 30 | 220 | 410 | .095 | 10 | 83.6 |
| †1N2841B | 120 | 100 | 40 | 240 | 375 | .095 | 10 | 91.2 |
| †1N2842B | 130 | 95 | 50 | 275 | 345 | .095 | 10 | 98.8 |
| †1N2843B | 150 | 85 | 75 | 400 | 300 | .095 | 10 | 114.0 |
| †1N2844B | 160 | 80 | 80 | 450 | 285 | .095 | 10 | 121.6 |
| †1N2845B | 180 | 68 | 90 | 525 | 250 | .095 | 10 | 136.8 |
| †1N2846B | 200 | 65 | 100 | 600 | 220 | .100 | 10 | 152.0 |



All dimensions in INCH and m.m. **FIGURE 1**

MECHANICAL CHARACTERISTICS

CASE: Industry Standard TO-3, (modified), hermetically sealed, 0.052 inch diameter pins.

FINISH: All external surfaces are corrosion resistant and terminal solderable.

THERMAL RESISTANCE: $1.5^{\circ}\text{C}/\text{W}$ (Typical) junction to base.

POLARITY: Standard Polarity units are connected anode to case. Reverse polarity (cathode to case is indicated by a red dot on the base plate. (Suffix R)

WEIGHT: 15 grams.

MOUNTING HARDWARE: See page 2-9.

*JEDEC Registered Data. **Not JEDEC Data.

†Have JAN, JANTX and JANTXV Qualifications to MIL-S-19500/114.

1N2804 thru 1N2846B, 1N457B thru 1N4564B

NOTE 1 The JEDEC type numbers shown (B suffix) have a $\pm 5\%$ tolerance on nominal zener voltage. The suffix A is used to identify $\pm 10\%$ tolerance; no suffix indicates $\pm 20\%$ tolerance. If tighter tolerance is required, consult factory. Standard polarity units have the anode connected to the case. Reverse polarity (cathode-to-case) units are available and are indicated by suffixing an R to the part number.

NOTE 2 Zener Voltage (V_Z) is measured with junction in thermal equilibrium with 30°C base temperature. The test currents (I_{ZT}) have been selected so that at nominal voltages the dissipation is a constant 12.5 watts. This results in a nominal junction temperature rise of 18.75°C .

NOTE 3 The zener impedance is derived from the 60 cycle A.C. voltage, which results when an A.C. current having an R.M.S. value equal to 10% of the D.C. zener current (I_{ZT} or I_{ZK}) is superimposed on I_{ZT} or I_{ZK} . Zener impedance is measured at 2 points to insure a sharp knee on the breakdown curve and to eliminate unstable units. A curve showing the variation of zener impedance vs. zener current for six representative types is shown in Figure 3. A 100% cathode ray tube curve trace test is used to insure that each zener diode breakdown region begins at a current lower than I_{ZK} and continues at nearly constant voltage to a current level in excess of I_{ZM} .

NOTE 4 The values of I_{ZM} are calculated for a $\pm 5\%$ tolerance on nominal zener voltage. Allowance has been made for the rise in zener voltage above V_{ZT} which results from zener impedance and the increase in junction temperature as power dissipation approaches 50 watts. In the case of individual diodes I_{ZM} is that value of current which results in a dissipation of 50 watts.

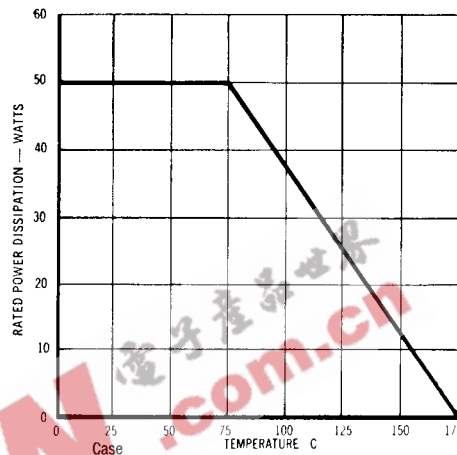
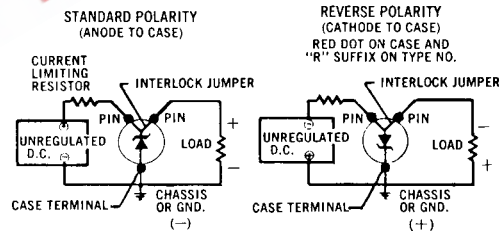


FIGURE 2
POWER DERATING CURVE



Typical circuit connections for anode-to-case and cathode-to-case polarities (standard and reverse polarities, respectively).

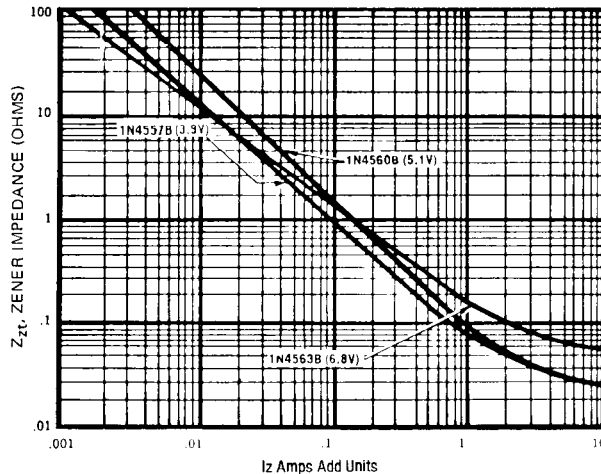
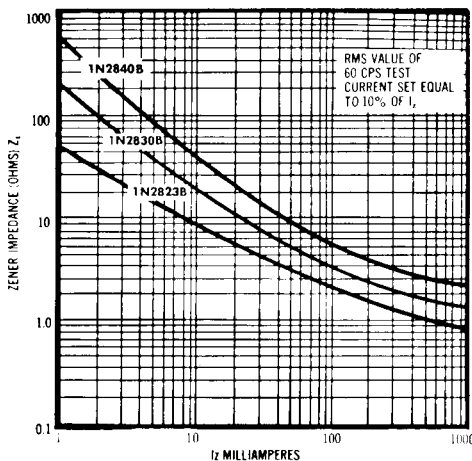


FIGURE 3

TYPICAL ZENER IMPEDANCE vs. ZENER CURRENT
FOR TYPES SHOWN