



**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:  $-65^{\circ}\text{C}$  to  $+175^{\circ}\text{C}$

DC Power Dissipation: 50 watts

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

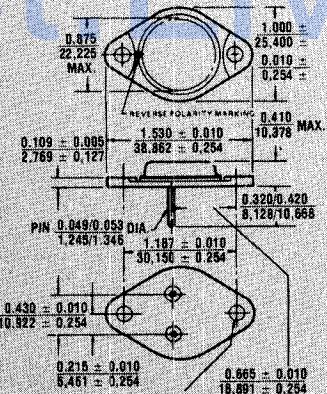
Forward Voltage @ 10 A: 1.5 Volts

## \*ELECTRICAL CHARACTERISTICS @ $25^{\circ}\text{C}$

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 $I_{z,dc}$ @ $75^{\circ}\text{C}$ Case Temp. (Note 4)	TYPICAL ZENER VOLTAGE Temp. Coeff. $\alpha_{Vz}$ %/°C	MAXIMUM LEAKAGE CURRENT $I_s$ @ $V_s$ , mA	
			$Z_z$ @ $I_z$ , mΩ	$Z_z$ @ $5 \text{ mA}$ ( $I_z$ ) mΩ				
1N4557B	3.9	3200	0.16	400	11,900	-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	$\pm 0.010$	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
†IN2804B	6.8	1850	0.2	70	7,400	.040	150	4.5
†IN2805B	7.5	1700	0.3	70	6,600	.045	75	5
†IN2806B	8.2	1500	0.4	70	5,800	.048	50	5.4
†IN2807B	9.1	1370	0.5	70	5,300	.050	25	6.1
†IN2808B	10	1200	0.6	80	4,800	.055	10	6.7
†IN2809B	11	1100	0.8	80	4,300	.060	5	8.4
†IN2810B	12	1000	1.0	80	4,000	.065	5	9.1
†IN2811B	13	950	1.1	80	3,700	.065	5	9.9
†IN2812B	14	890	1.2	80	3,400	.070	5	10.6
†IN2813B	15	830	1.4	80	3,100	.070	5	11.4
†IN2814B	16	730	1.6	80	2,950	.070	5	12.2
†IN2815B	17	740	1.8	80	2,750	.075	5	13.0
†IN2816B	18	700	2.0	80	2,550	.075	5	13.7
1N2817B	19	650	2.2	80	2,450	.075	5	14.4
†IN2818B	20	630	2.4	80	2,350	.075	5	15.2
†IN2819B	22	570	2.5	80	2,100	.080	5	16.7
†IN2820B	24	520	2.6	80	1,950	.080	5	18.2
†IN2821B	25	500	2.7	90	1,850	.080	5	19
†IN2822B	27	450	2.8	90	1,650	.085	5	20.6
†IN2823B	30	420	3.0	90	1,550	.085	5	22.8
†IN2824B	33	380	3.2	90	1,450	.085	5	25.1
†IN2825B	36	350	3.5	90	1,300	.085	5	27.4
†IN2826B	39	320	4.0	90	1,175	.090	5	29.7
†IN2827B	43	290	4.5	90	1,075	.090	5	32.7
IN2828B	45	280	4.5	100	1,030	.090	5	34.2
†IN2829B	47	270	5.0	100	980	.090	5	35.8
1N2830B	50	250	5.0	100	935	.090	5	38
†IN2831B	51	245	5.2	100	925	.090	5	38.8
†IN2832B	56	220	6	110	825	.090	5	42.6
†IN2833B	62	200	7	120	735	.090	5	47.1
†IN2834B	68	180	8	140	670	.090	5	51.7
†IN2835B	75	170	9	150	600	.090	5	56
†IN2836B	82	150	11	160	550	.090	5	62.2
†IN2837B	91	140	15	180	470	.090	5	69.2
†IN2838B	100	120	20	200	450	.090	5	76
†IN2839B	105	120	25	210	430	.095	5	79.8
†IN2840B	110	110	30	220	410	.095	5	83.6
†IN2841B	120	100	40	240	375	.095	5	91.2
†IN2842B	130	95	50	275	345	.095	5	98.8
†IN2843B	150	85	75	400	300	.095	5	114.0
†IN2844B	160	80	80	450	285	.095	5	121.6
†IN2845B	180	68	90	525	250	.095	5	136.8
†IN2846B	200	65	100	600	220	.100	5	152.0

\*JEDEC Registered Data. †Have JAN, JANTX and JANTXV Qualifications to MIL-S-19500/114.

## SILICON 50 WATT ZENER DIODES



All dimensions in INCH mm. FIGURE 1

## MECHANICAL CHARACTERISTICS

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

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

THERMAL RESISTANCE:  $1.5^{\circ}\text{C/W}$  (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 (47).

For more information call:  
(602) 941-6300

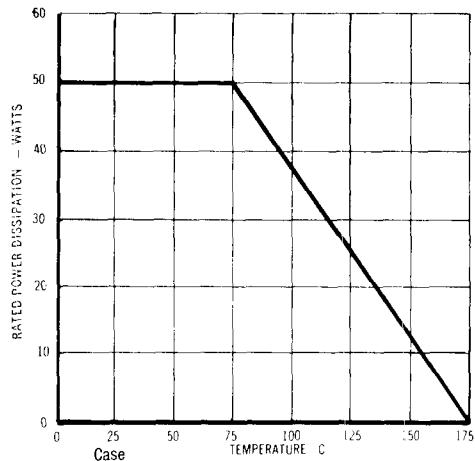
# 1N2804 thru 1N2846B, 1N457B thru 1N4564B

**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.

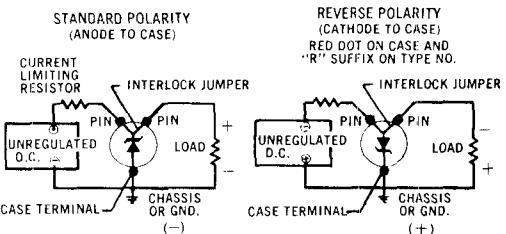
**NOTE 2** Zener Voltage ( $V_z$ ) is measured with junction in thermal equilibrium with  $30^\circ\text{C}$  base temperature. The test currents ( $I_{zt}$ ) have been selected so that at nominal voltages the dissipation is a constant 12.5 watts. This results in a nominal junction temperature rise of  $12.5^\circ\text{C}$ .

**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  $I_{zm}$ .

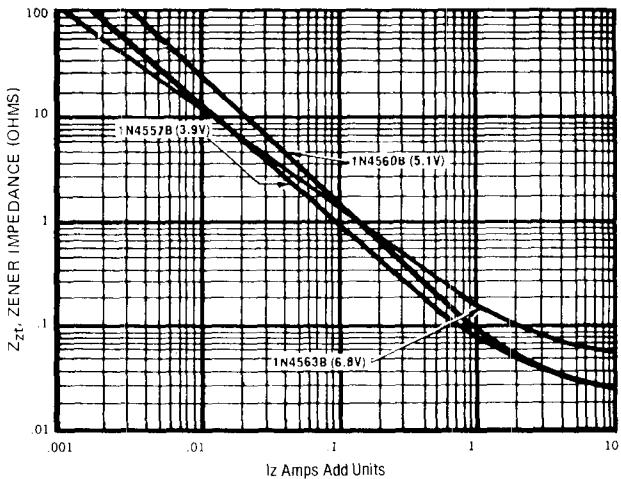
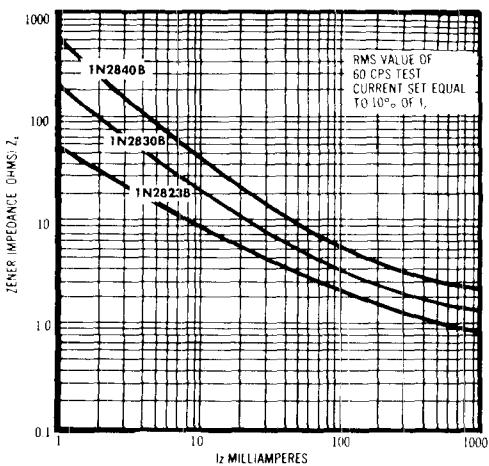
**NOTE 4** The values of  $I_{zm}$  are calculated for a  $\pm 5\%$  tolerance on nominal zener voltage. Allowance has been made for the rise in zener voltage above  $V_{zt}$  which results from zener impedance and the increase in junction temperature as power dissipation approaches 50 watts. In the 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