1N5221B THRU 1N5256B

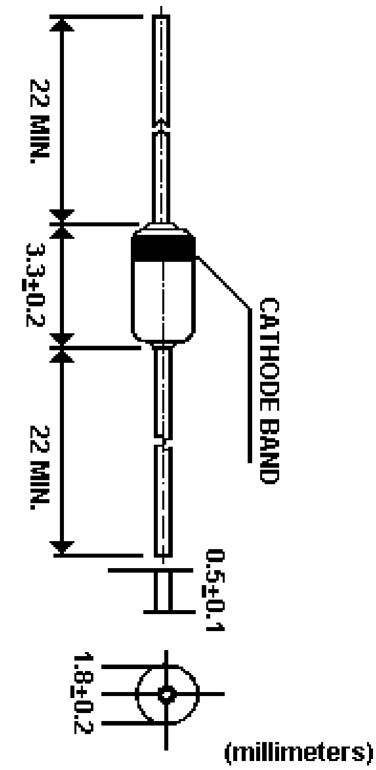
GLASS PASSIVATED JUNCTION SILICON ZENER DIODE

VOLTAGE - 2.4 TO 30 Volts   Power -0.5 Watt

FEATURES

- Low profile package
- Built-in strain relief
- Glass passivated junction
- Low inductance
- Typical I_R less than 5.0 £gA above 4.3V
- High temperature soldering :
  260 ¢J/10 seconds at terminals
- Double Slug Type Construction Metallurgically
  Bonded Construction

Do-35



MECHANICAL DATA

Case: Double slug type, hermetically sealed glass, DO-35

Load: Axial leads, solderable per MIL-STD-202,
method 208 guaranteed

Polarity: Color band denotes cathode end

Mounting position : Any

Weight: 0.005 ounce, 0.13 gram

MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

Ratings at 25 ¢J ambient temperature unless otherwise specified.

	SYMBOL	VALUE	UNITS
DC Power Dissipation and T_L ¡Ø 75 ¢J Lead Length=3/8" Derate above T_L=75 ¢J	P_D	500 4	mW mW/¢J
Operating and Storage Temperature Range	T_J,T_{STG}	-65 to +200	¢J

PANJIT

1N5221B THRU 1N5256B

ELECTRICAL CHARACTERISTICS (T_A=25 ¢J unless otherwise noted, Based on dc measurements at thermal equilibrium; lead length = 3/8"; thermal resistance of teat sink = 30 ¢J/W) V_F=1.1 Max @ I_F=200mA for all types.

JEDEC Type No. (Note 1.)	Nominal Zener Voltage Vz @ I_{ZT} volts (Note 3.)	Test current I_{ZT} mA	Maximum Zener Impedance		Max reverse Leakage Current		Max Zener Voltage temperature coeff. £c$_{VZ}$(%/¢J) (Note 2.)
			Z_{ZT} @ I_{ZT} Ohms	Z_{ZK} @ I_{ZK} = 0.25 mA Ohms	I_R £g A	V_R Volts	
1N5221B	2.4	20	30	1200	100	1	-0.085
1N5222B	2.5	20	30	1250	100	1	-0.085
1N5223B	2.7	20	30	1300	75	1	-0.08
1N5224B	2.8	20	30	1400	75	1	-0.08
1N5225B	3	20	29	1600	50	1	-0.075
1N5226B	3.3	20	28	1600	25	1	-0.07
1N5227B	3.6	20	24	1700	15	1	-0.065
1N5228B	3.9	20	23	1900	10	1	-0.06
1N5229B	4.3	20	22	2000	5	1	¡Ó0.055
1N5230B	4.7	20	19	1900	5	2	¡Ó0.03
1N5231B	5.1	20	17	1600	5	2	¡Ó0.03
1N5232B	5.6	20	11	1600	5	3	+0.038
1N5233B	6	20	7	1600	5	3.5	+0.038
1N5234B	6.2	20	7	1000	5	4	+0.045
1N5235B	6.8	20	5	750	3	5	+0.05
1N5236B	7.5	20	6	500	3	6	+0.058
1N5237B	8.2	20	8	500	3	6.5	+0.062
1N5238B	8.7	20	8	600	3	6.5	+0.065
1N5239B	9.1	20	10	600	3	7	+0.068
1N5240B	10	20	17	600	3	8	+0.075
1N5241B	11	20	22	600	2	8.4	+0.076
1N5242B	12	20	30	600	1	9.1	+0.077
1N5243B	13	9.5	13	600	0.5	9.9	+0.079
1N5244B	14	9	15	600	0.1	10	+0.082
1N5245B	15	8.5	16	600	0.1	11	+0.082
1N5246B	16	7.8	17	600	0.1	12	+0.083
1N5247B	17	7.4	19	600	0.1	13	+0.084
1N5248B	18	7	21	600	0.1	14	+0.085
1N5249B	19	6.6	23	600	0.1	14	+0.086
1N5250B	20	6.2	25	600	0.1	15	+0.086
1N5251B	22	5.6	29	600	0.1	17	+0.087
1N5252B	24	5.2	33	600	0.1	18	+0.088
1N5253B	25	5	35	600	0.1	19	+0.089
1N5254B	27	4.6	41	600	0.1	21	+0.09
1N5255B	28	4.5	44	600	0.1	21	+0.091
1N5256B	30	4.2	49	600	0.1	23	+0.091

NOTE:

1. TOLERANCE

   The JEDEC type numbers shown indicate a tolerance of ¡Ó5%. For tighter tolerance devices use suffixes ”C” for ¡Ó2% and “D” for ¡Ó1%.

2. TEMPERATURE COEFFICIENT(£c$_{VZ}$)

   a.I_{ZT} = 7.5mA, T1 = 25 ¢J,

   T_2 = 125 ¢J(1N5221B through 1N5242B).

   b.I_{ZT} = Rated IZT, T1= 25 ¢J

   T_2= 125 ¢J(1N5221B through 1N5242B).

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

3. ZENER VOLTAGE (V_Z) MEASUREMENT

   Nominal zener voltage is measured with the device junction in thermal equilibrium at the lead temperature of 30 ¢J¡Ó1 ¢J and 3/8” lead length.

4. ZENER IMPEDANCE(Z_Z) DERIVATION

   Z_{ZT} and Z_{ZK} are measured by dividing the ac voltage drop across the device by the ac current applied. The specified limits are for I_Z(ac) = 0.1 I_Z(dc) with the ac frequency = 60Hz.

APPLICATION NOTE-ZENER VOLTAGE

Since the actual voltage available from a given zener diode is temperature dependent, it is necessary to determine junction temperature under any set of operating conditions in order to calculate its value. The following procedure is recommended:

Lead Temperature, T_L, should be determined from:T_L = £c$_{LA}$$P_D$ + T_A

£c$_{LA}$ is the lead-to-ambient thermal resistance (¢J/W) and P_D is the power dissipation.

Junction Temperature, T_J , may be found from:T_J = T_L + £GT_{JL}

£GT_{JL} is the increase in junction temperature above the lead temperature and may be found from Figure 3 for a train of power pulses or from Figure 4 for dc power. £GT_{JL}= £c$_{JL}$$P_D$ For worst-case design, using expected limits of Iz, limits of P_D and the extremes of T_J(£GT_J) may be estimated. Changes in voltage, Vz, can then be found from:

£GV = £c$_{VZ}$£GT_J

£c$_{VZ}$, the zener voltage temperature coefficient, is fount from Figures 2.

Under high power-pulse operation, the zener voltage will vary with time and may also be affected significantly be the zener resistance. For best regulation, keep current excursions as low as possible.

Data of Figure 3 should not be used to compute surge capability. Surge limitations are given in Figure 5. They are lower than would be expected by considering only junction temperature, as current crowding effects cause temperatures to be extremely high in small spots resulting in device degradation should the limits of Figure. 5 be exceeded.

TEMPERATURE COEFFICIENTS

(-55 ¢J TO +150 ¢J temperature range; 90% of the units are in the ranges indicated)

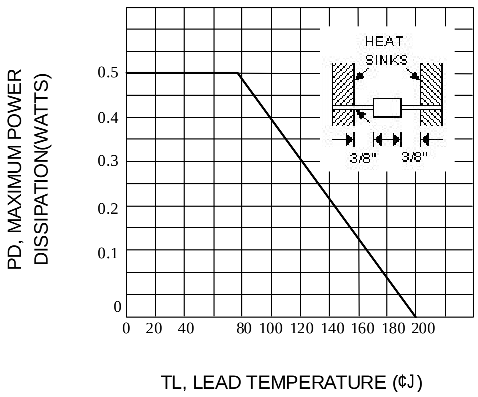


Fig. 1-STEADY STATE POWER DERATING

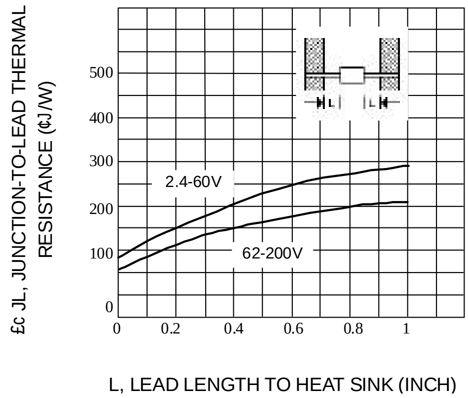


Fig. 2-TYPICAL THERMAL RESISTANCE

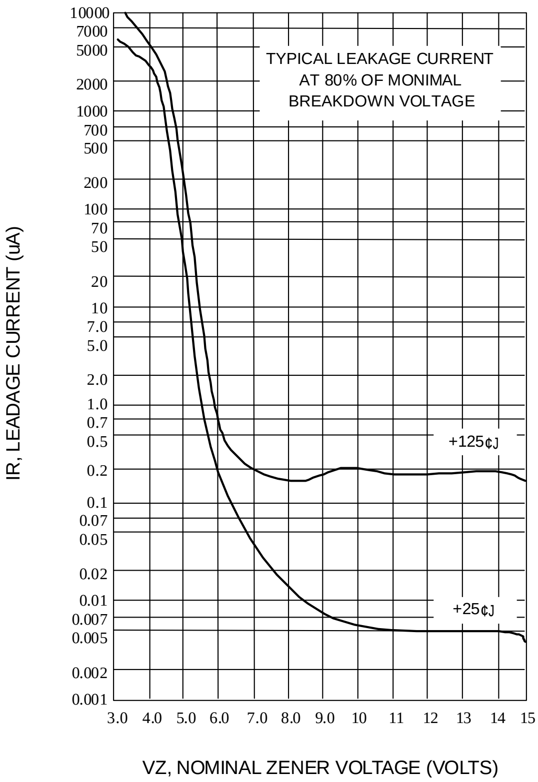


Fig. 3-TYPICAL LEADAGE CURRENT

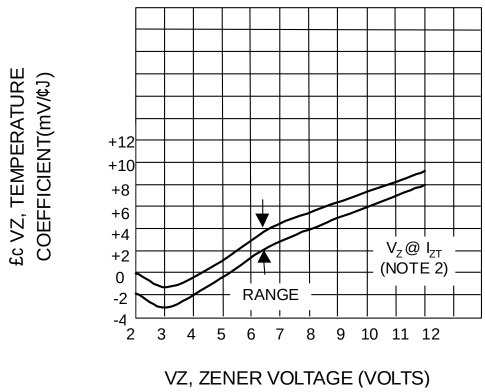


Fig. 4a-RANGE FOR UNITS TO 12 VOLTS

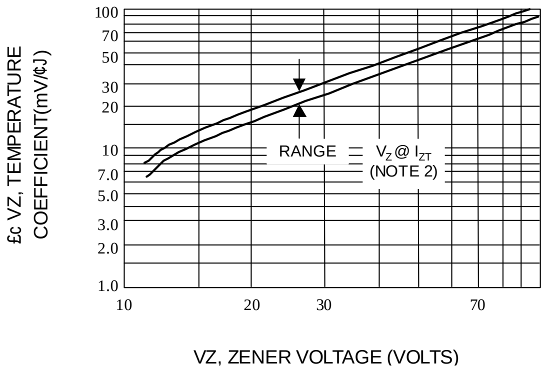


Fig. 4b-RANGE FOR UNITS 12 TO 100 VOLTS

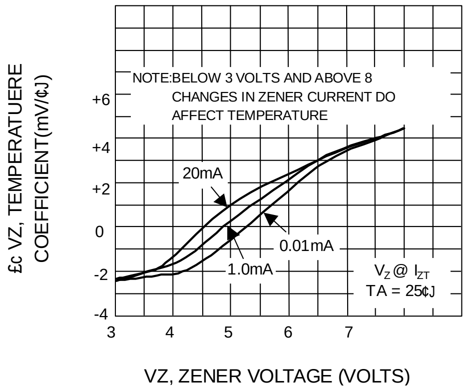


Fig. 5-EFFECT OF ZENER CURRENT

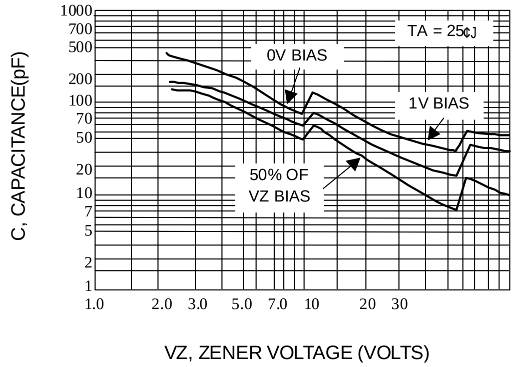


Fig. 6a-TYPICAL CAPACITANCE 2.4 TO 100 VOLTS

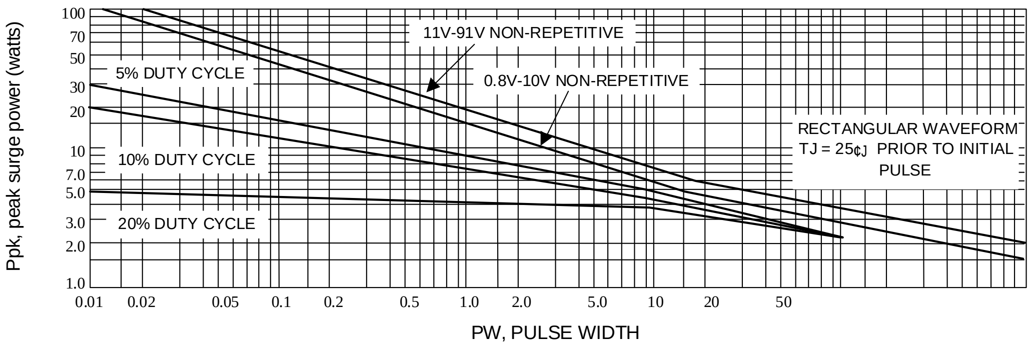


Fig. 7a-MAXIMUM SURGE POWER 1.8 TO 91 VOLTS

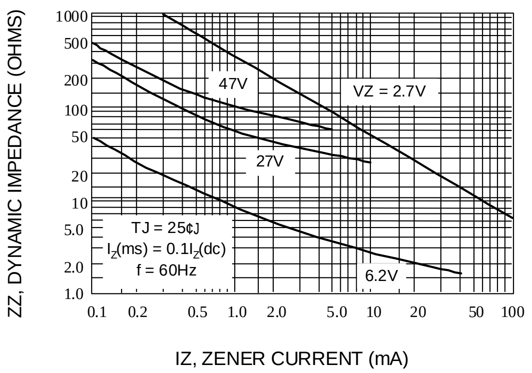


Fig. 8-EFFECT OF ZENER CURRENT ON ZENER IMPEDANCE

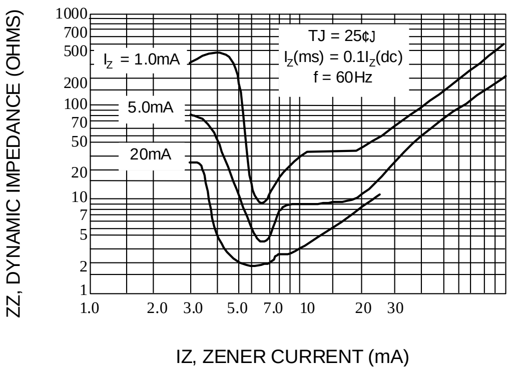


Fig. 9-EFFECT OF ZENER VOLTAGE ON ZENER IMPEDANCE

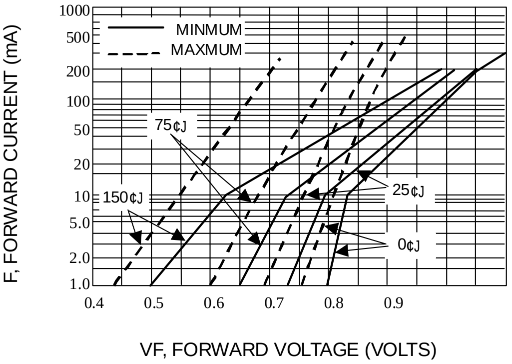


Fig. 10-TYPICAL FORWARD CHARACTERISTICS

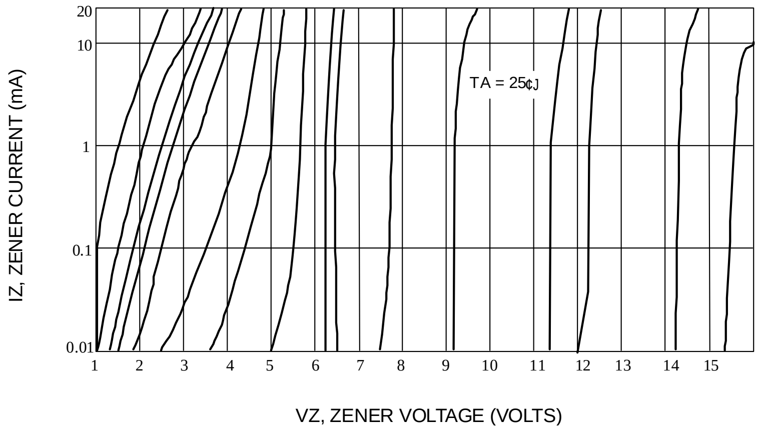


Fig. 11-ZENER VOLTAGE VERSUS ZENER CURRENT
VZ = 1 THRU 16 VOLTS

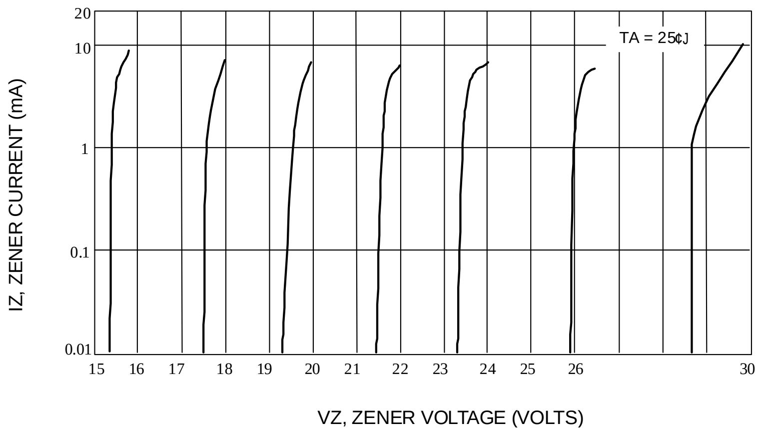


Fig. 12-ZENER VOLTAGE VERSUS ZENER CURRENT VZ= 15 THRU 30 VOLTS

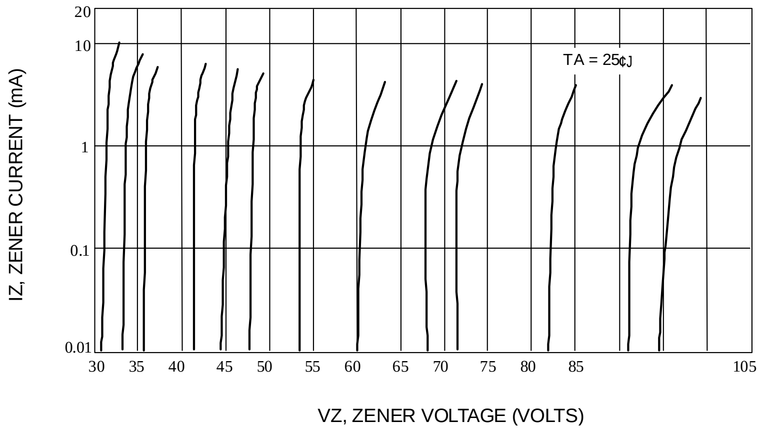


Fig. 13-ZENER VOLTAGE VERSUS ZENER CURRENT VZ = 30 THRU 105 VOLTS