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1N2970 thru 1N3015B and 1N3993 thru 1N4000A

SILICON 10 WATT ZENER DIODES

FEATURES

- ZENER VOLTAGE 3.9 to 200V
- VOLTAGE TOLERANCES; ±5%, ±10% and ±20% (See Note 1)
- MAXIMUM RELIABILITY FOR MILITARY ENVIRONMENTS (See † Below)

MAXIMUM RATINGS

Junction and Storage Temperatures: -65°C to +175°C
DC Power Dissipation: 10 Watts
Power Derating: 80 mW/°C above 50°C
Forward Voltage @ 2.0 A: 1.5 Volts

MECHANICAL CHARACTERISTICS

CASE: Industry Standard DO-4, (DO-203AA). 7/16" Hex. stud with 10-32 threads, welded, hermetically sealed metal and glass.

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

WEIGHT: 7.5 grams.

MOUNTING POSITION: Any

THERMAL RESISTANCE: 10°C/W (Typical) junction to stud.

POLARITY:
IN3993 - IN4000: Std. Polarity is cathode to sud. Reverse polarity (anode to stud) indicated by suffix "R."
IN2970 - IN3015: Std. Polarity is anode to stud. Reverse polarity indicated by suffix "R."

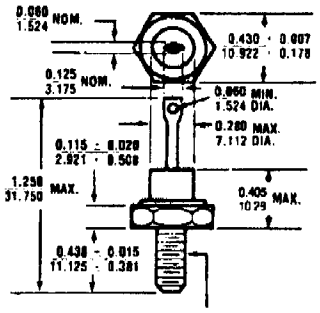

FIGURE 1

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

Quality Semi-Conductors

ELECTRICAL CHARACTERISTICS

JEDEC TYPE NO. (Note 1)	NOMINAL ZENER VOLTAGE V_Z @ I_{ZT} (Note 2)	ZENER TEST CURRENT (I_{ZT})	MAX. DYNAMIC IMPEDANCE (Note 3)		MAX DC ZENER CURRENT (I_{ZM}) @ 25°C Stud Temp. (Note 4)	TEMP. COEFF. α_{VZ}	MAX** REVERSE CURRENT I_R @ V_R		POLARITY
			Z_{ZT} @ I_{ZT}	Z_{ZK} @ 1mA (I_{ZK})					
	Volts	mA	Ohms	Ohms	mA	%/°C	µA	Volts	
†1N3993A	3.9	640	2.0	400	2440	-0.060	100	0.5	STD. POLARITY CATHODE TO STUD
†1N3994A	4.3	580	1.5	400	2200	-0.050	100	0.5	
†1N3995A	4.7	530	1.2	550	2000	+0.025	50	1.0	
†1N3996A	5.1	490	1.1	550	1840	+0.030	10	1.0	
†1N3997A	5.6	445	1.0	600	1680	+0.040	10	1.0	
†1N3998A	6.2	405	1.1	700	1520	+0.045	10	2.0	
†1N2970B	6.8	370	1.2	500	1500	+0.057	150	5.2	STD. POLARITY ANODE TO STUD
†1N2971B	7.5	335	1.3	250	1350	+0.067	100	5.7	
†1N2972B	8.2	305	1.5	250	1180	+0.070	50	6.2	
†1N2973B	9.1	275	2.0	250	1100	+0.075	25	6.9	
†1N2974B	10	250	3	250	980	+0.081	25	7.6	
†1N2975B	11	230	3	250	890	+0.085	10	8.4	
†1N2976B	12	210	3	250	820	+0.079	10	9.1	
†1N2977B	13	190	3	250	750	+0.080	10	9.9	
1N2978B	14	180	3	250	600	+0.070	10	10.5	
†1N2979B	15	170	3	250	640	+0.082	10	11.4	
†1N2980B	16	155	4	250	605	+0.083	10	12.2	
1N2981B	17	145	4	250	500	+0.075	10	13.0	
†1N2982B	18	140	4	250	525	+0.085	10	13.7	
1N2983B	19	130	4	250	440	+0.075	10	14.0	
†1N2984B	20	125	4	250	480	+0.086	10	15.2	
†1N2985B	22	115	5	250	435	+0.087	10	16.7	
†1N2986B	24	105	5	250	400	+0.088	10	18.2	
1N2987B	25	100	6	250	310	+0.080	10	18.2	
†1N2988B	27	95	7	250	340	+0.090	10	20.6	
†1N2989B	30	85	8	300	320	+0.091	10	22.8	
†1N2990B	33	75	9	300	300	+0.092	10	25.1	
†1N2991B	36	70	10	300	260	+0.093	10	27.4	
†1N2992B	39	65	11	300	240	+0.094	10	29.7	
†1N2993B	43	60	12	400	220	+0.095	10	32.7	
1N2994B	45	55	13	400	185	+0.090	10	33.0	
†1N2995B	47	55	14	400	200	+0.095	10	35.8	
1N2996B	50	50	15	500	165	+0.090	10	36.0	
†1N2997B	51	50	15	500	185	+0.096	10	38.8	
1N2998B	52	50	15	500	160	+0.090	10	39.0	
†1N2999B	56	45	16	500	170	+0.096	10	42.6	
†1N3000B	62	40	17	600	150	+0.097	10	47.1	
†1N3001B	68	37	18	600	137	+0.097	10	51.7	
†1N3002B	75	33	22	600	125	+0.098	10	56.0	
†1N3003B	82	30	25	700	115	+0.098	10	62.2	
†1N3004B	91	28	35	800	97	+0.099	10	69.2	
†1N3005B	100	25	40	900	91	+0.110	10	76.0	
1N3006B	105	25	45	1000	75	+0.095	10	76.0	
†1N3007B	110	23	55	1100	82	+0.110	10	83.6	
†1N3008B	120	20	75	1200	77	+0.110	10	91.2	
†1N3009B	130	19	100	1300	71	+0.110	10	98.8	
1N3010B	140	18	125	1400	58	+0.095	10	100.0	
†1N3011B	150	17	175	1500	62	+0.110	10	114.0	
†1N3012B	160	16	200	1600	58	+0.110	10	121.6	
1N3013B	175	14	250	1750	46	+0.095	10	135.0	
†1N3014B	180	14	260	1850	52	+0.110	10	136.8	
†1N3015B	200	12	300	2000	46	+0.110	10	152.0	

NOTE 1 1N3993-1N4000 series: suffix A indicates ±5% tolerance, no suffix indicates ±10% tolerance. 1N2970-1N3015 series: suffix B indicates ±5% tolerance, suffix A indicates ±10%, no suffix indicates ±20% tolerance. If tighter tolerance is required, consult factory.

NOTE 2 The electrical characteristics are measured after allowing the device to stabilize for 90 seconds with 30°C Base temperature.

NOTE 3 The zener impedance (Z_{ZT}) is derived from the 60 Hz ac voltage, which results when an ac current having an rms value equal to 10% of the DC zener current (I_{ZT} or I_{ZK}) is superimposed on I_{ZT} or I_{ZK}. When making zener impedance measurements at the I_{ZK} test point, it may be necessary to insert a 60 Hz band pass filter between the diode and voltmeter to avoid errors resulting from low level noise signals. A curve showing the variation of zener impedance vs. zener current for three representative types is shown in Figures 3 and 4.

NOTE 4 These values of I_{zm} may be exceeded in the case of individual diodes. The values shown are calculated for the worst case which is a unit of ±5% tolerance at the high voltage end of its tolerance range. Allowance has also 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 10 watts.