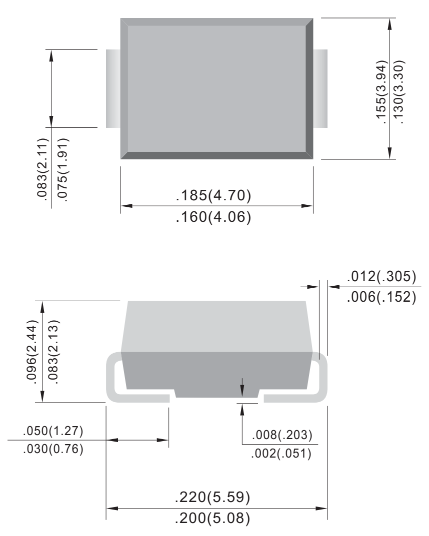
1SMB3EZ6.8~1SMB3EZ100

SILICON ZENER DIODES

VOLTAGE 6.8 to 100 Volts **POWER** 3.0 Watts

SMB/DO-214AA Unit: inch (mm)



FEATURES

- Low profile package
- Built-in strain relief
- Low inductance
- Typical I_D less than 1.0μA above 11V
- Plastic package has Underwriters Laboratory Flammability Classification 94V-O
- High temperature soldering : 260°C /10 seconds at terminals
- Pb free product are available : 99% Sn can meet RoHS environment substance directive request

MECHANICALDATA

Case: JEDEC DO-214AA, Molded plastic over passivated junction
Terminals: Solder plated, solderable per MIL-STD-750, Method 2026

Polarity: Indicated by cathode band

Standard packing: 12mm tape (E1A-481)

Weight: 0.003 ounce, 0.093 gram

MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

Ratings at 25°C ambient temperature unless otherwise specified.

Parameter	Symbol	Value	Units
Peak Pulse Power Dissipation on TA=50°C (Notes A) Derate above 70°C	P_D	3.0 24.0	W atts mW/ °C
Peak Forward Surge Current 8.3ms single half sine-wave superimposed on rated load (JEDEC method)	I_{FSM}	15	Amps
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 to + 150	°C

NOTES:
A.Mounted on 5.0mm² (.013mm thick) land areas.
B.Measured on 8.3ms, and single half sine-wave or equivalent square wave ,duty cycle=4 pulses per minute maximum

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Part Number	Nominal Zener Voltage			Maximum Zener Impedance				Max. Reverse Leakage Current		Marking Code	Package
	V_Z @ I_{ZT}			Z_{ZT} @ I_{ZT}	I_{ZT}	Z_{ZK} @ I_{ZK}	I_{ZK}	I_R @V_R			
	Nom. V	Min. V	Max. V	Ohms	mA	Ohms	mA	µA	V		
3.0 watt Zener Diodes											
1SMB3EZ6.8	6.8	6.46	7.14	2	110.0	700	1.00	5.00	4.00	3006	SMB
1SMB3EZ7.5	7.5	7.13	7.88	2	100.0	700	0.50	5.00	5.00	3007	SMB
1SMB3EZ8.2	8.2	7.79	8.61	2	91.0	700	0.50	5.00	6.00	3008	SMB
1SMB3EZ8.7	8.7	8.27	9.14	2	85.0	700	0.50	4.00	6.60	30A8	SMB
1SMB3EZ9.1	9.1	8.65	9.56	3	82.0	700	0.50	3.00	7.00	3009	SMB
1SMB3EZ10	10	9..50	10.50	4	75.0	700	0.25	3.00	7.60	3010	SMB
1SMB3EZ11	11	10.45	11.55	4	68.0	700	0.25	1.00	8.40	3011	SMB
1SMB3EZ12	12	11.40	12.60	5	63.0	700	0.25	1.00	9.10	3012	SMB
1SMB3EZ13	13	12.35	13.65	5	58.0	700	0.25	0.50	9.90	3013	SMB
1SMB3EZ14	14	13.30	14.70	6	53.0	700	0.25	0.50	10.60	3014	SMB
1SMB3EZ15	15	14.25	15.75	7	50.0	700	0.25	0.50	11.40	3015	SMB
1SMB3EZ16	16	15.20	16.80	8	47.0	700	0.25	0.50	12.20	3016	SMB
1SMB3EZ17	17	16.15	17.85	9	44.0	750	0.25	0.50	13.00	3017	SMB
1SMB3EZ18	18	17.10	18.90	10	42.0	750	0.25	0.50	13.70	3018	SMB
1SMB3EZ19	19	18.05	19.95	11	40.0	750	0.25	0.50	14.40	3019	SMB
1SMB3EZ20	20	19.00	21.00	11	37.0	750	0.25	0.50	15.20	3020	SMB
1SMB3EZ22	22	20.90	23.10	12	34.0	750	0.25	0.50	16.70	3022	SMB
1SMB3EZ24	24	22.80	25.20	13	31.0	750	0.25	0.50	18.20	3024	SMB
1SMB3EZ25	25	23.75	26.25	14	30.0	750	0.25	0.50	19.00	3025	SMB
1SMB3EZ27	27	25.65	28.35	18	28.0	750	0.25	0.50	20.60	3027	SMB
1SMB3EZ28	28	26.60	29.40	18	27.0	750	0.25	0.50	21.30	3028	SMB
1SMB3EZ30	30	28.50	31.50	20	25.0	1000	0.25	0.50	22.50	3030	SMB
1SMB3EZ33	33	31.35	34.65	23	23.0	1000	0.25	0.50	25.10	3033	SMB
1SMB3EZ36	36	34.20	37.80	25	21.0	1000	0.25	0.50	27.40	3036	SMB
1SMB3EZ39	39	37.05	40.95	30	19.0	1000	0.25	0.50	29.70	3039	SMB
1SMB3EZ43	43	40.85	45.15	35	17.0	1500	0.25	0.50	32.70	3043	SMB
1SMB3EZ47	47	44.65	49.35	40	16.0	1500	0.25	0.50	35.70	3047	SMB
1SMB3EZ51	51	48.45	53.55	48	15.0	1500	0.25	0.50	38.80	3051	SMB
1SMB3EZ56	56	53.20	58.80	55	13.0	2000	0.25	0.50	42.60	3056	SMB
1SMB3EZ60	60	57.00	63.00	58	12.5	2000	0.25	0.50	45.60	3060	SMB
1SMB3EZ62	62	58.90	65.10	60	12.0	2000	0.25	0.50	47.10	3062	SMB
1SMB3EZ68	68	64.60	71.40	75	11.0	2000	0.25	0.50	51.70	3068	SMB
1SMB3EZ75	75	71.25	78.75	90	10.0	2000	0.25	0.50	56.00	3075	SMB
1SMB3EZ82	82	77.90	86.10	100	9.1	3000	0.25	0.50	62.20	3082	SMB
1SMB3EZ87	87	82.65	91.35	120	8.5	3000	0.25	0.50	66.10	3087	SMB
1SMB3EZ91	91	86.45	95.55	125	8.2	3000	0.25	0.50	69.20	3091	SMB
1SMB3EZ100	100	95.00	105.00	175	7.5	3000	0.25	0.50	76.00	3100	SMB

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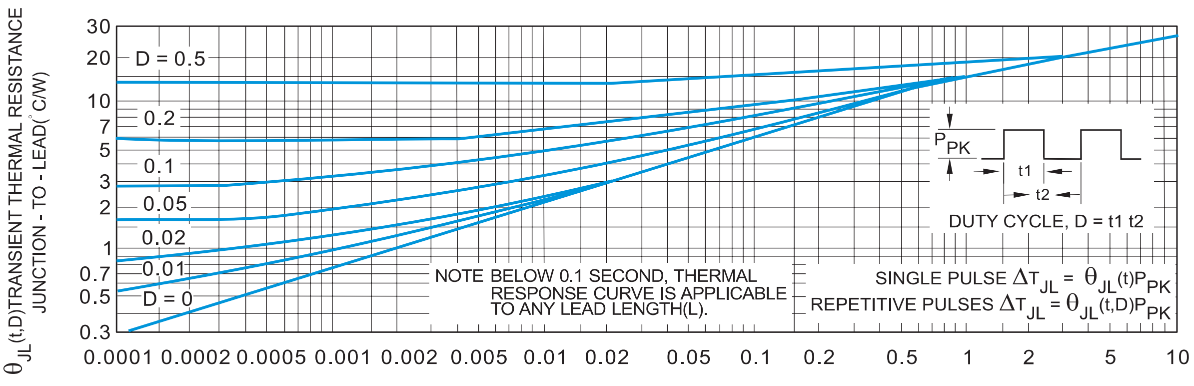

FIGURE 2. TYPICAL THERMAL RESPONSE L,

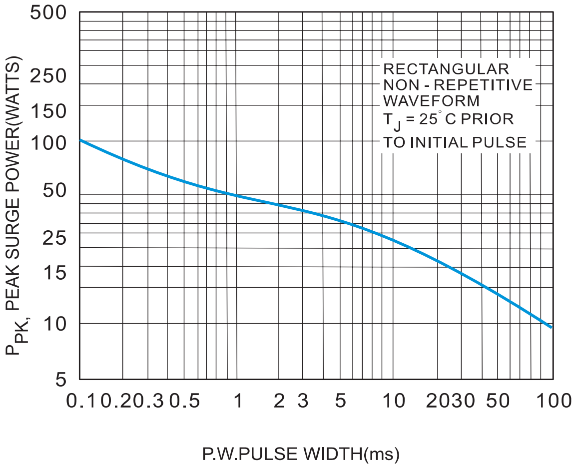

FIGURE 3. MAXIMUM SURGE POWER

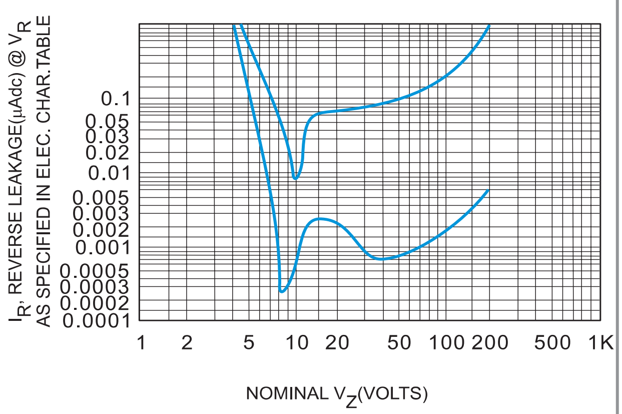

FIGURE 4. TYPICAL REVERSE LEAKAGE

APPLICATION NOTE:

Since the actual voltage available from a given zener diode is temperature dependent, it is necessary to determinejunction 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:

$$T_L = \theta_{LA} P_D + T_A$$

θ_{LA} is the lead-to-ambient thermal resistance (°C/W) and Pd is the power dissipation. The value for θ_{LA} will vary and depends on the device mounting method. θ_{LA} is generally 30-40 °C/W for the various clips and tie points in common use and for printed circuit board wiring.

The temperature of the lead can also be measured using a thermocouple placed on the lead as close as possible to the tie poin

The thermal mass connected to the tie point is normally large enough so that it will not significantly respond to heat surges generated in the diode as a result of pulsed operation once steady-state conditions are achieved. Using the measured value of TL, the junction temperature may be determined by:

$$T_J = T_L + \Delta T_{JL}$$

ΔT_{JL} is the increase in junction temperature above the lead temperature and may be found from Figure 2 for a train of power puls or from Figure 10 for dc power.

$$\Delta T_{JL} = \theta_{JL} P_D$$

For worst-case design, using expected limits of Iz, limits of P_D and the extremes of $T_J(\Delta T_J)$ may be estimated. Changes in volta Vz, can then be found from:

$$\Delta V = \theta V_Z \Delta T_J$$

θV_Z, the zener voltage temperature coefficient, is found from Figures 5 and 6.

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

Data of Figure 2 should not be used to compute surge capa-bility. Surge limitations are given in Figure 3. They are lower than \ be expected by considering only junction temperature, as current crowding effects cause temperatures to be extremely high in s spots resulting in device degradation should the limits of Figure 3 be exceeded.

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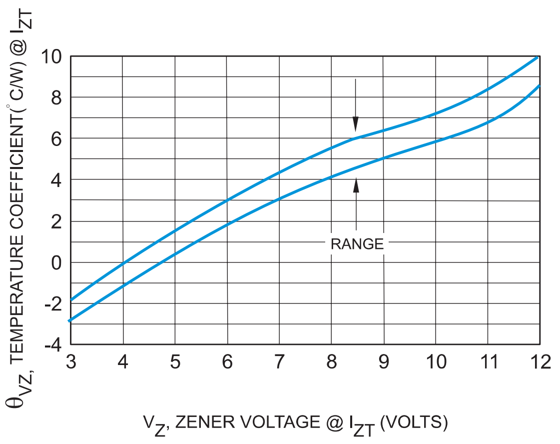

FIGURE 5. UNITS TO 12 VOLTS

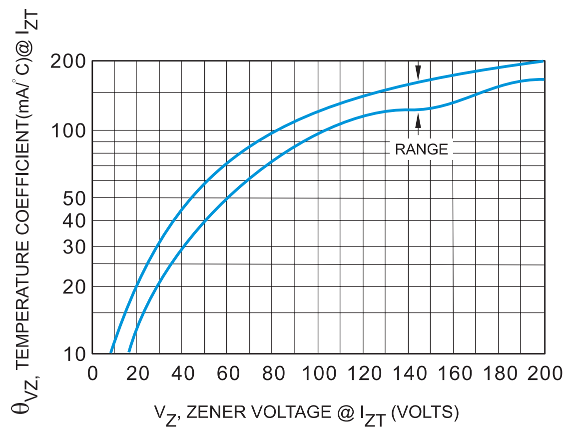

FIGURE 6. UNIT 10 TO 200 VOLTS

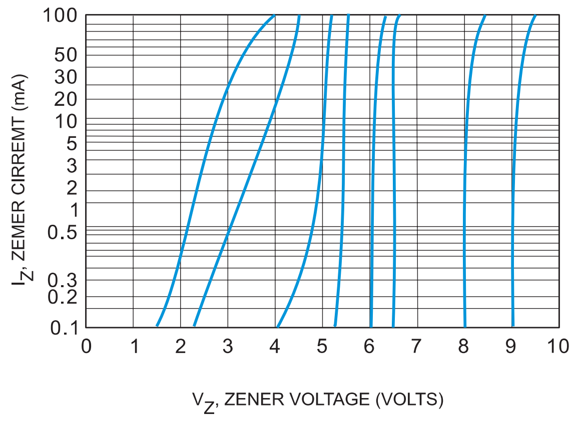

FIGURE 7.V_Z = 3.9 THRU 10 VOLTS

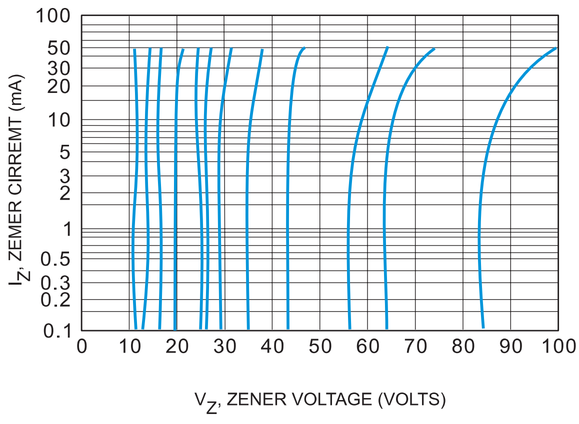

FIGURE 8. V_Z = 12 THRU 82 VOLTS

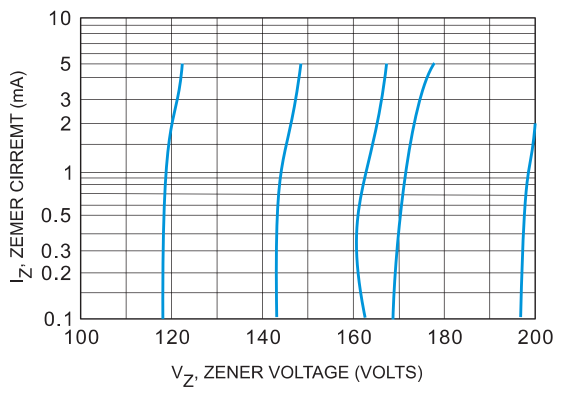

FIGURE 9. V_Z = 100 THRU 200 VOLTS

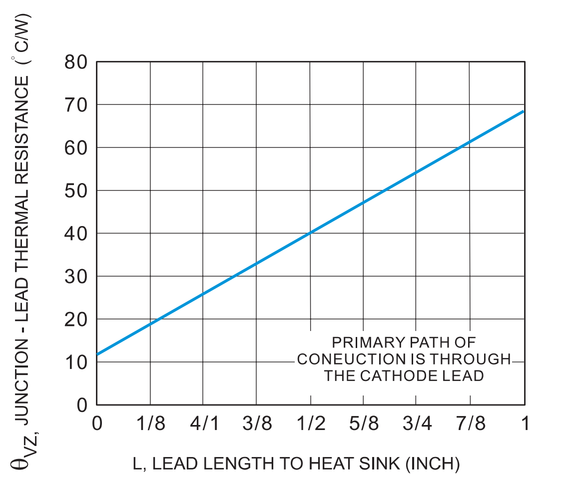

FIGURE 10. TYPICAL THERMAL RESISTANCE