1SMC5348 THRU 1SMC5388

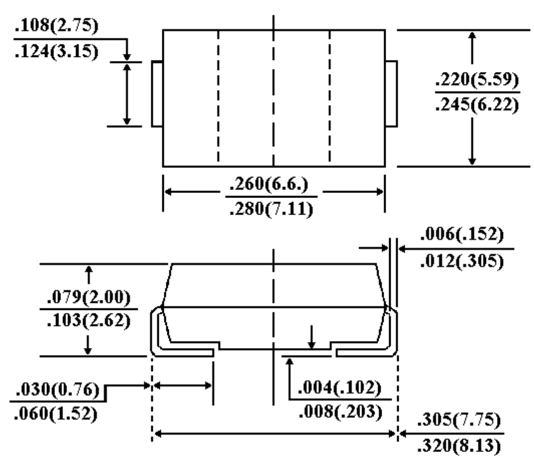
SURFACE MOUNT SILICON ZENER DIODE

VOLTAGE - 11 TO 200 Volts   Power - 5.0 Watts

FEATURES

- For surface mounted applications in order to optimize board space
- Low profile package
- Built-in strain relief
- Glass passivated junction
- Low inductance
- Typical I_D less than 1 £gA above 13V
- High temperature soldering : 260 ¢J/10 seconds at terminals
- Plastic package has Underwriters Laboratory Flammability Classification 94V-O

DO-214AB



Dimensions in inches and (millimeters)

MECHANICAL DATA

Case: JEDEC DO-214AB Molded plastic over passivated junction

Terminals: Solder plated, solderable per MIL-STD-750, method 2026

Standard Packaging: 16mm tape(EIA-481)

Weight: 0.007 ounce, 0.21 gram

MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

Ratings at 25 ¢J ambient temperature unless otherwise specified.

	SYMBOL	VALUE	UNITS
DC Power Dissipation @ T_L=75 ¢J, Measure at Zero Lead Length(Fig. 1) Derate above 75 ¢J(Note 1)	P_D	5.0 40.0	Watts mW/¢J
Peak forward Surge Current 8.3ms single half sine-wave superimposed on rated load(JEDEC Method) (Note 1,2)	I_{FSM}	See Fig. 5	Amps
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 to +150	¢J

NOTES:

1. Mounted on 8.0mm^2 copper pads to each terminal.

2. 8.3ms single half sine-wave, or equivalent square wave, duty cycle = 4 pulses per minute maximum.

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ELECTRICAL CHARACTERISTICS (T_A=25 ¢J unless otherwise noted, V_F=1.2 Max @ I_F=1A for all types.

Type No. (Note 1.)	Nominal Zener Voltage Vz @ I_{ZT} volts (Note 2.)	Test current I_{ZT} mA	Maximum Zener Impedance		Max reverse Leakage Current			Max Surge Current Ir Amps (Note 3.)	Max Voltage Regulation £GVz, Volts (Note 4.)	Maximum Regulator Current I_{ZM} mA (Note 5.)	Device Marking Code
			Z_{ZT} @ I_{ZT} Ohms (Note 2.)	Z_{Zk} @ I_{ZK} = 1 mA Ohms (Note 2.)	I_R £g A	@ V_R Volts					
						Non & A Suffix	B-Suffix				
1SMC5348	11	125	2.5	125	5	8	8.4	8	0.25	430	348B
1SMC5349	12	100	2.5	125	2	8.6	9.1	7.5	0.25	395	349B
1SMC5350	13	100	2.5	100	1	9.4	9.9	7	0.25	365	350B
1SMC5351	14	100	2.5	75	1	10.1	10.6	6.7	0.25	340	351B
1SMC5352	15	75	2.5	75	1	10.8	11.5	6.3	0.25	315	352B
1SMC5353	16	75	2.5	75	1	11.5	12.2	6	0.3	295	353B
1SMC5354	17	70	2.5	75	0.5	12.2	12.9	5.8	0.35	280	354B
1SMC5355	18	65	2.5	75	0.5	13	13.7	5.5	0.4	265	355B
1SMC5356	19	65	3	75	0.5	13.7	14.4	5.3	0.4	250	356B
1SMC5357	20	65	3	75	0.5	14.4	15.2	5.1	0.4	237	357B
1SMC5358	22	50	3.5	75	0.5	15.8	16.7	4.7	0.45	216	358B
1SMC5359	24	50	3.5	100	0.5	17.3	18.2	4.4	0.55	198	359B
1SMC5360	25	50	4	110	0.5	18	19	4.3	0.55	190	360B
1SMC5361	27	50	5	120	0.5	19.4	20.6	4.1	0.6	176	361B
1SMC5362	28	50	6	130	0.5	20.1	21.2	3.9	0.6	170	362B
1SMC5363	30	40	8	140	0.5	21.6	22.8	3.7	0.6	158	363B
1SMC5364	33	40	10	150	0.5	23.8	25.1	3.5	0.6	144	364B
1SMC5365	36	30	11	160	0.5	25.9	27.4	3.3	0.65	132	365B
1SMC5366	39	30	14	170	0.5	28.1	29.7	3.1	0.65	122	366B
1SMC5367	43	30	20	190	0.5	31	32.7	2.8	0.7	110	367B
1SMC5368	47	25	25	210	0.5	33.8	35.8	2.7	0.8	100	368B
1SMC5369	51	25	27	230	0.5	36.7	38.8	2.5	0.9	93	369B
1SMC5370	56	20	35	280	0.5	40.3	42.6	2.3	1	86	370B
1SMC5371	60	20	40	350	0.5	43	45.5	2.2	1.2	79	371B
1SMC5372	62	20	42	400	0.5	44.6	47.1	2.1	1.35	76	372B
1SMC5373	68	20	44	500	0.5	49	51.7	2	1.5	70	373B
1SMC5374	75	20	45	620	0.5	54	56	1.9	1.6	63	374B
1SMC5375	82	15	65	720	0.5	59	62.2	1.8	1.8	58	375B
1SMC5376	87	15	75	760	0.5	63	66	1.7	2	54.5	376B
1SMC5377	91	15	75	760	0.5	65.5	69.2	1.6	2.2	52.5	377B
1SMC5378	100	12	90	800	0.5	72	76	1.5	2.5	47.5	378B
1SMC5379	110	12	125	1000	0.5	79.2	83.6	1.4	2.5	43	379B
1SMC5380	120	10	170	1150	0.5	86.4	91.2	1.3	2.5	39.5	380B
1SMC5381	130	10	190	1250	0.5	93.6	98.8	1.2	2.5	36.6	381B
1SMC5382	140	8	230	1500	0.5	101	106	1.2	2.5	34	382B
1SMC5383	150	8	330	1500	0.5	108	114	1.1	3	31.6	383B
1SMC5384	160	8	350	1650	0.5	115	122	1.1	3	29.4	384B
1SMC5385	170	8	380	1750	0.5	122	129	1	3	28	385B
1SMC5386	180	5	430	1750	0.5	130	137	1	4	26.4	386B
1SMC5387	190	5	450	1850	0.5	137	144	0.9	5	25	387B
1SMC5388	200	5	480	1850	0.5	144	152	0.9	5	23.6	388B

NOTE:

1. TOLERANCE AND VOLTAGE DESIGNATION - The JEDEC type numbers shown indicate a tolerance of ¡Ó10% with guaranteed limits on only Vz, I_R, I_r, and V_F as shown in the electrical characteristics table. Units with guaranteed limits on all seven parameters are indicated by suffix “B” for ¡Ó5% tolerance.
2. ZENER VOLTAGE (Vz) AND IMPEDANCE (Z_{ZT} & Z_{ZK}) - Test conditions for Zener voltage and impedance are as follows; Iz is applied 40 ¡Ó 10 ms prior to reading. Mounting contacts are located from the inside edge of mounting clips to the body of the diode.(T_A=25 ¢J ¡Ï¢¡Ð¢± ¢J).

3. SURGE CURRENT (Ir) - Surge current is specified as the maximum allowable peak, non-recurrent square-wave current with a pulse width, PW, of 8.3 ms. The data given in Figure 5 may be used to find the maximum surge current for a quare wave of any pulse width between 1 ms and 1000ms by plotting the applicable points on logarithmic paper. Examples of this, using the 6.8v and 200V zeners, are shown in Figure 6. Mounting contact located as specified in Note 3. (T_A=25 ¢J ¡Ï¢· ¡Ð¢± ¢J).

4. VOLTAGE REGULATION (£GVz) - Test conditions for voltage regulation are as follows: Vz measurements are made at 10% and then at 50% of the Iz max value listed in the electrical characteristics table. The test currents are the same for the 5% and 10% tolerance devices. The test current time druation for each Vz measurement is 40 ¡Ó 10 ms. (T_A=25 ¢J ¡Ï¢· ¡Ð¢± ¢J). Mounting contact located as specified in Note2.

5. MAXIMUM REGULATOR CURRENT (I_{ZM}) - The maximum current shown is based on the maximum voltage of a 5% type unit. Therefore, it applies only to the B-suffix device. The actual I_{ZM} for any device may not exceed the value of 5 watts divided by the actual Vz of the device. T_L=75 ¢J at maximum from the device body.

APPLICATION NOTE:

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.

RATING AND CHARACTERISTICS CURVES

1N5348B THRU 1N5388B

TEMPERATURE COEFFICIENTS

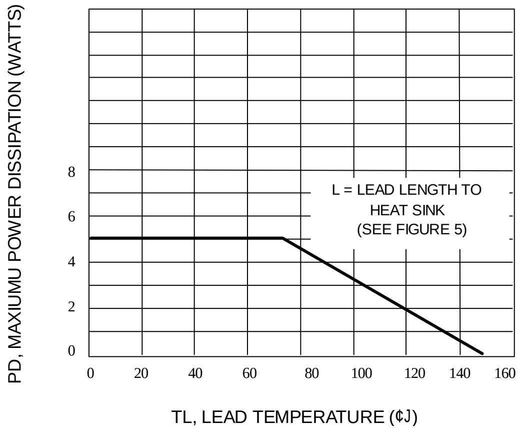

Fig. 1-POWER TEMPERATURE DERATING CURVE

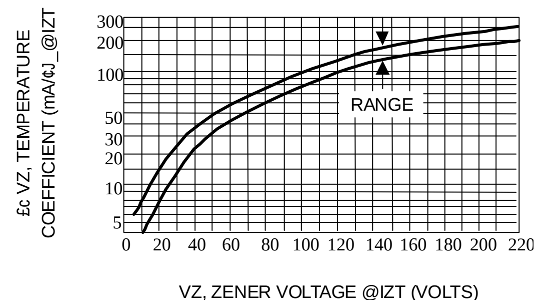

Fig. 2-TEMPERATURE COEFFICIENT-RANGE FOR UNITS 6 TO 220 VOLTS

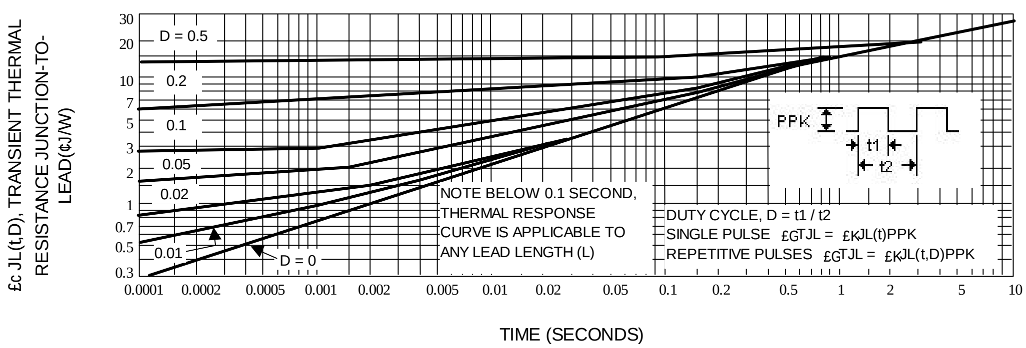

Fig. 3-TYPICAL THERMAL RESPONSE

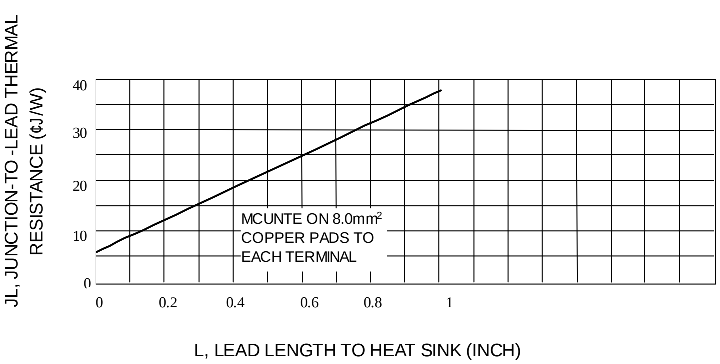

Fig. 4-TYPICAL THERMAL RESISTANCE

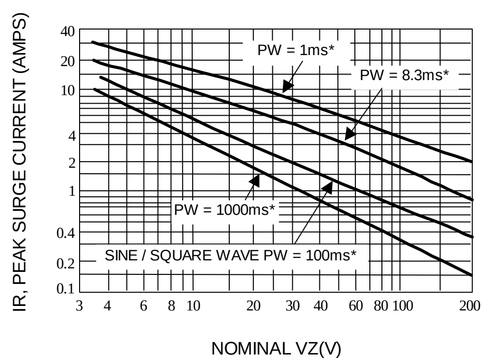

Fig. 5-MAXIMUM NON-REPETITIVE SURGE CURRENT VERSUS NOMINAL ZENER VOLTAGE (SEE NOTE 3)

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ZENER VOLTAGE VERSUS ZENER CURRENT
(FIGURES 7,8, AND 9)

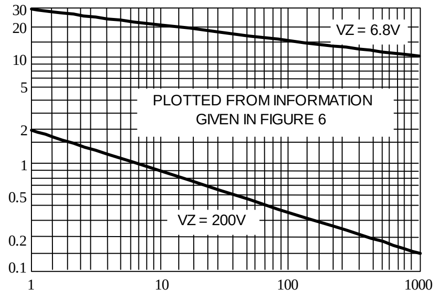

Fig. 6-PEAK SURGE CURRENT VERSUS PULSE WIDTH(SEE NOTE 3)

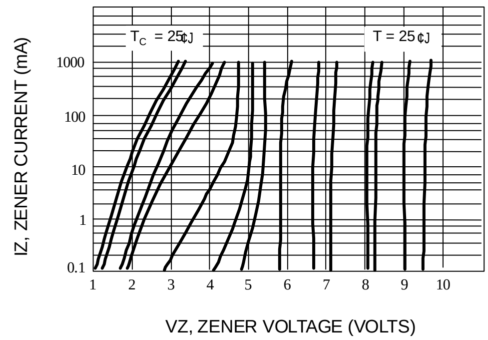

Fig. 7-ZENER VOLTAGE VERSUS ZENER CURRENT VZ = 6.8 THRU 10 VOLTS

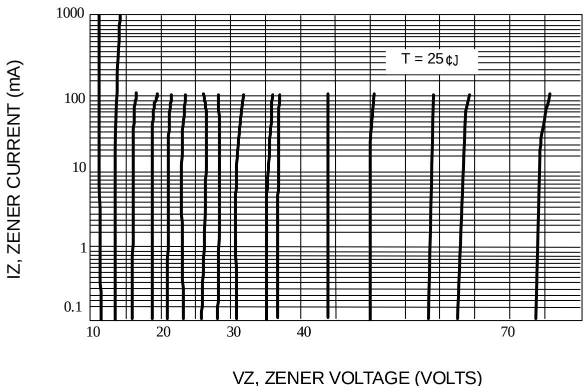

Fig. 8-ZENER VOLTAGE VERSUS ZENER CURRENT VZ = 11 THRU 75 VOLTS

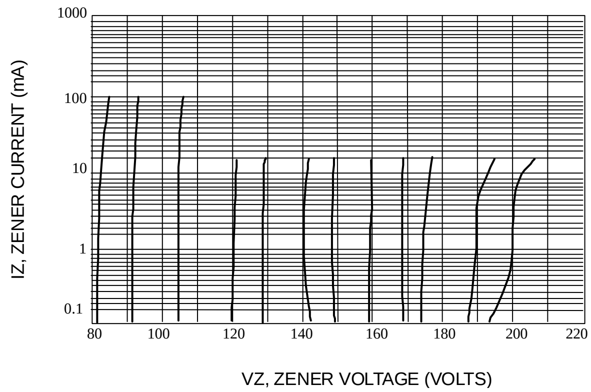

Fig. 9-ZENER VOLTAGE VERSUS ZENER CURRENT VZ = 82 THRU 200 VOLTS

*** 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