



1SMC5348 THRU 1SMC5388

SURFACE MOUNT SILICON ZENER DIODE

VOLTAGE - 11 TO 200 Volts Power - 5.0 Watts

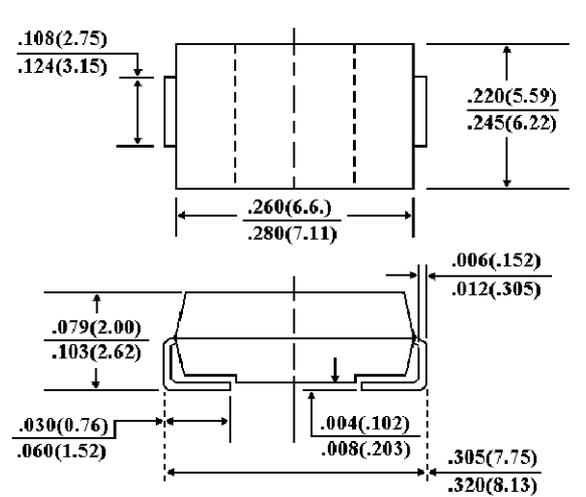
FEATURES

- 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 100mA above 13V
- High temperature soldering :
260 °C/10 seconds at terminals
- Plastic package has Underwriters Laboratory Flammability Classification 94V-0

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

DO-214AB



Dimensions in inches and (millimeters)

MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

Ratings at 25 °C ambient temperature unless otherwise specified.

	SYMBOL	VALUE	UNITS
DC Power Dissipation @ $T_L=75$ °C, Measure at Zero Lead Length(Fig. 1) Derate above 75 °C(Note 1)	P_D	5.0 40.0	Watts mW/°C
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	°C

NOTES:

1. Mounted on 8.0mm² 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 ($T_A=25$ •• unless otherwise noted, $V_F=1.2$ Max @ $I_F=1A$ for all types.

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

NOTE:

1. TOLERANCE AND VOLTAGE DESIGNATION - The JEDEC type numbers shown indicate a tolerance of •• 10% with guaranteed limits on only V_Z , 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 •• 5% tolerance.
2. ZENER VOLTAGE (V_Z) AND IMPEDANCE (Z_{ZT} & Z_{ZK}) - Test conditions for Zener voltage and impedance are as follows; I_Z is applied 40 •• 10 ms prior to reading. Mounting contacts are located from the inside edge of mounting clips to the body of the diode. ($T_A=25$ ••••••••).

3. SURGE CURRENT (I_r) - 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 square 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. ($T_A=25 \dots$).
4. VOLTAGE REGULATION ($\dots V_z$) - Test conditions for voltage regulation are as follows: V_z measurements are made at 10% and then at 50% of the I_z 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 duration for each V_z measurement is 40 \dots 10 ms. ($T_A=25 \dots$). Mounting contact located as specified in Note 2.
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 V_z of the device. $T_L=75 \dots$ 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:

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

$\dots \theta_{LA}$ is the lead-to-ambient thermal resistance (\dots/W) and P_D is the power dissipation.

Junction Temperature, T_J , may be found from:

$$T_J = T_L + \dots \theta_{JL}$$

$\dots \theta_{JL}$ 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.

$$\dots \theta_{JL} = \dots \theta_{JL} P_D$$

For worst-case design, using expected limits of I_z , limits

of P_D and the extremes of $T_J(\dots T_J)$ may be estimated. Changes in voltage, V_z , can then be found from:

$$\dots V = \dots V_z \dots T_J$$

$\dots V_z$, the zener voltage temperature coefficient, is found from Figures 2.

Under high power-pulse operation, the zener voltage will vary with time and may also be affected significantly by 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

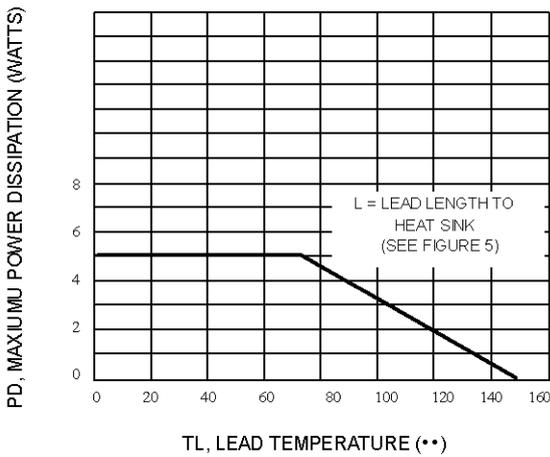


Fig. 1-POWER TEMPERATURE DERATING CURVE

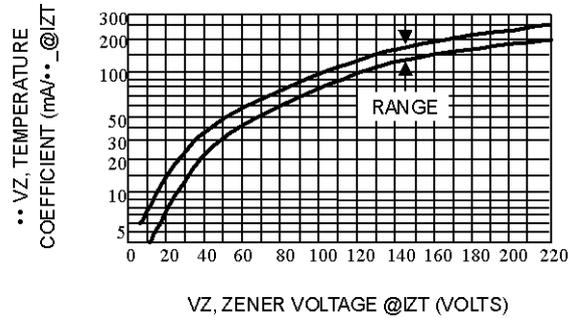


Fig. 2-TEMPERATURE COEFFICIENT-RANGE FOR UNITS 6 TO 220 VOLTS

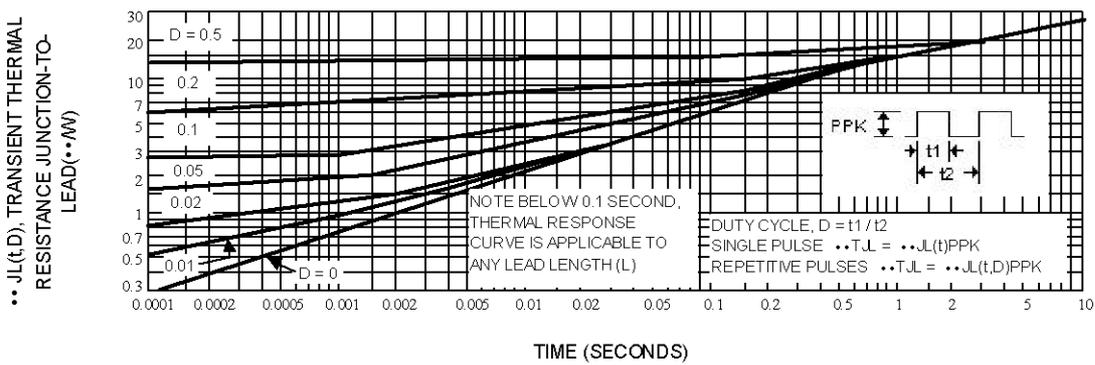


Fig. 3-TYPICAL THERMAL RESPONSE

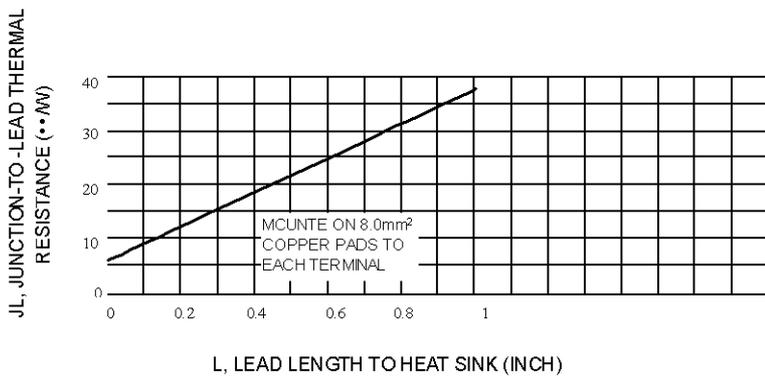


Fig. 4-TYPICAL THERMAL RESISTANCE

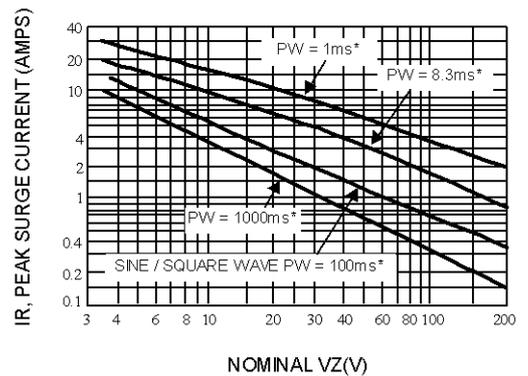


Fig. 5-MAXIMUM NON-REPETITIVE SURGE CURRENT VERSUS NOMINAL ZENER VOLTAGE (SEE NOTE 3)

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

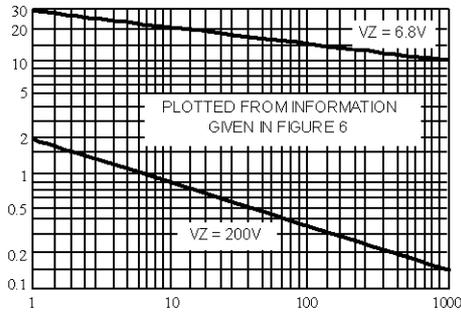


Fig. 6-PEAK SURGE CURRENT VERSUS PULSE WIDTH(SEE NOTE 3)

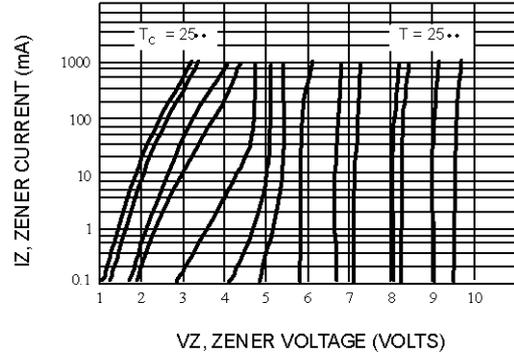


Fig. 7-ZENER VOLTAGE VERSUS ZENER CURRENT
VZ = 6.8 THRU 10 VOLTS

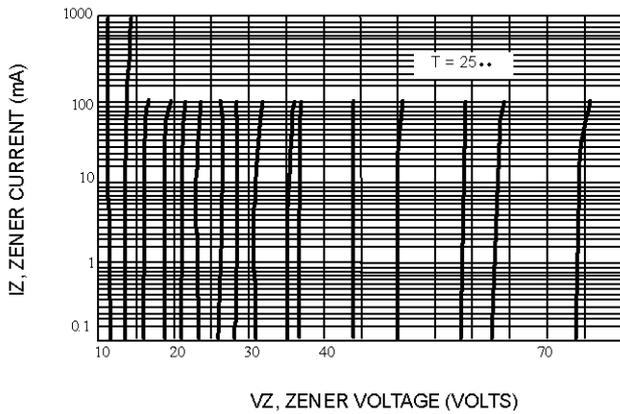


Fig. 8-ZENER VOLTAGE VERSUS ZENER CURRENT
VZ = 11 THRU 75 VOLTS

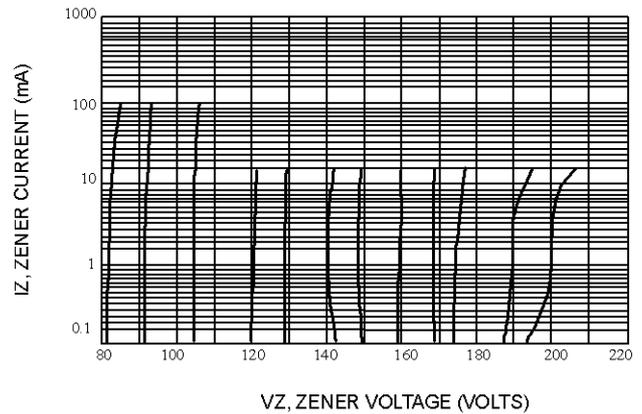


Fig. 9-ZENER VOLTAGE VERSUS ZENER CURRENT
VZ = 82 THRU 200 VOLTS

*** 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