Micro Commercial Components

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1N5338B THRU 1N5369B

5 Watt Zener Diode 5.1 to 51 Volts

Features

- Zener Voltage From 5.1V to 51V
- Epoxy meets UL 94 V-0 flammability rating
- Moisture Sensitivity Level 1
- Lead Free Finish/RoHS Compliant (Note1) ("P"Suffix designates Compliant. See ordering information)
- Marking : Cathode band and type number

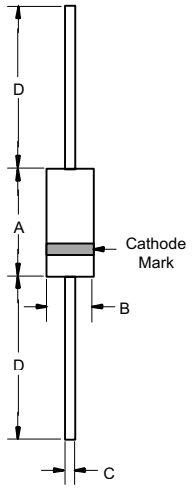
Maximum Ratings:

- Operating Temperature: -55°C to +150°C
- Storage Temperature: -55°C to +150°C
- 5 Watt DC Power Dissipation
- Maximum Forward Voltage @ 1A: 1.2 Volts
- Power Derating: 40 mW/℃ Above 75℃
- Maximum thermal resistence: 25C/W from junction to ambient

Mechanical Data

Case: JEDEC DO-15.
Terminals: Solder plated , solderable per MIL-STD-750, Method 2026.
Standard Packaging: 52mm tape

DO-15



DIMENSIONS					
	INCHES		MM		
DIM	MIN	MAX	MIN	MAX	NOTE
A	.230	.300	5.80	7.60	
B	.104	.140	2.60	3.60	
C	.026	.034	.70	.90	
D	1.000	---	25.40	---	

Note: 1. High Temperature Solder Exemption Applied, see EU Directive Annex 7.

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

MCC PART NUMBER	REGULATOR VOLTAGE V_Z (Note2)	TEST CURRENT I_{ZT}	MAXIMUM DYNAMIC IMPEDANCE Z_{ZK} (@I_{ZT}) (Note2)	MAXIMUM REVERSE CURRENT I_R	TEST VOLTAGE V_R	MAXIMUM REGULATOR CURRENT I_{ZM} (Note5)	MAXIMUM DYNAMIC KNEE IMPEDANCE ZZK@ 1.0mA (Note2)	MAXIMUM SURGE CURRENT I_r (Note3)	MAXIMUM VOLTAGE REGULATION (Note4)
	VOLTS	mA	OHMS	µA	VOLTS	mA	ohms	A	VOLTS
1N5338B	5.1	240	1.5	1.0	1.0	930	400	14.4	0.39
1N5339B	5.6	220	1.0	1.0	2.0	865	400	13.4	0.25
1N5340B	6.0	200	1.0	1.0	3.0	790	300	12.7	0.19
1N5341B	6.2	200	1.0	1.0	3.0	765	200	12.4	0.10
1N5342B	6.8	175	1.0	10	5.2	700	200	11.5	0.15
1N5343B	7.5	175	1.5	10	5.7	630	200	10.7	0.15
1N5344B	8.2	150	1.5	10	6.2	580	200	10	0.20
1N5345B	8.7	150	2.0	10	6.6	545	200	9.5	0.20
1N5346B	9.1	150	2.0	7.5	6.9	520	150	9.2	0.22
1N5347B	10	125	2.0	5.0	7.6	475	125	8.6	0.22
1N5348B	11	125	2.5	5.0	8.4	430	125	8.0	0.25
1N5349B	12	100	2.5	2.0	9.1	395	125	7.5	0.25
1N5350B	13	100	2.5	1.0	9.9	365	100	7.0	0.25
1N5351B	14	100	2.5	1.0	10.6	340	75	6.7	0.25
1N5352B	15	75	2.5	1.0	11.5	315	75	6.3	0.25
1N5353B	16	75	2.5	1.0	12.2	295	75	6.0	0.30
1N5354B	17	70	2.5	0.5	12.9	280	75	5.8	0.35
1N5355B	18	65	2.5	0.5	13.7	264	75	5.5	0.40
1N5356B	19	65	3.0	0.5	14.4	250	75	5.3	.040
1N5357B	20	65	3.0	0.5	15.2	237	75	5.1	.040
1N5358B	22	50	3.5	0.5	16.7	216	75	4.7	0.45
1N5359B	24	50	3.5	0.5	18.2	198	100	4.4	0.55
1N5360B	25	50	4.0	0.5	19	190	110	4.3	0.55
1N5361B	27	50	5.0	0.5	20.6	176	120	4.1	0.60
1N5362B	28	50	6.0	0.5	21.2	170	130	3.9	0.60
1N5363B	30	40	8.0	0.5	22.8	158	140	3.7	0.60
1N5364B	33	40	10	0.5	25.1	144	150	3.5	0.60
1N5365B	36	30	11	0.5	27.4	132	160	3.3	0.65
1N5366B	39	30	14	0.5	29.7	122	170	3.1	0.65
1N5367B	43	30	20	0.5	32.7	110	190	2.8	0.70
1N5368B	47	25	25	0.5	35.8	100	210	2.7	0.80
1N5369B	51	25	27	0.5	38.8	93	230	2.5	0.90

NOTE:

1. TOLERANCE AND VOLTAGE DESIGNATION - The JEDEC type numbers shown indicate a tolerance of+/-10% 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+/-5% 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+/-10 ms prior to reading. Mounting contacts are located from the inside edge of mounting clips to the body of the diode(Ta=25°C)

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 , is shown in Figure 6. Mounting contact located as specified in Note 3. (T_A=25 ℃).
4. VOLTAGE REGULATION (Vz) - 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+/- 10 ms. (T_A=25C). 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=75C 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:

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

θ_{LA} is the lead-to-ambient thermal resistance and P_D is the power dissipation.

Junction Temperature, T_J, may be found from:

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

ΔT_{JL} is the increase in junction temperature above the lead temperature and may be found from Figure 4 for a train of power pulses or from Figure 1 for dc power.

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

For worst-case design, using expected limits of I_Z, limits of P_D and the extremes of T_J (ΔT_J) may be estimated. Changes in voltage, V_Z, can then be found from:

$$\Delta V = \theta_{VZ} \Delta T_J$$

θ_{VZ}, the Zener voltage temperature coefficient, is found from Figures 2 and 3.

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 4 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.

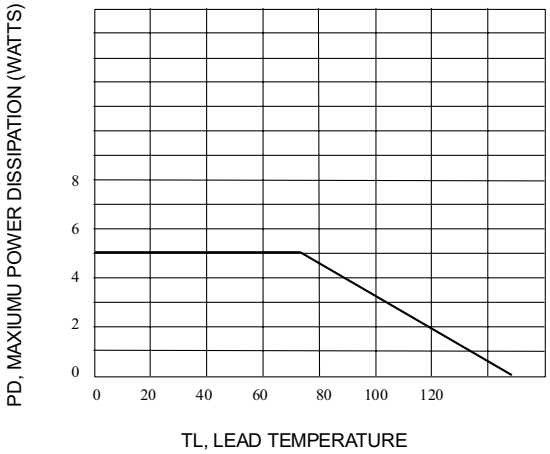

Fig. 1-POWER TEMPERATURE DERATING CURVE

TEMPERATURE COEFFICIENTS

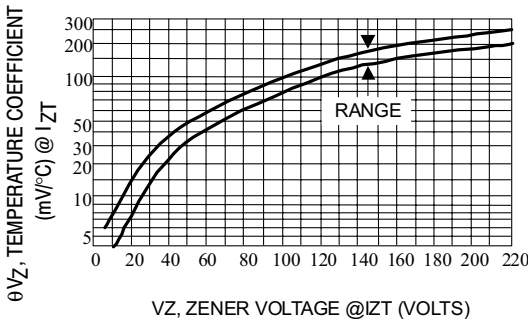

Fig. 2-TEMPERATURE COEFFICIENT-RANGE FOR UNITS 6 TO 51 VOLTS

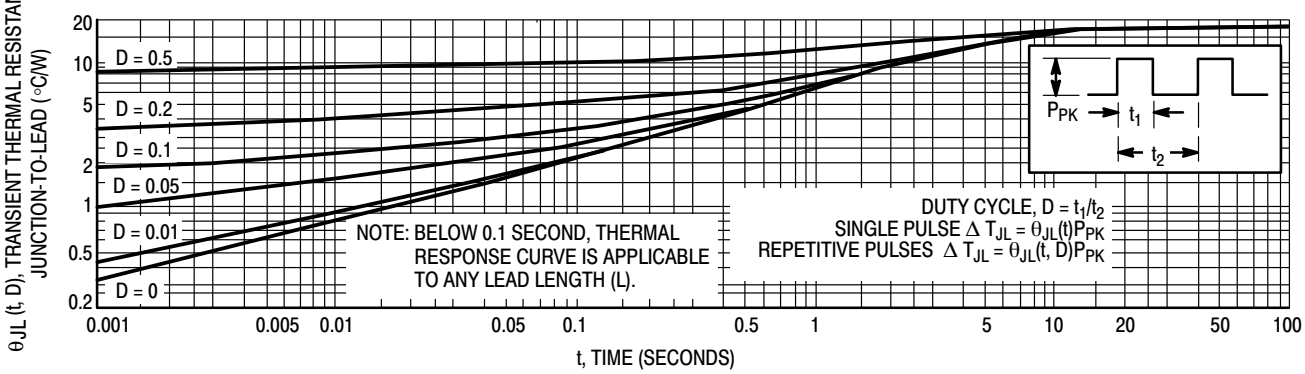

Figure 3. Typical Thermal Response
L, Lead Length = 3/8 Inch

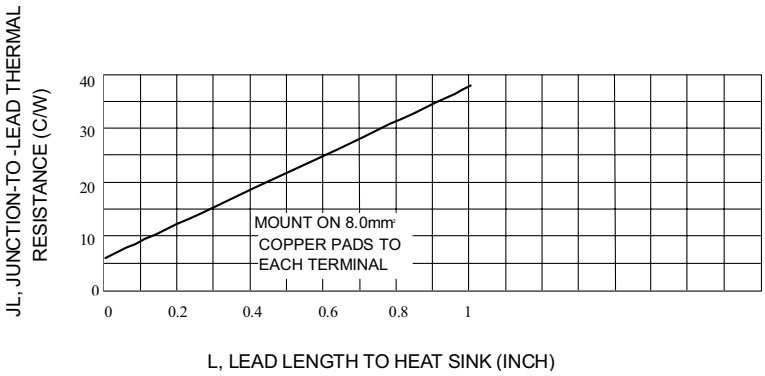

Fig. 4-TYPICAL THERMAL RESISTANCE

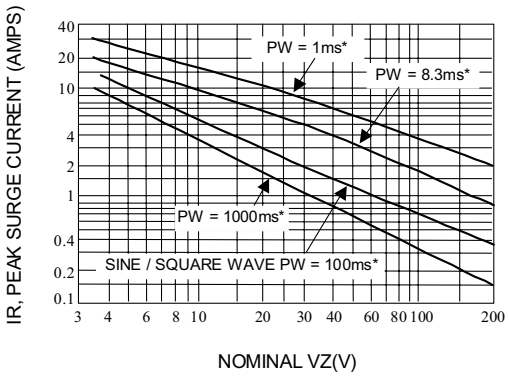

Fig. 5-MAXIMUM NON-REPETITIVE SURGE CURRENT VERSUS NOMINAL ZENER VOLTAGE (SEE NOTE 3)

ZENER VOLTAGE VERSUS ZENER CURRENT
(FIGURES 7,8)

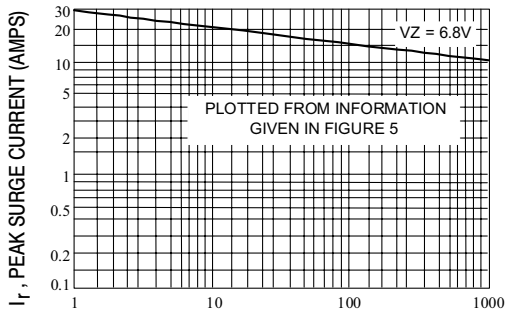

Fig. 6-PEAK SURGE CURRENT VERSUS PULSE WIDTH(SEE NOTE 3)

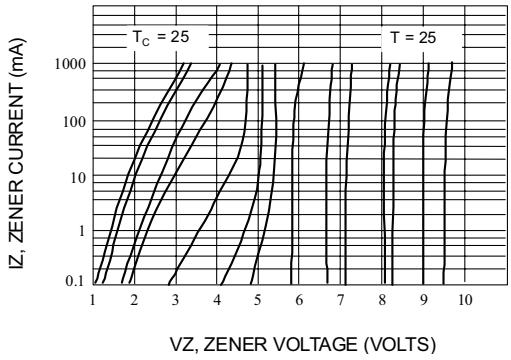

Fig. 7-ZENER VOLTAGE VERSUS ZENER CURRENT
VZ = 6.8 THRU 10 VOLTS

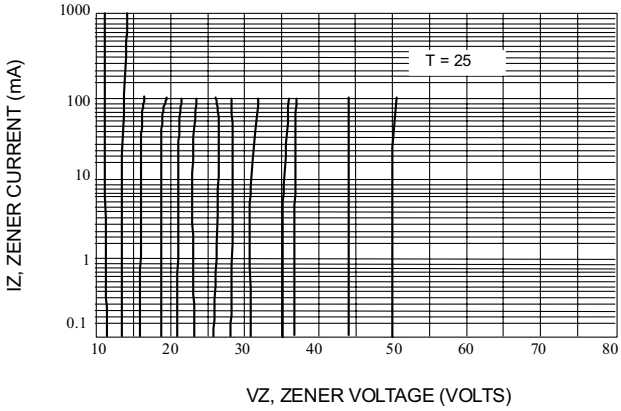

Fig. 8-ZENER VOLTAGE VERSUS ZENER CURRENT
VZ = 11 THRU 51 VOLTS

*** 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

Ordering Information :

Device	Packing
Part Number-TP	Tape&Reel: 4Kpcs/Reel
Part Number-AP	Ammo Packing: 3Kpcs/Ammo Box
Part Number-BP	Bulk: 25Kpcs/Carton

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