MMBZ5221B THRU MMBZ5270B

List

MMBZ5221B THRU MMBZ5270B

225mW Surface Mount
Zener Diodes - 2.4V-91V

Features

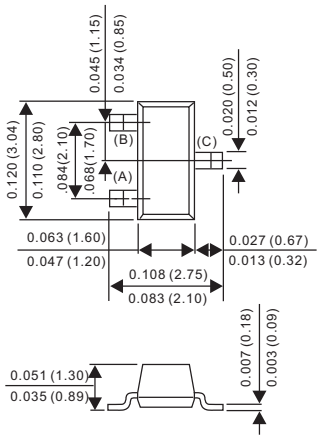
- 225 mW Rating on FR–4 or FR–5 Board.
- Silicon epitaxial planar chip strucuction.
- Wide zener reverse voltage range 2.4V to 91V.
- Small package size for high density applications.
- Ideally suited for automated assembly processes.
- Lead-free parts meet environmental standards of MIL-STD-19500 /228
- ESD Rating of Class 3 (>16 KV) per Human Body Model.
- Suffix "-H" indicates Halogen-free part, ex.MMBZ5221B-H.

Mechanical data

- Epoxy:UL94-V0 rated flame retardant
- Case : Molded plastic, SOT-23
- Terminals : Solder plated, solderable per MIL-STD-750, Method 2026
- Polarity : Indicated by cathode band
- Mounting Position : Any
- Weight : Approximated 0.008 gram

Package outline

SOT-23



Dimensions in inches and (millimeters)

Maximum ratings (at T_A=25°C unless otherwise noted)

PARAMETER	CONDITIONS	Symbol	MIN.	TYP.	MAX.	UNIT
Forward Voltage	I_F=10mA	V_F			0.9	V
Power Dissipation		P_D			225	mW
Thermal resistance	Junction to ambient	$R_{\theta JA}$		556		°C/W
Operating temperature		T_J	-55		+150	°C
Storage temperature		T_{STG}	-65		+175	°C

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Electrical characteristics(Pinout: A-NC, B-Anode, C-Cathode) (V_F = 0.9 V Max @ I_F = 10 mA for all types.)

Part No.	Marking Code	Zener Voltage (Note 1)				Zener Impedance			Leakage Current	
		V_Z (Volts)			@ I_{ZT}	Z_{ZT} @ I_{ZT}	Z_{ZK} @ I_{ZK}		I_R @ V_R	
		Min	Nom	Max	mA	Ω	Ω	mA	μA	Volts
MMBZ5221B	18A	2.28	2.4	2.52	20	30	1200	0.25	100	1
MMBZ5222B	18B	2.37	2.5	2.63	20	30	1250	0.25	100	1
MMBZ5223B	18C	2.56	2.7	2.84	20	30	1300	0.25	75	1
MMBZ5224B	18D	2.66	2.8	2.94	20	30	1400	0.25	75	1
MMBZ5225B	18E	2.85	3	3.15	20	29	1600	0.25	50	1
MMBZ5226B	8A	3.13	3.3	3.47	20	28	1600	0.25	25	1
MMBZ5227B	8B	3.42	3.6	3.78	20	24	1700	0.25	15	1
MMBZ5228B	8C	3.70	3.9	4.10	20	23	1900	0.25	10	1
MMBZ5229B	8D	4.08	4.3	4.52	20	22	2000	0.25	5	1
MMBZ5230B	8E	4.46	4.7	4.94	20	19	1900	0.25	5	2
MMBZ5231B	8F	4.84	5.1	5.36	20	17	1600	0.25	5	2
MMBZ5232B	8G	5.32	5.6	5.88	20	11	1600	0.25	5	3
MMBZ5233B	8H	5.70	6	6.30	20	7	1600	0.25	5	3.5
MMBZ5234B	8J	5.89	6.2	6.51	20	7	1000	0.25	5	4
MMBZ5235B	8K	6.46	6.8	7.14	20	5	750	0.25	3	5
MMBZ5236B	8L	7.12	7.5	7.88	20	6	500	0.25	3	6
MMBZ5237B	8M	7.79	8.2	8.61	20	8	500	0.25	3	6.5
MMBZ5238B	8N	8.26	8.7	9.14	20	8	600	0.25	3	6.5
MMBZ5239B	8P	8.64	9.1	9.56	20	10	600	0.25	3	7
MMBZ5240B	8Q	9.50	10	10.50	20	17	600	0.25	3	8
MMBZ5241B	8R	10.4	11	11.55	20	22	600	0.25	2	8.4
MMBZ5242B	8S	11.40	12	12.60	20	30	600	0.25	1	9.1
MMBZ5243B	8T	12.35	13	13.65	9.5	13	600	0.25	0.5	9.9
MMBZ5244B	8U	13.30	14	14.70	9	15	600	0.25	0.1	10
MMBZ5245B	8V	14.25	15	15.75	8.5	16	600	0.25	0.1	11
MMBZ5246B	8W	15.20	16	16.80	7.8	17	600	0.25	0.1	12
MMBZ5247B	8X	16.15	17	17.85	7.4	19	600	0.25	0.1	13
MMBZ5248B	8Y	17.10	18	18.90	7	21	600	0.25	0.1	14
MMBZ5249B	8Z	18.05	19	19.95	6.6	23	600	0.25	0.1	14
MMBZ5250B	81A	19.00	20	21.00	6.2	25	600	0.25	0.1	15
MMBZ5251B	81B	20.90	22	23.10	5.6	29	600	0.25	0.1	17
MMBZ5252B	81C	22.80	24	25.20	5.2	33	600	0.25	0.1	18
MMBZ5253B	81D	23.75	25	26.25	5	35	600	0.25	0.1	19
MMBZ5254B	81E	25.65	27	28.35	4.6	41	600	0.25	0.1	21
MMBZ5255B	81F	26.60	28	29.40	4.5	44	600	0.25	0.1	21
MMBZ5256B	81G	28.50	30	31.50	4.2	49	600	0.25	0.1	23
MMBZ5257B	81H	31.35	33	34.65	3.8	58	700	0.25	0.1	25
MMBZ5258B	81J	34.20	36	37.80	3.4	70	700	0.25	0.1	27
MMBZ5259B	81K	37.05	39	40.95	3.2	80	800	0.25	0.1	30
MMBZ5260B	81L	40.85	43	45.15	3	93	900	0.25	0.1	33
MMBZ5261B	81M	44.65	47	49.35	2.7	105	1000	0.25	0.1	36
MMBZ5262B	81N	48.45	51	53.55	2.5	125	1100	0.25	0.1	39
MMBZ5263B	81P	53.20	56	58.80	2.2	150	1300	0.25	0.1	43
MMBZ5264B	81Q	57.00	60	63.00	2.1	170	1400	0.25	0.1	46
MMBZ5265B	81R	58.90	62	65.10	2	185	1400	0.25	0.1	47
MMBZ5266B	81S	64.60	68	71.40	1.8	230	1600	0.25	0.1	52
MMBZ5267B	81T	71.25	75	78.75	1.7	270	1700	0.25	0.1	56
MMBZ5268B	81U	77.90	82	86.10	1.5	330	2000	0.25	0.1	62
MMBZ5269B	81V	82.65	87	91.35	1.4	370	2200	0.25	0.1	68
MMBZ5270B	81W	86.45	91	95.55	1.4	400	2300	0.25	0.1	69

Note:
1. Zener voltage is measured with a pulse test current I_z at an ambient temperature of 25°C

Rating and characteristic curves (MMBZ5221B THRU MMBZ5270B)

Figure 1. Temperature Coefficients (Temperature Range −55°C to+150°C)

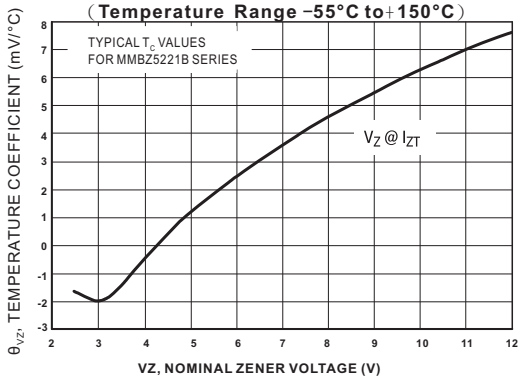


Figure 2. Temperature Coefficients (Temperature Range −55°C to+150°C)

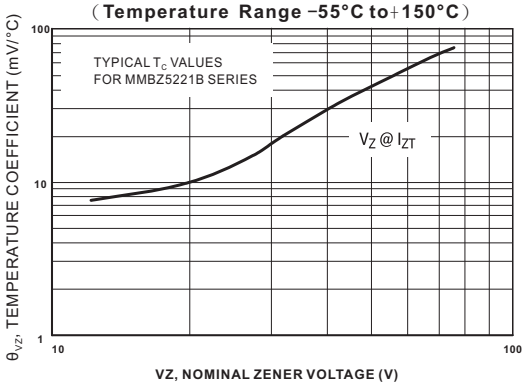


Figure 3. Effect of Zener Voltage on Zener Impedance

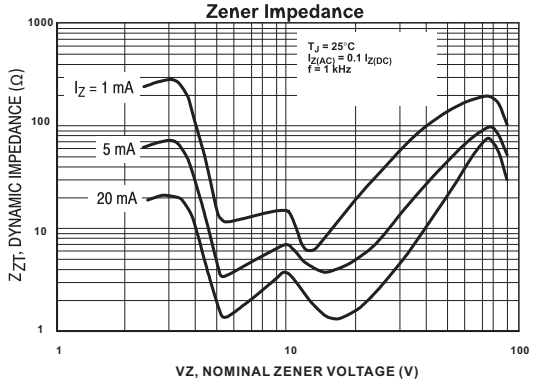


Figure 4. Typical Forward Voltage

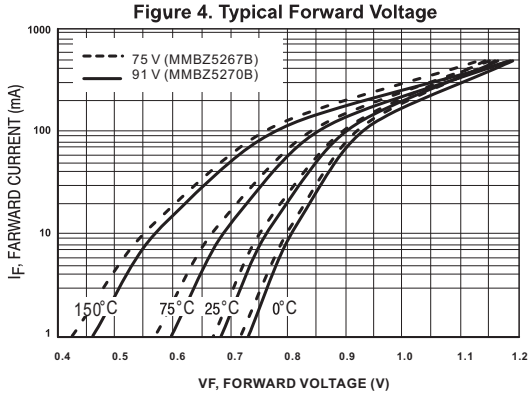


Figure 5. Typical Capacitance

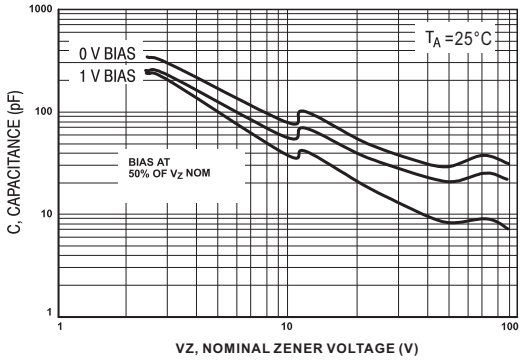


Figure 6. Typical Leakage Current

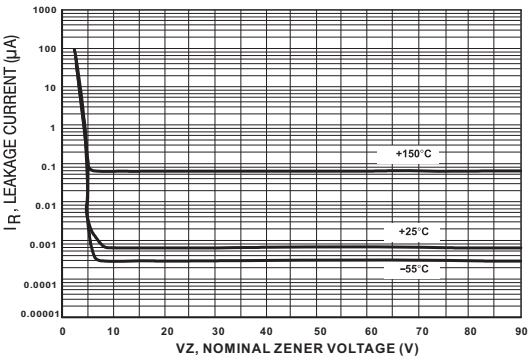


Figure 7. Zener Voltage versus Zener Current (V_Z Up to 12 V)

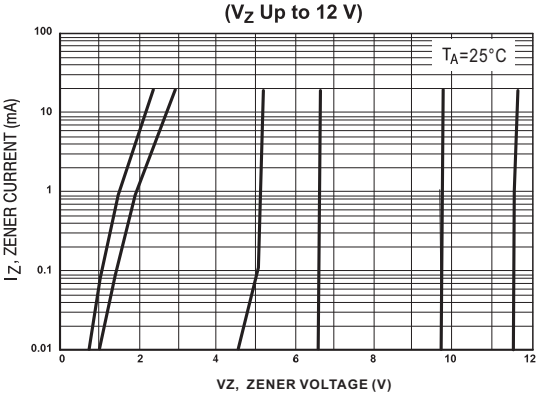
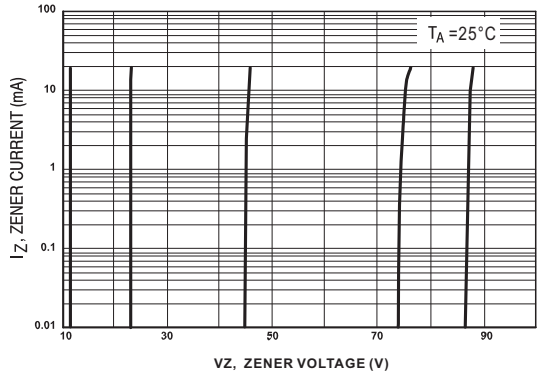


Figure 8. Zener Voltage versus Zener Current (12 V to 91 V)



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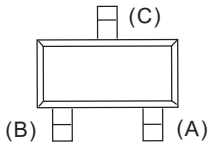
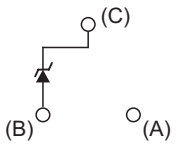
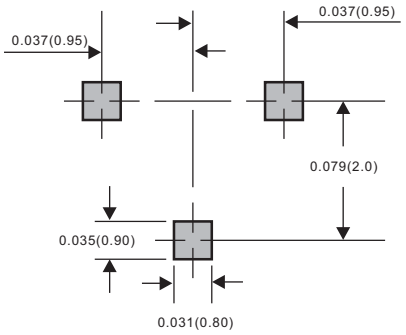
Pinning information

Pin	Simplified outline	Symbol
PinA no connection PinB anode PinC cathode		

Suggested solder pad layout

SOT-23



Dimensions in inches and (millimeters)

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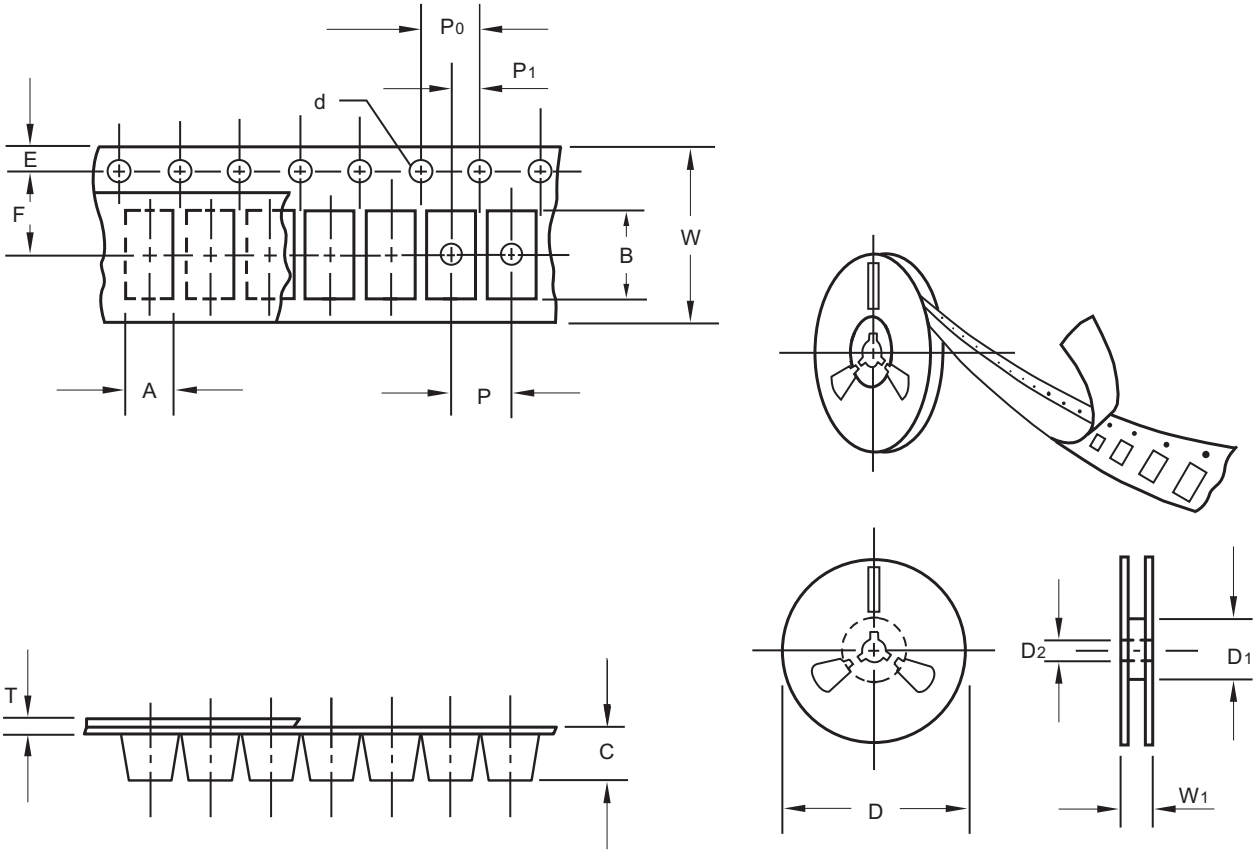
Packing information



unit:mm

Item	Symbol	Tolerance	SOT-23
Carrier width	A	0.1	3.15
Carrier length	B	0.1	2.77
Carrier depth	C	0.1	1.22
Sprocket hole	d	0.1	1.50
13" Reel outside diameter	D	2.0	-
13" Reel inner diameter	D_1	min	-
7" Reel outside diameter	D	2.0	178.00
7" Reel inner diameter	D_1	min	62.00
Feed hole diameter	D_2	0.5	13.00
Sprocket hole position	E	0.1	1.75
Punch hole position	F	0.1	3.50
Punch hole pitch	P	0.1	4.00
Sprocket hole pitch	P_0	0.1	4.00
Embossment center	P_1	0.1	2.00
Overall tape thickness	T	0.1	0.23
Tape width	W	0.3	8.00
Reel width	W_1	1.0	11.40

Note:Devices are packed in accor dance with EIA standar RS-481-A and specifications listed above.

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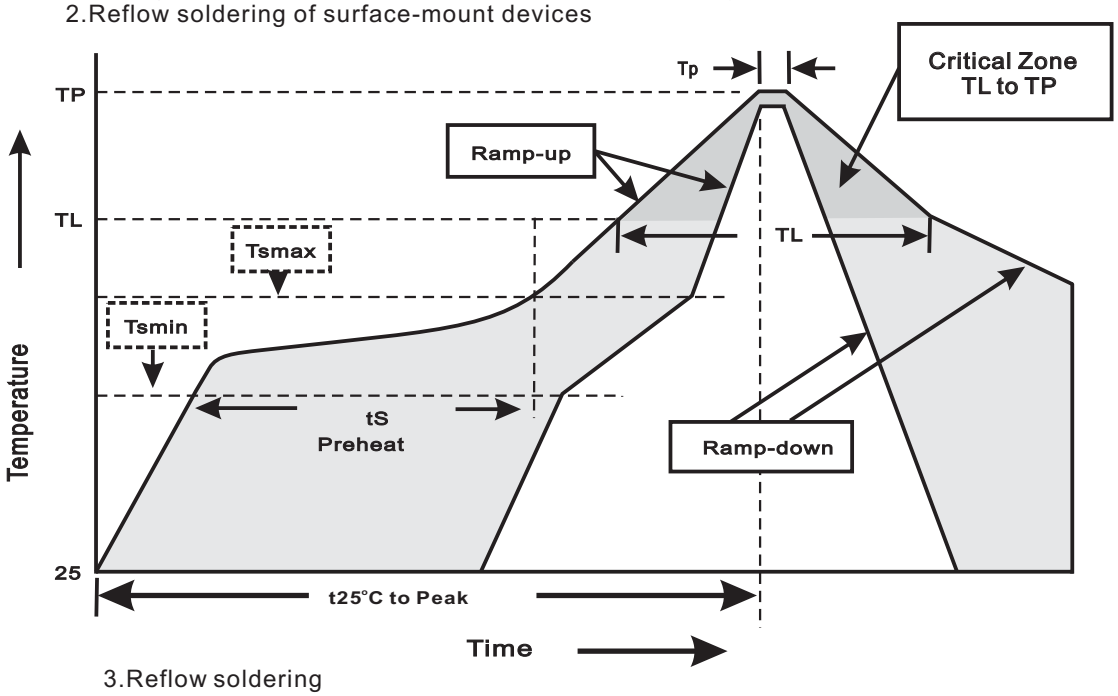
Reel packing

PACKAGE	REEL SIZE	REEL (pcs)	COMPONENT SPACING (m/m)	BOX (pcs)	INNER BOX (m/m)	REEL DIA, (m/m)	CARTON SIZE (m/m)	CARTON (pcs)	APPROX. GROSS WEIGHT (kg)
SOT-23	7"	3,000	4.0	30,000	183*183*123	178	382*262*387	240,000	11.6

Suggested thermal profiles for soldering processes

1.Storage environment: Temperature=5°C~40°C Humidity=55%±25%
2.Reflow soldering of surface-mount devices



3.Reflow soldering

Profile Feature	Soldering Condition
Average ramp-up rate(T_L to T_P)	<3°C/sec
Preheat -Temperature Min(Tsmin) -Temperature Max(Tsmax) -Time(min to max)(t_s)	 150°C 200°C 60~120sec
Tsmax to T_L -Ramp-upRate	 <3°C/sec
Time maintained above: -Temperature(T_L) -Time(t_L)	 217°C 60~260sec
Peak Temperature(T_P)	255°C-0/+5°C
Time within 5°C of actual Peak Temperature(t_P)	10~30sec
Ramp-down Rate	<6°C/sec
Time 25°C to Peak Temperature	<6minutes

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High reliability test capabilities

Item Test	Conditions	Reference
1. Solder Resistance	at 260±5°C for 10±2sec. immerse body into solder 1/16"±1/32"	MIL-STD-750D METHOD-2031
2. Solderability	at 245±5°C for 5 sec.	MIL-STD-202F METHOD-208
3. High Temperature Reverse Bias	V_R=80% rate at T_J=150°C for 168 hrs.	MIL-STD-750D METHOD-1038
4. Pressure Cooker	15P_{SIG} at T_A=121°C for 4 hrs.	JESD22-A102
5. Temperature Cycling	-55°C to +125°C dwelled for 30 min. and transferred for 5min. total 10 cycles.	MIL-STD-750D METHOD-1051
6. Thermal Shock	0°C for 5 min. rise to 100°C for 5 min. total 10 cycles.	MIL-STD-750D METHOD-1056
7. Humidity	at T_A=85°C, RH=85% for 1000hrs.	MIL-STD-750D METHOD-1021
8. High Temperature Storage Life	at 175°C for 1000 hrs.	MIL-STD-750D METHOD-1031