

MMBZ5221B THRU MMBZ5270B

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MMBZ5221B THRU MMBZ5270B

225mW Surface Mount
Zener Diodes 2.4V-91V

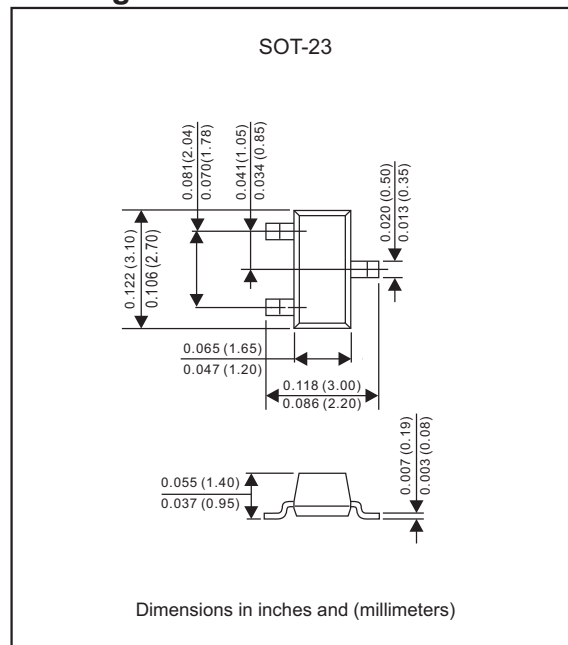
Features

- 225mW Rating on FR-4 or FR-5 Board
- Silicon epitaxial planar chip struction
- Wide zener reverse voltage range 2.4V to 91V
- Small package size for high density applications
- Ideally suited for automated assembly processes
- ESD Rating of Class 3 (> 8 KV) per human body model
- Lead-free parts meet RoHS requirements
- 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
- Mounting Position : Any
- Weight : Approximated 0.008 gram

Package outline



Maximum ratings (at $T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter	Conditions	Symbol	MIN.	TYP.	MAX.	Unit
Forward voltage	$I_F=10\text{mA}$	V_F			0.9	V
Power dissipation		P_D			225	mW
Thermal resistance	Junction to ambient	$R_{\theta JA}$		556		$^\circ\text{C/W}$
Operating junction temperature range		T_J	-55		+150	$^\circ\text{C}$
Storage temperature range		T_{STG}	-55		+150	$^\circ\text{C}$

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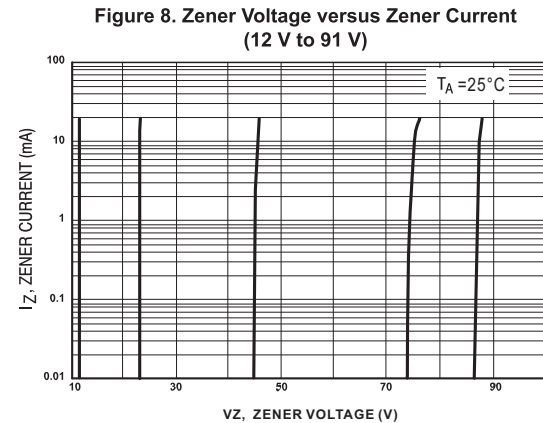
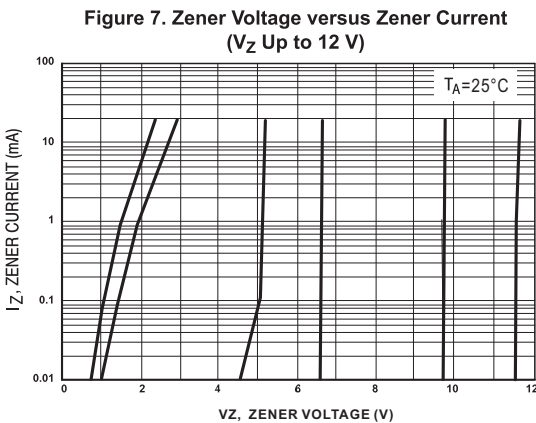
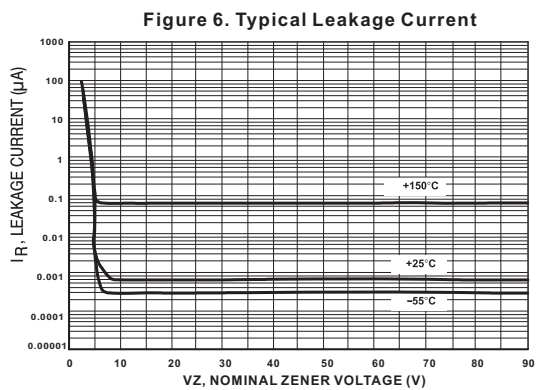
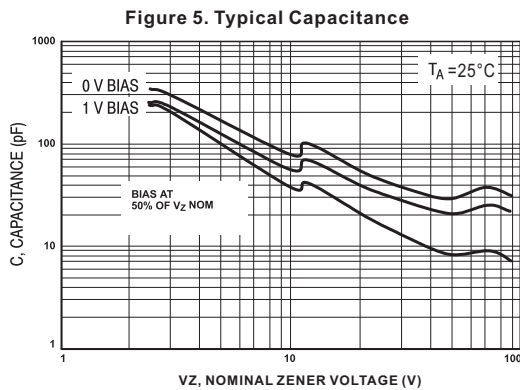
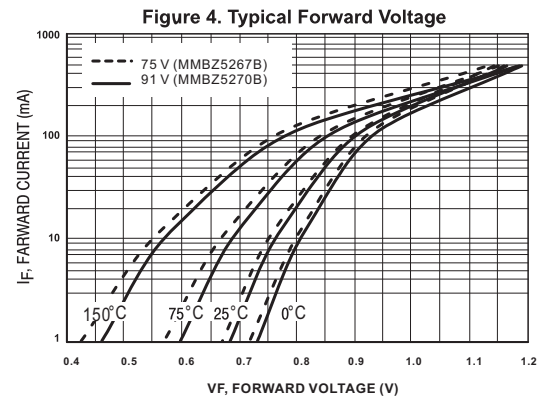
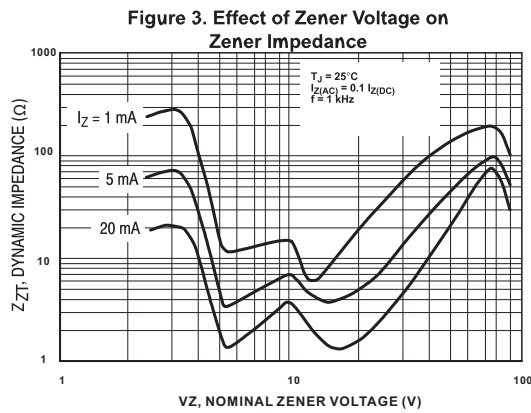
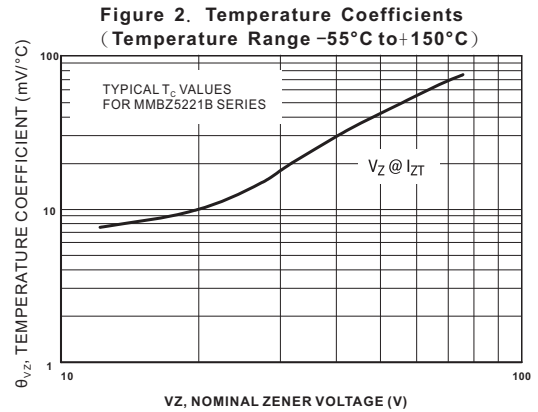
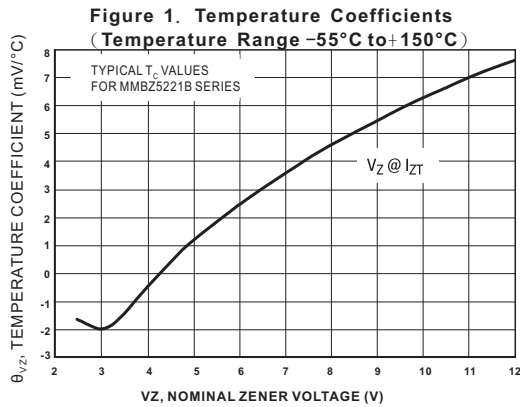
Electrical characteristics (Pinout: A-NC, B-Anode, C-Cathode)(V_F = 0.9V Max @I_F = 10mA for all types.)

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(Max)	Ω(Max)	mA	μA(Max)	Volts
MMBZ5221B	18A,Y0	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,Z0	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,AA	2.85	3.0	3.15	20	29	1600	0.25	50	1
MMBZ5226B	8A,AB	3.13	3.3	3.47	20	28	1600	0.25	25	1
MMBZ5227B	8B,AC	3.42	3.6	3.78	20	24	1700	0.25	15	1
MMBZ5228B	8C,AD	3.70	3.9	4.10	20	23	1900	0.25	10	1
MMBZ5229B	8D,AE	4.08	4.3	4.52	20	22	2000	0.25	5	1
MMBZ5230B	8E,AF	4.46	4.7	4.94	20	19	1900	0.25	5	2
MMBZ5231B	8F,AH	4.84	5.1	5.36	20	17	1600	0.25	5	2
MMBZ5232B	8G,AJ	5.32	5.6	5.88	20	11	1600	0.25	5	3
MMBZ5233B	8H,AK	5.70	6.0	6.30	20	7	1600	0.25	5	3.5
MMBZ5234B	8J,AM	5.89	6.2	6.51	20	7	1000	0.25	5	4
MMBZ5235B	8K,AN	6.46	6.8	7.14	20	5	750	0.25	3	5
MMBZ5236B	8L,AP	7.12	7.5	7.88	20	6	500	0.25	3	6
MMBZ5237B	8M,AR	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,AY	8.64	9.1	9.56	20	10	600	0.25	3	7
MMBZ5240B	8Q,AZ	9.50	10	10.50	20	17	600	0.25	3	8
MMBZ5241B	8R,BA	10.40	11	11.55	20	22	600	0.25	2	8.4
MMBZ5242B	8S,BB	11.40	12	12.60	20	30	600	0.25	1	9.1
MMBZ5243B	8T,BC	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,BE	14.25	15	15.75	8.5	16	600	0.25	0.1	11
MMBZ5246B	8W,BF	15.20	16	16.80	7.8	17	600	0.25	0.1	12
MMBZ5247B	8X,BH	16.15	17	17.85	7.4	19	600	0.25	0.1	13
MMBZ5248B	8Y,BJ	17.10	18	18.90	7	21	600	0.25	0.1	14
MMBZ5249B	8Z,BK	18.05	19	19.95	6.6	23	600	0.25	0.1	14
MMBZ5250B	81A,BM	19.00	20	21.00	6.2	25	600	0.25	0.1	15
MMBZ5251B	81B,BN	20.90	22	23.10	5.6	29	600	0.25	0.1	17
MMBZ5252B	81C,BP	22.80	24	25.20	5.2	33	600	0.25	0.1	18
MMBZ5253B	81D,BR	23.75	25	26.25	5	35	600	0.25	0.1	19
MMBZ5254B	81E,BX	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,BZ	28.50	30	31.50	4.2	49	600	0.25	0.1	23
MMBZ5257B	81H,CA	31.35	33	34.65	3.8	58	700	0.25	0.1	25
MMBZ5258B	81J,CB	34.20	36	37.80	3.4	70	700	0.25	0.1	27
MMBZ5259B	81K,CC	37.05	39	40.95	3.2	80	800	0.25	0.1	30
MMBZ5260B	81L,CD	40.85	43	45.15	3	93	900	0.25	0.1	33
MMBZ5261B	81M,CE	44.65	47	49.35	2.7	105	1000	0.25	0.1	33
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:

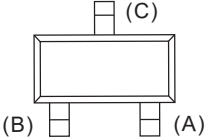
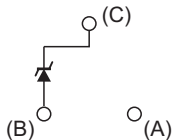
1. Zener voltage is measured with a pulse test current I_Z at an ambient temperature of 25°C

Rating and characteristic curves (MMBZ5221B THRU MMBZ5270B)



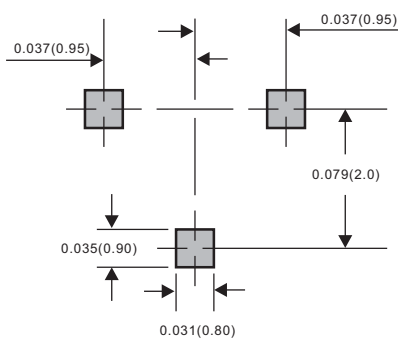
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Pinning information

Pin	Simplified outline	Symbol
PinA no connection PinB anode PinC cathode		

Suggested solder pad layout

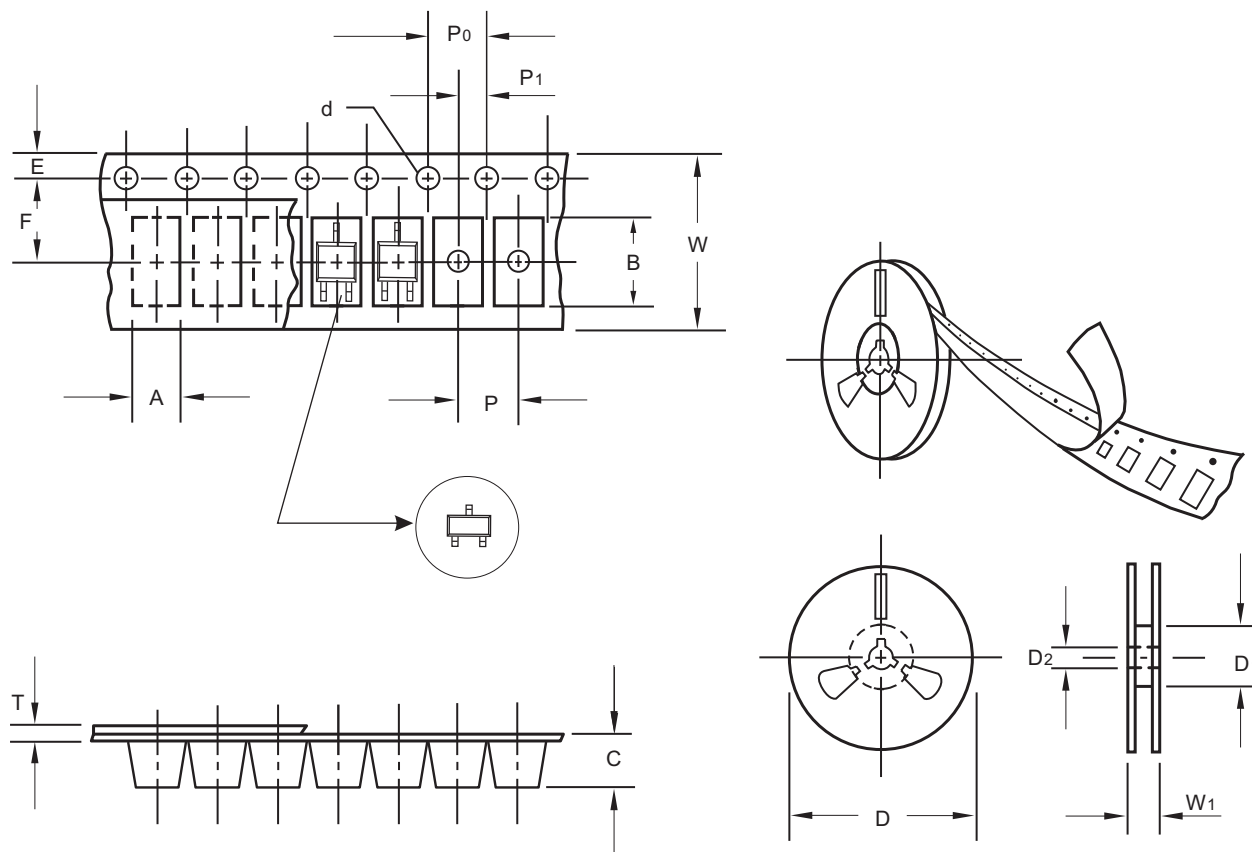
SOT-23



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	D1	min	-
7" Reel outside diameter	D	2.0	178.00
7" Reel inner diameter	D1	min	62.00
Feed hole diameter	D2	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	P0	0.1	4.00
Embossment center	P1	0.1	2.00
Overall tape thickness	T	0.1	0.23
Tape width	W	0.3	8.00
Reel width	W1	1.0	11.40

Note: Devices are packed in accordance with EIA standard RS-481-A and specifications listed above.

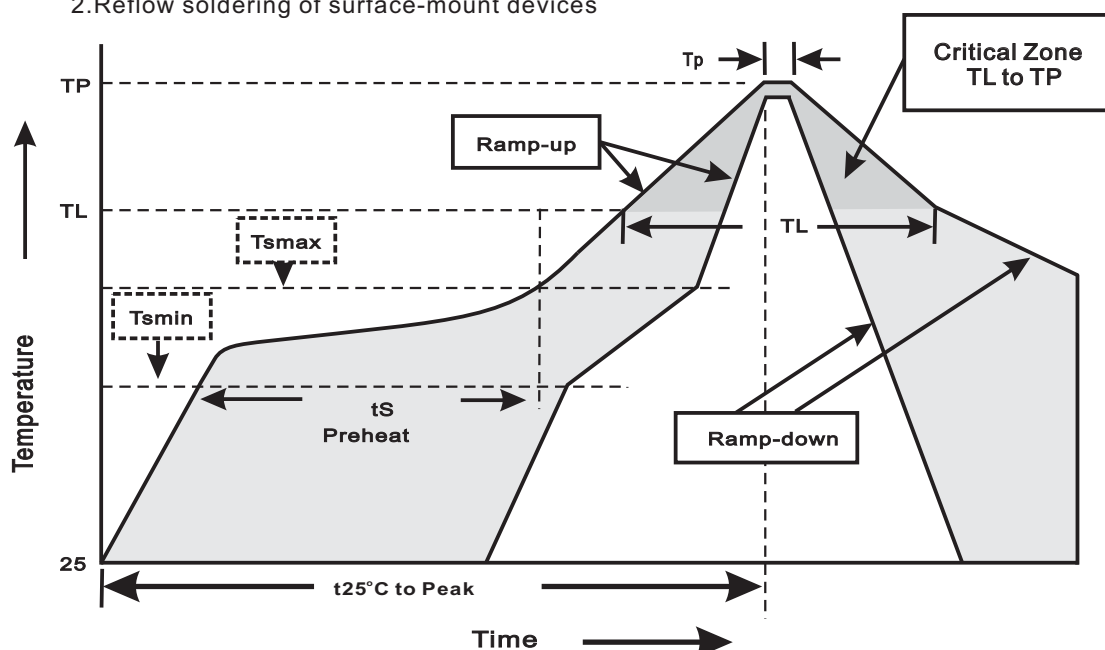
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Reel packing

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*123*183	178	382*257*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(T _{smmin}) -Temperature Max(T _{smmax}) -Time(min to max)(t _s)	150°C 200°C 60~120sec
T _{smmax} 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 $260 \pm 5^{\circ}\text{C}$ for $10 \pm 2\text{sec.}$	MIL-STD-750D METHOD-2031
2. Solderability	at $245 \pm 5^{\circ}\text{C}$ for 5 sec.	MIL-STD-202F METHOD-208
3. High Temperature Reverse Bias	$V_z = V_z \text{ Nom} * 80\%$ at $T_j = 150^{\circ}\text{C}$ for 168 hrs.	MIL-STD-750D METHOD-1038
4. Pressure Cooker	$15P_{\text{SIG}}$ at $T_A = 121^{\circ}\text{C}$ for 4 hrs.	JESD22-A102
5. Temperature Cycling	-55°C to $+125^{\circ}\text{C}$ dwelled for 30 min. and transferred for 5min. total 10 cycles.	MIL-STD-750D METHOD-1051
6. Humidity	at $T_A = 85^{\circ}\text{C}$, RH=85% for 1000hrs.	MIL-STD-750D METHOD-1021
7. High Temperature Storage Life	at 175°C for 1000 hrs.	MIL-STD-750D METHOD-1031