



# MMBZ5221B - MMBZ5259B

## 350mW SURFACE MOUNT ZENER DIODE

## Features

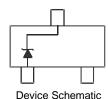
- Planar Die Construction
- 350mW Power Dissipation on FR-4 PCB
- General Purpose, Medium Current
- Ideally Suited for Automated Assembly Processes
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Notes 3 & 4)
- Qualified to AEC-Q101 Standards for High Reliability

## **Mechanical Data**

- Case: SOT23
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Terminals: Matte Tin Finish Annealed over Alloy 42 Leadframe (Lead Free Plating). Solderable per MIL-STD-202, Method 208<sup>(3)</sup>
- Weight: 0.008 grams (Approximate)

SOT23





# Ordering Information (Notes 5 & 6)

Device	Qualification	Packaging	Shipping
(Type Number)-7-F*	Commercial	SOT23	3,000/Tape & Reel
(Type Number)Q-7-F* (Note 7)	Automotive	SOT23	3,000/Tape & Reel
(Type Number)-13-F*	Commercial	SOT23	10,000/Tape & Reel
(Type Number)Q-13-F* (Note 7)	Automotive	SOT23	10,000/Tape & Reel

\* Add "-7-F" to the appropriate type number in Electrical Characteristics Table from Page 2. Example: 6.2V Zener = MMBZ5234B-7-F.

1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.

2. See http://www.diodes.com for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.

3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.

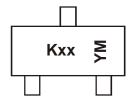
4. Product manufactured with Date Code OW (week 42, 2009) and newer are built with Green Molding Compound. Product manufactured prior to Date Code OW are built with Non-Green Molding Compound and may contain Halogens or Sb<sub>2</sub>O<sub>3</sub> Fire Retardants.

5. For Packaging Details, go to our website at http://www.diodes.com.

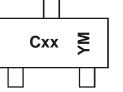
6. Selected voltages are available on 13" reels (10,000 devices per reel). Add "-13-F" to the appropriate type number in Electrical Characteristics Table from Page 2. Example: 6.2V Zener = MMBZ5234B-13-F. Please contact your Diodes Inc. sales representative for availability.

7. Automotive products are AEC-Q10x qualified and are PPAP capable. Automotive, AEC-Q10x and standard products are and thermally the same, except where specified. For more information, please refer to https://www.diodes.com/quality/product-compliance-definitions/.

# Marking Information



K = SAT (Shanghai Assembly / Test site)
xx = Product Type Marking Code See Electrical Characteristics Table
YM = Date Code Marking
Y = Year (ex: F = 2018)
M = Month (ex: 9 = September)



C = CAT (Chengdu Assembly / Test site) xx = Product Type Marking Code See Electrical Characteristics Table YM = Date Code Marking

- Y = Year (ex: F = 2018)
- M = Month (ex: 9 = September)

Date Code Key

Notes:

Year	20	12	2013	2014		2015	2016	2017	2018		2021	2022	2023
Code		Z	А	В		С	D	E	F		Ι	J	К
Month	Jan	Fel	b Ma	ar A	pr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3		4	5	6	7	8	9	0	Ν	D



## **Maximum Ratings** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Forward Voltage @ I <sub>F</sub> = 10mA	VF	0.9	V

## **Thermal Characteristics**

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 8)	PD	350	mW
Thermal Resistance, Junction to Ambient Air (Note 8)	R <sub>θJA</sub>	357	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-65 to +150	°C

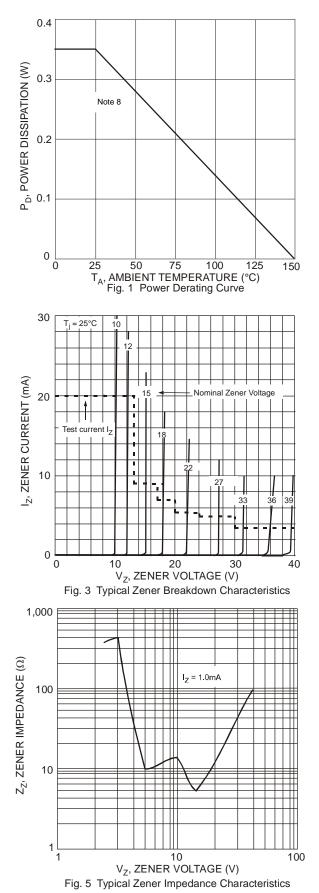
Note: 8. Mounted on FR4 PC Board with recommended pad layout which can be found on our website at http://www.diodes.com.

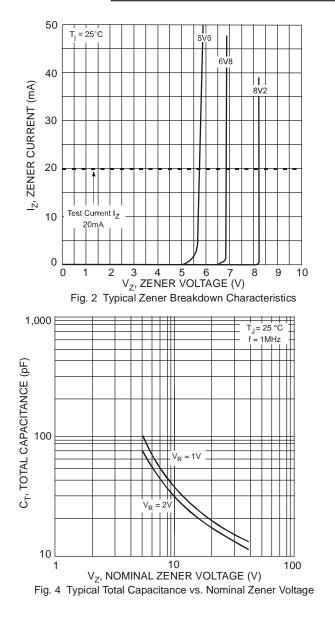
### Maximum Zener Maximum Reverse Zener Voltage Range (Note 9) Impedance Leakage Current (Note 9) f = 1kHz Туре Type Number Code **Z**zк @ Izк Vz @ Izt Z<sub>ZT</sub> @ I<sub>ZT</sub> $@V_R$ IZT $I_R$ = 0.25mA ٧ Nom (V) Min (V) Max (V) mΑ Ω μΑ MMBZ5221B C1 2.52 30 1,200 100 2.4 2.28 20 1.0 MMBZ5222B C2 2.5 2.38 2.63 20 30 1,200 100 1.0 1,300 MMBZ5223B C3 2.7 2.57 2.84 20 30 75 1.0 MMBZ5225B C5 3.0 2.85 3.15 20 30 1.600 50 1.0 MMBZ5226B G1 3.3 3.14 3.47 20 28 1,600 25 1.0 15 MMBZ5227B G2 3.6 3.42 3.78 20 24 1,700 1.0 MMBZ5228B 3.9 3.71 4.10 20 23 1,900 10 1.0 G3 MMBZ5229B 4.09 4.52 20 22 2,000 4.3 5.0 1.0 G4 MMBZ5230B 4.47 4.94 19 G5 4.7 20 1,900 5.0 2.0 MMBZ5231B E1 5.1 4.85 5.36 20 17 1,600 5.0 2.0 MMBZ5232B 20 11 1,600 5.0 3.0 F2 5.6 5.32 5.88 MMBZ5233B 5.70 6.30 20 7 5.0 3.5 F3 6.0 1,600 MMBZ5234B E4 6.2 5.89 6.51 20 7 1,000 5.0 4.0 MMBZ5235B E5 6.8 6.46 7.14 20 5 750 3.0 5.0 MMBZ5236B F1 7.5 7.13 7.88 20 6 500 3.0 6.0 MMBZ5237B F2 8.2 7.79 8.61 20 8 500 3.0 6.5 MMBZ5238B F3 8.7 8.27 9.14 20 8 600 3.0 6.5 MMBZ5239B F4 9.1 8.65 9.56 20 10 600 3.0 7.0 MMBZ5240B F5 10 9.50 10.50 20 17 600 3.0 8.0 MMBZ5241B H1 11 10.45 11.55 20 22 600 2.0 8.4 MMBZ5242B H2 12 11.40 12.60 20 30 600 1.0 9.1 MMBZ5243B 13 12.35 13.65 9.5 0.5 H3 13 600 9.9 MMBZ5244B H4 14 13.30 14.70 9.0 15 600 0.1 10 MMBZ5245B H5 15 14.25 15.75 8.5 16 600 0.1 11 MMBZ5246B 15.20 17 J1 16 16.80 7.8 600 0.1 12 MMBZ5248B 21 J3 18 17.10 18.90 7.0 600 0.1 14 MMBZ5250B J5 20 19.00 21.00 6.2 25 600 0.1 15 MMBZ5251B 29 K1 22 20.90 23.10 5.6 600 0.1 17 MMBZ5252B 24 22.80 25.20 K2 5.2 33 600 0.1 18 MMBZ5254B K4 27 25.65 28.35 5.0 41 600 0.1 21 MMBZ5255B 29.40 44 21 K5 28 26.60 4.5 600 0.1 MMBZ5256B M1 30 28.50 31.50 4.2 49 600 0.1 23 MMBZ5257B M2 33 31.35 34.65 3.8 58 700 0.1 25 MMBZ5258B M3 36 70 700 27 34.20 37.80 3.4 0.1 MMBZ5259B M4 39 37.05 40.95 3.2 80 800 0.1 30

Electrical Characteristics (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Note: 9. Short duration pulse test used to minimize self-heating effect.





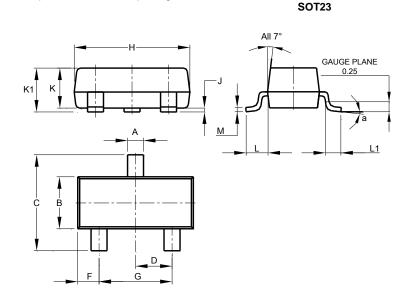


# MMBZ5221B - MMBZ5259B



# Package Outline Dimensions

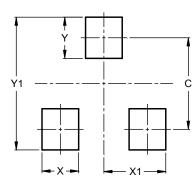
Please see http://www.diodes.com/package-outlines.html for the latest version.



SOT23						
Dim	Min	Max	Тур			
Α	0.37	0.51	0.40			
В	1.20	1.40	1.30			
С	2.30	2.50	2.40			
D	0.89	1.03	0.915			
F	0.45	0.60	0.535			
G	1.78	2.05	1.83			
н	2.80	3.00	2.90			
J	0.013	0.10	0.05			
К	0.890	1.00	0.975			
K1	0.903	1.10	1.025			
L	0.45	0.61	0.55			
L1	0.25	0.55	0.40			
Μ	0.085	0.150	0.110			
а	0°	8°				
All	All Dimensions in mm					

# Suggested Pad Layout

Please see http://www.diodes.com/package-outlines.html for the latest version. SOT23



Dimensions	Value (in mm)
С	2.0
Х	0.8
X1	1.35
Y	0.9
Y1	2.9



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