



**THE DATASHEET OF
MMBZ5228B-7**



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⁽³⁾
- Weight: 0.008 grams (Approximate)



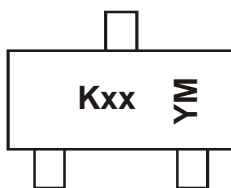
Ordering Information (Notes 5 & 6)

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

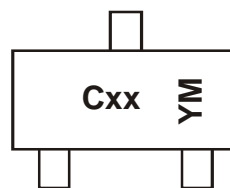
* Add "-7-F" to the appropriate type number in Electrical Characteristics Table from Page 2. Example: 6.2V Zener = MMBZ5234B-7-F.

- Notes:
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 Sb₂O₃ 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

Year	2012	2013	2014	2015	2016	2017	2018	...	2021	2022	2023
Code	Z	A	B	C	D	E	F	...	I	J	K

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	O	N	D

Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Forward Voltage @ I _F = 10mA	V _F	0.9	V

Thermal Characteristics

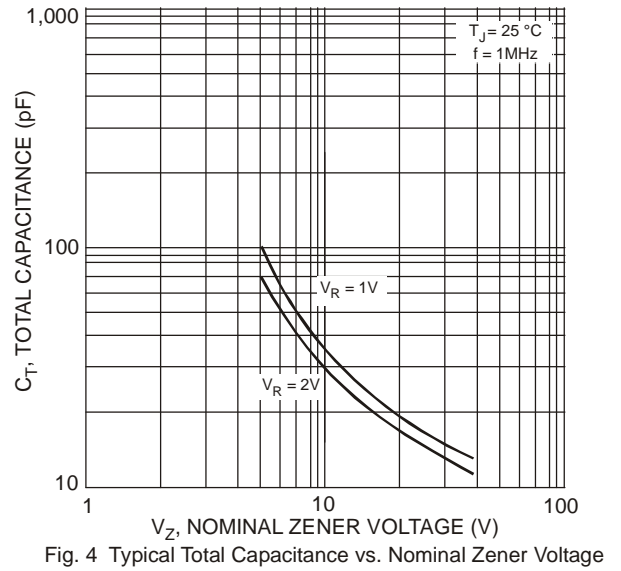
Characteristic	Symbol	Value	Unit
Power Dissipation (Note 8)	P _D	350	mW
Thermal Resistance, Junction to Ambient Air (Note 8)	R _{θJA}	357	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-65 to +150	°C

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

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Type Number	Type Code	Zener Voltage Range (Note 9)				Maximum Zener Impedance f = 1kHz		Maximum Reverse Leakage Current (Note 9)	
		V _Z @ I _{ZT}			I _{ZT}	Z _{KT} @ I _{ZT}	Z _{ZK} @ I _{ZK} = 0.25mA	I _R	@ V _R
		Nom (V)	Min (V)	Max (V)	mA	Ω		μA	V
MMBZ5221B	C1	2.4	2.28	2.52	20	30	1,200	100	1.0
MMBZ5222B	C2	2.5	2.38	2.63	20	30	1,200	100	1.0
MMBZ5223B	C3	2.7	2.57	2.84	20	30	1,300	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
MMBZ5227B	G2	3.6	3.42	3.78	20	24	1,700	15	1.0
MMBZ5228B	G3	3.9	3.71	4.10	20	23	1,900	10	1.0
MMBZ5229B	G4	4.3	4.09	4.52	20	22	2,000	5.0	1.0
MMBZ5230B	G5	4.7	4.47	4.94	20	19	1,900	5.0	2.0
MMBZ5231B	E1	5.1	4.85	5.36	20	17	1,600	5.0	2.0
MMBZ5232B	E2	5.6	5.32	5.88	20	11	1,600	5.0	3.0
MMBZ5233B	E3	6.0	5.70	6.30	20	7	1,600	5.0	3.5
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	H3	13	12.35	13.65	9.5	13	600	0.5	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	J1	16	15.20	16.80	7.8	17	600	0.1	12
MMBZ5248B	J3	18	17.10	18.90	7.0	21	600	0.1	14
MMBZ5250B	J5	20	19.00	21.00	6.2	25	600	0.1	15
MMBZ5251B	K1	22	20.90	23.10	5.6	29	600	0.1	17
MMBZ5252B	K2	24	22.80	25.20	5.2	33	600	0.1	18
MMBZ5254B	K4	27	25.65	28.35	5.0	41	600	0.1	21
MMBZ5255B	K5	28	26.60	29.40	4.5	44	600	0.1	21
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	34.20	37.80	3.4	70	700	0.1	27
MMBZ5259B	M4	39	37.05	40.95	3.2	80	800	0.1	30

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



Package Outline Dimensions

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



SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	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
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	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
M	0.085	0.150	0.110
a	0°	8°	--
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)
C	2.0
X	0.8
X1	1.35
Y	0.9
Y1	2.9

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