MMBZ52xxELT1G Series, SZMMBZ52xxELT1G Series

Zener Voltage Regulators

225 mW SOT−23 Surface Mount

This series of Zener diodes is offered in the convenient, surface mount plastic SOT−23 package. These devices are designed to provide voltage regulation with minimum space requirement. They are well suited for applications such as cellular phones, hand held portables, and high density PC boards.

Features

- 225 mW Rating on FR−4 or FR−5 Board
- Zener Voltage Range − 2.4 V to 91 V
- Package Designed for Optimal Automated Board Assembly
- Small Package Size for High Density Applications
- ESD Rating of Class 3 (>16 kV) per Human Body Model
- Peak Power − 225 W (8 x 20 μs)
- SZ Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC−Q101 Qualified and PPAP Capable
- Pb−Free Packages are Available

Mechanical Characteristics:

CASE: Void-free, transfer-molded, thermosetting plastic case
FINISH: Corrosion resistant finish, easily solderable
MAXIMUM CASE TEMPERATURE FOR SOLDERING PURPOSES: 260°C for 10 Seconds
POLARITY: Cathode indicated by polarity band
FLAMMABILITY RATING: UL 94 V−0

MAXIMUM RATINGS

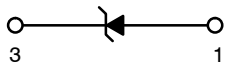
Rating	Symbol	Max	Unit
Peak Power Dissipation @ 20 μs (Note 1) @ $T_L \le 25°C$	P_{pk}	225	W
Total Power Dissipation on FR−5 Board, (Note 2) @ $T_A = 25°C$ Derated above 25°C	P_D	225 1.8	mW mW/°C
Thermal Resistance, Junction−to−Ambient	$R_{\theta JA}$	556	°C/W
Total Power Dissipation on Alumina Substrate, (Note 3) @ $T_A = 25°C$ Derated above 25°C	P_D	300 2.4	mW mW/°C
Thermal Resistance, Junction−to−Ambient	$R_{\theta JA}$	417	°C/W
Junction and Storage Temperature Range	T_J, T_{stg}	−65 to +150	°C

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

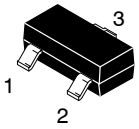
1. Nonrepetitive current pulse per Figure 9.
2. FR−5 = 1.0 X 0.75 X 0.62 in.
3. Alumina = 0.4 X 0.3 X 0.024 in., 99.5% alumina.

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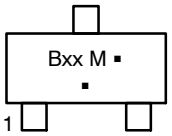
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MARKING DIAGRAM



SOT−23
CASE 318
STYLE 8



Bxx = Device Code
xx = (Refer to page 2)
M = Date Code*
▪ = Pb−Free Package

(Note: Microdot may be in either location)

*Date Code orientation may vary depending upon manufacturing location.

ORDERING INFORMATION

Device	Package	Shipping†
MMBZ52xxELT1G	SOT−23 (Pb−Free)	3000 / Tape & Reel
SZMMBZ52xxELT1G	SOT−23 (Pb−Free)	3000 / Tape & Reel
MMBZ52xxELT3G	SOT−23 (Pb−Free)	10000 / Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

DEVICE MARKING INFORMATION

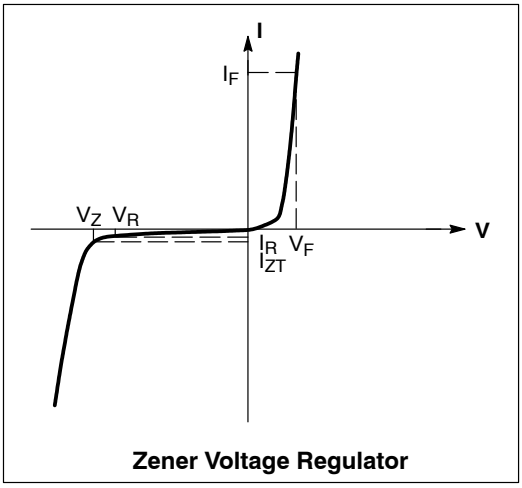
See specific marking information in the device marking column of the Electrical Characteristics table on page 2 of this data sheet.

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ELECTRICAL CHARACTERISTICS

(Pinout: 1-Anode, 2-No Connection, 3-Cathode) (T_A = 25°C unless otherwise noted, V_F = 0.95 V Max. @ I_F = 10 mA)

Symbol	Parameter
V_Z	Reverse Zener Voltage @ I_{ZT}
I_{ZT}	Reverse Current
Z_{ZT}	Maximum Zener Impedance @ I_{ZT}
I_{ZK}	Reverse Current
Z_{ZK}	Maximum Zener Impedance @ I_{ZK}
I_R	Reverse Leakage Current @ V_R
V_R	Reverse Voltage
I_F	Forward Current
V_F	Forward Voltage @ I_F



Zener Voltage Regulator

ELECTRICAL CHARACTERISTICS (Pinout: 1-Anode, 2-NC, 3-Cathode) (V_F = 0.9 V Max @ I_F = 10 mA for all types.)

Device*	Device Marking	Zener Voltage (Note 4)				Zener Impedance			Leakage Current	
		V_Z (V)			@ I_{ZT}	Z_{ZT} @ I_{ZT}	Z_{ZK} @ I_{ZK}		I_R @ V_R	
		Min	Nom	Max	mA	Ω	Ω	mA	μA	V
MMBZ5221ELT1/T3G	BE2	2.28	2.4	2.52	20	30	1200	0.25	100	1
MMBZ5226ELT1/T3G	BE7	3.13	3.3	3.47	20	28	1600	0.25	25	1
MMBZ5228ELT1/T3G	BE9	3.70	3.9	4.10	20	23	1900	0.25	10	1
MMBZ5229ELT1/T3G	BF1	4.08	4.3	4.52	20	22	2000	0.25	5	1
MMBZ5230ELT1/T3G	BF2	4.46	4.7	4.94	20	19	1900	0.25	5	2
MMBZ5231ELT1/T3G	BF3	4.84	5.1	5.36	20	17	1600	0.25	5	2
MMBZ5232ELT1/T3G	BF4	5.32	5.6	5.88	20	11	1600	0.25	5	3
MMBZ5234ELT1/T3G	BF6	5.89	6.2	6.51	20	7	1000	0.25	5	4
MMBZ5235ELT1/T3G	BF7	6.46	6.8	7.14	20	5	750	0.25	3	5
MMBZ5236ELT1/T3G	BF8	7.12	7.5	7.88	20	6	500	0.25	3	6
MMBZ5237ELT1/T3G	BF9	7.79	8.2	8.61	20	8	500	0.25	3	6.5
MMBZ5239ELT1/T3G	BG2	8.65	9.1	9.55	20	10	600	0.25	3	7
MMBZ5240ELT1/T3G	BG3	9.50	10	10.50	20	17	600	0.25	3	8
MMBZ5242ELT1/T3G	BG5	11.40	12	12.60	20	30	600	0.25	1	9.1
MMBZ5243ELT1/T3G	BG6	12.35	13	13.65	9.5	13	600	0.25	0.5	9.9
MMBZ5244ELT1/T3G	BG7	13.30	14	14.70	9	15	600	0.25	0.1	10
MMBZ5245ELT1/T3G	BG8	14.25	15	15.75	8.5	16	600	0.25	0.1	11
MMBZ5246ELT1G†	BG9	15.20	16	16.80	7.8	17	600	0.25	0.1	12
MMBZ5248ELT1/T1G	BH2	17.10	18	18.90	7	21	600	0.25	0.1	14
MMBZ5250ELT1/T3G	BH4	19.00	20	21.00	6.2	25	600	0.25	0.1	15

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

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

*Includes SZ−prefix devices where applicable.

†MMBZ5246EL, MMBZ5252EL, and MMBZ5265EL Not Available in 10,000/Tape & Reel.

ELECTRICAL CHARACTERISTICS (continued) (Pinout: 1-Anode, 2-NC, 3-Cathode) (V_F = 0.9 V Max @ I_F = 10 mA for all types.)

Device*	Device Marking	Zener Voltage (Note 5)				Zener Impedance			Leakage Current	
		V_Z (V)			@ I_{ZT}	Z_{ZT} @ I_{ZT}	Z_{ZK} @ I_{ZK}		I_R @ V_R	
		Min	Nom	Max	mA	Ω	Ω	mA	μA	V
MMBZ5252ELT1G†	BH6	22.80	24	25.20	5.2	33	600	0.25	0.1	18
MMBZ5253ELT1/T3G	BH7	23.75	25	26.25	5	35	600	0.25	0.1	19
MMBZ5254ELT1/T3G	BH8	25.65	27	28.35	4.6	41	600	0.25	0.1	21
MMBZ5255ELT1/T3G	BH9	26.60	28	29.40	4.5	44	600	0.25	0.1	21
MMBZ5256ELT1/T3G	BJ1	28.50	30	31.50	4.2	49	600	0.25	0.1	23
MMBZ5257ELT1/T3G	BJ2	31.35	33	34.65	3.8	58	700	0.25	0.1	25
MMBZ5258ELT1/T3G	BJ3	34.20	36	37.80	3.4	70	700	0.25	0.1	27
MMBZ5261ELT1G	BJ6	49.35	47	44.65	2.7	105	1000	0.25	0.1	36
MMBZ5262ELT1/T3G	BJ7	48.45	51	53.55	2.5	125	1100	0.25	0.1	37
MMBZ5263ELT1/T3G	BJ8	53.20	56	58.80	2.2	150	1300	0.25	0.1	43
MMBZ5265ELT1G†	BK1	58.90	62	65.10	2	185	1400	0.25	0.1	47

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

*Includes SZ−prefix devices where applicable.

†MMBZ5246EL, MMBZ5252EL, and MMBZ5265EL Not Available in 10,000/Tape & Reel.

TYPICAL CHARACTERISTICS

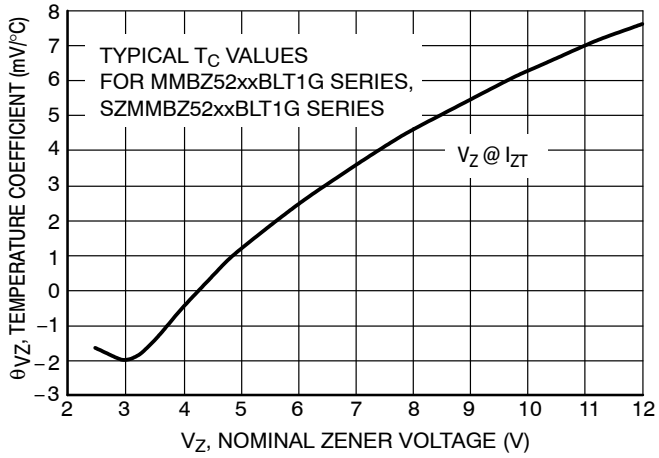


Figure 1. Temperature Coefficients (Temperature Range −55°C to +150°C)

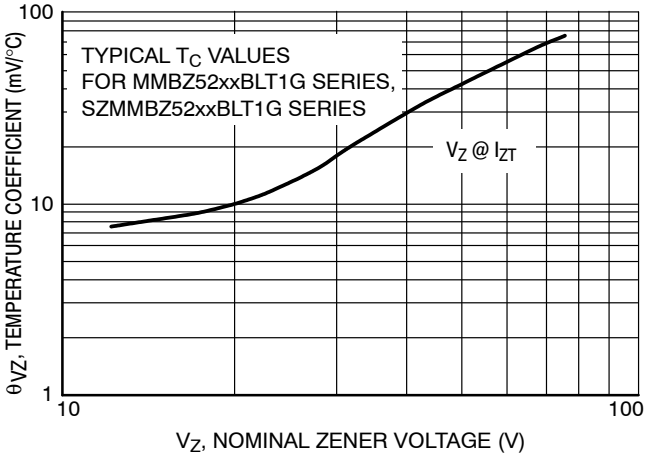


Figure 2. Temperature Coefficients (Temperature Range −55°C to +150°C)

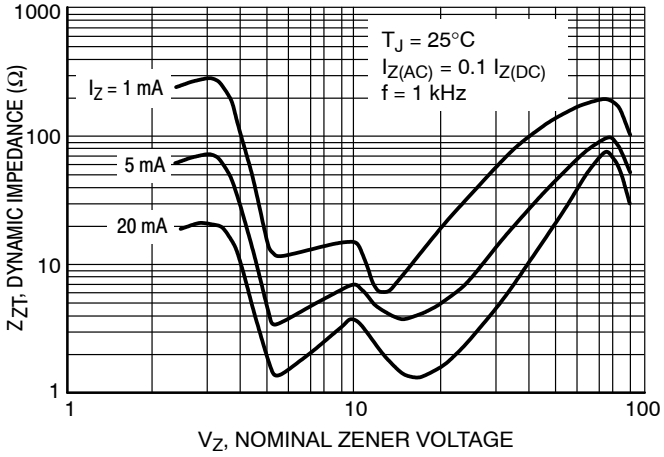


Figure 3. Effect of Zener Voltage on Zener Impedance

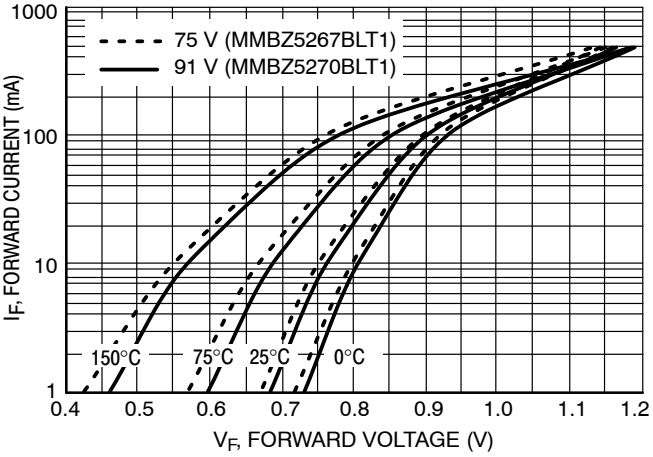


Figure 4. Typical Forward Voltage

TYPICAL CHARACTERISTICS

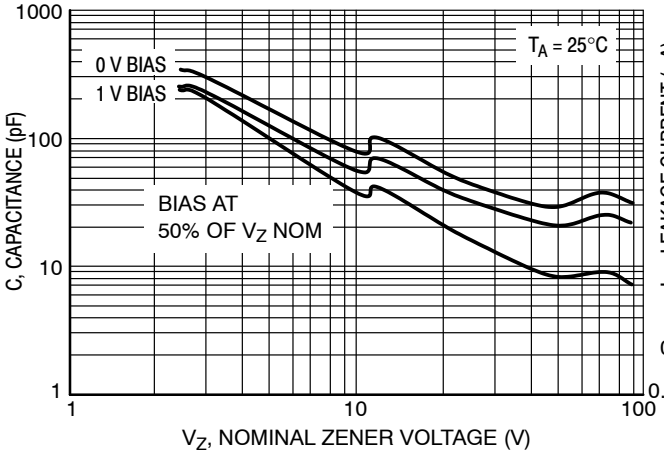


Figure 5. Typical Capacitance

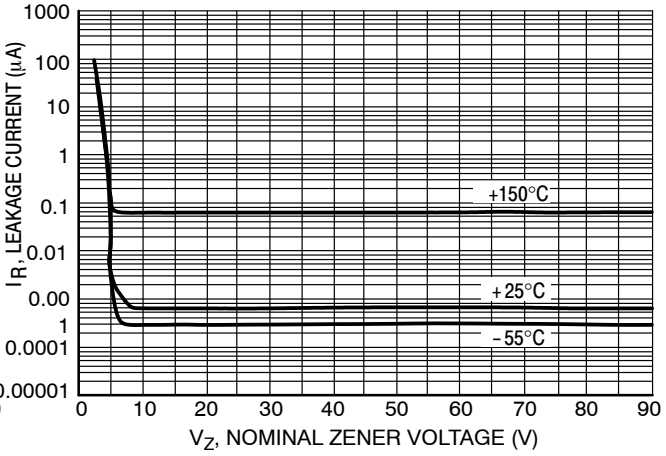


Figure 6. Typical Leakage Current

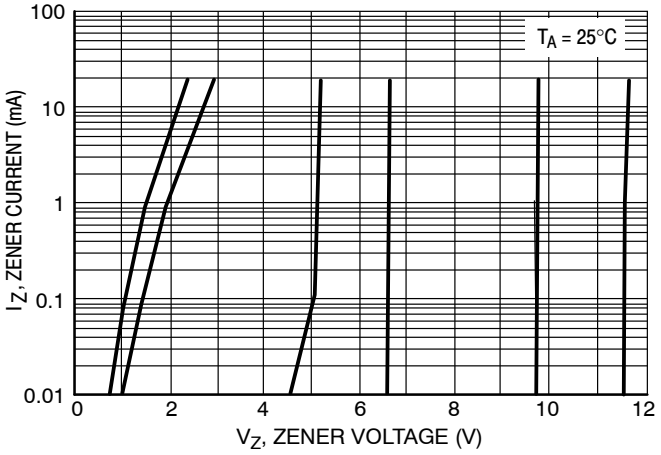


Figure 7. Zener Voltage versus Zener Current (V_Z Up to 12 V)

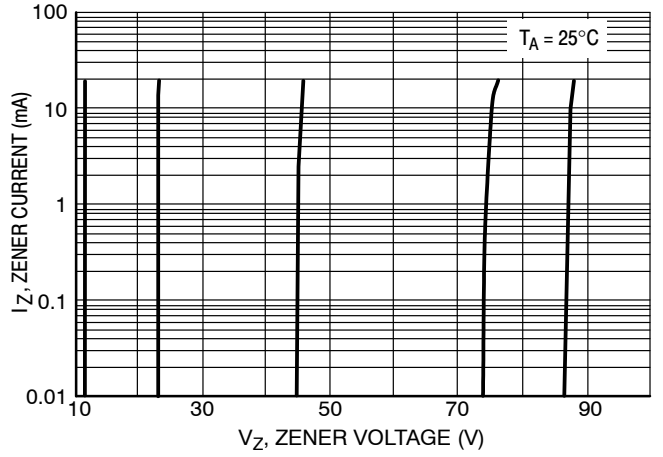


Figure 8. Zener Voltage versus Zener Current (12 V to 91 V)

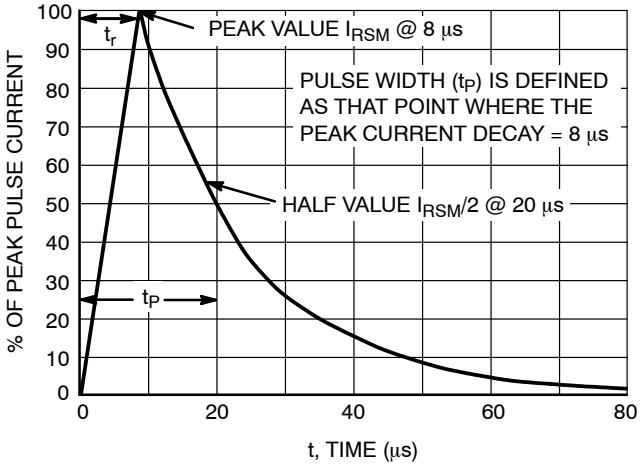


Figure 9. 8 × 20 μs Pulse Waveform

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