MMBZ5221ELT1 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.

Specification 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 Watt (8 X 20 μs)

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: UL94 V−0

MAXIMUM RATINGS

Rating	Symbol	Max	Unit
Peak Power Dissipation @ 20 μs (Note 1) @ $T_L \le 25°C$	P_{pk}	225	Watts
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

1. Non−repetitive 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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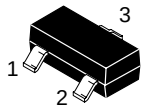
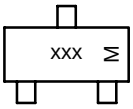


SOT−23
CASE 318
STYLE 8

MARKING DIAGRAM



xxx = Specific Device Code
M = Date Code

ORDERING INFORMATION

Device †	Package	Shipping
MMBZ52xxELT1	SOT−23	3000/Tape & Reel
MMBZ52xxELT3*	SOT−23	10,000/Tape & Reel

*MMBZ5246ELT1, and MMBZ5252ELT1 Not Available in 10,000/Tape & Reel.

DEVICE MARKING INFORMATION

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

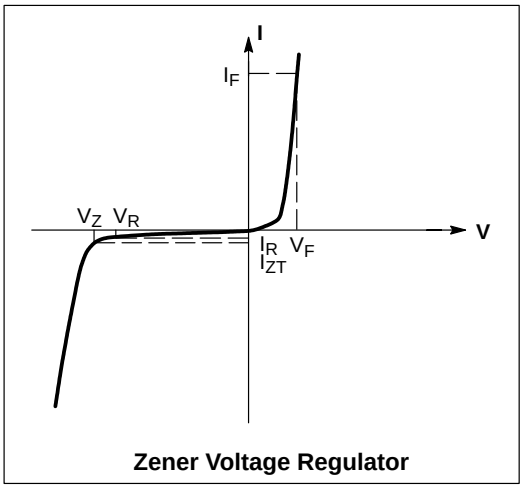
Devices listed in ***bold, italic*** are ON Semiconductor **Preferred** devices. **Preferred** devices are recommended choices for future use and best overall value.

†The “T1” suffix refers to an 8 mm, 7 inch reel.
The “T3” suffix refers to an 8 mm, 13 inch reel.

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 (Volts)			@ I_{ZT}	Z_{ZT} @ I_{ZT}	Z_{ZK} @ I_{ZK}		I_R @ V_R	
		Min	Nom	Max	mA	Ω	Ω	mA	μA	Volts
MMBZ5221ELT1	18A	2.28	2.4	2.52	20	30	1200	0.25	100	1
MMBZ5226ELT1	8A	3.13	3.3	3.47	20	28	1600	0.25	25	1
MMBZ5228ELT1	8C	3.70	3.9	4.10	20	23	1900	0.25	10	1
MMBZ5229ELT1	8D	4.08	4.3	4.52	20	22	2000	0.25	5	1
MMBZ5230ELT1	8E	4.46	4.7	4.94	20	19	1900	0.25	5	2
MMBZ5231ELT1	***8F***	***4.84***	***5.1***	***5.36***	***20***	***17***	***1600***	***0.25***	***5***	***2***
MMBZ5232ELT1	***8G***	***5.32***	***5.6***	***5.88***	***20***	***11***	***1600***	***0.25***	***5***	***3***
MMBZ5234ELT1	***8J***	***5.89***	***6.2***	***6.51***	***20***	***7***	***1000***	***0.25***	***5***	***4***
MMBZ5235ELT1	***8K***	***6.46***	***6.8***	***7.14***	***20***	***5***	***750***	***0.25***	***3***	***5***
MMBZ5236ELT1	8L	7.12	7.5	7.88	20	6	500	0.25	3	6
MMBZ5237ELT1	8M	7.79	8.2	8.61	20	8	500	0.25	3	6.5
MMBZ5240ELT1	***8Q***	***9.50***	***10***	***10.50***	***20***	***17***	***600***	***0.25***	***3***	***8***
MMBZ5242ELT1	***8S***	***11.40***	***12***	***12.60***	***20***	***30***	***600***	***0.25***	***1***	***9.1***
MMBZ5243ELT1	8T	12.35	13	13.65	9.5	13	600	0.25	0.5	9.9
MMBZ5244ELT1	8U	13.30	14	14.70	9	15	600	0.25	0.1	10
MMBZ5245ELT1	***8V***	***14.25***	***15***	***15.75***	***8.5***	***16***	***600***	***0.25***	***0.1***	***11***
MMBZ5246ELT1*	8W	15.20	16	16.80	7.8	17	600	0.25	0.1	12
MMBZ5248ELT1	***8Y***	***17.10***	***18***	***18.90***	***7***	***21***	***600***	***0.25***	***0.1***	***14***
MMBZ5250ELT1	***81A***	***19.00***	***20***	***21.00***	***6.2***	***25***	***600***	***0.25***	***0.1***	***15***
MMBZ5252ELT1*	81C	22.80	24	25.20	5.2	33	600	0.25	0.1	18
MMBZ5254ELT1	***81E***	***25.65***	***27***	***28.35***	***4.6***	***41***	***600***	***0.25***	***0.1***	***21***
MMBZ5255ELT1	81F	26.60	28	29.40	4.5	44	600	0.25	0.1	21
MMBZ5257ELT1	***81H***	***31.35***	***33***	***34.65***	***3.8***	***58***	***700***	***0.25***	***0.1***	***25***
MMBZ5263ELT1	81P	53.20	56	58.80	2.2	150	1300	0.25	0.1	43

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

*Not Available in the 10,0000/Tape & Reel.

TYPICAL CHARACTERISTICS

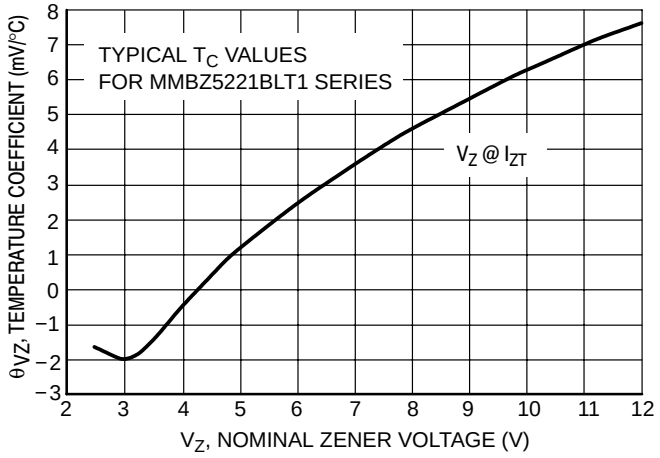


Figure 1. Temperature Coefficients (Temperature Range −55°C to +150°C)

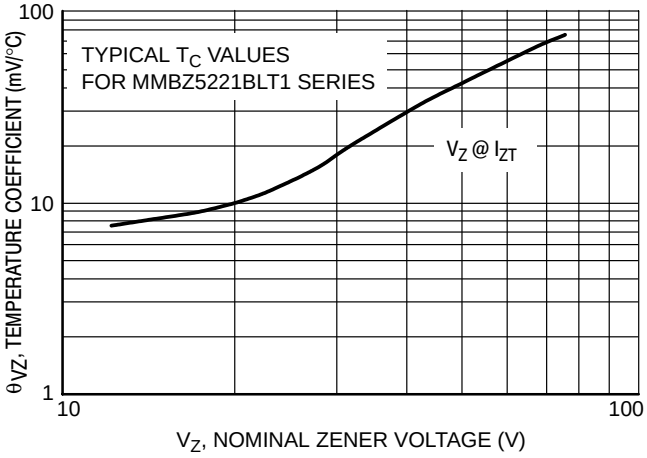


Figure 2. Temperature Coefficients (Temperature Range −55°C to +150°C)

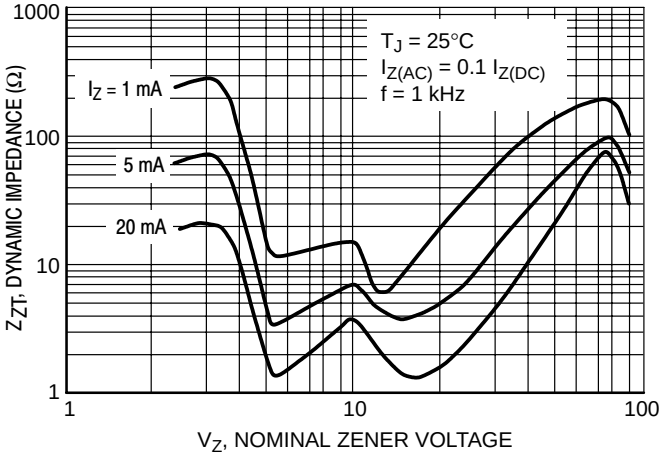


Figure 3. Effect of Zener Voltage on Zener Impedance

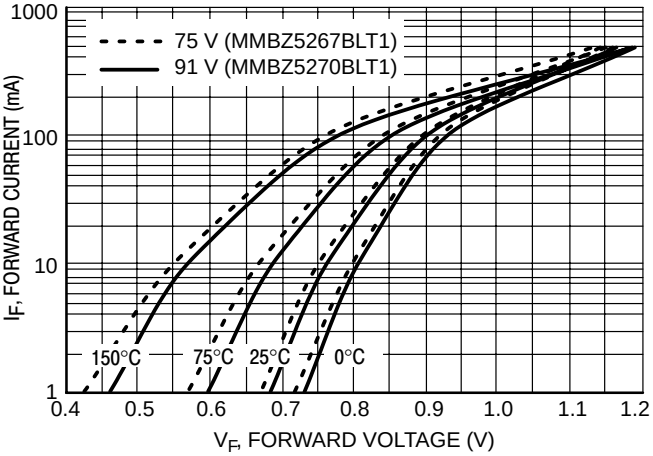


Figure 4. Typical Forward Voltage

TYPICAL CHARACTERISTICS

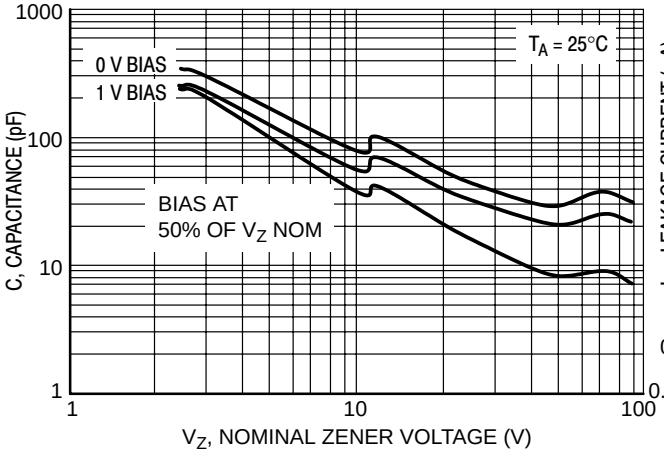


Figure 5. Typical Capacitance

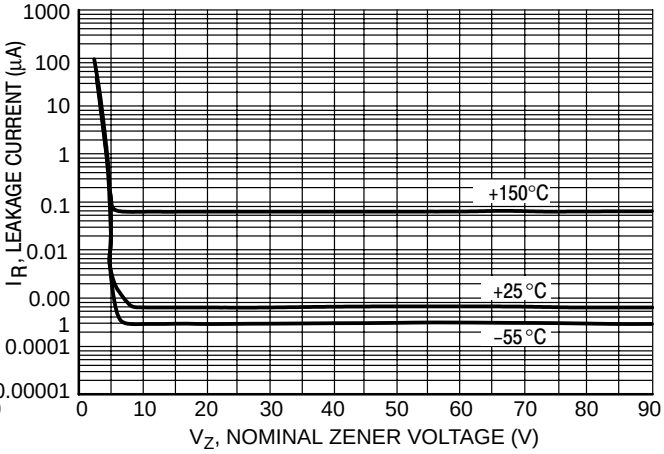


Figure 6. Typical Leakage Current

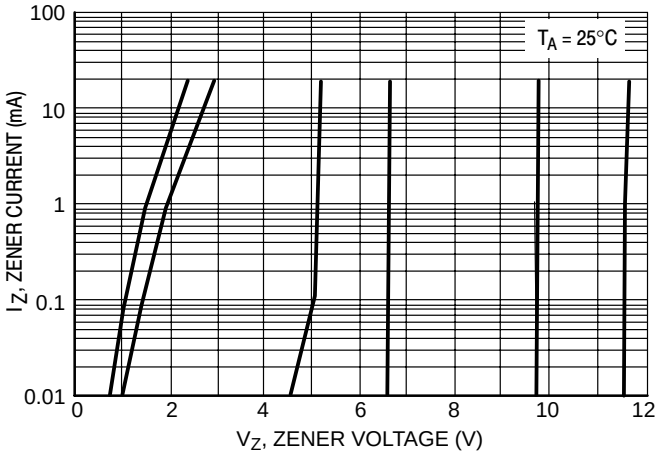


Figure 7. Zener Voltage versus Zener Current (V_Z Up to 12 V)

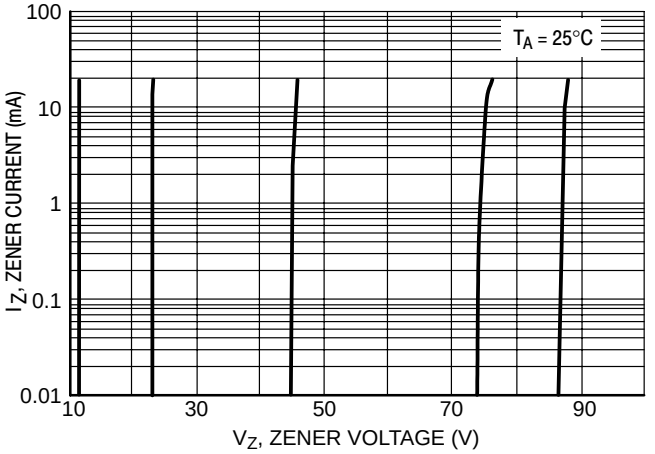


Figure 8. Zener Voltage versus Zener Current (12 V to 91 V)

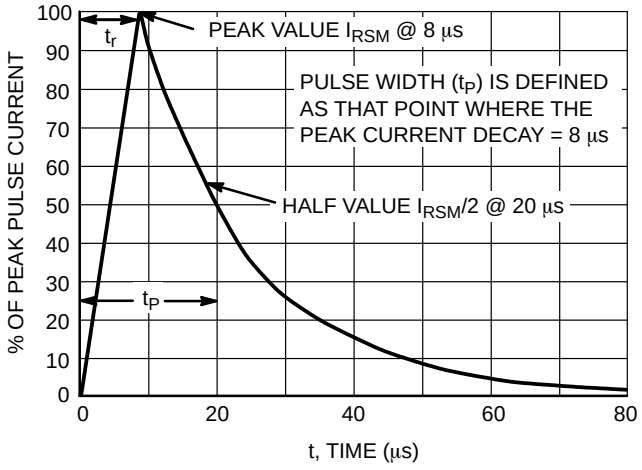
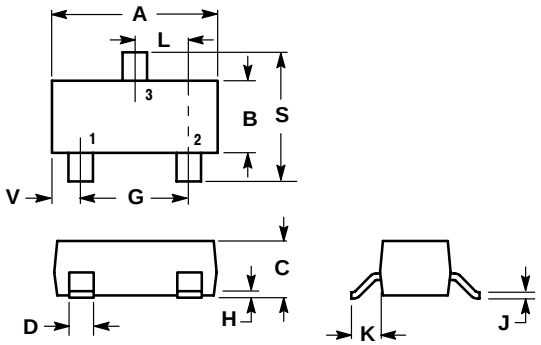


Figure 9. 8 × 20 μs Pulse Waveform

PACKAGE DIMENSIONS

SOT−23
TO−236AB
CASE 318−08
ISSUE AH



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. 318−03 AND −07 OBSOLETE, NEW STANDARD 318−08.

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.1102	0.1197	2.80	3.04
B	0.0472	0.0551	1.20	1.40
C	0.0350	0.0440	0.89	1.11
D	0.0150	0.0200	0.37	0.50
G	0.0701	0.0807	1.78	2.04
H	0.0005	0.0040	0.013	0.100
J	0.0034	0.0070	0.085	0.177
K	0.0140	0.0285	0.35	0.69
L	0.0350	0.0401	0.89	1.02
S	0.0830	0.1039	2.10	2.64
V	0.0177	0.0236	0.45	0.60

PUBLICATION ORDERING INFORMATION

Literature Fulfillment:
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