



# MMBZ5221BG THRU MMBZ5270BG

Zener Voltage Regulator Dildes

## 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
- Small Package Size for High Density Applications
- ESD Rating of Class 3 (>16 KV) per Human Body Model
- We declare that the material of product compliance with RoHS requirements

### 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

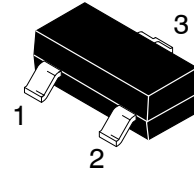
### Maximum Ratings

Rating	Symbol	Max	Unit
Total Power Dissipation on FR-5 Board, (Note 1) @ $T_A = 25^\circ\text{C}$ Derated above $25^\circ\text{C}$	$P_D$	225	mW
Thermal Resistance – Junction-to-Ambient	$R_{\theta JA}$	1.8	$\text{mW}/^\circ\text{C}$
Total Power Dissipation on Alumina Substrate, (Note 2) @ $T_A = 25^\circ\text{C}$ Derated above $25^\circ\text{C}$	$P_D$	556	$^\circ\text{C}/\text{W}$
Thermal Resistance – Junction-to-Ambient	$R_{\theta JA}$	2.4	$^\circ\text{C}/\text{W}$
Junction and Storage Temperature Range	$T_J, T_{stg}$	417	$^\circ\text{C}$
		-65 to +150	

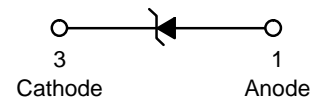
1. FR-5 = 1.0 X 0.75 X 0.62 in.

2. Alumina = 0.4 X 0.3 X 0.024 in., 99.5% alumina

## MMBZ52xxBG SERIES



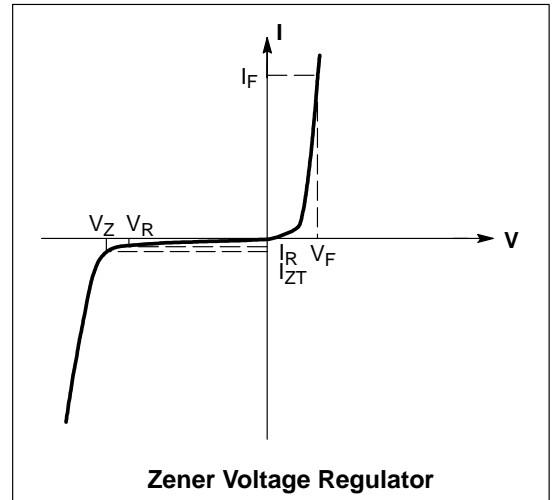
SOT-23



## Electrical Characteristics

(Pinout: 1-Anode, 2-No Connection, 3-Cathode) ( $T_A = 25^\circ\text{C}$  unless otherwise noted,  $V_F = 0.95\text{ V Max. @ } I_F = 10\text{ mA}$ )

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 @ $I_F$





# MMBZ5221BG THRU MMBZ5270BG

**Electrical Characteristics** (Pinout: 1-Anode, 2-NC, 3-Cathode) ( $V_F = 0.9\text{ V Max @ } I_F = 10\text{ mA}$  for all types.)

Device	Device Marking	Zener Voltage (Note 3)				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	$\Omega$	$\Omega$	mA	$\mu\text{A}$	Volts
MMBZ5221BG	18A	2.28	2.4	2.52	20	30	1200	0.25	100	1
MMBZ5222BG	18B	2.37	2.5	2.63	20	30	1250	0.25	100	1
MMBZ5223BG	18C	2.56	2.7	2.84	20	30	1300	0.25	75	1
MMBZ5224BG	18D	2.66	2.8	2.94	20	30	1400	0.25	75	1
MMBZ5225BG	18E	2.85	3	3.15	20	29	1600	0.25	50	1
MMBZ5226BG	8A	3.13	3.3	3.47	20	28	1600	0.25	25	1
MMBZ5227BG	8B	3.42	3.6	3.78	20	24	1700	0.25	15	1
MMBZ5228BG	8C	3.70	3.9	4.10	20	23	1900	0.25	10	1
MMBZ5229BG	8D	4.08	4.3	4.52	20	22	2000	0.25	5	1
MMBZ5230BG	8E	4.46	4.7	4.94	20	19	1900	0.25	5	2
<b>MMBZ5231BG</b>	<b>8F</b>	<b>4.84</b>	<b>5.1</b>	<b>5.36</b>	<b>20</b>	<b>17</b>	<b>1600</b>	<b>0.25</b>	<b>5</b>	<b>2</b>
<b>MMBZ5232BG</b>	<b>8G</b>	<b>5.32</b>	<b>5.6</b>	<b>5.88</b>	<b>20</b>	<b>11</b>	<b>1600</b>	<b>0.25</b>	<b>5</b>	<b>3</b>
MMBZ5233BG	8H	5.70	6	6.30	20	7	1600	0.25	5	3.5
<b>MMBZ5234BG</b>	<b>8J</b>	<b>5.89</b>	<b>6.2</b>	<b>6.51</b>	<b>20</b>	<b>7</b>	<b>1000</b>	<b>0.25</b>	<b>5</b>	<b>4</b>
<b>MMBZ5235BG</b>	<b>8K</b>	<b>6.46</b>	<b>6.8</b>	<b>7.14</b>	<b>20</b>	<b>5</b>	<b>750</b>	<b>0.25</b>	<b>3</b>	<b>5</b>
MMBZ5236BG	8L	7.12	7.5	7.88	20	6	500	0.25	3	6
MMBZ5237BG	8M	7.79	8.2	8.61	20	8	500	0.25	3	6.5
MMBZ5238BG	8N	8.26	8.7	9.14	20	8	600	0.25	3	6.5
MMBZ5239BG	8P	8.64	9.1	9.56	20	10	600	0.25	3	7
<b>MMBZ5240BG</b>	<b>8Q</b>	<b>9.50</b>	<b>10</b>	<b>10.50</b>	<b>20</b>	<b>17</b>	<b>600</b>	<b>0.25</b>	<b>3</b>	<b>8</b>
MMBZ5241BG	8R	10.4	11	11.55	20	22	600	0.25	2	8.4
<b>MMBZ5242BG</b>	<b>8S</b>	<b>11.40</b>	<b>12</b>	<b>12.60</b>	<b>20</b>	<b>30</b>	<b>600</b>	<b>0.25</b>	<b>1</b>	<b>9.1</b>
MMBZ5243BG	8T	12.35	13	13.65	9.5	13	600	0.25	0.5	9.9
MMBZ5244BG	8U	13.30	14	14.70	9	15	600	0.25	0.1	10
<b>MMBZ5245BG</b>	<b>8V</b>	<b>14.25</b>	<b>15</b>	<b>15.75</b>	<b>8.5</b>	<b>16</b>	<b>600</b>	<b>0.25</b>	<b>0.1</b>	<b>11</b>
MMBZ5246BG	8W	15.20	16	16.80	7.8	17	600	0.25	0.1	12
MMBZ5247BG	8X	16.15	17	17.85	7.4	19	600	0.25	0.1	13
<b>MMBZ5248BG</b>	<b>8Y</b>	<b>17.10</b>	<b>18</b>	<b>18.90</b>	<b>7</b>	<b>21</b>	<b>600</b>	<b>0.25</b>	<b>0.1</b>	<b>14</b>
MMBZ5249BG	8Z	18.05	19	19.95	6.6	23	600	0.25	0.1	14
<b>MMBZ5250BG</b>	<b>81A</b>	<b>19.00</b>	<b>20</b>	<b>21.00</b>	<b>6.2</b>	<b>25</b>	<b>600</b>	<b>0.25</b>	<b>0.1</b>	<b>15</b>
MMBZ5251BG	81B	20.90	22	23.10	5.6	29	600	0.25	0.1	17
MMBZ5252BG	81C	22.80	24	25.20	5.2	33	600	0.25	0.1	18
MMBZ5253BG	81D	23.75	25	26.25	5	35	600	0.25	0.1	19
<b>MMBZ5254BG</b>	<b>81E</b>	<b>25.65</b>	<b>27</b>	<b>28.35</b>	<b>4.6</b>	<b>41</b>	<b>600</b>	<b>0.25</b>	<b>0.1</b>	<b>21</b>
MMBZ5255BG	81F	26.60	28	29.40	4.5	44	600	0.25	0.1	21
MMBZ5256BG	81G	28.50	30	31.50	4.2	49	600	0.25	0.1	23
<b>MMBZ5257BG</b>	<b>81H</b>	<b>31.35</b>	<b>33</b>	<b>34.65</b>	<b>3.8</b>	<b>58</b>	<b>700</b>	<b>0.25</b>	<b>0.1</b>	<b>25</b>
MMBZ5258BG	81J	34.20	36	37.80	3.4	70	700	0.25	0.1	27
MMBZ5259BG	81K	37.05	39	40.95	3.2	80	800	0.25	0.1	30
MMBZ5260BG	81L	40.85	43	45.15	3	93	900	0.25	0.1	33
MMBZ5261BG	81M	44.65	47	49.35	2.7	105	1000	0.25	0.1	36
MMBZ5262BG	81N	48.45	51	53.55	2.5	125	1100	0.25	0.1	39
MMBZ5263BG	81P	53.20	56	58.80	2.2	150	1300	0.25	0.1	43
MMBZ5264BG	81Q	57.00	60	63.00	2.1	170	1400	0.25	0.1	46
MMBZ5265BG	81R	58.90	62	65.10	2	185	1400	0.25	0.1	47
MMBZ5266BG	81S	64.60	68	71.40	1.8	230	1600	0.25	0.1	52
MMBZ5267BG	81T	71.25	75	78.75	1.7	270	1700	0.25	0.1	56
MMBZ5268BG	81U	77.90	82	86.10	1.5	330	2000	0.25	0.1	62
MMBZ5269BG	81V	82.65	87	91.35	1.4	370	2200	0.25	0.1	68
MMBZ5270BG	81W	86.45	91	95.55	1.4	400	2300	0.25	0.1	69

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

\*Not Available in the 10,000/Tape & Reel.



## Typical Characteristics

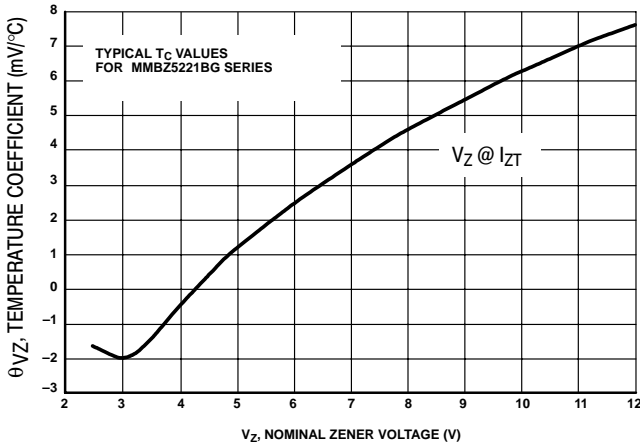


Figure 1. Temperature Coefficients  
(Temperature Range -55°C to +150°C)

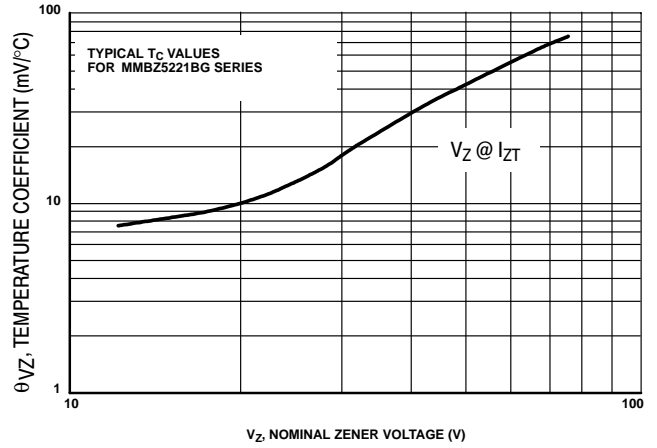


Figure 2. Temperature Coefficients  
(Temperature Range -55°C to +150°C)

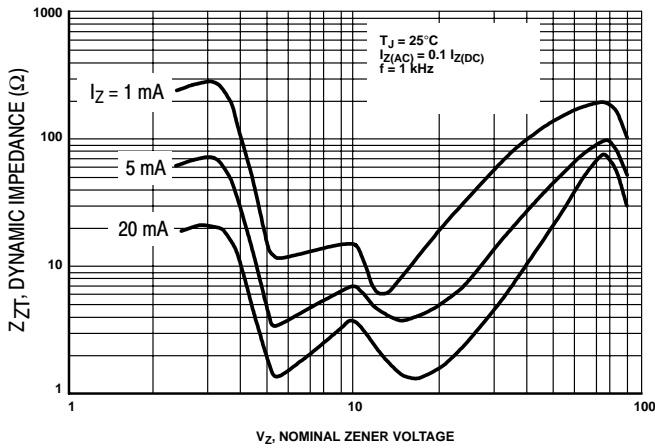


Figure 3. Effect of Zener Voltage on  
Zener Impedance

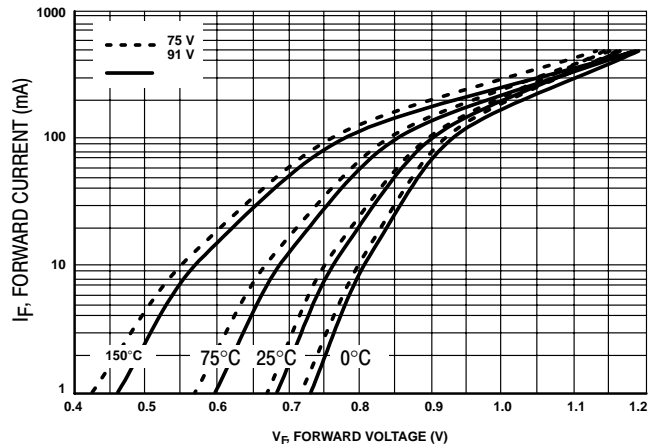


Figure 4. Typical Forward Voltage

## Typical Characteristics

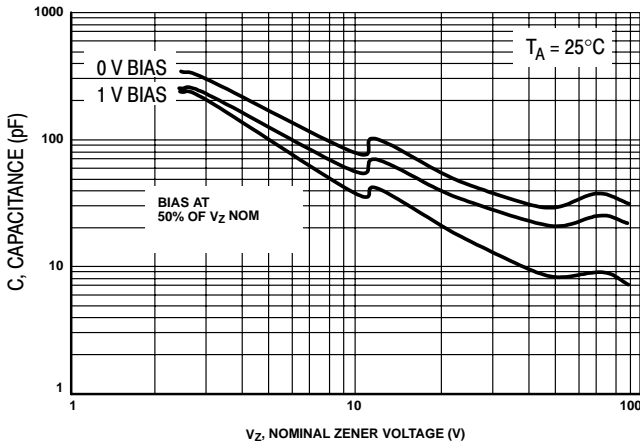


Figure 5. Typical Capacitance

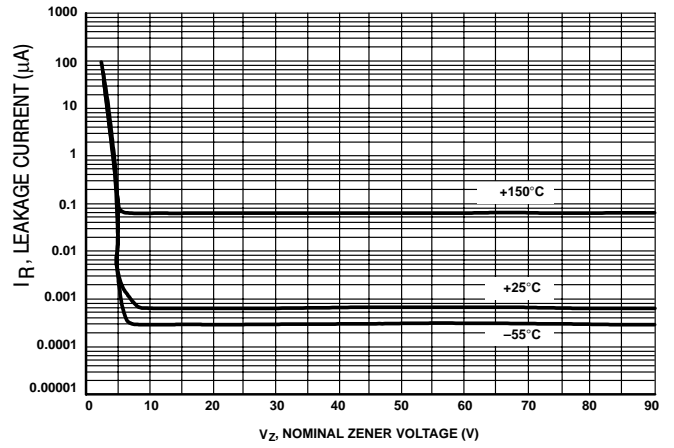


Figure 6. Typical Leakage Current

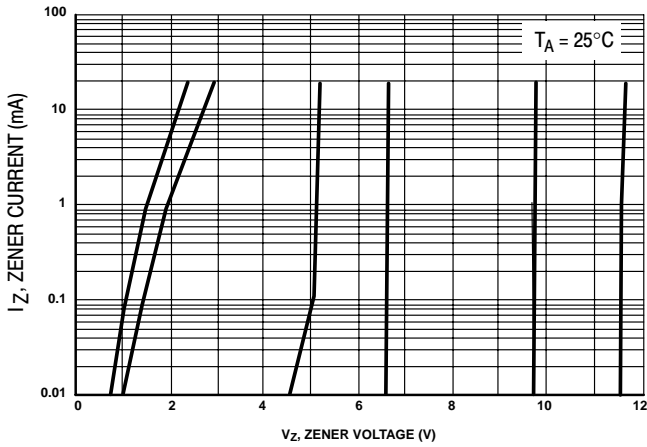


Figure 7. Zener Voltage versus Zener Current (V<sub>Z</sub> Up to 12 V)

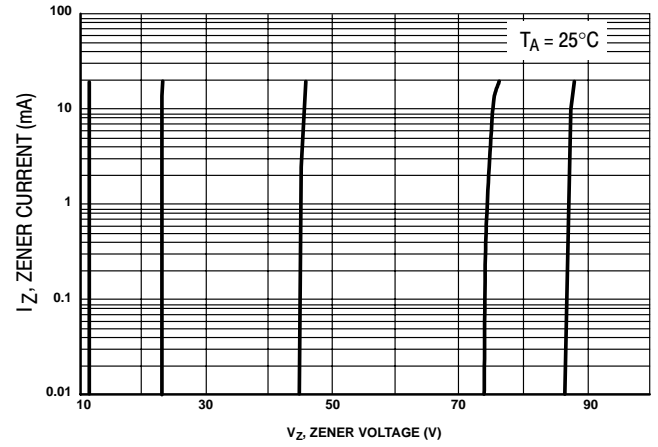
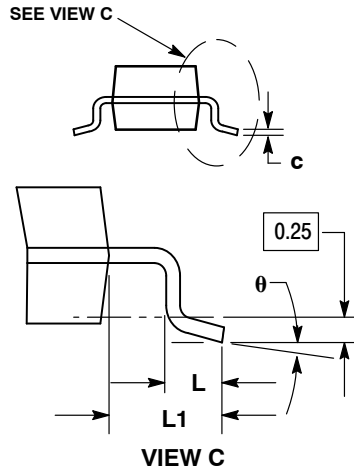
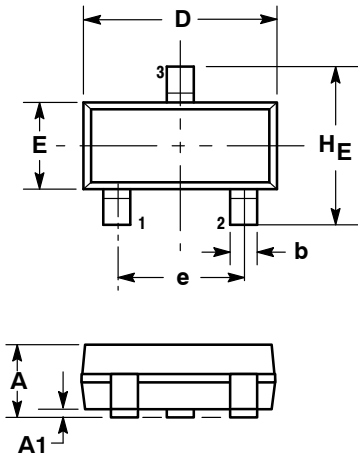


Figure 8. Zener Voltage versus Zener Current (12 V to 91 V)

## Package Dimensions

### SOT-23



**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. 318-01 THRU -07 AND -09 OBSOLETE, NEW STANDARD 318-08.

DIM	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.89	1.00	1.11	0.035	0.040	0.044
A1	0.01	0.06	0.10	0.001	0.002	0.004
b	0.37	0.44	0.50	0.015	0.018	0.020
c	0.09	0.13	0.18	0.003	0.005	0.007
D	2.80	2.90	3.04	0.110	0.114	0.120
E	1.20	1.30	1.40	0.047	0.051	0.055
e	1.78	1.90	2.04	0.070	0.075	0.081
L	0.10	0.20	0.30	0.004	0.008	0.012
L1	0.35	0.54	0.69	0.014	0.021	0.029
HE	2.10	2.40	2.64	0.083	0.094	0.104

**STYLE 6:**

- PIN 1. BASE
- EMITTER
- COLLECTOR

### SOLDERING FOOTPRINT\*

