

# 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
- Small Package Size for High Density Applications
- ESD Rating of Class 3 (>16 KV) per Human Body Model
- Pb-Free Package is available.

### Mechanical Characteristics:

**CASE:** Void-free, transfer-molded, thermosetting plastic case

**FINISH:** Corrosion resistant finish, easily solderable

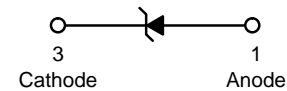
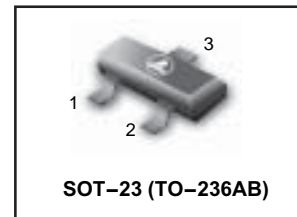
### MAXIMUM CASE TEMPERATURE FOR SOLDERING PURPOSES:

260°C for 10 Seconds

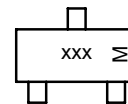
**POLARITY:** Cathode indicated by polarity band

**FLAMMABILITY RATING:** UL94 V-0

## LMBZ52xxBL Series



### MARKING DIAGRAM



xxx = Specific Device Code  
M = Date Code

### MAXIMUM RATINGS

Rating	Symbol	Max	Unit
Total Power Dissipation on FR-5 Board, (Note 1) @ T <sub>A</sub> = 25°C Derated above 25°C	P <sub>D</sub>	225 1.8	mW mW/°C
Thermal Resistance – Junction-to-Ambient	R <sub>θJA</sub>	556	°C/W
Total Power Dissipation on Alumina Substrate, (Note 2) @ T <sub>A</sub> = 25°C Derated above 25°C	P <sub>D</sub>	300 2.4	mW mW/°C
Thermal Resistance – Junction-to-Ambient	R <sub>θJA</sub>	417	°C/W
Junction and Storage Temperature Range	T <sub>J</sub> , T <sub>stg</sub>	-65 to +150	°C

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

### ORDERING INFORMATION

Device*1	Package	Shipping
LMBZ52xxBLT1	SOT-23	3000/Tape&Reel
LMBZ52xxBLT1G (Pb-Free)	SOT-23	3000/Tape&Reel
LMBZ52xxBLT3*2	SOT-23	10,000/Tape&Reel
LMBZ52xxBLT3G (Pb-Free)	SOT-23	10,000/Tape&Reel

\*2 LMBZ5233BLT1, LMBZ5246BLT1, LMBZ5251BLT1, and LMBZ5252BLT1 Not Available in 10,000/Tape & Reel.

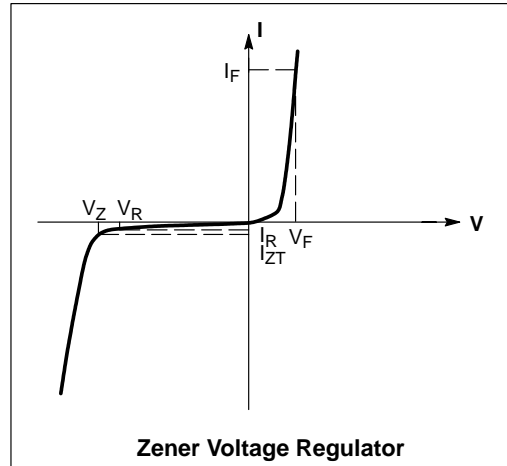
\*1 The "T1" suffix refers to an 8 mm, 7 inch reel.  
The "T3" suffix refers to an 8 mm, 13 inch reel.  
The "G" suffix refers to Pb-Free package.

**LMBZ5221BLT1 Series**

**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 @ $I_F$



**LMBZ5221BLT1 Series**
**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
LMBZ5221BLT1	18A	2.28	2.4	2.52	20	30	1200	0.25	100	1
LMBZ5222BLT1	18B	2.37	2.5	2.63	20	30	1250	0.25	100	1
LMBZ5223BLT1	18C	2.56	2.7	2.84	20	30	1300	0.25	75	1
LMBZ5224BLT1	18D	2.66	2.8	2.94	20	30	1400	0.25	75	1
LMBZ5225BLT1	18E	2.85	3	3.15	20	29	1600	0.25	50	1
LMBZ5226BLT1	8A	3.13	3.3	3.47	20	28	1600	0.25	25	1
LMBZ5227BLT1	8B	3.42	3.6	3.78	20	24	1700	0.25	15	1
LMBZ5228BLT1	8C	3.70	3.9	4.10	20	23	1900	0.25	10	1
LMBZ5229BLT1	8D	4.08	4.3	4.52	20	22	2000	0.25	5	1
LMBZ5230BLT1	8E	4.46	4.7	4.94	20	19	1900	0.25	5	2
<b>LMBZ5231BLT1</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>LMBZ5232BLT1</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>
LMBZ5233BLT1*	8H	5.70	6	6.30	20	7	1600	0.25	5	3.5
<b>LMBZ5234BLT1</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>LMBZ5235BLT1</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>
LMBZ5236BLT1	8L	7.12	7.5	7.88	20	6	500	0.25	3	6
LMBZ5237BLT1	8M	7.79	8.2	8.61	20	8	500	0.25	3	6.5
LMBZ5238BLT1	8N	8.26	8.7	9.14	20	8	600	0.25	3	6.5
LMBZ5239BLT1	8P	8.64	9.1	9.56	20	10	600	0.25	3	7
<b>LMBZ5240BLT1</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>
LMBZ5241BLT1	8R	10.4	11	11.55	20	22	600	0.25	2	8.4
<b>LMBZ5242BLT1</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>
LMBZ5243BLT1	8T	12.35	13	13.65	9.5	13	600	0.25	0.5	9.9
LMBZ5244BLT1	8U	13.30	14	14.70	9	15	600	0.25	0.1	10
<b>LMBZ5245BLT1</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>
LMBZ5246BLT1*	8W	15.20	16	16.80	7.8	17	600	0.25	0.1	12
LMBZ5247BLT1	8X	16.15	17	17.85	7.4	19	600	0.25	0.1	13
<b>LMBZ5248BLT1</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>
LMBZ5249BLT1	8Z	18.05	19	19.95	6.6	23	600	0.25	0.1	14
<b>LMBZ5250BLT1</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>
LMBZ5251BLT1*	81B	20.90	22	23.10	5.6	29	600	0.25	0.1	17
LMBZ5252BLT1*	81C	22.80	24	25.20	5.2	33	600	0.25	0.1	18
LMBZ5253BLT1	81D	23.75	25	26.25	5	35	600	0.25	0.1	19
<b>LMBZ5254BLT1</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>
LMBZ5255BLT1	81F	26.60	28	29.40	4.5	44	600	0.25	0.1	21
LMBZ5256BLT1	81G	28.50	30	31.50	4.2	49	600	0.25	0.1	23
<b>LMBZ5257BLT1</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>
LMBZ5258BLT1	81J	34.20	36	37.80	3.4	70	700	0.25	0.1	27
LMBZ5259BLT1	81K	37.05	39	40.95	3.2	80	800	0.25	0.1	30
LMBZ5260BLT1	81L	40.85	43	45.15	3	93	900	0.25	0.1	33
LMBZ5261BLT1	81M	44.65	47	49.35	2.7	105	1000	0.25	0.1	36
LMBZ5262BLT1	81N	48.45	51	53.55	2.5	125	1100	0.25	0.1	39
LMBZ5263BLT1	81P	53.20	56	58.80	2.2	150	1300	0.25	0.1	43
LMBZ5264BLT1	81Q	57.00	60	63.00	2.1	170	1400	0.25	0.1	46
LMBZ5265BLT1	81R	58.90	62	65.10	2	185	1400	0.25	0.1	47
LMBZ5266BLT1	81S	64.60	68	71.40	1.8	230	1600	0.25	0.1	52
LMBZ5267BLT1	81T	71.25	75	78.75	1.7	270	1700	0.25	0.1	56
LMBZ5268BLT1	81U	77.90	82	86.10	1.5	330	2000	0.25	0.1	62
LMBZ5269BLT1	81V	82.65	87	91.35	1.4	370	2200	0.25	0.1	68
LMBZ5270BLT1	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 &amp; Reel.

LMBZ5221BLT1 Series

TYPICAL CHARACTERISTICS

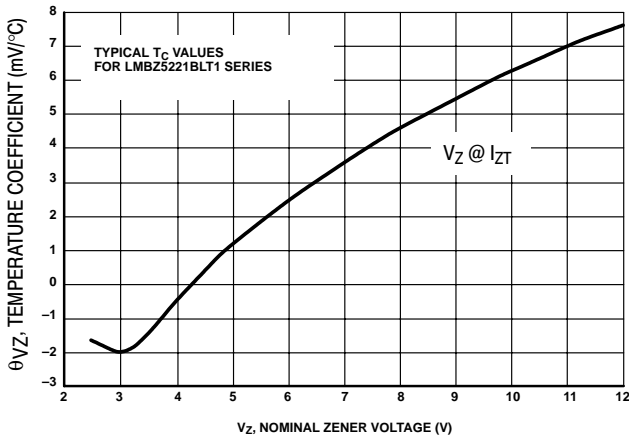


Figure 1. Temperature Coefficients (Temperature Range -55°C to +150°C)

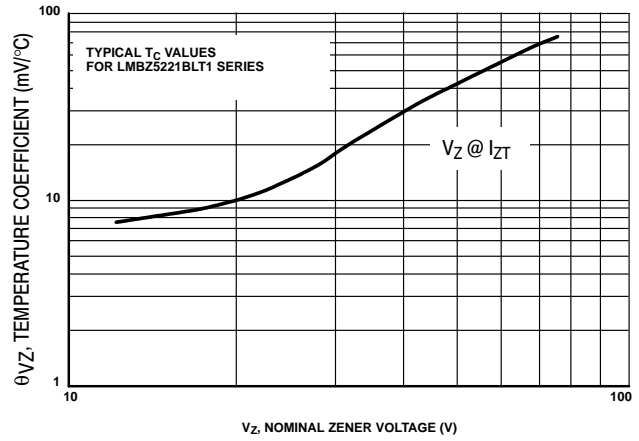


Figure 2. Temperature Coefficients (Temperature Range -55°C to +150°C)

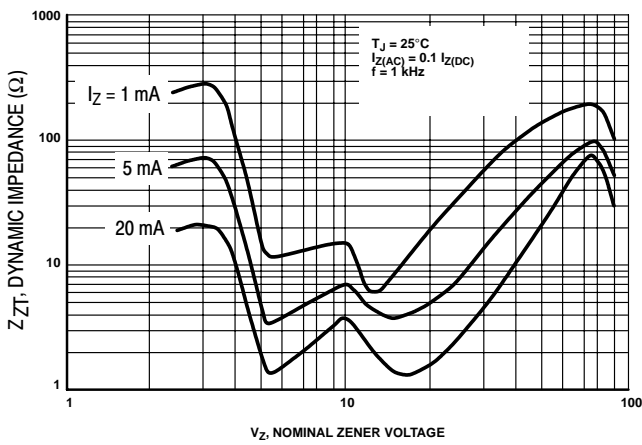


Figure 3. Effect of Zener Voltage on Zener Impedance

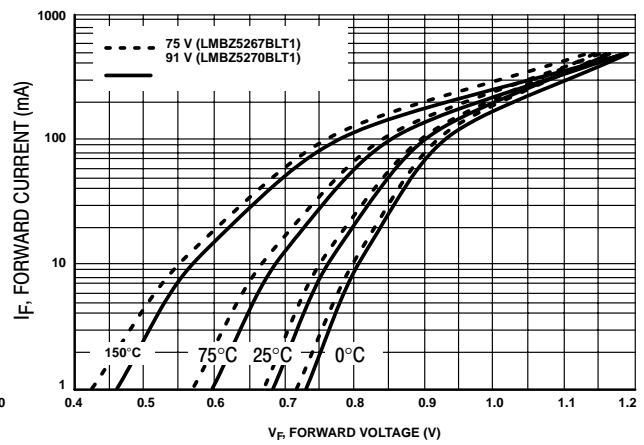
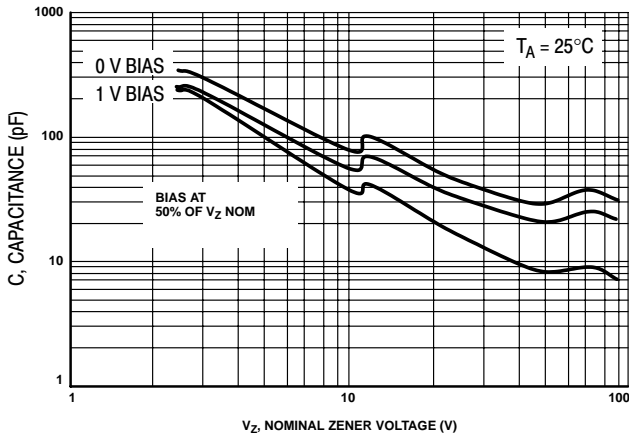


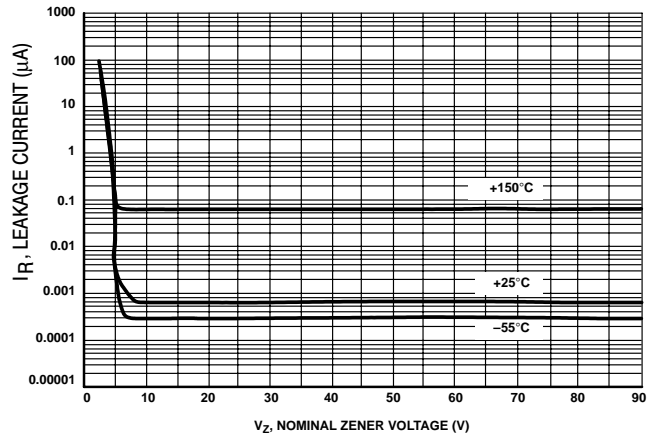
Figure 4. Typical Forward Voltage

**LMBZ5221BLT1 Series**

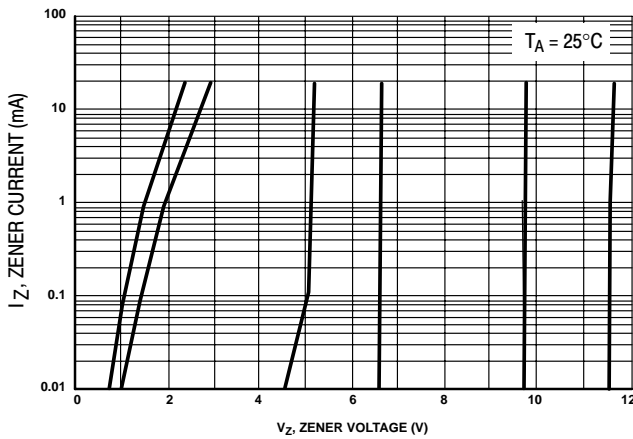
**TYPICAL CHARACTERISTICS**



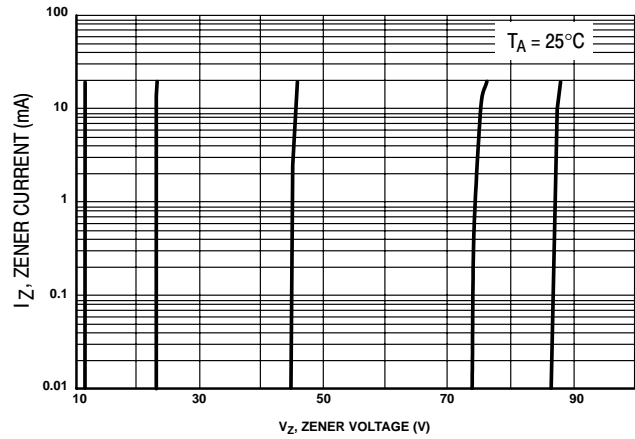
**Figure 5. Typical Capacitance**



**Figure 6. Typical Leakage Current**



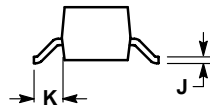
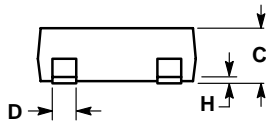
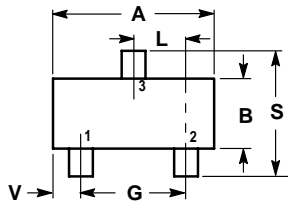
**Figure 7. Zener Voltage versus Zener Current (V<sub>Z</sub> Up to 12 V)**



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

**LMBZ52xxBLT1 Series**

**SOT-23 (TO-236AB)**



**NOTES:**

1. CONTROLLING DIMENSION: MILLIMETERS
2. LEAD THICKNESS SPECIFIED PER L / F DRAWING WITH SOLDER PLATING.

DIM	INCHES		MILLIMETERS	
	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	0.0180	0.0236	0.45	0.60
L	0.0350	0.0401	0.89	1.02
S	0.0830	0.0984	2.10	2.50
V	0.0177	0.0236	0.45	0.60

**STYLE 11:**

- PIN 1. ANODE
2. NO CONNECTION
3. CATHODE

