# **Zener Voltage Regulators**

225 mW SOT-23 Surface Mount

# MMBZ52xxBLT1G Series, SZMMBZ52xxBLT1G Series

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
- SZ Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC–Q101 Qualified and PPAP Capable
- These Devices are Pb–Free, Halogen Free/BFR Free and are RoHS Compliant

## **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	Units
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 (Note 1)	$R_{\thetaJA}$	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 (Note 2)	$R_{\theta JA}$	417	°C/W
Junction and Storage Temperature Range	T <sub>J</sub> , T <sub>stg</sub>	-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. 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.

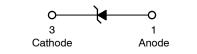


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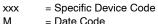


SOT-23 CASE 318 STYLE 8



#### MARKING DIAGRAM





= Date Code = Pb-Free Package

(Note: Microdot may be in either location)

## **ORDERING INFORMATION**

Device	Package	Shipping <sup>†</sup>
MMBZ52xxBLT1G	SOT-23 (Pb-Free)	3,000 / Tape & Reel
SZMMBZ52xxBLT1G	SOT-23 (Pb-Free)	3,000 / Tape & Reel
MMBZ52xxBLT3G	SOT-23 (Pb-Free)	10,000 / Tape & Reel
SZMMBZ52xxBLT3G	SOT-23 (Pb-Free)	10,000 / 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.

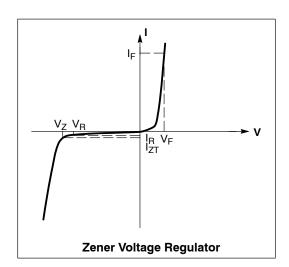
## **DEVICE MARKING INFORMATION**

See specific marking information in the device marking column of the Electrical Characteristics table on page 3 of this data sheet.

#### **ELECTRICAL CHARACTERISTICS**

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

Symbol	Parameter
VZ	Reverse Zener Voltage @ I <sub>ZT</sub>
I <sub>ZT</sub>	Reverse Current
Z <sub>ZT</sub>	Maximum Zener Impedance @ I <sub>ZT</sub>
I <sub>ZK</sub>	Reverse Current
Z <sub>ZK</sub>	Maximum Zener Impedance @ I <sub>ZK</sub>
I <sub>R</sub>	Reverse Leakage Current @ V <sub>R</sub>
V <sub>R</sub>	Reverse Voltage
١ <sub>F</sub>	Forward Current
V <sub>F</sub>	Forward Voltage @ I <sub>F</sub>

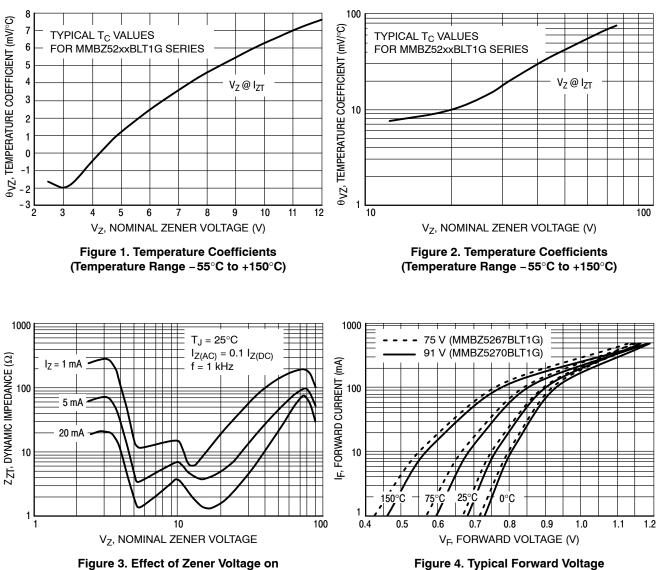


#### ELECTRICAL CHARACTERISTICS (Pinout: 1-Anode, 2-NC, 3-Cathode) (V<sub>F</sub> = 0.9 V Max @ I<sub>F</sub> = 10 mA for all types.)

MMBZ5222BLT1G         18A         2.28         2.4         2.52         20         30         1200         0.25         100         1           MMBZ5222BLT1G         18B         2.37         2.5         2.63         20         30         1250         0.25         100         1           MMBZ5222BLT1G         18C         2.56         2.7         2.84         20         30         1300         0.25         75         1           MMBZ5224BLT1G         18D         2.66         2.8         2.94         20         30         1400         0.25         75         1           MMBZ5224BLT1G         18E         2.85         3         3.15         20         29         1600         0.25         75         1           MMBZ5226BLT1G         8A         3.13         3.3         3.47         20         28         1600         0.25         25         1           MMBZ5226BLT1G         8B         3.42         3.6         3.78         20         24         1700         0.25         15         1           MMBZ5228BLT1G         8C         3.70         3.9         4.10         20         23         1900         0.25         5				Zener Voltage (Note 3)			Zener Impedance			Leakage Current	
DeviceMarkingMinNonMaxnAQQnApApApAMMBZS221PL1701882.782.52.682.03.01.2000.250.261.001MMBZS223BL1701802.662.72.442.003.001.3000.257.501MMBZS228DL1701802.683.03.152.002.601.000.257.501MMBZS228DL170883.423.03.782.002.401.000.251.001.01MMBZS228DL170883.423.03.782.002.401.000.255.71.01MMBZS228DL170864.044.74.942.001.001.000.255.73.01MMBZS230BL170865.325.65.882.001.111.6000.255.53.5MMBZS232BL170(730865.225.65.812.007.71.6000.255.53.5MMBZS232BL170(730865.796.26.612.007.57.500.253.36.5MMBZS232BL170(730876.798.28.612.007.71.6000.253.36.5MMBZS232BL170(730876.798.28.612.011.011.011.011.011.011.011.011.011.011.011.011.011.011.011.011.01 </th <th></th> <th>Device</th> <th></th> <th>V<sub>Z</sub> (Volts)</th> <th></th> <th>@ I<sub>ZT</sub></th> <th>Z<sub>ZT</sub> @ I<sub>ZT</sub></th> <th colspan="2">Z<sub>ZK</sub> @ I<sub>ZK</sub></th> <th colspan="2">I<sub>R</sub>@V<sub>R</sub></th>		Device		V <sub>Z</sub> (Volts)		@ I <sub>ZT</sub>	Z <sub>ZT</sub> @ I <sub>ZT</sub>	Z <sub>ZK</sub> @ I <sub>ZK</sub>		I <sub>R</sub> @V <sub>R</sub>	
MMBZs222BLT1G         1BB         2.37         2.5         2.63         2.0         30         1250         0.25         100         1           MMBZs22BLT1G         18D         2.66         2.7         2.84         20         30         1400         0.25         75         1           MMBZs22BLT1G         18D         2.66         2.8         2.94         20         30         1400         0.25         75         1           MMBZs22BLT1G         8B         3.33         3.37         20         28         1600         0.25         15         1           MMBZs22BLT1G         8B         3.42         3.6         3.78         20         22         2000         0.25         5         1           MMBZs23BLT1G         8F         4.46         4.7         4.94         20         17         1600         0.25         5         3           MMBZs23BLT1G         8F         4.46         6.7         4.94         20         7         1000         0.25         5         3         5           MMBZs23BLT1G         8F         4.46         6.87         7.88         20         6         500         0.25         3         6	Device*		Min	Nom	Max	mA	Ω	Ω	mA	μΑ	Volts
MMBZ2223BLTIG         16C         2.56         2.7         2.84         20         30         1300         0.25         75         1           MMBZ222BLTIG         18E         2.86         3         3.15         20         30         1400         0.25         75         1           MMBZ322BLTIG         8A         3.13         3.3         3.47         20         28         1600         0.25         150         1           MMBZ322BLTIG         8B         3.42         3.6         3.78         20         24         1700         0.25         15         1           MMBZ522BLTIG         8C         3.70         3.9         4.10         20         22         2000         0.25         5         2           MMBZ522BLTIG         8E         4.46         4.7         4.94         20         19         1900         0.25         5         2           MMBZ523DELTIG         8E         4.46         6.47         4.94         20         17         1600         0.25         5         3         3           MMBZ523DELTIG         8H         5.70         6         6.50         0.27         3         65         3         6.5	MMBZ5221BLT1G	18A	2.28	2.4	2.52	20	30	1200	0.25	100	1
MMBZs222BLTIG         18D         2.66         2.8         2.94         20         30         1400         0.25         75         1           MMBZs225BLTIG         18E         2.85         3         3.15         20         29         1600         0.25         50         1           MMBZs225BLTIG         8B         3.13         3.3         3.47         20         28         1600         0.25         15         1           MMBZs228BLTIG         8C         3.70         3.9         4.10         20         23         1900         0.25         5         1           MMBZs228BLTIG         8D         4.84         4.7         4.94         20         19         1900         0.25         5         2           MMBZs232BLTIG/T3G         8G         5.32         5.6         5.88         20         11         1600         0.25         5         3.5           MMBZs23BLTIG         8H         5.70         6         6.50         20         7         1000         0.25         3         6           MMBZs23BLTIG         8H         7.79         8.2         8.61         20         7         1000         0.25         3         6<	MMBZ5222BLT1G	18B	2.37	2.5	2.63	20	30	1250	0.25	100	1
MMBZS225BLTIG         1EE         2.85         3         3.15         20         29         1600         0.25         50         1           MMBZS227BLTIG         8A         3.13         3.3         3.47         20         28         1600         0.25         15         1           MMBZS228BLTIG         8C         3.70         3.9         4.10         20         23         1900         0.25         15         1           MMBZS228BLTIG         8E         4.46         4.7         4.84         20         190         0.25         5         2           MMBZS233BLTIG         8E         4.46         4.7         4.94         20         19         1900         0.25         5         3.5           MMBZS233BLTIG         8F         4.46         4.7         4.94         20         7         1600         0.25         5         4.3           MMBZS233BLTIG         8H         5.70         6         6.30         20         7         1000         0.25         3         6.5           MMBZS233BLTIG         8K         6.46         6.8         7.14         20         8         600         0.25         3         6.5      <	MMBZ5223BLT1G	18C	2.56	2.7	2.84	20	30	1300	0.25	75	1
MMBZ5226BLTIG         8A         3.13         3.3         3.47         20         28         1600         0.25         25         1           MMBZ522BLTIG         8B         3.42         3.6         3.78         20         24         1700         0.25         15         1           MMBZ522BLTIG         8C         3.70         3.9         4.10         20         23         1900         0.25         5         1           MMBZ522BLTIG         8E         4.46         4.7         4.94         20         19         1900         0.25         5         2           MMBZ523BLTIG(73G         8F         4.48         5.1         5.36         20         17         1600         0.25         5         3.5           MMBZ523BLTIG         8H         5.70         6         6.30         20         7         1000         0.25         5         3.5           MMBZ523BLTIG         8L         7.12         7.5         7.88         20         6         500         0.25         3         6.5           MMBZ523BLTIG         8H         7.79         8.2         8.61         20         10         600         0.25         3         6.5 <td>MMBZ5224BLT1G</td> <td>18D</td> <td>2.66</td> <td>2.8</td> <td>2.94</td> <td>20</td> <td>30</td> <td>1400</td> <td>0.25</td> <td>75</td> <td>1</td>	MMBZ5224BLT1G	18D	2.66	2.8	2.94	20	30	1400	0.25	75	1
MMBZ5227BLTIG         8B         3.42         3.6         3.78         20         24         1700         0.25         15         1           MMBZ5229BLTIG         8C         3.70         3.9         4.10         20         23         1900         0.25         5         10         11           MMBZ5229BLTIG         8E         4.46         4.77         4.94         20         19         1900         0.25         5         22           MMBZ5230BLTIG/T3G         8F         4.84         5.1         5.36         20         11         1600         0.25         5         3.5           MMBZ5233BLTIG/T3G         8F         4.84         6.51         2.0         7         1000         0.25         5         4.4           MMBZ5233BLTIG/T3B         8H         7.70         6.2         6.51         20         7         1000         0.25         3         6.5           MMBZ5233BLTIG/T3B         8K         6.46         6.88         7.14         20         8         500         0.25         3         6.5           MMBZ5239BLTIG         8M         7.79         8.2         8.61         2.0         10         600         0.25 <td< td=""><td>MMBZ5225BLT1G</td><td>18E</td><td>2.85</td><td>3</td><td>3.15</td><td>20</td><td>29</td><td>1600</td><td>0.25</td><td>50</td><td>1</td></td<>	MMBZ5225BLT1G	18E	2.85	3	3.15	20	29	1600	0.25	50	1
MMBZ5229BLTIG         8C         3.70         3.9         4.10         20         23         1900         0.25         10         1           MMBZ5229BLTIG         8D         4.08         4.3         4.52         20         22         2000         0.25         5         1           MMBZ523BLTIG/TGG         8F         4.44         4.51         5.36         20         17         1600         0.25         5         2           MMBZ523BLTIG/TGG         8F         4.44         5.7         6         6.30         20         7         1000         0.25         5         3           MMBZ523BLTIG         8H         5.70         6         6.30         20         7         1000         0.25         5         4           MMBZ523BLTIG         8L         7.12         7.5         7.88         20         6         500         0.25         3         6.5           MMBZ523BLTIG         8M         7.79         8.2         8.61         20         10         600         0.25         3         6.5           MMBZ523BLTIG         8M         8.26         8.7         9.14         20         8         600         0.25         1.5 <td>MMBZ5226BLT1G</td> <td>8A</td> <td>3.13</td> <td>3.3</td> <td>3.47</td> <td>20</td> <td>28</td> <td>1600</td> <td>0.25</td> <td>25</td> <td>1</td>	MMBZ5226BLT1G	8A	3.13	3.3	3.47	20	28	1600	0.25	25	1
MMBZ5229BLT1G         8D         4.08         4.3         4.52         20         22         2000         0.25         5         1           MMBZ5230BLT1G/T3G         8F         4.44         5.1         5.36         20         17         1600         0.25         5         2           MMBZ523BLT1G/T3G         8G         5.32         5.6         5.88         20         111         1600         0.25         5         3           MMBZ523BLT1G         8H         5.70         6         6.30         20         7         1600         0.25         5         4           MMBZ523BLT1G         8L         7.12         7.5         7.88         20         6         500         0.25         3         6.5           MMBZ523BLT1G         8L         7.12         7.5         7.88         20         6         500         0.25         3         6.5           MMBZ523BLT1G         8N         8.26         8.7         9.14         20         8         600         0.25         3         7           MMBZ5240BLT1G/T3G         8R         10.4         11         11.55         20         22         600         0.25         0.1         1	MMBZ5227BLT1G	8B	3.42	3.6	3.78	20	24	1700	0.25	15	1
MMBZ5230BLTIG         9E         4.46         4.7         4.94         20         19         1900         0.25         5         2           MMBZ5231BLTIG/T3G         8F         4.84         5.1         5.36         20         17         1600         0.25         5         3           MMBZ5233BLTIG         8H         5.70         6         6.30         20         7         1600         0.25         5         35           MMBZ523BLTIG         8K         6.46         6.8         7.14         20         5         750         0.25         3         5           MMBZ523BLTIG         8L         7.12         7.5         7.88         20         6         500         0.25         3         65           MMBZ523BLTIG         8M         7.79         8.2         8.61         20         8         600         0.25         3         65           MMBZ5230BLTIG         8R         10.4         11         11.55         20         10         600         0.25         3         65           MMBZ5240BLTIG/T3G         8R         10.4         11         11.55         20         10         600         0.25         1         9.1 <td>MMBZ5228BLT1G</td> <td>8C</td> <td>3.70</td> <td>3.9</td> <td>4.10</td> <td>20</td> <td>23</td> <td>1900</td> <td>0.25</td> <td>10</td> <td>1</td>	MMBZ5228BLT1G	8C	3.70	3.9	4.10	20	23	1900	0.25	10	1
MMBZ5231BLT1G/T3G         8F         4.84         5.1         5.36         20         17         1600         0.25         5         2           MMBZ5232BLT1G         8G         5.32         5.6         5.88         20         11         1600         0.25         5         3           MMBZ5233BLT1G         8H         5.70         6         6.30         20         7         1600         0.25         5         4           MMBZ5233BLT1G         8L         7.12         7.5         7.88         20         6         500         0.25         3         6.5           MMBZ5233BLT1G         8L         7.12         7.5         7.88         20         6         500         0.25         3         6.5           MMBZ5237BLT1G         8L         7.79         8.2         8.61         20         10         600         0.25         3         6.5           MMBZ523BLT1G         8P         8.64         9.1         9.56         20         10         600         0.25         3         7           MMBZ5240BLT1G         8T         12.35         13         13.65         9.5         13         600         0.25         1         9.1<	MMBZ5229BLT1G	8D	4.08	4.3	4.52	20	22	2000	0.25	5	1
MMBZ52328LT1G/T3G         8G         5.32         5.6         5.88         20         11         1600         0.25         5         33           MMBZ5233BLT1G         8H         5.70         6         6.30         20         7         1600         0.25         5         35           MMBZ5233BLT1G         8K         6.46         6.8         7.14         20         5         750         0.25         3         6           MMBZ5233BLT1G         8K         6.46         6.8         7.14         20         6         500         0.25         3         6.5           MMBZ5237BLT1G         8M         7.79         8.2         8.61         20         8         600         0.25         3         6.5           MMBZ5239BLT1G         8P         8.64         9.1         9.56         20         10         600         0.25         3         7           MMBZ5249BLT1G         8Q         9.50         10         15.50         20         22         600         0.25         0.1         9.1           MMBZ5249BLT1G         8T         12.35         13         13.66         9.5         13         600         0.25         0.1 <td< td=""><td>MMBZ5230BLT1G</td><td>8E</td><td>4.46</td><td>4.7</td><td>4.94</td><td>20</td><td>19</td><td>1900</td><td>0.25</td><td>5</td><td>2</td></td<>	MMBZ5230BLT1G	8E	4.46	4.7	4.94	20	19	1900	0.25	5	2
MMBZ52338LT1G         8H         5.70         6         6.30         20         7         1600         0.25         5         3.5           MMBZ52348LT1G/T3G         8J         5.89         6.2         6.51         20         7         1000         0.25         5         4           MMBZ5238BLT1G         8K         6.46         6.8         7.14         20         5         7.50         0.25         3         65           MMBZ5238BLT1G         8M         7.79         8.2         8.61         20         8         600         0.25         3         65           MMBZ5239BLT1G         8N         8.26         8.7         9.14         20         8         600         0.25         3         65           MMBZ5243BLT1G/T3G         8N         8.26         8.7         9.14         20         80         0.25         3         8           MMBZ5244BLT1G/T3G         8R         10.4         11         11.55         20         22         600         0.25         0.1         9.1           MMBZ5244BLT1G/T3G         8N         13.0         14         14.70         9         15         600         0.25         0.1         11	MMBZ5231BLT1G/T3G	8F	4.84	5.1	5.36	20	17	1600	0.25	5	2
MMBZ5234BLT1G/T3G         8J         5.89         6.2         6.51         20         7         1000         0.25         5         4           MMBZ5233BLT1G         8K         6.46         6.8         7.14         20         5         750         0.25         3         5           MMBZ5233BLT1G         8L         7.12         7.5         7.88         20         6         500         0.25         3         6.5           MMBZ5233BLT1G         8M         7.79         8.2         8.61         20         8         600         0.25         3         6.5           MMBZ5239BLT1G         8P         8.64         9.1         9.56         20         10         600         0.25         3         6.5           MMBZ5240BLT1G         8Q         9.50         10         10.55         20         22         600         0.25         1         9.1           MMBZ5243BLT1G         8U         13.30         14         14.70         9         15         600         0.25         0.1         10           MMBZ5248BLT1G         8W         15.20         16         16.80         7.8         17         600         0.25         0.1         <	MMBZ5232BLT1G/T3G	8G	5.32	5.6	5.88		11	1600	0.25	5	3
MMBZ5234BLTIG/T3G         8J         5.89         6.2         6.51         20         7         1000         0.25         5         4           MMBZ5233BLTIG         8K         6.46         6.8         7.14         20         5         750         0.25         3         5           MMBZ5233BLTIG         8L         7.79         8.2         8.61         20         6         500         0.25         3         65.           MMBZ5233BLTIG         8M         7.79         8.2         8.61         20         8         600         0.25         3         65.           MMBZ5239BLTIG         8P         8.64         9.1         9.56         20         10         600         0.25         3         67.           MMBZ5249BLTIG         8Q         9.50         10         10.50         20         127         600         0.25         3         8           MMBZ5249BLTIG         8R         11.40         12         12.60         20         30         600         0.25         0.1         10           MMBZ5248BLTIG         8U         13.30         14         14.70         9         15         600         0.25         0.1 <td< td=""><td>MMBZ5233BLT1G</td><td></td><td>5.70</td><td>6</td><td></td><td>20</td><td></td><td>1600</td><td>0.25</td><td>5</td><td>3.5</td></td<>	MMBZ5233BLT1G		5.70	6		20		1600	0.25	5	3.5
MMBZ52358LT1G         8K         6.46         6.8         7.14         20         5         750         0.25         3         5           MMBZ5238BLT1G         8L         7.12         7.5         7.88         20         6         500         0.25         3         65           MMBZ5238BLT1G         8M         7.79         8.2         8.61         20         8         600         0.25         3         65           MMBZ5239BLT1G         8P         8.64         9.1         9.56         20         10         600         0.25         3         7           MMBZ5249BLT1G         8P         8.64         9.1         155         20         22         600         0.25         1         9.1           MMBZ5244BLT1G/T3G         8R         11.40         12         12.60         20         30         600         0.25         0.1         10           MMBZ5243BLT1G         8U         13.30         14         14.70         9         15         600         0.25         0.1         11           MMBZ5243BLT1G         8V         15.20         16         16.80         7.8         17         600         0.25         0.1 <t< td=""><td>MMBZ5234BLT1G/T3G</td><td></td><td>5.89</td><td>6.2</td><td></td><td>20</td><td>7</td><td>1000</td><td>0.25</td><td>5</td><td>4</td></t<>	MMBZ5234BLT1G/T3G		5.89	6.2		20	7	1000	0.25	5	4
MMBZ5237BLT1G         8M         7.79         8.2         8.61         20         8         500         0.25         3         6.5           MMBZ5238BLT1G         8N         8.26         8.7         9.14         20         8         600         0.25         3         6.5           MMBZ5238BLT1G         8Q         9.50         10         10.50         20         17         600         0.25         3         8           MMBZ5240BLT1G/T3G         8R         10.4         11         11.55         20         22         600         0.25         2         8.4           MMBZ5241BLT1G/T3G         8R         11.40         12         12.60         20         30         600         0.25         0.5         9.9           MMBZ52448LT1G         8U         13.30         14         14.70         9         15         600         0.25         0.1         10           MMBZ5246BLT1G         8W         16.25         15         15.75         8.5         16         600         0.25         0.1         11           MMBZ5246BLT1G/T3G         8Y         17.10         18         18.90         7         21         600         0.25         0.1	MMBZ5235BLT1G		6.46	6.8		20				3	5
MMBZ5237BLT1G         8M         7.79         8.2         8.61         20         8         500         0.25         3         6.5           MMBZ5238BLT1G         8N         8.26         8.7         9.14         20         8         600         0.25         3         6.5           MMBZ5238BLT1G         8Q         9.50         10         10.50         20         17         600         0.25         3         8           MMBZ5240BLT1G/T3G         8R         10.4         11         11.55         20         22         600         0.25         2         8.4           MMBZ5241BLT1G/T3G         8R         11.40         12         12.60         20         30         600         0.25         0.5         9.9           MMBZ52448LT1G         8U         13.30         14         14.70         9         15         600         0.25         0.1         10           MMBZ5246BLT1G         8W         16.25         15         15.75         8.5         16         600         0.25         0.1         11           MMBZ5246BLT1G/T3G         8Y         17.10         18         18.90         7         21         600         0.25         0.1	MMBZ5236BLT1G	8L	7.12	7.5	7.88	20	6	500	0.25	3	6
MMBZ5238BLT1G         8N         8.26         8.7         9.14         20         8         600         0.25         3         6.5           MMBZ5239BLT1G         8P         8.64         9.1         9.56         20         10         600         0.25         3         7           MMBZ5240BLT1G         8Q         9.50         10         10.50         20         117         600         0.25         3         8           MMBZ5241BLT1G/T3G         8R         10.4         11         11.55         20         22         600         0.25         1         9.1           MMBZ5244BLT1G/T3G         8S         11.40         12         12.60         20         30         600         0.25         0.1         9.9           MMBZ5244BLT1G/T3G         8S         11.40         12         12.60         20         30         600         0.25         0.1         11           MMBZ5244BLT1G/T3G         8V         14.25         15         15.75         8.5         16         600         0.25         0.1         11           MMBZ524BLT1G/T3G         8V         16.15         17         17.85         7.4         19         600         0.25											6.5
MMBZ5239BLT1G         8P         8.64         9.1         9.56         20         10         600         0.25         3         7           MMBZ5240BLT1G         8Q         9.50         10         10.50         20         17         600         0.25         3         8           MMBZ524BLT1G/T3G         8R         10.4         11         11.55         20         22         600         0.25         1         9.1           MMBZ524BLT1G/T3G         8S         11.40         12         12.60         20         30         600         0.25         0.5         9.9           MMBZ5244BLT1G         8U         13.30         14         14.70         9         15         600         0.25         0.1         10           MMBZ5246BLT1G         8V         14.25         15         15.75         8.5         16         600         0.25         0.1         12           MMBZ5249BLT1G/T3G         8X         16.15         17         17.85         7.4         19         600         0.25         0.1         14           MMBZ5249BLT1G         8Z         18.05         19         19.95         6.6         23         600         0.25											
MMBZ5240BLT1G         8Q         9.50         10         10.50         20         17         600         0.25         3         8           MMBZ5241BLT1G/T3G         8R         10.4         11         11.55         20         22         600         0.25         2         8.4           MMBZ5242BLT1G/T3G         8S         11.40         12         12.60         20         30         600         0.25         1         9.1           MMBZ5244BLT1G         8U         13.30         14         14.70         9         15         600         0.25         0.1         10           MMBZ5244BLT1G         8U         13.30         14         14.70         9         15         600         0.25         0.1         10           MMBZ5244BLT1G         8W         16.15         17         17.85         7.4         19         600         0.25         0.1         13           MMBZ5249BLT1G/T3G         8Y         17.10         18         18.90         7         21         600         0.25         0.1         14           MMBZ5249BLT1G/T3G         8Y         17.10         18         18.90         7         21         600         0.25         <							10				
MBZ5241BLT1G/T3G         8R         10.4         11         11.55         20         22         600         0.25         2         8.4           MMBZ5242BLT1G/T3G         8S         11.40         12         12.60         20         30         600         0.25         1         9.1           MMBZ5244BLT1G         8T         12.35         13         13.65         9.5         13         600         0.25         0.1         10           MMBZ5244BLT1G         8U         14.25         15         15.75         8.5         16         600         0.25         0.1         11           MMBZ5244BLT1G/T3G         8W         15.20         16         16.80         7.8         17         600         0.25         0.1         12           MMBZ5244BLT1G/T3G         8Y         17.10         18         18.90         7         21         600         0.25         0.1         14           MMBZ5249BLT1G/T3G         8Y         17.10         18         18.90         7         21         600         0.25         0.1         14           MMBZ5250BLT1G/T3G         81A         19.00         20         21.00         6.2         25         600         0.											
MMBZ5242BLT1G/T3G         8S         11.40         12         12.60         20         30         600         0.25         1         9.1           MMBZ5243BLT1G         8T         12.35         13         13.65         9.5         13         600         0.25         0.5         9.9           MMBZ5244BLT1G         8U         13.30         14         14.70         9         15         600         0.25         0.1         10           MMBZ5245BLT1G         8V         14.25         15         15.75         8.5         16         600         0.25         0.1         11           MMBZ5246BLT1G/T3G         8W         15.20         16         16.80         7.8         17         600         0.25         0.1         13           MMBZ5246BLT1G/T3G         8Y         17.10         18         18.90         7         21         600         0.25         0.1         14           MMBZ5250BLT1G/T3G         81A         19.00         20         21.00         6.2         25         600         0.25         0.1         15           MMBZ5250BLT1G         81B         20.90         22         23.10         5.6         29         600         0.25	MMBZ5241BI T1G/T3G	8B	10.4	11		20	22	600	0.25	2	8.4
MMBZ5243BLT1G         8T         12.35         13         13.65         9.5         13         600         0.25         0.5         9.9           MMBZ5244BLT1G         8U         13.30         14         14.70         9         15         600         0.25         0.1         10           MMBZ5245BLT1G         8V         15.20         16         16.80         7.8         17         600         0.25         0.1         11           MMBZ5246BLT1G         8W         15.20         16         16.80         7.8         17         600         0.25         0.1         12           MMBZ5246BLT1G         8W         15.17         17.85         7.4         19         600         0.25         0.1         13           MMBZ5249BLT1G         8Z         18.05         19         19.95         6.6         23         600         0.25         0.1         14           MMBZ5250BLT1G         818         20.90         22         23.10         5.6         29         600         0.25         0.1         17           MMBZ5250BLT1G         81B         20.90         22         23.10         5.6         29         600         0.25         0.1	,										
MMBZ5244BLT1G         8U         13.30         14         14.70         9         15         600         0.25         0.1         10           MMBZ5244BLT1G         8V         14.25         15         15.75         8.5         16         600         0.25         0.1         11           MMBZ5244BLT1G         8W         15.20         16         16.80         7.8         17         600         0.25         0.1         12           MMBZ5247BLT1G/T3G         8X         16.15         17         17.85         7.4         19         600         0.25         0.1         14           MMBZ5249BLT1G/T3G         8Y         17.10         18         18.90         7         21         600         0.25         0.1         14           MMBZ5249BLT1G         81B         20.90         22         23.10         5.6         29         600         0.25         0.1         17           MMBZ5253BLT1G         81D         23.75         25         26.25         5         33         600         0.25         0.1         21           MMBZ5254BLT1G         81F         26.60         28         29.40         4.5         44         600         0.25											
MMBZ5245BLT1G         8V         14.25         15         15.75         8.5         16         600         0.25         0.1         11           MMBZ5246BLT1G         8W         15.20         16         16.80         7.8         17         600         0.25         0.1         12           MMBZ5247BLT1G/T3G         8X         16.15         17         17.85         7.4         19         600         0.25         0.1         13           MMBZ5248BLT1G/T3G         8Y         17.10         18         18.90         7         21         600         0.25         0.1         14           MMBZ5249BLT1G         81A         19.00         20         21.00         6.2         25         600         0.25         0.1         17           MMBZ525BLT1G         81B         20.90         22         23.10         5.6         29         600         0.25         0.1         17           MMBZ525BLT1G         81C         22.80         24         25.20         5.2         33         600         0.25         0.1         18           MMBZ525BLT1G         81E         25.65         27         28.35         4.6         41         600         0.25											
MMBZ5247BLT1G/T3G8X16.151717.857.4196000.250.113MMBZ5248BLT1G/T3G8Y17.101818.907216000.250.114MMBZ5249BLT1G8Z18.051919.956.6236000.250.114MMBZ5250BLT1G/T3G81A19.002021.006.2256000.250.115MMBZ5251BLT1G81B20.902223.105.6296000.250.117MMBZ5252BLT1G81C22.802425.205.2336000.250.118MMBZ5254BLT1G81E25.652728.354.6416000.250.121MMBZ5256BLT1G81F26.602829.404.5446000.250.121MMBZ5256BLT1G81G28.503031.504.2496000.250.123MMBZ5256BLT1G81H31.353334.653.8587000.250.125MMBZ5256BLT1G81H31.353334.653.8587000.250.127MMBZ5258BLT1G81H31.353334.653.8587000.250.127MMBZ5258BLT1G81H43.203637.803.4707000.250.130MMBZ5264BLT1G81H											
MMBZ5247BLT1G/T3G8X16.151717.857.4196000.250.113MMBZ5248BLT1G/T3G8Y17.101818.907216000.250.114MMBZ5249BLT1G8Z18.051919.956.6236000.250.114MMBZ5250BLT1G/T3G81A19.002021.006.2256000.250.115MMBZ5251BLT1G81B20.902223.105.6296000.250.117MMBZ5252BLT1G81C22.802425.205.2336000.250.118MMBZ5253BLT1G81E25.652728.554.6416000.250.121MMBZ5254BLT1G81F26.602829.404.5446000.250.121MMBZ5256BLT1G81G28.503031.504.2496000.250.123MMBZ5256BLT1G81H31.353334.653.8587000.250.125MMBZ5256BLT1G81H31.353334.653.8587000.250.127MMBZ5259BLT1G81H31.353334.653.8587000.250.127MMBZ5259BLT1G81H31.353334.653.2808000.250.130MMBZ5259BLT1G81H	MMBZ5246BLT1G	8W	15.20	16	16.80	7.8	17	600	0.25	0.1	12
MMBZ5248BLT1G/T3G         8Y         17.10         18         18.90         7         21         600         0.25         0.1         14           MMBZ5249BLT1G         8Z         18.05         19         19.95         6.6         23         600         0.25         0.1         14           MMBZ5250BLT1G/T3G         81A         19.00         20         21.00         6.2         25         600         0.25         0.1         15           MMBZ5251BLT1G         81B         20.90         22         23.10         5.6         29         600         0.25         0.1         17           MMBZ5252BLT1G         81C         22.80         24         25.20         5.2         33         600         0.25         0.1         18           MMBZ5253BLT1G         81D         23.75         25         26.25         5         35         600         0.25         0.1         21           MMBZ5255BLT1G         81F         26.60         28         29.40         4.5         44         600         0.25         0.1         23           MMBZ5255BLT1G         81H         31.35         33         34.65         3.8         58         700         0.25 <td></td>											
MMBZ5249BLT1G MMBZ5250BLT1G/T3G8Z18.051919.956.6. 21.00236000.250.114MMBZ5250BLT1G/T3G81A19.002021.006.2256000.250.115MMBZ5251BLT1G81B20.902223.105.6296000.250.117MMBZ5252BLT1G81C22.802425.205.2336000.250.118MMBZ5253BLT1G81D23.752526.255356000.250.121MMBZ5254BLT1G81E25.652728.354.6416000.250.121MMBZ5256BLT1G81F26.602829.404.5446000.250.121MMBZ5256BLT1G81G28.503031.504.2496000.250.123MMBZ5256BLT1G81H31.353334.653.8587000.250.127MMBZ5259BLT1G81K37.053940.953.2808000.250.127MMBZ5260BLT1G81L40.854345.153939000.250.133MMBZ5263BLT1G81N44.654749.352.710510000.250.139MMBZ5263BLT1G81N44.654749.352.512511000.250.139MMBZ5											
MMBZ5250BLT1G/T3G81A19.002021.006.2256000.250.115MMBZ5251BLT1G81B20.902223.105.6296000.250.117MMBZ5252BLT1G81C22.802425.205.2336000.250.118MMBZ5253BLT1G81D23.752526.255356000.250.119MMBZ5254BLT1G81E25.652728.354.6416000.250.121MMBZ5255BLT1G81F26.602829.404.5446000.250.121MMBZ5256BLT1G81G28.503031.504.2496000.250.123MMBZ5257BLT1G/T3G81H31.353334.653.8587000.250.125MMBZ5259BLT1G81L31.353334.653.8587000.250.127MMBZ5259BLT1G81L40.854345.153939000.250.130MMBZ5260BLT1G81N44.654749.352.710510000.250.139MMBZ5263BLT1G81N44.654749.352.512511000.250.139MMBZ5263BLT1G81N44.654749.352.512511000.250.139MMBZ5263BLT1G81N<											
MMBZ5252BLT1G81C22.802425.205.2336000.250.118MMBZ5253BLT1G81D23.752526.255356000.250.119MMBZ5254BLT1G81E25.652728.354.6416000.250.121MMBZ5255BLT1G81F26.602829.404.5446000.250.121MMBZ5256BLT1G81G28.503031.504.2496000.250.123MMBZ5257BLT1G/T3G81H31.353334.653.8587000.250.125MMBZ5259BLT1G81J34.203637.803.4707000.250.127MMBZ5260BLT1G81K37.053940.953.2808000.250.130MMBZ5260BLT1G81L40.854749.352.710510000.250.133MMBZ5263BLT1G81N48.455153.552.512511000.250.139MMBZ5263BLT1G81P53.205658.802.215013000.250.144MMBZ5266BLT1G81R58.906265.10215514000.250.143MMBZ5266BLT1G81R58.906265.10218514000.250.147MMBZ5266BLT1G81R <td< td=""><td></td><td></td><td></td><td>20</td><td></td><td></td><td></td><td></td><td></td><td></td><td>15</td></td<>				20							15
MMBZ5252BLT1G81C22.802425.205.2336000.250.118MMBZ5253BLT1G81D23.752526.255356000.250.119MMBZ5254BLT1G81E25.652728.354.6416000.250.121MMBZ5255BLT1G81F26.602829.404.5446000.250.121MMBZ5256BLT1G81G28.503031.504.2496000.250.123MMBZ5257BLT1G/T3G81H31.353334.653.8587000.250.125MMBZ5259BLT1G81J34.203637.803.4707000.250.127MMBZ5260BLT1G81K37.053940.953.2808000.250.130MMBZ5260BLT1G81L40.854749.352.710510000.250.133MMBZ5263BLT1G81N48.455153.552.512511000.250.139MMBZ5263BLT1G81P53.205658.802.215013000.250.144MMBZ5266BLT1G81R58.906265.10215514000.250.143MMBZ5266BLT1G81R58.906265.10218514000.250.147MMBZ5266BLT1G81R <td< td=""><td>MMBZ5251BLT1G</td><td>81B</td><td>20.90</td><td>22</td><td></td><td>56</td><td>29</td><td>600</td><td>0.25</td><td>0.1</td><td>17</td></td<>	MMBZ5251BLT1G	81B	20.90	22		56	29	600	0.25	0.1	17
MMBZ5253BLT1G81D23.752526.255356000.250.119MMBZ5254BLT1G81E25.652728.354.6416000.250.121MMBZ5255BLT1G81F26.602829.404.5446000.250.121MMBZ5256BLT1G81G28.503031.504.2496000.250.123MMBZ5257BLT1G/T3G81H31.353334.653.8587000.250.125MMBZ5258BLT1G81J34.203637.803.4707000.250.127MMBZ5259BLT1G81K37.053940.953.2808000.250.130MMBZ5260BLT1G81L40.854345.153939000.250.133MMBZ5261BLT1G/T3G81M44.654749.352.710510000.250.136MMBZ5263BLT1G81N48.455153.552.512511000.250.139MMBZ5263BLT1G81P53.205658.802.215013000.250.143MMBZ5264BLT1G81R58.906265.10218514000.250.146MMBZ5266BLT1G81R58.906265.10218514000.250.147MMBZ5266BLT1G81R<											
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MMBZ5263BLT1G         81P         53.20         56         58.80         2.2         150         1300         0.25         0.1         43           MMBZ5264BLT1G         81Q         57.00         60         63.00         2.1         170         1400         0.25         0.1         46           MMBZ5265BLT1G         81R         58.90         62         65.10         2         185         1400         0.25         0.1         47           MMBZ5266BLT1G         81S         64.60         68         71.40         1.8         230         1600         0.25         0.1         42           MMBZ5267BLT1G         81T         71.25         75         78.75         1.7         270         1700         0.25         0.1         52	,										
MMBZ5264BLT1G         81Q         57.00         60         63.00         2.1         170         1400         0.25         0.1         46           MMBZ5265BLT1G         81R         58.90         62         65.10         2         185         1400         0.25         0.1         47           MMBZ5266BLT1G         81S         64.60         68         71.40         1.8         230         1600         0.25         0.1         52           MMBZ5267BLT1G         81T         71.25         75         78.75         1.7         270         1700         0.25         0.1         56											
MMBZ5266BLT1G         81R         58.90         62         65.10         2         185         1400         0.25         0.1         47           MMBZ5266BLT1G         81S         64.60         68         71.40         1.8         230         1600         0.25         0.1         52           MMBZ5267BLT1G         81T         71.25         75         78.75         1.7         270         1700         0.25         0.1         56											
MMBZ5266BLT1G         81S         64.60         68         71.40         1.8         230         1600         0.25         0.1         52           MMBZ5267BLT1G         81T         71.25         75         78.75         1.7         270         1700         0.25         0.1         56											
MMBZ5267BLT1G         81T         71.25         75         78.75         1.7         270         1700         0.25         0.1         56											
MMBZ5270BLT1G 81W 86.45 91 95.55 1.4 400 2300 0.25 0.1 69											

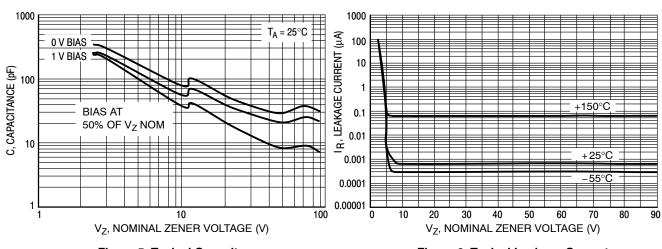
Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.
Zener voltage is measured with a pulse test current I<sub>Z</sub> at an ambient temperature of 25°C

NOTE: MMBZ5233BLT1G, MMBZ5246BLT1G, MMBZ5251BLT1G, and MMBZ5252BLT1G Not Available in 10,000/Tape & Reel. \*Include SZ-prefix devices where applicable.



**TYPICAL CHARACTERISTICS** 

Figure 3. Effect of Zener Voltage on **Zener Impedance** 



## **TYPICAL CHARACTERISTICS**

Figure 5. Typical Capacitance

Figure 6. Typical Leakage Current

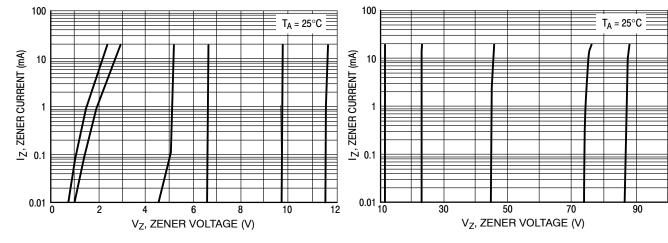


Figure 7. Zener Voltage versus Zener Current (V<sub>Z</sub> Up to 12 V)

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

#### MECHANICAL CASE OUTLINE PACKAGE DIMENSIONS

D

3

TOP VIEW

SIDE VIEW

Нe

DETAIL A

-3X b

# onsemi



SCALE 4:1

A\_\_\_\_ ' A1SOT-23 (TO-236) CASE 318 ISSUE AT

0.25

-L1

DETAIL A

END VIEW

DATE 01 MAR 2023

NDTES

- 1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M,1994.
- 2. CONTROLLING DIMENSION: MILLIMETERS
- 3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF THE BASE MATERIAL.
- 4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

	MILLIM	IETERS		INCHES		
DIM	MIN.	NDM.	MAX.	MIN.	NDM.	MAX.
Α	0.89	1.00	1.11	0.035	0.039	0.044
A1	0.01	0.06	0.10	0.000	0.002	0.004
b	0.37	0.44	0.50	0.015	0.017	0.020
с	0.08	0.14	0.20	0.003	0.006	0.008
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	0.080
L	0.30	0.43	0.55	0.012	0.017	0.022
L1	0.35	0.54	0.69	0.014	0.021	0.027
Η <sub>E</sub>	2.10	2.40	2.64	0.083	0.094	0.104
Т	0*		10*	0*		10*



RECOMMENDED MOUNTING FOOTPRINT

\* For additional information on our Pb-Free strategy and soldering details, please download the DN Semiconductor Soldering and Mounting Techniques Reference Manual, SDLDERRM/D.

# GENERIC MARKING DIAGRAM\*



XXX = Specific Device Code

M = Date Code

= Pb–Free Package

\*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "•", may or may not be present. Some products may not follow the Generic Marking.

# **STYLES ON PAGE 2**

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# MECHANICAL CASE OUTLINE

PACKAGE DIMENSIONS

# onsemi

#### SOT-23 (TO-236) CASE 318 ISSUE AT

#### DATE 01 MAR 2023

STYLE 1 THRU 5: CANCELLED	STYLE 6: PIN 1. BASE 2. EMITTER 3. COLLECTOR	STYLE 7: PIN 1. EMITTER 2. BASE 3. COLLECTOR	STYLE 8: PIN 1. ANODE 2. NO CONNECTION 3. CATHODE		
STYLE 9:	STYLE 10:	STYLE 11:	STYLE 12:	STYLE 13:	STYLE 14:
PIN 1. ANODE	PIN 1. DRAIN	PIN 1. ANODE	PIN 1. CATHODE	PIN 1. SOURCE	PIN 1. CATHODE
2. ANODE	2. SOURCE	2. CATHODE	2. CATHODE	2. DRAIN	2. GATE
3. CATHODE	3. GATE	3. CATHODE-ANODE	3. ANODE	3. GATE	3. ANODE
STYLE 15:	STYLE 16:	STYLE 17:	STYLE 18:	STYLE 19:	STYLE 20:
PIN 1. GATE	PIN 1. ANODE	PIN 1. NO CONNECTION	PIN 1. NO CONNECTION	PIN 1. CATHODE	PIN 1. CATHODE
2. CATHODE	2. CATHODE	2. ANODE	2. CATHODE	2. ANODE	2. ANODE
3. ANODE	3. CATHODE	3. CATHODE	3. ANODE	3. CATHODE-ANODE	3. GATE
STYLE 21:	STYLE 22:	STYLE 23:	STYLE 24:	STYLE 25:	STYLE 26:
PIN 1. GATE	PIN 1. RETURN	PIN 1. ANODE	PIN 1. GATE	PIN 1. ANODE	PIN 1. CATHODE
2. SOURCE	2. OUTPUT	2. ANODE	2. DRAIN	2. CATHODE	2. ANODE
3. DRAIN	3. INPUT	3. CATHODE	3. SOURCE	3. GATE	3. NO CONNECTION
STYLE 27: PIN 1. CATHODE 2. CATHODE 3. CATHODE	STYLE 28: PIN 1. ANODE 2. ANODE 3. ANODE				

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