

# 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  $\mu$ s)
- AEC-Q101 Qualified and PPAP Capable
- SZ Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements
- 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 $\mu$ s (Note 1)<br>@ $T_L \leq 25^\circ\text{C}$                                            | $P_{pk}$        | 225            | W                          |
| Total Power Dissipation on FR-5 Board,<br>(Note 2) @ $T_A = 25^\circ\text{C}$<br>Derated above $25^\circ\text{C}$        | $P_D$           | 225<br>1.8     | mW<br>mW/ $^\circ\text{C}$ |
| Thermal Resistance, Junction-to-Ambient                                                                                  | $R_{\theta JA}$ | 556            | $^\circ\text{C}/\text{W}$  |
| Total Power Dissipation on Alumina<br>Substrate, (Note 3) @ $T_A = 25^\circ\text{C}$<br>Derated above $25^\circ\text{C}$ | $P_D$           | 300<br>2.4     | mW<br>mW/ $^\circ\text{C}$ |
| Thermal Resistance, Junction-to-Ambient                                                                                  | $R_{\theta JA}$ | 417            | $^\circ\text{C}/\text{W}$  |
| Junction and Storage Temperature Range                                                                                   | $T_J, T_{stg}$  | -65 to<br>+150 | $^\circ\text{C}$           |

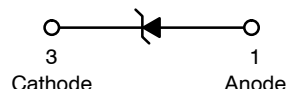
Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

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.

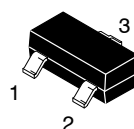


**ON Semiconductor®**

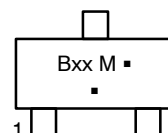
<http://onsemi.com>



#### 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<br>(Pb-Free) | 3000 / Tape & Reel  |
| SZMMBZ52xxELT1G | SOT-23<br>(Pb-Free) | 3000 / Tape & Reel  |
| MMBZ52xxELT3G   | SOT-23<br>(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

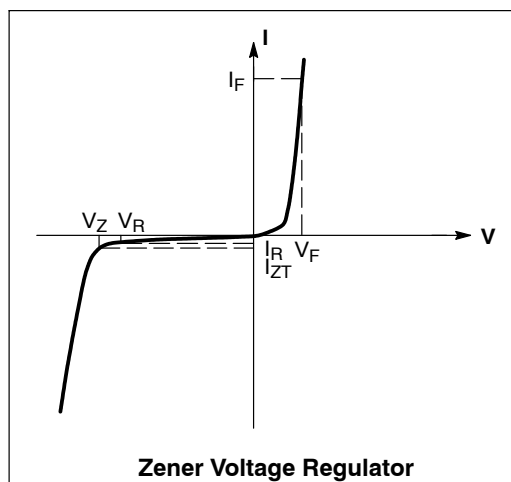
See specific marking information in the device marking column of the Electrical Characteristics table on page 2 of this data sheet.

## MMBZ52xxELT1G Series, SZMMBZ52xxELT1G 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 @ $I_F$            |



### 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 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   |            |                     |                     |      |                 |     |
| 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  |

4. Zener voltage is measured with a pulse test current  $I_Z$  at an ambient temperature of  $25^\circ\text{C}$ .

\*Includes SZ-prefix devices where applicable.

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

## MMBZ52xxELT1G Series, SZMMBZ52xxELT1G Series

**ELECTRICAL CHARACTERISTICS** (continued) (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 5) |     |       |                   | Zener Impedance                   |                                   |      | Leakage Current                 |    |
|------------------|----------------|------------------------|-----|-------|-------------------|-----------------------------------|-----------------------------------|------|---------------------------------|----|
|                  |                | V <sub>Z</sub> (V)     |     |       | @ I <sub>ZT</sub> | Z <sub>YT</sub> @ I <sub>ZT</sub> | Z <sub>ZK</sub> @ I <sub>ZK</sub> |      | I <sub>R</sub> @ V <sub>R</sub> |    |
|                  |                | 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.

# MMBZ52xxELT1G Series, SZMMBZ52xxELT1G Series

## TYPICAL CHARACTERISTICS

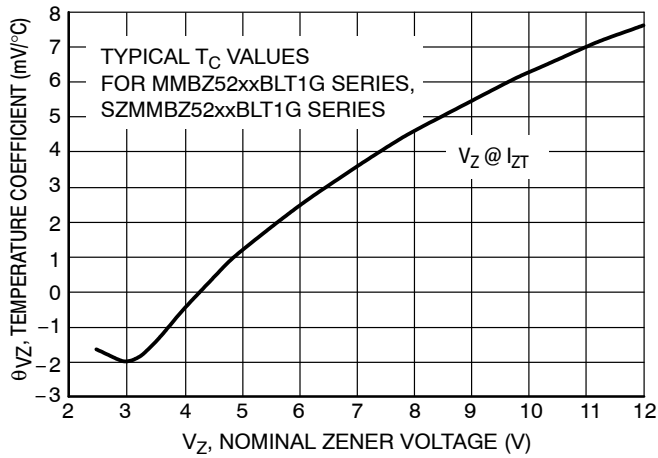


**Figure 1. Temperature Coefficients**  
(Temperature Range -55°C to +150°C)

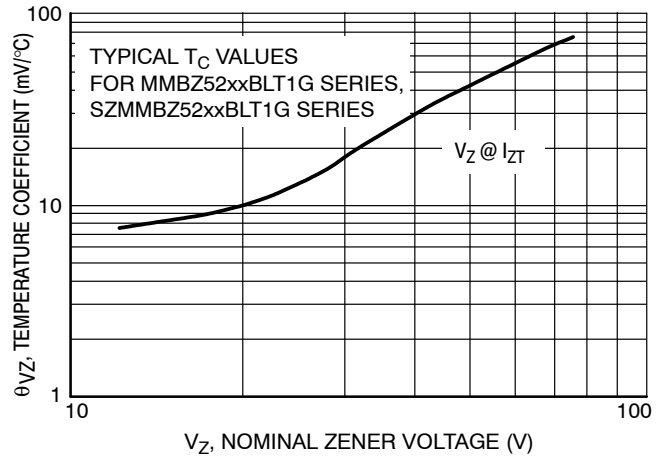


**Figure 2. Temperature Coefficients**  
(Temperature Range -55°C to +150°C)

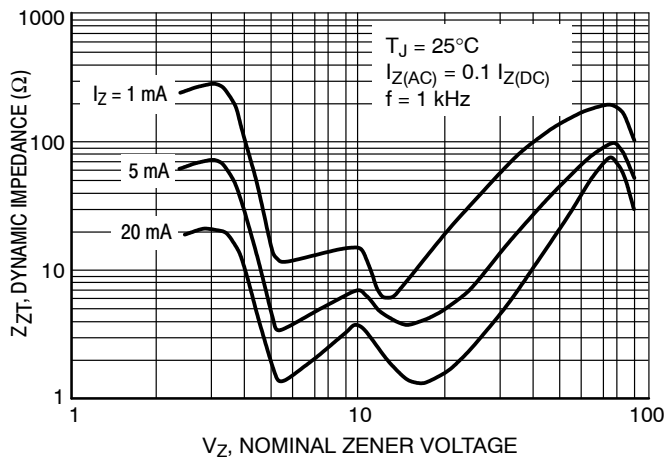


**Figure 3. Effect of Zener Voltage on Zener Impedance**

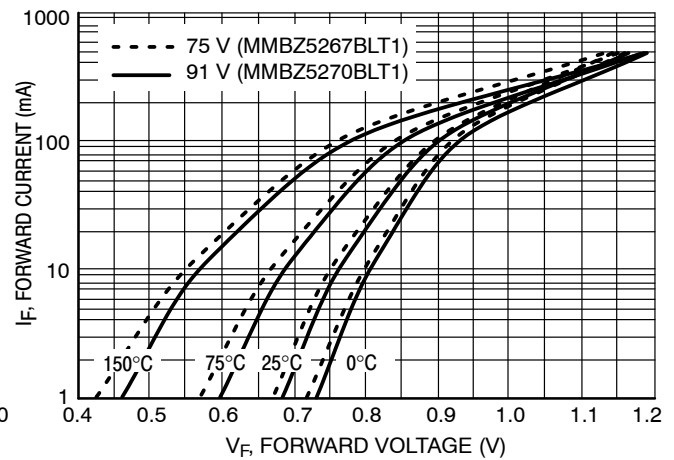


**Figure 4. Typical Forward Voltage**

# MMBZ52xxELT1G Series, SZMMBZ52xxELT1G Series

## TYPICAL CHARACTERISTICS

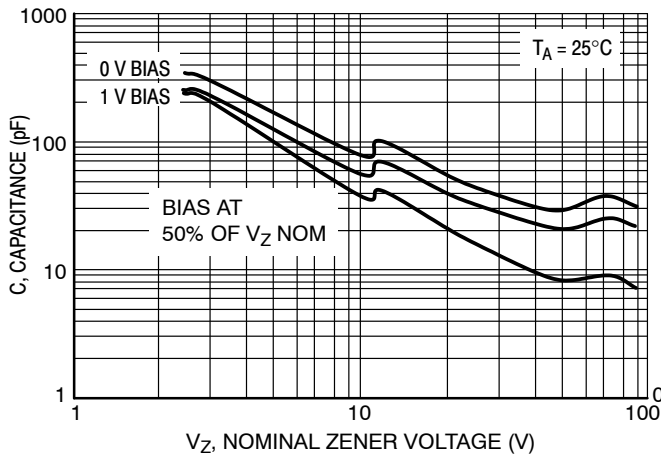


Figure 5. Typical Capacitance

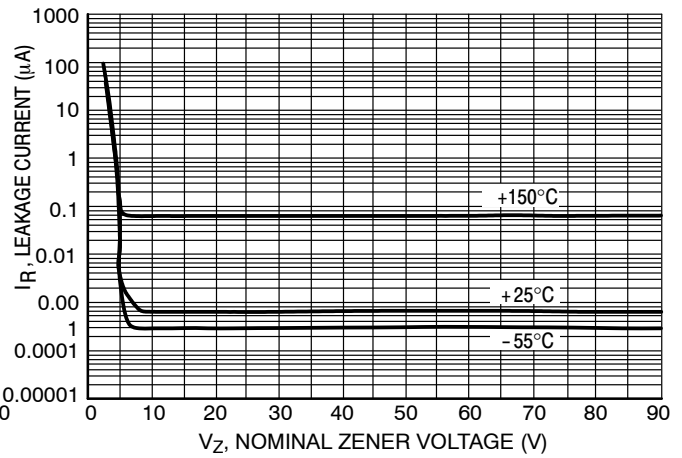


Figure 6. Typical Leakage Current

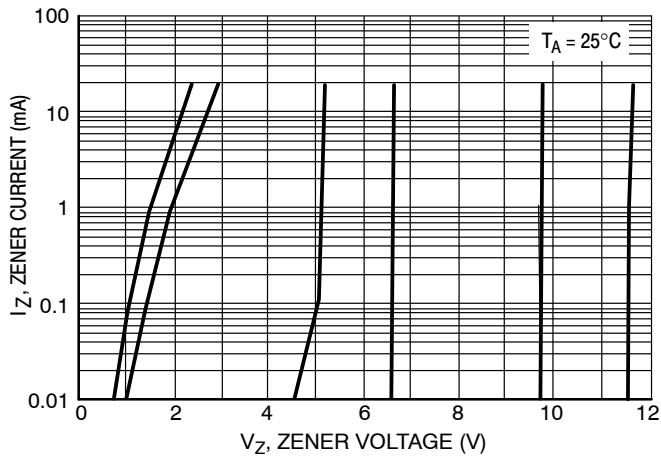


Figure 7. Zener Voltage versus Zener Current ( $V_Z$  Up to 12 V)

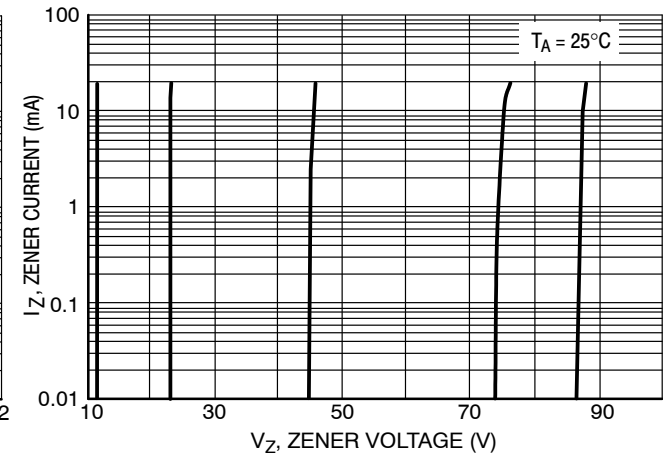


Figure 8. Zener Voltage versus Zener Current (12 V to 91 V)

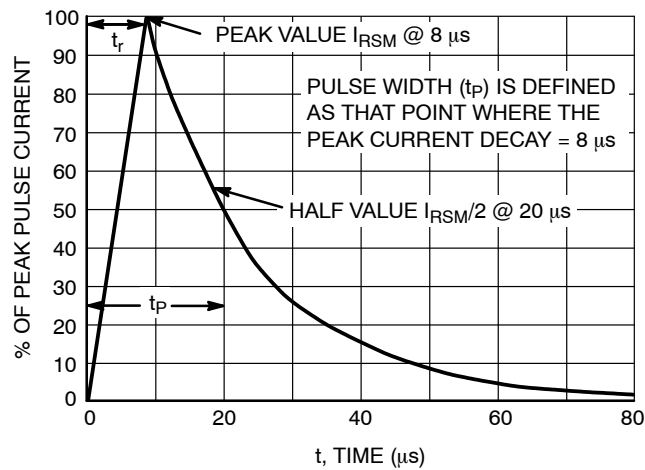


Figure 9.  $8 \times 20 \mu\text{s}$  Pulse Waveform

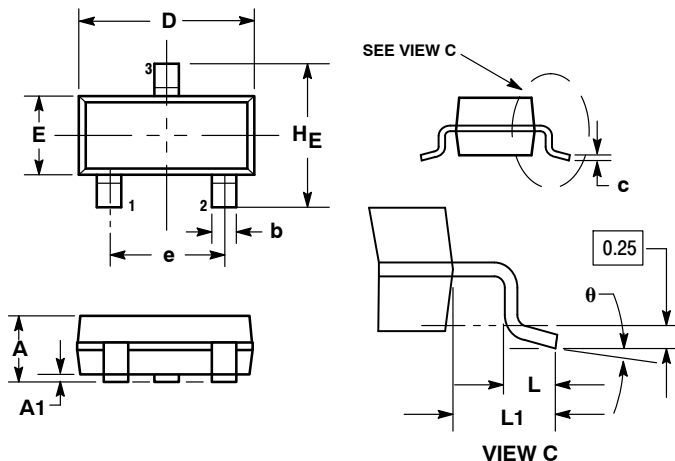
# MMBZ52xxELT1G Series, SZMMBZ52xxELT1G Series

## PACKAGE DIMENSIONS

### SOT-23 (TO-236)

CASE 318-08

ISSUE AP



#### NOTES:

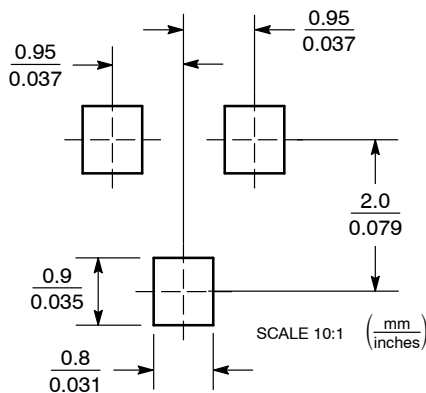
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

| 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 |
| θ   | 0°          | ---  | 10°  | 0°     | ---   | 10°   |

#### STYLE 8:

- PIN 1: ANODE
- NO CONNECTION
- CATHODE

### SOLDERING FOOTPRINT\*



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

ON Semiconductor and  are registered trademarks of Semiconductor Components Industries, LLC (SCILLC). SCILLC reserves the right to make changes without further notice to any products herein. SCILLC makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does SCILLC assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. "Typical" parameters which may be provided in SCILLC data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. SCILLC does not convey any license under its patent rights nor the rights of others. SCILLC products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the SCILLC product could create a situation where personal injury or death may occur. Should Buyer purchase or use SCILLC products for any such unintended or unauthorized application, Buyer shall indemnify and hold SCILLC and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that SCILLC was negligent regarding the design or manufacture of the part. SCILLC is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

## PUBLICATION ORDERING INFORMATION

### LITERATURE FULFILLMENT:

Literature Distribution Center for ON Semiconductor  
P.O. Box 5163, Denver, Colorado 80217 USA  
Phone: 303-675-2175 or 800-344-3860 Toll Free USA/Canada  
Fax: 303-675-2176 or 800-344-3867 Toll Free USA/Canada  
Email: [orderlit@onsemi.com](mailto:orderlit@onsemi.com)

N. American Technical Support: 800-282-9855 Toll Free  
USA/Canada

Europe, Middle East and Africa Technical Support:  
Phone: 421 33 790 2910

Japan Customer Focus Center  
Phone: 81-3-5817-1050

ON Semiconductor Website: [www.onsemi.com](http://www.onsemi.com)

Order Literature: <http://www.onsemi.com/orderlit>

For additional information, please contact your local  
Sales Representative

## Данный компонент на территории Российской Федерации

**Вы можете приобрести в компании MosChip.**

Для оперативного оформления запроса Вам необходимо перейти по данной ссылке:

<http://moschip.ru/get-element>

Вы можете разместить у нас заказ для любого Вашего проекта, будь то серийное производство или разработка единичного прибора.

В нашем ассортименте представлены ведущие мировые производители активных и пассивных электронных компонентов.

Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

Сотрудничество с глобальными дистрибьюторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

На всех этапах разработки и производства наши партнеры могут получить квалифицированную поддержку опытных инженеров.

Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

### Офис по работе с юридическими лицами:

105318, г.Москва, ул.Щербаковская д.3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: [info@moschip.ru](mailto:info@moschip.ru)

Skype отдела продаж:

moschip.ru

moschip.ru\_4

moschip.ru\_6

moschip.ru\_9