

### ■ Features

- Wide zener reverse voltage range 2.40V to 91V.
- ESD rating of class 3(>16KV) per human body model.
- Small package size for high density applications.
- Suffix "G" indicates Halogen-free part, ex.MMBZ5221BG.
- Lead-free parts meet environmental standards of MIL-STD-19500 /228

### ■ Mechanical data

- Epoxy:UL94-V0 rated flame retardant
- Case : Molded plastic, SOT-23
- Terminals : Solder plated, solderable per MIL-STD-750, Method 2026
- Mounting Position : Any
- Weight : Approximated 0.008 gram

### ■ Maximum ratings and electrical characteristics

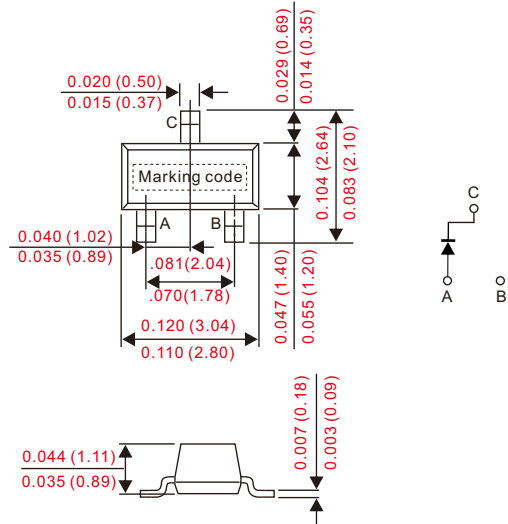
Rating at 25°C ambient temperature unless otherwise specified. Single phase, half wave, 60Hz, resistive or inductive load. For capacitive load, derate current by 20%.

| Parameter                      | Conditions                                      | Symbol           | MIN. | TYP. | MAX. | UNIT  |
|--------------------------------|---|------------------|------|------|------|-------|
| Total power dissipation        | on FR-5 board, (1)@T <sub>A</sub> = 25°C        | P <sub>D</sub>   |      |      | 225  | mW    |
|                                | Derated above 25°C                              |                  |      |      | 1.8  | mW/°C |
| Thermal resistance             | junction to ambient air                         | R <sub>θJA</sub> |      |      | 556  | °C/W  |
| Total power dissipation        | on alumina substrate, (2)@T <sub>A</sub> = 25°C | P <sub>D</sub>   |      |      | 300  | mW    |
|                                | Derated above 25°C                              |                  |      |      | 2.4  | mW/°C |
| Thermal resistance             | junction to ambient air                         | R <sub>θJA</sub> |      |      | 417  | °C/W  |
| Operating Junction temperature |   | T <sub>J</sub>   | -55  |      | +150 | °C    |
| Storage temperature            |   | T <sub>STG</sub> | -55  |      | +150 | °C    |

Note : 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

### ■ Outline

SOT-23



■ Electrical characteristics

| Part No.  | Marking code | Zener voltage                            |      |       | Zener impedance |                                   |                                   |                 | Leakage current |                |
|-----------|--------------|--|------|-------|-----------------|-----------------------------------|-----------------------------------|-----------------|-----------------|----------------|
|           |              | V <sub>Z</sub> @ I <sub>ZT</sub> (Volts) |      |       | I <sub>ZT</sub> | Z <sub>ZT</sub> @ I <sub>ZT</sub> | Z <sub>ZK</sub> @ I <sub>ZK</sub> | I <sub>ZK</sub> | I <sub>R</sub>  | V <sub>R</sub> |
|           |              | Min.                                     | Nom. | Max.  | mA              | OHMs                              | OHMs                              | mA              | uA              | Volts          |
| MMBZ5221B | 18A          | 2.28                                     | 2.4  | 2.52  | 20.0            | 30                                | 1200                              | 0.25            | 100             | 1.0            |
| MMBZ5222B | 18B          | 2.37                                     | 2.5  | 2.63  | 20.0            | 30                                | 1250                              | 0.25            | 100             | 1.0            |
| MMBZ5223B | 18C          | 2.56                                     | 2.7  | 2.84  | 20.0            | 30                                | 1300                              | 0.25            | 75              | 1.0            |
| MMBZ5224B | 18D          | 2.66                                     | 2.8  | 2.94  | 20.0            | 30                                | 1400                              | 0.25            | 75              | 1.0            |
| MMBZ5225B | 18E          | 2.85                                     | 3.0  | 3.15  | 20.0            | 29                                | 1600                              | 0.25            | 50              | 1.0            |
| MMBZ5226B | 8A           | 3.13                                     | 3.3  | 3.47  | 20.0            | 28                                | 1600                              | 0.25            | 25              | 1.0            |
| MMBZ5227B | 8B           | 3.42                                     | 3.6  | 3.78  | 20.0            | 24                                | 1700                              | 0.25            | 15              | 1.0            |
| MMBZ5228B | 8C           | 3.70                                     | 3.9  | 4.10  | 20.0            | 23                                | 1900                              | 0.25            | 10              | 1.0            |
| MMBZ5229B | 8D           | 4.08                                     | 4.3  | 4.52  | 20.0            | 22                                | 2000                              | 0.25            | 5.0             | 1.0            |
| MMBZ5230B | 8E           | 4.46                                     | 4.7  | 4.94  | 20.0            | 19                                | 1900                              | 0.25            | 5.0             | 2.0            |
| MMBZ5231B | 8F           | 4.84                                     | 5.1  | 5.36  | 20.0            | 17                                | 1600                              | 0.25            | 5.0             | 2.0            |
| MMBZ5232B | 8G           | 5.32                                     | 5.6  | 5.88  | 20.0            | 11                                | 1600                              | 0.25            | 5.0             | 3.0            |
| MMBZ5233B | 8H           | 5.70                                     | 6.0  | 6.30  | 20.0            | 7                                 | 1600                              | 0.25            | 5.0             | 3.5            |
| MMBZ5234B | 8J           | 5.89                                     | 6.2  | 6.51  | 20.0            | 7                                 | 1000                              | 0.25            | 5.0             | 4.0            |
| MMBZ5235B | 8K           | 6.46                                     | 6.8  | 7.14  | 20.0            | 5                                 | 750                               | 0.25            | 3.0             | 5.0            |
| MMBZ5236B | 8L           | 7.12                                     | 7.5  | 7.88  | 20.0            | 6                                 | 500                               | 0.25            | 3.0             | 6.0            |
| MMBZ5237B | 8M           | 7.79                                     | 8.2  | 8.61  | 20.0            | 8                                 | 500                               | 0.25            | 3.0             | 6.5            |
| MMBZ5238B | 8N           | 8.26                                     | 8.7  | 9.14  | 20.0            | 8                                 | 600                               | 0.25            | 3.0             | 6.5            |
| MMBZ5239B | 8P           | 8.64                                     | 9.1  | 9.56  | 20.0            | 10                                | 600                               | 0.25            | 3.0             | 7.0            |
| MMBZ5240B | 8Q           | 9.50                                     | 10   | 10.50 | 20.0            | 17                                | 600                               | 0.25            | 3.0             | 8.0            |
| MMBZ5241B | 8R           | 10.40                                    | 11   | 11.55 | 20.0            | 22                                | 600                               | 0.25            | 2.0             | 8.4            |
| MMBZ5242B | 8S           | 11.40                                    | 12   | 12.60 | 20.0            | 30                                | 600                               | 0.25            | 1.0             | 9.1            |
| MMBZ5243B | 8T           | 12.35                                    | 13   | 13.65 | 9.5             | 13                                | 600                               | 0.25            | 0.5             | 9.9            |
| MMBZ5244B | 8U           | 13.30                                    | 14   | 14.70 | 9.0             | 15                                | 600                               | 0.25            | 0.1             | 10.0           |
| MMBZ5245B | 8V           | 14.25                                    | 15   | 15.75 | 8.5             | 16                                | 600                               | 0.25            | 0.1             | 11.0           |
| MMBZ5246B | 8W           | 15.20                                    | 16   | 16.80 | 7.8             | 17                                | 600                               | 0.25            | 0.1             | 12.0           |
| MMBZ5247B | 8X           | 16.15                                    | 17   | 17.85 | 7.4             | 19                                | 600                               | 0.25            | 0.1             | 13.0           |
| MMBZ5248B | 8Y           | 17.10                                    | 18   | 18.90 | 7.0             | 21                                | 600                               | 0.25            | 0.1             | 14.0           |
| MMBZ5249B | 8Z           | 18.05                                    | 19   | 19.95 | 6.6             | 23                                | 600                               | 0.25            | 0.1             | 14.0           |
| MMBZ5250B | 81A          | 19.00                                    | 20   | 21.00 | 6.2             | 25                                | 600                               | 0.25            | 0.1             | 15.0           |
| MMBZ5251B | 81B          | 20.90                                    | 22   | 23.10 | 5.6             | 29                                | 600                               | 0.25            | 0.1             | 17.0           |
| MMBZ5252B | 81C          | 22.80                                    | 24   | 25.20 | 5.2             | 33                                | 600                               | 0.25            | 0.1             | 18.0           |
| MMBZ5253B | 81D          | 23.75                                    | 25   | 26.25 | 5.0             | 35                                | 600                               | 0.25            | 0.1             | 19.0           |
| MMBZ5254B | 81E          | 25.65                                    | 27   | 28.35 | 4.6             | 41                                | 600                               | 0.25            | 0.1             | 21.0           |
| MMBZ5255B | 81F          | 26.60                                    | 28   | 29.40 | 4.5             | 44                                | 600                               | 0.25            | 0.1             | 21.0           |
| MMBZ5256B | 81G          | 28.50                                    | 30   | 31.50 | 4.2             | 49                                | 600                               | 0.25            | 0.1             | 23.0           |
| MMBZ5257B | 81H          | 31.35                                    | 33   | 34.65 | 3.8             | 58                                | 700                               | 0.25            | 0.1             | 25.0           |

■ Electrical characteristics

| Part No.  | Marking code | Zener voltage                            |      |       | Zener impedance |                                   |                                   |                 | Leakage current |                |
|-----------|--------------|--|------|-------|-----------------|-----------------------------------|-----------------------------------|-----------------|-----------------|----------------|
|           |              | V <sub>Z</sub> @ I <sub>ZT</sub> (Volts) |      |       | I <sub>ZT</sub> | Z <sub>ZT</sub> @ I <sub>ZT</sub> | Z <sub>ZK</sub> @ I <sub>ZK</sub> | I <sub>ZK</sub> | I <sub>R</sub>  | V <sub>R</sub> |
|           |              | Min.                                     | Nom. | Max.  | mA              | OHMs                              | OHMs                              | mA              | uA              | Volts          |
| MMBZ5258B | 81J          | 34.20                                    | 36   | 37.80 | 3.4             | 70                                | 700                               | 0.25            | 0.1             | 27             |
| MMBZ5259B | 81K          | 37.05                                    | 39   | 40.95 | 3.2             | 80                                | 800                               | 0.25            | 0.1             | 30             |
| MMBZ5260B | 81L          | 40.85                                    | 43   | 45.15 | 3.0             | 93                                | 900                               | 0.25            | 0.1             | 33             |
| MMBZ5261B | 81M          | 44.65                                    | 47   | 49.35 | 2.7             | 105                               | 1000                              | 0.25            | 0.1             | 36             |
| MMBZ5262B | 81N          | 48.45                                    | 51   | 53.55 | 2.5             | 125                               | 1100                              | 0.25            | 0.1             | 39             |
| MMBZ5263B | 81P          | 53.20                                    | 56   | 58.80 | 2.2             | 150                               | 1300                              | 0.25            | 0.1             | 43             |
| MMBZ5264B | 81Q          | 57.00                                    | 60   | 63.00 | 2.1             | 170                               | 1400                              | 0.25            | 0.1             | 46             |
| MMBZ5265B | 81R          | 58.90                                    | 62   | 65.10 | 2.0             | 185                               | 1400                              | 0.25            | 0.1             | 47             |
| MMBZ5266B | 81S          | 64.60                                    | 68   | 71.40 | 1.8             | 230                               | 1600                              | 0.25            | 0.1             | 52             |
| MMBZ5267B | 81T          | 71.25                                    | 75   | 78.75 | 1.7             | 270                               | 1700                              | 0.25            | 0.1             | 56             |
| MMBZ5268B | 81U          | 77.90                                    | 82   | 86.10 | 1.5             | 330                               | 2000                              | 0.25            | 0.1             | 62             |
| MMBZ5269B | 81V          | 82.65                                    | 87   | 91.35 | 1.4             | 370                               | 2200                              | 0.25            | 0.1             | 68             |
| MMBZ5270B | 81W          | 86.45                                    | 91   | 95.55 | 1.4             | 400                               | 2300                              | 0.25            | 0.1             | 69             |

Note : Zener voltage is measured with a pulse test current I<sub>Z</sub> at an ambient temperature of 25°C.

■ Rating and characteristic curves

FIG.1-TOTAL POWER DISSIPATION VS. AMBIENT TEMPERATURE

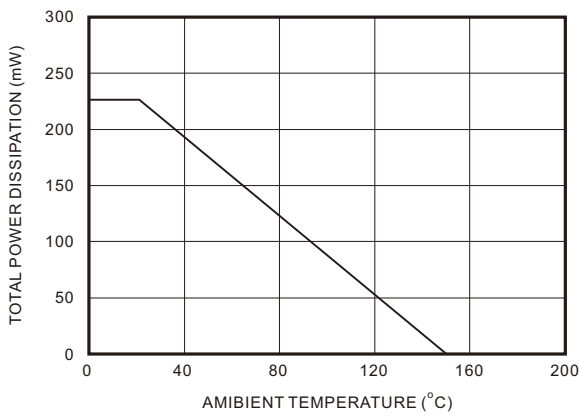


FIG. 2-TEMPERATURE COEFFICIENTS

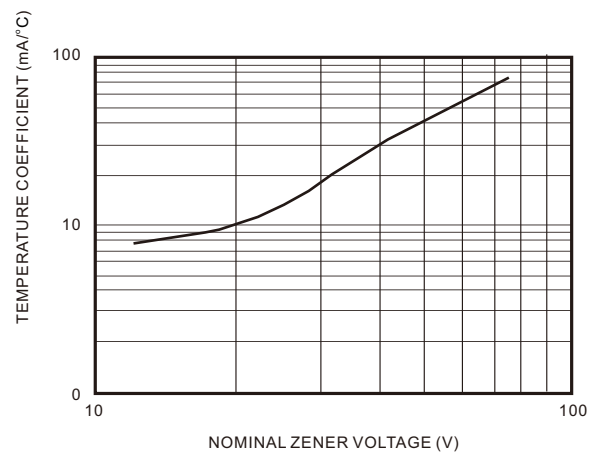


FIG. 3-TYPICAL LEAKAGE CURRENT

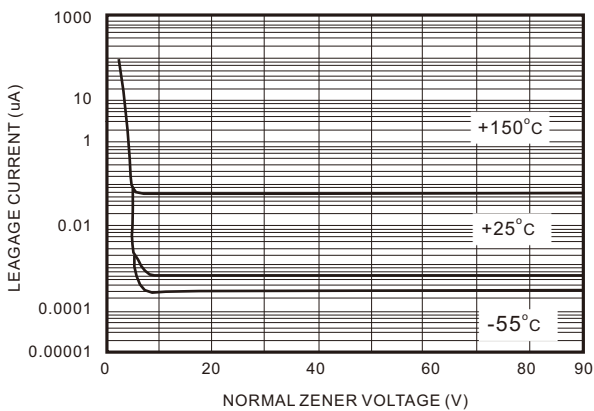
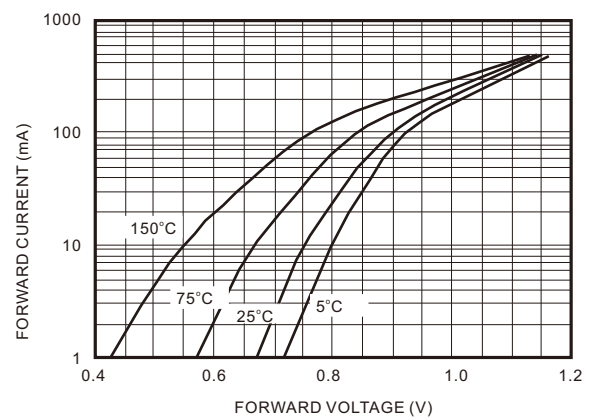
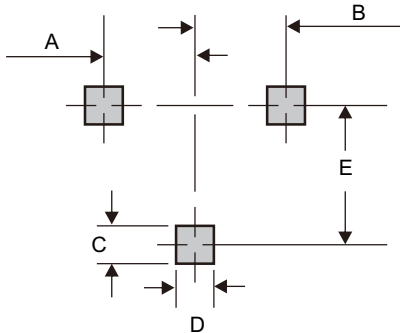


FIG. 4-TYPICAL FORWARD VOLTAGE



■ SOT-23 foot print



| A            | B            | C            | D            | E            |
|--------------|--------------|--------------|--------------|--------------|
| 0.037 (0.95) | 0.037 (0.95) | 0.035 (0.90) | 0.031 (0.80) | 0.079 (2.00) |

Dimensions in inches and (millimeters)

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