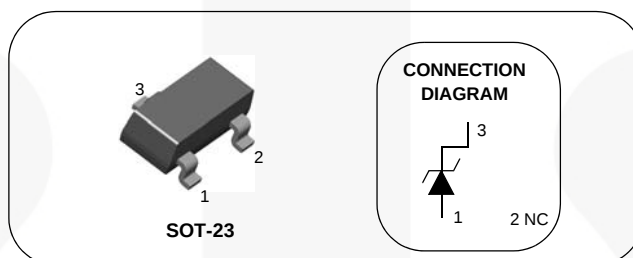




November 2015

## MMBZ5221B - MMBZ5257B Zener Diodes

Tolerance = 5%



### Absolute Maximum Ratings<sup>(1, 2)</sup>

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only. Values are at  $T_A = 25^\circ\text{C}$  unless otherwise noted.

| Symbol          | Parameter                                                               |                                                        | Value       | Unit               |
|-----------------|-------------------------------------------------------------------------|--------------------------------------------------------|-------------|--------------------|
| $P_D$           | Power Dissipation                                                       | Referencing $R_{\theta JA}$ , $T_A = 25^\circ\text{C}$ | 250         | mW                 |
|                 |                                                                         | Referencing $\psi_{JL}$ , $T_L = 25^\circ\text{C}$     | 550         |                    |
| $R_{\theta JA}$ | Junction-to-Ambient Thermal Resistance <sup>(3)</sup>                   |                                                        | 465         | $^\circ\text{C/W}$ |
| $\psi_{JL}$     | Junction-to-Lead Thermal Characteristics<br>(with reference to Cathode) |                                                        | 220         | $^\circ\text{C/W}$ |
| $T_{STG}$       | Storage Temperature Range                                               |                                                        | -55 to +150 | $^\circ\text{C}$   |
| $T_J$           | Operating Junction Temperature                                          |                                                        | +150        | $^\circ\text{C}$   |

#### Note:

1. These ratings are based on a maximum junction temperature of  $150^\circ\text{C}$ .
2. These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.
3. Device mounted on FR-4 PCB, board size = 76.2 mm x 114.3 mm

## Electrical Characteristics

Values are at  $T_A = 25^\circ\text{C}$  unless otherwise noted.

| Device    | Mark | $V_Z(\text{V}) @ I_Z(\text{mA})$ |      |       |                  | $Z_Z(\Omega) @ I_Z(\text{mA})$ |     | $Z_{ZK}(\Omega) @ I_{ZK}(\text{mA})$ |      | $I_R(\mu\text{A}) @ V_R(\text{V})$ |     |
|-----------|------|----------------------------------|------|-------|------------------|--------------------------------|-----|--------------------------------------|------|------------------------------------|-----|
|           |      | Min.                             | Nor. | Max.  | $I_Z(\text{mA})$ |                                |     |                                      |      |                                    |     |
| MMBZ5221B | 18A  | 2.28                             | 2.4  | 2.52  | 20               | 30                             | 20  | 1,200                                | 0.25 | 100                                | 1.0 |
| MMBZ5223B | 18C  | 2.565                            | 2.7  | 2.835 | 20               | 30                             | 20  | 1,300                                | 0.25 | 75                                 | 1.0 |
| MMBZ5226B | 8A   | 3.135                            | 3.3  | 3.465 | 20               | 28                             | 20  | 1,600                                | 0.25 | 25                                 | 1.0 |
| MMBZ5227B | 8B   | 3.42                             | 3.6  | 3.78  | 20               | 24                             | 20  | 1,700                                | 0.25 | 15                                 | 1.0 |
| MMBZ5228B | 8C   | 3.705                            | 3.9  | 4.095 | 20               | 23                             | 20  | 1,900                                | 0.25 | 10                                 | 1.0 |
| MMBZ5229B | 8D   | 4.085                            | 4.3  | 4.515 | 20               | 22                             | 20  | 1,000                                | 0.25 | 5.0                                | 1.0 |
| MMBZ5230B | 8E   | 4.465                            | 4.7  | 4.935 | 20               | 19                             | 20  | 1,900                                | 0.25 | 5.0                                | 2.0 |
| MMBZ5231B | 8F   | 4.845                            | 5.1  | 5.355 | 20               | 17                             | 20  | 1,600                                | 0.25 | 5.0                                | 2.0 |
| MMBZ5232B | 8G   | 5.32                             | 5.6  | 5.88  | 20               | 11                             | 20  | 1,600                                | 0.25 | 5.0                                | 3.0 |
| MMBZ5233B | 8H   | 5.7                              | 6.0  | 6.3   | 20               | 7.0                            | 20  | 1,600                                | 0.25 | 5.0                                | 3.5 |
| MMBZ5234B | 8J   | 5.89                             | 6.2  | 6.51  | 20               | 7.0                            | 20  | 1,000                                | 0.25 | 5.0                                | 4.0 |
| MMBZ5235B | 8K   | 6.46                             | 6.8  | 7.14  | 20               | 5.0                            | 20  | 750                                  | 0.25 | 3.0                                | 5.0 |
| MMBZ5236B | 8L   | 7.125                            | 7.5  | 7.875 | 20               | 6.0                            | 20  | 500                                  | 0.25 | 3.0                                | 6.0 |
| MMBZ5237B | 8M   | 7.79                             | 8.2  | 8.61  | 20               | 8.0                            | 20  | 500                                  | 0.25 | 3.0                                | 6.5 |
| MMBZ5238B | 8N   | 8.265                            | 8.7  | 9.135 | 20               | 8.0                            | 20  | 600                                  | 0.25 | 3.0                                | 6.5 |
| MMBZ5239B | 8P   | 8.645                            | 9.1  | 9.555 | 20               | 10                             | 20  | 600                                  | 0.25 | 3.0                                | 7.0 |
| MMBZ5240B | 8Q   | 9.5                              | 10   | 10.5  | 20               | 17                             | 20  | 600                                  | 0.25 | 3.0                                | 8.0 |
| MMBZ5241B | 8R   | 10.45                            | 11   | 11.55 | 20               | 22                             | 20  | 600                                  | 0.25 | 2.0                                | 8.4 |
| MMBZ5242B | 8S   | 11.4                             | 12   | 12.6  | 20               | 30                             | 20  | 600                                  | 0.25 | 1.0                                | 9.1 |
| MMBZ5243B | 8T   | 12.35                            | 13   | 13.65 | 9.5              | 13                             | 9.5 | 600                                  | 0.25 | 0.5                                | 9.9 |
| MMBZ5244B | 8U   | 13.3                             | 14   | 14.7  | 9.0              | 15                             | 9.0 | 600                                  | 0.25 | 0.1                                | 10  |
| MMBZ5245B | 8V   | 14.25                            | 15   | 15.75 | 8.5              | 16                             | 8.5 | 600                                  | 0.25 | 0.1                                | 11  |
| MMBZ5246B | 8W   | 15.2                             | 16   | 16.8  | 7.8              | 17                             | 7.8 | 600                                  | 0.25 | 0.1                                | 12  |
| MMBZ5247B | 8X   | 16.15                            | 17   | 17.85 | 7.4              | 19                             | 7.4 | 600                                  | 0.25 | 0.1                                | 13  |
| MMBZ5248B | 8Y   | 17.1                             | 18   | 18.9  | 7.0              | 21                             | 7.0 | 600                                  | 0.25 | 0.1                                | 14  |
| MMBZ5249B | 8Z   | 18.05                            | 19   | 19.95 | 6.6              | 23                             | 6.6 | 600                                  | 0.25 | 0.1                                | 14  |
| MMBZ5250B | 81A  | 19                               | 20   | 21    | 6.2              | 25                             | 6.2 | 600                                  | 0.25 | 0.1                                | 15  |
| MMBZ5251B | 81B  | 20.9                             | 22   | 23.1  | 5.6              | 29                             | 5.6 | 600                                  | 0.25 | 0.1                                | 17  |
| MMBZ5252B | 81C  | 22.8                             | 24   | 25.2  | 5.2              | 33                             | 5.2 | 600                                  | 0.25 | 0.1                                | 18  |
| MMBZ5253B | 81D  | 23.75                            | 25   | 26.25 | 5.0              | 35                             | 5.0 | 600                                  | 0.25 | 0.1                                | 19  |
| MMBZ5254B | 81E  | 25.65                            | 27   | 28.35 | 4.6              | 41                             | 4.6 | 600                                  | 0.25 | 0.1                                | 21  |
| MMBZ5255B | 81F  | 26.6                             | 28   | 29.4  | 4.5              | 44                             | 4.5 | 600                                  | 0.25 | 0.1                                | 21  |
| MMBZ5256B | 81G  | 28.5                             | 30   | 31.5  | 4.2              | 49                             | 4.2 | 600                                  | 0.25 | 0.1                                | 23  |
| MMBZ5257B | 81H  | 31.35                            | 33   | 34.65 | 3.8              | 58                             | 3.8 | 600                                  | 0.25 | 0.1                                | 25  |

$V_F$  Forward Voltage = 0.9 V Maximum at  $I_F = 10 \text{ mA}$  for all MMBZ5200 series

## Typical Performance Characteristics

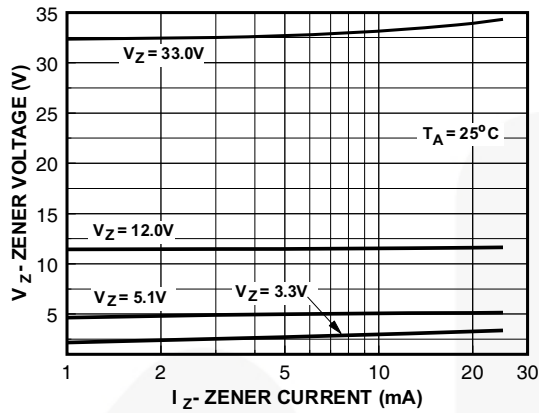


Figure 1. Zener Current vs. Zener Voltage

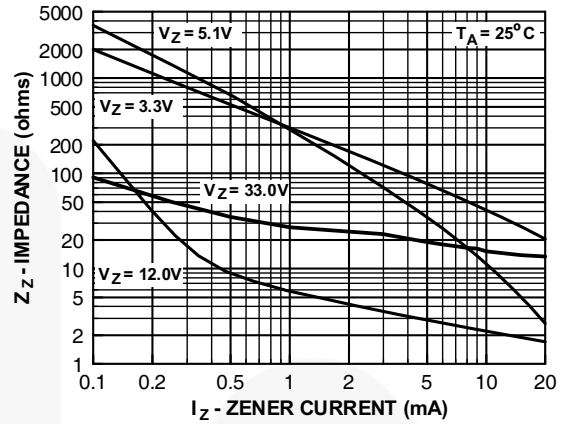


Figure 2. Zener Current vs. Zener Impedance

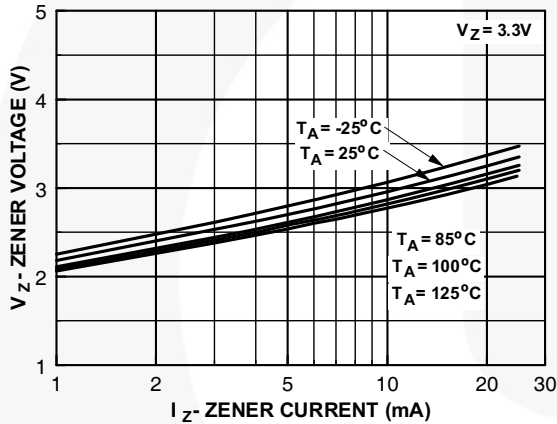


Figure 3. 3.3 Zener Voltage vs. Temperature

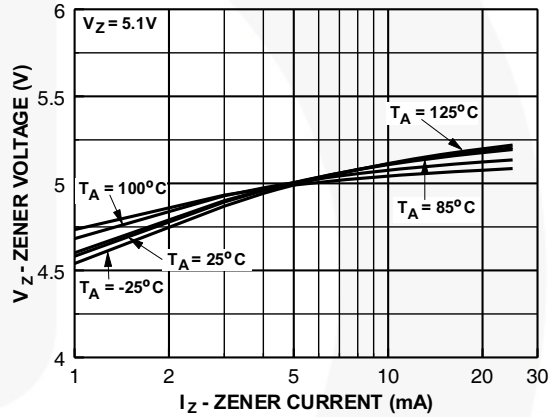


Figure 4. 5.1 Zener Voltage vs. Temperature

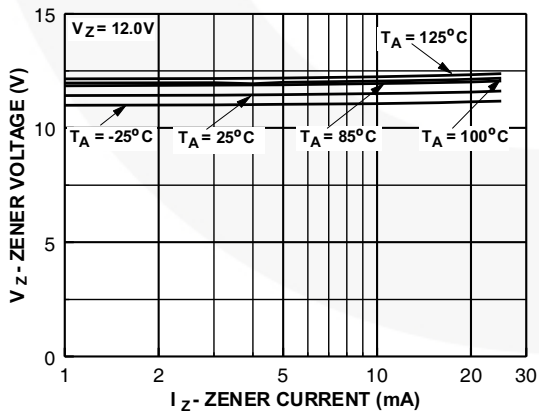


Figure 5. 12 Zener Voltage vs. Zener Temperature

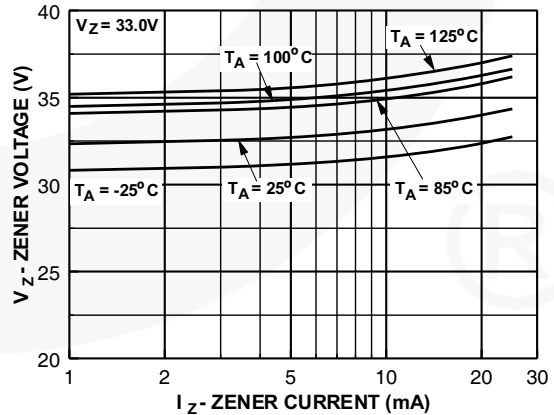
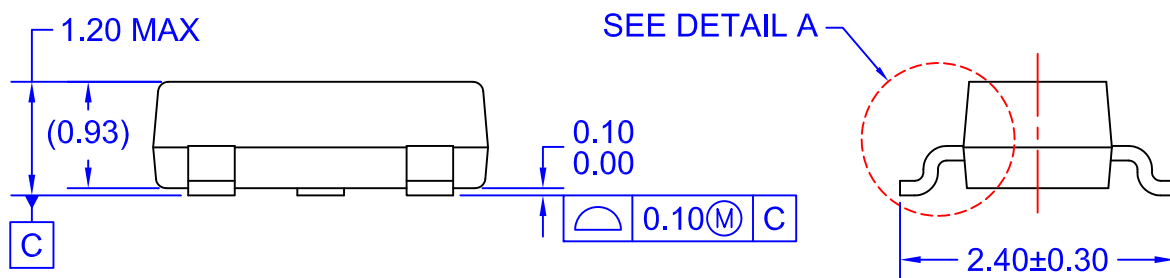


Figure 6. 33 Zener Voltage vs. Zener Temperature



- A) REFERENCE JEDEC REGISTRATION TO-236, VARIATION AB, ISSUE H.
- B) ALL DIMENSIONS ARE IN MILLIMETERS.
- C) DIMENSIONS ARE INCLUSIVE OF BURRS, MOLD FLASH AND TIE BAR EXTRUSIONS.
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