



# MMBZ5221B - MMBZ5259B

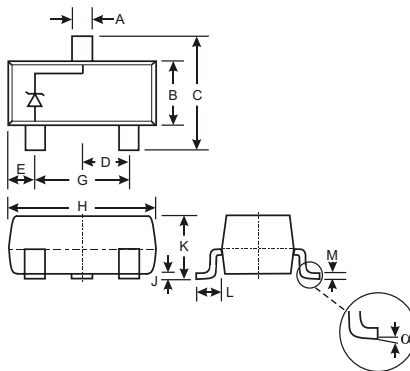
350mW SURFACE MOUNT ZENER DIODE

## Features

- Planar Die Construction
- 350mW Power Dissipation on FR-4 PCB
- General Purpose, Medium Current
- Ideally Suited for Automated Assembly Processes

## Mechanical Data

- Case: SOT-23, Molded Plastic
- Case Material - UL Flammability Rating Classification 94V-0
- Moisture sensitivity: Level 1 per J-STD-020A
- Terminals: Solderable per MIL-STD-202, Method 208
- Polarity: See Diagram
- Marking: Marking Code (See Table on Page 2)
- Weight: 0.008 grams (approx.)



| SOT-23               |       |       |
|----------------------|-------|-------|
| Dim                  | Min   | Max   |
| A                    | 0.37  | 0.51  |
| B                    | 1.20  | 1.40  |
| C                    | 2.30  | 2.50  |
| D                    | 0.89  | 1.03  |
| E                    | 0.45  | 0.60  |
| G                    | 1.78  | 2.05  |
| H                    | 2.80  | 3.00  |
| J                    | 0.013 | 0.10  |
| K                    | 0.903 | 1.10  |
| L                    | 0.45  | 0.61  |
| M                    | 0.085 | 0.180 |
| $\alpha$             | 0°    | 8°    |
| All Dimensions in mm |       |       |

## Maximum Ratings @ $T_A = 25^\circ\text{C}$ unless otherwise specified

| Characteristic                                       | Symbol          | Value       | Unit               |
|------------------------------------------------------|-----------------|-------------|--------------------|
| Forward Voltage @ $I_F = 10\text{mA}$                | $V_F$           | 0.9         | V                  |
| Power Dissipation (Note 1)                           | $P_d$           | 350         | mW                 |
| Thermal Resistance, Junction to Ambient Air (Note 1) | $R_{\theta JA}$ | 357         | $^\circ\text{C/W}$ |
| Operating and Storage Temperature Range              | $T_j, T_{STG}$  | -65 to +150 | $^\circ\text{C}$   |

## Ordering Information (Note 2)

| Device           | Packaging | Shipping         |
|------------------|-----------|------------------|
| (Type Number)-7* | SOT-23    | 3000/Tape & Reel |

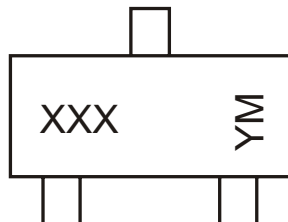
\* Add "-7" to the appropriate type number in Table, Sheet 2 example: 6.2V Zener = MMBZ5234B-7.

- Notes:
1. Mounted on FR4 PC Board with recommended pad layout which can be found on our website at <http://www.diodes.com/datasheets/ap02001.pdf>.
  2. For Packaging Details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

**Electrical Characteristics** @ T<sub>A</sub> = 25°C unless otherwise specified

| Type Number | Type Code | Zener Voltage Range (Note 3)     |         |         |                 | Maximum Zener Impedance (Note 4)  |                                            | Maximum Reverse Leakage Current (Note 3) |                  |
|-------------|-----------|----------------------------------|---------|---------|-----------------|-----------------------------------|--------------------------------------------|------------------------------------------|------------------|
|             |           | V <sub>Z</sub> @ I <sub>ZT</sub> |         |         | I <sub>ZT</sub> | Z <sub>ZT</sub> @ I <sub>ZT</sub> | Z <sub>ZK</sub> @ I <sub>ZK</sub> = 0.25mA | I <sub>R</sub>                           | @ V <sub>R</sub> |
|             |           | Nom (V)                          | Min (V) | Max (V) | mA              | Ω                                 |                                            | μA                                       | V                |
| MMBZ5221B   | KC1       | 2.4                              | 2.28    | 2.52    | 20              | 30                                | 1200                                       | 100                                      | 1.0              |
| MMBZ5223B   | KC3       | 2.7                              | 2.57    | 2.84    | 20              | 30                                | 1300                                       | 75                                       | 1.0              |
| MMBZ5225B   | KC5       | 3.0                              | 2.85    | 3.15    | 20              | 30                                | 1600                                       | 50                                       | 1.0              |
| MMBZ5226B   | KG1       | 3.3                              | 3.14    | 3.47    | 20              | 28                                | 1600                                       | 25                                       | 1.0              |
| MMBZ5227B   | KG2       | 3.6                              | 3.42    | 3.78    | 20              | 24                                | 1700                                       | 15                                       | 1.0              |
| MMBZ5228B   | KG3       | 3.9                              | 3.71    | 4.10    | 20              | 23                                | 1900                                       | 10                                       | 1.0              |
| MMBZ5229B   | KG4       | 4.3                              | 4.09    | 4.52    | 20              | 22                                | 2000                                       | 5.0                                      | 1.0              |
| MMBZ5230B   | KG5/8E    | 4.7                              | 4.4 7   | 4.94    | 20              | 19                                | 1900                                       | 5.0                                      | 2.0              |
| MMBZ5231B   | KE1       | 5.1                              | 4.85    | 5.36    | 20              | 17                                | 1600                                       | 5.0                                      | 2.0              |
| MMBZ5232B   | KE2       | 5.6                              | 5.32    | 5.88    | 20              | 11                                | 1600                                       | 5.0                                      | 3.0              |
| MMBZ5233B   | KE3       | 6.0                              | 5.70    | 6.30    | 20              | 7                                 | 1600                                       | 5.0                                      | 3.5              |
| MMBZ5234B   | KE4       | 6.2                              | 5.89    | 6.51    | 20              | 7                                 | 1000                                       | 5.0                                      | 4.0              |
| MMBZ5235B   | KE5       | 6.8                              | 6.46    | 7.14    | 20              | 5                                 | 750                                        | 3.0                                      | 5.0              |
| MMBZ5236B   | KF1/8L    | 7.5                              | 7.13    | 7.88    | 20              | 6                                 | 500                                        | 3.0                                      | 6.0              |
| MMBZ5237B   | KF2       | 8.2                              | 7.79    | 8.61    | 20              | 8                                 | 500                                        | 3.0                                      | 6.5              |
| MMBZ5238B   | KF3       | 8.7                              | 8.27    | 9.14    | 20              | 8                                 | 600                                        | 3.0                                      | 6.5              |
| MMBZ5239B   | KF4       | 9.1                              | 8.65    | 9.56    | 20              | 10                                | 600                                        | 3.0                                      | 7.0              |
| MMBZ5240B   | KF5       | 10                               | 9.50    | 10.50   | 20              | 17                                | 600                                        | 3.0                                      | 8.0              |
| MMBZ5241B   | KH1       | 11                               | 10.45   | 11.55   | 20              | 22                                | 600                                        | 2.0                                      | 8.4              |
| MMBZ5242B   | KH2/8S    | 12                               | 11.40   | 12.60   | 20              | 30                                | 600                                        | 1.0                                      | 9.1              |
| MMBZ5243B   | KH3       | 13                               | 12.35   | 13.65   | 9.5             | 13                                | 600                                        | 0.5                                      | 9.9              |
| MMBZ5245B   | KH5       | 15                               | 14.25   | 15.75   | 8.5             | 16                                | 600                                        | 0.1                                      | 11               |
| MMBZ5246B   | KJ1       | 16                               | 15.20   | 16.80   | 7.8             | 17                                | 600                                        | 0.1                                      | 12               |
| MMBZ5248B   | KJ3       | 18                               | 17.10   | 18.90   | 7.0             | 21                                | 600                                        | 0.1                                      | 14               |
| MMBZ5250B   | KJ5       | 20                               | 19.00   | 21.00   | 6.2             | 25                                | 600                                        | 0.1                                      | 15               |
| MMBZ5251B   | KK1       | 22                               | 20.90   | 23.10   | 5.6             | 29                                | 600                                        | 0.1                                      | 17               |
| MMBZ5252B   | KK2       | 24                               | 22.80   | 25.20   | 5.2             | 33                                | 600                                        | 0.1                                      | 18               |
| MMBZ5254B   | KK4       | 27                               | 25.65   | 28.35   | 5.0             | 41                                | 600                                        | 0.1                                      | 21               |
| MMBZ5255B   | KK5       | 28                               | 26.60   | 29.40   | 4.5             | 44                                | 600                                        | 0.1                                      | 21               |
| MMBZ5256B   | KM1       | 30                               | 28.50   | 31.50   | 4.2             | 49                                | 600                                        | 0.1                                      | 23               |
| MMBZ5257B   | KM2       | 33                               | 31.35   | 34.65   | 3.8             | 58                                | 700                                        | 0.1                                      | 25               |
| MMBZ5258B   | KM3       | 36                               | 34.20   | 37.80   | 3.4             | 70                                | 700                                        | 0.1                                      | 27               |
| MMBZ5259B   | KM4       | 39                               | 37.05   | 40.95   | 3.2             | 80                                | 800                                        | 0.1                                      | 30               |

Notes: 3. Short duration test pulse used to minimize self-heating effect.  
 4. f = 1KHz.

**Marking Information**


XXX = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year ex: N = 2002  
 M = Month ex: 9 = September

**Date Code Key**

| Year | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Code | J    | K    | L    | M    | N    | P    | R    | S    | T    | U    | V    | W    |

| Month | Jan | Feb | March | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-------|-----|-----|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Code  | 1   | 2   | 3     | 4   | 5   | 6   | 7   | 8   | 9   | O   | N   | D   |

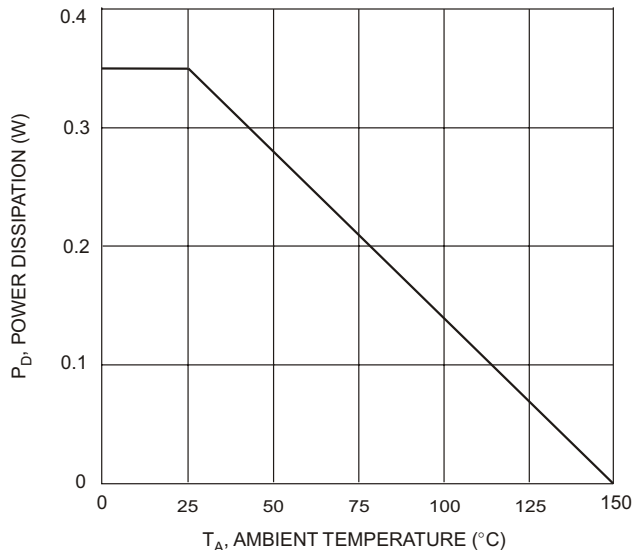


Fig. 1 Power Dissipation vs Ambient Temperature

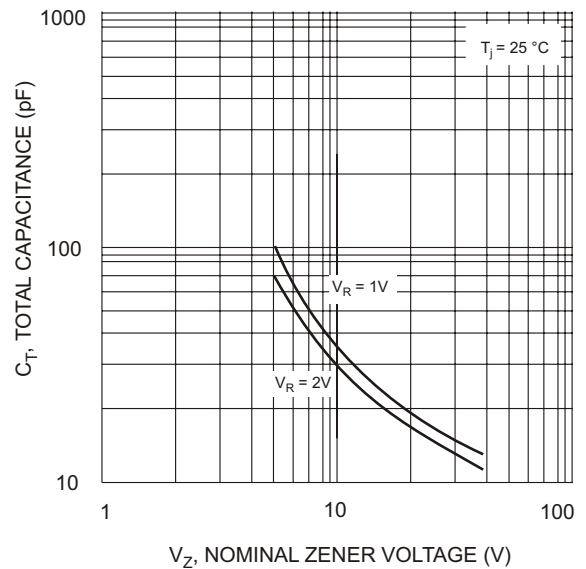


Fig. 2 Total Capacitance vs Nominal Zener Voltage

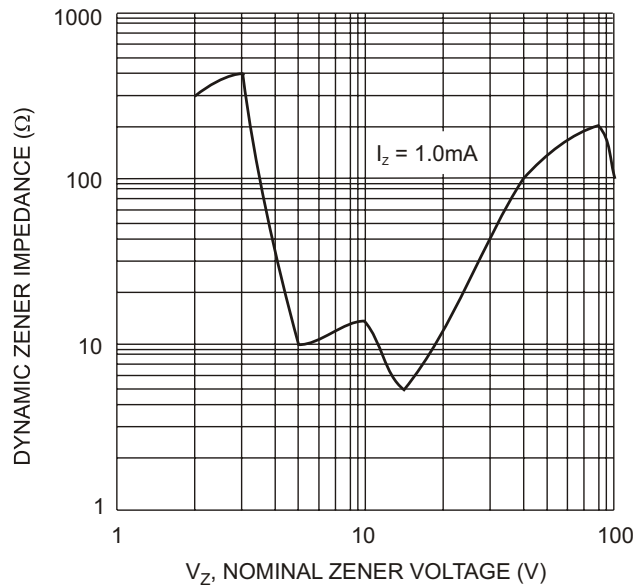


Fig. 3 Zener Voltage vs. Zener Impedance

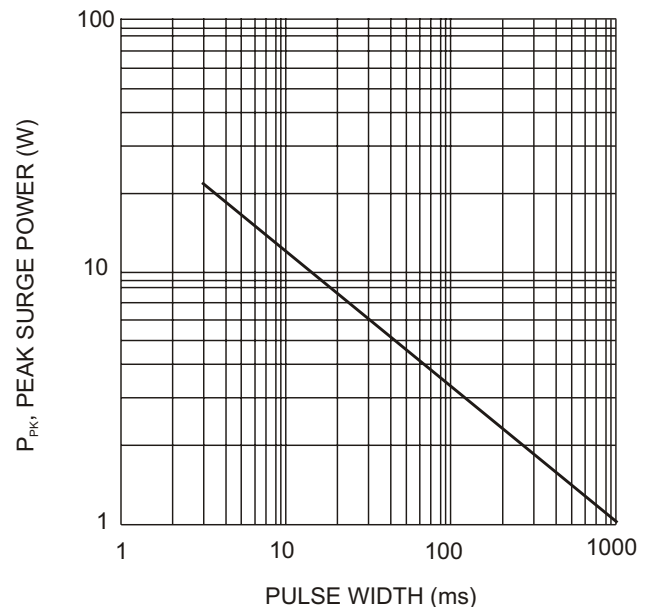


Fig. 4 Maximum Non-repetitive Surge Power

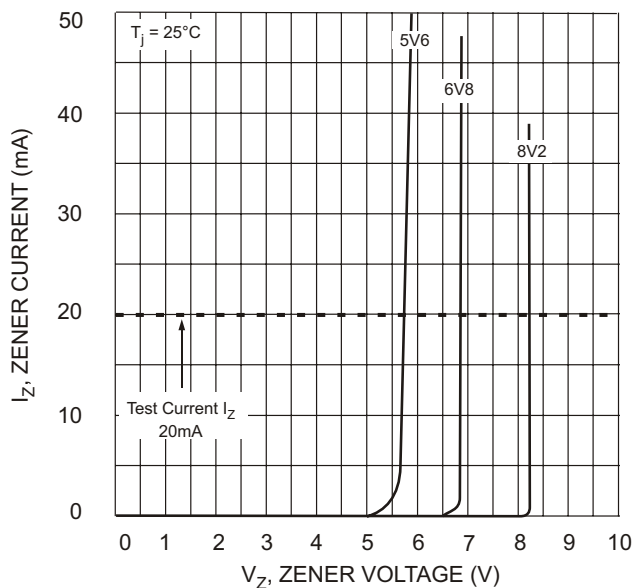


Fig. 5 Zener Breakdown Characteristics

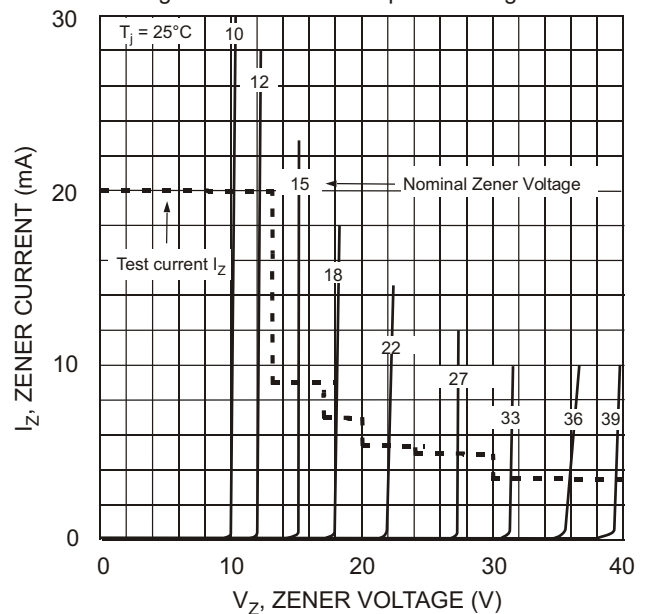


Fig. 6 Zener Breakdown Characteristics