

# DATA SHEET

## ZMM5221B SERIES

### SURFACE MOUNT ZENER DIODES

**VOLTAGE** 2.4 to 47 Volts

**POWER** 500 mWatts

**MINI-MELF/LL-34**

Unit : inch (mm)

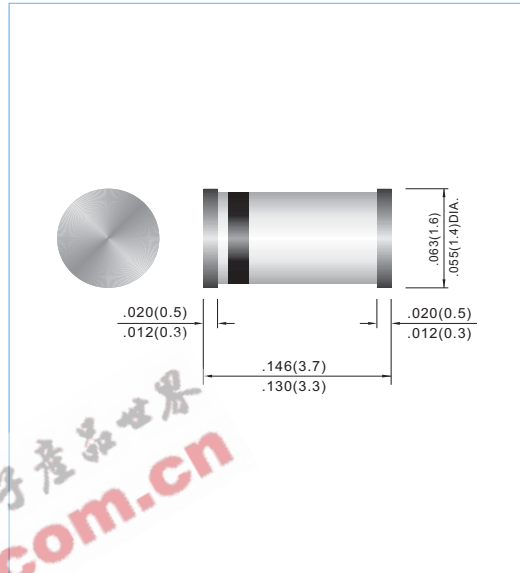
#### FEATURES

- Planar Die construction
- 500mW Power Dissipation
- Ideally Suited for Automated Assembly Processes
- Both normal and Pb free product are available :  
Normal : 80~95% Sn, 5~20% Pb  
Pb free: 98.5% Sn above

#### MECHANICAL DATA

- Case: Molded Glass MINI-MELF
- Terminals: Solderable per MIL-STD-202E, Method 208
- Polarity: See Diagram Below
- Approx. Weight: 0.03 grams
- Mounting Position: Any
- Packing information

T/R - 2.5K per 7" plastic Reel



### MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

| Parameter                         | Symbol           | Value       | Units |
|-----------------------------------|------------------|-------------|-------|
| Power Dissipation at Tamb = 25 °C | P <sub>tot</sub> | 500         | mW    |
| Junction Temperature              | T <sub>J</sub>   | 175         | °C    |
| Storage Temperature Range         | T <sub>s</sub>   | -65 to +175 | °C    |

Valid provided that leads at a distance of 10mm from case are kept at ambient temperature.

| Parameter                                  | Symbol           | Min. | Typ. | Max. | Units |
|--------------------------------------------|------------------|------|------|------|-------|
| Thermal Resistance Junction to Ambient Air | R <sub>thA</sub> | —    | —    | 0.3  | K/mW  |
| Forward Voltage at I <sub>F</sub> = 200mA  | V <sub>F</sub>   | —    | —    | 1.1  | V     |

Valid provided that leads at a distance of 10mm from case are kept at ambient temperature.

| Part Number | Nominal Zener Voltage            |        |        | Max. Zener Impedance              |      |                                   |      | Max Reverse Leakage Current     |      | Marking code |
|-------------|----------------------------------|--------|--------|-----------------------------------|------|-----------------------------------|------|---------------------------------|------|--------------|
|             | V <sub>Z</sub> @ 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> |      |              |
|             | Nom. V                           | Min. V | Max. V | Ω                                 | mA   | Ω                                 | mA   | uA                              | V    |              |
| ZMM5221B    | 2.40                             | 2.28   | 2.52   | 30                                | 20.0 | 1200                              | 0.25 | 100                             | 1.0  | 5221         |
| ZMM5222B    | 2.50                             | 2.38   | 2.63   | 30                                | 20.0 | 1250                              | 0.25 | 100                             | 1.0  | 5222         |
| ZMM5223B    | 2.70                             | 2.57   | 2.84   | 30                                | 20.0 | 1300                              | 0.25 | 75                              | 1.0  | 5223         |
| ZMM5224B    | 2.80                             | 2.66   | 2.94   | 30                                | 20.0 | 1400                              | 0.25 | 75                              | 1.0  | 5224         |
| ZMM5225B    | 3.00                             | 2.85   | 3.15   | 29                                | 20.0 | 1600                              | 0.25 | 50                              | 1.0  | 5225         |
| ZMM5226B    | 3.30                             | 3.14   | 3.47   | 28                                | 20.0 | 1600                              | 0.25 | 25                              | 1.0  | 5226         |
| ZMM5227B    | 3.60                             | 3.42   | 3.78   | 24                                | 20.0 | 1700                              | 0.25 | 15                              | 1.0  | 5227         |
| ZMM5228B    | 3.90                             | 3.71   | 4.10   | 23                                | 20.0 | 1900                              | 0.25 | 10                              | 1.0  | 5228         |
| ZMM5229B    | 4.30                             | 4.09   | 4.52   | 22                                | 20.0 | 2000                              | 0.25 | 5.0                             | 1.0  | 5229         |
| ZMM5230B    | 4.70                             | 4.47   | 4.94   | 19                                | 20.0 | 1900                              | 0.25 | 5.0                             | 2.0  | 5230         |
| ZMM5231B    | 5.10                             | 4.85   | 5.36   | 17                                | 20.0 | 1600                              | 0.25 | 5.0                             | 2.0  | 5231         |
| ZMM5232B    | 5.60                             | 5.32   | 5.88   | 11                                | 20.0 | 1600                              | 0.25 | 5.0                             | 3.0  | 5232         |
| ZMM5233B    | 6.00                             | 5.70   | 6.30   | 7                                 | 20.0 | 1600                              | 0.25 | 5.0                             | 3.5  | 5233         |
| ZMM5234B    | 6.20                             | 5.89   | 6.51   | 7                                 | 20.0 | 1000                              | 0.25 | 5.0                             | 4.0  | 5234         |
| ZMM5235B    | 6.80                             | 6.46   | 7.14   | 5                                 | 20.0 | 750                               | 0.25 | 3.0                             | 5.0  | 5235         |
| ZMM5236B    | 7.50                             | 7.13   | 7.88   | 6                                 | 20.0 | 500                               | 0.25 | 3.0                             | 6.0  | 5236         |
| ZMM5237B    | 8.20                             | 7.79   | 8.61   | 8                                 | 20.0 | 500                               | 0.25 | 3.0                             | 6.5  | 5237         |
| ZMM5238B    | 8.70                             | 8.27   | 9.14   | 8                                 | 20.0 | 600                               | 0.25 | 3.0                             | 6.5  | 5238         |
| ZMM5239B    | 9.10                             | 8.65   | 9.56   | 10                                | 20.0 | 600                               | 0.25 | 3.0                             | 7.0  | 5239         |
| ZMM5240B    | 10.00                            | 9.50   | 10.50  | 17                                | 20.0 | 600                               | 0.25 | 3.0                             | 8.0  | 5240         |
| ZMM5241B    | 11.00                            | 10.45  | 11.55  | 22                                | 20.0 | 600                               | 0.25 | 2.0                             | 8.4  | 5241         |
| ZMM5242B    | 12.00                            | 11.40  | 12.60  | 30                                | 20.0 | 600                               | 0.25 | 1.0                             | 9.1  | 5242         |
| ZMM5243B    | 13.00                            | 12.35  | 13.65  | 13                                | 9.5  | 600                               | 0.25 | 0.5                             | 9.9  | 5243         |
| ZMM5244B    | 14.00                            | 13.30  | 14.70  | 15                                | 9.0  | 600                               | 0.25 | 0.1                             | 10.0 | 5244         |
| ZMM5245B    | 15.00                            | 14.25  | 15.75  | 16                                | 8.5  | 600                               | 0.25 | 0.1                             | 11.0 | 5245         |
| ZMM5246B    | 16.00                            | 15.20  | 16.80  | 17                                | 7.8  | 600                               | 0.25 | 0.1                             | 12.0 | 5246         |
| ZMM5247B    | 17.00                            | 16.15  | 17.85  | 19                                | 7.4  | 600                               | 0.25 | 0.1                             | 13.0 | 5247         |
| ZMM5248B    | 18.00                            | 17.10  | 18.90  | 21                                | 7.0  | 600                               | 0.25 | 0.1                             | 14.0 | 5248         |
| ZMM5249B    | 19.00                            | 18.05  | 19.95  | 23                                | 6.6  | 600                               | 0.25 | 0.1                             | 14.0 | 5249         |
| ZMM5250B    | 20.00                            | 19.00  | 21.00  | 25                                | 6.2  | 600                               | 0.25 | 0.1                             | 15.0 | 5250         |
| ZMM5251B    | 22.00                            | 20.90  | 23.10  | 29                                | 5.6  | 600                               | 0.25 | 0.1                             | 17.0 | 5251         |
| ZMM5252B    | 24.00                            | 22.80  | 25.20  | 33                                | 5.2  | 600                               | 0.25 | 0.1                             | 18.0 | 5252         |
| ZMM5253B    | 25.00                            | 23.75  | 26.25  | 35                                | 5.0  | 600                               | 0.25 | 0.1                             | 19.0 | 5253         |
| ZMM5254B    | 27.00                            | 25.65  | 28.35  | 41                                | 4.6  | 600                               | 0.25 | 0.1                             | 21.0 | 5254         |
| ZMM5255B    | 28.00                            | 26.60  | 29.40  | 44                                | 4.5  | 600                               | 0.25 | 0.1                             | 21.0 | 5255         |
| ZMM5256B    | 30.00                            | 28.50  | 31.50  | 49                                | 4.2  | 600                               | 0.25 | 0.1                             | 23.0 | 5256         |
| ZMM5257B    | 33.00                            | 31.35  | 34.65  | 58                                | 3.8  | 700                               | 0.25 | 0.1                             | 25.0 | 5257         |
| ZMM5258B    | 36.00                            | 34.20  | 37.80  | 70                                | 3.4  | 700                               | 0.25 | 0.1                             | 27.0 | 5258         |
| ZMM5259B    | 39.00                            | 37.05  | 40.95  | 80                                | 3.2  | 800                               | 0.25 | 0.1                             | 30.0 | 5259         |
| ZMM5260B    | 43.00                            | 40.85  | 45.15  | 93                                | 3.0  | 900                               | 0.25 | 0.1                             | 33.0 | 5260         |
| ZMM5261B    | 47.00                            | 44.65  | 49.35  | 150                               | 2.7  | 1000                              | 0.25 | 0.1                             | 36.0 | 5261         |

Notes.

STANDARD VOLTAGE TOLERANCE IS + 5% AND :

SUFFIX " A " FOR + 3%

SUFFIX " B " FOR + 5%

SUFFIX " C " FOR + 10%

SUFFIX " D " FOR + 20%

## RATING AND CHARACTERISTIC CURVES

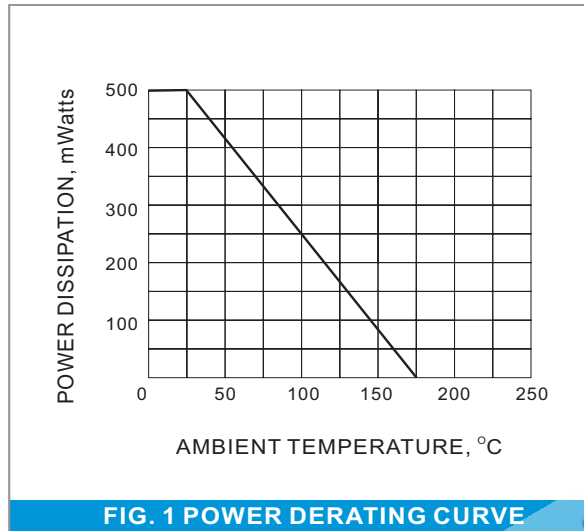


FIG. 1 POWER DERATING CURVE

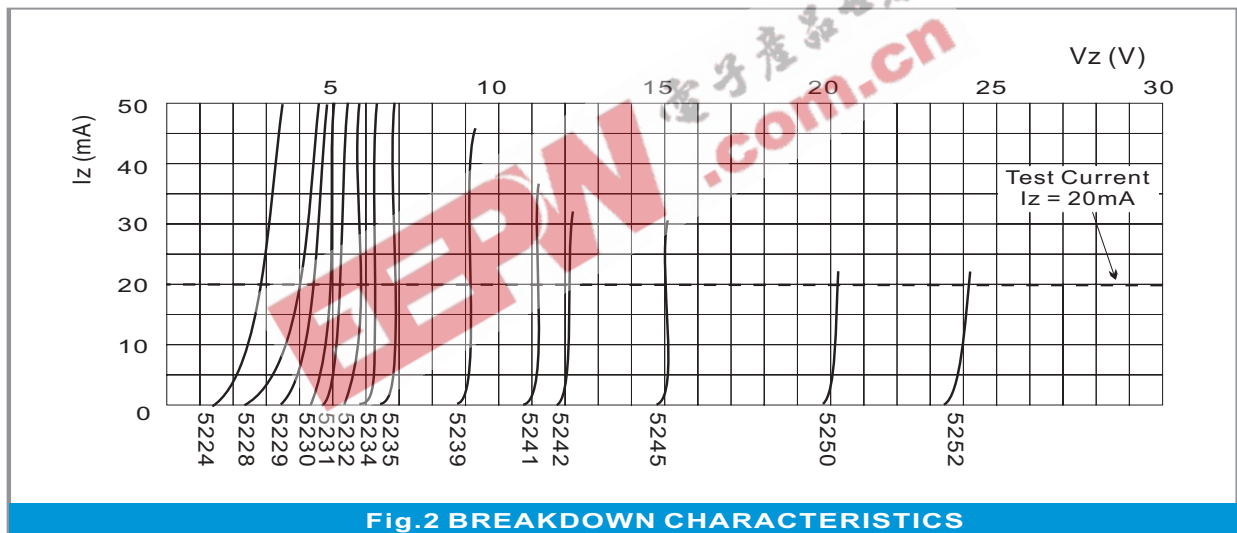


Fig.2 BREAKDOWN CHARACTERISTICS