

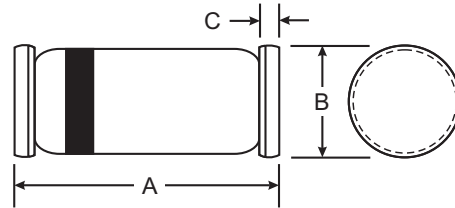
### Features

- 500mW Power Dissipation
- Outline Similar to JEDEC DO-213AA
- Hemetic Glass Package
- **Lead Free Finish, RoHS Compliant (Note 3)**

**NOT RECOMMENDED FOR NEW DESIGN**  
**SUGGESTED REPLACEMENT MMSZ52xx**

### Mechanical Data

- Case: MiniMELF
- Case Material: Molded Plastic. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020C
- Terminals: Finish - Sn97.5Ag2.5. Solderable per MIL-STD-202, Method 208
- Polarity: Cathode Band
- Ordering Information: See Last Page
- Marking: Cathode Band Only
- Weight: 0.034 grams (approximate)



| MiniMELF                    |      |      |
|-----------------------------|------|------|
| Dim                         | Min  | Max  |
| <b>A</b>                    | 3.30 | 3.70 |
| <b>B</b>                    | 1.30 | 1.60 |
| <b>C</b>                    | 0.28 | 0.50 |
| <b>All Dimensions in mm</b> |      |      |

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

| Characteristic                                       | Symbol          | Value       | Unit                      |
|--|-----------------|-------------|---------------------------|
| Power Dissipation (Note 1)                           | $P_d$           | 500         | mW                        |
| Thermal Resistance, Junction to Ambient Air (Note 1) | $R_{\theta JA}$ | 300         | $^\circ\text{C}/\text{W}$ |
| Forward Voltage @ $I_F = 200\text{mA}$               | $V_F$           | 1.5         | V                         |
| Operating and Storage Temperature Range              | $T_j, T_{STG}$  | -65 to +175 | $^\circ\text{C}$          |

- Notes:
1. Valid provided that electrodes are kept at ambient temperature.
  2. Tested with pulses,  $T_p \leq 100\text{ms}$ .
  3. EC Directive 2002/95/EC (RoHS) revision 13.2.2003. Glass and High Temperature Solder Exemptions Applied where applicable, see *EU Directive Annex Notes 5 and 7*.

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

| Type Number | Zener Voltage Range (Note 2)     |         |         |                 | Maximum Zener Impedance           |  | Maximum Reverse Current |                  | Typical Temperature Coefficient @ I <sub>ZT</sub> |
|-------------|----------------------------------|---------|---------|-----------------|-----------------------------------|--|-------------------------|------------------|---|
|             | 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                                 | Ω  | μA                      | V                |   |
| ZMM5221B    | 2.4                              | 2.28    | 2.52    | 20              | 30                                | 1200                                       | 100                     | 1.0              | -0.085  |
| ZMM5222B    | 2.5                              | 2.38    | 2.63    | 20              | 30                                | 1250                                       | 100                     | 1.0              | -0.085  |
| ZMM5223B    | 2.7                              | 2.57    | 2.84    | 20              | 30                                | 1300                                       | 75                      | 1.0              | -0.080  |
| ZMM5224B    | 2.8                              | 2.66    | 2.94    | 20              | 30                                | 1400                                       | 75                      | 1.0              | -0.080  |
| ZMM5225B    | 3.0                              | 2.85    | 3.15    | 20              | 29                                | 1600                                       | 50                      | 1.0              | -0.075  |
| ZMM5226B    | 3.3                              | 3.14    | 3.47    | 20              | 28                                | 1600                                       | 25                      | 1.0              | -0.070  |
| ZMM5227B    | 3.6                              | 3.42    | 3.78    | 20              | 24                                | 1700                                       | 15                      | 1.0              | -0.065  |
| ZMM5228B    | 3.9                              | 3.71    | 4.10    | 20              | 23                                | 1900                                       | 10                      | 1.0              | -0.060  |
| ZMM5229B    | 4.3                              | 4.09    | 4.52    | 20              | 22                                | 2000                                       | 5.0                     | 1.0              | -0.055  |
| ZMM5230B    | 4.7                              | 4.47    | 4.94    | 20              | 19                                | 1900                                       | 5.0                     | 2.0              | ±0.030  |
| ZMM5231B    | 5.1                              | 4.85    | 5.36    | 20              | 17                                | 1600                                       | 5.0                     | 2.0              | ±0.030  |
| ZMM5232B    | 5.6                              | 5.32    | 5.88    | 20              | 11                                | 1600                                       | 5.0                     | 3.0              | +0.038  |
| ZMM5233B    | 6.0                              | 5.70    | 6.30    | 20              | 7.0                               | 1600                                       | 5.0                     | 3.5              | +0.038  |
| ZMM5234B    | 6.2                              | 5.89    | 6.51    | 20              | 7.0                               | 1000                                       | 5.0                     | 4.0              | +0.045  |
| ZMM5235B    | 6.8                              | 6.46    | 7.14    | 20              | 5.0                               | 750  | 3.0                     | 5.0              | +0.050  |
| ZMM5236B    | 7.5                              | 7.13    | 7.88    | 20              | 6.0                               | 500  | 3.0                     | 6.0              | +0.058  |
| ZMM5237B    | 8.2                              | 7.79    | 8.61    | 20              | 8.0                               | 500  | 3.0                     | 6.5              | +0.062  |
| ZMM5238B    | 8.7                              | 8.27    | 9.14    | 20              | 8.0                               | 600  | 3.0                     | 6.5              | +0.065  |
| ZMM5239B    | 9.1                              | 8.65    | 9.56    | 20              | 10                                | 600  | 3.0                     | 7.0              | +0.068  |
| ZMM5240B    | 10                               | 9.50    | 10.50   | 20              | 17                                | 600  | 3.0                     | 8.0              | +0.075  |
| ZMM5241B    | 11                               | 10.45   | 11.55   | 20              | 22                                | 600  | 2.0                     | 8.4              | +0.076  |
| ZMM5242B    | 12                               | 11.40   | 12.60   | 20              | 30                                | 600  | 1.0                     | 9.1              | +0.077  |
| ZMM5243B    | 13                               | 12.35   | 13.65   | 9.5             | 13                                | 600  | 0.5                     | 9.9              | +0.079  |
| ZMM5244B    | 14                               | 13.30   | 14.70   | 9.0             | 15                                | 600  | 0.1                     | 10               | +0.082  |
| ZMM5245B    | 15                               | 14.25   | 15.75   | 8.5             | 16                                | 600  | 0.1                     | 11               | +0.082  |
| ZMM5246B    | 16                               | 15.20   | 16.80   | 7.8             | 17                                | 600  | 0.1                     | 12               | +0.083  |
| ZMM5247B    | 17                               | 16.15   | 17.85   | 7.4             | 19                                | 600  | 0.1                     | 13               | +0.084  |
| ZMM5248B    | 18                               | 17.10   | 18.90   | 7.0             | 21                                | 600  | 0.1                     | 14               | +0.085  |
| ZMM5249B    | 19                               | 18.05   | 19.95   | 6.6             | 23                                | 600  | 0.1                     | 14               | +0.086  |
| ZMM5250B    | 20                               | 19.00   | 21.00   | 6.2             | 25                                | 600  | 0.1                     | 15               | +0.086  |
| ZMM5251B    | 22                               | 20.90   | 23.10   | 5.6             | 29                                | 600  | 0.1                     | 17               | +0.087  |
| ZMM5252B    | 24                               | 22.80   | 25.20   | 5.2             | 33                                | 600  | 0.1                     | 18               | +0.087  |
| ZMM5253B    | 25                               | 23.75   | 26.25   | 5.0             | 35                                | 600  | 0.1                     | 19               | +0.089  |
| ZMM5254B    | 27                               | 25.65   | 28.35   | 4.6             | 41                                | 600  | 0.1                     | 21               | +0.090  |
| ZMM5255B    | 28                               | 26.60   | 29.40   | 4.5             | 44                                | 600  | 0.1                     | 21               | +0.091  |
| ZMM5256B    | 30                               | 28.50   | 31.50   | 4.2             | 49                                | 600  | 0.1                     | 23               | +0.091  |
| ZMM5257B    | 33                               | 31.35   | 34.65   | 3.8             | 58                                | 700  | 0.1                     | 25               | +0.092  |
| ZMM5258B    | 36                               | 34.20   | 37.80   | 3.4             | 70                                | 700  | 0.1                     | 27               | +0.093  |
| ZMM5259B    | 39                               | 37.05   | 40.95   | 3.2             | 80                                | 800  | 0.1                     | 30               | +0.094  |
| ZMM5260B    | 43                               | 40.85   | 45.15   | 3.0             | 93                                | 900  | 0.1                     | 33               | +0.095  |
| ZMM5261B    | 47                               | 44.65   | 49.35   | 2.7             | 105                               | 1000                                       | 0.1                     | 36               | +0.095  |
| ZMM5262B    | 51                               | 48.45   | 53.55   | 2.5             | 125                               | 1100                                       | 0.1                     | 39               | +0.096  |
| ZMM5263B    | 56                               | 53.20   | 58.80   | 2.2             | 150                               | 1300                                       | 0.1                     | 43               | +0.096  |
| ZMM5264B    | 60                               | 57.00   | 63.00   | 2.1             | 170                               | 1400                                       | 0.1                     | 46               | +0.097  |
| ZMM5265B    | 62                               | 58.90   | 65.10   | 2.0             | 185                               | 1400                                       | 0.1                     | 47               | +0.097  |
| ZMM5266B    | 68                               | 64.60   | 71.40   | 1.8             | 230                               | 1600                                       | 0.1                     | 52               | +0.097  |
| ZMM5267B    | 75                               | 71.25   | 78.75   | 1.7             | 270                               | 1700                                       | 0.1                     | 56               | +0.098  |

Notes: 2. Tested with pulses, T<sub>p</sub> ≤ 100ms.



Fig. 1 Power Dissipation vs Ambient Temperature



Fig. 2 Junction Capacitance vs Zener Voltage



Fig. 3 Differential Zener Impedance



Fig. 4 Typical Normalized Transient Thermal Impedance Curves

**Ordering Information** (Note 4)

| Device      | Packaging | Shipping                 |
|-------------|-----------|--------------------------|
| ZMM5221B-7  | MiniMELF  | 2.5K/Tape & Reel, 7-inch |
| ZMM5221B-13 | MiniMELF  | 10K/Tape & Reel, 13-inch |
| ZMM5222B-7  | MiniMELF  | 2.5K/Tape & Reel, 7-inch |
| ZMM5222B-13 | MiniMELF  | 10K/Tape & Reel, 13-inch |
| ZMM5223B-7  | MiniMELF  | 2.5K/Tape & Reel, 7-inch |
| ZMM5223B-13 | MiniMELF  | 10K/Tape & Reel, 13-inch |
| ZMM5224B-7  | MiniMELF  | 2.5K/Tape & Reel, 7-inch |
| ZMM5224B-13 | MiniMELF  | 10K/Tape & Reel, 13-inch |
| ZMM5225B-7  | MiniMELF  | 2.5K/Tape & Reel, 7-inch |
| ZMM5225B-13 | MiniMELF  | 10K/Tape & Reel, 13-inch |
| ZMM5226B-7  | MiniMELF  | 2.5K/Tape & Reel, 7-inch |
| ZMM5226B-13 | MiniMELF  | 10K/Tape & Reel, 13-inch |
| ZMM5227B-7  | MiniMELF  | 2.5K/Tape & Reel, 7-inch |
| ZMM5227B-13 | MiniMELF  | 10K/Tape & Reel, 13-inch |
| ZMM5228B-7  | MiniMELF  | 2.5K/Tape & Reel, 7-inch |
| ZMM5228B-13 | MiniMELF  | 10K/Tape & Reel, 13-inch |
| ZMM5229B-7  | MiniMELF  | 2.5K/Tape & Reel, 7-inch |
| ZMM5229B-13 | MiniMELF  | 10K/Tape & Reel, 13-inch |
| ZMM5230B-7  | MiniMELF  | 2.5K/Tape & Reel, 7-inch |
| ZMM5230B-13 | MiniMELF  | 10K/Tape & Reel, 13-inch |
| ZMM5231B-7  | MiniMELF  | 2.5K/Tape & Reel, 7-inch |
| ZMM5231B-13 | MiniMELF  | 10K/Tape & Reel, 13-inch |
| ZMM5232B-7  | MiniMELF  | 2.5K/Tape & Reel, 7-inch |
| ZMM5232B-13 | MiniMELF  | 10K/Tape & Reel, 13-inch |
| ZMM5233B-7  | MiniMELF  | 2.5K/Tape & Reel, 7-inch |
| ZMM5233B-13 | MiniMELF  | 10K/Tape & Reel, 13-inch |
| ZMM5234B-7  | MiniMELF  | 2.5K/Tape & Reel, 7-inch |
| ZMM5234B-13 | MiniMELF  | 10K/Tape & Reel, 13-inch |
| ZMM5235B-7  | MiniMELF  | 2.5K/Tape & Reel, 7-inch |
| ZMM5235B-13 | MiniMELF  | 10K/Tape & Reel, 13-inch |
| ZMM5236B-7  | MiniMELF  | 2.5K/Tape & Reel, 7-inch |
| ZMM5236B-13 | MiniMELF  | 10K/Tape & Reel, 13-inch |
| ZMM5237B-7  | MiniMELF  | 2.5K/Tape & Reel, 7-inch |
| ZMM5237B-13 | MiniMELF  | 10K/Tape & Reel, 13-inch |
| ZMM5238B-7  | MiniMELF  | 2.5K/Tape & Reel, 7-inch |
| ZMM5238B-13 | MiniMELF  | 10K/Tape & Reel, 13-inch |
| ZMM5239B-7  | MiniMELF  | 2.5K/Tape & Reel, 7-inch |
| ZMM5239B-13 | MiniMELF  | 10K/Tape & Reel, 13-inch |
| ZMM5240B-7  | MiniMELF  | 2.5K/Tape & Reel, 7-inch |
| ZMM5240B-13 | MiniMELF  | 10K/Tape & Reel, 13-inch |
| ZMM5241B-7  | MiniMELF  | 2.5K/Tape & Reel, 7-inch |
| ZMM5241B-13 | MiniMELF  | 10K/Tape & Reel, 13-inch |
| ZMM5242B-7  | MiniMELF  | 2.5K/Tape & Reel, 7-inch |
| ZMM5242B-13 | MiniMELF  | 10K/Tape & Reel, 13-inch |
| ZMM5243B-7  | MiniMELF  | 2.5K/Tape & Reel, 7-inch |
| ZMM5243B-13 | MiniMELF  | 10K/Tape & Reel, 13-inch |
| ZMM5244B-7  | MiniMELF  | 2.5K/Tape & Reel, 7-inch |
| ZMM5244B-13 | MiniMELF  | 10K/Tape & Reel, 13-inch |
| ZMM5245B-7  | MiniMELF  | 2.5K/Tape & Reel, 7-inch |
| ZMM5245B-13 | MiniMELF  | 10K/Tape & Reel, 13-inch |

**Ordering Information** (Note 4) (continued)

| Device      | Packaging | Shipping                 |
|-------------|-----------|--------------------------|
| ZMM5246B-7  | MiniMELF  | 2.5K/Tape & Reel, 7-inch |
| ZMM5246B-13 | MiniMELF  | 10K/Tape & Reel, 13-inch |
| ZMM5247B-7  | MiniMELF  | 2.5K/Tape & Reel, 7-inch |
| ZMM5247B-13 | MiniMELF  | 10K/Tape & Reel, 13-inch |
| ZMM5248B-7  | MiniMELF  | 2.5K/Tape & Reel, 7-inch |
| ZMM5248B-13 | MiniMELF  | 10K/Tape & Reel, 13-inch |
| ZMM5249B-7  | MiniMELF  | 2.5K/Tape & Reel, 7-inch |
| ZMM5249B-13 | MiniMELF  | 10K/Tape & Reel, 13-inch |
| ZMM5250B-7  | MiniMELF  | 2.5K/Tape & Reel, 7-inch |
| ZMM5250B-13 | MiniMELF  | 10K/Tape & Reel, 13-inch |
| ZMM5251B-7  | MiniMELF  | 2.5K/Tape & Reel, 7-inch |
| ZMM5251B-13 | MiniMELF  | 10K/Tape & Reel, 13-inch |
| ZMM5252B-7  | MiniMELF  | 2.5K/Tape & Reel, 7-inch |
| ZMM5252B-13 | MiniMELF  | 10K/Tape & Reel, 13-inch |
| ZMM5253B-7  | MiniMELF  | 2.5K/Tape & Reel, 7-inch |
| ZMM5253B-13 | MiniMELF  | 10K/Tape & Reel, 13-inch |
| ZMM5254B-7  | MiniMELF  | 2.5K/Tape & Reel, 7-inch |
| ZMM5254B-13 | MiniMELF  | 10K/Tape & Reel, 13-inch |
| ZMM5255B-7  | MiniMELF  | 2.5K/Tape & Reel, 7-inch |
| ZMM5255B-13 | MiniMELF  | 10K/Tape & Reel, 13-inch |
| ZMM5256B-7  | MiniMELF  | 2.5K/Tape & Reel, 7-inch |
| ZMM5256B-13 | MiniMELF  | 10K/Tape & Reel, 13-inch |
| ZMM5257B-7  | MiniMELF  | 2.5K/Tape & Reel, 7-inch |
| ZMM5257B-13 | MiniMELF  | 10K/Tape & Reel, 13-inch |
| ZMM5258B-7  | MiniMELF  | 2.5K/Tape & Reel, 7-inch |
| ZMM5258B-13 | MiniMELF  | 10K/Tape & Reel, 13-inch |
| ZMM5259B-7  | MiniMELF  | 2.5K/Tape & Reel, 7-inch |
| ZMM5259B-13 | MiniMELF  | 10K/Tape & Reel, 13-inch |
| ZMM5260B-7  | MiniMELF  | 2.5K/Tape & Reel, 7-inch |
| ZMM5260B-13 | MiniMELF  | 10K/Tape & Reel, 13-inch |
| ZMM5261B-7  | MiniMELF  | 2.5K/Tape & Reel, 7-inch |
| ZMM5261B-13 | MiniMELF  | 10K/Tape & Reel, 13-inch |
| ZMM5262B-7  | MiniMELF  | 2.5K/Tape & Reel, 7-inch |
| ZMM5262B-13 | MiniMELF  | 10K/Tape & Reel, 13-inch |
| ZMM5263B-7  | MiniMELF  | 2.5K/Tape & Reel, 7-inch |
| ZMM5263B-13 | MiniMELF  | 10K/Tape & Reel, 13-inch |
| ZMM5264B-7  | MiniMELF  | 2.5K/Tape & Reel, 7-inch |
| ZMM5264B-13 | MiniMELF  | 10K/Tape & Reel, 13-inch |
| ZMM5265B-7  | MiniMELF  | 2.5K/Tape & Reel, 7-inch |
| ZMM5265B-13 | MiniMELF  | 10K/Tape & Reel, 13-inch |
| ZMM5266B-7  | MiniMELF  | 2.5K/Tape & Reel, 7-inch |
| ZMM5266B-13 | MiniMELF  | 10K/Tape & Reel, 13-inch |
| ZMM5267B-7  | MiniMELF  | 2.5K/Tape & Reel, 7-inch |
| ZMM5267B-13 | MiniMELF  | 10K/Tape & Reel, 13-inch |

Notes: 4. For packaging details, visit our website at <http://www.diodes.com/datasheets/ap02007.pdf>