

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 |
| A | 3.30 | 3.70 |
| B | 1.30 | 1.60 |
| C | 0.28 | 0.50 |
| All Dimensions in mm | | |

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_A = 25°C unless otherwise specified

| Type Number | Zener Voltage Range (Note 2) | | | | Maximum Zener Impedance | | Maximum Reverse Current | | Typical Temperature Coefficient @ I _{ZT} |
|-------------|----------------------------------|---------|---------|-----------------|-----------------------------------|--|-------------------------|------------------|---|
| | V _Z @ I _{ZT} | | | I _{ZT} | Z _{ZT} @ I _{ZT} | Z _{ZK} @ I _{ZK} = 0.25mA | I _R | @ V _R | |
| | 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_p ≤ 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>