# Small Signal Zener Diodes

## FEATURES

- Very sharp reverse characteristic
- Low reverse current level
- Very high stability
- Low noise
- $V_Z$-tolerance ± 1 %
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

RoHS COMPLIANT

## APPLICATION

- Voltage stabilization

## LINKS TO ADDITIONAL RESOURCES

3D Models | Marking | Parametric Search | Order Samples

| PRIMARY CHARACTERISTICS | | |
|---|---|---|
| PARAMETER | VALUE | UNIT |
| $V_Z$ range nom. | 4.7 to 30 | V |
| Test current $I_{ZT}$ | 1; 5 | mA |
| $V_Z$ specification | Pulse current | |
| Int. construction | Single | |

| ORDERING INFORMATION | | | |
|---|---|---|---|
| DEVICE NAME | ORDERING CODE | TAPED UNITS PER REEL | MINIMUM ORDER QUANTITY |
| TZMA-series | TZMA-series-GS08 | 2500 (8 mm tape on 7" reel) | 12 500/box |

| PACKAGE | | | | |
|---|---|---|---|---|
| PACKAGE NAME | WEIGHT | MOLDING COMPOUND FLAMMABILITY RATING | MOISTURE SENSITIVITY LEVEL | SOLDERING CONDITIONS |
| MiniMELF (SOD-80) | approx. 31 mg | UL 94 V-0 | MSL level 1 (according J-STD-020) | 260 °C/10 s at terminals |

| ABSOLUTE MAXIMUM RATINGS ($T_{amb}$ = 25 °C, unless otherwise specified) | | | | |
|---|---|---|---|---|
| PARAMETER | TEST CONDITION | SYMBOL | VALUE | UNIT |
| Power dissipation | $R_{thJA} \leq 300$ K/W | $P_{tot}$ | 500 | mW |
| Zener current | | $I_Z$ | $P_{tot}/V_Z$ | mA |
| Junction to ambient air | On PC board 50 mm x 50 mm x 1.6 mm | $R_{thJA}$ | 500 | K/W |
| Junction to lead | | $R_{thJL}$ | 300 | K/W |
| Junction temperature | | $T_j$ | 175 | °C |
| Storage temperature range | | $T_{stg}$ | -65 to +175 | °C |
| Forward voltage (max.) | $I_F$ = 200 mA | $V_F$ | 1.5 | V |

**ELECTRICAL CHARACTERISTICS** ($T_{amb}$ = 25 °C, unless otherwise specified)

| PART NUMBER | ZENER VOLTAGE RANGE | | | TEST CURRENT | | REVERSE LEAKAGE CURRENT | | | DYNAMIC RESISTANCE | | TEMPERATURE COEFFICIENT OF ZENER VOLTAGE | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $V_Z$ at $I_{ZT1}$ | | | $I_{ZT1}$ | $I_{ZT2}$ | $I_R$ at $V_R$ | | | $Z_Z$ at $I_{ZT1}$ | $Z_{ZK}$ at $I_{ZT2}$ | $TK_{VZ}$ | |
| | V | | | mA | | µA | | V | Ω | | %/K | |
| | MIN. | NOM. | MAX. | | | | | | TYP. | TYP. | MIN. | MAX. |
| TZMA4V7 | 4.65 | 4.7 | 4.75 | 5 | 1 | < 0.5 | < 10 | 1 | < 80 | < 600 | -0.05 | 0.02 |
| TZMA5V1 | 5.05 | 5.1 | 5.15 | 5 | 1 | < 0.1 | < 2 | 1 | < 60 | < 550 | -0.02 | 0.02 |
| TZMA5V6 | 5.54 | 5.6 | 5.66 | 5 | 1 | < 0.1 | < 2 | 1 | < 40 | < 450 | -0.05 | 0.05 |
| TZMA6V2 | 6.14 | 6.2 | 6.26 | 5 | 1 | < 0.1 | < 2 | 2 | < 10 | < 200 | 0.03 | 0.06 |
| TZMA6V8 | 6.73 | 6.8 | 6.87 | 5 | 1 | < 0.1 | < 2 | 3 | < 8 | < 150 | 0.03 | 0.07 |
| TZMA7V5 | 7.42 | 7.5 | 7.58 | 5 | 1 | < 0.1 | < 2 | 5 | < 7 | < 50 | 0.03 | 0.07 |
| TZMA8V2 | 8.12 | 8.2 | 8.28 | 5 | 1 | < 0.1 | < 2 | 6.2 | < 7 | < 50 | 0.03 | 0.08 |
| TZMA9V1 | 9.01 | 9.1 | 9.19 | 5 | 1 | < 0.1 | < 2 | 6.8 | < 10 | < 50 | 0.03 | 0.09 |
| TZMA10 | 9.90 | 10 | 10.10 | 5 | 1 | < 0.1 | < 2 | 7.5 | < 15 | < 70 | 0.03 | 0.1 |
| TZMA11 | 10.89 | 11 | 11.11 | 5 | 1 | < 0.1 | < 2 | 8.2 | < 20 | < 70 | 0.03 | 0.11 |
| TZMA12 | 11.88 | 12 | 12.12 | 5 | 1 | < 0.1 | < 2 | 9.1 | < 20 | < 90 | 0.03 | 0.11 |
| TZMA13 | 12.87 | 13 | 13.13 | 5 | 1 | < 0.1 | < 2 | 10 | < 26 | < 110 | 0.03 | 0.11 |
| TZMA15 | 14.85 | 15 | 15.15 | 5 | 1 | < 0.1 | < 2 | 11 | < 30 | < 110 | 0.03 | 0.11 |
| TZMA16 | 15.84 | 16 | 16.16 | 5 | 1 | < 0.1 | < 2 | 12 | < 40 | < 170 | 0.03 | 0.11 |
| TZMA18 | 17.82 | 18 | 18.18 | 5 | 1 | < 0.1 | < 2 | 13 | < 50 | < 170 | 0.03 | 0.11 |
| TZMA20 | 19.80 | 20 | 20.20 | 5 | 1 | < 0.1 | < 2 | 15 | < 55 | < 220 | 0.03 | 0.11 |
| TZMA30 | 29.70 | 30 | 30.30 | 5 | 1 | < 0.1 | < 2 | 22 | < 80 | < 220 | 0.04 | 0.12 |

**TYPICAL CHARACTERISTICS** ($T_{amb}$ = 25 °C, unless otherwise specified)

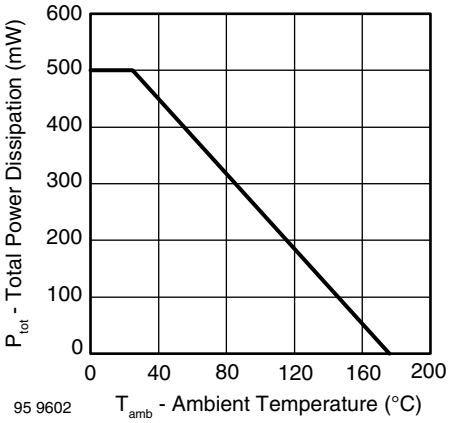



Fig. 1 - Total Power Dissipation vs. Ambient Temperature

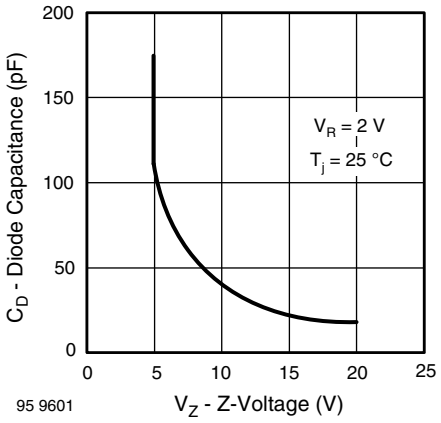



Fig. 4 - Diode Capacitance vs. Z-Voltage

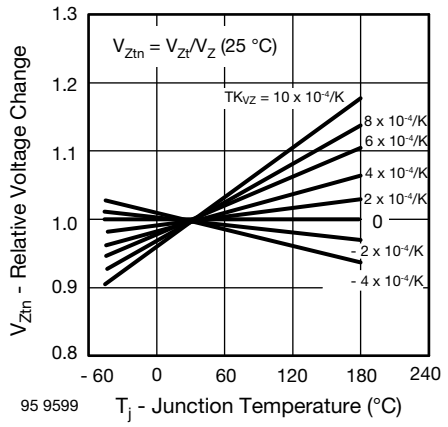



Fig. 2 - Typical Change of Working Voltage vs. Junction Temperature

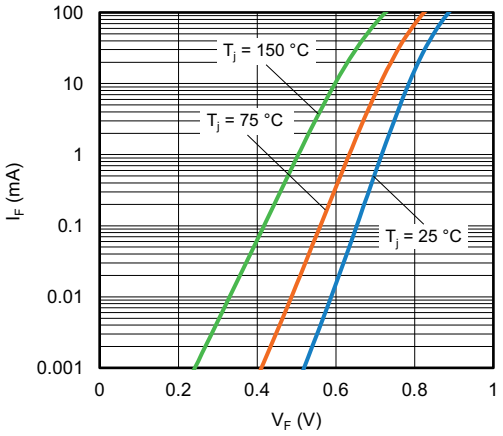



Fig. 5 - Typical Forward Current $I_F$ vs. Forward Voltage $V_F$

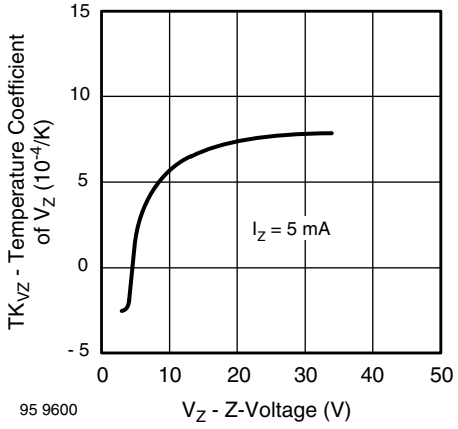



Fig. 3 - Typical Temperature Coefficient of $V_Z$ vs. Z-Voltage

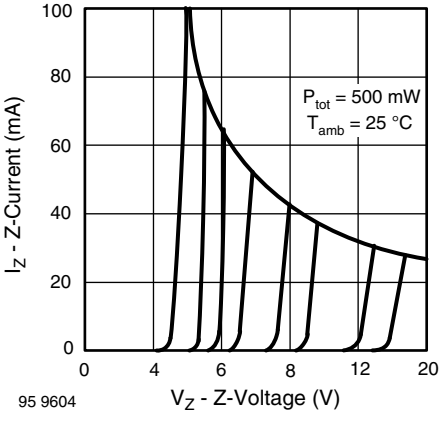



Fig. 6 - Typical Z-Current vs. Z-Voltage

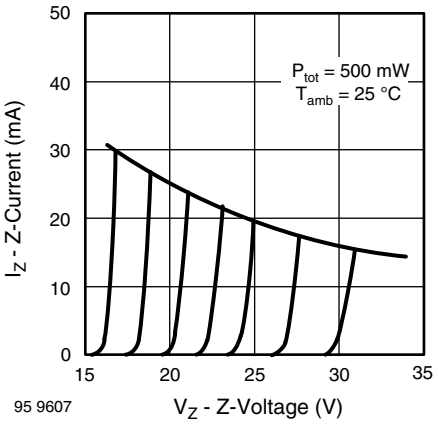



Fig. 7 - Typical Z-Current vs. Z-Voltage

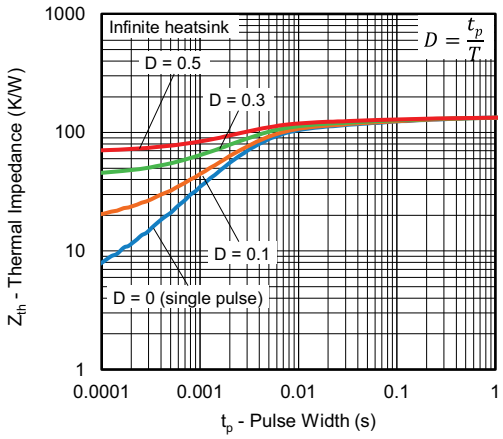
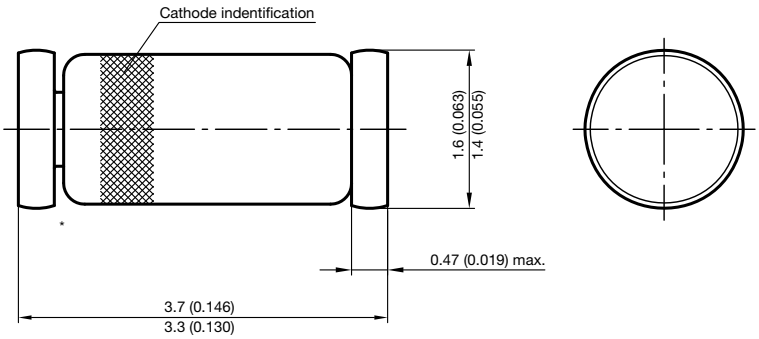
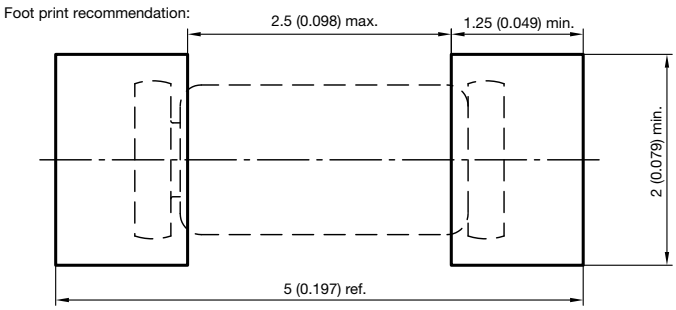



Fig. 8 - Typical Thermal Response

**PACKAGE DIMENSIONS** in millimeters (inches): **MiniMELF (SOD-80)**

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