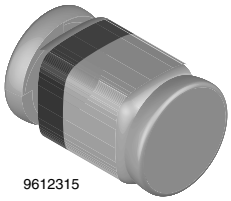
# Small Signal Zener Diodes

## Features

- Saving space
- Hermetic sealed parts
- Electrical data identical with the devices BZT55..Series/TZM..Series
- Fits onto SOD-323/SOD-110 footprints
- Very sharp reverse characteristic
- Low reverse current level
- Very high stability
- Low noise
- Available with tighter tolerances
- AEC-Q101 qualified
- Compliant to RoHS directive 2002/95/EC and in accordance to WEEE 2002/96/EC
- Halogen-free according to IEC 61249-2-21 definition

RoHS COMPLIANT

HALOGEN FREE



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## Applications

- Voltage stabilization

## Mechanical Data

**Case:** MicroMELF

**Weight:** approx. 12 mg

**Packaging codes/options:**

TR/2.5 k per 7" reel, 12.5 k/box

TR3/10 k per 13" reel, 10 k/box

### Absolute Maximum Ratings

$T_{amb}$ = 25 °C, unless otherwise specified

| Parameter | Test condition | Symbol | Value | Unit |
|---|---|---|---|---|
| Power dissipation | $R_{thJA} \leq 300$ K/W | $P_V$ | 500 | mW |
| Z-current | | $I_Z$ | $P_V/V_Z$ | mA |
| Junction temperature | | $T_j$ | 175 | °C |
| Storage temperature range | | $T_{stg}$ | - 65 to + 175 | °C |

## Thermal Characteristics

$T_{amb}$ = 25 °C, unless otherwise specified

| Parameter | Test condition | Symbol | Value | Unit |
|---|---|---|---|---|
| Junction to ambient air | Mounted on epoxy-glass hard tissue, fig. 1 | $R_{thJA}$ | 500 | K/W |
| Junction tie point | 35 µm copper clad, 0.9 $mm^2$ copper area per electrode | $R_{thJL}$ | 300 | K/W |

## Electrical Characteristics

$T_{amb}$ = 25 °C, unless otherwise specified

| Parameter | Test condition | Symbol | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Forward voltage | $I_F$ = 200 mA | $V_F$ | | | 1.5 | V |

## Electrical Characteristics

**BZM55C..**

| Part number | Zener voltage range [1] | | Dynamic resistance | | Test current | Temperature coefficient | | Test current | Reverse leakage current | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | $V_Z$ at $I_{ZT}$ | | $r_{zjT}$ at $I_{ZT}$, f = 1kHz | $r_{zjK}$ at $I_{ZK}$, f = 1kHz | $I_{ZT}$ | $TK_{VZ}$ | | $I_{ZK}$ | $I_R$ at $T_{amb}$ = 25 °C | $I_R$ at $T_{amb}$ = 150 °C | at $V_R$ |
| | V | | Ω | | mA | %/K | | mA | µA | | V |
| | min. | max. | | | | min. | max. | | | | |
| BZM55C2V4 | 2.28 | 2.56 | < 85 | < 600 | 5 | - 0.09 | - 0.06 | 1 | < 50 | < 100 | 1 |
| BZM55C2V7 | 2.5 | 2.9 | < 85 | < 600 | 5 | - 0.09 | - 0.06 | 1 | < 10 | < 50 | 1 |
| BZM55C3V0 | 2.8 | 3.2 | < 90 | < 600 | 5 | - 0.08 | - 0.05 | 1 | < 4 | < 40 | 1 |
| BZM55C3V3 | 3.1 | 3.5 | < 90 | < 600 | 5 | - 0.08 | - 0.05 | 1 | < 2 | < 40 | 1 |
| BZM55C3V6 | 3.4 | 3.8 | < 90 | < 600 | 5 | -0.08 | - 0.05 | 1 | < 2 | < 40 | 1 |
| BZM55C3V9 | 3.7 | 4.1 | < 90 | < 600 | 5 | - 0.08 | - 0.05 | 1 | < 2 | < 40 | 1 |
| BZM55C4V3 | 4 | 4.6 | < 90 | < 600 | 5 | - 0.06 | - 0.03 | 1 | < 1 | < 20 | 1 |
| BZM55C4V7 | 4.4 | 5 | < 80 | < 600 | 5 | - 0.05 | 0.02 | 1 | < 0.5 | < 10 | 1 |
| BZM55C5V1 | 4.8 | 5.4 | < 60 | < 550 | 5 | - 0.02 | 0.02 | 1 | < 0.1 | < 2 | 1 |
| BZM55C5V6 | 5.2 | 6 | < 40 | < 450 | 5 | - 0.05 | 0.05 | 1 | < 0.1 | < 2 | 1 |
| BZM55C6V2 | 5.8 | 6.6 | < 10 | < 200 | 5 | 0.03 | 0.06 | 1 | < 0.1 | < 2 | 2 |
| BZM55C6V8 | 6.4 | 7.2 | < 8 | < 150 | 5 | 0.03 | 0.07 | 1 | < 0.1 | < 2 | 3 |
| BZM55C7V5 | 7 | 7.9 | < 7 | < 50 | 5 | 0.03 | 0.07 | 1 | < 0.1 | < 2 | 5 |
| BZM55C8V2 | 7.7 | 8.7 | < 7 | < 50 | 5 | 0.03 | 0.08 | 1 | < 0.1 | < 2 | 6.2 |
| BZM55C9V1 * | 8.5 | 9.6 | < 10 | < 50 | 5 | 0.03 | 0.09 | 1 | < 0.1 | < 2 | 6.8 |
| BZM55C10 * | 9.4 | 0.6 | < 15 | < 70 | 5 | 0.03 | 0.1 | 1 | < 0.1 | < 2 | 7.5 |
| BZM55C11 * | 10.4 | 11.6 | < 20 | < 70 | 5 | 0.03 | 0.11 | 1 | < 0.1 | < 2 | 8.2 |
| BZM55C12 * | 11.4 | 12.7 | < 20 | < 90 | 5 | 0.03 | 0.11 | 1 | < 0.1 | < 2 | 9.1 |
| BZM55C13 * | 12.4 | 14.1 | < 26 | < 110 | 5 | 0.03 | 0.11 | 1 | < 0.1 | < 2 | 10 |
| BZM55C15 * | 13.8 | 15.6 | < 30 | < 110 | 5 | 0.03 | 0.11 | 1 | < 0.1 | < 2 | 11 |
| BZM55C16 * | 15.3 | 17.1 | < 40 | < 170 | 5 | 0.03 | 0.11 | 1 | < 0.1 | < 2 | 12 |
| BZM55C18 * | 16.8 | 19.1 | < 50 | < 170 | 5 | 0.03 | 0.11 | 1 | < 0.1 | < 2 | 13 |
| BZM55C20 * | 18.8 | 21.2 | < 55 | < 220 | 5 | 0.03 | 0.11 | 1 | < 0.1 | < 2 | 15 |
| BZM55C22 * | 20.8 | 23.3 | < 55 | < 220 | 5 | 0.04 | 0.12 | 1 | < 0.1 | < 2 | 16 |
| BZM55C24 * | 22.8 | 25.6 | < 80 | < 220 | 5 | 0.04 | 0.12 | 1 | < 0.1 | < 2 | 18 |
| BZM55C27 * | 25.1 | 28.9 | < 80 | < 220 | 5 | 0.04 | 0.12 | 1 | < 0.1 | < 2 | 20 |
| BZM55C30 * | 28 | 32 | < 80 | < 220 | 5 | 0.04 | 0.12 | 1 | < 0.1 | < 2 | 22 |
| BZM55C33 * | 31 | 35 | < 80 | < 220 | 5 | 0.04 | 0.12 | 1 | < 0.1 | < 2 | 24 |
| BZM55C36 * | 34 | 38 | < 80 | < 220 | 5 | 0.04 | 0.12 | 1 | < 0.1 | < 2 | 27 |
| BZM55C39 * | 37 | 41 | < 90 | < 500 | 2.5 | 0.04 | 0.12 | 0.5 | < 0.1 | < 5 | 30 |
| BZM55C43 * | 40 | 46 | < 90 | < 600 | 2.5 | 0.04 | 0.12 | 0.5 | < 0.1 | < 5 | 33 |
| BZM55C47 * | 44 | 50 | 110 | < 700 | 2.5 | 0.04 | 0.12 | 0.5 | < 0.1 | < 5 | 36 |
| BZM55C51 * | 48 | 54 | 125 | < 700 | 2.5 | 0.04 | 0.12 | 0.5 | < 0.1 | < 10 | 39 |
| BZM55C56 * | 52 | 60 | 135 | < 1000 | 2.5 | 0.04 | 0.12 | 0.5 | < 0.1 | < 10 | 43 |
| BZM55C62 * | 58 | 66 | 150 | < 1000 | 2.5 | 0.04 | 0.12 | 0.5 | < 0.1 | < 10 | 47 |
| BZM55C68 * | 64 | 72 | 200 | < 1000 | 2.5 | 0.04 | 0.12 | 0.5 | < 0.1 | < 10 | 51 |
| BZM55C75 * | 70 | 79 | 250 | < 1500 | 2.5 | 0.04 | 0.12 | 0.5 | < 0.1 | < 10 | 56 |

Notes:

[1] $t_p \leq 10$ ms, $T/t_p > 1000$

*) Additionnal measurement of voltage group 9V1 to 75 % at 95 % $V_{zmin.} \leq 35$ nA at $T_j$ 25 °C




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## Electrical Characteristics

**BZM55B..**

| Part number | Zener voltage range [1] | | Dynamic resistance | | Test current | Temperature coefficient | | Test current | Reverse leakage current | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | $V_Z$ at $I_{ZT}$ | | $r_{zjT}$ at $I_{ZT}$, f = 1kHz | $r_{zjK}$ at $I_{ZK}$, f = 1kHz | $I_{ZT}$ | $TK_{VZ}$ | | $I_{ZK}$ | $I_R$ at $T_{amb}$ = 25 °C | $I_R$ at $T_{amb}$ = 150 °C | at $V_R$ |
| | V | | Ω | | mA | %/K | | mA | µA | | V |
| | min. | max. | | | | min. | max. | | | | |
| BZM55B2V4 | 2.35 | 2.45 | < 85 | < 600 | 5 | - 0.09 | - 0.06 | 1 | < 50 | < 100 | 1 |
| BZM55B2V7 | 2.64 | 2.76 | < 85 | < 600 | 5 | - 0.09 | - 0.06 | 1 | < 10 | < 50 | 1 |
| BZM55B3V0 | 2.94 | 3.06 | < 90 | < 600 | 5 | - 0.08 | - 0.05 | 1 | < 4 | < 40 | 1 |
| BZM55B3V3 | 3.24 | 3.36 | < 90 | < 600 | 5 | - 0.08 | - 0.05 | 1 | < 2 | < 40 | 1 |
| BZM55B3V6 | 3.52 | 3.68 | < 90 | < 600 | 5 | - 0.08 | - 0.05 | 1 | < 2 | < 40 | 1 |
| BZM55B3V9 | 3.82 | 3.98 | < 90 | < 600 | 5 | - 0.08 | - 0.05 | 1 | < 2 | < 40 | 1 |
| BZM55B4V3 | 4.22 | 4.38 | < 90 | < 600 | 5 | - 0.06 | - 0.03 | 1 | < 1 | < 20 | 1 |
| BZM55B4V7 | 4.6 | 4.80 | < 80 | < 600 | 5 | - 0.05 | 0.02 | 1 | < 0.5 | < 10 | 1 |
| BZM55B5V1 | 5 | 5.20 | < 60 | < 550 | 5 | - 0.02 | 0.02 | 1 | < 0.1 | < 2 | 1 |
| BZM55B5V6 | 5.48 | 5.72 | < 40 | < 450 | 5 | - 0.05 | 0.05 | 1 | < 0.1 | < 2 | 1 |
| BZM55B6V2 | 6.08 | 6.32 | < 10 | < 200 | 5 | 0.03 | 0.06 | 1 | < 0.1 | < 2 | 2 |
| BZM55B6V8 | 6.66 | 6.94 | < 8 | < 150 | 5 | 0.03 | 0.07 | 1 | < 0.1 | < 2 | 3 |
| BZM55B7V5 | 7.35 | 7.65 | < 7 | < 50 | 5 | 0.03 | 0.07 | 1 | < 0.1 | < 2 | 5 |
| BZM55B8V2 | 8.04 | 8.36 | < 7 | < 50 | 5 | 0.03 | 0.08 | 1 | < 0.1 | < 2 | 6.2 |
| BZM55B9V1 * | 8.92 | 9.28 | < 10 | < 50 | 5 | 0.03 | 0.09 | 1 | < 0.1 | < 2 | 6.8 |
| BZM55B10 * | 9.8 | 10.20 | < 15 | < 70 | 5 | 0.03 | 0.1 | 1 | < 0.1 | < 2 | 7.5 |
| BZM55B11 * | 10.78 | 11.22 | < 20 | < 70 | 5 | 0.03 | 0.11 | 1 | < 0.1 | < 2 | 8.2 |
| BZM55B12 * | 11.76 | 12.24 | < 20 | < 90 | 5 | 0.03 | 0.11 | 1 | < 0.1 | < 2 | 9.1 |
| BZM55B13 * | 12.74 | 13.26 | < 26 | < 110 | 5 | 0.03 | 0.11 | 1 | < 0.1 | < 2 | 10 |
| BZM55B15 * | 14.7 | 15.30 | < 30 | < 110 | 5 | 0.03 | 0.11 | 1 | < 0.1 | < 2 | 11 |
| BZM55B16 * | 15.7 | 16.30 | < 40 | < 170 | 5 | 0.03 | 0.11 | 1 | < 0.1 | < 2 | 12 |
| BZM55B18 * | 17.64 | 18.36 | < 50 | < 170 | 5 | 0.03 | 0.11 | 1 | < 0.1 | < 2 | 13 |
| BZM55B20 * | 19.6 | 20.40 | < 55 | < 220 | 5 | 0.03 | 0.11 | 1 | < 0.1 | < 2 | 15 |
| BZM55B22 * | 21.55 | 22.45 | < 55 | < 220 | 5 | 0.04 | 0.12 | 1 | < 0.1 | < 2 | 16 |
| BZM55B24 * | 23.5 | 24.5 | < 80 | < 220 | 5 | 0.04 | 0.12 | 1 | < 0.1 | < 2 | 18 |
| BZM55B27 * | 26.4 | 27.6 | < 80 | < 220 | 5 | 0.04 | 0.12 | 1 | < 0.1 | < 2 | 20 |
| BZM55B30 * | 29.4 | 30.6 | < 80 | < 220 | 5 | 0.04 | 0.12 | 1 | < 0.1 | < 2 | 22 |
| BZM55B33 * | 32.4 | 33.6 | < 80 | < 220 | 5 | 0.04 | 0.12 | 1 | < 0.1 | < 2 | 24 |
| BZM55B36 * | 35.3 | 36.7 | < 80 | < 220 | 5 | 0.04 | 0.12 | 1 | < 0.1 | < 2 | 27 |
| BZM55B39 * | 38.2 | 39.8 | < 90 | < 500 | 2.5 | 0.04 | 0.12 | 1 | < 0.1 | < 5 | 30 |
| BZM55B43 * | 42.1 | 43.9 | < 90 | < 600 | 2.5 | 0.04 | 0.12 | 0.5 | < 0.1 | < 5 | 33 |
| BZM55B47 * | 46.1 | 47.9 | < 110 | < 700 | 2.5 | 0.04 | 0.12 | 0.5 | < 0.1 | < 5 | 36 |
| BZM55B51 * | 50 | 52.0 | < 125 | < 700 | 2.5 | 0.04 | 0.12 | 0.5 | < 0.1 | < 10 | 39 |
| BZM55B56 * | 54.9 | 57.1 | < 135 | < 1000 | 2.5 | 0.04 | 0.12 | 0.5 | < 0.1 | < 10 | 43 |
| BZM55B62 * | 60.8 | 63.2 | < 150 | < 1000 | 2.5 | 0.04 | 0.12 | 0.5 | < 0.1 | < 10 | 47 |
| BZM55B68 * | 66.6 | 69.4 | < 200 | < 1000 | 2.5 | 0.04 | 0.12 | 0.5 | < 0.1 | < 10 | 51 |
| BZM55B75 * | 73.5 | 76.5 | < 250 | < 1500 | 2.5 | 0.04 | 0.12 | 0.5 | < 0.1 | < 10 | 56 |

Notes:

[1] $t_p \leq 10$ ms, $T/t_p > 1000$

[*] Additionnal measurement of voltage group 9V1 to 75 % at 95 % $V_{zmin.} \leq 35$ nA at $T_j$ 25 °C

## Typical Characteristics

$T_{amb}$ = 25 °C, unless otherwise specified

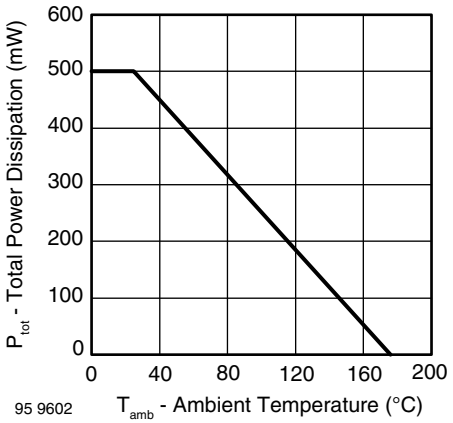



Figure 1. Total Power Dissipation vs. Ambient Temperature

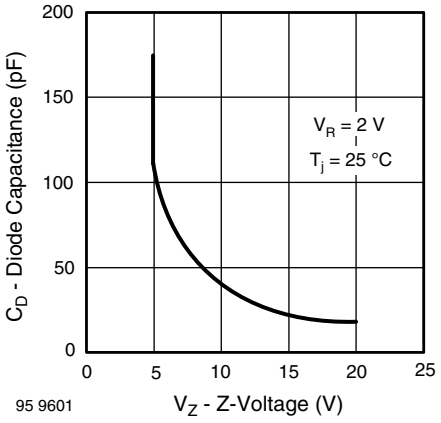



Figure 4. Diode Capacitance vs. Z-Voltage

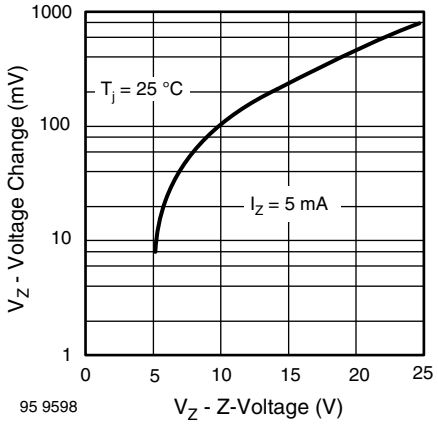



Figure 2. Typical Change of Working Voltage under Operating Conditions at $T_{amb}$=25°C

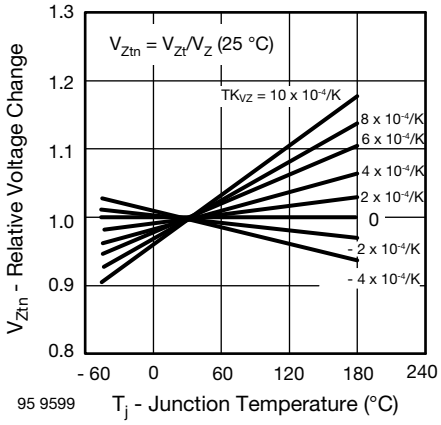



Figure 5. Typical Change of Working Voltage vs. Junction Temperature

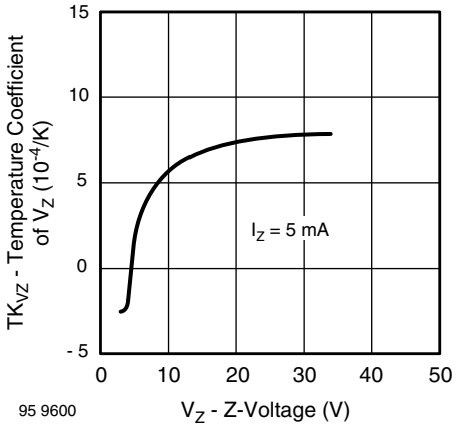



Figure 3. Temperature Coefficient of Vz vs. Z-Voltage

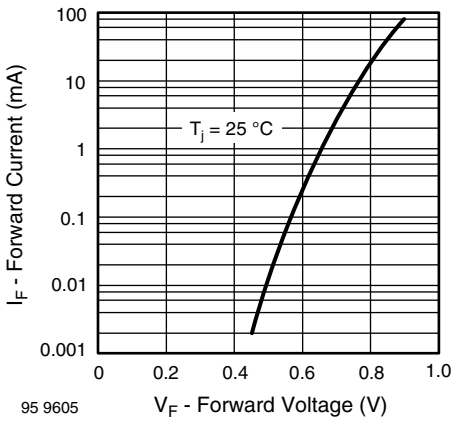



Figure 6. Forward Current vs. Forward Voltage

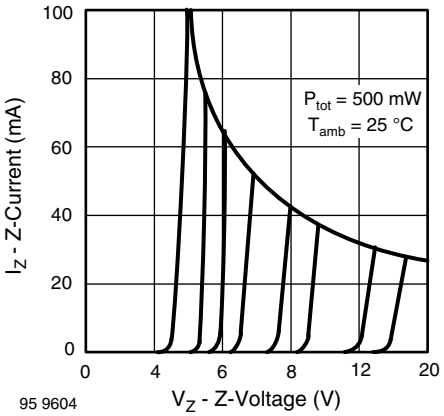



Figure 7. Z-Current vs. Z-Voltage

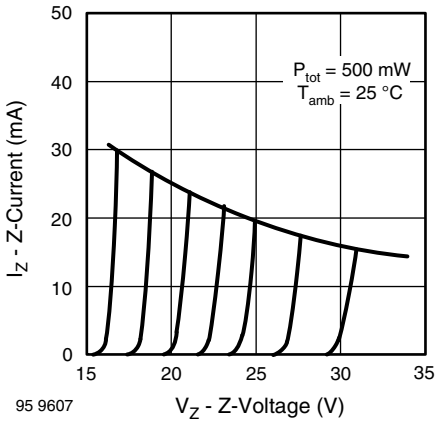



Figure 8. Z-Current vs. Z-Voltage

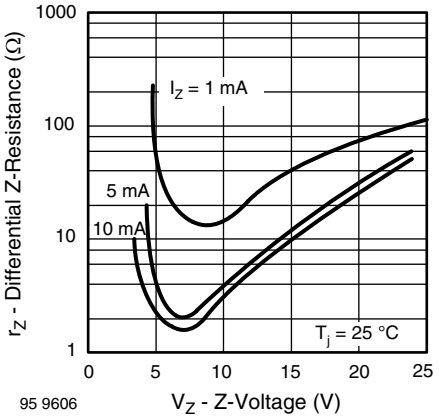



Figure 9. Differential Z-Resistance vs. Z-Voltage

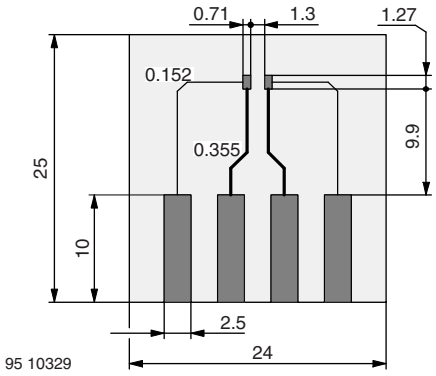



Figure 10. Board for $R_{thJA}$ Definition (in mm)

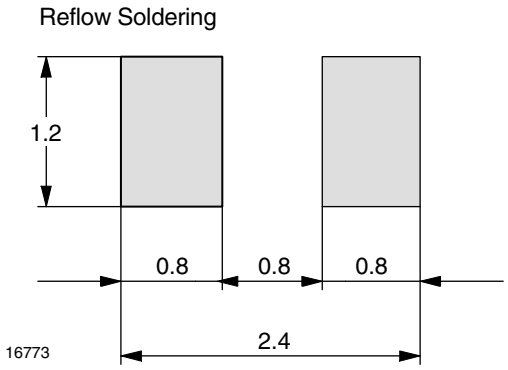



Figure 11. Recommended Foot Pads (in mm)

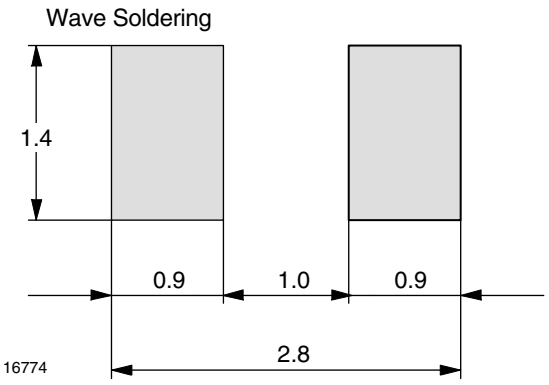



Figure 12. Recommended Foot Pads (in mm)

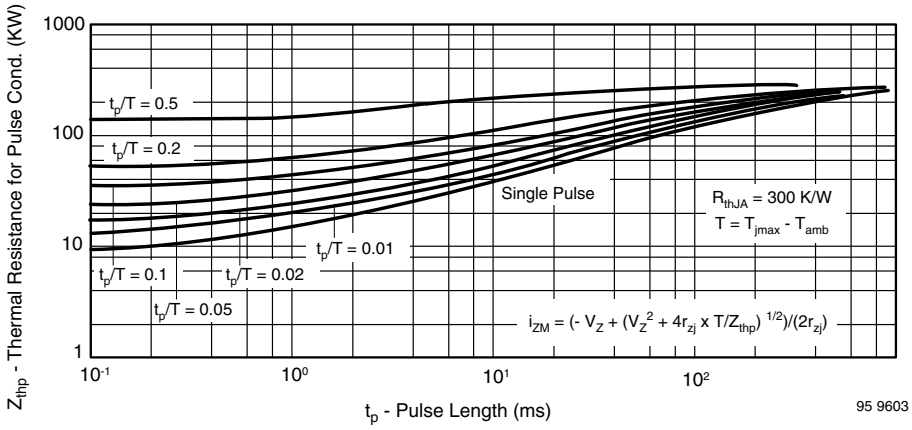
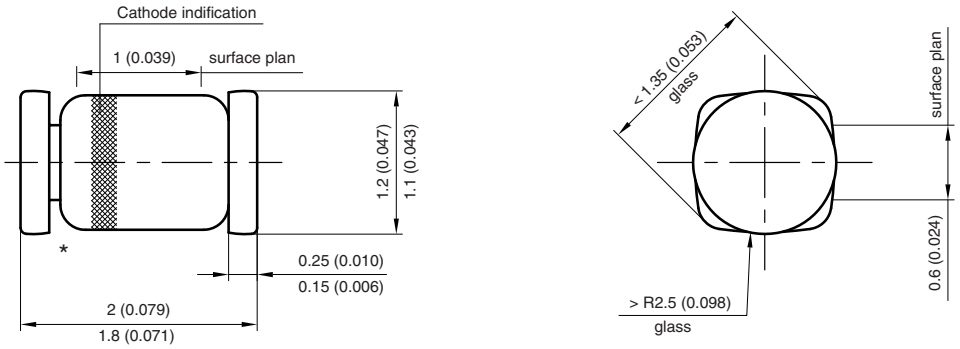


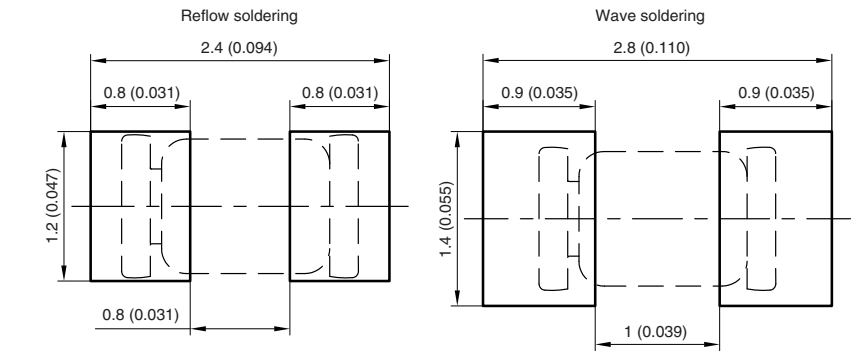

Figure 13. Thermal Response

## **Package Dimensions** in millimeters (inches): **MicroMELF**




* The gap between plug and glass can be either on cathode or anode side

Foot print recommendation:

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