

## Small Signal Zener Diodes



### FEATURES

- Saving space
- Hermetic sealed parts
- Electrical data identical with the devices BZT55..series, TZM..series
- Fits onto SOD-323
- Very sharp reverse characteristic
- Low reverse current level
- Very high stability
- Low noise
- 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**

### PRIMARY CHARACTERISTICS

| PARAMETER                    | VALUE         | UNIT |
|------------------------------|---------------|------|
| V <sub>Z</sub> range nom.    | 2.4 to 75     | V    |
| Test current I <sub>ZT</sub> | 2.5; 5        | mA   |
| V <sub>Z</sub> specification | Pulse current |      |
| Int. construction            | Single        |      |

### APPLICATIONS

- Voltage stabilization

### ORDERING INFORMATION

| DEVICE NAME  | ORDERING CODE    | TAPED UNITS PER REEL           | MINIMUM ORDER QUANTITY |
|--------------|------------------|--------------------------------|------------------------|
| BZM55-series | BZM55-series-TR3 | 10 000 (8 mm tape on 13" reel) | 10 000                 |
| BZM55-series | BZM55-series-TR  | 2500 (8 mm tape on 7" reel)    | 12 500                 |

### PACKAGE

| PACKAGE NAME | WEIGHT | MOLDING COMPOUND FLAMMABILITY RATING | MOISTURE SENSITIVITY LEVEL           | SOLDERING CONDITIONS     |
|--------------|--------|--------------------------------------|--------------------------------------|--------------------------|
| MicroMELF    | 12 mg  | UL 94 V-0                            | MSL level 1<br>(according J-STD-020) | 260 °C/10 s at terminals |

### ABSOLUTE MAXIMUM RATINGS (T<sub>amb</sub> = 25 °C, unless otherwise specified)

| PARAMETER                 | TEST CONDITION                                                   | SYMBOL            | VALUE                            | UNIT |
|---------------------------|------------------------------------------------------------------|-------------------|----------------------------------|------|
| Power dissipation         | R <sub>thJA</sub> ≤ 300 K/W                                      | P <sub>tot</sub>  | 500                              | mW   |
| Junction to ambient air   | Mounted on epoxy-glass hard tissue, fig. 1                       | R <sub>thJA</sub> | 500                              | K/W  |
| Junction tie point        | 35 µm copper clad, 0.9 mm <sup>2</sup> copper area per electrode | R <sub>thJL</sub> | 300                              | K/W  |
| Junction temperature      |                                                                  | T <sub>j</sub>    | 175                              | °C   |
| Storage temperature range |                                                                  | T <sub>stg</sub>  | - 65 to + 175                    | °C   |
| Zener current             |                                                                  | I <sub>Z</sub>    | P <sub>tot</sub> /V <sub>Z</sub> | mA   |
| Forward voltage           | I <sub>F</sub> = 200 mA                                          | V <sub>F</sub>    | 1.5                              | V    |

**ELECTRICAL CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)

| PART NUMBER | ZENER VOLTAGE RANGE <sup>(1)</sup> |      |      | TEST CURRENT     |                  | REVERSE LEAKAGE CURRENT          |                              |     | DYNAMIC RESISTANCE                 |                                     | TEMPERATURE COEFFICIENT |        |
|-------------|------------------------------------|------|------|------------------|------------------|----------------------------------|------------------------------|-----|------------------------------------|-------------------------------------|-------------------------|--------|
|             | V <sub>Z</sub> at I <sub>ZT1</sub> |      |      | I <sub>ZT1</sub> | I <sub>ZT2</sub> | I <sub>R</sub> at V <sub>R</sub> |                              |     | Z <sub>Z</sub> at I <sub>ZT1</sub> | Z <sub>ZK</sub> at I <sub>ZT2</sub> | TK <sub>VZ</sub>        |        |
|             |                                    |      |      |                  |                  | at T <sub>amb</sub> = 25 °C      | at T <sub>amb</sub> = 125 °C |     | f = 1 kHz                          |                                     |                         |        |
|             | V                                  |      |      | mA               |                  | µA                               |                              | V   | Ω                                  |                                     | % / K                   |        |
|             | MIN.                               | NOM. | MAX. |                  |                  |                                  |                              |     | MAX.                               | MAX.                                | MIN.                    | MAX.   |
| BZM55C2V4   | 2.28                               | 2.4  | 2.56 | 5                | 1                | < 50                             | < 100                        | 1   | < 85                               | < 600                               | - 0.09                  | - 0.06 |
| BZM55C2V7   | 2.5                                | 2.7  | 2.9  | 5                | 1                | < 10                             | < 50                         | 1   | < 85                               | < 600                               | - 0.09                  | - 0.06 |
| BZM55C3V0   | 2.8                                | 3.0  | 3.2  | 5                | 1                | < 4                              | < 40                         | 1   | < 90                               | < 600                               | - 0.08                  | - 0.05 |
| BZM55C3V3   | 3.1                                | 3.3  | 3.5  | 5                | 1                | < 2                              | < 40                         | 1   | < 90                               | < 600                               | - 0.08                  | - 0.05 |
| BZM55C3V6   | 3.4                                | 3.6  | 3.8  | 5                | 1                | < 2                              | < 40                         | 1   | < 90                               | < 600                               | -0.08                   | - 0.05 |
| BZM55C3V9   | 3.7                                | 3.9  | 4.1  | 5                | 1                | < 2                              | < 40                         | 1   | < 90                               | < 600                               | - 0.08                  | - 0.05 |
| BZM55C4V3   | 4                                  | 4.3  | 4.6  | 5                | 1                | < 1                              | < 20                         | 1   | < 90                               | < 600                               | - 0.06                  | - 0.03 |
| BZM55C4V7   | 4.4                                | 4.7  | 5    | 5                | 1                | < 0.5                            | < 10                         | 1   | < 80                               | < 600                               | - 0.05                  | 0.02   |
| BZM55C5V1   | 4.8                                | 5.1  | 5.4  | 5                | 1                | < 0.1                            | < 2                          | 1   | < 60                               | < 550                               | - 0.02                  | 0.02   |
| BZM55C5V6   | 5.2                                | 5.6  | 6    | 5                | 1                | < 0.1                            | < 2                          | 1   | < 40                               | < 450                               | - 0.05                  | 0.05   |
| BZM55C6V2   | 5.8                                | 6.2  | 6.6  | 5                | 1                | < 0.1                            | < 2                          | 2   | < 10                               | < 200                               | 0.03                    | 0.06   |
| BZM55C6V8   | 6.4                                | 6.8  | 7.2  | 5                | 1                | < 0.1                            | < 2                          | 3   | < 8                                | < 150                               | 0.03                    | 0.07   |
| BZM55C7V5   | 7                                  | 7.5  | 7.9  | 5                | 1                | < 0.1                            | < 2                          | 5   | < 7                                | < 50                                | 0.03                    | 0.07   |
| BZM55C8V2   | 7.7                                | 8.2  | 8.7  | 5                | 1                | < 0.1                            | < 2                          | 6.2 | < 7                                | < 50                                | 0.03                    | 0.08   |
| BZM55C9V1   | 8.5                                | 9.1  | 9.6  | 5                | 1                | < 0.1                            | < 2                          | 6.8 | < 10                               | < 50                                | 0.03                    | 0.09   |
| BZM55C10    | 9.4                                | 10   | 10.6 | 5                | 1                | < 0.1                            | < 2                          | 7.5 | < 15                               | < 70                                | 0.03                    | 0.1    |
| BZM55C11    | 10.4                               | 11   | 11.6 | 5                | 1                | < 0.1                            | < 2                          | 8.2 | < 20                               | < 70                                | 0.03                    | 0.11   |
| BZM55C12    | 11.4                               | 12   | 12.7 | 5                | 1                | < 0.1                            | < 2                          | 9.1 | < 20                               | < 90                                | 0.03                    | 0.11   |
| BZM55C13    | 12.4                               | 13   | 14.1 | 5                | 1                | < 0.1                            | < 2                          | 10  | < 26                               | < 110                               | 0.03                    | 0.11   |
| BZM55C15    | 13.8                               | 15   | 15.6 | 5                | 1                | < 0.1                            | < 2                          | 11  | < 30                               | < 110                               | 0.03                    | 0.11   |
| BZM55C16    | 15.3                               | 16   | 17.1 | 5                | 1                | < 0.1                            | < 2                          | 12  | < 40                               | < 170                               | 0.03                    | 0.11   |
| BZM55C18    | 16.8                               | 18   | 19.1 | 5                | 1                | < 0.1                            | < 2                          | 13  | < 50                               | < 170                               | 0.03                    | 0.11   |
| BZM55C20    | 18.8                               | 20   | 21.2 | 5                | 1                | < 0.1                            | < 2                          | 15  | < 55                               | < 220                               | 0.03                    | 0.11   |
| BZM55C22    | 20.8                               | 22   | 23.3 | 5                | 1                | < 0.1                            | < 2                          | 16  | < 55                               | < 220                               | 0.04                    | 0.12   |
| BZM55C24    | 22.8                               | 24   | 25.6 | 5                | 1                | < 0.1                            | < 2                          | 18  | < 80                               | < 220                               | 0.04                    | 0.12   |
| BZM55C27    | 25.1                               | 27   | 28.9 | 5                | 1                | < 0.1                            | < 2                          | 20  | < 80                               | < 220                               | 0.04                    | 0.12   |
| BZM55C30    | 28                                 | 30   | 32   | 5                | 1                | < 0.1                            | < 2                          | 22  | < 80                               | < 220                               | 0.04                    | 0.12   |
| BZM55C33    | 31                                 | 33   | 35   | 5                | 1                | < 0.1                            | < 2                          | 24  | < 80                               | < 220                               | 0.04                    | 0.12   |
| BZM55C36    | 34                                 | 36   | 38   | 5                | 1                | < 0.1                            | < 2                          | 27  | < 80                               | < 220                               | 0.04                    | 0.12   |
| BZM55C39    | 37                                 | 39   | 41   | 2.5              | 0.5              | < 0.1                            | < 5                          | 30  | < 90                               | < 500                               | 0.04                    | 0.12   |
| BZM55C43    | 40                                 | 43   | 46   | 2.5              | 0.5              | < 0.1                            | < 5                          | 33  | < 90                               | < 600                               | 0.04                    | 0.12   |
| BZM55C47    | 44                                 | 47   | 50   | 2.5              | 0.5              | < 0.1                            | < 5                          | 36  | 110                                | < 700                               | 0.04                    | 0.12   |
| BZM55C51    | 48                                 | 51   | 54   | 2.5              | 0.5              | < 0.1                            | < 10                         | 39  | 125                                | < 700                               | 0.04                    | 0.12   |
| BZM55C56    | 52                                 | 56   | 60   | 2.5              | 0.5              | < 0.1                            | < 10                         | 43  | 135                                | < 1000                              | 0.04                    | 0.12   |
| BZM55C62    | 58                                 | 62   | 66   | 2.5              | 0.5              | < 0.1                            | < 10                         | 47  | 150                                | < 1000                              | 0.04                    | 0.12   |
| BZM55C68    | 64                                 | 68   | 72   | 2.5              | 0.5              | < 0.1                            | < 10                         | 51  | 200                                | < 1000                              | 0.04                    | 0.12   |
| BZM55C75    | 70                                 | 75   | 79   | 2.5              | 0.5              | < 0.1                            | < 10                         | 56  | 250                                | < 1500                              | 0.04                    | 0.12   |

**Notes**

- Additional measurement of voltage group 9V1 to 75 at 95 %  $V_{Zmin.} \leq 35\text{ nA}$  at  $T_j = 25\text{ }^{\circ}\text{C}$

<sup>(1)</sup>  $t_p \leq 10\text{ ms}$ ,  $T/t_p > 1000$



| ELECTRICAL CHARACTERISTICS (T <sub>amb</sub> = 25 °C, unless otherwise specified) |                                    |      |       |                  |                  |                                  |                              |     |                                    |                                     |                         |        |
|-----------------------------------------------------------------------------------|------------------------------------|------|-------|------------------|------------------|----------------------------------|------------------------------|-----|------------------------------------|-------------------------------------|-------------------------|--------|
| PART NUMBER                                                                       | ZENER VOLTAGE RANGE <sup>(1)</sup> |      |       | TEST CURRENT     |                  | REVERSE LEAKAGE CURRENT          |                              |     | DYNAMIC RESISTANCE                 |                                     | TEMPERATURE COEFFICIENT |        |
|                                                                                   | V <sub>Z</sub> at I <sub>ZT1</sub> |      |       | I <sub>ZT1</sub> | I <sub>ZT2</sub> | I <sub>R</sub> at V <sub>R</sub> |                              |     | Z <sub>Z</sub> at I <sub>ZT1</sub> | Z <sub>ZK</sub> at I <sub>ZT2</sub> | TK <sub>VZ</sub>        |        |
|                                                                                   |                                    |      |       |                  |                  | at T <sub>amb</sub> = 25 °C      | at T <sub>amb</sub> = 125 °C |     | f = 1 kHz                          |                                     |                         |        |
|                                                                                   | V                                  |      |       | mA               |                  | µA                               |                              | V   | Ω                                  |                                     | % / K                   |        |
|                                                                                   | MIN.                               | NOM. | MAX.  |                  |                  |                                  |                              |     | MAX.                               | MAX.                                | MIN.                    | MAX.   |
| BZM55B2V4                                                                         | 2.35                               | 2.4  | 2.45  | 5                | 1                | < 50                             | < 100                        | 1   | < 85                               | < 600                               | - 0.09                  | - 0.06 |
| BZM55B2V7                                                                         | 2.64                               | 2.7  | 2.76  | 5                | 1                | < 10                             | < 50                         | 1   | < 85                               | < 600                               | - 0.09                  | - 0.06 |
| BZM55B3V0                                                                         | 2.94                               | 3.0  | 3.06  | 5                | 1                | < 4                              | < 40                         | 1   | < 90                               | < 600                               | - 0.08                  | - 0.05 |
| BZM55B3V3                                                                         | 3.24                               | 3.3  | 3.36  | 5                | 1                | < 2                              | < 40                         | 1   | < 90                               | < 600                               | - 0.08                  | - 0.05 |
| BZM55B3V6                                                                         | 3.52                               | 3.6  | 3.68  | 5                | 1                | < 2                              | < 40                         | 1   | < 90                               | < 600                               | - 0.08                  | - 0.05 |
| BZM55B3V9                                                                         | 3.82                               | 3.9  | 3.98  | 5                | 1                | < 2                              | < 40                         | 1   | < 90                               | < 600                               | - 0.08                  | - 0.05 |
| BZM55B4V3                                                                         | 4.22                               | 4.3  | 4.38  | 5                | 1                | < 1                              | < 20                         | 1   | < 90                               | < 600                               | - 0.06                  | - 0.03 |
| BZM55B4V7                                                                         | 4.6                                | 4.7  | 4.8   | 5                | 1                | < 0.5                            | < 10                         | 1   | < 80                               | < 600                               | - 0.05                  | 0.02   |
| BZM55B5V1                                                                         | 5                                  | 5.1  | 5.2   | 5                | 1                | < 0.1                            | < 2                          | 1   | < 60                               | < 550                               | - 0.02                  | 0.02   |
| BZM55B5V6                                                                         | 5.48                               | 5.6  | 5.72  | 5                | 1                | < 0.1                            | < 2                          | 1   | < 40                               | < 450                               | - 0.05                  | 0.05   |
| BZM55B6V2                                                                         | 6.08                               | 6.2  | 6.32  | 5                | 1                | < 0.1                            | < 2                          | 2   | < 10                               | < 200                               | 0.03                    | 0.06   |
| BZM55B6V8                                                                         | 6.66                               | 6.8  | 6.94  | 5                | 1                | < 0.1                            | < 2                          | 3   | < 8                                | < 150                               | 0.03                    | 0.07   |
| BZM55B7V5                                                                         | 7.35                               | 7.5  | 7.65  | 5                | 1                | < 0.1                            | < 2                          | 5   | < 7                                | < 50                                | 0.03                    | 0.07   |
| BZM55B8V2                                                                         | 8.04                               | 8.2  | 8.36  | 5                | 1                | < 0.1                            | < 2                          | 6.2 | < 7                                | < 50                                | 0.03                    | 0.08   |
| BZM55B9V1                                                                         | 8.92                               | 9.1  | 9.28  | 5                | 1                | < 0.1                            | < 2                          | 6.8 | < 10                               | < 50                                | 0.03                    | 0.09   |
| BZM55B10                                                                          | 9.8                                | 10   | 10.2  | 5                | 1                | < 0.1                            | < 2                          | 7.5 | < 15                               | < 70                                | 0.03                    | 0.1    |
| BZM55B11                                                                          | 10.78                              | 11   | 11.22 | 5                | 1                | < 0.1                            | < 2                          | 8.2 | < 20                               | < 70                                | 0.03                    | 0.11   |
| BZM55B12                                                                          | 11.76                              | 12   | 12.24 | 5                | 1                | < 0.1                            | < 2                          | 9.1 | < 20                               | < 90                                | 0.03                    | 0.11   |
| BZM55B13                                                                          | 12.74                              | 13   | 13.26 | 5                | 1                | < 0.1                            | < 2                          | 10  | < 26                               | < 110                               | 0.03                    | 0.11   |
| BZM55B15                                                                          | 14.7                               | 15   | 15.3  | 5                | 1                | < 0.1                            | < 2                          | 11  | < 30                               | < 110                               | 0.03                    | 0.11   |
| BZM55B16                                                                          | 15.7                               | 16   | 16.3  | 5                | 1                | < 0.1                            | < 2                          | 12  | < 40                               | < 170                               | 0.03                    | 0.11   |
| BZM55B18                                                                          | 17.64                              | 18   | 18.36 | 5                | 1                | < 0.1                            | < 2                          | 13  | < 50                               | < 170                               | 0.03                    | 0.11   |
| BZM55B20                                                                          | 19.6                               | 20   | 20.4  | 5                | 1                | < 0.1                            | < 2                          | 15  | < 55                               | < 220                               | 0.03                    | 0.11   |
| BZM55B22                                                                          | 21.55                              | 22   | 22.45 | 5                | 1                | < 0.1                            | < 2                          | 16  | < 55                               | < 220                               | 0.04                    | 0.12   |
| BZM55B24                                                                          | 23.5                               | 24   | 24.5  | 5                | 1                | < 0.1                            | < 2                          | 18  | < 80                               | < 220                               | 0.04                    | 0.12   |
| BZM55B27                                                                          | 26.4                               | 27   | 27.6  | 5                | 1                | < 0.1                            | < 2                          | 20  | < 80                               | < 220                               | 0.04                    | 0.12   |
| BZM55B30                                                                          | 29.4                               | 30   | 30.6  | 5                | 1                | < 0.1                            | < 2                          | 22  | < 80                               | < 220                               | 0.04                    | 0.12   |
| BZM55B33                                                                          | 32.4                               | 33   | 33.6  | 5                | 1                | < 0.1                            | < 2                          | 24  | < 80                               | < 220                               | 0.04                    | 0.12   |
| BZM55B36                                                                          | 35.3                               | 36   | 36.7  | 5                | 1                | < 0.1                            | < 2                          | 27  | < 80                               | < 220                               | 0.04                    | 0.12   |
| BZM55B39                                                                          | 38.2                               | 39   | 39.8  | 2.5              | 1                | < 0.1                            | < 5                          | 30  | < 90                               | < 500                               | 0.04                    | 0.12   |
| BZM55B43                                                                          | 42.1                               | 43   | 43.9  | 2.5              | 0.5              | < 0.1                            | < 5                          | 33  | < 90                               | < 600                               | 0.04                    | 0.12   |
| BZM55B47                                                                          | 46.1                               | 47   | 47.9  | 2.5              | 0.5              | < 0.1                            | < 5                          | 36  | < 110                              | < 700                               | 0.04                    | 0.12   |
| BZM55B51                                                                          | 50                                 | 51   | 52    | 2.5              | 0.5              | < 0.1                            | < 10                         | 39  | < 125                              | < 700                               | 0.04                    | 0.12   |
| BZM55B56                                                                          | 54.9                               | 56   | 57.1  | 2.5              | 0.5              | < 0.1                            | < 10                         | 43  | < 135                              | < 1000                              | 0.04                    | 0.12   |
| BZM55B62                                                                          | 60.8                               | 62   | 63.2  | 2.5              | 0.5              | < 0.1                            | < 10                         | 47  | < 150                              | < 1000                              | 0.04                    | 0.12   |
| BZM55B68                                                                          | 66.6                               | 68   | 69.4  | 2.5              | 0.5              | < 0.1                            | < 10                         | 51  | < 200                              | < 1000                              | 0.04                    | 0.12   |
| BZM55B75                                                                          | 73.5                               | 75   | 76.5  | 2.5              | 0.5              | < 0.1                            | < 10                         | 56  | < 250                              | < 1500                              | 0.04                    | 0.12   |

**Notes**

- Additional measurement of voltage group 9V1 to 75 at 95 %  $V_{Zmin.} \leq 35\text{ nA}$  at  $T_j = 25\text{ }^{\circ}\text{C}$

<sup>(1)</sup>  $t_p \leq 10\text{ ms}$ ,  $T/t_p > 1000$

**BASIC CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , 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 under Operating Conditions at  $T_{amb}=25^{\circ}\text{C}$ 


Fig. 5 - Typical Change of Working Voltage vs. Junction Temperature

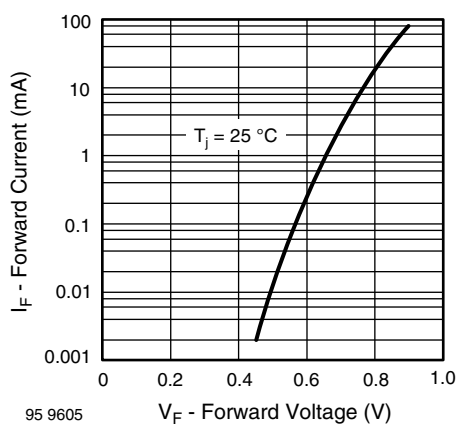

Fig. 3 - Temperature Coefficient of  $V_Z$  vs. Z-Voltage


Fig. 6 - Forward Current vs. Forward Voltage



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

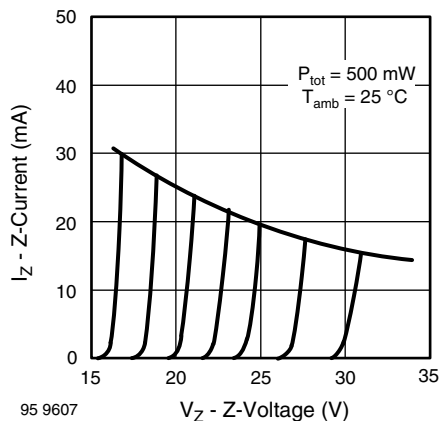


Fig. 8 - Z-Current vs. Z-Voltage

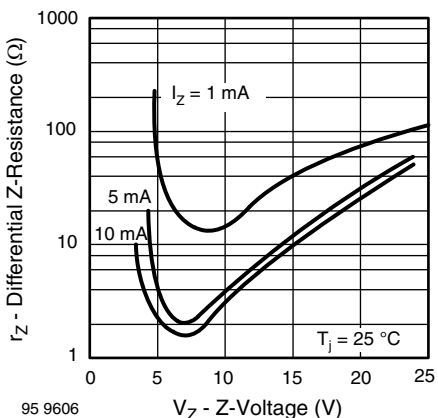
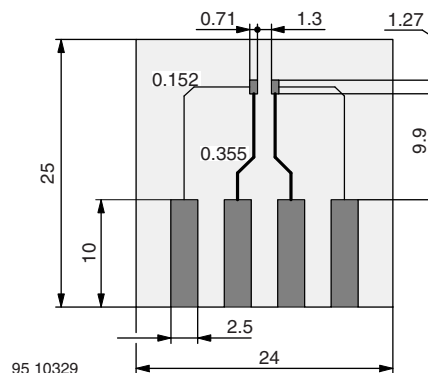


Fig. 9 - Differential Z-Resistance vs. Z-Voltage


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

## Reflow Soldering

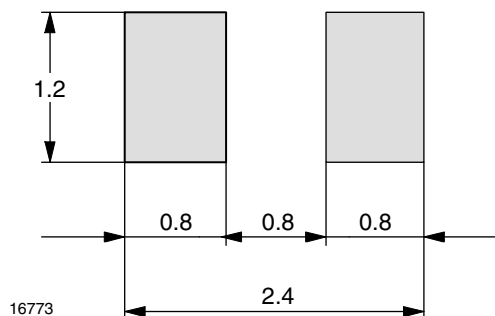


Fig. 11 - Recommended Foot Pads (in mm)

## Wave Soldering

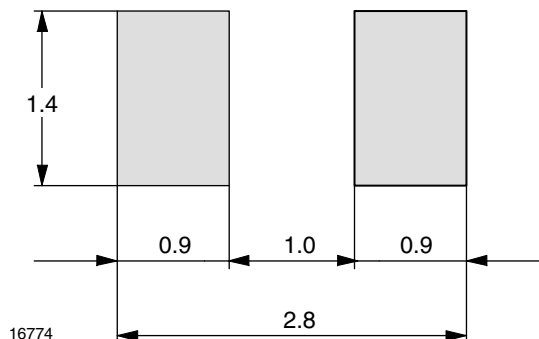


Fig. 12 - Recommended Foot Pads (in mm)

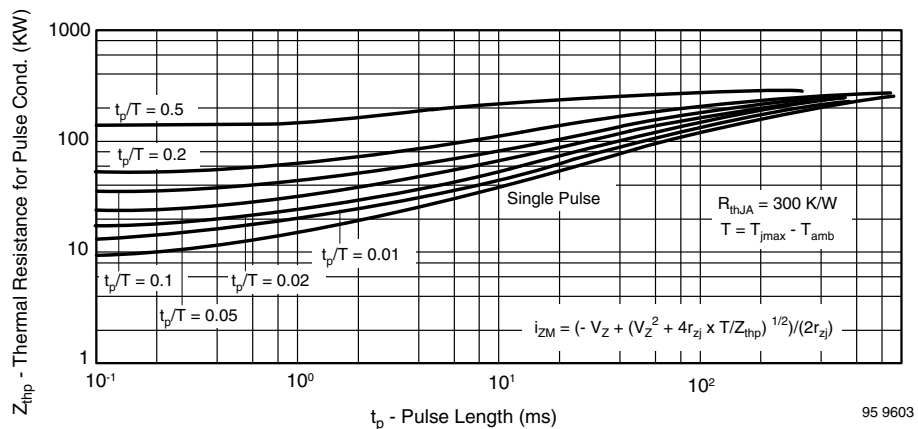
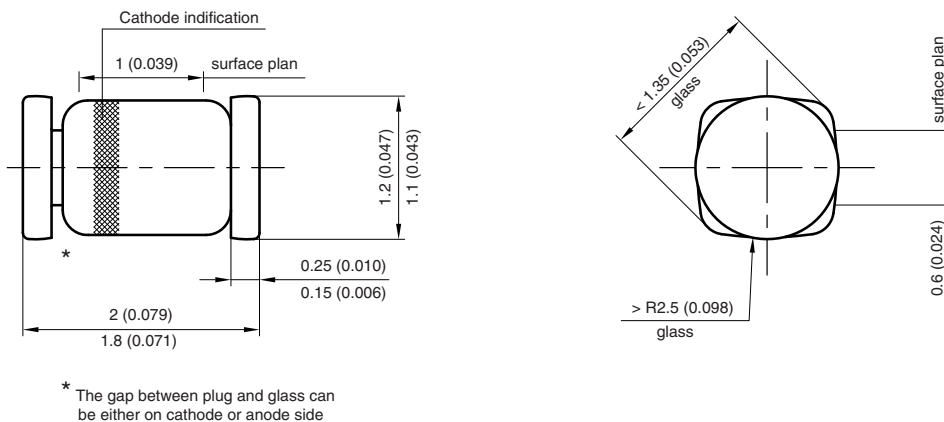
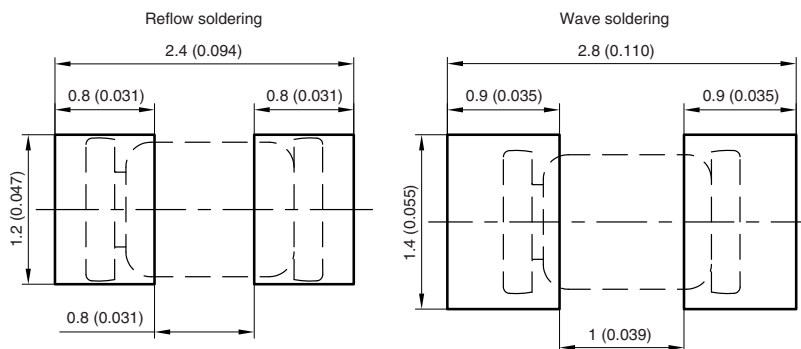


Fig. 13 - Thermal Response

**PACKAGE DIMENSIONS** in millimeters (inches): **MicroMELF**


Foot print recommendation:



Created - Date: 26.July.1996  
Rev. 13 - Date: 07.June.2006  
Document no.: 6.560-5007.01-4  
96 12072



## Disclaimer

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