

## Thin Film Micro-MELF Resistors



### FEATURES

- Advanced thin film technology
- Low TCR and tight tolerances
- Excellent stability
- Pure tin termination on nickel barrier, plated on press fit steel caps
- Compliant to RoHS Directive 2002/95/EC



**RoHS**  
COMPLIANT  
**GREEN**  
[5-2009]\*\*

### STANDARD ELECTRICAL SPECIFICATIONS

| MODEL   | POWER RATING <sup>(1)</sup><br>$P_{70}$<br>W | LIMITING ELEMENT<br>VOLTAGE DC or AC <sub>RMS</sub><br>V | TEMPERATURE<br>COEFFICIENT<br>ppm/K | TOLERANCE<br>% | RESISTANCE<br>RANGE<br>$\Omega$ | E-SERIES |
|---|--|--|-------------------------------------|----------------|---------------------------------|----------|
| SMM0102   | 0.2  | 150  | $\pm 15$                            | $\pm 0.1$      | 100R to 100K                    | 24; 96   |
| SMM0102   | 0.2  | 150  | $\pm 25$                            | $\pm 0.1$      | 100R to 100K                    | 24; 96   |
| SMM0102   | 0.2  | 150  | $\pm 50$                            | $\pm 1.0$      | 10R to 2M21                     | 24; 96   |
| Zero-Ohm-Resistor: OMM0102 $R_{max.} = 10 \text{ m}\Omega$ $I_{max.} = 2 \text{ A}$ |  |  |                                     |                |                                 |          |

#### Note

<sup>(1)</sup> Permissible dissipation depends on the maximum temperature at the solder joint, the component placement density, the substrate material and PCB layout.

### TECHNICAL SPECIFICATIONS

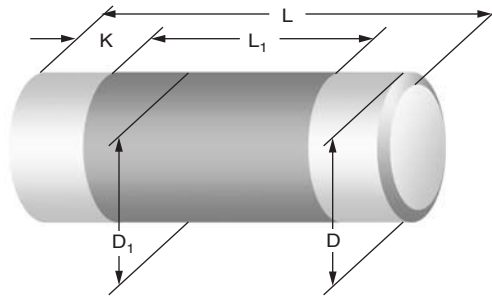
| PARAMETER  | UNIT               | SMM0102                            |
|--|--------------------|------------------------------------|
| Power rating $P_{70}$                                | W                  | 0.2                                |
| Limiting element voltage, DC or AC <sub>RMS</sub>    | V                  | 150                                |
| Insulation voltage (1 min), DC or AC <sub>PEAK</sub> | V                  | 200                                |
| Thermal resistance                                   | K/W                | $\leq 250$                         |
| Insulation resistance                                | $\Omega$           | $\geq 10^9$                        |
| Category temperature range                           | $^{\circ}\text{C}$ | - 55 to + 125                      |
| Failure rate: FIT <sub>observed</sub>                |                    | $\leq 0.1 \times 10^{-9}/\text{h}$ |

#### Notes

- The power dissipation on the resistor generates a temperature rise against the local ambient, depending on the heat flow support of the printed-circuit board (thermal resistance). The rated dissipation applies only if the permitted film temperature of 125  $^{\circ}\text{C}$  is not exceeded.
- The specification of this product is based on a test board according to EN 140400, providing a thermal resistance of approximately 275 K/W.
- These resistors do not feature a limited lifetime when operated within the permissible limits. However, resistance value drift increasing over operating time may result in exceeding a limit acceptable to the specific application, thereby establishing a functional lifetime.

\*\* Please see document "Vishay Material Category Policy": [www.vishay.com/doc?999902](http://www.vishay.com/doc?999902)

**DIMENSIONS**

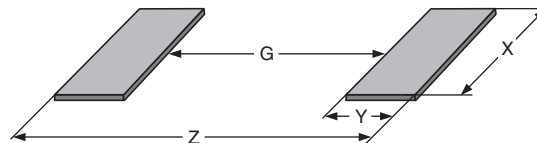


| DIMENSIONS AND MASS |                |               |                          |                     |            |           |
|---------------------|----------------|---------------|--------------------------|---------------------|------------|-----------|
| TYPE                | L (mm)         | D (mm)        | L <sub>1</sub> min. (mm) | D <sub>1</sub> (mm) | K (mm)     | MASS (mg) |
| SMM0102<br>OMM0102  | 2.2 + 0/- 0.15 | 1.1 + 0/- 0.1 | 1.2                      | D + 0/- 0.1         | 0.4 ± 0.05 | 7         |

**Notes**

- Color code marking is applied according to IEC 60062 <sup>(1)</sup> in five bands. Each color band appears as a single solid line, voids are permissible if at least 2/3 of the band is visible from each radial angle of view. The last color band for tolerance is approximately 50 % wider than the other bands. An interrupted band between the 4<sup>th</sup> and 5<sup>th</sup> full band indicates the temperature coefficient (yellow = TC25, orange = TC15).
- Zero ohm jumper are marked with one centered black band.

**PATTERN STYLES FOR MELF RESISTORS**



| RECOMMENDED SOLDER PAD DIMENSIONS |                |        |        |        |                  |        |        |        |
|-----------------------------------|----------------|--------|--------|--------|------------------|--------|--------|--------|
| TYPE                              | WAVE SOLDERING |        |        |        | REFLOW SOLDERING |        |        |        |
|                                   | G (mm)         | Y (mm) | X (mm) | Z (mm) | G (mm)           | Y (mm) | X (mm) | Z (mm) |
| SMM0102<br>OMM0102                | 0.7            | 1.2    | 1.5    | 3.1    | 1.1              | 0.8    | 1.3    | 2.7    |

**Note**

- The given solder pad dimensions reflect the considerations for board design and assembly as outlined e.g. in standards IEC 61188-5-x, or in publication IPC-7351. They do not guarantee any supposed thermal properties, however, they will be found adequate for most general applications.



| PART NUMBER AND PRODUCT DESCRIPTION           |  |   |   |  |   |   |  |   |   |  |   |                      |   |   |   |   |   |   |
|---|--|---|---|--|---|---|--|---|---|--|---|----------------------|---|---|---|---|---|---|
| Part Number: SMM01020D5620BB300               |  |   |   |  |   |   |  |   |   |  |   |                      |   |   |   |   |   |   |
| Part Number: OMM01020000000B300               |  |   |   |  |   |   |  |   |   |  |   |                      |   |   |   |   |   |   |
| S   | M                                      | M | 0 | 1  | 0 | 2 | 0  | D | 5 | 6                                      | 2 | 0                    | B | B | 3 | 0 | 0 |   |
| O   | M                                      | M | 0 | 1  | 0 | 2 | 0  | 0 | 0 | 0                                      | 0 | 0                    | 0 | 0 | B | 3 | 0 | 0 |
| MODEL   | VERSION                                |   |   | TCR  |   |   | RESISTANCE   |   |   | TOLERANCE                              |   | PACKAGING            |   |   |   |   |   |   |
| SMM0102<br>OMM0102                            | 0 = Neutral                            |   |   | E = ± 15 ppm/K<br>D = ± 25 ppm/K<br>C = ± 50 ppm/K<br>0 = Jumper |   |   | 3 digit value<br>1 digit multiplier<br>0000 = Jumper<br>MULTIPLIER<br>9 = *10 <sup>-1</sup> 2 = *10 <sup>2</sup><br>0 = *10 <sup>0</sup> 3 = *10 <sup>3</sup><br>1 = *10 <sup>1</sup> 4 = *10 <sup>4</sup> |   |   | B = ± 0.1 %<br>F = ± 1 %<br>0 = Jumper |   | B1<br>B3<br>B0<br>M8 |   |   |   |   |   |   |
| Product Description: SMM0102 25 562R 0.1 % B3 |  |   |   |  |   |   |  |   |   |  |   |                      |   |   |   |   |   |   |
| Product Description: OMM0102 0R0 B3           |  |   |   |  |   |   |  |   |   |  |   |                      |   |   |   |   |   |   |
| SMM0102                                       | 25                                     |   |   | 562R   |   |   | 0.1 %  |   |   | B3                                     |   |                      |   |   |   |   |   |   |
| OMM0102                                       | -                                      |   |   | 0R0  |   |   | -  |   |   | B3                                     |   |                      |   |   |   |   |   |   |
| MODEL   | TCR                                    |   |   | RESISTANCE   |   |   | TOLERANCE  |   |   | PACKAGING                              |   |                      |   |   |   |   |   |   |
| SMM0102<br>OMM0102                            | ± 15 ppm/K<br>± 25 ppm/K<br>± 50 ppm/K |   |   | 100 = 100 Ω<br>2M21 = 2.21 MΩ<br>0R0 = Jumper                    |   |   | ± 0.1 %<br>± 1 %   |   |   | B1<br>B3<br>B0<br>M8                   |   |                      |   |   |   |   |   |   |

Note

- Products can be ordered using either the PART NUMBER or the PRODUCT DESCRIPTION.

| PACKAGING          |                   |                     |   |       |       |               |
|--------------------|-------------------|---------------------|---|-------|-------|---------------|
| TYPE               | CODE              | QUANTITY            | CARRIER TAPE                                | WIDTH | PITCH | REEL DIAMETER |
| SMM0102<br>OMM0102 | B1 <sup>(1)</sup> | 1000 <sup>(1)</sup> | Blister tape<br>acc. IEC 60286-3<br>Type II | 8 mm  | 4 mm  | 180 mm/7"     |
|                    | B3                | 3000                |   |       |       | 330 mm/13"    |
|                    | B0                | 10 000              |   |       |       |               |

Note

<sup>(1)</sup> Package of 1000 pieces, code B1, is available only for products with tolerance ± 0.1 %.

**FUNCTIONAL PERFORMANCE**



| <b>TEST PROCEDURES AND REQUIREMENTS</b>                              |  |  |                                |
|--|--|--|--------------------------------|
| TEST   | CONDITIONS OF TEST   | REQUIREMENTS PERMISSIBLE CHANGE ( $\Delta R$ ) |                                |
|  |  | < 221 k $\Omega$                               | > 221 k $\Omega$               |
| Endurance test at 70 °C<br>IEC 60115-1, 4.25.1                       | 1000 h at 70 °C, 1.5 h "on", 0.5 h "off"<br>8000 h at 70 °C, 1.5 h "on", 0.5 h "off" | $\pm 0.25 \% R$<br>$\pm 0.5 \% R$              | $\pm 0.5 \% R$<br>$\pm 1 \% R$ |
| Endurance at UCT<br>IEC 60115-1, 4.25.3                              | 1000 h at 125 °C without load  | $\pm 0.25 \% R$                                | $\pm 1 \% R$                   |
| Overload test<br>IEC 60115-1, 4.13                                   | Short time overload for 2 s<br>at 6.25 x rated power                                 | $\pm 0.1 \% R$                                 | $\pm 0.15 \% R$                |
| Thermal shock<br>IEC 60115-1, 4.19 and IEC 60068-2-14                | Rapid change between LCT = - 55 °C<br>and UCT = 125 °C, 5 cycles                     | $\pm 0.1 \% R$                                 | $\pm 0.15 \% R$                |
| Damp heat steady state<br>IEC 60115-1, 4.24 and IEC 60068-2-78       | 56 days at 40 °C and 93 %<br>relative humidity                                       | $\pm 0.5 \% R$                                 | $\pm 1 \% R$                   |
| Resistance to soldering heat<br>IEC 60115-1, 4.18 and IEC 60068-2-58 | 10 s at 260 °C solder bath temperature   | $\pm 0.1 \% R$                                 | $\pm 0.25 \% R$                |

| <b>APPLICABLE SPECIFICATIONS</b> |  |
|----------------------------------|--|
| • EN 60115-1                     | Generic specification                    |
| • EN 140400                      | Sectional specification                  |
| • EN 140401-803                  | Detail specification                     |
| • IEC 60068-2-x                  | Variety of environmental test procedures |
| • IEC 60286-3                    | Packaging of SMD components              |



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