

Thin Film MELF Resistors



FEATURES

- MELF resistor with high power rating
- AEC-Q200 qualified
- Advanced thin film technology
- Pure tin termination on nickel barrier, plated on press fit steel caps
- Compliant to RoHS Directive 2002/95/EC

AUTOMOTIVE
GRADERoHS
COMPLIANTGREEN
(5-2008)**

STANDARD ELECTRICAL SPECIFICATIONS

| MODEL | POWER RATING ⁽¹⁾ P_{70} W | LIMITING ELEMENT VOLTAGE DC or AC _{RMS} V | TEMPERATURE COEFFICIENT ppm/K | TOLERANCE % | RESISTANCE RANGE Ω | E-SERIES |
|---------|--|---|-------------------------------------|----------------|---------------------------------|----------|
| SMM0207 | 1.0 | 350 | ± 50 | ± 0.5 | 1R0 to 2M21 | 24; 96 |
| SMM0207 | 1.0 | 350 | ± 50 | ± 1 | 1R0 to 10M | 24; 96 |
| SMM0207 | 1.0 | 350 | ± 100 | ± 5 | R16 to R91 | 24 |

Zero-Ohm-Resistor: OMM0207 $R_{max.} = 10 \text{ m}\Omega$ $I_{max.} = 5 \text{ A}$

Note

⁽¹⁾ Permissible dissipation depends on the maximum temperature at the solder joint, the component placement density and the substrate material.

TECHNICAL SPECIFICATIONS

| PARAMETER | UNIT | SMM0207 |
|--|--------------------|------------------------------------|
| Power rating P_{70} | W | 1 |
| Limiting element voltage, DC or AC _{RMS} | V | 350 |
| Insulation voltage (1 min), DC or AC _{PEAK} | V | 500 |
| Insulation resistance | Ω | $\geq 10^{10}$ |
| Category temperature range | $^{\circ}\text{C}$ | - 55 to + 155 |
| Failure rate: FIT _{observed} | | $\leq 0.1 \times 10^{-9}/\text{h}$ |

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 155 $^{\circ}\text{C}$ is not exceeded.
- The specification of this product is based on a test board, providing a thermal resistance of approximately 85 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

DIMENSIONS



| DIMENSIONS AND MASS | | | | | | |
|---------------------|---------------|------------------------|--------------------------|---------------------|------------|-----------|
| TYPE | L (mm) | D _{max.} (mm) | L ₁ min. (mm) | D ₁ (mm) | K (mm) | MASS (mg) |
| SMM0207 OMM0207 | 5.8 + 0/- 0.3 | 2.2 | 2.6 | D + 0/- 0.2 | 1.25 ± 0.2 | 77 |

Notes

- Color code marking is applied according to IEC 60062 ⁽¹⁾ 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.
- 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) |
| SMM0207 OMM0207 | 2.4 | 2.3 | 2.6 | 7.0 | 2.6 | 2.0 | 2.4 | 6.6 |

Notes

- 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.
- The specified dissipation of 1 W relies on special support from the printed-circuit board in order to achieve the required heat flow. Specification of a particular conductor size is not feasible since its thermal performance depends on a variety of influences from the actual PCB design and from the application environment.



PART NUMBER AND PRODUCT DESCRIPTION

Part Number: SMM02070C5620FBS00
 Part Number: OMM02070000000BS00

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S | M | M | 0 | 2 | 0 | 7 | 0 | C | 5 | 6 | 2 | 0 | F | B | S | 0 | 0 |
| O | M | M | 0 | 2 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | B | S | 0 | 0 |

| | | | | | |
|--------------------|-------------|---|---|---|-----------|
| MODEL | VERSION | TCR | RESISTANCE | TOLERANCE | PACKAGING |
| SMM0207 OMM0207 | 0 = Neutral | C = ± 50 ppm/K B = ± 100 ppm/K 0 = Jumper | 3 digit value 1 digit multiplier 0000 = Jumper MULTIPLIER 7 = *10 ⁻³ 2 = *10 ² 8 = *10 ⁻² 3 = *10 ³ 9 = *10 ⁻¹ 4 = *10 ⁴ 0 = *10 ⁰ 5 = *10 ⁵ 1 = *10 ¹ | D = ± 0.5 % F = ± 1 % J = ± 5 % 0 = Jumper | BP BS |

Product Description: SMM0207 50 562R 1 % BS
 Product Description: OMM0207 0R0 BS

| | | | | |
|--------------------|---------------------------|--|---------------------------|-----------|
| SMM0207 | 50 | 562R | 1 % | BS |
| OMM0207 | - | 0R0 | - | BS |
| MODEL | TCR | RESISTANCE | TOLERANCE | PACKAGING |
| SMM0207 OMM0207 | ± 50 ppm/K ± 100 ppm/K | 100R = 100 Ω 2M21 = 2.21 MΩ 0R0 = Jumper | ± 0.5 % ± 1 % ± 5 % | BP BS |

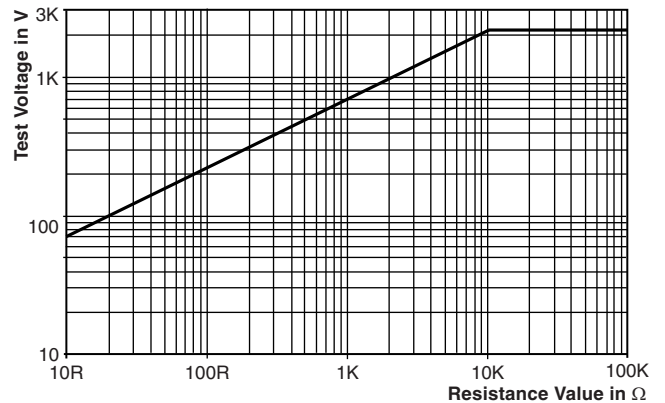
Note

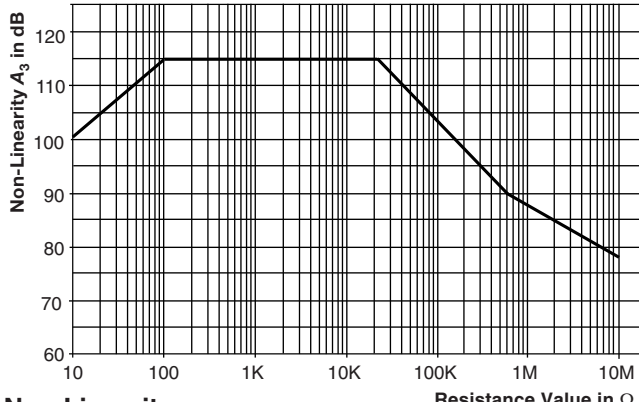
- Products can be ordered using either the PART NUMBER or the PRODUCT DESCRIPTION.

PACKAGING

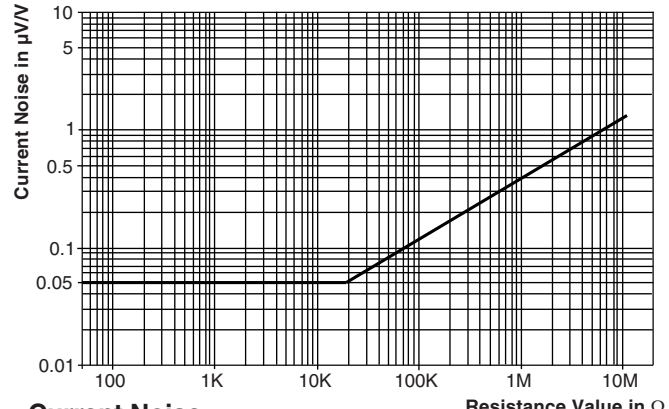
| TYPE | CODE | QUANTITY | CARRIER TAPE | WIDTH | PITCH | REEL DIAMETER |
|--------------------|------|----------|---|-------|-------|---------------|
| SMM0207 OMM0207 | BP | 1500 | Blister tape acc. IEC 60286-3 Type II | 12 mm | 4 mm | 180 mm/7" |
| | BS | 7500 | | | | 330 mm/13" |

FUNCTIONAL PERFORMANCE





Non-Linearity



Current Noise

TEST PROCEDURES AND REQUIREMENTS

| TEST | CONDITIONS OF TEST | REQUIREMENTS PERMISSIBLE CHANGE (ΔR) | | | |
|--|---|--|--------------------------------|--------------------------------|--|
| | | STABILITY CLASS 0.25 | STABILITY CLASS 0.5 | STABILITY CLASS 1 | STABILITY CLASS 2 |
| | | 10 Ω to 1 M Ω | 1 Ω to 10 Ω | < 1 Ω | > 1 M Ω |
| Endurance test at 70 °C IEC 60115-1, 4.25.1 | $U = \sqrt{P_{70} \times R} \leq U_{max.}$; 1.5 h "on", 0.5 h "off" at 70 °C, 1000 h at 70 °C, 8000 h | $\pm (0.25 \% R + 0.05 \Omega)$ | | | $\pm (0.5 \% R + 0.05 \Omega)$ $\pm (1.0 \% R + 0.05 \Omega)$ |
| Endurance at UCT IEC 60115-1, 4.25.3 | at 125 °C, 1000 h | $\pm (0.25 \% R + 0.05 \Omega)$ | | | $\pm (0.5 \% R + 0.05 \Omega)$ |
| Damp heat steady state 40 °C/93 % RH IEC 60115-1, 4.24 and IEC 60068-2-78 | 56 days; $U = 0.1 \times \sqrt{P_{70} \times R}$; $U_{max.} = 20 V$ | $\pm (0.25 \% R + 0.05 \Omega)$ | | $\pm (0.5 \% R + 0.05 \Omega)$ | |
| Damp heat steady state accelerated 85 °C/85 % RH | 1000 h; $U = 0.3 \times \sqrt{P_{70} \times R}$; $U_{max.} = 40 V$ | | $\pm (1.0 \% R + 0.05 \Omega)$ | | $\pm (2.0 \% R + 0.05 \Omega)$ |
| Rapid change of temperature; 1000 cycles IEC 60115-1, 4.19 and IEC 60068-2-14 | 30 min at LCT; 30 min at UCT; LCT = - 55 °C; UCT = 125 °C | $\pm (0.25 \% R + 0.05 \Omega)$ | | | |
| Overload test IEC 60115-1, 4.13 | $U = 2.5 \times \sqrt{P_{70} \times R} \leq 2 \times U_{max.}$; 5 s | $\pm (0.05 \% + 0.01 \Omega/R)$ | | | $\pm (0.1 \% R + 0.05 \Omega)$ |
| Electrostatic discharge (HBM) IEC 60340-3-1 | 3 positive + 3 negative discharges 4 kV | $\pm (0.5 \% R + 0.05 \Omega)$ | | | |
| Resistance to soldering heat IEC 60115-1, 4.18.2 and IEC 60068-2-58 | Solder bath method (260 \pm 5) °C; 10 s | $\pm (0.05 \% R + 0.01 \Omega)$ | $\pm (0.1 \% R + 0.05 \Omega)$ | | |

APPLICABLE SPECIFICATIONS

- 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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