

SMD Wraparound Ultra Low Value Thin Film Resistors



LINKS TO ADDITIONAL RESOURCES



With extremely low resistance and high power capabilities, these ultra low value resistors are available with solderable or weldable terminations.

FEATURES

- NiCr + Ta₂O₅ resistive layer
- Pre-soldered or gold terminations
- No inductance for high frequency applications
- Alumina substrates for high power handling capability
- Resistance range: 0.1 Ω to 9.99 Ω
- TCR down to 50 ppm/°C
- Power rating: up to 2 W at +70 °C
- Withstand AEC-Q200 humidity test
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



RoHS*
Available
HALOGEN FREE
Available
GREEN
(5-2008)
Available

Note

* This datasheet provides information about parts that are RoHS-compliant and / or parts that are non RoHS-compliant. For example, parts with lead (Pb) terminations are not RoHS-compliant. Please see the information / tables in this datasheet for details

| STANDARD ELECTRICAL SPECIFICATIONS | | | | | | |
|------------------------------------|------|-----------------------|---|----------------------------------|------------------|--|
| MODEL | SIZE | RESISTANCE RANGE Ω | RATED POWER <i>P</i> _{70 °C} W | LIMITING ELEMENT VOLTAGE V | TOLERANCE ± % | TEMPERATURE COEFFICIENT ± ppm/°C |
| L0603 | 0603 | 0.1 to 9.99 | 0.125 | 50 | 1, 2, 3, 5, 10 | 50, 100, 200, 300 |
| L0805 | 0805 | 0.1 to 9.99 | 0.2 | 50 | 1, 2, 3, 5, 10 | 50, 100, 200, 300 |
| L1206 | 1206 | 0.1 to 9.99 | 0.33 | 50 | 1, 2, 3, 5, 10 | 50, 100, 200, 300 |
| L1505 | 1505 | 0.1 to 9.99 | 0.5 | 50 | 1, 2, 3, 5, 10 | 50, 100, 200, 300 |
| L2010 | 2010 | 0.1 to 9.99 | 1.0 | 50 | 1, 2, 3, 5, 10 | 50, 100, 200, 300 |
| L2512 | 2512 | 0.1 to 9.99 | 2.0 ⁽¹⁾ | 50 | 1, 2, 3, 5, 10 | 50, 100, 200, 300 |

Note

⁽¹⁾ With special assembly care

| CLIMATIC SPECIFICATIONS | |
|-----------------------------|-----------------|
| Operating temperature range | -55 °C; +155 °C |

| MECHANICAL SPECIFICATIONS | |
|---------------------------|---|
| Substrate | Alumina |
| Technology | NiCr + Ta ₂ O ₅ |
| Coating | Silicone |
| Terminations | Solderable B type: SnPb over nickel barrier N type: SnAg over nickel barrier G type: Gold over nickel barrier |

Note

- Refer to Application Note “Guidelines for Vishay Sfernice Resistive and Inductive Components” (document number: 52029) for recommended reflow profile. Profile #3 applies

| TOLERANCE AND TCR VS. OHMIC VALUE | | | |
|-----------------------------------|------------------------|-------------------|--------------|
| OHMIC VALUE RANGE in Ω | TIGHTEST TOLERANCE (%) | BEST TCR (ppm/°C) | TERMINATIONS |
| 0R1 < 0R25 | 1 | 300 | N or B |
| 0R25 < 0R5 | 1 | 200 | N or B |
| 0R5 < 2R5 | 1 | 100 | N or B |
| 2R5 < 9R99 | 1 | 50 | N or B |
| 0R1 < 0R25 | 5 | 300 | G |
| 0R25 < 0R5 | 5 | 200 | G |
| 0R < 1R | 5 | 100 | G |
| 1R < 2R5 | 3 | 100 | G |
| 2R5 to 9R99 | 3 | 50 | G |

| DIMENSIONS in millimeters (inches) | | | | |
|---|-------------------------|-------------------------|-----------------------|-------------------------|
| | | | | |
| CASE SIZE | A | B | C | D/E |
| | $\pm 0.152 (\pm 0.006)$ | $\pm 0.127 (\pm 0.005)$ | $\pm 0.127 (+ 0.005)$ | $\pm 0.127 (\pm 0.005)$ |
| 0603 | 1.52 (0.060) | 0.85 (0.033) | 0.5 (0.020) | 0.38 (0.015) |
| 0805 | 1.91 (0.075) | 1.27 (0.050) | | 0.40 (0.016) |
| 1206 | 3.06 (0.120) | 1.60 (0.063) | | 0.48 (0.019) |
| 1505 | 3.81 (0.150) | 1.32 (0.052) | | |
| 2010 | 5.08 (0.200) | 2.54 (0.100) | | |
| 2512 | 6.30 (0.248) | 3.30 (0.129) | | |

| SUGGESTED LAND PATTERN in millimeters (inches) (to IPC-7351A) | | | |
|--|-------------------|-------------------|-------------------|
| | | | |
| CASE SIZE | Z _{max.} | G _{min.} | X _{max.} |
| 0603 | 2.37 (0.093) | 0.35 (0.014) | 0.98 (0.039) |
| 0805 | 2.76 (0.109) | 0.74 (0.029) | 1.40 (0.055) |
| 1206 | 3.91 (0.154) | 1.85 (0.073) | 1.73 (0.068) |
| 1505 | 4.66 (0.183) | 2.44 (0.096) | 1.45 (0.057) |
| 2010 | 5.93 (0.233) | 3.71 (0.146) | 2.67 (0.105) |
| 2512 | 7.15 (0.281) | 4.93 (0.194) | 3.43 (0.135) |

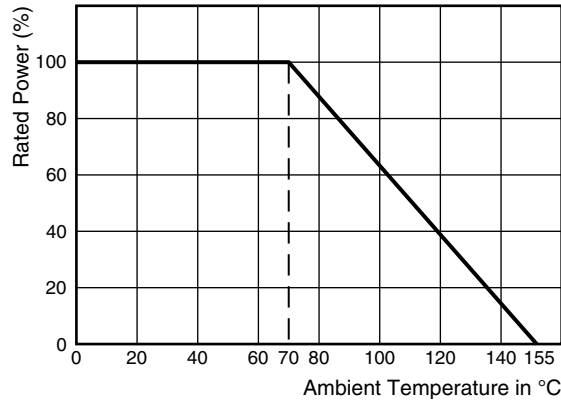
Option: Enlarged Terminations: 0063

For stringent and special power dissipation requirements, the thermal resistance between the resistive layer and the solder joint can be reduced using enlarged terminations chip resistors which are soldered on large and thick copper pads acting as heat sinks (see application note: "Power Dissipation in High Precision Vishay Sfernice Chip Resistors and Arrays (P Thin Film, PRA Arrays, CHP Thick Film)": www.vishay.com/doc?53048).

For enlarged terminations: Please consult Vishay Sfernice.



POWER DERATING CURVE



PACKAGING

Several types of packaging are proposed: waffle-pack and tape and reel

| SIZE | MOQ | NUMBER OF PIECES PER PACKAGE | | TAPE WIDTH | |
|------|-----|------------------------------|---------------|------------|------|
| | | WAFFLE PACK 2" x 2" | TAPE AND REEL | | |
| | | | MIN. | | MAX. |
| 0603 | 100 | 100 | 100 | 5000 | |
| 0805 | | | | 4000 | |
| 1206 | | | | | |
| 1505 | | 60 | 2000 | | |
| 2010 | | 50 | | | |
| 2512 | | | 12 mm | | |

PACKAGING RULES

Waffle Pack

Can be filled up to maximum quantity indicated in the table here above, taking into account the minimum order quantity. When quantity ordered exceeds maximum quantity of a single waffle pack, the waffle packs are stacked up on the top of each other and closed by one single cover. **To get "not stacked up" waffle pack in case of ordered quantity > maximum number of pieces per package: Please consult Vishay Sfernice for specific ordering code.**

Tape and Reel

Can be filled up to maximum quantity indicated in the table here above, taking into account the minimum order quantity. When quantity ordered is between the MOQ and the maximum reel capacity, only one reel is provided. **When several reels are needed for ordered quantity within MOQ and maximum reel capacity: Please consult Vishay Sfernice for specific ordering code.**

| PERFORMANCE | | | |
|---------------------------|---|--------------------------|-----------------------|
| TESTS | CONDITIONS | VALUES AND DRIFT | |
| | | MIL-R-55342 REQUIREMENTS | TYPICAL PERFORMANCES |
| Thermal shock | MIL-R-55342 C MIL-STD-702, method 107 | ± 0.25 % | ± 0.02 % |
| Short time overload | MIL-R-55342 C PARA 3.10.4.7.5 | ± 0.10 % | ± 0.01 % |
| Low temperature operation | MIL-R-55342 C PARA 3.9 and 4.7.4 | ± 0.25 % | ± 0.01 % |
| Resistance to solder heat | MIL-R-55342 C PARA 3.12, 4.7.7, 4.7.1.2 | ± 0.25 % | ± 0.04 % |
| Moisture resistance | MIL-R-55342 C PARA 3.13 and 4.7.8 MIL-STD-202, method 106 | ± 0.40 % | ± 0.01 % |
| | AEC-Q200 85 °C / 85 % RH / 0.1 Pn 1000 h | - | Max. < 0.5 % + 0.05 Ω |
| High temperature | MIL-R-55342 C PARA 3.11 and 4.7.6 | ± 0.20 % | ± 0.075 % |
| Load life | MIL-R-55342 C 2000 h Pn at 70 °C MIL-STD-202, method 108 | ± 0.50 % | ± 0.15 % |



| GLOBAL PART NUMBER INFORMATION | | | | | | | | | | | | | | | | |
|---|--|---|---|--|---|--|--------------------------|---|---|---|---|---|---|---|---|---|
| New Global Part Numbering: L0805K1R00FBT0099 | | | | | | | | | | | | | | | | |
| L | 0 | 8 | 0 | 5 | K | 1 | R | 0 | 0 | F | B | T | 0 | 0 | 9 | 9 |
| GLOBAL MODEL | SIZE | TCR | VALUE | TOLERANCE | TERMINATION ⁽¹⁾ | PACKAGING | OPTION | | | | | | | | | |
| L | 0603 0805 1206 1505 2010 2512 | H = ± 50 ppm K = ± 100 ppm L = ± 200 ppm M = ± 300 ppm | R designated decimal point For values under 1R Rxxx | F = ± 1 % G = ± 2 % H = ± 3 % J = ± 5 % K = ± 10 % | B: SnPb over nickel barrier N: SnAg over nickel barrier G: gold over nickel barrier | For more information see Codification of Packaging table | Leave blank if no option | | | | | | | | | |
| Historical Part Number Example: L 0805 K 1R00 1 % B T R0099 | | | | | | | | | | | | | | | | |
| L | 0805 | K | 1R00 | 1 % | B | T | R0099 | | | | | | | | | |
| MODEL | SIZE | TCR | VALUE | TOLERANCE | TERMINATION | PACKAGING | OPTION | | | | | | | | | |

Note

- ⁽¹⁾ **B:** lead bearing version
- N** and **G:** lead (Pb)-free / RoHS version

| CODIFICATION OF PACKAGING | |
|--|---|
| CODE 18 | PACKAGING |
| WAFFLE PACK | |
| W | 100 min., 1 mult. |
| WA | 100 min., 100 mult. (available only in size 1206) |
| PLASTIC TAPE (Standard for all sizes) | |
| T | 100 min., 1 mult. |
| TA | 100 min., 100 mult. |
| TB | 250 min., 250 mult. |
| TC | 500 min., 500 mult. |
| TD | 1000 min., 1000 mult. |
| TE | 2500 min., 2500 mult. |
| TF | Full tape (quantity depending on size of chips) |
| PAPER TAPE (Available for 0603, 0805, and 1206. Please consult Vishay Sfernice for other sizes) | |
| PT | 100 min., 1 mult. |
| PA | 100 min., 100 mult. |
| PB | 250 min., 250 mult. |
| PC | 500 min., 500 mult. |
| PD | 1000 min., 1000 mult. |
| PE | 2500 min., 2500 mult. |
| PF | Full tape (quantity depending on size of chips) |



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