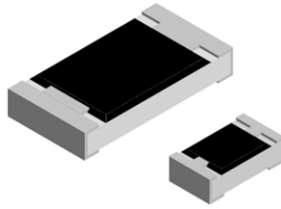


Thick Film Surface Mount Chip Resistors, Wraparound, Low Value (0.1 Ω to 0.91 Ω)



FEATURES

- Low resistance values (0.1 Ω to 0.91 Ω)
- Suitable for current sensing and shunts
- Metal glaze on high quality ceramic
- Protective overglaze
- Solder contacts on Ni barrier layer
- AEC-Q200 qualified
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



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 | | | | | | |
|------------------------------------|-----------|---|--|------------------------------|----------------------|----------|
| GLOBAL MODEL | CASE SIZE | POWER RATING $P_{70\text{ }^{\circ}\text{C}}$ W | TEMPERATURE COEFFICIENT \pm ppm/ $^{\circ}\text{C}$ | RESISTANCE RANGE Ω | TOLERANCE \pm % | E-SERIES |
| RCWL0402 | 0402 | 0.063 | 600 | 0.22 to 0.43 | 5 | 24 |
| | | | 400 | 0.47 to 0.91 | | |
| RCWL0603 | 0603 | 0.1 | 400 | 0.10 to 0.43 | 5 | 24 |
| | | | 200 | 0.47 to 0.91 | | |
| RCWL0805 | 0805 | 0.125 | 300 | 0.10 to 0.43 | 5 | 24 |
| | | | 200 | 0.47 to 0.91 | | |
| RCWL1206 | 1206 | 0.25 | 300 | 0.10 to 0.43 | 5 | 24 |
| | | | 200 | 0.47 to 0.91 | | |
| RCWL1210 | 1210 | 0.33 | 200 | 0.10 to 0.91 | 5 | 24 |
| RCWL1218 | 1218 | 1.0 | 200 | 0.10 to 0.91 | 5 | 24 |
| RCWL2010 | 2010 | 0.5 | 200 | 0.10 to 0.91 | 5 | 24 |
| RCWL2512 | 2512 | 1.0 | 200 | 0.10 to 0.91 | 5 | 24 |

Note

- Power rating depends on the max. temperature at the solder point, the component placement density and the substrate material
- Part marking: reference "Surface Mount Resistor Marking" (www.vishay.com/doc?20020)
- The resistance is measured from the top side

| GLOBAL PART NUMBER INFORMATION | | | | | | | | | | | | | | | | | |
|--|---|---|---|------------------------------|---|---|-------------------------|---|--|---|---|--|---|--|---|--|--|
| Part Number: RCWL0402R470JQEA | | | | | | | | | | | | | | | | | |
| R | C | W | L | 0 | 4 | 0 | 2 | R | 4 | 7 | 0 | J | Q | E | A | | |
| GLOBAL MODEL (8 digits) | | | | VALUE (4 digits) | | | TOLERANCE (1 digits) | | TCR (1 digits) | | | PACKAGING (2 digits) | | SPECIAL (up to 2 digits) | | | |
| RCWL0402 RCWL0603 RCWL0805 RCWL1206 RCWL1210 RCWL1218 RCWL2010 RCWL2512 | | | | R = decimal R470 = 0.47 Ω | | | J = \pm 5.0 % | | N = \pm 200 ppm/ $^{\circ}\text{C}$ M = \pm 300 ppm/ $^{\circ}\text{C}$ Q = \pm 400 ppm/ $^{\circ}\text{C}$ T = \pm 600 ppm/ $^{\circ}\text{C}$ | | | EA = lead (Pb)-free, tape/reel TA = tin/lead, tape/reel | | (dash number) from 1 to 99 as applicable | | | |

| TECHNICAL SPECIFICATIONS | | | | | | | | | |
|--------------------------------------|----------|----------------------|----------|----------|----------|----------|----------|----------|----------|
| PARAMETER | UNIT | RCWL0402 | RCWL0603 | RCWL0805 | RCWL1206 | RCWL1210 | RCWL1218 | RCWL2010 | RCWL2512 |
| Operating temp. range | °C | -55 to +155 | | | | | | | |
| Maximum operating voltage | V | $(P \times R)^{1/2}$ | | | | | | | |
| Insulation voltage U_{ins} (1 min) | V | > 75 | > 100 | > 200 | > 300 | > 300 | > 300 | > 300 | > 300 |
| Insulation resistance | Ω | > 10^9 | | | | | | | |
| Weight/1000 pieces (typical) | g | 0.65 | 2 | 5.5 | 10 | 16 | 29.5 | 25.5 | 40.5 |

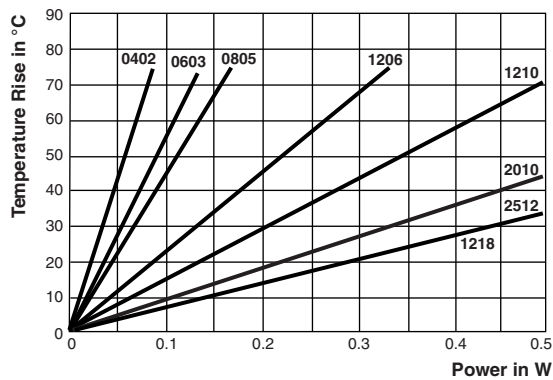
DIMENSIONS



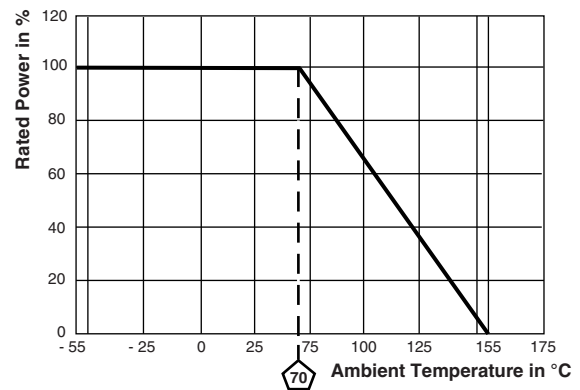
• Surface mount solder profile recommendations: www.vishay.com/doc?31052

| MODEL | DIMENSIONS in millimeters | | | | | | | | | | |
|----------|--|-------------|-------------|---------------------------------------|-----------|------------------|-----|-----|----------------|-----|-----|
| | L | W | H | T1 | T2 | REFLOW SOLDERING | | | WAVE SOLDERING | | |
| | | | | | | a | b | l | a | b | l |
| RCWL0402 | 1.0 ± 0.05 | 0.5 ± 0.05 | 0.35 ± 0.05 | 0.25 ± 0.05 | 0.2 ± 0.1 | 0.4 | 0.6 | 0.5 | 0.5 | 0.6 | 0.5 |
| RCWL0603 | 1.55 ^{+0.10} _{-0.05} | 0.85 ± 0.1 | 0.45 ± 0.05 | 0.3 ± 0.2 | 0.3 ± 0.2 | 0.5 | 0.9 | 1.0 | 0.9 | 0.9 | 1.0 |
| RCWL0805 | 2.0 ^{+0.20} _{-0.10} | 1.25 ± 0.15 | 0.45 ± 0.05 | 0.3 ^{+0.20} _{-0.10} | 0.3 ± 0.2 | 0.7 | 1.3 | 1.2 | 0.9 | 1.3 | 1.3 |
| RCWL1206 | 3.2 ^{+0.10} _{-0.20} | 1.6 ± 0.15 | 0.55 ± 0.05 | 0.45 ± 0.2 | 0.4 ± 0.2 | 0.9 | 1.7 | 2.0 | 1.1 | 1.7 | 2.3 |
| RCWL1210 | 3.2 ± 0.2 | 2.5 ± 0.2 | 0.55 ± 0.05 | 0.45 ± 0.2 | 0.4 ± 0.2 | 0.9 | 2.5 | 2.0 | 1.1 | 2.5 | 2.2 |
| RCWL1218 | 3.2 ^{+0.10} _{-0.20} | 4.6 ± 0.15 | 0.55 ± 0.05 | 0.45 ± 0.2 | 0.4 ± 0.2 | 1.05 | 4.9 | 1.9 | 1.25 | 4.8 | 1.9 |
| RCWL2010 | 5.0 ± 0.15 | 2.5 ± 0.15 | 0.6 ± 0.1 | 0.6 ± 0.2 | 0.6 ± 0.2 | 1.0 | 2.5 | 3.9 | 1.2 | 2.5 | 3.9 |
| RCWL2512 | 6.3 ± 0.2 | 3.15 ± 0.15 | 0.6 ± 0.1 | 0.6 ± 0.2 | 0.6 ± 0.2 | 1.0 | 3.2 | 5.2 | 1.2 | 3.2 | 5.2 |

TEMPERATURE RISE



DERATING





| PERFORMANCE | | |
|---------------------------|---|------------------------|
| TEST | CONDITIONS OF TEST | TEST LIMITS |
| Thermal shock | MIL-STD-202, method 107, -55 °C to +125 °C, 300 cycles at each extreme | ± (2.0 % + 0.005 Ω) ΔR |
| Short time overload | 2x rated power; duration according the model | ± (0.5 % + 0.005 Ω) ΔR |
| High temperature exposure | MIL-STD-202, method 108, 1000 h at T = 125 °C, 0 % power | ± (2.0 % + 0.005 Ω) ΔR |
| Temperature cycling | JESD 22, method JA-104, 1000 cycles (-55 °C to +125 °C) | ± (2.0 % + 0.005 Ω) ΔR |
| Biased humidity | MIL-STD-202, method 103, 1000 h 85 °C/85 % RH, 10 % x (P x R) ^{1/2} | ± (2.0 % + 0.005 Ω) ΔR |
| Mechanical shock | MIL-STD-202, method 213, condition C, 10 g's, 6 ms (half sine), 3 directions | ± (0.5 % + 0.005 Ω) ΔR |
| Vibration | MIL-STD-202, method 204, 5 g's, 20 min, 12 cycles, 3 directions, 10 Hz to 2000 Hz | ± (0.5 % + 0.005 Ω) ΔR |
| Operational life | MIL-STD-202, method 108, 1000 h at T = 125 °C at rated power | ± (2.0 % + 0.005 Ω) ΔR |
| Resistance to solder heat | MIL-STD-202, method 210, +260 °C solder, 10 s to 12 s dwell, 25 mm/s emergence | ± (1.0 % + 0.005 Ω) ΔR |
| Moisture resistance | MIL-STD-202, method 106, 0 % power, 7a and 7b not required | ± (2.0 % + 0.005 Ω) ΔR |

| PACKAGING | | | | | |
|-----------|------------------------|-----------|-------|-------------|------|
| MODEL | REEL | | | | |
| | TAPE WIDTH | DIAMETER | PITCH | PIECES/REEL | CODE |
| RCWL0402 | 8 mm/punched paper | 180 mm/7" | 2 mm | 10 000 | EA |
| RCWL0603 | 8 mm/punched paper | 180 mm/7" | 4 mm | 5000 | EA |
| RCWL0805 | 8 mm/punched paper | 180 mm/7" | 4 mm | 5000 | EA |
| RCWL1206 | 8 mm/punched paper | 180 mm/7" | 4 mm | 5000 | EA |
| RCWL1210 | 12 mm/punched paper | 180 mm/7" | 4 mm | 5000 | EA |
| RCWL1218 | 12 mm/embossed plastic | 180 mm/7" | 4 mm | 4000 | EA |
| RCWL2010 | 12 mm/embossed plastic | 180 mm/7" | 4 mm | 4000 | EA |
| RCWL2512 | 12 mm/embossed plastic | 180 mm/7" | 8 mm | 2000 | EA |

Note

- Embossed carrier tape per EIA-481-1A



Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Hyperlinks included in this datasheet may direct users to third-party websites. These links are provided as a convenience and for informational purposes only. Inclusion of these hyperlinks does not constitute an endorsement or an approval by Vishay of any of the products, services or opinions of the corporation, organization or individual associated with the third-party website. Vishay disclaims any and all liability and bears no responsibility for the accuracy, legality or content of the third-party website or for that of subsequent links.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.