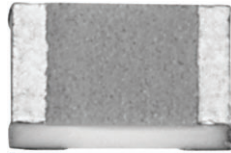


High Precision Wraparound Thin Film Chip Resistors

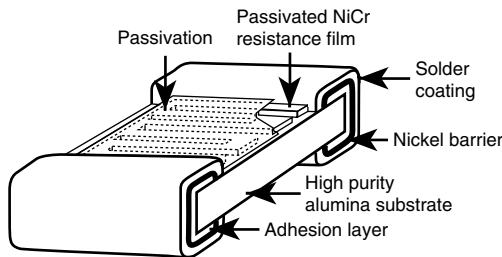


LINKS TO ADDITIONAL RESOURCES



Utilizing proven expertise in thin film resistors, Vishay provides a chip manufactured according to CECC with the same reliability and stability found in QPL resistors. These chips are available in a wide range of sizes, values, and performance characteristics.

CONSTRUCTION



FEATURES

- Nickel barrier for high temperature operating conditions
- Tight TCR < 10 ppm/°C, and in lot tracking < 5 ppm/°C in (-55 °C, +155 °C temperature range)
- Very low noise < 35 dB and voltage coefficient 0.1 ppm/V
- Non-inductive
- Laser trimmed down to 0.1 %
- Wraparound resistance less than 0.01 Ω
- Antistatic waffle-pack or tape and reel packaging available
- High stability (0.05 % - 1000 h at Pn at +70 °C)
- Withstand moisture resistance test of AEC-Q200
- According to CECC 40401-010
- 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 | | | | | | |
|------------------------------------|------|-------------------------------|------------------------|------------------------------------|-------------------|-------------------------------------|
| MODEL | SIZE | RESISTANCE RANGE (1) (2) Ω | RATED POWER Pn W | LIMITING ELEMENT VOLTAGE (UL) V | TOLERANCE ± % | TEMPERATURE COEFFICIENT ± ppm/°C |
| RV | 0505 | 100 to 260K | 0.125 | 50 | 0.1, 0.5, 1, 2, 5 | 10, 25 |
| RV | 0603 | 100 to 260K | 0.125 | 50 | 0.1, 0.5, 1, 2, 5 | 10, 25 |
| RV | 0805 | 100 to 300K | 0.200 | 50 | 0.1, 0.5, 1, 2, 5 | 10, 25 |
| RV | 1206 | 100 to 1M | 0.330 | 75 | 0.1, 0.5, 1, 2, 5 | 10, 25 |

Notes

- (1) Extended resistance range on request
 (2) For ohmic range versus tolerance and TCR, see detailed table

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

| MECHANICAL SPECIFICATIONS | |
|--------------------------------|--|
| Resistive material | Nichrome |
| Substrate material | Alumina |
| Plating | Tin lead over nickel or tin silver over nickel or gold over nickel |
| Marking resistance to solvents | Per CECC specs |

| OHMIC RANGE VS. TOLERANCE AND TCR | | | |
|-----------------------------------|------------------|-------------------|---------------|
| CASE SIZE | OHMIC RANGE Ω | TOLERANCE % | TCR ppm/°C |
| 0505 | 100 < 500 | 0.5; 1; 2; 5 | 10, 25 |
| 0505 | 500 to 260K | 0.1; 0.5; 1; 2; 5 | 10, 25 |
| 0603 | 100 < 500 | 0.5; 1; 2; 5 | 10, 25 |
| 0603 | 500 to 260K | 0.1; 0.5; 1; 2; 5 | 10, 25 |
| 0805 | 100 < 500 | 0.5; 1; 2; 5 | 10, 25 |
| 0805 | 500 to 300K | 0.1; 0.5; 1; 2; 5 | 10, 25 |
| 1206 | 100 < 500 | 0.5; 1; 2; 5 | 10, 25 |
| 1206 | 500 to 1M | 0.1; 0.5; 1; 2; 5 | 10, 25 |

| TECHNICAL SPECIFICATIONS | | |
|--------------------------|---|---------------------------------------|
| TEST | SPECIFICATIONS | CONDITIONS |
| Absolute TCR | E: ± 25 ppm/ $^{\circ}$ C / Y: ± 10 ppm/ $^{\circ}$ C | -55 $^{\circ}$ C to +155 $^{\circ}$ C |
| Absolute tolerance | ± 0.1 %, ± 0.5 %, ± 1 %, ± 2 %, ± 5 % ($R \geq 500 \Omega$) | |
| | ± 0.5 %, ± 1 %, ± 2 %, ± 5 % ($R \geq 100 \Omega$) | |
| Voltage coefficient | 0.1 ppm/V | |
| Noise | -35 dB typical | |
| Thermal EMF | < 0.1 μ V/ $^{\circ}$ C | |
| Load life stability | $\pm (0.1$ % Rn ⁽¹⁾ $\pm 0.05 \Omega$) | 1000 h Pn at +70 $^{\circ}$ C |

Note

⁽¹⁾ Rn: nominal resistance

| DIMENSIONS in millimeters (inches) | | | | | | | | |
|------------------------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| | | | | | | | | |
| SERIES / CASE SIZES | A | | B | | D/E | | C | |
| | MIN. | MAX. | MIN. | MAX. | MIN. | MAX. | MIN. | MAX. |
| RV 0505 | 1.198 (0.047) | 1.502 (0.059) | 1.143 (0.045) | 1.397 (0.055) | 0.250 (0.010) | 0.510 (0.020) | 0.373 (0.015) | 0.627 (0.025) |
| RV 0603 | 1.368 (0.054) | 1.672 (0.066) | 0.623 (0.025) | 0.877 (0.035) | 0.250 (0.010) | 0.510 (0.020) | 0.373 (0.015) | 0.627 (0.025) |
| RV 0805 | 1.758 (0.069) | 2.062 (0.081) | 1.143 (0.045) | 1.397 (0.055) | 0.250 (0.010) | 0.510 (0.020) | 0.373 (0.015) | 0.627 (0.025) |
| RV 1206 | 2.908 (0.114) | 3.212 (0.126) | 1.473 (0.058) | 1.727 (0.068) | 0.250 (0.010) | 0.510 (0.020) | 0.373 (0.015) | 0.627 (0.025) |

POPULAR OPTION

AEC-Q200 moisture resistance

Option to order: 0058: specific production process to withstand 85 $^{\circ}$ C / 85 % RH at Pn/10

| ENVIRONMENTAL TEST | | | |
|------------------------------------|--|---|------------------------------|
| TEST | CONDITIONS | VALUES AND DRIFTS ($\Delta R/R \pm \%$) | |
| | | CECC REQUIREMENTS | TYPICAL PERFORMANCE |
| Overload | 6.25 x rated power / 2 s (or 2 UL) | 0.05 % Rn ⁽²⁾ + 0.05 Ω | 0.01 % Rn ⁽²⁾ |
| Climatic sequences ⁽¹⁾ | -55 $^{\circ}$ C / +155 $^{\circ}$ C 5 moisture cycles | 0.1 % Rn ⁽²⁾ + 0.05 Ω | 0.02 % Rn ⁽²⁾ |
| Thermal shock ⁽¹⁾ | -55 $^{\circ}$ C / +155 $^{\circ}$ C 5 cycles 30 min | 0.05 % Rn ⁽²⁾ + 0.05 Ω | 0.02 % Rn ⁽²⁾ |
| Load life ⁽¹⁾ | +70 $^{\circ}$ C/Pn 1000 h | 0.1 % Rn ⁽²⁾ + 0.05 Ω | 0.05 % Rn ⁽²⁾ |
| Resistance to solder heat | +260 $^{\circ}$ C/ 10 s | 0.05 % Rn ⁽²⁾ + 0.05 Ω | 0.02 % Rn ⁽²⁾ |
| Moisture resistance ⁽¹⁾ | +40 $^{\circ}$ C / 93 % HR Pn/10 | 0.1 % Rn ⁽²⁾ + 0.05 Ω | 0.01 % Rn ⁽²⁾ |
| | AEC-Q200 ⁽³⁾ 85 $^{\circ}$ C / 85 % RH / Pn/10 1000 h | 0.5 % + 0.05 Ω | Max. < 0.3 % + 0.05 Ω |
| High temperature storage | 1000 h at + 155 $^{\circ}$ C | 0.1 % Rn ⁽²⁾ + 0.05 Ω | 0.05 % Rn ⁽²⁾ |
| Bending ⁽¹⁾ | 10 bends / 2 mm / 5 s | 0.05 % Rn ⁽²⁾ + 0.05 Ω | 0.02 % Rn ⁽²⁾ |

Notes

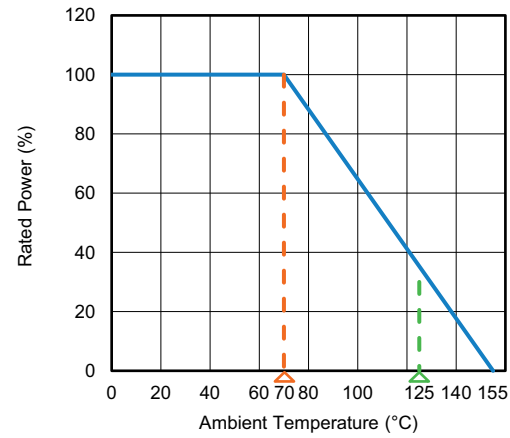
- Test requiring parts to be mounted on PCB will be performed with the requirement that termination alloy will be the same as solder paste alloy. Gold termination will be tested as B termination
- Rn: nominal resistance
Pn: nominal power
- Option to order: 0058

| SPECIFIC CONDITIONS DUE TO TERMINATION TYPE | | | | |
|---|-------------------------------|------------------------------|-----------------------------------|-----------------------------------|
| TEST | CONDITIONS | | VALUES AND DRIFTS | |
| | B; G | N | VISHAY REQUIREMENTS | TYPICAL PERFORMANCE |
| Solderability | +235 °C/2 s Sn60Pb40 alloy | +245 °C/3 s Sn97Ag3 alloy | VISUAL INSPECTION | |
| High T° reflow profile | N/A | +255 °C/40 s (on parts) | 0.02 % Rn ⁽¹⁾ + 0.05 Ω | 0.01 % Rn ⁽¹⁾ + 0.05 Ω |

Note

- ⁽¹⁾ Rn: nominal resistance
Pn: nominal power

| PACKAGING INFORMATION | | | | |
|-----------------------|------------------------------|-----------------------|-----------------------|------------------|
| SIZE | NUMBER OF PIECES PER PACKAGE | | | TAPE WIDTH |
| | WAFFLE PACK (2" x 2") | TAPE AND REEL MIN. | TAPE AND REEL MAX. | |
| 0505 | 100 | 100 | 4000 | 8 mm (0.315") |
| 0603 | | | 5000 | |
| 0805 | | | 4000 | |
| 1206 | | | 140 | |

DERATING CURVE


| GLOBAL PART NUMBER INFORMATION | | | | | | | | | | | | | | | | | |
|--|------------------------------|------------------------------------|---|---|---|---|---|---|---|--|--------------------------|---|---|---|---|---|---|
| New Global Part Numbering: RV0505E1001DBT0099 | | | | | | | | | | | | | | | | | |
| R | V | 0 | 5 | 0 | 5 | E | 1 | 0 | 0 | 1 | D | B | T | 0 | 0 | 9 | 9 |
| GLOBAL MODEL | SIZE | TCR | | VALUE | | | | TOLERANCE | TERMINATION | PACKAGING | OPTION | | | | | | |
| | 0505 0603 0805 1206 | E = ± 25 ppm/°C Y = ± 10 ppm/°C | | The first 3 digits (2 digits are enough for tolerance G and J) are significant figures and the last digit specifies the number of zeros to follow. R designates decimal point. 10R0 = 10 Ω 3901 = 3900 Ω 1004 = 1 MΩ | | | | B = ± 0.1 % D = ± 0.5 % F = ± 1 % G = ± 2 % J = ± 5 % | 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 | | | | | | |
| B: lead bearing version N and G: lead (Pb)-free / RoHS version | | | | | | | | | | | | | | | | | |
| Historical Part Number Example: RV 0505 25 ppm 1K 0.5 % B TR R1016 | | | | | | | | | | | | | | | | | |

| PART NUMBER DESCRIPTION (for information only) | | | | | | | |
|--|------|--------|-------------|-----------|-------------|-----------|--------|
| RV | 0505 | 25 ppm | 1K | 0.5 % | B | TR | R1016 |
| MODEL | SIZE | TCR | OHMIC VALUE | TOLERANCE | TERMINATION | PACKAGING | OPTION |



| 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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