

# Thick Film Chip Resistors, Industrial, High Power, Aluminum Nitride Substrate



Aluminum nitride  
over 3 x more power - same size

## FEATURES

- Thick film resistive element on an aluminum nitride (AlN) substrates
- Very high thermal conductivity in a small package size
- Termination: tin / lead wraparound termination over nickel barrier. Also available with lead (Pb)-free wraparound terminations.
- Capability to develop specific reliability programs designed to customer requirements
- Operating temperature range: -65 °C to +155 °C
- High frequency performance to 6 GHz
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://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

## MATERIAL SPECIFICATIONS

|                   |                                     |
|-------------------|-------------------------------------|
| Resistive element | Ruthenium oxide                     |
| Encapsulation     | Epoxy                               |
| Substrate         | Aluminum nitride                    |
| Termination       | Solder-coated nickel barrier        |
| Solder finish     | Pure tin or tin / lead solder alloy |

## STANDARD ELECTRICAL SPECIFICATIONS

| GLOBAL MODEL | CASE SIZE | POWER RATING <sup>(1)</sup><br>(Standard Board Mount)<br>$P_{25^{\circ}\text{C}}$<br>W | POWER RATING <sup>(1)</sup><br>(Active Temperature Control)<br>W | MAXIMUM WORKING VOLTAGE<br>V | RESISTANCE RANGE<br>$\Omega$ | TOLERANCE<br>$\pm \%$ | TEMPERATURE COEFFICIENT<br>$\pm \text{ppm}/^{\circ}\text{C}$ |
|--------------|-----------|----------------------------------------------------------------------------------------|------------------------------------------------------------------|------------------------------|------------------------------|-----------------------|--------------------------------------------------------------|
| RCP0505      | 0505      | 1.4                                                                                    | 5.0                                                              | $\sqrt{P \times R}$          | 10 to 2K                     | 1, 2, 5               | 150                                                          |
| RCP0603      | 0603      | 1.5                                                                                    | 3.9                                                              | $\sqrt{P \times R}$          | 10 to 2K                     | 1, 2, 5               | 150                                                          |
| RCP1206      | 1206      | 2.4                                                                                    | 11                                                               | $\sqrt{P \times R}$          | 10 to 2K                     | 1, 2, 5               | 150                                                          |
| RCP2512      | 2512      | 3.5                                                                                    | 22                                                               | $\sqrt{P \times R}$          | 10 to 2K                     | 1, 2, 5               | 150                                                          |

## Notes

- Consult factory for availability of additional case sizes
- <sup>(1)</sup> The power rating depends on the maximum temperature of the resistive element. The temperature of the resistive element and adjacent materials will rise due to the power dissipation of the resistor. The majority of this heat/energy is dissipated by conduction through the substrate, terminations, solder joints, and printed circuit board. The maximum power rating in a particular application only applies if the temperature of the resistive element is maintained at or below 155 °C

## GLOBAL PART NUMBER INFORMATION

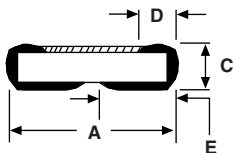
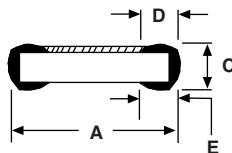
New Global Part Numbering: RCP1206W100RGWB (preferred part numbering format)

|                                          |   |                             |   |                                                 |   |                                     |   |                                                                                                                                                                                                                                                                                                                                                                                |   |   |   |                                                                             |   |   |  |  |  |
|------------------------------------------|---|-----------------------------|---|-------------------------------------------------|---|-------------------------------------|---|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|---|-----------------------------------------------------------------------------|---|---|--|--|--|
| R                                        | C | P                           | 1 | 2                                               | 0 | 6                                   | W | 1                                                                                                                                                                                                                                                                                                                                                                              | 0 | 0 | R | G                                                                           | W | B |  |  |  |
| GLOBAL MODEL                             |   | BOTTOM TERM.                |   | RESISTANCE VALUE                                |   | TOLERANCE CODE                      |   | PACKAGING CODE                                                                                                                                                                                                                                                                                                                                                                 |   |   |   | SPECIAL                                                                     |   |   |  |  |  |
| RCP0505<br>RCP0603<br>RCP1206<br>RCP2512 |   | W = wide<br>B = traditional |   | R = Ω<br>K = kΩ<br>10R0 = 10 Ω<br>1K30 = 1.3 kΩ |   | F = ± 1 %<br>G = ± 2 %<br>J = ± 5 % |   | TP = tin / lead, T/R (full reel)<br>S3 = tin / lead, T/R (1000 pieces)<br>WB = tin / lead, tray<br>S2 = tin / lead, T/R (500 pieces)<br>S6 = tin / lead, T/R (300 pieces)<br><br>EA = lead (Pb)-free, T/R (full reel)<br>EB = lead (Pb)-free, T/R (1000 pieces)<br>ET = lead (Pb)-free, tray<br>EC = lead (Pb)-free, T/R (500 pieces)<br>ED = lead (Pb)-free, T/R (300 pieces) |   |   |   | Blank = standard (dash number) (up to 3 digits) from 1 to 999 as applicable |   |   |  |  |  |

## Note

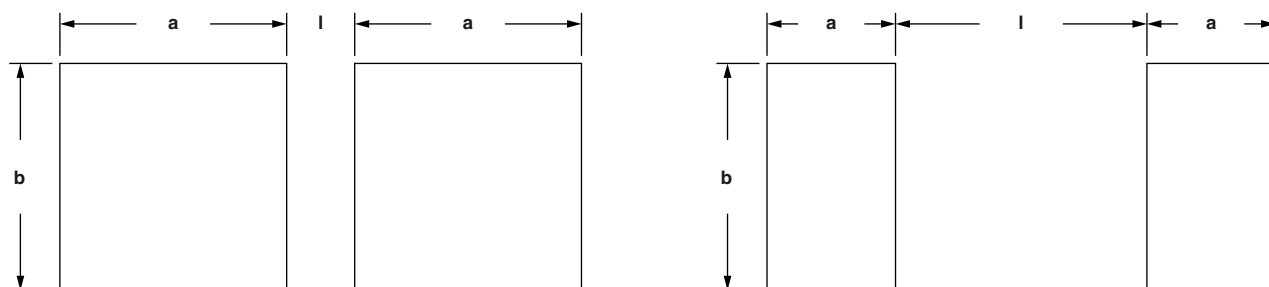
- For additional information on packaging, refer to the Surface Mount Resistor Packaging document ([www.vishay.com/doc?31543](http://www.vishay.com/doc?31543))

| PERFORMANCE                           |         |                                      |  |                                     |
|---------------------------------------|---------|--------------------------------------|--|-------------------------------------|
| TEST                                  |         | CONDITIONS OF TEST                   |  | TEST RESULTS<br>(TYPICAL TEST LOTS) |
| Resistance to soldering heat          |         | 2 cycles; > 183 °C for 90 s to 120 s |  | ≤ ± 0.20 %                          |
| Resistance temperature characteristic |         | -55 °C to +125 °C                    |  | ≤ ± 120 ppm                         |
| Low temperature operation             |         | -65 °C at rated voltage              |  | ≤ ± 0.02 %                          |
| Short time overload                   | RCP0505 | 3.1 W applied for 5 s                |  | ≤ ± 0.10 %                          |
|                                       | RCP0603 | 4.4 W applied for 5 s                |  |                                     |
|                                       | RCP1206 | 4.7 W applied for 5 s                |  |                                     |
|                                       | RCP2512 | 7.7 W applied for 5 s                |  |                                     |
| High temperature exposure             |         | +150 °C for 100 h                    |  | ≤ ± 0.10 %                          |
| Moisture resistance                   |         | 240 h at ≥ 80 % RH                   |  | ≤ ± 0.15 %                          |
| Life                                  |         | 1000 h at +70 °C                     |  | ≤ ± 0.10 %                          |
| Solderability                         |         | J-STD-202, test B                    |  | 95 % coverage                       |
| Solder mounting integrity             |         | Per MIL-PRF-55342:                   |  | No evidence of mechanical damage    |
|                                       | RCP0505 | 1 kg force applied                   |  |                                     |
|                                       | RCP0603 | 2 kg force applied                   |  |                                     |
|                                       | RCP1206 | 2 kg force applied                   |  |                                     |
|                                       | RCP2512 | 3 kg force applied                   |  |                                     |

| DIMENSIONS in inches (millimeters)                                                                                                                                                                                                                          |                                |                                |                                |                                |                                |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|
|    |                                |                                |                                |                                |                                |
|                                                                                                                                                                                                                                                             |                                | WIDE BOTTOM TERMINAL (W)       |                                | TRADITIONAL TERMINAL (B)       |                                |
| GLOBAL MODEL                                                                                                                                                                                                                                                | A<br>(LENGTH)                  | B<br>(WIDTH)                   | C<br>(HEIGHT)                  | D<br>(TOP TERM)                | E<br>(BOTTOM TERM)             |
| RCP0505W                                                                                                                                                                                                                                                    | 0.055 ± 0.005<br>(1.40 ± 0.13) | 0.050 ± 0.005<br>(1.27 ± 0.13) | 0.020 ± 0.005<br>(0.51 ± 0.13) | 0.010 ± 0.005<br>(0.25 ± 0.13) | 0.020 ± 0.005<br>(0.51 ± 0.13) |
| RCP0505B                                                                                                                                                                                                                                                    | 0.055 ± 0.005<br>(1.40 ± 0.13) | 0.050 ± 0.005<br>(1.27 ± 0.13) | 0.020 ± 0.005<br>(0.51 ± 0.13) | 0.010 ± 0.005<br>(0.25 ± 0.13) | 0.015 ± 0.005<br>(0.38 ± 0.13) |
| RCP0603W                                                                                                                                                                                                                                                    | 0.063 ± 0.005<br>(1.60 ± 0.13) | 0.032 ± 0.005<br>(0.81 ± 0.13) | 0.018 ± 0.005<br>(0.46 ± 0.13) | 0.012 ± 0.005<br>(0.30 ± 0.13) | 0.023 ± 0.005<br>(0.58 ± 0.13) |
| RCP0603B                                                                                                                                                                                                                                                    | 0.063 ± 0.005<br>(1.60 ± 0.13) | 0.032 ± 0.005<br>(0.81 ± 0.13) | 0.018 ± 0.005<br>(0.46 ± 0.13) | 0.012 ± 0.005<br>(0.30 ± 0.13) | 0.015 ± 0.005<br>(0.38 ± 0.13) |
| RCP1206W                                                                                                                                                                                                                                                    | 0.122 ± 0.005<br>(3.10 ± 0.13) | 0.060 ± 0.005<br>(1.52 ± 0.13) | 0.020 ± 0.005<br>(0.51 ± 0.13) | 0.015 ± 0.005<br>(0.38 ± 0.13) | 0.048 ± 0.005<br>(1.22 ± 0.13) |
| RCP1206B                                                                                                                                                                                                                                                    | 0.122 ± 0.005<br>(3.10 ± 0.13) | 0.060 ± 0.005<br>(1.52 ± 0.13) | 0.020 ± 0.005<br>(0.51 ± 0.13) | 0.015 ± 0.005<br>(0.38 ± 0.13) | 0.015 ± 0.005<br>(0.38 ± 0.13) |
| RCP2512W                                                                                                                                                                                                                                                    | 0.250 ± 0.005<br>(6.35 ± 0.13) | 0.124 ± 0.005<br>(3.15 ± 0.13) | 0.020 ± 0.005<br>(0.51 ± 0.13) | 0.020 ± 0.005<br>(0.51 ± 0.13) | 0.113 ± 0.005<br>(2.87 ± 0.13) |
| RCP2512B                                                                                                                                                                                                                                                    | 0.250 ± 0.005<br>(6.35 ± 0.13) | 0.124 ± 0.005<br>(3.15 ± 0.13) | 0.020 ± 0.005<br>(0.51 ± 0.13) | 0.020 ± 0.005<br>(0.51 ± 0.13) | 0.020 ± 0.005<br>(0.51 ± 0.13) |



**RECOMMENDED SOLDER PAD DIMENSIONS** in inches (millimeters)



WIDE BOTTOM TERMINAL (W)

TRADITIONAL TERMINAL (B)

| GLOBAL MODEL | a<br>(LENGTH)   | b<br>(WIDTH)    | l<br>(SPACING)  |
|--------------|-----------------|-----------------|-----------------|
| RCP0505W     | 0.040<br>(1.02) | 0.055<br>(1.40) | 0.015<br>(0.38) |
| RCP0505B     | 0.035<br>(0.89) | 0.055<br>(1.40) | 0.025<br>(0.64) |
| RCP0603W     | 0.043<br>(1.09) | 0.037<br>(0.94) | 0.018<br>(0.46) |
| RCP0603B     | 0.035<br>(0.89) | 0.037<br>(0.94) | 0.033<br>(0.84) |
| RCP1206W     | 0.068<br>(1.73) | 0.066<br>(1.68) | 0.018<br>(0.46) |
| RCP1206B     | 0.037<br>(0.94) | 0.066<br>(1.68) | 0.081<br>(2.06) |
| RCP2512W     | 0.133<br>(3.38) | 0.129<br>(3.28) | 0.024<br>(0.61) |
| RCP2512B     | 0.040<br>(1.02) | 0.129<br>(3.28) | 0.210<br>(5.33) |



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