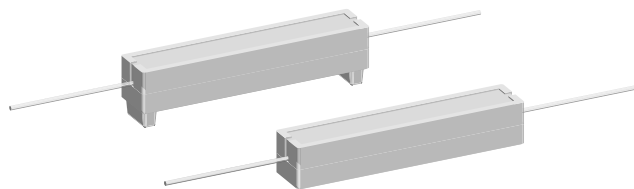




## Wirewound Resistors, Commercial Power, Axial Lead



## FEATURES

- High power to size ratio
- Ceramic cases are available with circuit board stand-offs (designated with a -3 model ending)
- Superior surge capability
- Complete welded construction
- Available in non-inductive styles with Aryton-Perry winding (CPWN in lieu of CPW, maximum resistance is one-half CPW range)
- Special inorganic potting compound and ceramic case provide high thermal conductivity in a fireproof package
- Compliant to RoHS Directive 2002/95/EC



## Notes

\* Pb containing terminations are not RoHS compliant, exemptions may apply

\*\* Please see document "Vishay Material Category Policy": [www.vishay.com/doc?999902](http://www.vishay.com/doc?999902)

## STANDARD ELECTRICAL SPECIFICATIONS

| GLOBAL MODEL | HISTORICAL MODEL | POWER RATING $P_{40^\circ\text{C}}$<br>W | RESISTANCE RANGE<br>$\Omega$ | TOLERANCE<br>$\pm \%$ | WEIGHT (typical)<br>g |
|--------------|------------------|------------------------------------------|------------------------------|-----------------------|-----------------------|
| CPW02        | CPW-2            | 2                                        | 0.1 to 7K                    | 1, 2, 3, 5            | 2.0                   |
| CPW02...3    | CPW-2-3          | 2                                        | 0.1 to 7K                    | 1, 2, 3, 5            | 2.2                   |
| CPW03        | CPW-3            | 3                                        | 0.1 to 7.5K                  | 1, 2, 3, 5            | 3.4                   |
| CPW03...3    | CPW-3-3          | 3                                        | 0.1 to 7.5K                  | 1, 2, 3, 5            | 3.6                   |
| CPW05        | CPW-5            | 5                                        | 0.1 to 8.5K                  | 1, 2, 3, 5            | 4.8                   |
| CPW05...3    | CPW-5-3          | 5                                        | 0.1 to 8.5K                  | 1, 2, 3, 5            | 5.0                   |
| CPW07        | CPW-7            | 7                                        | 0.1 to 18K                   | 1, 2, 3, 5            | 6.8                   |
| CPW07...3    | CPW-7-3          | 7                                        | 0.1 to 18K                   | 1, 2, 3, 5            | 7.0                   |
| CPW10        | CPW-10           | 10                                       | 0.12 to 30K                  | 1, 2, 3, 5            | 9.5                   |
| CPW10...3    | CPW-10-3         | 10                                       | 0.12 to 30K                  | 1, 2, 3, 5            | 9.9                   |
| CPW15        | CPW-15           | 15                                       | 0.12 to 30K                  | 1, 2, 3, 5            | 16.8                  |
| CPW15...3    | CPW-15-3         | 15                                       | 0.12 to 30K                  | 1, 2, 3, 5            | 17.4                  |
| CPW20        | CPW-20           | 20                                       | 0.18 to 45K                  | 1, 2, 3, 5            | 22.8                  |
| CPW20...3    | CPW-20-3         | 20                                       | 0.18 to 45K                  | 1, 2, 3, 5            | 23.6                  |

## TECHNICAL SPECIFICATIONS

| PARAMETER                       | UNIT                  | CPW RESISTOR CHARACTERISTICS                                                                                               |
|---------------------------------|-----------------------|----------------------------------------------------------------------------------------------------------------------------|
| Temperature Coefficient         | ppm/ $^\circ\text{C}$ | $\pm 30$ for 10 $\Omega$ and above; $\pm 50$ for 1.0 $\Omega$ to 9.9 $\Omega$ ; $\pm 90$ for 0.5 $\Omega$ to 0.99 $\Omega$ |
| Short Time Overload             | -                     | 5 x rated power for 5 s                                                                                                    |
| Maximum Working Voltage         | V                     | $(P \times R)^{1/2}$                                                                                                       |
| Operating Temperature Range     | $^\circ\text{C}$      | - 65 to + 275                                                                                                              |
| Terminal Strength               | lb                    | 10 minimum                                                                                                                 |
| Dielectric Withstanding Voltage | V <sub>AC</sub>       | 1000                                                                                                                       |

## GLOBAL PART NUMBER INFORMATION

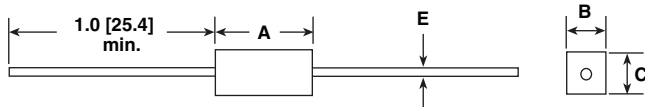
Global Part Numbering example: CPW0515R00JB313

|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|--|--|
| C | P | W | 0 | 5 | 1 | 5 | R | 0 | 0 | J | B | 3 | 1 | 3 |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|--|--|

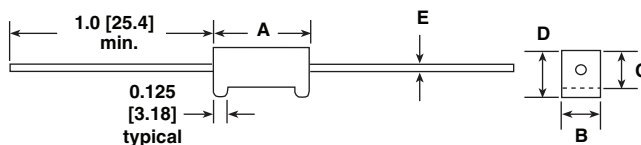
| GLOBAL MODEL                                                             | VALUE                                                                         | TOLERANCE                                                                                                             | PACKAGING                                                                                                                                                                                    | SPECIAL                                                             |
|--------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|
| (See Standard Electrical Specifications Global Model column for options) | R = Decimal<br>K = Thousand<br>R1500 = 0.15 $\Omega$<br>1K500 = 1500 $\Omega$ | D = $\pm 0.5 \%$<br>F = $\pm 1.0 \%$<br>G = $\pm 2.0 \%$<br>H = $\pm 3.0 \%$<br>J = $\pm 5.0 \%$<br>K = $\pm 10.0 \%$ | E14 = Lead (Pb)-free bulk<br>E31 = Lead (Pb)-free four layer bulk<br>E01 = Lead (Pb)-free skin pack<br><br>B14 = Tin/lead bulk<br>B31 = Tin/lead four layer bulk<br>J01 = Tin/lead skin pack | (Dash Number)<br>(up to 3 digits)<br>From 1 to 999<br>as applicable |
| Historical Part Numbering example: CPW-5-3 15 $\Omega$ 5 % B31           |                                                                               |                                                                                                                       |                                                                                                                                                                                              |                                                                     |
| CPW-5-3                                                                  | 15 $\Omega$                                                                   | 5 %                                                                                                                   | B31                                                                                                                                                                                          |                                                                     |
| HISTORICAL MODEL                                                         | RESISTANCE VALUE                                                              | TOLERANCE CODE                                                                                                        | PACKAGING                                                                                                                                                                                    |                                                                     |

**DIMENSIONS** in inches [millimeters]

CPWxx



CPWxx...3



| GLOBAL MODEL | DIMENSIONS in inches [millimeters]  |                      |                      |                      |                      |
|--------------|-------------------------------------|----------------------|----------------------|----------------------|----------------------|
|              | A <sup>(1)</sup><br>± 0.031 [0.794] | B<br>± 0.031 [0.794] | C<br>± 0.031 [0.794] | D<br>± 0.031 [0.794] | E<br>± 0.001 [0.025] |
| CPW02        | 0.688 [17.46]                       | 0.250 [6.35]         | 0.250 [6.35]         | -                    | 0.032 [0.813]        |
| CPW02...3    | 0.688 [17.46]                       | 0.250 [6.35]         | 0.250 [6.35]         | 0.313 [7.94]         | 0.032 [0.813]        |
| CPW03        | 0.875 [22.22]                       | 0.313 [7.94]         | 0.313 [7.94]         | -                    | 0.032 [0.813]        |
| CPW03...3    | 0.875 [22.22]                       | 0.313 [7.94]         | 0.313 [7.94]         | 0.375 [9.52]         | 0.032 [0.813]        |
| CPW05        | 0.875 [22.22]                       | 0.375 [9.52]         | 0.344 [8.73]         | -                    | 0.032 [0.813]        |
| CPW05...3    | 0.875 [22.22]                       | 0.375 [9.52]         | 0.344 [8.73]         | 0.406 [10.32]        | 0.032 [0.813]        |
| CPW07        | 1.391 [35.32]                       | 0.375 [9.52]         | 0.344 [8.73]         | -                    | 0.032 [0.813]        |
| CPW07...3    | 1.391 [35.32]                       | 0.375 [9.52]         | 0.344 [8.73]         | 0.469 [11.91]        | 0.032 [0.813]        |
| CPW10        | 1.875 [47.62]                       | 0.375 [9.52]         | 0.344 [8.73]         | -                    | 0.032 [0.813]        |
| CPW10...3    | 1.875 [47.62]                       | 0.375 [9.52]         | 0.344 [8.73]         | 0.469 [11.91]        | 0.032 [0.813]        |
| CPW15        | 1.875 [47.62]                       | 0.500 [12.70]        | 0.500 [12.70]        | -                    | 0.032 [0.813]        |
| CPW15...3    | 1.875 [47.62]                       | 0.500 [12.70]        | 0.500 [12.70]        | 0.625 [15.87]        | 0.032 [0.813]        |
| CPW20        | 2.500 [63.50]                       | 0.500 [12.70]        | 0.500 [12.70]        | -                    | 0.032 [0.813]        |
| CPW20...3    | 2.500 [63.50]                       | 0.500 [12.70]        | 0.500 [12.70]        | 0.625 [15.87]        | 0.032 [0.813]        |

**Note**
<sup>(1)</sup> Potting compound may extend outside of ceramic case up to 0.060 [1.52] maximum per side.

**MATERIAL SPECIFICATIONS**
**Element:** Copper-nickel alloy or nickel-chrome alloy, depending on resistance value

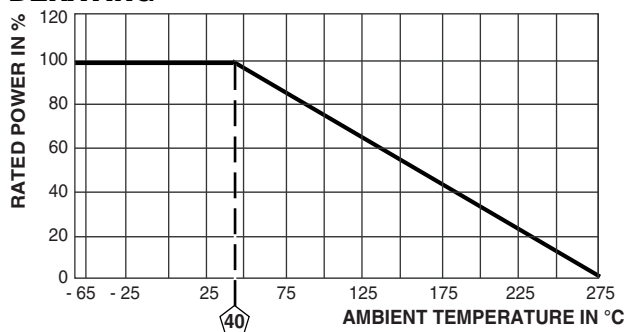
**Core:** Ceramic

**End Caps:** Tin plated steel

**Body:** Steatite ceramic case with inorganic potting compound

**Terminals:** Tinned Copperweld®

**Part Marking:** DALE, model, wattage, value, tolerance, date code

**DERATING**


| PERFORMANCE               |                                                                                    |                          |
|---------------------------|------------------------------------------------------------------------------------|--------------------------|
| TEST                      | CONDITIONS OF TEST                                                                 | TEST LIMITS (EIA RS-344) |
| Thermal Shock             | - 55 °C to + 275 °C, 5 cycles, 30 min dwell time                                   | ± (2.0 % + 0.05 Ω) ΔR    |
| Short Time Overload       | 5 x rated power for 5 s                                                            | ± (2.0 % + 0.05 Ω) ΔR    |
| Dielectric Withstanding   | 1000 V <sub>RMS</sub> for 1 min                                                    | ± (0.1 % + 0.05 Ω) ΔR    |
| Low Temperature Storage   | - 65 °C, full rated working voltage for 45 min                                     | ± (2.0 % + 0.05 Ω) ΔR    |
| Bias Humidity             | 75 °C, 90 % to 100 % RH, 240 h                                                     | ± (2.0 % + 0.05 Ω) ΔR    |
| Load Life                 | 1000 h at rated power, + 40 °C, 1.5 h "ON", 0.5 h "OFF"                            | ± (3.0 % + 0.05 Ω) ΔR    |
| Terminal Strength         | 5 s to 10 s 10 pound pull test, torsion test - 3 alternating directions, 360° each | ± (1.0 % + 0.05 Ω) ΔR    |
| Resistance to Solder Heat | Terminal immersed 3.5 s in molten solder at 1/8" to 3/16" from body                | ± (1.0 % + 0.05 Ω) ΔR    |



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