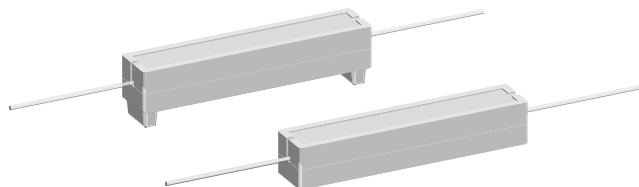


# Wirewound / Metal Oxide Resistors, Commercial Power, Axial Lead



## FEATURES

- High performance for low cost
- Meets or exceeds requirements of EIA Standard RS-344
- High power to size ratio
- Ceramic cases are available with circuit board stand-offs (designated with a -3 model ending)
- Special inorganic potting compound and ceramic case provide high thermal conductivity in a fireproof package
- Material categorization:  
for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



## STANDARD ELECTRICAL SPECIFICATIONS

| GLOBAL MODEL | POWER RATING<br>$P_{40^{\circ}\text{C}}$<br>W | RESISTANCE RANGE $\Omega$<br>WIREWOUND <sup>(1)</sup> | RESISTANCE RANGE $\Omega$<br>METAL OXIDE <sup>(1)(2)</sup> | TOLERANCE<br>$\pm \%$ | WEIGHT<br>(TYPICAL)<br>g |
|--------------|-----------------------------------------------|-------------------------------------------------------|------------------------------------------------------------|-----------------------|--------------------------|
| CP0002       | 2                                             | 0.1 to 1K                                             | 100 to 30K                                                 | 5, 10                 | 2.0                      |
| CP0002...3   | 2                                             | 0.1 to 1K                                             | 100 to 30K                                                 | 5, 10                 | 2.2                      |
| CP0003       | 3                                             | 0.1 to 2K                                             | 150 to 33K                                                 | 5, 10                 | 3.4                      |
| CP0003...3   | 3                                             | 0.1 to 2K                                             | 150 to 33K                                                 | 5, 10                 | 3.6                      |
| CP0005       | 5                                             | 0.1 to 2.4K                                           | 150 to 50K                                                 | 5, 10                 | 4.8                      |
| CP0005...3   | 5                                             | 0.1 to 2.4K                                           | 150 to 50K                                                 | 5, 10                 | 5.0                      |
| CP0007       | 7                                             | 0.1 to 7K                                             | -                                                          | 5, 10                 | 6.8                      |
| CP0007...3   | 7                                             | 0.1 to 7K                                             | -                                                          | 5, 10                 | 7.0                      |
| CP0010       | 10                                            | 0.1 to 11K                                            | -                                                          | 5, 10                 | 9.5                      |
| CP0010...3   | 10                                            | 0.1 to 11K                                            | -                                                          | 5, 10                 | 9.9                      |
| CP0015       | 15                                            | 0.1 to 11K                                            | -                                                          | 5, 10                 | 16.8                     |
| CP0015...3   | 15                                            | 0.1 to 11K                                            | -                                                          | 5, 10                 | 17.4                     |
| CP0020       | 20                                            | 0.1 to 16K                                            | -                                                          | 5, 10                 | 22.8                     |
| CP0020...3   | 20                                            | 0.1 to 16K                                            | -                                                          | 5, 10                 | 23.6                     |
| CP0022       | 22                                            | 0.1 to 16K                                            | -                                                          | 5, 10                 | 24.5                     |
| CP0022...3   | 22                                            | 0.1 to 16K                                            | -                                                          | 5, 10                 | 25.3                     |
| CP0025       | 25                                            | 0.1 to 16K                                            | -                                                          | 5, 10                 | 37.0                     |

### Notes

- <sup>(1)</sup> To specifically order a wirewound sub-assembly for resistance values that overlap between the wirewound and metal oxide technologies, the model will be a CPxxxx...85 for standard body and CPxxxx...91 for body with stand-offs. To specifically order a metal oxide sub-assembly for resistance values that overlap between the wirewound and metal oxide technologies, the model will be a CPxxxx...100 for a standard body and CPxxxx...101 for body with stand-offs. If no dash type is specified, either technology may be supplied
- <sup>(2)</sup> **Metal oxide versions are not recommended for new designs**

## TECHNICAL SPECIFICATIONS

| PARAMETER                       | UNIT                    | WIREWOUND CHARACTERISTICS                                  | METAL OXIDE CHARACTERISTICS  |
|---------------------------------|-------------------------|------------------------------------------------------------|------------------------------|
| Temperature Coefficient         | ppm/ $^{\circ}\text{C}$ | $\pm 300$ 1 $\Omega$ and above; $\pm 600$ below 1 $\Omega$ | $\pm 300$ (CP0002 to CP0005) |
| Short Time Overload             | -                       | 5 x rated power for 5 s                                    | 5 x rated power for 5 s      |
| Terminal Strength               | lb                      | 10 minimum                                                 | 10 minimum                   |
| Operating Temperature Range     | $^{\circ}\text{C}$      | -65 to +275                                                | -65 to +225                  |
| Dielectric Withstanding Voltage | $V_{AC}$                | 1000                                                       | 1000                         |
| Maximum Working Voltage         | V                       | $(P \times R)^{1/2}$                                       | $(P \times R)^{1/2}$         |

### Note

- Wirewound CP resistors can reliably function as a fuse and as a resistor. Such components involve compromise between fusing and resistive functions; therefore, each design should be tailored to the application to ensure optimum performance. Contact factory by using the e-mail address at the bottom of this page for design assistance

**GLOBAL PART NUMBER INFORMATION**

Global Part Numbering Example: CP000515R00JE143

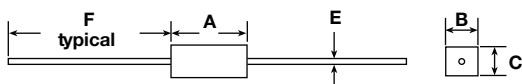
|                                                                          |   |   |   |                                                                 |   |   |                             |   |                                                                                                                              |   |   |   |   |                                                                     |   |  |  |
|--------------------------------------------------------------------------|---|---|---|-----------------------------------------------------------------|---|---|-----------------------------|---|------------------------------------------------------------------------------------------------------------------------------|---|---|---|---|---------------------------------------------------------------------|---|--|--|
| C                                                                        | P | 0 | 0 | 0                                                               | 5 | 1 | 5                           | R | 0                                                                                                                            | 0 | J | E | 1 | 4                                                                   | 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 Ω<br>1K500 = 1500 Ω |   |   | J = ± 5.0 %<br>K = ± 10.0 % |   | E14 = lead (Pb)-free bulk pack<br>E31 = lead (Pb)-free four layer bulk pack<br>B14 = bulk pack<br>B31 = four layer bulk pack |   |   |   |   | (Dash number)<br>(Up to 3 digits)<br>From 1 to 999<br>as applicable |   |  |  |

Historical Part Numbering Example: CP-5-3 15  $\Omega$  5 % B14

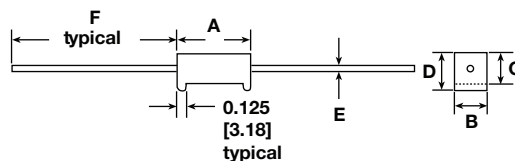
|                  |                  |                |           |
|------------------|------------------|----------------|-----------|
| CP-5-3           | 15 $\Omega$      | 5 %            | B14       |
| HISTORICAL MODEL | RESISTANCE VALUE | TOLERANCE CODE | PACKAGING |

**DIMENSIONS** in inches [millimeters]

CPxxxx



CPxxxx...3



| GLOBAL MODEL          | DIMENSIONS in inches [millimeters]         |                             |                             |                             |                          |                |                                  |                        |
|-----------------------|--------------------------------------------|-----------------------------|-----------------------------|-----------------------------|--------------------------|----------------|----------------------------------|------------------------|
|                       | A <sup>(1)</sup><br>$\pm 0.031$<br>[0.794] | B<br>$\pm 0.031$<br>[0.794] | C<br>$\pm 0.031$<br>[0.794] | D<br>$\pm 0.031$<br>[0.794] | E<br>$\pm 0.002$ [0.050] |                | F                                |                        |
|                       |                                            |                             |                             |                             | WIREWOUND                | METAL OXIDE    | WIREWOUND<br>$\pm 0.125$ [3.175] | METAL OXIDE<br>MINIMUM |
| CP0002                | 0.688 [17.46]                              | 0.250 [6.35]                | 0.250 [6.35]                | -                           | 0.032 [0.813]            | 0.0236 [0.600] | 1.500 [38.10]                    | 0.750 [19.05]          |
| CP0002...3            | 0.688 [17.46]                              | 0.250 [6.35]                | 0.250 [6.35]                | 0.313 [7.94]                | 0.032 [0.813]            | 0.0236 [0.600] | 1.500 [38.10]                    | 0.750 [19.05]          |
| CP0003                | 0.875 [22.22]                              | 0.313 [7.94]                | 0.313 [7.94]                | -                           | 0.036 [0.914]            | 0.032 [0.813]  | 1.500 [38.10]                    | 1.000 [25.40]          |
| CP0003...3            | 0.875 [22.22]                              | 0.313 [7.94]                | 0.313 [7.94]                | 0.375 [9.52]                | 0.036 [0.914]            | 0.032 [0.813]  | 1.500 [38.10]                    | 1.000 [25.40]          |
| CP0005                | 0.875 [22.22]                              | 0.375 [9.52]                | 0.344 [8.73]                | -                           | 0.036 [0.914]            | 0.032 [0.813]  | 1.500 [38.10]                    | 1.000 [25.40]          |
| CP0005...3            | 0.875 [22.22]                              | 0.375 [9.52]                | 0.344 [8.73]                | 0.406 [10.32]               | 0.036 [0.914]            | 0.032 [0.813]  | 1.500 [38.10]                    | 1.000 [25.40]          |
| CP0007                | 1.391 [35.32]                              | 0.375 [9.52]                | 0.344 [8.73]                | -                           | 0.036 [0.914]            | -              | 1.500 [38.10]                    | -                      |
| CP0007...3            | 1.391 [35.32]                              | 0.375 [9.52]                | 0.344 [8.73]                | 0.469 [11.91]               | 0.036 [0.914]            | -              | 1.500 [38.10]                    | -                      |
| CP0010                | 1.875 [47.62]                              | 0.375 [9.52]                | 0.344 [8.73]                | -                           | 0.036 [0.914]            | -              | 1.500 [38.10]                    | -                      |
| CP0010...3            | 1.875 [47.62]                              | 0.375 [9.52]                | 0.344 [8.73]                | 0.469 [11.91]               | 0.036 [0.914]            | -              | 1.500 [38.10]                    | -                      |
| CP0015                | 1.875 [47.62]                              | 0.500 [12.70]               | 0.500 [12.70]               | -                           | 0.036 [0.914]            | -              | 1.500 [38.10]                    | -                      |
| CP0015...3            | 1.875 [47.62]                              | 0.500 [12.70]               | 0.500 [12.70]               | 0.625 [15.87]               | 0.036 [0.914]            | -              | 1.500 [38.10]                    | -                      |
| CP0020 <sup>(2)</sup> | 2.500 [63.50]                              | 0.500 [12.70]               | 0.500 [12.70]               | -                           | 0.036 [0.914]            | -              | 1.500 [38.10]                    | -                      |
| CP0020...3            | 2.500 [63.50]                              | 0.500 [12.70]               | 0.500 [12.70]               | 0.625 [15.87]               | 0.036 [0.914]            | -              | 1.500 [38.10]                    | -                      |
| CP0022                | 2.500 [63.50]                              | 0.500 [12.70]               | 0.500 [12.70]               | -                           | 0.036 [0.914]            | -              | 1.500 [38.10]                    | -                      |
| CP0022...3            | 2.500 [63.50]                              | 0.500 [12.70]               | 0.500 [12.70]               | 0.625 [15.87]               | 0.036 [0.914]            | -              | 1.500 [38.10]                    | -                      |
| CP0025                | 2.500 [63.50]                              | 0.625 [15.87]               | 0.625 [15.87]               | -                           | 0.040 [1.016]            | -              | 1.500 [38.10]                    | -                      |

**Notes**

- (1) Potting compound may extend outside of ceramic case up to 0.060 [1.52] maximum per side  
(2) Dimensions for the metal oxide are: A = 2.360 [59.94], B = 0.570 [14.48], C = 0.530 [13.46], E = 0.032 [0.813], F = 1.000 [25.40]

**MATERIAL SPECIFICATIONS**

**Element:** wirewound = copper-nickel alloy or nickel-chrome alloy, depending on resistance value  
metal oxide = high temperature fired metal oxide film

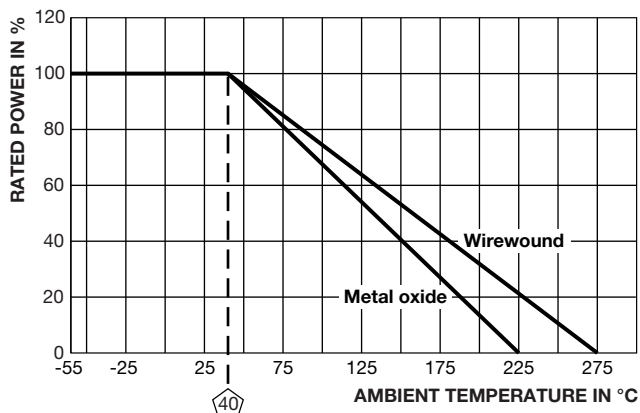
**Core:** wirewound = woven fiberglass  
metal oxide = alumina ceramic

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

**End Caps:** tin plated steel

**Terminals:** tinned copper

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

**DERATING**

| PERFORMANCE                     |                                                                          |                        |
|---------------------------------|--------------------------------------------------------------------------|------------------------|
| TEST                            | CONDITIONS OF TEST                                                       | TEST LIMITS (EIA-344)  |
| Thermal Shock                   | -55 °C to +275 °C (+225 °C for metal oxide), 5 cycles, 30 min dwell time | ± (5.0 % + 0.05 Ω) ΔR  |
| Short Time Overload             | 5 x rated power for 5 s                                                  | ± (4.0 % + 0.05 Ω) ΔR  |
| Dielectric Withstanding Voltage | 1000 V <sub>RMS</sub> , for 1 min                                        | ± (2.0 % + 0.05 Ω) ΔR  |
| Low Temperature Storage         | -65 °C, full rated working voltage for 45 min                            | ± (3.0 % + 0.05 Ω) ΔR  |
| Humidity                        | 75 °C, 90 % to 100 % RH, 240 h                                           | ± (5.0 % + 0.05 Ω) ΔR  |
| Load Life                       | 1000 h at rated power, + 25 °C, 1.5 h "ON", 0.5 h "OFF"                  | ± (10.0 % + 0.05 Ω) ΔR |
| Terminal Strength               | 5 pounds for 30 s; body twisted about axis, 3 x 360° rotations           | ± (2.0 % + 0.05 Ω) ΔR  |
| Resistance to Solder Heat       | Terminal immersed 3.5 s in molten solder at 1/8" to 3/16" from body      | ± (4.0 % + 0.05 Ω) ΔR  |



## 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.

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.

# Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[Vishay:](#)

[CP00152K700JB14](#)