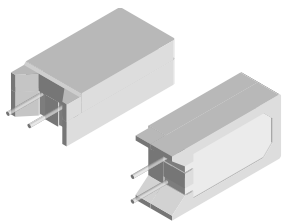


## Wirewound/Metal Film Resistors, Commercial Power, Vertical Mount



### FEATURES

- Board space saving due to vertical design
- Meets or exceeds requirements of EIA Standard RS-344
- High power to size ratio
- Special inorganic potting compound and ceramic case provide high thermal conductivity in a fireproof package
- Compliant to RoHS Directive 2002/95/EC



**RoHS\***  
COMPLIANT  
**GREEN**  
(5-2008)\*\*  
Available

### STANDARD ELECTRICAL SPECIFICATIONS

| GLOBAL MODEL                 | HISTORICAL MODEL | POWER RATING<br>$P_{70^{\circ}\text{C}}$ W | RESISTANCE RANGE<br>$\Omega$ | TOLERANCE<br>$\pm \%$ | WEIGHT (typical)<br>g |
|------------------------------|------------------|--------------------------------------------|------------------------------|-----------------------|-----------------------|
| CPCL02                       | CPCL-2           | 2                                          | 0.01 to 0.10                 | 5, 10                 | 3.5                   |
| CPCC02                       | CPCC-2           | 2                                          | 0.1 to 500                   | 5, 10                 | 3.5                   |
| CPCP02                       | CPCP-2           | 2                                          | 0.1 to 4K                    | 1, 5                  | 3.5                   |
| CPCF02                       | CPCF-2           | 2                                          | 501 to 150K                  | 1, 5, 10              | 3.5                   |
| CPCL03                       | CPCL-3           | 3                                          | 0.01 to 0.10                 | 5, 10                 | 5.5                   |
| CPCC03                       | CPCC-3           | 3                                          | 0.1 to 800                   | 5, 10                 | 5.5                   |
| CPCP03                       | CPCP-3           | 3                                          | 0.1 to 5K                    | 1, 5                  | 5.5                   |
| CPCF03                       | CPCF-3           | 3                                          | 801 to 150K                  | 1, 5, 10              | 5.5                   |
| CPCL05                       | CPCL-5           | 5                                          | 0.01 to 0.10                 | 5, 10                 | 6.9                   |
| CPCC05                       | CPCC-5           | 5                                          | 0.1 to 800                   | 5, 10                 | 6.9                   |
| CPCP05                       | CPCP-5           | 5                                          | 0.1 to 5K                    | 1, 5                  | 6.9                   |
| CPCF05                       | CPCF-5           | 5                                          | 801 to 150K                  | 1, 5, 10              | 6.9                   |
| CPCC07/CPCF07 <sup>(1)</sup> | CPCC07/CPCF07    | 7                                          | 0.1 to 50K                   | 5, 10                 | 9.2                   |
| CPCL10                       | CPCL-10          | 10                                         | 0.01 to 0.10                 | 5, 10                 | 14.3                  |
| CPCC10                       | CPCC-10          | 10                                         | 0.1 to 1.5K                  | 5, 10                 | 14.3                  |
| CPCP10                       | CPCP-10          | 10                                         | 0.1 to 8K                    | 1, 5                  | 14.3                  |

### Notes

- Non-inductively wound types are available on the CPCP series signified by a 1 in the special character on part number such as CPCP0510R00FB321. Max. resistance value will be  $\frac{1}{2}$  of the standard CPCP.
- <sup>(1)</sup> CPCx07 is only available as CPCC or CPCF High Volume style which is noted by using E66 package code and can be found on datasheet [www.vishay.com/doc?30116](http://www.vishay.com/doc?30116).

### TECHNICAL SPECIFICATIONS

| PARAMETER                       | UNIT                    | CPCLxx                                                                                 | CPCCxx                                                                                                 | CPCPxx                                                                                                               | CPCFxx                                       |
|---------------------------------|-------------------------|----------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|----------------------------------------------|
| Temperature Coefficient         | ppm/ $^{\circ}\text{C}$ | $\pm 100 = 0.05 \Omega$ to $0.1 \Omega$ ,<br>$\pm 400 = 0.01 \Omega$ to $0.049 \Omega$ | $\pm 300 = 1.0 \Omega$ and above,<br>$\pm 600 = 0.1 \Omega$ to $0.99 \Omega$ ,<br>$\pm 400$ for CPCC07 | $\pm 20 = 10 \Omega$ and above,<br>$\pm 50 = 1.0 \Omega$ to $9.9 \Omega$ ,<br>$\pm 90 = 0.1 \Omega$ to $0.99 \Omega$ | $\pm 50$ all values,<br>$\pm 400$ for CPCF07 |
| 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: CPCC0515R00JB32

C P C C 0 5 1 5 R 0 0 J B 3 2

| 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 $\Omega$ | F = $\pm 1.0 \%$<br>H = $\pm 3.0 \%$<br>J = $\pm 5.0 \%$<br>K = $\pm 10.0 \%$ | E32 = Lead (Pb)-free two layer bulk<br>E01 = Lead (Pb)-free skin pack<br>E66 = Lead (Pb)-free bulk (CPCx07 only)<br><br>B32 = Tin/lead two layer bulk<br>J01 = Tin/lead skin pack | (Dash number)<br>(up to 3 digits)<br>From 1 to 999<br>as applicable |

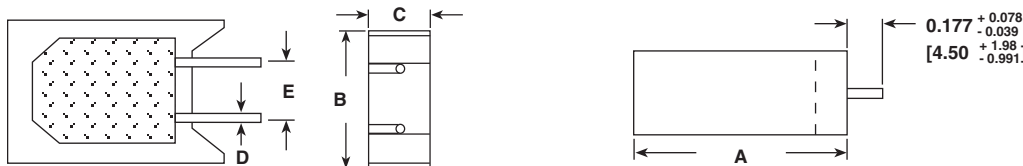
Historical Part Numbering example: CPCC-5 15  $\Omega$  5 % B32

| CPCC-5           | 15 $\Omega$      | 5 %            | B32       |
|------------------|------------------|----------------|-----------|
| HISTORICAL MODEL | RESISTANCE VALUE | TOLERANCE CODE | PACKAGING |

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

\*\* Please see document "Vishay Material Category Policy": [www.vishay.com/doc?99902](http://www.vishay.com/doc?99902)

## DIMENSIONS in inches [millimeters]



| GLOBAL MODEL                     | DIMENSIONS in inches [millimeters] |                                 |                                   |                                  |                                             |
|----------------------------------|------------------------------------|---------------------------------|-----------------------------------|----------------------------------|---------------------------------------------|
|                                  | ± 0.031 [0.794]                    | ± 0.031 [0.794]                 | + 0.043 [1.09]<br>- 0.012 [0.305] | ± 0.005 [0.127]                  | ± 0.040 [1.02]                              |
| CPCL02, CPCC02<br>CPCP02, CPCF02 | 0.807 [20.50]                      | 0.433 [11.00]                   | 0.276 [7.01]                      | 0.032 [0.813]                    | 0.197 [5.00]                                |
| CPCL03, CPCC03<br>CPCP03, CPCF03 | 0.984 [24.99]                      | 0.472 [11.99]                   | 0.315 [8.00]                      | 0.032 [0.813]                    | 0.197 [5.00]                                |
| CPCL05, CPCC05<br>CPCP05, CPCF05 | 1.003 [25.48]                      | 0.512 [13.00]                   | 0.354 [8.99]                      | 0.032 [0.813]                    | 0.197 [5.00]                                |
| CPCC07, CPCF07                   | 1.535 ± 0.059<br>[39.00 ± 1.50]    | 0.512 ± 0.043<br>[13.00 ± 1.10] | 0.354 ± 0.043<br>[9.00 ± 1.10]    | 0.032 ± 0.005<br>[0.813 ± 0.127] | 0.197 + 0.079/- 0.039<br>[5.00 + 2.0/- 1.0] |
| CPCL10, CPCP10                   | 1.372 [34.85]                      | 0.633 [16.08]                   | 0.485 [12.32]                     | 0.040 [1.02]                     | 0.290 [7.37]                                |
| CPCC10                           |                                    |                                 |                                   | 0.036 [0.914]                    |                                             |

## MATERIAL SPECIFICATIONS

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

**CPCL: Element:** Self-supporting copper-nickel alloy or nickel-chrome alloy, depending on resistance value

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

**Terminals:** Tinned copper

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

**Core:** Woven fiberglass (CPCC07 is alumina ceramic)

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

**End Caps:** Tin plated steel

**Terminals:** Tinned copper

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

**Core:** Ceramic

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

**End Caps:** Stainless steel

**Terminals:** Tinned Copperweld®

**CPCF: Element:** Metal film - nickel-chrome alloy (CPCF07 is nickel oxide)

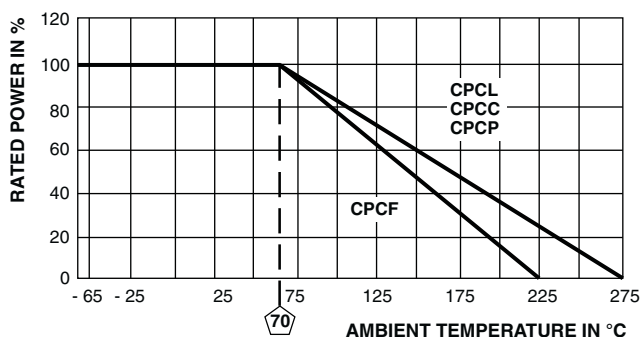
**Core:** Alumina ceramic

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

**End Caps:** Brass alloy

**Terminals:** Solder-coated copper (CPCF07 is tinned copper)

## DERATING



### Note

- CPCC07 and CPCF07 deratings begin at 40 °C in lieu of 70 °C

| PERFORMANCE                     |                                                                      |                       |                              |
|---------------------------------|----------------------------------------------------------------------|-----------------------|------------------------------|
| TEST                            | CONDITIONS OF TEST                                                   | CPCP TEST LIMITS      | CPCC, CPCL, CPCF TEST LIMITS |
| Thermal Shock                   | - 55 °C to + 275 °C (+ 225 °C for CPCF), 5 cycles, 30 min dwell time | ± (2.0 % + 0.05 Ω) ΔR | ± (5.0 % + 0.05 Ω) ΔR        |
| Short Time Overload             | 5 x rated power for 5 s                                              | ± (2.0 % + 0.05 Ω) ΔR | ± (4.0 % + 0.05 Ω) ΔR        |
| Dielectric Withstanding Voltage | 1000 V <sub>RMS</sub> for 1 min                                      | ± (0.1 % + 0.05 Ω) ΔR | ± (2.0 % + 0.05 Ω) ΔR        |
| Low Temperature Storage         | - 65 °C, full rated working voltage for 45 min                       | ± (2.0 % + 0.05 Ω) ΔR | ± (3.0 % + 0.05 Ω) ΔR        |
| Bias Humidity                   | 75 °C, 90 % to 100 % RH, 240 h                                       | ± (2.0 % + 0.05 Ω) ΔR | ± (5.0 % + 0.05 Ω) ΔR        |
| Load Life                       | 1000 h at rated power, + 40 °C, 1.5 h "ON", 0.5 h "OFF"              | ± (5.0 % + 0.05 Ω) ΔR | ± (5.0 % + 0.05 Ω) ΔR        |
| Terminal Strength               | 5 s to 10 s 10 pound pull test                                       | ± (1.0 % + 0.05 Ω) ΔR | ± (1.0 % + 0.05 Ω) ΔR        |
| Resistance to Solder Heat       | Terminal immersed 3.5 s in molten solder up to body                  | ± (1.0 % + 0.05 Ω) ΔR | ± (4.0 % + 0.05 Ω) ΔR        |



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