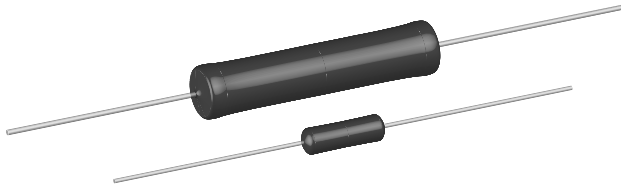


# Wirewound Resistors, Commercial Coated, Axial Lead



## FEATURES

- High performance for low cost
- High temperature silicone coating
- Complete welded construction
- Excellent stability in operation
- High power to size ratio
- Lead (Pb)-free version is RoHS compliant



RoHS\* COMPLIANT

## STANDARD ELECTRICAL SPECIFICATIONS

| GLOBAL MODEL | HISTORICAL MODEL | POWER RATING** $P_{25^\circ\text{C}} \text{ W}$ |                           | RESISTANCE RANGE $\Omega$<br>$\pm 5\%, \pm 10\%^{***}$ | WEIGHT (Max.)<br>g |
|--------------|------------------|---|---------------------------|--|--------------------|
|              |                  | Characteristic U + 250 °C                       | Characteristic V + 350 °C |  |                    |
| CW1/2        | CW-1/2           | 0.5   | -                         | 0.1 - 1.77K  | 0.21               |
| CW001        | CW-1             | 1.0   | -                         | 0.1 - 6.37K  | 0.34               |
| CW01M        | CW-1M            | 1.0   | -                         | 0.1 - 3.3K   | 0.3                |
| CW002        | CW-2             | 4.0   | 5.5                       | 0.1 - 28.7K  | 2.1                |
| CW02M        | CW-2M            | 3.0   | 3.75                      | 0.1 - 12K  | 0.65               |
| CW02B        | CW-2B            | 3.0   | 3.75                      | 0.1 - 15K  | 0.7                |
| CW02B...13   | CW-2B-13         | 4.0   | 6.0                       | 0.1 - 6.8K   | 0.9                |
| CW02C        | CW-2C            | 2.5   | 3.25                      | 0.1 - 19.9K  | 1.8                |
| CW02C...14   | CW-2C-14         | 2.5   | 3.25                      | 0.1 - 19.9K  | 1.2                |
| CW005        | CW-5             | 5.0   | 6.5                       | 0.1 - 58.5K  | 4.2                |
| CW005...2    | CW-5-2           | 4.0   | 5.0                       | 0.1 - 40.3K  | 4.2                |
| CW005...3    | CW-5-3           | 5.0   | 6.5                       | 0.1 - 58.5K  | 4.2                |
| CW007        | CW-7             | 7.0   | 9.0                       | 0.1 - 95.2K  | 4.7                |
| CW010        | CW-10            | 10.0  | 13.0                      | 0.1 - 167K   | 9.0                |
| CW010...3    | CW-10-3          | 10.0  | 13.0                      | 0.1 - 167K   | 9.0                |

\*\* Vishay Dale CW models have two power ratings, depending on operating temperature and stability requirements

\*\*\* 3% tolerance available

• Shaded areas indicate most popular models

## TECHNICAL SPECIFICATIONS

| PARAMETER                       | UNIT     | CW RESISTOR CHARACTERISTICS  |
|---------------------------------|----------|--|
| Temperature Coefficient         | ppm/°C   | $\pm 90$ for below 1.0 $\Omega$ , $\pm 50$ for 1.0 $\Omega$ to 9.9 $\Omega$ , $\pm 30$ for 10 $\Omega$ and above   |
| Dielectric Withstanding Voltage | $V_{AC}$ | 1000   |
| Short Time Overload             | -        | 5 x rated power for 5 sec. for 3.75 W size and smaller,<br>10 x rated power for 5 sec. for 4 W size and greater  |
| Terminal Strength               | lb       | 10 minimum   |
| Maximum Working Voltage         | V        | $(P \times R)^{1/2}$   |
| Operating Temperature Range     | °C       | Characteristic U = - 65/+ 250, Characteristic V = - 65/+ 350   |
| Power Rating                    | -        | Characteristic U = + 250 °C max. hot spot temperature, $\pm 0.5\%$ max. $\Delta R$ in 2000 hrs. load life<br>Characteristic V = + 350 °C max. hot spot temperature, $\pm 3.0\%$ max. $\Delta R$ in 2000 hrs. load life |

## GLOBAL PART NUMBER INFORMATION

New Global Part Numbering: CW02C10K00JB1214 (preferred part numbering format)

C W 0 2 C 1 0 K 0 0 J B 1 2 1 4

**GLOBAL MODEL**  
(See Standard Electrical Specifications Global Model column for options)

**RESISTANCE VALUE**  
R = Decimal  
K = Thousand  
1R500 = 1.5  $\Omega$   
1K500 = 1.5 k $\Omega$

**TOLERANCE CODE**  
H =  $\pm 3\%$   
J =  $\pm 5\%$   
K =  $\pm 10\%$

**PACKAGING**  
E70 = Lead (Pb)-free, Tape/Reel 1k pcs  
E73 = Lead (Pb)-free, Tape/Reel 500 pcs  
E12 = Lead (Pb)-free, Bulk  
D18 = Lead (Pb)-free, R1R80 Tape/Reel  
CW02B...13 pack code for Europe use only  
S70 = Tin/Lead, Tape/Reel 1k pcs  
S73 = Tin/Lead, Tape/Reel 500 pcs  
B12 = Tin/Lead, Bulk

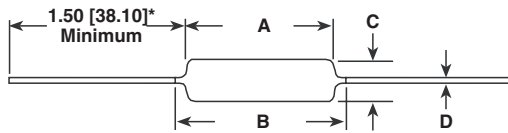
**SPECIAL**  
(Dash Number)  
(up to 3 digits)  
From 1-999 as applicable

Historical Part Number example: CW-2C-14 10 k $\Omega$  5% B12 (will continue to be accepted)



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

**DIMENSIONS**



\* On some standard reel pack methods, the leads may be trimmed to a shorter length than shown.

**MATERIAL SPECIFICATIONS**

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

**Core:** Ceramic: Steatite or alumina, depending on physical size

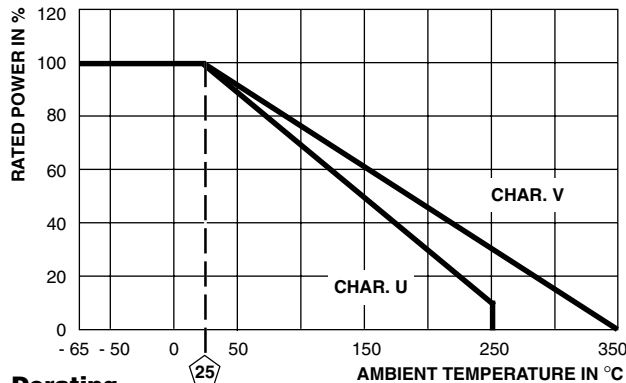
**Coating:** Special high temperature silicone

**Standard Terminals:** Tinned Copperweld®

**End Caps:** Stainless steel

**Part Marking:** DALE, Model, Wattage\*\*, Value, Tolerance, Date Code

\*\* Wattage marked on resistor will be “V” characteristic, CW1/2 will not be marked with wattage



**Derating**

| MODEL      | DIMENSIONS in inches [millimeters] |                  |                                 |                                  |
|------------|------------------------------------|------------------|---------------------------------|----------------------------------|
|            | A                                  | B (Maximum)***   | C                               | D                                |
| CW1/2      | 0.250 ± 0.031<br>[6.35 ± 0.787]    | 0.281<br>[7.14]  | 0.085 ± 0.020<br>[2.16 ± 0.508] | 0.020 ± 0.002<br>[0.508 ± 0.051] |
| CW001      | 0.406 ± 0.031<br>[10.31 ± 0.787]   | 0.437<br>[11.10] | 0.094 ± 0.031<br>[2.39 ± 0.787] | 0.020 ± 0.002<br>[0.508 ± 0.051] |
| CW01M      | 0.285 ± 0.025<br>[7.24 ± 0.635]    | 0.311<br>[7.90]  | 0.110 ± 0.015<br>[2.79 ± 0.381] | 0.020 ± 0.002<br>[0.508 ± 0.051] |
| CW002      | 0.625 ± 0.062<br>[15.87 ± 1.57]    | 0.765<br>[19.43] | 0.250 ± 0.032<br>[6.35 ± 0.813] | 0.040 ± 0.002<br>[1.02 ± 0.051]  |
| CW02M      | 0.500 ± 0.062<br>[12.70 ± 1.57]    | 0.562<br>[14.27] | 0.185 ± 0.015<br>[4.70 ± 0.381] | 0.032 ± 0.002<br>[0.813 ± 0.051] |
| CW02B      | 0.562 ± 0.062<br>[14.27 ± 1.57]    | 0.622<br>[15.80] | 0.188 ± 0.032<br>[4.78 ± .813]  | 0.032 ± 0.002<br>[0.813 ± 0.051] |
| CW02B...13 | 0.500 ± 0.062<br>[12.70 ± 1.57]    | 0.563<br>[14.30] | 0.188 ± 0.032<br>[4.78 ± 0.813] | 0.032 ± 0.002<br>[0.813 ± 0.051] |
| CW02C      | 0.500 ± 0.062<br>[12.70 ± 1.57]    | 0.593<br>[15.06] | 0.218 ± 0.032<br>[5.54 ± 0.813] | 0.040 ± 0.002<br>[1.02 ± 0.051]  |
| CW02C...14 | 0.500 ± 0.062<br>[12.70 ± 1.57]    | 0.593<br>[15.06] | 0.218 ± 0.032<br>[5.54 ± .813]  | 0.032 ± 0.002<br>[0.813 ± 0.051] |
| CW005      | 0.875 ± 0.062<br>[22.22 ± 1.57]    | 1.0<br>[25.40]   | 0.312 ± 0.032<br>[7.92 ± 0.813] | 0.040 ± 0.002<br>[1.02 ± 0.051]  |
| CW005...2  | 0.875 ± 0.062<br>[22.22 ± 1.57]    | 1.0<br>[25.40]   | 0.250 ± 0.032<br>[6.35 ± .813]  | 0.032 ± 0.002<br>[0.813 ± 0.051] |
| CW005...3  | 0.875 ± 0.062<br>[22.22 ± 1.57]    | 1.0<br>[25.40]   | 0.312 ± 0.032<br>[7.92 ± 0.813] | 0.032 ± 0.002<br>[0.813 ± 0.051] |
| CW007      | 1.218 ± 0.062<br>[30.94 ± 1.57]    | 1.281<br>[32.54] | 0.312 ± 0.032<br>[7.92 ± 0.813] | 0.040 ± 0.002<br>[1.02 ± 0.051]  |
| CW010      | 1.781 ± 0.062<br>[45.24 ± 1.57]    | 1.875<br>[47.62] | 0.375 ± 0.032<br>[9.52 ± 0.813] | 0.040 ± 0.002<br>[1.02 ± 0.051]  |
| CW010...3  | 1.781 ± 0.062<br>[45.24 ± 1.57]    | 1.875<br>[47.62] | 0.375 ± 0.032<br>[9.52 ± 0.813] | 0.032 ± 0.002<br>[0.813 ± 0.051] |

\*\*\* B (Maximum) dimension is clean lead to clean lead.

| PERFORMANCE****                 |   |                                |
|---------------------------------|---|--------------------------------|
| TEST                            | CONDITIONS OF TEST  | TEST LIMITS (CHARACTERISTIC V) |
| Thermal Shock                   | Rated power applied until thermally stable, then a minimum of 15 minutes at - 55 °C     | ± (2.0 % + 0.05 Ω) ΔR          |
| Short Time Overload             | 5 x rated power (3.75 W and smaller), 10 x rated power (4 W and larger) for 5 sec.      | ± (2.0 % + 0.05 Ω) ΔR          |
| Dielectric Withstanding Voltage | 1000 V <sub>rms</sub> , one minute  | ± (0.1 % + 0.05 Ω) ΔR          |
| Low Temperature Storage         | - 65 °C for 24 hours  | ± (2.0 % + 0.05 Ω) ΔR          |
| High Temperature Exposure       | 250 hours at + 350 °C   | ± (4.0 % + 0.05 Ω) ΔR          |
| Moisture Resistance             | MIL-STD-202 Method 106, 7b not applicable   | ± (2.0 % + 0.05 Ω) ΔR          |
| Shock, Specified Pulse          | MIL-STD-202 Method 213, 100 g's for 6 milliseconds, 10 shocks                           | ± (0.2 % + 0.05 Ω) ΔR          |
| Vibration, High Frequency       | Frequency varied 10 to 2000 Hz, 20 g peak, 2 directions 6 hours each                    | ± (0.2 % + 0.05 Ω) ΔR          |
| Load Life                       | 2000 hours at rated power, + 25 °C, 1.5 hours “ON”, 0.5 hours “OFF”                     | ± (3.0 % + 0.05 Ω) ΔR          |
| Terminal Strength               | 5 to 10 second 10 pound pull test; torsion test - 3 alternating directions, 360 °C each | ± (1.0 % + 0.05 Ω) ΔR          |

\*\*\*\* All ΔR figures shown are maximum, based upon testing requirements per MIL-PRF-26 at a maximum operating temperature of + 350 °C. ΔR maximum figures are considerably lower when tested at a maximum operating temperature of + 250 °C.



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