# Wirewound Resistors, High Energy, Silicone Coated, Axial Lead

## FEATURES

- High continuous energy handling, > 106.5 J
- High temperature silicone coating
- Complete welded construction
- Excellent stability in operation
- High power to size ratio
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free Available

e3

RoHS COMPLIANT

HALOGEN FREE Available

GREEN (5-2008) Available

## STANDARD ELECTRICAL SPECIFICATIONS

| GLOBAL MODEL | POWER RATING [1] $P_{25\,°C}$ W CHARACTERISTIC U +250 °C | POWER RATING [1] $P_{25\,°C}$ W CHARACTERISTIC V +350 °C | RESISTANCE RANGE Ω | MAX. CONTINUOUS ENERGY J | TOLERANCE ± % | WEIGHT (max.) g |
|---|---|---|---|---|---|---|
| CW02B...HE | 3.0 | 3.75 | 2 to 87.5 | 10.4 | 5 | 0.7 |
| CW005...HE | 5.0 | 6.5 | 7.6 to 343 | 39.1 | 5 | 4.2 |
| CW010...HE | 10.0 | 13.0 | 20.7 to 938 | 106.5 | 5 | 9.0 |

**Note**

[1] Vishay Dale CW models have two power ratings, depending on operating temperature and stability requirements.

## TECHNICAL SPECIFICATIONS

| PARAMETER | UNIT | CW RESISTOR CHARACTERISTICS |
|---|---|---|
| Temperature Coefficient | ppm/°C | ± 30 for 10 Ω and above, ± 50 for 1.0 Ω to 9.9 Ω, ± 90 for 0.5 Ω to 0.99 Ω |
| Short Time Overload | - | 5x rated power for 5 s for CW02B...HE<br>10x rated power for 5 s for CW005...HE and CW010...HE |
| Terminal Strength | lb | 10 minimum |
| Maximum Working Voltage | V | $(P \times R)^{1/2}$ |
| Operating Temperature Range | °C | Characteristic U = -65 to +250, characteristic V = -65 to +350 |
| Power Rating | - | Characteristic U = +250 °C max. hot spot temperature, ± 0.5 % max. $\Delta R$ in 2000 h load life<br>Characteristic V = +350 °C max. hot spot temperature, ± 3.0 % max. $\Delta R$ in 2000 h load life |

## GLOBAL PART NUMBER INFORMATION

**Global Part Numbering example: CW02B10R00JE12HE (preferred part number format)**

| C | W | 0 | 2 | B | 1 | 0 | R | 0 | 0 | J | E | 1 | 2 | H | E | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

| GLOBAL MODEL (5 digits) | VALUE (5 digits) | TOLERANCE (1 digit) | PACKAGING (3 digits) | SPECIAL (2 digits) |
|---|---|---|---|---|
| **CW02B**<br>**CW005**<br>**CW010** | **R** = Decimal<br>**K** = Thousand<br>**1R500** = 1.5 Ω<br>**1K500** = 1.5 kΩ | **H** = ± 3.0 %<br>**J** = ± 5.0 %<br>**K** = ± 10.0 % | **E70** = Lead (Pb)-free, tape/reel, 1K pcs. (CW02B only)<br>**E73** = Lead (Pb)-free, tape/reel, 500 pcs.<br>**E12** = Lead (Pb)-free, bulk<br>**S70** = Tin/lead, tape/reel, 1K pcs. (CW02B only)<br>**S73** = Tin/lead, tape/reel, 500 pcs.<br>**B12** = Tin/lead, bulk | **HE** = High energy |



For technical questions, contact: ww2aresistors@vishay.com

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## STANDARD ENERGY PERFORMANCE CHARACTERISTICS

| GLOBAL MODEL | RES. Ω | MAX. CONT. ENERGY J | FUSING ENERGY J | CURRENT TO FUSE (1) A | POWER TO FUSE (1) W |
|---|---|---|---|---|---|
| CW02B...HE | 2.0 | 10.4 | 42.3 | 14.54 | 422.60 |
| | 2.8 | 9.2 | 37.5 | 11.58 | 375.28 |
| | 4.0 | 8.0 | 32.8 | 9.06 | 328.37 |
| | 5.6 | 7.1 | 29.1 | 7.20 | 290.55 |
| | 7.6 | 6.4 | 25.9 | 5.84 | 259.16 |
| | 10.8 | 5.6 | 22.8 | 4.59 | 227.94 |
| | 15.4 | 5.0 | 20.2 | 3.62 | 201.54 |
| | 21.8 | 4.4 | 17.8 | 2.86 | 178.41 |
| | 30.5 | 3.7 | 15.9 | 2.28 | 158.54 |
| | 41.7 | 3.5 | 14.2 | 1.85 | 142.20 |
| | 59.1 | 3.1 | 12.6 | 1.46 | 125.82 |
| | 87.5 | 2.7 | 10.9 | 1.12 | 108.87 |
| CW005...HE | 7.6 | 39.1 | 159.0 | 14.46 | 1590.00 |
| | 10.5 | 34.9 | 142.3 | 11.64 | 1422.54 |
| | 15.1 | 30.8 | 125.5 | 9.12 | 1255.28 |
| | 21.4 | 27.4 | 111.4 | 7.21 | 1113.71 |
| | 29.3 | 24.5 | 99.9 | 5.84 | 999.14 |
| | 41.8 | 21.7 | 88.2 | 4.59 | 882.20 |
| | 59.6 | 19.2 | 78.0 | 3.62 | 779.99 |
| | 84.6 | 17.0 | 69.2 | 2.86 | 692.37 |
| | 118.6 | 14.2 | 61.6 | 2.28 | 616.48 |
| | 162.3 | 13.6 | 55.3 | 1.85 | 553.45 |
| | 230.6 | 12.1 | 49.1 | 1.46 | 490.94 |
| | 343.6 | 10.5 | 42.8 | 1.12 | 427.51 |
| CW010...HE | 20.7 | 106.5 | 433.1 | 14.46 | 4330.65 |
| | 28.6 | 95.2 | 387.5 | 11.64 | 3874.65 |
| | 41.0 | 83.5 | 340.8 | 9.12 | 3408.72 |
| | 58.0 | 74.3 | 302.6 | 7.21 | 3025.53 |
| | 79.7 | 66.6 | 271.8 | 5.84 | 2717.79 |
| | 113.6 | 58.8 | 239.8 | 4.59 | 2397.57 |
| | 162.3 | 52.2 | 212.4 | 3.62 | 2124.04 |
| | 230.5 | 46.3 | 188.6 | 2.86 | 1886.43 |
| | 323.2 | 38.7 | 168.0 | 2.28 | 1679.99 |
| | 442.7 | 37.0 | 151.0 | 1.85 | 1509.62 |
| | 629.3 | 32.9 | 134.0 | 1.46 | 1339.76 |
| | 938.0 | 28.7 | 116.7 | 1.12 | 1167.06 |

**Note**

(1) Time to fuse is 0.1 s.

Maximum Continuous Energy (J)

Fusing Energy (J)

Fusing Current (A) (1)


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**DIMENSIONS** in inches (millimeters)

| MODEL | DIMENSIONS in inches [millimeters] | | | |
|---|---|---|---|---|
| | A | B [MAXIMUM] (2) | C | D |
| **CW02B...HE** | 0.562 ± 0.062 [14.27 ± 1.57] | 0.622 [15.80] | 0.188 ± 0.032 [4.78 ± 0.813] | 0.032 ± 0.002 [0.813 ± 0.051] |
| **CW005...HE** | 0.875 ± 0.062 [22.22 ± 1.57] | 1.0 [25.40] | 0.312 ± 0.032 [7.92 ± 0.813] | 0.040 ± 0.002 [1.02 ± 0.051] |
| **CW010...HE** | 1.781 ± 0.062 [45.24 ± 1.57] | 1.875 [47.62] | 0.375 ± 0.032 [9.52 ± 0.813] | 0.040 ± 0.002 [1.02 ± 0.051] |

**Notes**

(1) On some standard reel pack methods, the leads may be trimmed to a shorter length than shown.

(2) B (maximum) dimension is clean lead to clean lead.

## MATERIAL SPECIFICATIONS

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

**Core:** Ceramic: Steatite

**Coating:** Special high temperature silicone

**Standard Terminals:** Tinned Copperweld®

**End Caps:** Stainless steel

**Part Marking:** DALE, model, wattage (3), value, tolerance, date code

**Note**

(3) Wattage marked on resistor will be “V” characteristic.

## DERATING

| PERFORMANCE | | |
|---|---|---|
| **TEST** | **CONDITIONS OF TEST** | **TEST LIMITS (4) (CHARACTERISTIC V)** |
| Thermal Shock | Rated power applied until thermally stable, then a minimum of 15 min at -55 °C | ± (2.0 % + 0.05 Ω) Δ*R* |
| Short Time Overload | 5x rated power for CW02B, 10 x rated power for CW005 and CW010 for 5 s | ± (2.0 % + 0.05 Ω) Δ*R* |
| High Temperature Exposure | 250 h at +350 °C | ± (4.0 % + 0.05 Ω) Δ*R* |
| Load Life | 2000 h at rated power, +25 °C, 1.5 h “ON”, 0.5 h “OFF” | ± (3.0 % + 0.05 Ω) Δ*R* |

**Note**

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


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