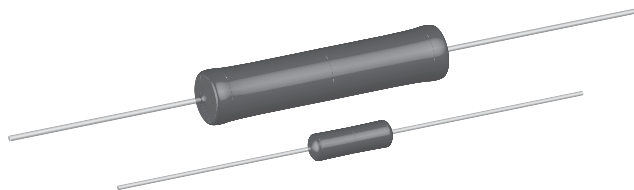


## Wirewound Resistors, High Energy, Silicone Coated, Axial Lead



### 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](http://www.vishay.com/doc?99912)



### STANDARD ELECTRICAL SPECIFICATIONS

| GLOBAL MODEL | POWER RATING <sup>(1)</sup><br>$P_{25^{\circ}\text{C W}}$<br>CHARACTERISTIC U<br>+250 °C | POWER RATING <sup>(1)</sup><br>$P_{25^{\circ}\text{C W}}$<br>CHARACTERISTIC V<br>+350 °C | RESISTANCE RANGE<br>$\Omega$ | MAX. CONTINUOUS ENERGY<br>J | TOLERANCE<br>$\pm \%$ | WEIGHT (max.)<br>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

<sup>(1)</sup> 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 | $\pm 30$ 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         | -      | 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, $\pm 0.5 \%$ max. $\Delta R$ in 2000 h load life<br>Characteristic V = +350 °C max. hot spot temperature, $\pm 3.0 \%$ 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<br>(5 digits) |   |   |   |   | VALUE<br>(5 digits)                                                           |   |   | TOLERANCE<br>(1 digit)                                    |   |   | PACKAGING<br>(3 digits)                                                                                                                                                                                                                                |   |   | SPECIAL<br>(2 digits) |   |  |
| CW02B<br>CW005<br>CW010    |   |   |   |   | R = Decimal<br>K = Thousand<br>1R500 = 1.5 $\Omega$<br>1K500 = 1.5 k $\Omega$ |   |   | H = $\pm 3.0 \%$<br>J = $\pm 5.0 \%$<br>K = $\pm 10.0 \%$ |   |   | 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><br>S70 = Tin/lead, tape/reel, 1K pcs. (CW02B only)<br>S73 = Tin/lead, tape/reel, 500 pcs.<br>B12 = Tin/lead, bulk |   |   | HE =<br>High energy   |   |  |

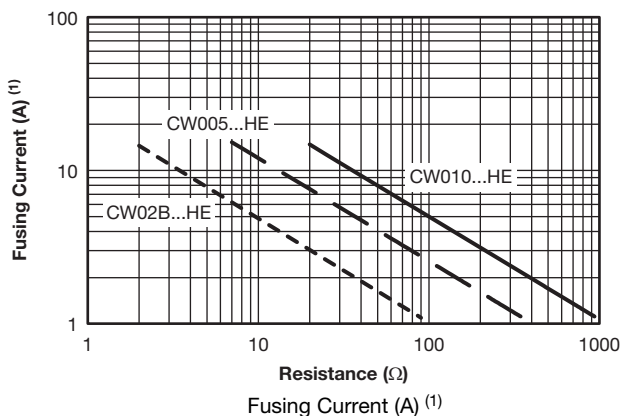
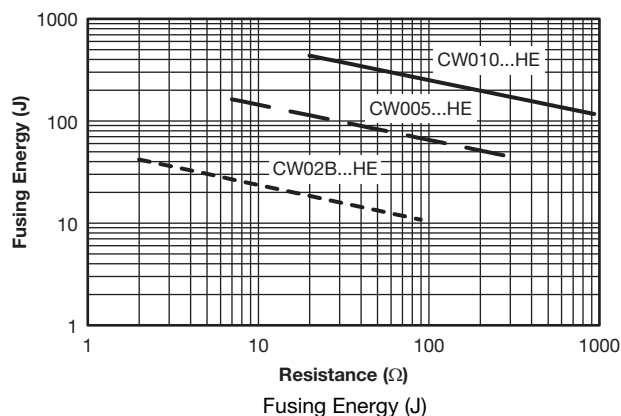
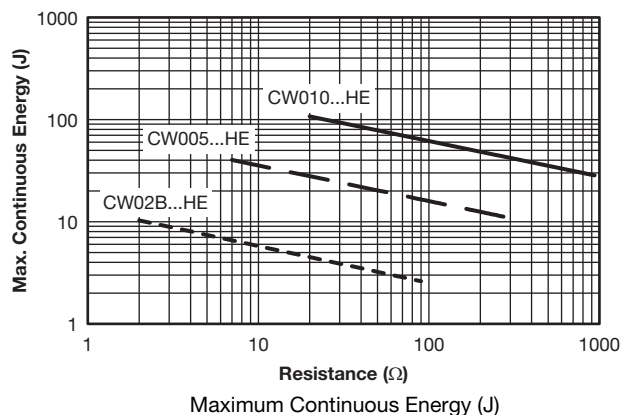


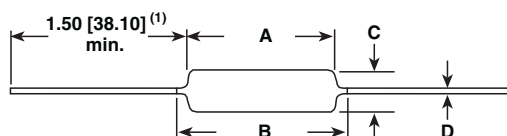
STANDARD ENERGY PERFORMANCE CHARACTERISTICS

| GLOBAL MODEL | RES. $\Omega$ | MAX. CONT. ENERGY J | FUSING ENERGY J | CURRENT TO FUSE <sup>(1)</sup> A | POWER TO FUSE <sup>(1)</sup> 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

<sup>(1)</sup> Time to fuse is 0.1 s.



**DIMENSIONS** in inches (millimeters)


| MODEL      | DIMENSIONS in inches [millimeters] |                            |                              |                               |
|------------|------------------------------------|----------------------------|------------------------------|-------------------------------|
|            | A                                  | B [MAXIMUM] <sup>(2)</sup> | 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**
<sup>(1)</sup> On some standard reel pack methods, the leads may be trimmed to a shorter length than shown.

<sup>(2)</sup> 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

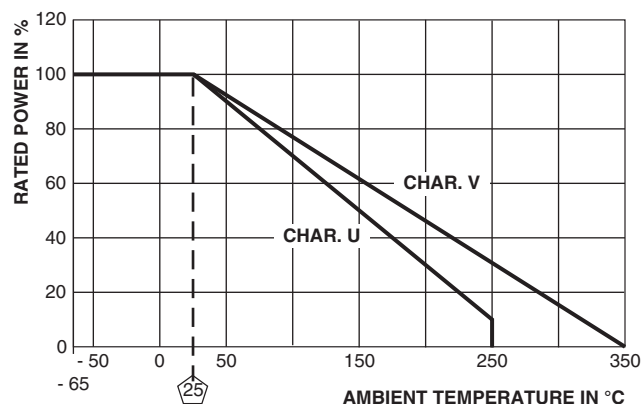
**Coating:** Special high temperature silicone

**Standard Terminals:** Tinned Copperweld®

**End Caps:** Stainless steel

**Part Marking:** DALE, model, wattage <sup>(3)</sup>, value, tolerance, date code

**Note**
<sup>(3)</sup> Wattage marked on resistor will be "V" characteristic.

**DERATING**


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

**Note**
<sup>(4)</sup> 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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