

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


**FEATURES**

- High continuous energy handling up to 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> $P_{25\text{ }^\circ\text{C}}$ W CHARACTERISTIC U +250 °C	POWER RATING <sup>(1)</sup> $P_{25\text{ }^\circ\text{C}}$ W CHARACTERISTIC V +350 °C	RESISTANCE RANGE $\Omega$	MAXIMUM SHORT TERM PULSE ENERGY J	TOLERANCE $\pm$ %	WEIGHT (max.) g
CW02B...HE	3.0	3.75	1.5 to 87.5	10.4	5, 10	0.7
CW005...HE	5.0	6.5	5.5 to 343.6	39.1	5, 10	4.2
CW010...HE	10.0	13.0	15.0 to 938.0	106.5	5, 10	9.0

**Note**

<sup>(1)</sup> Vishay Dale CW...HE models have two power ratings, depending on operating temperature and stability requirements.

TECHNICAL SPECIFICATIONS		
PARAMETER	UNIT	CW...HE RESISTOR CHARACTERISTICS
Temperature Coefficient	ppm/°C	$\pm$ 30 for 10 $\Omega$ and above, $\pm$ 50 for 1.0 $\Omega$ to 9.9 $\Omega$
Short Time Overload	-	5x rated power for 5 s for CW02B...HE 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 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															
C	W	0	2	B	1	0	R	0	0	J	E	12	H	E	
GLOBAL MODEL (5 digits)	VALUE (5 digits)		TOLERANCE (1 digit)		PACKAGING (3 digits)					SPECIAL (2 to 3 digits)					
CW02B CW005 CW010	R = Decimal 10R00 = 10 $\Omega$		J = $\pm$ 5.0 % K = $\pm$ 10.0 %		E70 = Lead (Pb)-free, tape/reel, 1K pcs. (CW02B only) E73 = Lead (Pb)-free, tape/reel, 500 pcs. E12 = Lead (Pb)-free, bulk  S70 = Tin/lead, tape/reel, 1K pcs. (CW02B only) S73 = Tin/lead, tape/reel, 500 pcs. B12 = Tin/lead, bulk					HE = High energy					

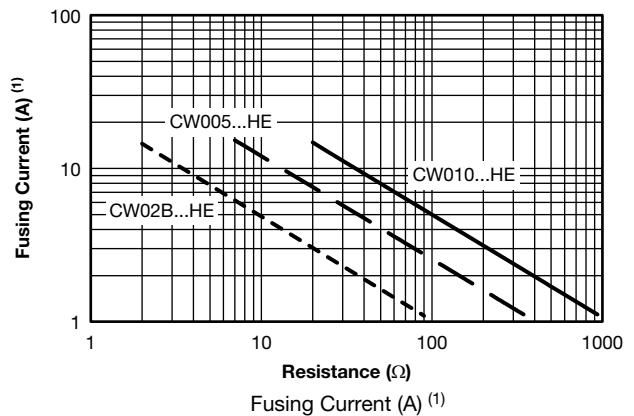
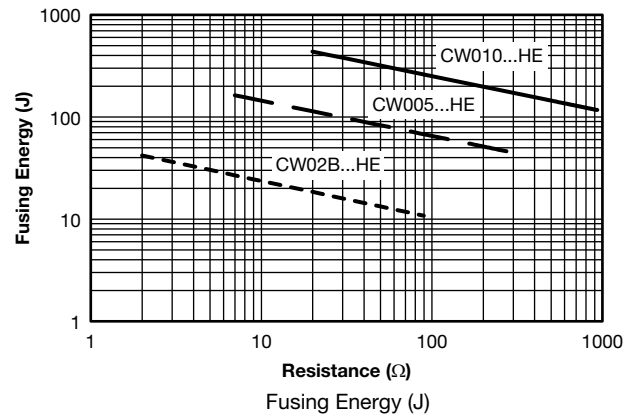
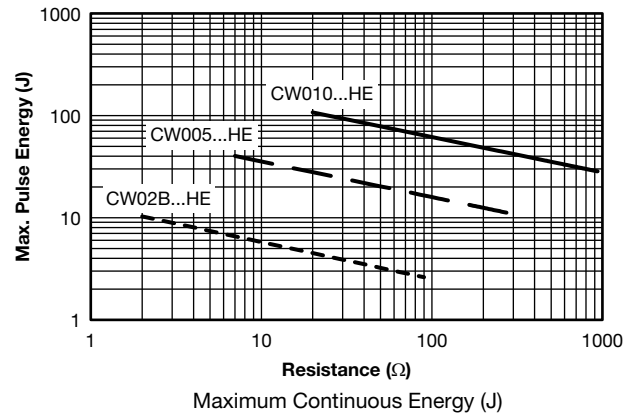


**STANDARD ENERGY PERFORMANCE CHARACTERISTICS**

GLOBAL MODEL	RESISTANCE RANGE $\Omega$	MAX. PULSE ENERGY J/ $\Omega$	FUSING ENERGY J/ $\Omega$	CURRENT TO FUSE <sup>(1)</sup> A/ $\Omega$	POWER TO FUSE <sup>(1)</sup> W/ $\Omega$
CW02B...HE	1.5 to 2.0	5.200	21.150	7.2700	211.3000
	2.1 to 2.8	3.286	13.393	4.1357	134.0286
	2.9 to 4.0	2.000	8.200	2.2650	82.0925
	4.1 to 5.6	1.268	5.196	1.2857	51.8839
	5.7 to 7.6	0.842	3.408	0.7684	34.1000
	7.7 to 10.8	0.519	2.111	0.4250	21.1056
	10.9 to 15.4	0.325	1.312	0.2351	13.0870
	15.5 to 21.8	0.202	0.817	0.1312	8.1839
	21.9 to 30.5	0.121	0.521	0.0748	5.1980
	30.6 to 41.7	0.084	0.341	0.0444	3.4101
CW005...HE	41.8 to 59.1	0.052	0.213	0.0247	2.1289
	59.2 to 87.5	0.031	0.125	0.0128	1.2442
	5.5 to 7.6	5.145	20.921	1.9026	209.2105
	7.7 to 10.5	3.324	13.552	1.1086	135.4800
	10.6 to 15.1	2.040	8.311	0.6040	83.1311
	15.2 to 21.4	1.280	5.206	0.3369	52.0425
	21.5 to 29.3	0.836	3.410	0.1993	34.1003
	29.4 to 41.8	0.519	2.110	0.1098	21.1053
	41.9 to 59.6	0.322	1.309	0.0607	13.0871
	59.7 to 84.6	0.201	0.818	0.0338	8.1840
CW010...HE	84.7 to 118.6	0.120	0.519	0.0192	5.1980
	118.7 to 162.3	0.084	0.341	0.0114	3.4100
	162.4 to 230.6	0.052	0.213	0.0063	2.1290
	230.7 to 343.6	0.031	0.125	0.0033	1.2442
	15.0 to 20.7	5.145	20.923	0.6986	209.2101
	20.8 to 28.6	3.329	13.549	0.4070	135.4773
	28.7 to 41.0	2.037	8.312	0.2224	83.1395
	41.1 to 58.0	1.281	5.217	0.1243	52.1643
	58.1 to 79.7	0.836	3.410	0.0733	34.1003
	79.8 to 113.6	0.518	2.111	0.0404	21.1054
113.7 to 162.3	0.322	1.309	0.0223	13.0871	
162.4 to 230.5	0.201	0.818	0.0124	8.1841	
230.6 to 323.2	0.120	0.520	0.0071	5.1980	
323.3 to 442.7	0.084	0.341	0.0042	3.4100	
442.8 to 629.3	0.052	0.213	0.0023	2.1290	
629.4 to 938.0	0.031	0.124	0.0012	1.2442	

**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**

- (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.

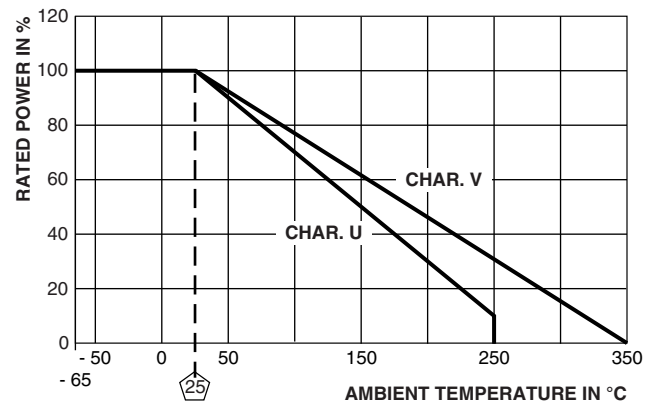
**MATERIAL SPECIFICATIONS**

- Element:** Nickel-chrome alloy
- Core:** Ceramic: Steatite
- Coating:** Special high temperature silicone
- Standard Terminals:** Tinned Copperweld<sup>®</sup>
- End Caps:** Stainless steel
- Part Marking:** DALE, model, wattage <sup>(3)</sup>, value, tolerance, date code

**Note**

- (3) Wattage marked on resistor will be "V" characteristic.

**DERATING**



PERFORMANCE		
TEST	CONDITIONS OF TEST	TEST LIMITS <sup>(4)</sup> (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 5 s for CW02B...HE 10x rated power for 5 s for CW005...HE and CW010...HE	± (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**

- (4) 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.



## 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.

Hyperlinks included in this datasheet may direct users to third-party websites. These links are provided as a convenience and for informational purposes only. Inclusion of these hyperlinks does not constitute an endorsement or an approval by Vishay of any of the products, services or opinions of the corporation, organization or individual associated with the third-party website. Vishay disclaims any and all liability and bears no responsibility for the accuracy, legality or content of the third-party website or for that of subsequent links.

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.