 High perform
 High tempera
 Complete we
 Excellent stat
 High power to
Compliant to

Wirewound Resistors, Commercial Power, Silicone Coated, Axial Lead

FEATURES

- 1.12 1ance for low cost
- ture silicone coating
- Ided construction
- bility in operation
- o size ratio
- **RoHS Directive 2002/95/EC**



Notes

Pb containing terminations are not RoHS compliant, exemptions may apply Please see document "Vishay Material Category Policy": <u>www.vishay.com/doc?99902</u>

STANDARD ELECTRICAL SPECIFICATIONS POWER RATING ⁽¹⁾ P_{25 °C} W CHARACTERISTIC U + 250 POWER RATING ⁽¹⁾ P_{25 °C} W CHARACTERISTIC V + 350 GLOBAL HISTORICAL **RESISTANCE RANGE** TOLERANCE WEIGHT MODEL MODEL ± % (2) (max.) g Ω °C °C CW1/2 0.21 CW-1/2 0.5 0.1 to 1.77K 5, 10 _ CW001 CW-1 0.1 to 6.37K 0.34 1.0 5, 10 CW-1M CW01M 1.0 0.1 to 3.3K 5, 10 0.3 CW002 CW-2 5.5 0.1 to 28.7K 5, 10 2.1 4.0 CW-2M CW02M 3.0 3.750.1 to 12K 5, 10 0.65 CW02B CW-2B 3.0 3.75 0.1 to 15K 5, 10 0.7 CW02B...13 CW-2B-13 0.1 to 10.89K (3) 0.9 40 6.0 5, 10 CW02C CW-2C 2.5 3.25 0.1 to 19.9K 5, 10 1.8 5, 10 5, 10 CW-2C-14 3.25 0.1 to 19.9K 1.2 CW02C...14 2.5 CW005 CW-5 5.0 6.5 0.1 to 58.5K 4.2 4.2 CW005...2 CW-5-2 4.0 5.0 0.1 to 40.3K 5.10 CW005...3 CW-5-3 5.0 6.5 0.1 to 58.5K 5, 10 4.2 CW007 7.0 9.0 4.7 CW-7 0.1 to 95.2K 5, 10 5, 10 CW010 CW-10 10.0 9.0 13.0 0.1 to 167K CW010...3 CW-10-3 0.1 to 167K 5, 10 9.0 10.0 13.0

Notes (1) Vishay Dale CW models have two power ratings, depending on operating temperature and stability requirements (2) 3 % tolerance available (3) Higher values available on request

TECHNICAL SPECIFICATIONS				
PARAMETER	UNIT	CW RESISTOR CHARACTERISTICS		
Temperature Coefficient	ppm/°C	\pm 30 for 10 Ω and above, \pm 50 for 1.0 Ω to 9.9 Ω , \pm 90 for 0.5 Ω to 0.99 Ω		
Dielectric Withstanding Voltage	V _{AC}	1000		
Short Time Overload	-	5 x rated power for 5 s for 3.75 W size and smaller, 10 x rated power for 5 s 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 to $+250$, characteristic V = -65 to $+350$		
Power Rating	-	Characteristic U = + 250 °C max. hot spot temperature, ± 0.5 % max. ∆R in 2000 h load life Characteristic V = + 350 °C max. hot spot temperature, ± 3.0 % max. ∆R in 2000 h load life		
		Characteristic V = + 350 °C max. hot spot temperature, ± 3.0 % max. ∆R in 2000 h load		

GLOBAL PART NUMBER INFORMATION								
Global Part Numbering example: CW02C10K00JB1214								
C W 0 2 C 1 0 K 0 0 J B 1 2 1 4								
GLOBAL MODE	L VALUE	TOLERANCE			PACKAGING			SPECIAL
(See Standard	R = Decimal	H = ± 3.0 %	$\mathbf{H} = \pm 3.0 \%$ E70 = Lead (Pb)-free, tape/reel, 1K pcs (smaller than CW005)				CW005)	(Dash Number)
Electrical	K = Thousand	J = ± 5.0 %	E7:		id (Pb)-free, tape/reel, 500 p	CS		(up to 3 digits)
Specifications	1R500 = 1.5 Ω	K = ± 10.0 %				From 1 to 999		
Global Model					as applicable			
column for CW02B13 pack code for Europe use only								
options) S70 = Tin/lead, tape/reel, 1K pcs (smaller than CW005)								
S73 = Tin/lead, tape/reel, 500 pcs								
					B12 = Tin/lead, bulk			
Historical Part Numbering example: CW-2C-14 10 kΩ 5 % B12								
CW-2	2C-14	10 4	Ω		5 %			B12
HISTORIC	AL MODEL	RESISTANO	CE VALUE		TOLERANCE CODE		PAC	CKAGING

Revision: 01-Feb-12

1 For technical questions, contact: <u>ww2aresistors@vishay.com</u> Document Number: 30215

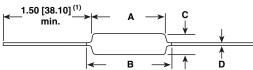
Vishay Dale

www.vishay.com

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DIMENSIONS in inches (millimeters)



DIMENSIONS in inches [millimeters]				
А	B [MAXIMUM] ⁽²⁾	С	D	
0.250 ± 0.031 [6.35 ± 0.787]	0.281 [7.14]	0.085 ± 0.020 [2.16 ± 0.508]	0.020 ± 0.002 [0.508 ± 0.051]	
0.406 ± 0.031 [10.31 ± 0.787]	0.437 [11.10]	0.094 ± 0.031 [2.39 ± 0.787]	0.020 ± 0.002 [0.508 ± 0.051]	
0.285 ± 0.025 [7.24 ± 0.635]	0.311 [7.90]	0.110 ± 0.015 [2.79 ± 0.381]	0.020 ± 0.002 [0.508 ± 0.051]	
0.625 ± 0.062 [15.87 ± 1.57]	0.765 [19.43]	0.250 ± 0.032 [6.35 ± 0.813]	0.040 ± 0.002 [1.02 ± 0.051]	
0.500 ± 0.062 [12.70 ± 1.57]	0.562 [14.27]	0.185 ± 0.015 [4.70 ± 0.381]	0.032 ± 0.002 [0.813 ± 0.051]	
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]	
0.500 ± 0.062 [12.70 ± 1.57]	0.563 [14.30]	0.188 ± 0.032 [4.78 ± 0.813]	0.032 ± 0.002 [0.813 ± 0.051]	
0.500 ± 0.062 [12.70 ± 1.57]	0.593 [15.06]	0.218 ± 0.032 [5.54 ± 0.813]	0.040 ± 0.002 [1.02 ± 0.051]	
0.500 ± 0.062 [12.70 ± 1.57]	0.593 [15.06]	0.218 ± 0.032 [5.54 ± 0.813]	0.032 ± 0.002 [0.813 ± 0.051]	
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]	
0.875 ± 0.062 [22.22 ± 1.57]	1.0 [25.40]	0.250 ± 0.032 [6.35 ± 0.813]	0.032 ± 0.002 [0.813 ± 0.051]	
0.875 ± 0.062 [22.22 ± 1.57]	1.0 [25.40]	0.312 ± 0.032 [7.92 ± 0.813]	0.032 ± 0.002 [0.813 ± 0.051]	
1.218 ± 0.062 [30.94 ± 1.57]	1.281 [32.54]	0.312 ± 0.032 [7.92 ± 0.813]	0.040 ± 0.002 [1.02 ± 0.051]	
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]	
1.781 ± 0.062 [45.24 ± 1.57]	1.875 [47.62]	0.375 ± 0.032 [9.52 ± 0.813]	0.032 ± 0.002 [0.813 ± 0.051]	
	$\begin{array}{c} 0.250 \pm 0.031 \ [6.35 \pm 0.787] \\ 0.406 \pm 0.031 \ [10.31 \pm 0.787] \\ 0.285 \pm 0.025 \ [7.24 \pm 0.635] \\ 0.625 \pm 0.062 \ [15.87 \pm 1.57] \\ 0.500 \pm 0.062 \ [12.70 \pm 1.57] \\ 0.562 \pm 0.062 \ [14.27 \pm 1.57] \\ 0.500 \pm 0.062 \ [12.70 \pm 1.57] \\ 0.875 \pm 0.062 \ [22.22 \pm 1.57] \\ 0.875 \pm 0.062 \ [22.22 \pm 1.57] \\ 0.875 \pm 0.062 \ [22.22 \pm 1.57] \\ 1.218 \pm 0.062 \ [30.94 \pm 1.57] \\ 1.781 \pm 0.062 \ [45.24 \pm 1.57] \end{array}$	AB [MAXIMUM] (2) $0.250 \pm 0.031 [6.35 \pm 0.787]$ $0.281 [7.14]$ $0.406 \pm 0.031 [10.31 \pm 0.787]$ $0.437 [11.10]$ $0.285 \pm 0.025 [7.24 \pm 0.635]$ $0.311 [7.90]$ $0.625 \pm 0.062 [15.87 \pm 1.57]$ $0.765 [19.43]$ $0.500 \pm 0.062 [12.70 \pm 1.57]$ $0.562 [14.27]$ $0.562 \pm 0.062 [14.27 \pm 1.57]$ $0.622 [15.80]$ $0.500 \pm 0.062 [12.70 \pm 1.57]$ $0.633 [14.30]$ $0.500 \pm 0.062 [12.70 \pm 1.57]$ $0.593 [15.06]$ $0.500 \pm 0.062 [12.70 \pm 1.57]$ $0.593 [15.06]$ $0.500 \pm 0.062 [22.22 \pm 1.57]$ $1.0 [25.40]$ $0.875 \pm 0.062 [22.22 \pm 1.57]$ $1.0 [25.40]$ $0.875 \pm 0.062 [23.22 \pm 1.57]$ $1.281 [32.54]$ $1.781 \pm 0.062 [45.24 \pm 1.57]$ $1.875 [47.62]$	AB [MAXIMUM] (2)C $0.250 \pm 0.031 [6.35 \pm 0.787]$ $0.281 [7.14]$ $0.085 \pm 0.020 [2.16 \pm 0.508]$ $0.406 \pm 0.031 [10.31 \pm 0.787]$ $0.437 [11.10]$ $0.094 \pm 0.031 [2.39 \pm 0.787]$ $0.285 \pm 0.025 [7.24 \pm 0.635]$ $0.311 [7.90]$ $0.110 \pm 0.015 [2.79 \pm 0.381]$ $0.625 \pm 0.062 [15.87 \pm 1.57]$ $0.765 [19.43]$ $0.250 \pm 0.032 [6.35 \pm 0.813]$ $0.500 \pm 0.062 [12.70 \pm 1.57]$ $0.562 [14.27]$ $0.185 \pm 0.015 [4.70 \pm 0.381]$ $0.562 \pm 0.062 [14.27 \pm 1.57]$ $0.622 [15.80]$ $0.188 \pm 0.032 [4.78 \pm 0.813]$ $0.500 \pm 0.062 [12.70 \pm 1.57]$ $0.563 [14.30]$ $0.188 \pm 0.032 [4.78 \pm 0.813]$ $0.500 \pm 0.062 [12.70 \pm 1.57]$ $0.593 [15.06]$ $0.218 \pm 0.032 [5.54 \pm 0.813]$ $0.500 \pm 0.062 [12.70 \pm 1.57]$ $0.593 [15.06]$ $0.218 \pm 0.032 [5.54 \pm 0.813]$ $0.500 \pm 0.062 [12.70 \pm 1.57]$ $0.593 [15.06]$ $0.218 \pm 0.032 [5.54 \pm 0.813]$ $0.875 \pm 0.062 [22.22 \pm 1.57]$ $1.0 [25.40]$ $0.312 \pm 0.032 [7.92 \pm 0.813]$ $0.875 \pm 0.062 [22.22 \pm 1.57]$ $1.0 [25.40]$ $0.312 \pm 0.032 [7.92 \pm 0.813]$ $1.218 \pm 0.062 [30.94 \pm 1.57]$ $1.281 [32.54]$ $0.312 \pm 0.032 [7.92 \pm 0.813]$ $1.781 \pm 0.062 [45.24 \pm 1.57]$ $1.875 [47.62]$ $0.375 \pm 0.032 [9.52 \pm 0.813]$	

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 or alumina, depending on physical size

Coating: Special high temperature silicone

Standard Terminals: Tinned Copperweld®

(CW02B...13 is tinned copper)

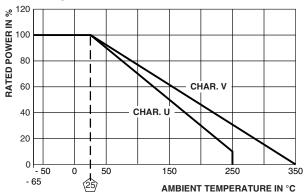
End Caps: Stainless steel

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

Note

(3) Wattage marked on resistor will be "V" characteristic, CW1/2 will not be marked with wattage

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 $^\circ C$	\pm (2.0 % + 0.05 Ω) Δ <i>R</i>		
Short Time Overload	5 x rated power (3.75 W and smaller), 10 x rated power (4 W and larger) for 5 s	± (2.0 % + 0.05 Ω) ΔR		
Dielectric Withstanding Voltage	1000 V _{rms} , 1 min	± (0.1 % + 0.05 Ω) ΔR		
Low Temperature Storage	- 65 °C for 24 h	± (2.0 % + 0.05 Ω) ΔR		
High Temperature Exposure	250 h at + 350 °C	\pm (4.0 % + 0.05 Ω) ΔR		
Moisture Resistance	MIL-STD-202 Method 106, 7b not applicable	\pm (2.0 % + 0.05 Ω) Δ <i>R</i>		
Shock, Specified Pulse	MIL-STD-202 Method 213, 100 g's for 6 ms, 10 shocks	± (0.2 % + 0.05 Ω) Δ <i>R</i>		
Vibration, High Frequency	Frequency varied 10 Hz to 2000 Hz, 20 g peak, 2 directions 6 h each	\pm (0.2 % + 0.05 Ω) Δ <i>R</i>		
Load Life	2000 h at rated power, + 25 °C, 1.5 h "ON", 0.5 h "OFF"	± (3.0 % + 0.05 Ω) ΔR		
Terminal Strength	5 s to 10 s 10 pound pull test; torsion test - 3 alternating directions, 360° each	± (1.0 % + 0.05 Ω) Δ <i>R</i>		

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.



Vishay

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