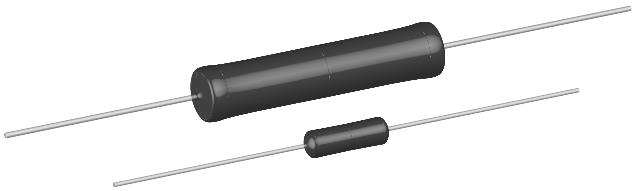
Wirewound Resistors, High Surge Immunity, Silicone Coated, Axial Lead



FEATURES

- High voltage surge immunity, up to 12 kV
- 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* Available

HALOGEN FREE Available

GREEN (5-2008) Available

Note

* This datasheet provides information about parts that are RoHS-compliant and/or parts that are non-RoHS-compliant. For example, parts with lead (Pb) terminations are not RoHS-compliant. Please see the information/tables in this datasheet for details.

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	TOLERANCE ± %	WEIGHT (max.) g
CW001...HS	1.0	-	0.1 to 6.37K	5, 10	0.34
CW02B...HS	3.0	3.75	0.1 to 15K	5, 10	0.7
CW005...HS	5.0	6.5	0.1 to 58.5K	5, 10	4.2
CW010...HS	10.0	13.0	0.1 to 167K	5, 10	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
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. ΔR in 2000 h load life Characteristic V = +350 °C max. hot spot temperature, ± 3.0 % max. ΔR in 2000 h load life

GLOBAL PART NUMBER INFORMATION

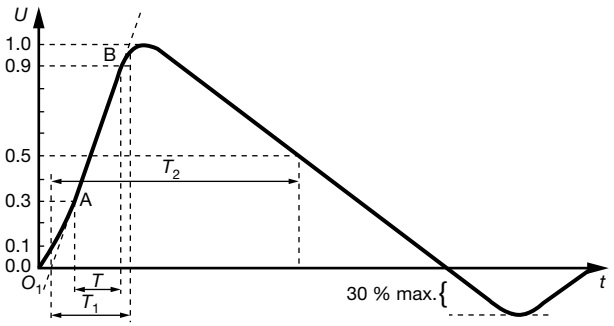
Global Part Numbering example: CW02B10K00JB12HS (preferred part number format)

C	W	0	2	B	1	0	K	0	0	J	B	1	2	H	S

GLOBAL MODEL (5 digits)	VALUE (5 digits)	TOLERANCE (1 digit)	PACKAGING (3 digits)	SPECIAL (2 digits)
CW001 **CW02B** **CW005** **CW010**	**R** = Decimal **K** = Thousand **1R500** = 1.5 Ω **1K500** = 1.5 kΩ	**H** = ± 3.0 % **J** = ± 5.0 % **K** = ± 10.0 %	**E70** = Lead (Pb)-free, tape/reel, 1K pcs. (CW001 and CW02B) **E73** = Lead (Pb)-free, tape/reel, 500 pcs. **E12** = Lead (Pb)-free, bulk **S70** = Tin/lead, tape/reel, 1K pcs. (CW001 and CW02B) **S73** = Tin/lead, tape/reel, 500 pcs. **B12** = Tin/lead, bulk	**HS** = High Surge

HIGH VOLTAGE SURGE

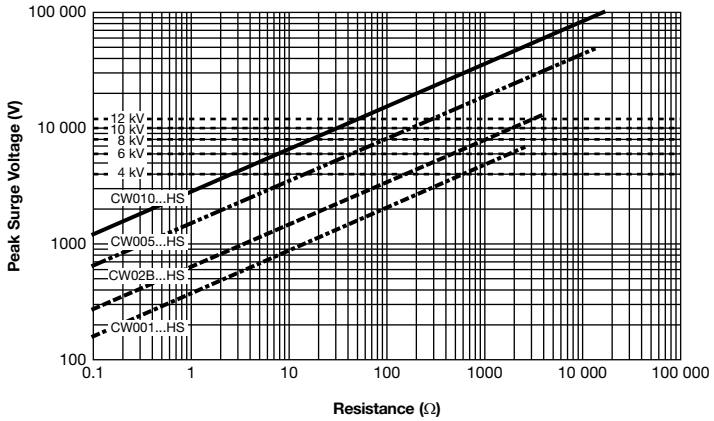
The surge handling capability is based upon applying an exponential open circuit voltage waveform according to specification IEC 61000-4-5 (1.2 µs/50 µs) as shown below at an ambient temperature of 25 °C.



Front time: T_1 = 1.67 x T = 1.2 µs ± 30 %
Time to half-value: T_2 = 50 µs ± 20 %

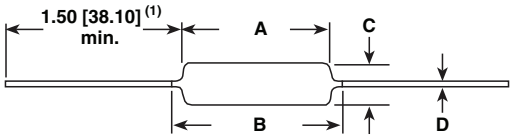
Open circuit voltage waveform at the output of the pulse generator

PEAK SURGE VOLTAGE - IEC 61000-4-5 (1.2 µs/50 µs pulse)



MINIMUM RESISTANCE VALUE FOR SURGE VOLTAGE					
GLOBAL MODEL	PEAK SURGE VOLTAGE				
	4 kV	6 kV	8 kV	10 kV	12 kV
CW001...HS	586 Ω	1.7 Ω	-	-	-
CW02B...HS	151 Ω	457 Ω	1.0 kΩ	1.8 kΩ	3.0 kΩ
CW005...HS	15 Ω	43 Ω	94 Ω	171 Ω	281 Ω
CW010...HS	2.6 Ω	7.6 Ω	17 Ω	30 Ω	50 Ω

DIMENSIONS in inches (millimeters)



MODEL	DIMENSIONS in inches [millimeters]			
	A	B [MAXIMUM] (2)	C	D
CW001...HS	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]
CW02B...HS	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...HS	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...HS	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 or alumina, depending on physical size

Coating: Special high temperature silicone

Standard Terminals: Tinned Copperweld®

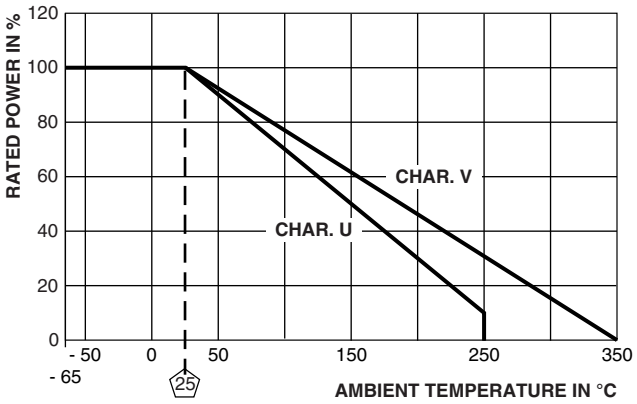
End Caps: Stainless steel

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	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) Δ*R*
Dielectric Withstanding Voltage	1000 V_{RMS}, 1 min	± (0.1 % + 0.05 Ω) Δ*R*
Low Temperature Storage	-65 °C for 24 h	± (2.0 % + 0.05 Ω) Δ*R*
High Temperature Exposure	250 h at +350 °C	± (4.0 % + 0.05 Ω) Δ*R*
Moisture Resistance	MIL-STD-202 Method 106, 7b not applicable	± (2.0 % + 0.05 Ω) Δ*R*
Shock, Specified Pulse	MIL-STD-202 Method 213, 100 *g*’s for 6 ms, 10 shocks	± (0.2 % + 0.05 Ω) Δ*R*
Vibration, High Frequency	Frequency varied 10 Hz to 2000 Hz, 20 *g* peak, 2 directions 6 h each	± (0.2 % + 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*
Terminal Strength	5 s to 10 s 10 pound pull test; torsion test - 3 alternating directions, 360° each	± (1.0 % + 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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