# Vishay Dale



# Wirewound/Metal Oxide Resistors, Commercial Power, Axial Lead



#### **FEATURES**

- High performance for low cost
- Meets or exceeds requirements of EIA Standard RS-344



- · High power to size ratio
- Ceramic cases are available with circuit board stand-offs (designated with a -3 model ending)
- RoHS\*
- Special inorganic potting compound and ceramic case provide high thermal conductivity in a fireproof package

STANDARD ELECTRICAL SPECIFICATIONS					
GLOBAL	POWER RATING	RESISTAN	WEIGHT		
MODEL	P <sub>40 °C</sub>	± 10 % Standard	(Typical)		
	w	WIREWOUND**	METAL OXIDE**	g	
CP0002	2	0.1 - 1K	100 - 12K	2.0	
CP00023	2	0.1 - 1K	100 - 12K	2.2	
CP0003	3	0.1 - 2K	150 - 22K	3.4	
CP00033	3	0.1 - 2K	150 - 22K	3.6	
CP0005	5	0.1 - 2.4K	150 - 27K	4.8	
CP00053	5	0.1 - 2.4K	150 - 27K	5.0	
CP0007	7	0.1 - 5K	1K - 35K	6.8	
CP00073	7	0.1 - 5K	1K - 35K	7.0	
CP0010	10	0.1 - 7K	1K - 40K	9.5	
CP00103	10	0.1 - 7K	1K - 40K	9.9	
CP0015	15	0.1 - 8K	1K - 40K	16.8	
CP00153	15	0.1 - 8K	1K - 40K	17.4	
CP0020	20	0.1 - 10K	1K - 45K	22.8	
CP00203	20	0.1 - 10K	-	23.6	
CP0022	22	0.1 - 10K	-	24.5	
CP00223	22	0.1 - 10K	-	25.3	
CP0025	25	0.1 - 10K	-	37.0	

<sup>\*\*</sup> To specifically order a Wirewound sub-assembly for resistance values that overlap between the Wirewound and Metal Oxide technologies, the model will be a CPxxxx...85 for standard body and CPxxxx...91 for body with stand-offs. To specifically order a Metal Oxide sub-assembly for resistance values that overlap between the Wirewound and Metal Oxide technologies, the model will be a CPxxxx...100 for a standard body and CPxxxx...101 for body with stand-offs. If no dash type is specified, either technology may be supplied

TECHNICAL SPECIFICATIONS						
PARAMETER	UNIT	WIREWOUND CHARACTERISTICS				
Temperature Coefficient	ppm/°C	± 600 below 1 Ω,				
Temperature obemolent		$\pm$ 300 1 $\Omega$ and above				
Short Time Overload	-	5 x rated power for 5 sec.				
Terminal Strength	lb	10 minimum				
Operating Temperature Range	°C	- 65/+ 275				
Dielectric Withstanding Voltage	V <sub>AC</sub>	1000				
Maximum Working Voltage	V	$(P \times R)^{1/2}$				
PARAMETER	UNIT	METAL OXIDE CHARACTERISTICS				
Tomporature Coefficient	nnm/0C	± 300 for CP0002 to CP0005;				
Temperature Coefficient	ppm/°C	± 400 for CP0007 to CP0020				
Short Time Overload	-	5 x rated power for 5 sec.				
Terminal Strength	lb	10 minimum				
Operating Temperature Range	°C	- 65/+ 225				
Dielectric Withstanding Voltage	$V_{AC}$	1000				
Maximum Working Voltage	V	(P x R) <sup>1/2</sup>				

**NOTE:** Wirewound CP resistors can reliably function as a fuse and as a resistor. Such components involve compromise between fusing and resistive functions; therefore, each design should be tailored to the application to ensure optimum performance. Contact factory by using the e-mail address at the bottom of this page for design assistance.

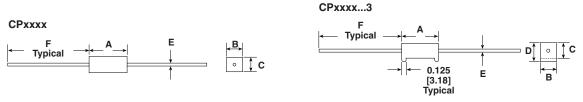
GLOBAL PART NUMBER INFORMATION						
New Global Part Numb	New Global Part Numbering: CP000515R00JB143 (preferred part number format)					
C P 0 0 5 1 5 R 0 0 J B 1 4 3						
GLOBAL MODEL	VALUE	TOLERANCE	PACKAGING	SPECIAL		
(See Standard Electrical Specifications Global Model column for	$\mathbf{R}$ = Decimal $\mathbf{K}$ = Thousand $\mathbf{R1500}$ = 0.15 $\Omega$	H = ± 3.0 % J = ± 5.0 % K = ± 10.0 %	E14 = Lead (Pb)-free bulk pack E31 = Lead (Pb)-free four layer bulk pack	(Dash Number) (up to 3 digits) From <b>1 - 999</b> as applicable		
options)	$1K500 = 0.15 \Omega$	<b>K</b> = ± 10.0 %	B14 = Bulk pack B31 = Four layer bulk pack			
Historical Part Number example: CP-5-3 15 $\Omega$ 5 $\%$ B14 (will continue to be accepted)						
CP-5-3		<b>15</b> Ω	5 %	B14		
HISTORICAL MODEL RESISTANCE VALUE		TOLERANCE CODE	PACKAGING			



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#### **DIMENSIONS**



	DIMENSIONS in inches [millimeters]							
GLOBAL	A* B		С	D	E ± 0.001 [0.025]		F	
MODEL	± 0.031 [0.794]	± 0.031 [0.794]	± 0.031 [0.794]	± 0.031 [0.794]	WIREWOUND	METAL OXIDE	WIREWOUND ± 0.125 [3.175]	METAL OXIDE MINIMUM
CP0002	0.688 [17.46]	0.250 [6.35]	0.250 [6.35]	-	0.032 [0.813]	0.0236 [0.600]	1.500 [38.10]	0.750 [19.05]
CP00023	0.688 [17.46]	0.250 [6.35]	0.250 [6.35]	0.313 [7.94]	0.032 [0.813]	0.0236 [0.600]	1.500 [38.10]	0.750 [19.05]
CP0003	0.875 [22.22]	0.313 [7.94]	0.313 [7.94]	-	0.036 [0.914]	0.032 [0.813]	1.500 38.10]	1.000 [25.40]
CP00033	0.875 [22.22]	0.313 [7.94]	0.313 [7.94]	0.375 [9.52]	0.036 [0.914]	0.032 [0.813]	1.500 [38.10]	1.000 [25.40]
CP0005	0.875 [22.22]	0.375 [9.52]	0.344 [8.73]	-	0.036 [0.914]	0.032 [0.813]	1.500 [38.10]	1.000 [25.40]
CP00053	0.875 [22.22]	0.375 [9.52]	0.344 [8.73]	0.406 [10.32]	0.036 [0.914]	0.032 [0.813]	1.500 [38.10]	1.000 [25.40]
CP0007	1.391 [35.32]	0.375 [9.52]	0.344 [8.73]	-	0.036 [0.914]	0.032 [0.813]	1.500 [38.10]	1.000 [25.40]
CP00073	1.391 [35.32]	0.375 [9.52]	0.344 [8.73]	0.469 [11.91]	0.036 [0.914]	0.032 [0.813]	1.500 [38.10]	1.000 [25.40]
CP0010	1.875 [47.62]	0.375 [9.52]	0.344 [8.73]	-	0.036 [0.914]	0.032 [0.813]	1.500 [38.10]	1.000 [25.40]
CP00103	1.875 [47.62]	0.375 [9.52]	0.344 [8.73]	0.469 [11.91]	0.036 [0.914]	0.032 [0.813]	1.500 [38.10]	1.000 [25.40]
CP0015	1.875 [47.62]	0.500 [12.70]	0.500 [12.70]	-	0.036 [0.914]	0.032 [0.813]	1.500 [38.10]	1.000 [25.40]
CP00153	1.875 [47.62]	0.500 [12.70]	0.500 [12.70]	0.625 [15.87]	0.036 [0.914]	0.032 [0.813]	1.500 [38.10]	1.000 [25.40]
CP0020**	2.500 [63.50]	0.500 [12.70]	0.500 [12.70]	-	0.036 [0.914]	0.032 [0.813]	1.500 [38.10]	1.000 [25.40]
CP00203	2.500 [63.50]	0.500 [12.70]	0.500 [12.70]	0.625 [15.87]	0.036 [0.914]	-	1.500 [38.10]	-
CP0022	2.500 [63.50]	0.500 [12.70]	0.500 [12.70]	-	0.036 [0.914]	-	1.500 [38.10]	-
CP00223	2.500 [63.50]	0.500 [12.70]	0.500 [12.70]	0.625 [15.87]	0.036 [0.914]	-	1.500 [38.10]	-
CP0025	2.500 [63.50]	0.625 [15.87]	0.625 [15.87]	-	0.040 [1.016]	-	1.500 [38.10]	-

<sup>\*</sup> Potting compound may extend outside of ceramic case up to 0.060" [1.52] maximum per side.

#### **MATERIAL SPECIFICATIONS**

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

Metal Oxide = High temperature fired Metal Oxide film

**Core:** Wirewound = Woven fiberglass Metal Oxide = Alumina ceramic

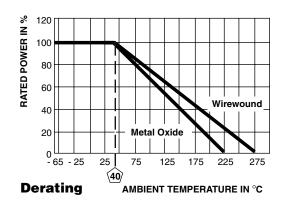
Body: Steatite ceramic case with inorganic potting

compound

End Caps: Tin plated steel
Terminals: Tinned copper

Part Marking: DALE, Model, Wattage, Value, Tolerance,

Date Code



PERFORMANCE					
TEST	CONDITIONS OF TEST	TEST LIMITS (EIA-344)			
Thermal Shock	- 55 °C to + 275 °C (+ 225 °C for Metal Oxide), 5 cycles, 30 minute dwell time	$\pm (5.0 \% + 0.05 \Omega) \Delta R$			
Short Time Overload	5 x rated power for 5 seconds	$\pm (4.0 \% + 0.05 \Omega) \Delta R$			
Dielectric Withstanding Voltage	1000 V <sub>rms</sub> , for one minute	$\pm$ (2.0 % + 0.05 $\Omega$ ) $\Delta R$			
Low Temperature Storage	- 65 °C, full rated working voltage for 45 minutes	$\pm (3.0 \% + 0.05 \Omega) \Delta R$			
Humidity	75 °C, 90 % - 100 % RH, 240 hours	$\pm (5.0 \% + 0.05 \Omega) \Delta R$			
Load Life	1000 hours at rated power, + 25 °C, 1.5 hours "ON", 0.5 hours "OFF"	$\pm$ (10.0 % + 0.05 $\Omega$ ) $\Delta R$			
Terminal Strength	5 pounds for 30 seconds; body twisted about axis, 3 360° rotations	$\pm (2.0 \% + 0.05 \Omega) \Delta R$			
Resistance to Solder Heat	Terminal immersed 3.5 seconds in molten solder at 1/8" to 3/16" from body	$\pm$ (4.0 % + 0.05 $\Omega$ ) $\Delta R$			

<sup>\*\*</sup> Dimensions for the metal oxide are: A = 2.360 [59.94], B = 0.570 [14.48], C = 0.530 [13.46], E = 0.032 [0.813], F = 1.000 [25.40]



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<u>CP10 .12 10% CP10 .15 10% CP10 270 5% CP10-3 3 5% CP2 10 5% CP25 400 10% CP3 .22 5% CP5 1.6K 5% CP5 160 5% CP5 820 5% CP22 2 5% CP10 750 5%</u>