Vishay Dale



Metal Film Resistors, Military, MIL-R-10509 Qualified, Type RN and MIL-PRF-22684 Qualified, Type RL



FEATURES

- Very low noise (- 40 dB)
- Very low voltage coefficient (5 ppm/V)
- Controlled temperature coefficient
- · Flame retardant epoxy coating
- Commercial alternatives to military styles are available with higher power ratings. See appropriate catalog or web page.

STAN	NDARD ELECTRICAL SPECIFICATIONS						
			VISHAY I				
MIL STYLE	VISHAY DALE MODEL	MAXIMUM WORKING VOLTAGE		MIL-R-10509			DIELECTRIC STRENGTH V _{AC}
	MODEL	VOLIAGE	CHARACTERISTIC D	CHARACTERISTIC C	CHARACTERISTIC E	MIL-PRF-22684	¥AC
RN50	CMF50	200	-	10R - 100K	10R - 100K	-	450
RN55	CMF55	200	10R - 301K	49R9 - 100K	49R9 - 100K	-	450
RN60	CMF60	300	10R - 1M	49R9 - 499K	49R9 - 499K	-	500
RN65	CMF65	350	10R - 2M	49R9 - 1M	49R9 - 1M	-	900
RN70	CMF70	500	10R - 2.49M	24R9 - 1M	24R9 - 1M	-	900
RL07	CMF07	250	-	-	-	51R - 150K	450
RL20	CMF20	350	-	-	-	4R3 - 470K	700

Note

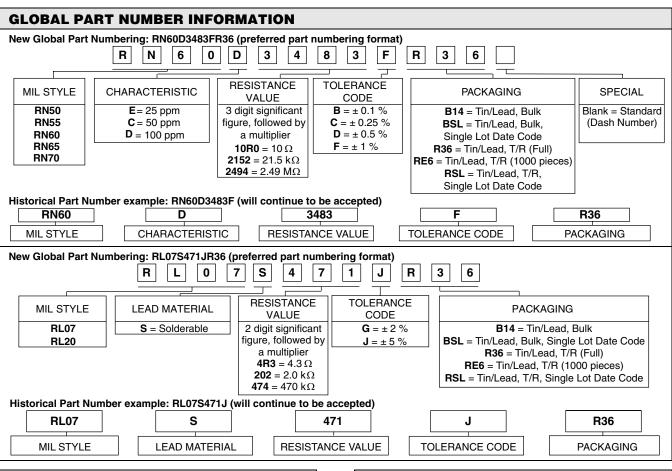
• Vishay Dale commercial value range: Extended resistance ranges are available in commercial equivalent types. Please contact us by using the email at the bottom of this page.

TECHNICAL SPECIFICATIONS				
PARAMETER	UNIT	CONDITION		
Voltage Coefficient	ppm/V	5 when measured between 10 % and full rated voltage		
Insulation Resistance	Ω	$\geq 10^{10}$ min. dry; $\geq 10^8$ min. after moisture test		
Operating Temperature Range	°C	- 65/+ 175 (see derating curves for military range)		
Terminal Strength	lb	5 pound pull test for RL07/RL20; 2 pound pull test for all others		
Solderability		Continuous satisfactory coverage when tested in accordance with MIL-R-10509 and MIL-PRF-22684		



CMF (Military RN and RL)

Metal Film Resistors, Military, MIL-R-10509 Qualified, Type RN and MIL-PRF-22684 Qualified, Type RL Vishay Dale



MATERIAL SPECIFICATIONS

Element:	Nickel-chrome alloy			
Coating:	Flame retardant epoxy, formulated for superior moisture protection			
Core:	Fire-cleaned high purity ceramic			
Termination:	Standard lead material is solder-coated copper. Solderable and weldable.			

APPLICABLE MIL-SPECS

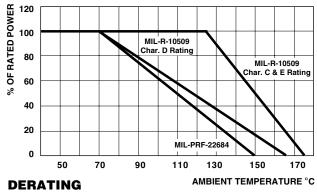
MIL-R-10509 and MIL-PRF-22684: The CMF models meet or exceed the electrical, environmental and dimensional requirements of MIL-R-10509 and MIL-PRF-22684.

Noise: Vishay Dale metal film resistors have exceptionally low noise level. Average for standard resistance range is 0.10 μ V per V over a decade of frequency, with low and intermediate resistance values typically below 0.05 μ V per V.

CAGE CODE: 91637

ENVIRONMENTAL SPECIFICATIONS				
General:	Environmental performance is shown in the Environmental Performance table. Test methods are those specified in MIL-R-10509 and MIL-PRF-22684.			
Shelf Life:	Resistance shifts due to storage at room temperature are negligible.			

Vishay Dale CMF resistors have an operating temperature range of - 65 °C to + 175 °C. They must be derated according to the following curves:



Document Number: 31027 Revision: 03-Jul-08 For technical questions, contact: ff2bresistors@vishay.com

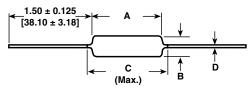
CMF (Military RN and RL)



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DIMENSIONS in inches [millimeters]



VISHAY DALE MODEL	A	В	C (Max.)	D
CMF50	0.150 ± 0.020	0.065 ± 0.015	0.244	0.016 ± 0.002
	[3.81 ± 0.51]	[1.65 ± 0.38]	[6.20]	[0.41 ± 0.05]
CMF55	0.240 ± 0.020	0.090 ± 0.008	0.278	0.025 ± 0.002
	[6.10 ± 0.51]	[2.29 ± 0.20]	[7.06] ⁽¹⁾	[0.64 ± 0.05]
CMF60	0.344 ± 0.031	0.145 ± 0.015	0.425	0.025 ± 0.002
	[8.74 ± 0.79]	[3.68 ± 0.38]	[10.80]	[0.64 ± 0.05]
CMF65	0.562 ± 0.031	0.180 ± 0.015	0.687	0.025 ± 0.002
	[14.27 ± 0.79]	[4.57 ± 0.38]	[17.45]	[0.64 ± 0.05]
CMF70	0.562 ± 0.031	0.180 ± 0.015	0.687	0.032 ± 0.002
	[14.27 ± 0.79]	[4.57 ± 0.38]	[17.45]	[0.81 ± 0.05]
CMF07	0.240 ± 0.020	0.090 ± 0.008	0.278	0.025 ± 0.002
	[6.10 ± 0.51]	[2.29 ± 0.20]	[7.06]	[0.64 ± 0.05]
CMF20	0.375± 0.040 [9.53 ± 1.02]	0.145 ± 0.015 [3.68 ± 0.38]	0.425 [10.80]	$\begin{array}{c} 0.032 \pm 0.002 \\ [0.81 \pm 0.05] \end{array}$

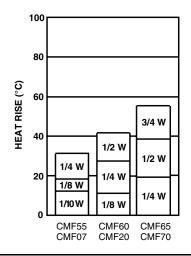
Note

 $^{(1)}$ 0.290" [7.37] for \pm 0.25 % and \pm 0.1 % resistance tolerances

MILITARY POWER RATING					
	MILITARY QUALIFIED				
WATTAGE	MIL-F	MIL-PRF-22684			
WATTAGE	AT + 70 °C (D)	AT + 125 °C (C and E)	AT + 70 °C		
0.05	-	RN50	-		
0.10	-	RN55	-		
0.125	RN55	RN60	-		
0.25	RN60	RN65	RL07		
0.50	RN65	RN70	RL20		
1.0	RN70	-	-		

Note

• Commercial equivalents of military styles are available with higher power ratings. Consult factory.



HEAT RISE

The increase in resistors surface temperature due to rated load is shown in the chart above. Resistor temperature = heat rise + ambient temperature.



CMF (Military RN and RL)

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MARKING			
	Characteristics: D = 100 ppm, C = 50 ppm, E = 25 ppm Tolerance: F = 1 %, D = 0.5 %, C = 0.25 %, B = 0.1 % Value = three significant figures and multiplier J = JAN (joint Army - Navy) brand		
RN50: (3 lines)		RN55, F	RN60, RN65, RN70 (4 lines)
J50D JAN, type, characteristic 1211 Value F137 Tolerance and 3 digit date code		DALE 0137J RN55D 1211F	Company Logo 4 digit date code and JAN brand Type and characteristic Value and Tolerance

Note

• RL series are color banded per MIL-PRF-22684

PERFORMANCE					
REQUIREMENT		MIL-PRF-22684			
	CHARACTERISTIC D CHARACTERISTIC C		CHARACTERISTIC E	₩II L-F NF-22004	
MIL Temperature Coefficient	+ 200 - 500 ppm/°C	± 50 ppm/°C	± 25 ppm/°C	± 200 ppm/°C	
Applicable Vishay Dale Temperature Coefficient	± 100 ppm/°C	± 50 ppm/°C	± 25 ppm/°C	± 200 ppm/°C	
TEST	MIL _{max.}	MIL _{max.}	MIL _{max.}	MIL _{max} .	
Thermal Shock	± 0.50 % Δ <i>R</i>	± 0.25 % ∆R	± 0.25 % ∆ <i>R</i>	± 1.00 % ∆ <i>R</i>	
Short Time Overload	± 0.50 % Δ <i>R</i>	± 0.25 % Δ <i>R</i>	± 0.25 % ∆ <i>R</i>	$\pm 0.50 \% \Delta R$	
Low Temperature Operation	± 0.50 % Δ <i>R</i>	± 0.25 % Δ <i>R</i>	± 0.25 % ∆ <i>R</i>	$\pm 0.50 \% \Delta R$	
Moisture Resistance	± 1.50 % Δ <i>R</i>	± 0.50 % Δ <i>R</i>	± 0.50 % Δ <i>R</i>	± 1.50 % ∆ <i>R</i>	
Shock	± 0.50 % Δ <i>R</i>	± 0.25 % Δ <i>R</i>	± 0.25 % ∆ <i>R</i>	$\pm 0.50 \% \Delta R$	
Vibration	± 0.50 % Δ <i>R</i>	± 0.25 % Δ <i>R</i>	± 0.25 % ∆ <i>R</i>	$\pm 0.50 \% \Delta R$	
Load Life	± 1.00 % Δ <i>R</i>	± 0.50 % Δ <i>R</i>	± 0.50 % ∆ <i>R</i>	$\pm 2.00 \% \Delta R$	
Dielectric Withstanding Voltage	± 0.50 % Δ <i>R</i>	± 0.25 % Δ <i>R</i>	± 0.25 % ∆ <i>R</i>	$\pm 0.50 \% \Delta R$	
Effect of Solder	± 0.50 % Δ <i>R</i>	± 0.10 % Δ <i>R</i>	± 0.10 % ∆R	± 0.50 % ∆ <i>R</i>	



Vishay

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