

Vishay Dale

Metal Film Resistors, Military, MIL-R-10509 Qualified, Precision, 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 CMF Industrial data sheet: (www.vishay.com/doc?31018)

STANE	STANDARD ELECTRICAL SPECIFICATIONS											
GLOBAL MODEL	MIL STYLE	MIL SPEC. SHEET	_	POWER RATING P _{125°C} W	MAX. WORKING VOLTAGE ⁽¹⁾ V	RESISTANCE RANGE Ω MIL-R-10509 ± 100 ppm/°C (D)	$\begin{array}{c} \text{RESISTANCE} \\ \text{RANGE} \\ \Omega \\ \text{MIL-R-10509} \\ \pm 50 \text{ ppm/°C} \\ \text{(C)} \end{array}$	RESISTANCE RANGE Ω MIL-R-10509 ± 25 ppm/°C (E)	RESISTANCE RANGE Ω MIL-PRF-22684	TOL. ⁽³⁾ ± %	DIELECTRIC STRENGTH V _{AC}	
CMF50	RN50	08	-	0.05	200	-	10 to 100K	10 to 100K	-	0.1, 0.25, 0.5, 1	450	
CMF55	RN55	07	0.125	0.10	200	10 to 301K	49.9 to 100K	49.9 to 100K	-	0.1, 0.25, 0.5, 1	450	
CMF60	RN60	01	0.25	0.125	300	10 to 1M	49.9 to 499K	49.9 to 499K	-	0.1, 0.25, 0.5, 1	500	
CMF65	RN65	02	0.50	0.25	350	10 to 2M	49.9 to 1M	49.9 to 1M	-	0.1, 0.25, 0.5, 1	900	
CMF70	RN70	03	0.75 ⁽²⁾	0.50	500	10 to 2.49M	24.9 to 1M	24.9 to 1M	-	0.1, 0.25, 0.5, 1	900	
CMF07	RL07	01	0.25	=	250	=	P	-	51 to 150K	2, 5	450	
CMF20	RL20	02	0.50	-	350	-	-	-	4.3 to 470K	2, 5	700	

Notes

 $^{^{(3)}}$ Tolerances of \pm 0.1 %, \pm 0.25 % and \pm 0.5 % are not applicable to characteristic D.

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				

⁽¹⁾ Continuous working voltage shall be $\sqrt{P \times R}$ or maximum working voltage, whichever is less.

⁽²⁾ Formerly rated at 1 W and is the direct replacement for RN70 of MIL-R-10509 rev. D.



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GLOBAL PART NUMBER INFORMATION														
New Global Part Numbering: RN60D3483FR36 (preferred part numbering format)														
	R	N 6 0	D	3	4	8	3	F	I	R 3 6				
			==										_	
MIL STYLE CHARACTERISTIC			RESISTANCE VALUE			TOLERANCE CODE			PACKAGING			SPECIAL		
RN50 RN55		: 25 ppm : 50 ppm	3 digit significant figure, followed by			B = ± 0.1 % C = ± 0.25 %			B14 = Tin/lead, bulk			Blank = Standard (Dash number)		
RN60		100 ppm	,	nultiplie	, ,	_	= ± 0.2 = ± 0.			BSL = Tin/lead single lot date				88 = Hot solder dip
RN65		тоо ррпт	1	"R" fo		ı	= ± 1 °			R36 = Tin/lead,				143 = Non-magnetic
RN70				s < 100				, -	1	RE6 = Tin/lead, T/R (140 - Non magnetic
			10R0	0 = 10	Ω					RSL = Tin/lead			,	
			_	= 21.5						single lot date				
			2494 =	= 2.49 N	MΩ									
Historical Part Number	r exa		483F (will	conti			cepte	ed)			7			
RN60		D			3	483		J L		F				R36
MIL STYLE	(CHARACTERIS	TIC	RES	SISTAI	NCE V	ALUE		T	OLERANCE CODE			PA	CKAGING
New Global Part Num	berii	ng: RL07S471J	R36 (pre	ferred	part r	numbe	ring f	ormat))					
R		L 0 7	S	4	7	1	J	R	3	6				
							_		₹					
MIL STYLE LEA	D MA	ATERIAL	RESIST VALI		TC	OLERA COD				PACKAGING				SPECIAL
RL07 S	= So	lderable	2 digit sig	gnificar	nt	G = ± 2	2 %			B14 = Tin/lead, bu	k			Blank = Standard
RL20		f	igure, foll		ру 🗀	$\mathbf{J} = \pm 5$	%	BSL =		in/lead, bulk, single l		ate coo		(Dash number)
			a multi							R36 = Tin/lead, T/R (88 = Hot solder dip
			Use "F							= Tin/lead, T/R (1000				43 = Non-magnetic
								RSL :	= T	Fin/lead, T/R, single lo	ot da	ate coc	de	
	$4R3 = 4.3 \Omega$ $202 = 2.0 kΩ$													
474 = 470 kΩ														
	111-11-11-11-11-11-11-11-11-11-11-11-11													
Historical Part Number	Historical Part Number example: RL07S471J (will continue to be accepted)													
RL07		S			471				J] [R36	
MIL STYLE LEAD MATE		ERIAL		RESISTANCE VALUE		UE		TOLERANCE CO	DE] [PACKAGING		

Note

• For additional information on packaging, refer to the Through Hole Resistor Packaging document (www.vishay.com/doc?31544).

MATERIAL SPECIFICATIONS						
Element	Nickel-chrome alloy Flame retardant epoxy, formulated for superior moisture protection					
Coating						
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.

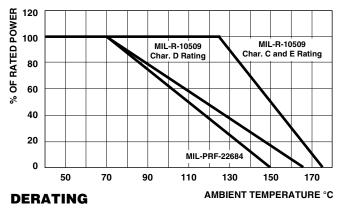
CAGE CODE: 91637

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.						

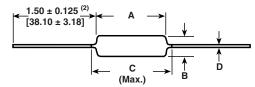
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Vishay Dale CMF resistors have an operating temperature range of - 65 °C to + 175 °C. They must be derated according to the following curves:



DIMENSIONS in inches (millimeters)



VISHAY DALE MODEL	А	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	0.145 ± 0.015	0.425	0.032 ± 0.002
	(9.53 ± 1.02)	(3.68 ± 0.38)	(10.80)	(0.81 ± 0.05)

Notes

⁽²⁾ Lead length for product in bulk pack. For product supplied in Tape and Reel, the actual lead length would be based on the body size, tape spacing and lead trim.

MILITARY POWER RATING									
	MILITARY QUALIFIED								
WATTAGE	MIL-	R-10509	MIL-PRF-22684						
WALLAGE	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						
0.75 (3)	RN70	-	-						

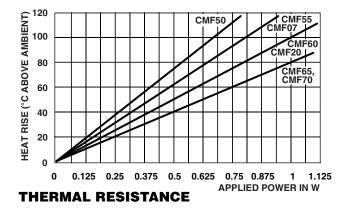
Notes

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

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

⁽³⁾ Formerly rated at 1 W and is the direct replacement for RN70 of MIL-R-10509 rev. D.

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MARKING (per MIL-PRF-10509)

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, RN60, RN65, RN70 (4 lines)

DALE Company logo J50D JAN, type, characteristic

0137J 4 digit date code and JAN brand 1211 Value RN55D Type and characteristic F137

Tolerance and 3 digit date code 1211F Value and Tolerance

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

PERFROMANCE							
REQUIREMENT		MIL-PRF-22684					
REQUIREMENT	CHARACTERISTIC D	CHARACTERISTIC C	CHARACTERISTIC E	WIIL-PRF-22004			
MIL Temperature Coefficient	+ 200 ppm/°C - 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 % ΔR	± 0.25 % ΔR	± 0.25 % ΔR	± 1.00 % ∆R			
Short Time Overload	± 0.50 % ΔR	± 0.25 % ΔR	± 0.25 % ΔR	± 0.50 % ΔR			
Low Temperature Operation	± 0.50 % ΔR	± 0.25 % ΔR	± 0.25 % ΔR	± 0.50 % ΔR			
Moisture Resistance	± 1.50 % ΔR	± 0.50 % ΔR	± 0.50 % ΔR	± 1.50 % ΔR			
Shock	± 0.50 % ΔR	± 0.25 % ΔR	± 0.25 % ΔR	± 0.50 % ΔR			
Vibration	± 0.50 % ΔR	± 0.25 % ΔR	± 0.25 % ΔR	± 0.50 % ΔR			
Load Life	± 1.00 % ΔR	± 0.50 % ΔR	± 0.50 % ΔR	± 2.00 % ΔR			
Dielectric Withstanding Voltage	± 0.50 % ΔR	± 0.25 % ΔR	± 0.25 % ΔR	± 0.50 % ΔR			
Effect of Solder	± 0.50 % ΔR	± 0.10 % ΔR	± 0.10 % ΔR	± 0.50 % ΔR			



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многоканальный

Общество с ограниченной ответственностью «МосЧип» ИНН 7719860671 / КПП 771901001 Адрес: 105318, г.Москва, ул.Щербаковская д.3, офис 1107

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