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Vishay Dale

# Metal Film Resistors, Axial, Military / Established Reliability, MIL-PRF-39017 Qualified, Type RLR



#### **FEATURES**

- Meets requirements of MIL-PRF-39017
- Failure rate: Verified failure rate (contact factory for current
- Epoxy coated construction provides superior moisture protection
- Traceability of materials and processing
  Monthly lot acceptance testing
- Very low noise (-40 dB)
- Extensive stocking program at distributors and factory in ± 1 % and ± 2 % tolerances
   Vishay Dale has complete capability to develop specific
- reliability programs designed to customer requirements

STANDARD ELECTRICAL SPECIFICATIONS								
VISHAY DALE MODEL	MIL-PRF-39017 STYLE	MIL SPEC. SHEET	POWER RATING 70 °C W	$\begin{array}{c} \textbf{RESISTANCE} \\ \textbf{RANGE} \text{ (1)} \\ \Omega \end{array}$	TOLERANCE ± %	TEMPERATURE COEFFICIENT ± ppm/°C	MAXIMUM WORKING VOLTAGE <sup>(4)</sup> V	LIFE FAILURE RATE <sup>(2)</sup>
ERL05, ERL0519 <sup>(3)</sup>	RLR05	05	0.125	4.7 to 100K > 100K to 1M	1, 2	100	200	M, P, R, S M, P, R
ERL07, ERL0723 <sup>(3)</sup>	RLR07	01	0.25	1 to 9.76 10 to 3.01M 3.02M to 10M	1, 2	100	250	M M, P, R, S M, P, R
ERL20, ERL2011 <sup>(3)</sup>	RLR20	02	0.50	4.3 to 3.01M	1, 2	100	350	M, P, R, S
ERL32, ERL321 <sup>(3)</sup>	RLR32	03	1.0	1 to 2.7M	1, 2	100	500	M, P, R

Extended resistance range: DSCC has created a series of drawings intended to support extended resistance ranges left otherwise void by the discontinuation of MIL-R-39008 RCR carbon composition resistors. Vishay Dale is listed as a resource on these drawings as follows:

DSCC DRAWING NUMBER	VISHAY DALE MODEL	POWER RATING  P <sub>70 °C</sub> W	$\begin{array}{c} \textbf{RESISTANCE} \\ \textbf{RANGE} \\ \Omega \end{array}$	TOLERANCE ± %	TEMPERATURE COEFFICIENT ± ppm/°C	MAXIMUM WORKING VOLTAGE V (4)
98020	ERL0536, ERL0537 (3)	0.125	1.1M to 22M	2, 5, 10	350	200
99011	ERL07100, ERL07101 (3)	0.25	11M to 22M	2, 5, 10	350	250
98021	ERL2036, ERL2037 (3)	0.50	3.3M to 22M	2, 5, 10	350	350
98022	ERL3236, ERL3237 (3)	1.0	3M to 22M	2, 5, 10	350	350
97004	ERL621, ERL622 <sup>(3)</sup>	2.0	10 to 2.7M 3M to 22M	1, 2, 5, 10	100 350	500

Low inductance: DSCC has created a drawing intended to support a resistor which exhibits low inductance over a frequency range of 1 MHz to 30 MHz. Vishay Dale is listed as a resource on these drawings as follows:

DSCC DRAWING NUMBER	VISHAY DALE MODEL	POWER RATING P <sub>70°C</sub> W	$\begin{array}{c} \textbf{RESISTANCE} \\ \textbf{RANGE} \\ \Omega \end{array}$	MAXIMUM INDUCTANCE nH	TOLERANCE ± %	TEMPERATURE COEFFICIENT ± ppm/°C	MAXIMUM WORKING VOLTAGE V <sup>(4)</sup>
96002	ERL0762	RL0762 0.25	1 to 10	10	1.0	100	250
90002 ERL0762		0.25	11 to 49.9	8	1, 2	100	230

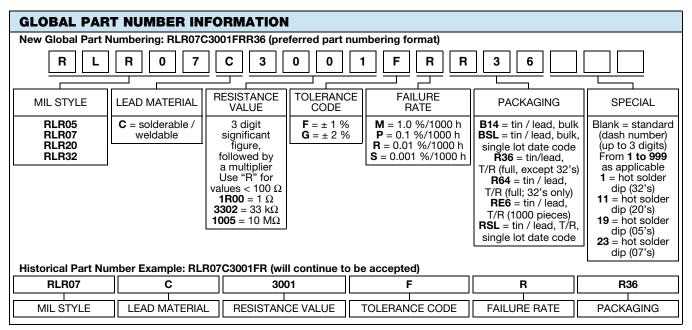
These drawings can be viewed at: https://landandmaritimeapps.dla.mil/Downloads/MilSpec/DsccDwg/96002.pdf

- Consult factory for current QPL failure rates
- Hot solder dipped leads
- Continuous working voltage shall be  $\sqrt{P \times R}$  or maximum working voltage, whichever is less

TECHNICAL SPECIFICATIONS					
PARAMETER	UNIT	CONDITION			
Voltage Coefficient, max.	ppm/V	5/V when measured between 10 % and full rated voltage			
Dielectric Strength	V <sub>AC</sub>	RLR05 = 300; RLR07 and RLR20 = 500; RLR32 = 1000			
Insulation Resistance	Ω	≥ 10 <sup>9</sup> min. dry; ≥ 10 <sup>11</sup> min. after moisture test			
Operating Temperature Range	°C	-65 to +150			
Terminal Strength	lb	2 lb pull test on RLR05; 5 lb pull test on all other sizes			
Solderability		Continuous satisfactory coverage when tested in accordance with MIL-STD-202, method 208			
Weight	g	RLR05 = 0.11; RLR07 = 0.35; RLR20 = 0.75; RLR32 = 1.05			

Revision: 25-Apr-2023 Document Number: 31023

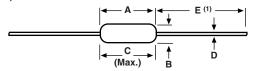




#### Note

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

#### **DIMENSIONS** in inches (millimeters)



#### Note

(1) 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

VISHAY DALE MODEL	Α	В	C (Max.)	D	E
ERL05	0.150 ± 0.020	$0.066 \pm 0.008$	0.187	0.016 ± 0.002	1.25 ± 0.266
	(3.81 ± 0.51)	(1.68 ± 0.21)	(4.75)	(0.41 ± 0.05)	(31.75 ± 6.76)
ERL07	0.250 + 0.031 - 0.046	$0.090 \pm 0.008$	0.300	0.025 ± 0.002	1.50 ± 0.125
	(6.35 + 0.79 - 1.17)	(2.29 ± 0.21)	(7.62)	(0.64 ± 0.05)	(38.10 ± 3.18)
ERL20	$0.375 \pm 0.041$	$0.138 \pm 0.023$	0.450	0.032 ± 0.002	1.50 ± 0.125
	(9.53 ± 1.04)	(3.51 ± 0.58)	(11.43)	(0.81 ± 0.05)	(38.10 ± 3.18)
ERL32	0.562 ± 0.031	$0.190 \pm 0.015$	0.625	0.032 + 0.002 - 0.001	1.50 ± 0.125
	(14.27 ± 0.79)	(4.83 ± 0.38)	(15.87)	(0.81 + 0.05 - 0.03)	(38.10 ± 3.18)
ERL62	0.562 + 0.031 - 0.042	$0.230 \pm 0.015$	0.650	0.032 + 0.002 - 0.001	1.50 ± 0.125
	(14.27 + 0.79 - 1.07)	(5.84 ± 0.38)	(16.51)	(0.81 + 0.05 - 0.03)	(38.10 ± 3.18)

MATERIAL SPECIFICATIONS			
Element Vacuum-deposited nickel-chrome			
Core	Fire-cleaned high purity ceramic		
Encapsulation	Specially formulated epoxy compound		
Termination	Standard lead material is solder-coated copper. Solderable and weldable per MIL-STD-1276, Type C.		

#### **POWER RATING**

Power ratings are based on the following two conditions:

- 1.  $\pm$  2.0 % maximum  $\Delta R$  in 2000 h load life
- 2. +150 °C maximum operating temperature

### **APPLICABLE MIL-SPECIFICATIONS**

#### MIL-PRF-39017:

The ERL series meets the electrical, environmental and dimensional requirements of MIL-PRF-39017.

#### MIL-PRF-22684:

MIL-PRF-39017 supersedes MIL-PRF-22684 on new designs. The ERL series meet or exceed MIL-PRF-22684 requirements.

#### **Documentation:**

Qualification and failure rate verification test data is maintained by Vishay Dale and is available upon request. Lot traceability and identification data is maintained by Vishay Dale for five years.

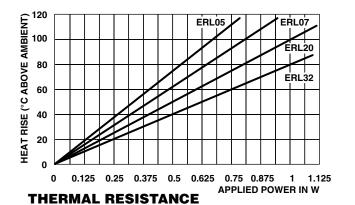
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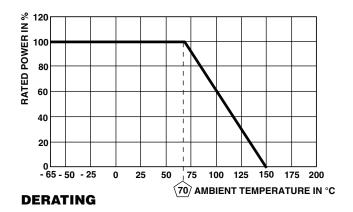




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### MARKING (per MIL-PRF-39017)

Tolerance: F = 1 %, G = 2 %

Value = three significant figures and multiplier J = JAN (Joint Army - Navy) brand

RLR05: (3 lines) RLR07: (4 lines)

210A 3-digit date code and lot code 214AJ 3-digit date code, lot code and JAN

1002 Value RLR7C Style ("0" omitted) and lead material

FSJD Tolerance, failure rate, JAN and manufacturer's code 1300G Value and tolerance

RD Failure rate and manufacturer's code

RLR20, RLR32: (4 lines)

91637 CAGE code

RLR20C Style and lead material

4993FR Value, tolerance and failure rate1225AJ 4-digit date code, lot code and JAN



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