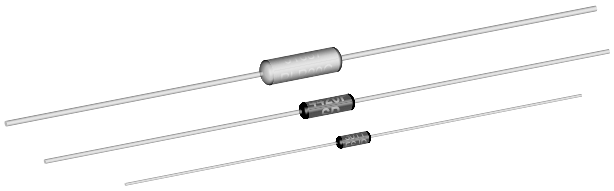
Metal Film Resistors, Military/Established Reliability, MIL-PRF-39017 Qualified, Type RLR



FEATURES

- Meets requirements of MIL-PRF-39017
- Failure rate: Verified failure rate (contact factory for current level)
- 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	RESISTANCE RANGE (1) Ω	TOLERANCE ± %	TEMPERATURE COEFFICIENT ± ppm/°C	MAXIMUM WORKING VOLTAGE (4) V	LIFE FAILURE RATE (2)
ERL05, ERL05..19 (3)	RLR05	05	0.125	4.7 to 301K	1, 2	100	200	M, P, R, S
				302K to 1M				M, P, R
ERL07, ERL07..23 (3)	RLR07	01	0.25	1 to 9.76	1, 2	100	250	M
				10 to 3.01M				M, P, R, S
				3.02M to 10M				M, P, R
ERL20, ERL20..11 (3)	RLR20	02	0.50	4.3 to 3.01M	1, 2	100	350	M, P, R
ERL32, ERL32..1 (3)	RLR32	03	1.0	1 to 2.7M	1, 2	100	500	M, P, R

Notes

(1) 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 $P_{70\,°C}$ W	RESISTANCE RANGE Ω	TOLERANCE ± %	TEMPERATURE COEFFICIENT ± ppm/°C	MAXIMUM WORKING VOLTAGE V (4)
98020	ERL05..36, ERL05..37 (3)	0.125	1.1M to 22M	2, 5, 10	350	200
99011	ERL07..100, ERL07..101 (3)	0.25	11M to 22M	2, 5, 10	350	250
98021	ERL20..36, ERL20..37 (3)	0.50	3.3M to 22M	2, 5, 10	350	350
98022	ERL32..36, ERL32..37 (3)	1.0	3M to 22M	2, 5, 10	350	350
97004	ERL62..1, ERL62..2 (3)	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 $P_{70\,°C}$ W	RESISTANCE RANGE Ω	MAXIMUM INDUCTANCE nH	TOLERANCE ± %	TEMPERATURE COEFFICIENT ± ppm/°C	MAXIMUM WORKING VOLTAGE V (4)
96002	ERL07..62	0.25	1 to 10	10	1, 2	100	250
			11 to 49.9	8			

These drawings can be viewed at: http://www.landandmaritime.dla.mil/Programs/MilSpec/ListDwgs.aspx?DocTYPE=DSCCdwg

(2) Consult factory for current QPL failure rates

(3) Hot solder dipped leads

(4) 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_{AC}	RLR05 = 300; RLR07 and RLR20 = 500; RLR32 = 1000
Insulations Resistance	Ω	≥ 10^9 min. dry; ≥ 10^{11} 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 = 1.50

For technical questions, contact: ff2aresistors@vishay.com

THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

GLOBAL PART NUMBER INFORMATION

New Global Part Numbering: RLR07C3001FRR36 (preferred part numbering format)

R	L	R	0	7	C	3	0	0	1	F	R	R	3	6			

MIL STYLE	LEAD MATERIAL	RESISTANCE VALUE	TOLERANCE CODE	FAILURE RATE	PACKAGING	SPECIAL
RLR05 **RLR07** **RLR20** **RLR32**	**C** = Solderable/ weldable	3 digit significant figure, followed by a multiplier Use "R" for values < 100 Ω **1R00** = 1.0 **3302** = 33 kΩ **1005** = 10 MΩ	**F** = ± 1 % **G** = ± 2 %	**M** = 1.0 %/1000 h **P** = 0.1 %/1000 h **R** = 0.01 %/1000 h **S** = 0.001 %/1000 h	**B14** = Tin/lead, bulk **BSL** = Tin/lead, bulk, single lot date code **R36** = Tin/lead, T/R (full, except 32's) **R64** = Tin/lead, T/R (full; 32's only) **RE6** = Tin/lead, T/R (1000 pieces) **RSL** = Tin/lead, T/R, single lot date code	Blank = Standard (Dash number) (Up to 3 digits) From **1 to 999** as applicable **1** = Hot solder dip (32's) **11** = Hot solder dip (20's) **19** = Hot solder dip (05's) **23** = Hot solder dip (07's)

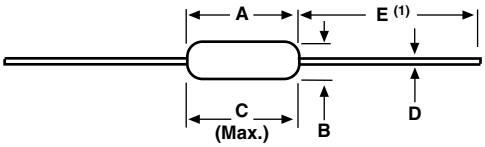
Historical Part Number example: RLR07C3001FR (will continue to be accepted)

RLR07	C	3001	F	R	R36
MIL STYLE	LEAD MATERIAL	RESISTANCE VALUE	TOLERANCE CODE	FAILURE RATE	PACKAGING

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

MATERIAL SPECIFICATIONS

Element	Vacuum-deposited nickel-chrome alloy
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. ± 2.0 % maximum 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 supercedes MIL-PRF-22684 on new designs. The ERL series meet or exceed MIL-PRF-22684 requirements.

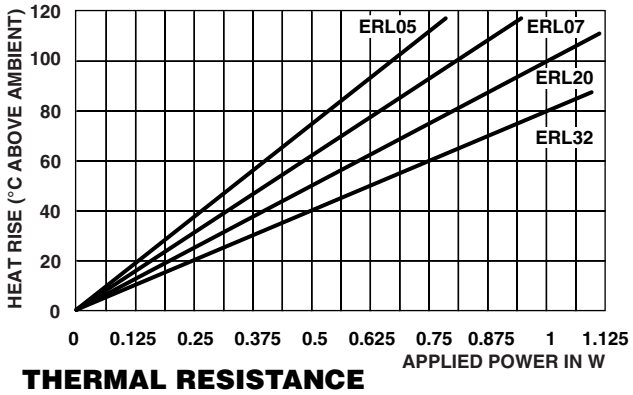
Documentation:

Qualification and failure rate verfication 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.

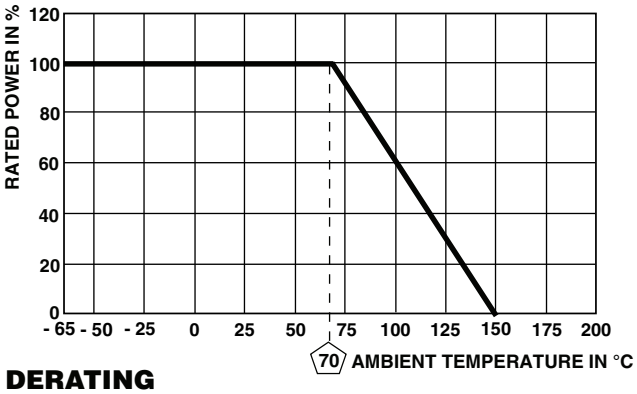
CAGE CODE: 91637

For technical questions, contact: ff2aresistors@vishay.com

THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000



THERMAL RESISTANCE



DERATING

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)

210A	3-digit date code and lot code
1002	Value
FSJD	Tolerance, failure rate, JAN and manufacturer's code

RLR07: (4 lines)

214AJ	3-digit date code, lot code and JAN
RLR7C	Style ("0" omitted) and lead material
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 rate
1225AJ	4-digit date code, lot code and JAN

For technical questions, contact: ff2aresistors@vishay.com

THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, “Vishay”), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay’s knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer’s responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and/or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer’s technical experts. Product specifications do not expand or otherwise modify Vishay’s terms and conditions of purchase, including but not limited to the warranty expressed therein.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.

Material Category Policy

Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as RoHS-Compliant fulfill the definitions and restrictions defined under Directive 2011/65/EU of The European Parliament and of the Council of June 8, 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (EEE) - recast, unless otherwise specified as non-compliant.

Please note that some Vishay documentation may still make reference to RoHS Directive 2002/95/EC. We confirm that all the products identified as being compliant to Directive 2002/95/EC conform to Directive 2011/65/EU.

Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as Halogen-Free follow Halogen-Free requirements as per JEDEC JS709A standards. Please note that some Vishay documentation may still make reference to the IEC 61249-2-21 definition. We confirm that all the products identified as being compliant to IEC 61249-2-21 conform to JEDEC JS709A standards.