



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 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 $\pm 1\%$ and $\pm 2\%$ 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 100K > 100K to 1M | 1, 2 | 100 | 200 | M, P, R, S M, P, R |
| ERL07, ERL07..23 ⁽³⁾ | 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, ERL20..11 ⁽³⁾ | RLR20 | 02 | 0.50 | 4.3 to 3.01M | 1, 2 | 100 | 350 | M, P, R, S |
| 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 $P_{70\text{ °C}}$ 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 $P_{70\text{ °C}}$ 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 11 to 49.9 | 10 8 | 1, 2 | 100 | 250 |

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

⁽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 |
| Insulation Resistance | Ω | $\geq 10^9$ min. dry; $\geq 10^{11}$ 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 = 1.05 |

| 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 Ω 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:

- ± 2.0 % maximum ΔR in 2000 h load life
- +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.

CAGE CODE: 91637



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



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