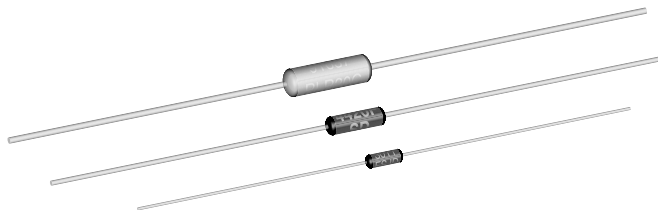


## Metal Film Resistors, Military/Established Reliability, MIL-PRF-39017 Qualified, Type RLR



### FEATURES

- Meets requirements of MIL-PRF-39017.
- Failure Rate: Verified Failure Rate (Contact factory for current level).
- Excellent high frequency performance.
- Epoxy coated construction provides superior moisture protection.
- Traceability of materials and processing.
- Monthly lot acceptance testing.
- Very low noise.
- 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 TYPE | POWER RATING<br>$P_{70^{\circ}\text{C}}$<br>W | RESISTANCE TOLERANCE % | MAXIMUM WEIGHT (Grams) | MAXIMUM WORKING VOLTAGE | RESISTANCE <sup>1)</sup> RANGE (Ohms)<br>$T - 1 (\pm 100\text{ppm}/^{\circ}\text{C})$ |
|-------------------|--------------------|-----------------------------------------------|------------------------|------------------------|-------------------------|---------------------------------------------------------------------------------------|
| ERL-05            | RLR05              | 0.125                                         | $\pm 1, \pm 2$         | .11                    | 200                     | 4R7 - 1M                                                                              |
| ERL-07            | RLR07              | 0.25                                          | $\pm 1, \pm 2$         | .35                    | 250                     | 1R - 10M                                                                              |
| ERL-20            | RLR20              | 0.5                                           | $\pm 1, \pm 2$         | .75                    | 350                     | 4R3 - 3.01M                                                                           |
| ERL-32            | RLR32              | 1                                             | $\pm 1, \pm 2$         | 1.5                    | 500                     | 1R - 2.7M                                                                             |

<sup>1)</sup> 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

#### RESISTANCE RANGE

#### SIZE

|       |                  |          |
|-------|------------------|----------|
| 98020 | 1.1 meg - 22 meg | 1/8 watt |
| 99011 | 11 meg - 22 meg  | 1/4 watt |
| 98021 | 3.3 meg - 22 meg | 1/2 watt |
| 98022 | 3 meg - 22 meg   | 1 watt   |
| 97004 | 1 ohm - 2.7 meg  | 2 watt   |

These drawings can be viewed at:

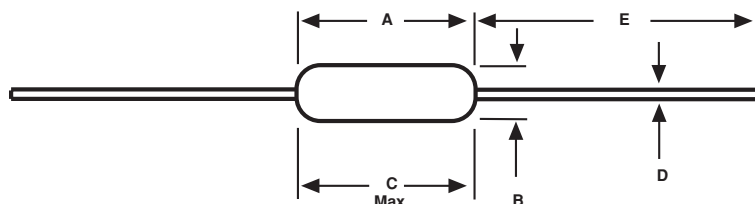
[www.dscc.dla.mil/Programs/MilSpec/ListDwgs.asp?DocType=DSCCdwwg](http://www.dscc.dla.mil/Programs/MilSpec/ListDwgs.asp?DocType=DSCCdwwg)

### TECHNICAL SPECIFICATIONS

| PARAMETER                   | UNIT                    | CONDITION                                                                               |
|-----------------------------|-------------------------|-----------------------------------------------------------------------------------------|
| Voltage Coefficient, max.   | ppm/ $^{\circ}\text{C}$ | 5/Volt when measured between 10% and full rated voltage                                 |
| Dielectric Strength         | VAC                     | RLR05 = 300; RLR07/RLR20 = 500; RLR32 = 1000                                            |
| Insulation Resistance       | $\Omega$                | $\geq 10^9$ minimum dry; $\geq 10^{11}$ minimum after moisture test                     |
| Operating Temperature Range | $^{\circ}\text{C}$      | - 65 / + 150                                                                            |
| Terminal Strength           | lb                      | 2lb pull test on RLR05; 5lb pull test on all other sizes                                |
| Solderability               |                         | Continuous satisfactory coverage when tested in accordance with MIL-STD-202, Method 208 |

### ORDERING INFORMATION - MILITARY PART NUMBER

| RLR<br>MILITARY TYPE<br>Per MIL-PRF-39017 | 07<br>SIZE                                                        | C<br>LEAD MATERIAL      | 3001<br>VALUE                                                                                                           | F<br>TOLERANCE                 | R<br>FAILURE RATE<br>%/1000 HOURS             |
|-------------------------------------------|-------------------------------------------------------------------|-------------------------|-------------------------------------------------------------------------------------------------------------------------|--------------------------------|-----------------------------------------------|
|                                           | 05 = 0.125 watt<br>07 = 0.25 watt<br>20 = 0.5 watt<br>32 = 1 watt | Solderable/<br>Weldable | First three digits are significant figures. Last digit specifies the number of zeros to follow. (3000 ohm illustrated.) | F = $\pm 1\%$<br>G = $\pm 2\%$ | M = 1%<br>P = 0.1%<br>R = 0.01%<br>S = 0.001% |

**DIMENSIONS** in inches [millimeters]


\*  $1.08 \pm 0.125$  [27.43  $\pm$  3.18] IF TAPE AND REEL

| MODEL  | A                                               | B                                      | C (Max.)         | D               | E                                      |
|--------|-------------------------------------------------|----------------------------------------|------------------|-----------------|----------------------------------------|
| ERL-05 | $0.150 \pm 0.020$<br>[3.81 $\pm$ 0.51]          | $0.066 \pm 0.008$<br>[1.68 $\pm$ 0.21] | 0.187<br>[4.75]  | 0.016<br>[0.41] | $1.25 \pm 0.266$<br>[31.75 $\pm$ 6.76] |
| ERL-07 | $0.250 + 0.031 - 0.046$<br>[6.35 + 0.79 - 1.17] | $0.090 \pm 0.008$<br>[2.29 $\pm$ 0.21] | 0.300<br>[7.62]  | 0.025<br>[0.64] | $1.50 \pm 0.125$<br>[38.10 $\pm$ 3.18] |
| ERL-20 | $0.375 \pm 0.041$<br>[9.53 $\pm$ 1.04]          | $0.138 \pm 0.023$<br>[3.51 $\pm$ 0.58] | 0.450<br>[11.43] | 0.032<br>[0.81] | $1.50 \pm 0.125$<br>[38.10 $\pm$ 3.18] |
| ERL-32 | $0.562 \pm 0.031$<br>[14.27 $\pm$ 0.79]         | $0.190 \pm 0.015$<br>[4.83 $\pm$ 0.38] | 0.625<br>[15.87] | 0.032<br>[0.81] | $1.50 \pm 0.125$<br>[38.10 $\pm$ 3.18] |

**MATERIAL SPECIFICATIONS**

|                 |                                      |                       |                                                                                                        |
|-----------------|--------------------------------------|-----------------------|--------------------------------------------------------------------------------------------------------|
| <b>Element:</b> | Vacuum-deposited nickel-chrome alloy | <b>Encapsulation:</b> | Specially formulated epoxy compound                                                                    |
| <b>Core:</b>    | Fire-cleaned high purity ceramic     | <b>Termination:</b>   | Standard lead material is solder-coated copper<br>Solderable and weldable per<br>MIL-STD-1276, Type C. |

**APPLICABLE MIL-SPECIFICATIONS**
**MIL-PRF-39017:**

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

**MIL-PRF-22684:**

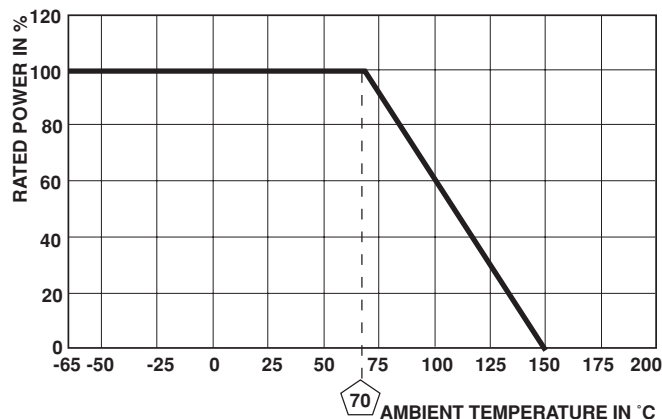
MIL-PRF-39017 supercedes MIL-PRF-22684 on new designs. The ERC series meet or exceed MIL-PRF-22684 requirements.

**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.

**POWER RATING**

Power ratings are based on the following two conditions:

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


**DERATING**
**MARKING**

— Per MIL-PRF-39017