

# Metal Film Resistors, Axial, Military/Established Reliability, MIL-PRF-55182 Qualified, Precision, Type RNC, Characteristics J, H, K



## FEATURES

- Meets requirements of MIL-PRF-55182
- Very low noise (-40 dB)
- Verified failure rate (contact factory for current level)
- 100 % stabilization and screening tests. Group A testing, if desired, to customer requirements
- Controlled temperature coefficient
- Epoxy coating provides superior moisture protection
- Standard lead on RNC product is solderable and weldable
- Traceability of materials and processing
- Monthly acceptance testing
- Vishay Dale has complete capability to develop specific reliability programs designed to customer requirements
- Extensive stocking program at distributors and factory on RNC50, RNC55, RNC60 and RNC65
- For MIL-PRF-55182 characteristics E and C product, see Vishay Angstrom's HDN (Military RNR/RNN) datasheet ([www.vishay.com/doc?66001](http://www.vishay.com/doc?66001))

## STANDARD ELECTRICAL SPECIFICATIONS

| GLOBAL MODEL                             | MIL-PRF-55182 STYLE | MIL SPEC. SHEET | POWER RATING<br>$P_{70^{\circ}\text{C}}$<br>W | POWER RATING<br>$P_{125^{\circ}\text{C}}$<br>W | TOLERANCE <sup>(4)</sup><br>$\pm$ % | MAXIMUM WORKING VOLTAGE <sup>(2)</sup><br>V | RESISTANCE RANGE<br>$\Omega$ | TEMPERATURE COEFFICIENT<br>$\pm$ ppm/ $^{\circ}\text{C}$ | LIFE FAILURE RATE <sup>(1)</sup> |
|------------------------------------------|---------------------|-----------------|-----------------------------------------------|------------------------------------------------|-------------------------------------|---------------------------------------------|------------------------------|----------------------------------------------------------|----------------------------------|
| ERC50,<br>ERC50..31 <sup>(3)</sup>       | RNC50, RNR50        | 07              | 0.10                                          | 0.05                                           | 0.1, 0.5, 1                         | 200                                         | 10 to 796K                   | 100 (K), 50 (H), 25 (J)                                  | M, P, R, S                       |
| ERC55,<br>ERC55..65 <sup>(3)</sup>       | RNC55, RNR55        | 01              | 0.125                                         | 0.10                                           | 0.1, 0.5, 1                         | 200                                         | 10 to 2M                     | 100 (K), 50 (H), 25 (J)                                  | M, P, R, S                       |
| ERC55..200,<br>ERC55..201 <sup>(3)</sup> | RNC60, RNR60        | 03              | 0.25                                          | 0.125                                          | 0.1, 0.5, 1                         | 250                                         | 10 to 2M                     | 100 (K), 50 (H), 25 (J)                                  | M, P, R, S                       |
|                                          |                     |                 |                                               |                                                |                                     |                                             | 2.01M to 3.01M               | 100 (K), 50 (H), 25 (J)                                  | M                                |
| ERC65,<br>ERC65..65 <sup>(3)</sup>       | RNC65, RNR65        | 05              | 0.50                                          | 0.25                                           | 0.1, 0.5, 1                         | 300                                         | 10 to 3.01M                  | 100 (K), 50 (H), 25 (J)                                  | M, P, R                          |
| ERC70<br>ERC70..4 <sup>(3)</sup>         | RNC70, RNR70        | 06              | 0.75                                          | 0.50                                           | 0.1, 0.5, 1                         | 350                                         | 10 to 3.01M                  | 100 (K), 50 (H), 25 (J)                                  | M, P, R                          |

### Notes

- (1) Consult factory for current QPL failure rates.
- (2) Continuous working voltage shall be  $\sqrt{P \times R}$  or maximum working voltage, whichever is less.
- (3) Hot solder dipped leads.
- (4) Tolerance of  $\pm 0.1$  % is not applicable to characteristics K.

## TECHNICAL SPECIFICATIONS

| PARAMETER                   | UNIT               | CONDITION                                                                               |
|-----------------------------|--------------------|-----------------------------------------------------------------------------------------|
| Voltage Coefficient, max.   | ppm/V              | 5/V when measured between 10 % and full rated voltage                                   |
| Dielectric Strength         | $V_{AC}$           | RNC50, RNC55 and RNC60 = 450; RNC65 and RNC70 = 900                                     |
| Insulations Resistance      | $\Omega$           | $\geq 10^{11}$ dry; $\geq 10^9$ after moisture test                                     |
| Operating Temperature Range | $^{\circ}\text{C}$ | -65 to +175                                                                             |
| Terminal Strength           | lb                 | 2 lb pull test on RNC50, RNC55, RNC60 and RNC65; 4.5 lb pull test on RNC70              |
| Solderability               |                    | Continuous satisfactory coverage when tested in accordance with MIL-STD-202, method 208 |
| Weight                      | g                  | RNC50 = 0.11; RNC55 = 0.35; RNC60 = 0.35; RNC65 = 0.84; RNC70 = 1.06                    |

**GLOBAL PART NUMBER INFORMATION**

New Global Part Numbering: RNC55H2152FRR36 (preferred part numbering format)

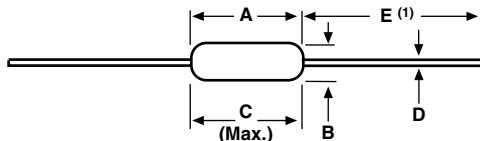
| MIL STYLE                                                                                                          | CHARACTERISTICS                                                                | RESISTANCE VALUE                                                                                                                                                                         | TOLERANCE CODE                                                           | FAILURE RATE                                                                                                | PACKAGING                                                                                                                                                                                                                                                                      | SPECIAL                                                                                                                                                                                                                                         |
|--------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>RNC</b> = solderable/weldable<br><b>RNR</b> = solderable only<br>(see Standard Electrical Specifications table) | <b>J</b> = $\pm 25$ ppm<br><b>H</b> = $\pm 50$ ppm<br><b>K</b> = $\pm 100$ ppm | 3 digit significant figure, followed by a multiplier<br>Use "R" for values < 100 $\Omega$<br><b>10R0</b> = 10 $\Omega$<br><b>2152</b> = 21.5 k $\Omega$<br><b>3014</b> = 3.01 M $\Omega$ | <b>B</b> = $\pm 0.1$ %<br><b>D</b> = $\pm 0.5$ %<br><b>F</b> = $\pm 1$ % | <b>M</b> = 1.0 %/1000 h<br><b>P</b> = 0.1 %/1000 h<br><b>R</b> = 0.01 %/1000 h<br><b>S</b> = 0.001 %/1000 h | <b>B14</b> = tin/lead, bulk<br><b>BSL</b> = tin/lead, bulk, single lot date code<br><b>R36</b> = tin/lead, T/R (full; 50, 55, 60)<br><b>R64</b> = tin/lead, T/R (full; 65, 70)<br><b>RE6</b> = tin/lead, T/R (1000 pieces)<br><b>RSL</b> = tin/lead, T/R, single lot date code | Blank = standard (Dash number) (Up to 3 digits)<br>From <b>1 to 999</b> as applicable<br><b>4</b> = hot solder dip (70's)<br><b>31</b> = hot solder dip (50's)<br><b>65</b> = hot solder dip (55's, 65's)<br><b>201</b> = hot solder dip (60's) |

Historical Part Number Example: RNC55H2152FR R36 (will continue to be accepted)

| RNC55     | H              | 2152             | F              | R            | R36       |
|-----------|----------------|------------------|----------------|--------------|-----------|
| MIL STYLE | CHARACTERISTIC | 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](http://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 | MIL-PRF-55182 STYLE | A                                                     | B                                      | C (MAX.)         | D                                      | E                                      |
|-------------------|---------------------|-------------------------------------------------------|----------------------------------------|------------------|----------------------------------------|----------------------------------------|
| ERC50             | RNC50, RNR50        | 0.150 $\pm$ 0.020<br>(3.81 $\pm$ 0.51)                | 0.070 $\pm$ 0.010<br>(1.78 $\pm$ 0.25) | 0.187<br>(4.75)  | 0.016 $\pm$ 0.002<br>(0.41 $\pm$ 0.05) | 1.25 $\pm$ 0.266<br>(31.75 $\pm$ 6.76) |
| ERC55             | RNC55, RNR55        | 0.250 $\pm$ 0.031 - 0.046<br>(6.35 $\pm$ 0.79 - 1.17) | 0.094 $\pm$ 0.012<br>(2.39 $\pm$ 0.30) | 0.300<br>(7.62)  | 0.025 $\pm$ 0.002<br>(0.64 $\pm$ 0.05) | 1.50 $\pm$ 0.125<br>(38.1 $\pm$ 3.18)  |
| ERC55..200        | RNC60, RNR60        | 0.280 $\pm$ 0.020<br>(7.11 $\pm$ 0.51)                | 0.097 $\pm$ 0.012<br>(2.46 $\pm$ 0.30) | 0.350<br>(8.89)  | 0.025 $\pm$ 0.002<br>(0.64 $\pm$ 0.05) | 1.50 $\pm$ 0.125<br>(38.1 $\pm$ 3.18)  |
| ERC65             | RNC65, RNR65        | 0.562 $\pm$ 0.031<br>(14.27 $\pm$ 0.79)               | 0.180 $\pm$ 0.015<br>(4.57 $\pm$ 0.38) | 0.687<br>(17.45) | 0.025 $\pm$ 0.002<br>(0.64 $\pm$ 0.05) | 1.50 $\pm$ 0.125<br>(38.1 $\pm$ 3.18)  |
| ERC70             | RNC70, RNR70        | 0.562 $\pm$ 0.031<br>(14.27 $\pm$ 0.79)               | 0.180 $\pm$ 0.015<br>(4.57 $\pm$ 0.38) | 0.687<br>(17.45) | 0.032 $\pm$ 0.002<br>(0.81 $\pm$ 0.05) | 1.50 $\pm$ 0.125<br>(38.1 $\pm$ 3.18)  |

**MATERIAL SPECIFICATIONS**

|                      |                                                                                                  |
|----------------------|--------------------------------------------------------------------------------------------------|
| <b>Element</b>       | Vacuum-deposited nickel-chrome alloy                                                             |
| <b>Core</b>          | Fire-cleaned high purity ceramic                                                                 |
| <b>Encapsulation</b> | Specially formulated epoxy compound                                                              |
| <b>Termination</b>   | 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:

- $\pm 2.0$  % maximum  $\Delta R$  in 10 000 h load life
- +175  $^{\circ}\text{C}$  maximum operating temperature

**APPLICABLE MIL-SPECIFICATIONS****MIL-PRF-55182:**

The ERC series meets the electrical, environmental and dimensional requirements of MIL-PRF-55182.

**MIL-R-10509:**

MIL-PRF-55182 supersedes MIL-R-10509 on new designs. The ERC series meets or exceeds MIL-R-10509 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**



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



## MARKING (per MIL-PRF-55182)

Characteristics: K = 100 ppm, H = 50 ppm, J = 25 ppm

Tolerance: F = 1 %, D = 0.5 %, B = 0.1 %

Value = three significant figures and multiplier

J = JAN (Joint Army - Navy) brand

RNC/RNR50, 55 (4 lines)

|      |                                                |
|------|------------------------------------------------|
| D    | Manufacturer's code                            |
| 210H | 3 digit date code and characteristic           |
| 1003 | Value                                          |
| FSCJ | Tolerance, failure rate, lead material and JAN |

RNC/RNR60, 65, 70 (5 lines)

|        |                                    |
|--------|------------------------------------|
| 91637  | CAGE code                          |
| 1213J  | 4 digit date code and JAN          |
| RNC60J | Style and characteristic           |
| 1211FS | Value, tolerance, and failure rate |
| 1209A  | Production lot code                |



## 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.