

# RNC60H2202BSB14 Datasheet



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|                              |   |
|------------------------------|---|
| DiGi Electronics Part Number | RNC60H2202BSB14-DG  |
| Manufacturer                 | <a href="#">Vishay Dale</a>   |
| Manufacturer Product Number  | RNC60H2202BSB14   |
| Description                  | RES 22K OHM 1/4W .1% AXIAL  |
| Detailed Description         | 22 kOhms $\pm$ 0.1% 0.25W, 1/4W Through Hole Resistor Axial Military, Moisture Resistant, Weldable Metal Film |

This model RNC60H2202BSB14 is available at DiGi Electronics.

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## Purchase and inquiry

Manufacturer Product Number:

RNC60H2202BSB14

Series:

Military, MIL-PRF-55182/03, RNC60

Resistance:

22 kOhms

Power (Watts):

0.25W, 1/4W

Features:

Military, Moisture Resistant, Weldable

Operating Temperature:

-65°C ~ 175°C

Supplier Device Package:

Axial

Height - Seated (Max):

-

Failure Rate:

S (0.001%)

Manufacturer:

Vishay Dale

Product Status:

Active

Tolerance:

±0.1%

Composition:

Metal Film

Temperature Coefficient:

±50ppm/°C

Package / Case:

Axial

Size / Dimension:

0.097" Dia x 0.280" L (2.46mm x 7.11mm)

Number of Terminations:

2

Base Product Number:

RNC60

## Environmental & Export classification

RoHS Status:

RoHS non-compliant

ECCN:

EAR99

Moisture Sensitivity Level (MSL):

Not Applicable

HTSUS:

8533.21.0090



## 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>± % | MAXIMUM WORKING VOLTAGE <sup>(2)</sup><br>V | RESISTANCE RANGE<br>Ω | TEMPERATURE COEFFICIENT<br>± ppm/°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

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

### TECHNICAL SPECIFICATIONS

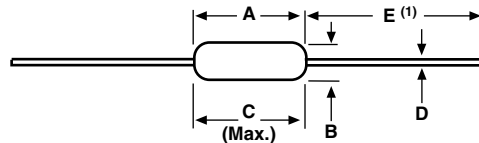
| PARAMETER                   | UNIT     | CONDITION   |
|-----------------------------|----------|---|
| Voltage Coefficient, max.   | ppm/V    | 5/V when measured between 10 % and full rated voltage                                   |
| Dielectric Strength         | $V_{AC}$ | RNC50, RNC55 and RNC60 = 450; RNC65 and RNC70 = 900                                     |
| Insulations Resistance      | Ω        | ≥ 10 <sup>11</sup> dry; ≥ 10 <sup>9</sup> after moisture test                           |
| Operating Temperature Range | °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)                           |   |   |   |   |   |  |   |   |   |   |   |   |   |   |  |  |  |
| R  | N   | C   | 5                                       | 5 | H   | 2  | 1 | 5   | 2 | F | R | R | 3 | 6 |  |  |  |
| MIL STYLE  | CHARACTERISTICS                               | RESISTANCE VALUE  | TOLERANCE CODE                          |   | FAILURE RATE  | PACKAGING  |   | SPECIAL   |   |   |   |   |   |   |  |  |  |
| RNC = solderable / weldable<br>RNR = solderable only<br>(see Standard Electrical Specifications table) | J = ± 25 ppm<br>H = ± 50 ppm<br>K = ± 100 ppm | 3 digit significant figure, followed by a multiplier<br>Use "R" for values < 100 Ω<br>10R0 = 10 Ω<br>2152 = 21.5 kΩ<br>3014 = 3.01 MΩ | B = ± 0.1 %<br>D = ± 0.5 %<br>F = ± 1 % |   | M = 1.0 % / 1000 h<br>P = 0.1 % / 1000 h<br>R = 0.01 % / 1000 h<br>S = 0.001 % / 1000 h | B14 = tin / lead, bulk<br>BSL = tin / lead, bulk, single lot date code<br>R36 = tin / lead, T/R (full; 50, 55, 60)<br>R64 = tin / lead, T/R (full; 65, 70)<br>RE6 = tin / lead, T/R (1000 pieces)<br>RSL = tin / lead, T/R, single lot date code |   | Blank = standard (Dash number) (Up to 3 digits) From 1 to 999 as applicable<br>4 = hot solder dip (70's)<br>31 = hot solder dip (50's)<br>65 = hot solder dip (55's, 65's)<br>201 = 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,<br>RNR50     | 0.150 ± 0.020<br>(3.81 ± 0.51)                | 0.070 ± 0.010<br>(1.78 ± 0.25) | 0.187<br>(4.75)  | 0.016 ± 0.002<br>(0.41 ± 0.05) | 1.25 ± 0.266<br>(31.75 ± 6.76) |
| ERC55             | RNC55,<br>RNR55     | 0.250 + 0.031 - 0.046<br>(6.35 + 0.79 - 1.17) | 0.094 ± 0.012<br>(2.39 ± 0.30) | 0.379<br>(9.62)  | 0.025 ± 0.002<br>(0.64 ± 0.05) | 1.50 ± 0.125<br>(38.1 ± 3.18)  |
| ERC55..200        | RNC60,<br>RNR60     | 0.280 ± 0.020<br>(7.11 ± 0.51)                | 0.097 ± 0.012<br>(2.46 ± 0.30) | 0.350<br>(8.89)  | 0.025 ± 0.002<br>(0.64 ± 0.05) | 1.50 ± 0.125<br>(38.1 ± 3.18)  |
| ERC65             | RNC65,<br>RNR65     | 0.562 ± 0.031<br>(14.27 ± 0.79)               | 0.180 ± 0.015<br>(4.57 ± 0.38) | 0.687<br>(17.45) | 0.025 ± 0.002<br>(0.64 ± 0.05) | 1.50 ± 0.125<br>(38.1 ± 3.18)  |
| ERC70             | RNC70,<br>RNR70     | 0.562 ± 0.031<br>(14.27 ± 0.79)               | 0.180 ± 0.015<br>(4.57 ± 0.38) | 0.687<br>(17.45) | 0.032 ± 0.002<br>(0.81 ± 0.05) | 1.50 ± 0.125<br>(38.1 ± 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  $\Delta R$  in 10 000 h load life
- +175 °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.

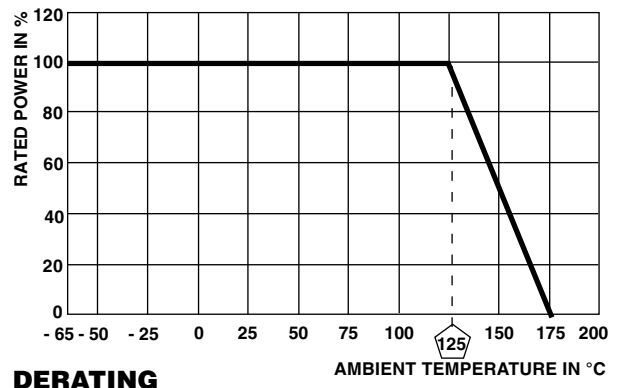
**CAGE CODE: 91637**


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## ERC (Military RNC/RNR)

Vishay Dale

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                |



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