

Vitreous Wirewound Power Resistors



FEATURES

- High dissipation
- Embedded collars
- Insulated mounting
- Applicable standard: NFC 93214
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912


RoHS
COMPLIANT

STANDARD ELECTRICAL SPECIFICATIONS

| GLOBAL MODEL | POWER RATING W | RESISTANCE RANGE Ω | TOLERANCE ± % | U _{LIM.} V |
|--------------|-------------------|-----------------------|------------------|------------------------|
| VNC 30 x 250 | 320 | 4.7 to 470K | 5 | 3000 |
| VNC 30 x 153 | 200 | 3.3 to 330K | 5 | 1700 |
| VNC 25 x 168 | 180 | 2.7 to 270K | 5 | 1900 |
| VNC 25 x 138 | 145 | 2.7 to 220K | 5 | 1400 |
| VNC 25 x 110 | 120 | 2.7 to 220K | 5 | 1000 |
| VNC 25 x 84 | 85 | 2.2 to 150K | 5 | 650 |
| VNC 20 x 265 | 230 | 3.9 to 390K | 5 | 3000 |
| VNC 20 x 165 | 140 | 2.7 to 270K | 5 | 1700 |
| VNC 20 x 140 | 120 | 2.2 to 220K | 5 | 1400 |
| VNC 20 x 117 | 90 | 1.8 to 220K | 5 | 1100 |
| VNC 20 x 102 | 85 | 1.2 to 180K | 5 | 950 |
| VNC 20 x 90 | 70 | 1.0 to 120K | 5 | 900 |
| VNC 16 x 94 | 55 | 2.2 to 68K | 5 | 900 |
| VNC 16 x 70 | 45 | 2.2 to 100K | 5 | 650 |
| VNC 13 x 70 | 35 | 1.8 to 56K | 5 | 650 |
| VNC 12 x 102 | 50 | 1.5 to 100K | 5 | 950 |
| VNC 12 x 76 | 40 | 1.0 to 82K | 5 | 700 |
| VNC 12 x 51 | 25 | 1.0 to 56K | 5 | 450 |
| VNC 12 x 38 | 18 | 1.0 to 33K | 5 | 350 |
| VNC 10 x 52 | 22 | 1.0 to 39K | 5 | 450 |
| VNC 10 x 44 | 18 | 1.0 to 33K | 5 | 400 |
| VNC 8 x 45 | 15 | 1.0 to 27K | 5 | 400 |

NFC 93214 CHARACTERISTICS

| GLOBAL MODEL | P _n W | RESISTANCE RANGE Ω |
|---------------------|---------------------|-----------------------|
| VN 30 x 153 (RB 37) | 113 | 3.3 to 27K/82K |
| VN 20 x 102 (RB 35) | 55 | 1.2 to 12K/39K |
| VN 12 x 76 (RB 33) | 26 | 1.0 to 5.6K/18K |
| VN 12 x 51 | 22 | - |
| VN 12 x 38 (RB 31) | 14 | 1.0 to 2K/6.2K |
| VN 10 x 44 | 10 | - |

Note

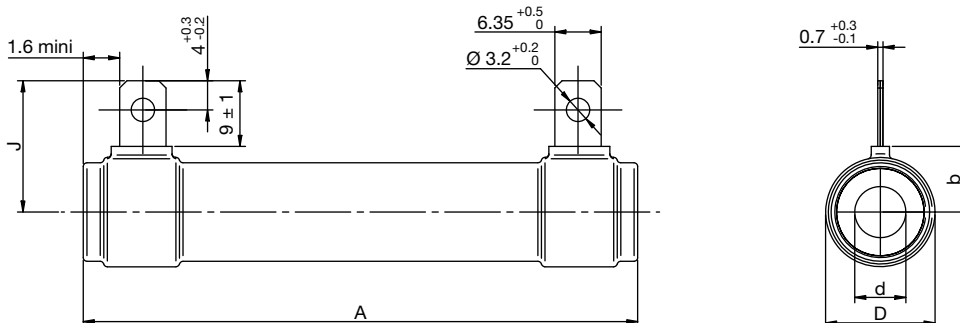
- Resistance maximum value: normal limits for wire with diameter of: 63 μ/38 μ minimum.

TECHNICAL SPECIFICATIONS

| PARAMETER | UNIT | RESISTOR CHARACTERISTICS |
|-----------------------------|--------|--------------------------|
| Temperature coefficient | ppm/°C | 75 ppm/°C (typical) |
| Operating temperature range | °C | -55 to +450 |

GENERAL CHARACTERISTICS

| | |
|-------------------------|-----------------|
| Core | Ceramic |
| Winding | NiCr alloy |
| Coating | Vitreous enamel |
| Ohmic values | E12 |
| Insulated mounting (PS) | On request |

DIMENSIONS in millimeters AND WEIGHT in g


| TYPE | 30 x 250 | 30 x 153 | 25 x 168 | 25 x 138 | 25 x 110 | 25 x 84 | 20 x 265 | 20 x 165 | 20 x 140 | 20 x 117 | 20 x 102 |
|--------|----------|-------------|-----------|-----------|-----------|-----------|----------|----------|----------|----------|-------------|
| A | 250 ± 2 | 152.5 ± 1.5 | 168 ± 2 | 138 ± 2 | 110 ± 2 | 84 ± 2 | 265 ± 2 | 163 ± 2 | 140 ± 2 | 117 ± 2 | 101.5 ± 1.5 |
| b max. | 18.3 | 18.3 | 15.8 | 15.8 | 15.8 | 15.8 | 13.2 | 13.2 | 13.2 | 13.2 | 13.2 |
| D max. | 33 | 33 | 28 | 28 | 28 | 28 | 23 | 23 | 23 | 23 | 23 |
| d | 20 ± 0.4 | 20 ± 0.4 | 17 ± 0.35 | 17 ± 0.35 | 17 ± 0.35 | 17 ± 0.35 | 12 ± 0.5 | 12 ± 0.5 | 12 ± 0.5 | 12 ± 0.5 | 12 ± 0.5 |
| J max. | 31 | 31 | 28 | 28 | 28 | 28 | 24 | 24 | 24 | 24 | 24 |
| Mass | 300 | 200 | 180 | 130 | 100 | 70 | 220 | 135 | 115 | 80 | 70 |

| TYPE | 20 x 90 | 16 x 94 | 16 x 70 | 13 x 70 | 12 x 102 | 12 x 76 | 12 x 51 | 12 x 38 | 10 x 52 | 10 x 44 | 8 x 45 |
|--------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| A | 88 ± 1.5 | 94 ± 2 | 70 ± 1.5 | 70 ± 1.5 | 100 ± 2 | 76 ± 1.5 | 50 ± 1 | 38 ± 1.5 | 52 ± 1 | 44 ± 0.9 | 45 ± 1 |
| b max. | 13.2 | 11.2 | 11.2 | 9.7 | 9.2 | 9.2 | 9.2 | 9.2 | 9.2 | 8.2 | 7.2 |
| D max. | 23 | 19 | 19 | 16 | 15 | 15 | 15 | 15 | 13 | 13 | 11 |
| d | 12 ± 0.5 | 10 ± 0.3 | 10 ± 0.3 | 7 ± 0.21 | 7 ± 0.21 | 7 ± 0.21 | 7 ± 0.21 | 7 ± 0.21 | 6 ± 0.18 | 6 ± 0.18 | 5 ± 0.15 |
| J max. | 24 | 22 | 22 | 20 | 19 | 19 | 19 | 19 | 18 | 18 | 17 |
| Mass | 70 | 35 | 25 | 22 | 27 | 20 | 15 | 10 | 12 | 10 | 8 |

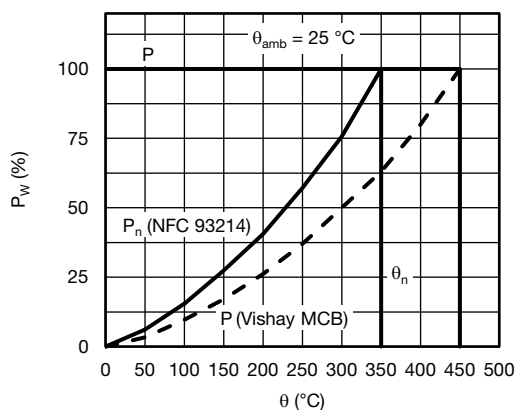
SPECIFIC NON-INDUCTIVE “A” VNC MODEL CHARACTERISTICS

| TYPE | 30 x 250A | 30 x 153A | 25 x 168A | 25 x 138A | 25 x 110A | 25 x 84A | 20 x 265A | 20 x 165A | 20 x 140A | 20 x 117A | 20 x 102A |
|-------------------|-----------|-----------|-----------|-----------|-----------|----------|-----------|-----------|-----------|-----------|-----------|
| R _{min.} | 4.7 Ω | 3.3 Ω | 2.7 Ω | 2.7 Ω | 2.7 Ω | 2.2 Ω | 3.9 Ω | 2.7 Ω | 2.2 Ω | 1.8 Ω | 1.2 Ω |
| R _{max.} | 1.2 kΩ | 680 Ω | 820 Ω | 560 Ω | 470 Ω | 330 Ω | 1.2 kΩ | 820 Ω | 560 Ω | 470 Ω | 390 Ω |

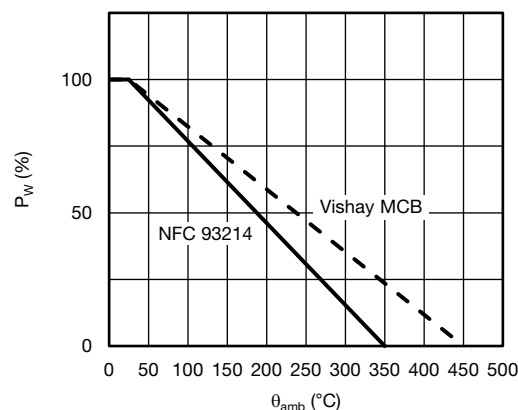
| TYPE | 20 x 90A | 16 x 94A | 16 x 70A | 13 x 70A | 12 x 102A | 12 x 76A | 12 x 51A | 12 x 38A | 10 x 52A | 10 x 44A | 8 x 45A |
|-------------------|----------|----------|----------|----------|-----------|----------|----------|----------|----------|----------|---------|
| R _{min.} | 1.0 Ω | 2.2 Ω | 2.2 Ω | 1.8 Ω | 1.5 Ω | 1.0 Ω | 1.0 Ω | 1.0 Ω | 1.0 Ω | 1.0 Ω | 1.0 Ω |
| R _{max.} | 330 Ω | 330 Ω | 270 Ω | 270 Ω | 470 Ω | 270 Ω | 150 Ω | 100 Ω | 150 Ω | 120 Ω | 120 Ω |

| PERFORMANCES | | | |
|-----------------------|--|--------------------------------|----------------|
| TESTS | CONDITIONS | NFC 93214 REQUIREMENTS | TYPICAL VALUES |
| Overloads | 10 P _n (temp. nom.), 5 s | 3 % or 0.05 Ω ⁽¹⁾ | 0.4 % |
| Climatic | -55 °C, 5 cycles, +200 °C | 3 % or 0.05 Ω ⁽¹⁾ | 0.2 % |
| Damp heat | 56 days 95 % HR | 2 % or 0.05 Ω ⁽¹⁾ | 0.1 % |
| Thermal shocks | P _n -55 °C | 2 % or 0.05 Ω ⁽¹⁾ | 0.2 % |
| Shocks | Severity 50 A | 0.5 % or 0.05 Ω ⁽¹⁾ | 0.25 % |
| Vibrations | Severity 55/10 | 0.5 % or 0.05 Ω ⁽¹⁾ | 0.25 % |
| Strength of terminals | 40 N collar | 1 % or 0.05 Ω ⁽¹⁾ | 0.1 % |
| Endurance | 500 cycles P _n 90 min / 30 min | 5 % | 1 % |

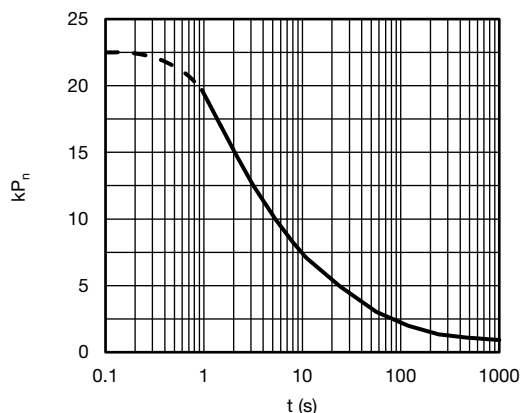
Note
⁽¹⁾ The higher of either value.

DISSIPATION


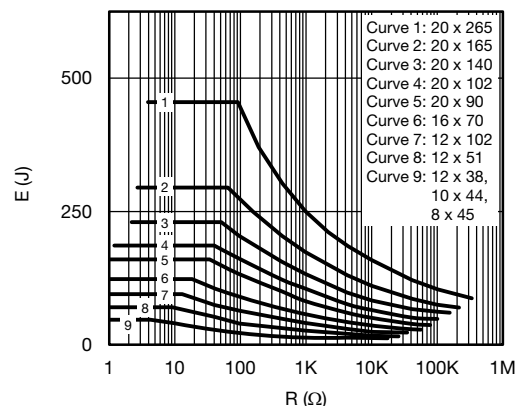
Power P_w as a Function of Surface Temperature
P(W) = f (Temperature Surface)



Derating in Power as a Function
of Ambient Temperature

OVERLOADS


Intermittent Overloads
Exceptional Operation
Initial Temperature < 70 °C
k × P_n = f(t)

PERMISSIBLE ENERGY


Repetitive Operation
Energy as a Function of R_n
Pulse Duration < 100 ms
E = f(R)

**OPTIONS** (Consult us)

- Other values than E12 series
- Intermediate terminals

ORDERING INFORMATION

| VNC | 30 x 250 | A | 10K | ± 5 % | XXX | BO4 |
|-------|----------|-----------------------------------|------------------|--|---|-----------|
| MODEL | STYLE | NON-INDUCTIVE WINDING Optional | RESISTANCE VALUE | TOLERANCE ± 5 % ± 10 % Other on request | CUSTOM DESIGN Optional On request: special value, tolerance, terminals, etc. | PACKAGING |

GLOBAL PART NUMBER INFORMATION

| | | | | | | | | | | | | | | | | | |
|--------------|---|---------------------------|---|---------------------|---|-----------------------------------|---|---|---|---|---|---|---|---|---|---|---|
| V | N | C | 2 | 0 | 2 | 6 | 5 | A | 4 | 7 | R | 0 | J | B | 2 | 4 | 7 |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | | | | | | | | | | | |
| PRODUCT TYPE | SIZE | OPTION (if applicable) | RESISTANCE VALUE | TOLERANCE | PACKAGING | INDUSTRIALIZATION NUMBER | | | | | | | | | | | |
| VNC | 08045 10044 10052 12038 12051 12076 12102 13070 16070 16094 20090 20102 20117 20140 20165 20265 25084 25110 25138 25168 30153 30250 42362 | A = non-inductive winding | The first three digits are significant figures and the last specifies the number of zeros to follow, R designates decimal point. 4702 = 47 kΩ 47R0 = 47 Ω | J = 5 % K = 10 % | B = box Box quantity depends of model and size | 3 specific digits (if applicable) | | | | | | | | | | | |

EXAMPLES

| MODEL | DESCRIPTION | PART NUMBER |
|-------|-------------------------------|--------------------|
| VNC | VNC 30X250 A 500U 5 % 999 BO4 | VNC30250A5000JB999 |
| VNC | VNC 25X168 100U 5 % BO5 | VNC251681000JB |



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.

Hyperlinks included in this datasheet may direct users to third-party websites. These links are provided as a convenience and for informational purposes only. Inclusion of these hyperlinks does not constitute an endorsement or an approval by Vishay of any of the products, services or opinions of the corporation, organization or individual associated with the third-party website. Vishay disclaims any and all liability and bears no responsibility for the accuracy, legality or content of the third-party website or for that of subsequent links.

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.