



# Wirewound Resistors, Miniature, Industrial, Precision Power, Silicone Coated, Axial Lead



## Note

\* This datasheet provides information about parts that are RoHS-compliant and / or parts that are non-RoHS-compliant. For example, parts with lead (Pb) terminations are not RoHS-compliant. Please see the information / tables in this datasheet for details.

## FEATURES

- From 1.4 to 4 times higher power ratings than conventional resistors of equivalent size
- High temperature coating (> 350 °C)
- Complete welded construction
- Meets applicable requirements of MIL-PRF-26
- Available in non-inductive styles (type GN) with Ayrton-Perry winding for lowest reactive components
- Excellent stability in operation (typical resistance shift < 0.5 %)
- MIL-PRF-26 qualified, type RW resistors can be found at: [www.vishay.com/doc?30281](http://www.vishay.com/doc?30281)
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS\***  
Available

**HALOGEN FREE**  
Available

**GREEN**  
(5-2008)  
Available

## STANDARD ELECTRICAL SPECIFICATIONS

| GLOBAL MODEL | HIST. MODEL | POWER RATING <sup>(1)</sup><br>$P_{25^{\circ}\text{C}}$ W<br>$U \pm 0.05\%$<br>to $\pm 5\%$ | POWER RATING <sup>(1)</sup><br>$P_{25^{\circ}\text{C}}$ W<br>$V \pm 3\%$<br>to $\pm 5\%$ | RESISTANCE RANGE $\Omega$<br>$\pm 0.05\%$ | RESISTANCE RANGE $\Omega$<br>$\pm 0.1\%$ | RESISTANCE RANGE $\Omega$<br>$\pm 0.25\%$ | RESISTANCE RANGE $\Omega$<br>$\pm 0.5\%, \pm 1\%,$<br>$\pm 3\%, \pm 5\%$ | WEIGHT (typical) g |
|--------------|-------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|-------------------------------------------|------------------------------------------|-------------------------------------------|--------------------------------------------------------------------------|--------------------|
| G001...80    | G-1-80      | 1.0                                                                                         | -                                                                                        | 1.0 to 1K                                 | 0.499 to 1K                              | 0.499 to 3.4K                             | 0.1 to 3.4K                                                              | 0.20               |
| G001...380   | G-1-380     | 1.0                                                                                         | -                                                                                        | -                                         | 0.499 to 1K                              | 0.499 to 1K                               | 0.1 to 1K                                                                | 0.20               |
| G002         | G-2         | 1.5                                                                                         | -                                                                                        | 1.0 to 1.3K                               | 0.499 to 1.3K                            | 0.499 to 4.9K                             | 0.1 to 4.9K                                                              | 0.21               |
| G003...80    | G-3-80      | 2.0                                                                                         | -                                                                                        | 1.0 to 2.74K                              | 0.499 to 2.74K                           | 0.499 to 10.4K                            | 0.1 to 10.4K                                                             | 0.34               |
| G003...380   | G-3-380     | 2.0                                                                                         | -                                                                                        | -                                         | 0.499 to 2.74K                           | 0.499 to 2.74K                            | 0.1 to 2.74K                                                             | 0.34               |
| G005         | G-5         | 4.0                                                                                         | 5.0                                                                                      | 0.499 to 6.5K                             | 0.499 to 6.5K                            | 0.1 to 24.5K                              | 0.1 to 24.5K                                                             | 0.80               |
| G05C         | G-5C        | 5.0                                                                                         | 7.0                                                                                      | 0.499 to 8.6K                             | 0.499 to 8.6K                            | 0.1 to 32.3K                              | 0.1 to 32.3K                                                             | 1.20               |
| G010         | G-10        | 7.0                                                                                         | 10.0                                                                                     | 0.499 to 25.7K                            | 0.499 to 25.7K                           | 0.1 to 95.2K                              | 0.1 to 95.2K                                                             | 3.60               |

## Notes

- G002, G005, G05C, and G010: Core consists of beryllium oxide ceramic
- Models not available as lead (Pb)-free: G001...380 and G003...380
- Shaded area indicates most popular models
- (1) Vishay Dale G models have two power ratings depending on operation temperature and stability requirements. Models not available for characteristic V are: G001...80, G001...380, G002, G003...80, and G003...380

## TECHNICAL SPECIFICATIONS

| PARAMETER                   | UNIT     | G RESISTOR CHARACTERISTICS                                                                                                                                                                                     |
|-----------------------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Temperature Coefficient     | ppm/°C   | $\pm 20$ for 10 $\Omega$ and above; $\pm 50$ for 1 $\Omega$ to 9.9 $\Omega$ ; $\pm 90$ for 0.5 $\Omega$ to 0.99 $\Omega$                                                                                       |
| Maximum Working Voltage     | V        | $(P \times R)^{1/2}$                                                                                                                                                                                           |
| Insulation Resistance       | $\Omega$ | 1000 M $\Omega$ minimum dry, 100 M $\Omega$ minimum after moisture test                                                                                                                                        |
| Terminal Strength           | lb       | 5 minimum for G001...80 thru G003...380, 10 minimum for all others                                                                                                                                             |
| Operating Temperature Range | °C       | Characteristic U = -65 to +250, characteristic V = -65 to +350                                                                                                                                                 |
| Power Rating                | -        | Characteristic U = +250 °C max. hot spot temperature, $\pm 0.5\%$ max. $\Delta R$ in 2000 h load life<br>Characteristic V = +350 °C max. hot spot temperature, $\pm 3.0\%$ max. $\Delta R$ in 2000 h load life |

## GLOBAL PART NUMBER INFORMATION

Global Part Numbering example: G00310R00FS7080

G 0 0 3 1 0 R 0 0 F S 7 0 8 0

| GLOBAL MODEL<br>(4 or 5 digits)                                          | RESISTANCE VALUE<br>(5 digits)                                              | TOLERANCE CODE<br>(1 digit)                                                                             | PACKAGING<br>(3 digits)                                                                                                                                                                                                                                  | SPECIAL<br>(up to 3 digits)               |
|--------------------------------------------------------------------------|-----------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|
| (See Standard Electrical Specifications Global Model column for options) | R = Decimal<br>K = Thousand<br>15R00 = 15 $\Omega$<br>10K00 = 10 k $\Omega$ | A = 0.05 %<br>B = 0.1 %<br>C = 0.25 %<br>D = 0.5 %<br>F = 1.0 %<br>H = 3.0 %<br>J = 5.0 %<br>K = 10.0 % | E70 = Lead (Pb)-free, tape/reel (smaller than G010)<br>E73 = Lead (Pb)-free, tape/reel (500 pieces)<br>E12 = Lead (Pb)-free, bulk<br><br>S70 = Tin/lead, tape/reel (smaller than G010)<br>S73 = Tin/lead, tape/reel (500 pieces)<br>B12 = Tin/lead, bulk | (Dash Number) From 1 to 999 as applicable |

Historical Part Numbering example: G-3-80 10  $\Omega$  1 % S70

|                  |                  |                |           |
|------------------|------------------|----------------|-----------|
| G-3-80           | 10 $\Omega$      | 1 %            | S70       |
| HISTORICAL MODEL | RESISTANCE VALUE | TOLERANCE CODE | PACKAGING |

**DIMENSIONS** in inches [millimeters]


| GLOBAL MODEL            | DIMENSIONS in inches [millimeters] |                         |                                                 |                                  |
|-------------------------|------------------------------------|-------------------------|-------------------------------------------------|----------------------------------|
|                         | L                                  | L <sub>1</sub> max. (2) | C                                               | D                                |
| G001...80<br>G001...380 | 0.250 ± 0.031<br>[6.35 ± 0.787]    | 0.281<br>[7.14]         | 0.085 ± 0.020<br>[2.16 ± 0.508]                 | 0.020 ± 0.002<br>[0.508 ± 0.051] |
| G002                    | 0.312 ± 0.016<br>[7.92 ± 0.406]    | 0.328<br>[8.33]         | 0.078 ± 0.016 - 0.031<br>[1.98 ± 0.406 - 0.787] | 0.020 ± 0.002<br>[0.508 ± 0.051] |
| G003...80<br>G003...380 | 0.406 ± 0.031<br>[10.31 ± 0.787]   | 0.437<br>[11.10]        | 0.094 ± 0.031<br>[2.39 ± 0.787]                 | 0.020 ± 0.002<br>[0.508 ± 0.051] |
| G005                    | 0.562 ± 0.062<br>[14.27 ± 1.57]    | 0.622<br>[15.80]        | 0.188 ± 0.032<br>[4.78 ± 0.813]                 | 0.032 ± 0.002<br>[0.813 ± 0.051] |
| G05C                    | 0.500 ± 0.062<br>[12.70 ± 1.57]    | 0.593<br>[15.06]        | 0.218 ± 0.032<br>[5.54 ± 0.813]                 | 0.040 ± 0.002<br>[1.02 ± 0.051]  |
| G010                    | 0.875 ± 0.062<br>[22.23 ± 1.57]    | 1.0<br>[25.4]           | 0.312 ± 0.032<br>[7.92 ± 0.813]                 | 0.040 ± 0.002<br>[1.02 ± 0.051]  |

**Notes**

(1) On some standard reel pack methods, the leads may be trimmed to a shorter length than shown

(2) L<sub>1</sub> max. dimension is clean lead to clean lead

**MATERIAL SPECIFICATIONS**
**Element:** Copper-nickel alloy or nickel-chrome alloy, depending on resistance value

**Core:** Ceramic, beryllium oxide or alumina, depending on resistor model

**Coating:** Special high temperature silicone

**Standard Terminals:** 100 % Sn, or 60/40 Sn/Pb coated Copperweld®

**End Caps:** Stainless steel

**Part Marking:** DALE, model, wattage (3), value, tolerance, date code

**Note**

(3) Wattage marked on part will be "U" characteristic

**GN NON-INDUCTIVE**

Models of equivalent physical and electrical specifications are available with non-inductive (Ayrtton-Perry) winding. They are identified by inserting the letter N after G in the model number (GN005, for example). Two conditions apply:

1. For GN models, divide maximum resistance values by two
2. Body O.D. on GN05C may exceed that of the G05C by 0.010"

**DERATING**

**TERMINATION**

When G resistors will be operated at full rated power, resistance welding or high temperature solder are the recommended termination methods. Termination should be made within 1/2" from end of resistor body.

| PERFORMANCE                     |                                                                                                                              |                       |                       |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------|-----------------------|-----------------------|
| TEST                            | CONDITIONS OF TEST                                                                                                           | TEST LIMITS           |                       |
|                                 |                                                                                                                              | CHARACTERISTIC U      | CHARACTERISTIC V      |
| Thermal Shock                   | Rated power applied until thermally stable, then a min. of 15 min at -55 °C                                                  | ± (0.2 % + 0.05 Ω) ΔR | ± (2.0 % + 0.05 Ω) ΔR |
| Short Time Overload             | 5x power (G001...80 thru G05C), 10 x power (G010) for 5 s                                                                    | ± (0.2 % + 0.05 Ω) ΔR | ± (2.0 % + 0.05 Ω) ΔR |
| Dielectric Withstanding Voltage | 500 V <sub>RMS</sub> minimum for G001...80 thru G003...380, 1000 V <sub>RMS</sub> minimum for all others, duration of 1 min  | ± (0.1 % + 0.05 Ω) ΔR | ± (0.1 % + 0.05 Ω) ΔR |
| Low Temperature Storage         | -65 °C for 24 h                                                                                                              | ± (0.2 % + 0.05 Ω) ΔR | ± (2.0 % + 0.05 Ω) ΔR |
| High Temperature Exposure       | 250 h at +250 °C (characteristic U)                                                                                          | ± (0.5 % + 0.05 Ω) ΔR | ± (2.0 % + 0.05 Ω) ΔR |
| Moisture Resistance             | MIL-STD-202 Method 106, 7b not applicable                                                                                    | ± (0.2 % + 0.05 Ω) ΔR | ± (2.0 % + 0.05 Ω) ΔR |
| Shock, Specified Pulse          | MIL-STD-202 Method 213, 100 g's for 6 ms, 10 shocks                                                                          | ± (0.1 % + 0.05 Ω) ΔR | ± (0.2 % + 0.05 Ω) ΔR |
| Vibration, High Frequency       | Frequency varied 10 Hz to 2000 Hz, 20 g peak, 2 directions 6 h each                                                          | ± (0.1 % + 0.05 Ω) ΔR | ± (0.2 % + 0.05 Ω) ΔR |
| Load Life                       | 2000 h at rated power, +25 °C, 1.5 h "ON", 0.5 h "OFF"                                                                       | ± (0.5 % + 0.05 Ω) ΔR | ± (3.0 % + 0.05 Ω) ΔR |
| Terminal Strength               | Pull test -5 s to 10 s, 5 lb (G001...80 thru G05C), 10 lb for all others; torsion test - 3 alternating directions, 360° each | ± (0.1 % + 0.05 Ω) ΔR | ± (1.0 % + 0.05 Ω) ΔR |



## 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.

## Material Category Policy

**Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as RoHS-Compliant fulfill the definitions and restrictions defined under Directive 2011/65/EU of The European Parliament and of the Council of June 8, 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (EEE) - recast, unless otherwise specified as non-compliant.**

**Please note that some Vishay documentation may still make reference to RoHS Directive 2002/95/EC. We confirm that all the products identified as being compliant to Directive 2002/95/EC conform to Directive 2011/65/EU.**

**Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as Halogen-Free follow Halogen-Free requirements as per JEDEC JS709A standards. Please note that some Vishay documentation may still make reference to the IEC 61249-2-21 definition. We confirm that all the products identified as being compliant to IEC 61249-2-21 conform to JEDEC JS709A standards.**