

High Precision Foil Resistor with TCR of ± 2.0 ppm/°C, Tolerance of ± 0.01 % and Load Life Stability of ± 0.005 % CECC Qualified



INTRODUCTION

Bulk Metal® Foil (BMF) technology outperforms all other resistor technologies available today for applications that require high precision and high stability.

This technology has been pioneered and developed by VISHAY, and products based on this technology are the most suitable for a wide range of applications. BMF technology allows us to produce customer orientated products, designed to satisfy challenging and specific technical requirements.

Models RS92N, RS92NA, and AN made from BMF offers low TCR, excellent load life stability, tight tolerance, fast response time, low current noise, low thermal EMF and low voltage coefficient, all in one resistor.

The RS92N, RS92NA, and AN are virtually insensitive to destabilizing factors. The resistor element is a solid alloy that displays the desirable bulk properties of its parent material, thus it is inherently stable and noise free.

Vishay's Bulk Metal® RS92N, RS92NA, and AN resistors are the modern generation of precision resistors. The standard design of these resistors provides a unique combination of characteristics found in no other single resistor.

Our Application Engineering Department is available to advise and to make recommendations. For non-standard technical requirements and special applications, please contact us.

FEATURES

- Temperature coefficient of resistance (TCR): ± 2 ppm/°C typical (- 55 °C to + 155 °C, ref. + 20 °C)
- Resistance range: 80.6 Ω to 120 k Ω
- Foil resistors are not restricted to standard values; specific "as required" values can be supplied at no extra cost or delivery (e.g. 1K2345 vs. 1K)
- Rated power: to 0.25 W at + 125 °C
- Tolerance: ± 0.01 %
- Load life stability: to ± 0.005 % at 70 °C, 2000 h at rated power
- Electrostatic discharge up to 25 000 V
- Non inductive, non capacitive design
- Rise time: 1 ns effectively no ringing
- Current noise: < - 40 dB
- Thermal EMF: 0.05 μ V/°C typical
- Voltage coefficient: < 0.1 ppm/V
- Low inductance: < 0.08 μ H typical
- Non hot spot design
- Terminal finish available: tin/lead alloy
- Matched sets are available per request (TCR Tracking: to 0.5 ppm/°C)
- For better TCR and PCR performances please review the [RNC90Z](#) and [Z555](#) datasheets

TABLE 1 - TOLERANCE AND TCR VS. RESISTANCE VALUE (- 55 °C to + 155 °C, + 20 °C Ref.)

| RESISTANCE VALUE (Ω) | TOLERANCE (%) | TYPICAL TCR AND MAX. SPREAD (ppm/°C) |
|----------------------------------|------------------|---|
| 80.6 to 120K | ± 0.01 | $\pm 2 \pm 3$ |

TABLE 2 - MECHANICAL AND ENVIRONMENTAL SPECIFICATIONS

| | |
|-----------------------|---------------------|
| Mechanical Protection | Insulated case |
| Resistive Element | Nickel-chromium |
| Unit Weight | 0.3 g |
| Temperature Limits | - 55 °C to + 155 °C |
| Climatic Category | 55/155/56 |

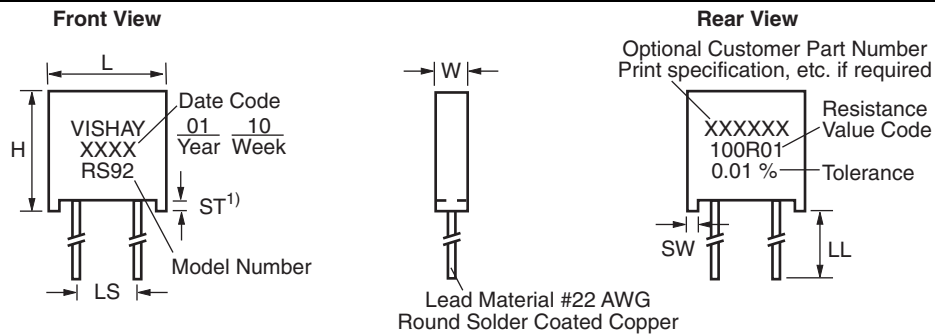
TABLE 3 - ELECTRICAL SPECIFICATIONS

| | | |
|-------------------------|---------------|---|
| Qualified Ohmic Range | RS92N, RS92NA | 80R6 to 120K |
| | AN | 80R6 to 92K |
| Qualified Tolerances | | 0.01 % to 1 % |
| Power Rating | | 0.5 W at +70 °C 0.25 W at + 125 °C |
| Temperature Coefficient | | see diagram |
| Dielectric Strength | | 700 V _{AC} |
| Insulation Resistance | | > 10 ⁴ MΩ |
| Thermal EMF | | < 0.5 μV for 1 °C of difference between leads |
| Noise | | non measureable |
| Thermal Resistance | | 0.14 °C/mW |

TABLE 4 - PERFORMANCE

| TESTS | CONDITIONS | REQUIREMENTS C 83-220 CECC 40302-001 | TYPICAL DRIFTS |
|------------------------------|--|---|--|
| Overload | 2.5 U _n /5 s U _{max.} < 2 U _n | ± 0.01 % | ± 0.002 % |
| Temperature Cycling | - 55 °C to + 155 °C, 5 cycles CEI 68-2-14 test Na | ± 0.01 % | ± 0.003 % |
| Terminals Strength | CEI 68-2-21 test U _a (pulling), U _b (bending), U _c (twisting) | ± 0.01 % | ± 0.002 % |
| Resistance to Soldering Heat | 260 °C/10 s CEI 68-2-20A test Tb (method 1A) | ± 0.01 % | ± 0.002 % |
| Vibrations | 10 Hz to 500 Hz 0.75 mm or 10g for 6 h method B4 CEI 68-2-6 test Fc | ± 0.01 % | ± 0.002 % |
| Climatic Sequence | - 55 °C to + 155 °C, 6 cycles, 95 % R.H., 85 mbar CEI 68-1 | ± 0.05 % Insulation R > 10 ² MΩ | ± 0.003 % Insulation R > 10 ⁴ MΩ |
| Humidity (Steady State) | 56 days, 95 % R.H., 40 °C CEI 68-2-3 | ± 0.05 % Insulation R > 10 ² MΩ | ± 0.003 % Insulation R > 10 ⁴ MΩ |
| Load Life | 1000 h Pr at + 70 °C 90'/30' cycle | ± 0.05 % | ± 0.01 % |
| High Temperature Exposure | 1000 h/155 °C CEI 68-2-20A test B | ± 0.05 % | ± 0.01 % |

FIGURE 1 - STANDARD IMPRINTING AND DIMENSIONS

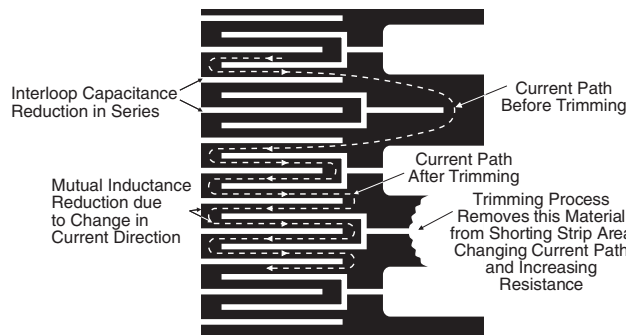


Note

1. The standoffs shall be so located as to give a lead clearance of 0.010" minimum between the resistor body and the printed circuit board when the standoffs are seated on the printed circuit board. This is to allow for proper cleaning of flux and other contaminants from the unit after all soldering processes.

| MODEL | DIM. | LS | W | L | H | ST | LL | WEIGHT NOMINAL |
|--------|------|--------------|-----------|-----------|-----------|------------|-----------|----------------|
| RS92NA | mm | 3.81 ± 0.13 | 2.50 max. | 7.50 max. | 8.00 max. | 0.254 min. | 25.4 min. | 0.6 g |
| RS92N | mm | 5.08 ± 0.076 | 2.50 max. | 7.50 max. | 8.00 max. | 0.254 min. | 25.4 min. | 0.6 g |
| AN | mm | 5.08 ± 0.076 | 2.50 max. | 7.50 max. | 8.00 max. | 0.254 min. | 25.4 min. | 0.6 g |

FIGURE 2 - TRIMMING TO VALUES (Conceptual Illustration)



Note: Foil shown in black, etched spaces in white

FIGURE 3 - POWER DERATING CURVE

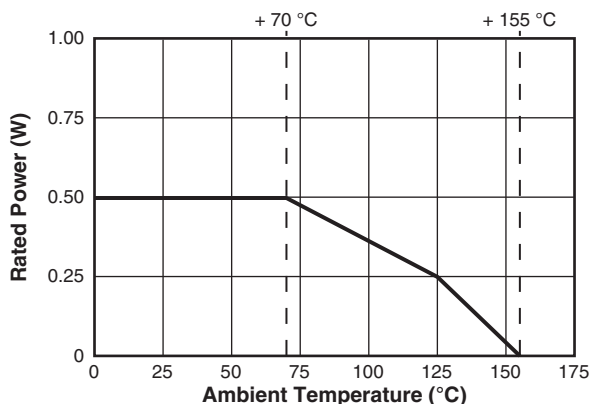


FIGURE 4 - TYPICAL RESISTANCE/TEMPERATURE CURVE

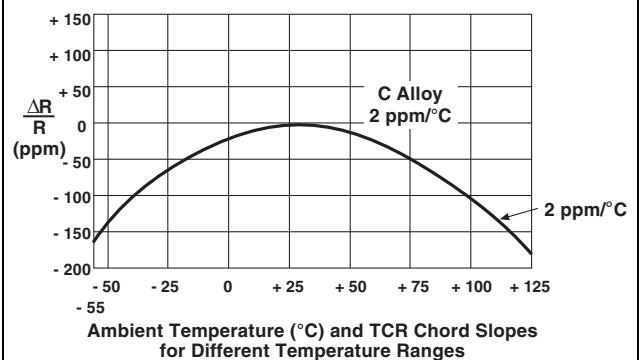
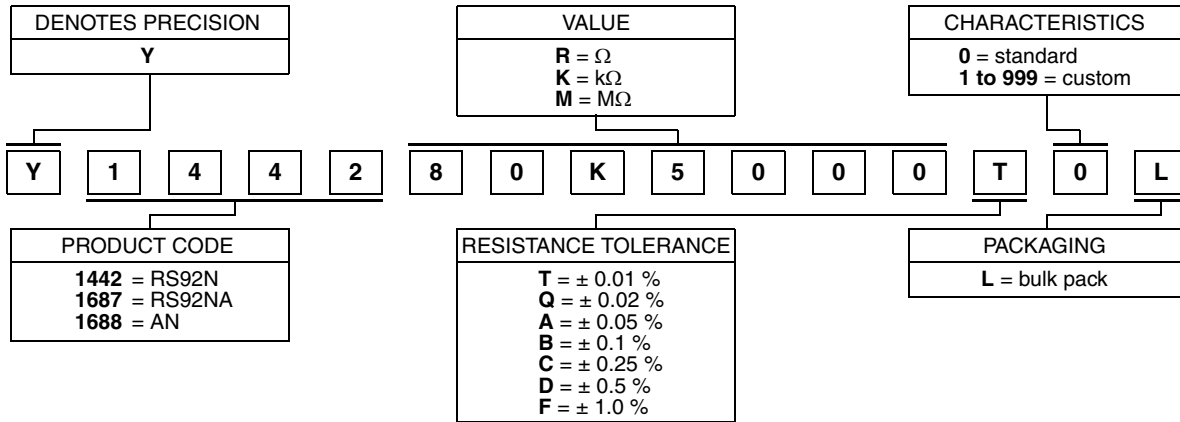


TABLE 5 - GLOBAL PART NUMBER INFORMATION (1)

NEW GLOBAL PART NUMBER: Y144280K5000T0L (preferred part number format)



FOR EXAMPLE: ABOVE GLOBAL ORDER Y1442 80K5000 T 0 L:

TYPE: RS92N

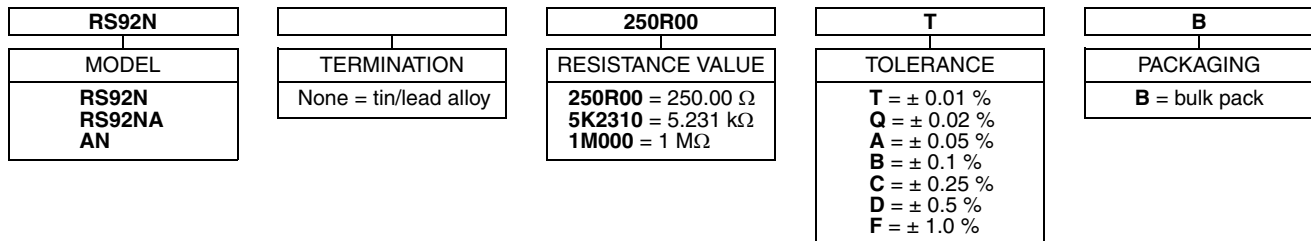
VALUE: 80.5 $k\Omega$

ABSOLUTE TOLERANCE: $\pm 0.01\%$

TERMINATION: standard

PACKAGING: bulk pack

HISTORICAL PART NUMBER: RS92N 250R00 T B (will continue to be used)



Note

(1) For non-standard requests, please contact application engineering.



Disclaimer

ALL PRODUCTS, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE.

Vishay Precision Group, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "VPG"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained herein or in any other disclosure relating to any product.

The product specifications do not expand or otherwise modify VPG's terms and conditions of purchase, including but not limited to, the warranty expressed therein.

VPG makes no warranty, representation or guarantee other than as set forth in the terms and conditions of purchase. **To the maximum extent permitted by applicable law, VPG 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.**

Information provided in datasheets and/or specifications may vary from actual results in different applications and performance may vary over time. Statements regarding the suitability of products for certain types of applications are based on VPG's knowledge of typical requirements that are often placed on VPG products. 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. You should ensure you have the current version of the relevant information by contacting VPG prior to performing installation or use of the product, such as on our website at vpgsensors.com.

No license, express, implied, or otherwise, to any intellectual property rights is granted by this document, or by any conduct of VPG.

The products shown herein are not designed for use in life-saving or life-sustaining applications unless otherwise expressly indicated. Customers using or selling VPG products not expressly indicated for use in such applications do so entirely at their own risk and agree to fully indemnify VPG for any damages arising or resulting from such use or sale. Please contact authorized VPG personnel to obtain written terms and conditions regarding products designed for such applications.

Product names and markings noted herein may be trademarks of their respective owners.

Copyright Vishay Precision Group, Inc., 2014. All rights reserved.