



## QPL RNC90Y Bulk Metal® Foil Established-Reliability Resistors with Extended Resistance Tolerance

### The Key Benefits:

- Extends resistance tolerance to  $\pm 0.005\%$
- Broad resistance range:  $4.99\ \Omega$  to  $121\ \text{k}\Omega$
- Very low TCR values of  $\pm 5\ \text{ppm}/^\circ\text{C}$  @  $-55\ ^\circ\text{C}$  to  $+125\ ^\circ\text{C}$  and  $10\ \text{ppm}/^\circ\text{C}$  @  $+125\ ^\circ\text{C}$  to  $+175\ ^\circ\text{C}$
- Load-life stability of  $\pm 0.005\%$  for 2000 hours at  $+125\ ^\circ\text{C}$
- “R” failure rate
- Feature a power rating of  $0.6\ \text{W}$  at  $+70\ ^\circ\text{C}$  and  $0.3\ \text{W}$  at  $+125\ ^\circ\text{C}$ , with a maximum working voltage of  $300\ \text{V}$
- Nearly immeasurable  $1.0\text{-ns}$  rise time, effectively no ringing
- Withstand electrostatic discharges up to  $25\ \text{kV}$ , for increased reliability
- Non-inductive, non-capacitive design
- Prototype samples available in 5 working days
- Non-QPL version, S555, also available with same or better performance capabilities



### The Key Applications:

- Military and aerospace applications and in other applications requiring established reliability and precision performance

### The News:

**Vishay’s RNC90Y Military Established, Bulk Metal® Foil Resistors Combine Extended Resistance Tolerance Down to  $\pm 0.005\%$ , Load Life Stability of  $\pm 0.005\%$ , and ESD Immunity up to  $25\ \text{kV}$**

This tight tolerance of  $\pm 0.005\%$  is only achievable with foil technology where the adjustment steps are not a turn of wire but a logarithmic decline of additive resistance segments bringing the resistor to final value in a few parts per million segments. This tight tolerancing is needed in long-range navigation equipment where the period of service is long and the accuracy is depended upon for protracted periods.



- “R” level established reliability resistors
- Handle unconventional environmental conditions above and below the surface with minimal drift
- Provide high resistance to thermal shock, moisture, mechanical shock, and vibrations
- Feature tin/lead alloy terminations

## Key Device Specifications:

Device	QPL RNC90Y	Non-QPL S555
TCR @ - 55 °C to + 125 °C	± 5 ppm/°C	± 5 ppm/°C
TCR @ - 125 °C to + 175 °C	± 10 ppm/°C	N/A
Resistance range	4.99 Ω to 121 KΩ	1 Ω TO 150 KΩ
Failure rate	R	Not specified
Load-life stability, 0.3 W @ 125 °C, 2000 h	± 0.05 % maximum ΔR	± 0.015 % maximum ΔR
Load-life stability, 0.3 W @ 125 °C, 10000 h	± 0.5 % maximum ΔR	± 0.05 % maximum ΔR
Current noise	Not specified	- 40 dB minimum
Working voltage	300 V maximum	300 V maximum
Thermal EMF	Not specified	0.1 μV/°C maximum
Ambient power rating at 70 °C	0.6 W	0.6 W
Ambient power rating at 125 °C	0.3 W	0.3 W
Device dimensions	0.105 in. by 0.300 in. (2.67 mm by 7.62 mm), with a height of 0.326 in. (8.28 mm)	0.105 in. by 0.300 in. (2.67 mm by 7.62 mm), with a height of 0.326 in. (8.28 mm)
Typical weight	0.6 g	0.6 g

## The Perspective:

As “R” level established reliability resistors, RNC90Y devices are military-qualified to MIL PRF 55182/9, the standard for military and aerospace applications requiring superior performance such as tighter tolerances, lower temperature coefficients, and better long-term stability. The resistors’ ability to retain their initial value through temperature change, load application, frequency shift, and short-time overload is unmatched in the industry. Designers can expect the RNC90Y devices to display stability levels that are orders of magnitude better than thin and thick film resistors (parts per million changes in service as opposed to percentage changes).

The enhanced devices offer a broad resistance range of 4.99 Ω to 121 kΩ, and a load-life stability of ± 0.005 % for 2000 hours at + 125 °C. Since Vishay Foil resistors are not restricted to standard values, and can be supplied with “as required” values (e.g. 100.123 kΩ vs. 100 kΩ) at no extra cost or delivery time, Vishay is able to offer the S555 as an alternative to the RNC90Y.

The S555 is a specially conditioned, non-QPL resistor for customers desiring higher or lower resistance values with the same or better performance capabilities as the RNC90Y. Both the qualified and the non-qualified version are manufactured on the same production line and are subjected to the same process, lot control, conditioning, and 100 % Group A screening. Qualified versions receive additional MIL Group B and C testing.

While other resistor technologies can take several seconds or even minutes to achieve a steady-state thermal stabilization, the RNC90Y and S555 devices have an almost instantaneous thermal stabilization time of < 1 second, and a nearly immeasurable 1.0-ns rise time, effectively no ringing. The ultimate resistors for analog applications, the devices are built to handle unconventional environmental conditions above and below the earth’s surface with minimal drift. Their construction guarantees a high level of reliability, and provides high resistance to thermal shock, moisture, mechanical shock, and vibrations.



# New Product Info



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**Product Group:** Vishay Foil Resistors

Thick and thin film resistors exhibit a continuous shift in resistance throughout their serviceable load life. Conversely, Vishay's Bulk Metal Foil resistors exhibit virtually no change in resistance after the minimal initial shift during the first 168 hours of operation. Where required, the minimal initial shift can be prevented by post-manufacturing operations (PMO) that result in the resistor having virtually no change in resistance, from initial installation into equipment through its entire load life. A short-time overload of 6.25 x rated power has no effect on the resistance of a PMO-serviced resistor, which returns to its initial value as soon as the heat of the power overload dissipates. While still in the heat of the power overload, the temporary shift is only about 0.01 %, equal to the low temperature coefficient times the temperature rise.

Offering the utmost in ESD immunity, the resistors withstand electrostatic discharges up to 25 kV, for increased reliability, and offer a non-inductive ( $< 0.08 \mu\text{H}$ ), non-capacitive ( $< 0.5 \text{ pF}$ ) design. The RNC90Y devices are available only with tin/lead alloy terminations, and offer 0.15-in lead spacing, with a 0.2-in version available: the RNC90T.

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