



防腐蝕抗潮濕貼片 電阻

[Anti-moisture SMD Resistors](#)

在苛刻環境中需精密應用的客戶，需要可應用於潮濕條件下的可靠零組件。一般最普遍使用的鎳鉻電阻技術通常會有阻值偏離超出規格甚至有發生電阻開路的可能。在此將探討 Stackpole 在工程應用需求上就這樣的產品功能需求所提供的解決方案 – RNCS 及 RTAN 系列，提供了可靠且適用於高濕度環境的經濟實惠解決方案。

Customers with precision applications in harsh environments require components that must reliably perform under humid conditions. The most commonly used nichrome resistor technologies will shift out of tolerance or fail open. This product feature will discuss Stackpole's solutions to these engineering requirements. The RNCS and RTAN series provide reliable, affordable solutions for high moisture environments.



RNCS – Passivated Nichrome Thin Film Chip Resistors



RTAN – Tantalum Nitride Precision Chip Resistors

[RNCS – Passivated Nichrome Thin Film Chip Resistors](#)

在過去，鎳鉻合金電阻並不是工程師在高濕度環境中的選擇。過多的溼氣會使鎳鉻合金電阻易受腐蝕。因此，在高濕度環境應用中使用 SMD 電阻時，工程師有兩種選擇。一種是使用厚膜電阻的解決方案，但是在 TCR 和公差方面的精度均有限。另一個選擇即為氮化鉭電阻。這個解決方案則比相對應替代的鎳鉻合金電阻要貴出許多。為了消除這二者之間的差距，Stackpole 推出了 RNCS 系列。該系列利用氧化矽或氮化矽做為中間介質來形成不透濕的介面，其作用有如氮化鉭元件但卻能保有較低的製造成本。RNCS 上的鈍化層被設計為可以更可靠地覆蓋電阻層並降低水氣自外部保護層上針孔滲透進入的可能。其結果是即使在最惡劣的條件下也表現出出色的穩定性。

在 40°C, 95% 相對濕度的條件，輸入電壓 1.5 小時“ON”0.5 小時“OFF”的標準偏置濕度測試 3000 小時下，RNCS 系列阻值變異小於 0.15%。此系列也可以在 120°C, 2 大氣壓力及 100% 相對濕度下通過 48 小時測試，且阻值變異小於 1%。而無鈍化處理的鎳鉻電阻在這樣的加速濕度測試條件下，阻值變異通常會超過 10%。

RNCS 的尺寸由 0402 至 2512，最小公差可達 0.1%。阻值範圍從 10W 到 1MW，而 TCR 大多可達 15 ppm。對於 0603, 0805 和 1206 的尺寸有較高的功率型號 RNCH 可供選擇。有關詳細信息，歡迎聯繫 Stackpole

Historically, nichrome elements in high moisture environments were not an option for engineers. The excessive moisture made the nichrome resistors susceptible to corrosion. As such, the engineers had two options when using SMD resistors in high humidity applications. They could use thick film solutions which provided a limited amount of precision in TCR and tolerance. The other option was tantalum nitride. This solution was much more expensive than their equivalent nichrome based counterparts. To eliminate this gap between available options, Stackpole introduced the RNCS Series. The RNCS series utilizes an intermediate layer of silicon oxide or silicon nitride to form a moisture impervious barrier which acts like the tantalum nitride element without the high manufacturing cost. The passivation on the RNCS is designed to more reliably

cover the resistive element and reduce the occurrences of pinholes which might allow moisture to penetrate the outer protective layer. The result is a part that shows outstanding stability even under the harshest conditions.

The RNCS series will shift less than 0.15% over 3000 hours of standard biased humidity testing at 40°C, 95% relative humidity, cycled power 1.5 hours "ON" 0.5 hour "OFF". The RNCS will also survive 48 hours in 120°C, 2 atm. Pressure, and 100% RH with less than 1% shift. Nichrome resistors without passivation will typically shift more than 10% under these accelerated humidity conditions.

The RNCS is available in sizes from 0402 to 2512, in tolerances as tight as 0.1%. Resistance values range from 10 ohms to 1M with most of the resistance values available in TCRs down to 15 ppm. For the 0603, 0805 and 1206 sizes higher power versions are available as the RNCH. Contact Stackpole for details.

[RTAN - Tantalum Nitride Precision Chip Resistors](#)

然而，對於一些客戶和應用來說，即使是最低風險的濕度腐蝕也無法接受。為了滿足這些客戶的要求，Stackpole 提供了 RTAN 系列的氮化鉭精密薄膜電阻。與需要特殊鈍化和防潮保護的鎳鉻合金電阻不同，氮化鉭電阻器完全不受水氣滲透腐蝕。在潮濕的情況下，氮化鉭電阻膜材料形成五氧化二鉭層將元件密封住並保護其不被進一步損壞。Stackpole 的 RTAN 系列通過最嚴格的偏置濕度測試，包括 85°C，85%相對濕度，10%額定功率偏差，數千小時測試後，電阻偏移非常低。除了這種出色的防潮性能外，RTAN 系列也通過 ASTM B809-95 的抗硫測試。

RTAN 的尺寸為 0402 至 1206，公差為 0.05%，TCR 低至 25 ppm。值範圍從 10W 到 1MW。

For some customers and applications however, the slightest risk of moisture corrosion is simply unacceptable. To address these customers' requirements, Stackpole offers the RTAN series of

tantalum nitride based precision thin film chips. Unlike nichrome resistors which require special passivation and protection from moisture, tantalum nitride resistors are impervious to moisture corrosion. In the presence of moisture, the tantalum nitride resistive film material forms a tantalum pentoxide layer which seals the element and protects it from further damage. Stackpole's RTAN series will pass the most stringent biased humidity testing consisting of 85°C, 85% relative humidity, 10% rated power bias for thousands of hours with very low resistance shift. In addition to this outstanding moisture performance, the RTAN series is also anti-sulfur per ASTM B809-95.

The RTAN is available in sizes from 0402 to 1206, in tolerances as tight as 0.05% and TCR as low as 25 ppm. Values range from 10 ohm to 1M.

Applications

RNCS 和 RTAN 的應用包括各種測試和監控設備，網絡電源，工業控制和自動化，電機控制，雷射控制，醫療應用，影音應用，汽車信息娛樂，航空電子設備，保全和安全設備，HVAC 和加熱控制，和機器人。

Applications for the RNCS and RTAN include a variety of testing and monitoring devices, network power supplies, industrial controls and automation, motor controls, laser controls, medical applications, audio applications, automotive infotainment, avionics, security and safety equipment, HVAC and heating controls, and robotics.

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