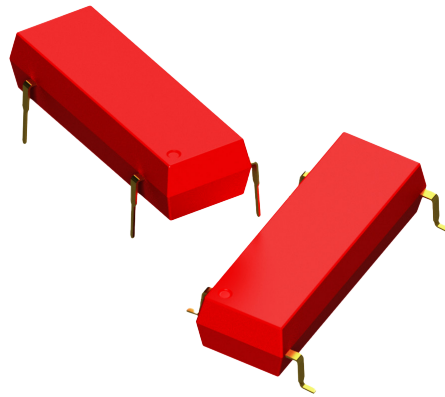


# 9105 New High-Voltage Reed Relay

**THE NEW 9105 SERIES – ENGINEERED TO MEET THE STRICTEST RELIABILITY REQUIREMENTS IN HIGH-VOLTAGE SYSTEMS.**

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The 9105 Series Reed Relay is the newest addition to Coto's extensive high-voltage product offering. Specially-designed to ensure proper Clearance and Creepage in accordance with IEC standard 60664-1, and featuring a Dielectric Strength of 7kV between contacts and coil, the 9105 Series is the perfect solution for preventing electrical breakdown in high-voltage systems. Available in both SMD and Through-Hole packaging, the 9105 benefits from Coto's advanced manufacturing and proprietary testing capabilities to ensure the highest performance and reliability.



## Introduction

In high-voltage (HV) systems, safety and reliability are critical to ensure long life and the protection of both equipment and the people that interact with it. Switching components that handle high voltages need to be designed to prevent electrical breakdown, which happens when a portion of an insulator or the surrounding air becomes electrically conductive under a sufficiently high electric field. Electrical breakdown occurs where the insulation is weakest, typically at the shortest distance between two conductors, resulting in arcing. This can lead to catastrophic damage to the component and the overall system.

For this reason, despite technology's general trend towards miniaturization, when it comes to high-voltage relays, smaller isn't always better. From a system design perspective, it is essential to maintain adequate spacing between high voltage transmission lines and exposed, uninsulated conductors. Ensuring sufficient separation minimizes the likelihood of failures, enhancing overall system reliability and safety.

When determining the minimum required spacing between pins for a relay, as well as the proper dimensions of the insulating package, there are two key terms to consider: Creepage and Clearance. Creepage is the shortest path between any two pins along the surface of a relay and relates to the main working voltage of the relay, itself. Clearance, on the other hand, is the shortest path through the air to prevent breakdown when an overvoltage transient occurs.

**TABLE 1: REQUIRED CLEARANCES FOR VARIOUS WITHSTAND VOLTAGES PER IEC-60664-1**

Required withstand voltage (kV)	Minimum clearances in air* (mm)
0.80	0.10
1.20	0.25
1.50	0.50
2.00	1.00
2.50	1.50
3.00	2.00
4.00	3.00
5.00	4.00
6.00	5.50
8.00	8.00
10.00	11.00
12.00	14.00

\*The dielectric properties of air vary depending on the altitude. Refer to IEC 60664-1 for further information, including more specific details that may or may not be applicable to your specific application.

Insulation ratings for relays are directly influenced by package dimensions, and it is important to review any relevant standards for maintaining safety in applications. For example, IEC (International Electrotechnical Commission) 60664-1 provides guidelines for de-

signing and maintaining proper insulation in equipment operating up to 1,000V DC or 1,500V AC, based on specifications such as voltage, pollution degree, and material group, helping to ensure compliance and safety. **Table 1** shows the minimum required Clearance that should be maintained for a given required withstand voltage, per this IEC standard.

## Coto Technology's 9105 High Voltage Reed Relay

Coto Technology has announced the 9105 High-Voltage Reed Relay, the newest addition to its product lineup. Designed to maintain proper insulation in high-voltage systems, this relay is the ideal solution for high-voltage applications. Its main specifications are listed in **Table 2**.

[Click here for the full specifications](#)



**TABLE 2: KEY SPECS FOR THE 9105 SERIES REED RELAY**

Parameter	Value
Dielectric Strength Across open contacts Contacts to coil (1 continuous minute)	<b>4.25kV</b> <b>7kV</b>
Switching Voltage	<b>1kV</b> (Hot Switching) <b>1.5kV</b> (Cold Switching)
Contact Power Rating	100W
Current Rating	<b>1A</b> Switching Current <b>2.5A</b> Carry Current
Certifications and Compliance	UL, RoHS, ATE grade Complies w/ IEC 60664-1
Packaging Type	<b>SMD and Thru Hole</b> available

The 9105 series is designed to align with IEC 60664-1, ensuring it meets recognized international benchmarks for safety, performance, & compatibility in electrical and electronic applications, and demonstrating its suitability for integration into a wide range of electronic systems. **Figure 1** (page 3) shows the Creepage and Clearance distances of the 9105 Series Reed Relay.

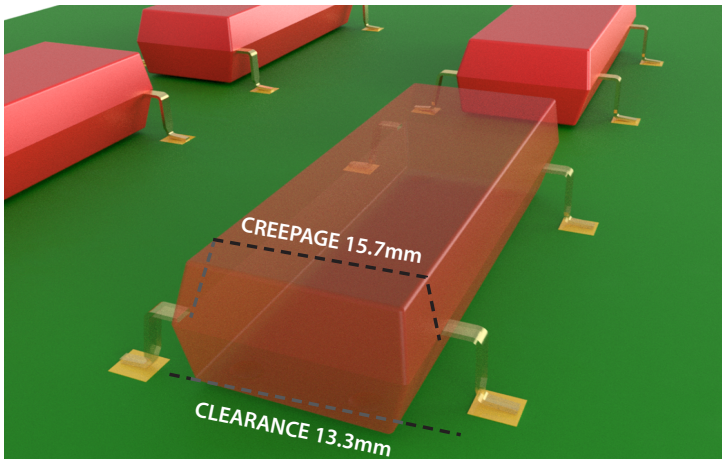


Figure 1: Creepage and Clearance distances of Coto's 9105 Series High Voltage Reed Relay.

### Coto's advanced manufacturing and proprietary testing capabilities ensure consistently high performance and superior reliability across demanding applications

The 9105 Series reed relay benefits from Coto Technology's proven expertise in manufacturing high-end SMD relays. This includes the fabrication of gold-plated leads that enhance temperature resistance, protect against corrosion, and ensure reliable electrical connections. Furthermore, what gives reed relays their high-voltage capabilities is the use of vacuum-sealed reed switches. Ensuring the integrity of the internal glass capsule is crucial for maintaining insulation reliability. Unlike common practices in commercial-grade reed relay manufacturing, which often involve multiple bends in the leads after switch fabrication, Coto's design avoids any post-fabrication bending, thereby reducing the risk of induced stress or micro-fractures.

**The 9105 series reed relay showcases a combination of a high-performance, high-voltage reed relay with exceptional specifications, and Coto's unmatched testing and manufacturing capabilities.**

As with all Coto Technology Reed Relay products, the 9105 Series undergoes 100% end-of-line parametric testing as well as rigorous reliability testing after fabrication. Coto's parametric testing includes checks for parameters such as high-voltage performance, Static and Dynamic Contact Resistance (SCR, DCR), among others. Coto bases its Dielectric Strength qualification test on MIL-STD-202, method 301, which involves ramping up the applied voltage for a minimum period of 60 seconds at a rate of 500V/sec, and monitoring the leakage current to ensure it remains within specification. Coto's testing systems have the capability to measure leakage currents down to the micro-amp range and detect any arcing.

Reliability testing is performed under Automated Test Equipment (ATE) grade requirements. Because even a single soft failure can be problematic for ATE, Coto maintains continuous monitoring of contact resistance and operation/release timings throughout the entire life test. The 9105 relay was tested to have a Mean Cycles Before Failure (MCBF) of 300 million switching cycles.

For questions and more information on our 9105 Series, you can reach out to us via the contact form on our website ([www.cototechnology.com](http://www.cototechnology.com)). To get a better understanding of switch ratings and how to get the most out of them, please check out the following App Note:

#### Understanding Reed Relay Power Ratings and How To Extend Switching Capabilities

