



# Application Alley

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## IC Testing - Reed Relays

Reed Relays Are a Key Component in Testing Integrated Circuits



Custom  
Engineered  
Solutions for  
Tomorrow

## Introduction

Humanity has changed dramatically as they carry out our daily endeavors, by the invention of the integrated circuit nearly 50 years ago. Whether we are checking the time on our wrist watch, making a phone call, watching children play with their electronic toys, or at work/home on our computer, etc, etc, integrated circuits are at work getting the job done. Chip designers continue to develop new integrated circuits that are smaller, faster acting and have more switching gates. These millions of gates per chip all need to be tested for satisfactory operation. Test equipment, some of which costs millions of dollars, are designed to test these chips on a 24 hour and 7 day basis.

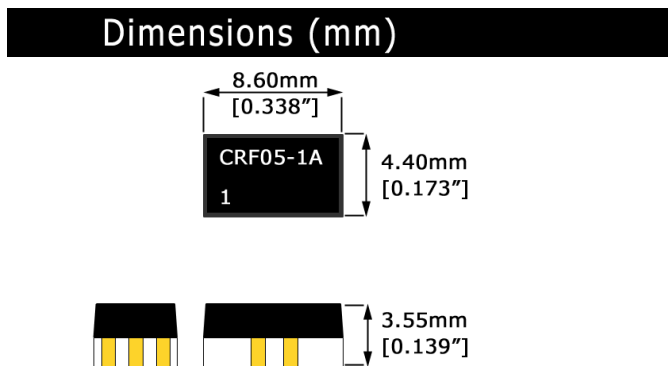


Figure 1. CRF physical layout

Because there are so many gates to be tested, test speed is essential. The tester needs to incorporate switches in the tester to isolate all points, and be able to carry the information using fast pulses. These fast pulses are in the picosecond range allowing billions of bits of information to be transferred per second. These switches used in the tester have to be carefully selected making sure they can switch and carry these fast pulses without distortion and operate in a reliable manner for billions of operations. Test equipment designers have found that Standex-Meder's specially designed ultra small relay series capably accomplishes the task for billions of operations.

## Reed Relays are used extensively in test equipment testing integrated circuits

Integrated circuits are rapidly changing the world we live in. Every year new faster integrated circuit chips become available that are used in the marketplace to speed up computers, expand cell phone features, and present new products. These new chips present quite a challenge to automatic test equipment (ATE) makers that need to develop the tester to test them. Since each of the millions of gates in each chip needs to be tested time becomes an important obstacle. The test equipment designers need to use switches in their testers that will allow them to switch the various test voltages and currents for each gate. The designer has three options: electromechanical relays, semiconductor switches (pin diodes, FETs, etc.),

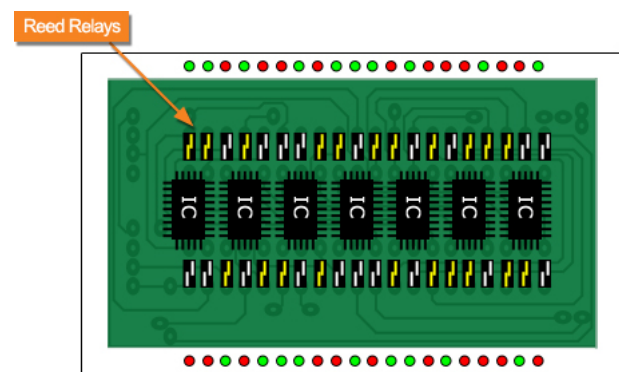


Figure 2. Integrated circuit test board showing IC's and reed relays.

or reed relays. Generally, the semiconductor switches offer too much leakage with too much capacitance that will literally interact with the test being performed, and therefore, its isolation is not good enough. Electromechanical relays are larger, very slow acting, and very costly for carrying high frequency pulses. MEDER's line of RF relays are specially designed to switch and pass fast digital pulses in a 50 ohm impedance environment while offering excellent isolation.

### Features


- High reliability
- Ideal RF characteristics
- Ideal for carrying fast digital pulses with skew rates less than 20 picoseconds.
- Ability to carry RF signals from DC up to 20 GHz (SRF)
- 50 Ω characteristic impedance
- Switch to shield capacitance < 0.5 picofarads
- Dielectric strength across the contacts 200 volts
- Contacts dynamically tested
- Surface mounted
- Very low profile
- BGAs available
- Rugged thermoset over-molded packaging
- Qual-shield arrangement

### Specifications (@ 20°C) CRF Series

	Min	Typ	Max	Units
<b>Coil characteristics</b>				
Coil resistance	135	150	165	Ω
Coil voltage		5.0		V
Pull-In			3.75	V
Drop-Out	0.85			V
<b>Switch characteristics</b>				
Contact rating			10	Watts
Switching voltage			170	V
Switching current			0.5	Amps
Carry current			0.5	Amps
Static contact resistance			250	mΩ
Dynamic contact resistance			250	mΩ
Dielectric from voltage across the contacts	210			V
Dielectric from voltage coil to contacts	1500			V
Insertion Loss (@ the -3 dB down point)			7	GHz
Operate time			0.1	msec
Release time			20	µsec
Operate temp	-10		100	°C
Storage temp	-55		125	°C

### Applications

- Any applications for testing integrated circuits such as: Digital memory chips, VLSI, ASICS, microprocessors, analog chips, mixed signal (analog and digital), discrete ICs.

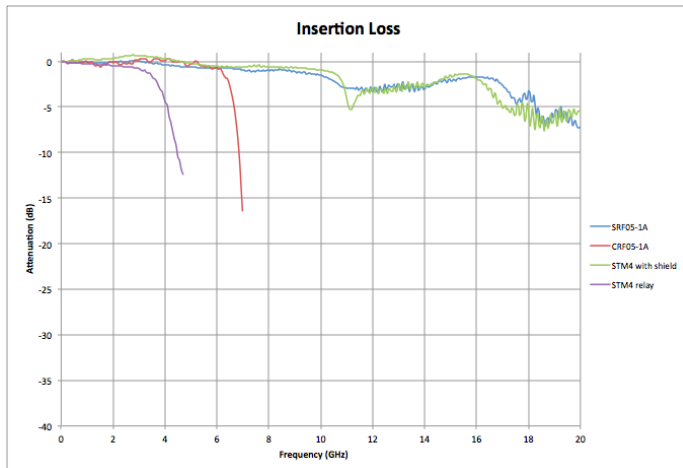
Surface Mount RF Reed Relay Series				
Series	Dimensions	mm	inches	Illustration
		SRF	W	
	H	3.2	0.126	
	L	7.5	0.295	
CRF	W	4.4	0.173	
	H	3.5	0.137	
	L	8.6	0.338	

Standex-Meder’s SRF series using a quad-shield that has only 0.5 pf from the open switch to its shield and only 0.2 pf across the open contacts. This series can switch and carry pulses shorter than 50 pico-seconds with no discernable effect on the pulse’s leading and trailing edge. Standex-Meder’s CRF series offers a flat insertion loss from DC up to 7 GHz, while the SRF series offers an insertion loss from DC to 20 GHz. Both series are ultra small with surface mount lead configurations.

Standex-Meder’s reed relays use hermetically sealed reed switches that are further packaged in strong high strength thermoset molding compound, and can therefore be subject to various environments without any loss of reliability.

The reed relay is an excellent choice because it can operate reliably over a wide temperature range, and represents an economical way to carry out billions of switching operations.

## Insertion Loss



Find out more about our ability to propel your business with our products by visiting [www.standexmeder.com](http://www.standexmeder.com) or by giving us a [hello@standexelectronics.com](mailto:hello@standexelectronics.com) today! One of our brilliant engineers or solution selling sales leaders will listen to you immediately.

## About Standex-Meder Electronics

Standex-Meder Electronics is a worldwide market leader in the design, development and manufacture of standard and custom electro-magnetic components, including magnetics products and reed switch-based solutions.

Our magnetic offerings include planar, Rogowski, current, and low- and high-frequency transformers and inductors. Our reed switch-based solutions include Meder, Standex and OKI brand reed switches, as well as a complete portfolio of reed relays, and a comprehensive array of fluid level, proximity, motion, water flow, HVAC condensate, hydraulic pressure differential, capacitive, conductive and inductive sensors.

We offer engineered product solutions for a broad spectrum of product applications in the automotive, medical, test and measurement, military and aerospace, as well as appliance and general industrial markets.

Standex-Meder Electronics has a commitment to absolute customer satisfaction and customer-driven innovation, with a global organization that offers sales support, engineering capabilities, and technical resources worldwide.

Headquartered in Cincinnati, Ohio, USA, Standex-Meder Electronics has eight manufacturing facilities in six countries, located in the United States, Germany, China, Mexico, the United Kingdom, and Canada.

For more information on Standex-Meder Electronics, please visit us on the web at [www.standexmeder.com](http://www.standexmeder.com).

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