

Application Alley

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Network Analyzers - RF Reed Relays

Network Analyzers Use High Frequency Reed Relays in Their Attenuator Circuit



Custom
Engineered
Solutions for
Tomorrow

Introduction

Network analyzers are widely used in the RF frequency realm, whether it is measuring the characteristics in the analog continuous wave high frequencies, or measuring the rise and fall times of fast digital pulses. With the rapid rise of cell phone usage over the last 15 years and wireless technology expanding into every 'nook and cranny' of our lives, network analyzers have skyrocketed in usage. Within the network analyzer's circuitry, the need to attenuate RF signals is necessary; and Standex-Meder's high frequency reed relays with life times in the billions of operations have found their niche.

Dimensions (mm)

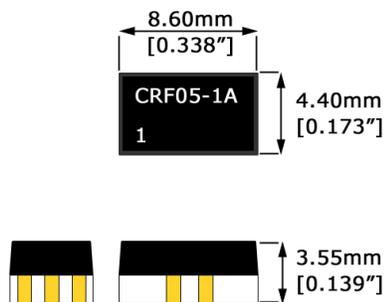


Figure 1. CRF physical layout

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The age of high frequency and fast digital pulsing is upon us. Billions of cell phones are now in existence, all transmitting and receiving RF signals from 900 MHz up to 4 GHz. Also, our computers along with other new electronic gadgetry have given rise to the ever increasing digital world, where billions of bits of information is being transferred every second. Making measurements in this very fast arena where information is being transferred in the pico seconds range is not an easy undertaking. Network analyzers have been specifically designed to work in this area. In many cases, internal to their circuitry,

signals often times need to be attenuated in accurate increments. These increments need to be switched in and out electronically and not influence the accuracy of these steps. Electro-mechanical relays had been chosen to carry out this attenuation switching, but their life is only around a million operations. This may be less than a year of usage in a network analyzer.

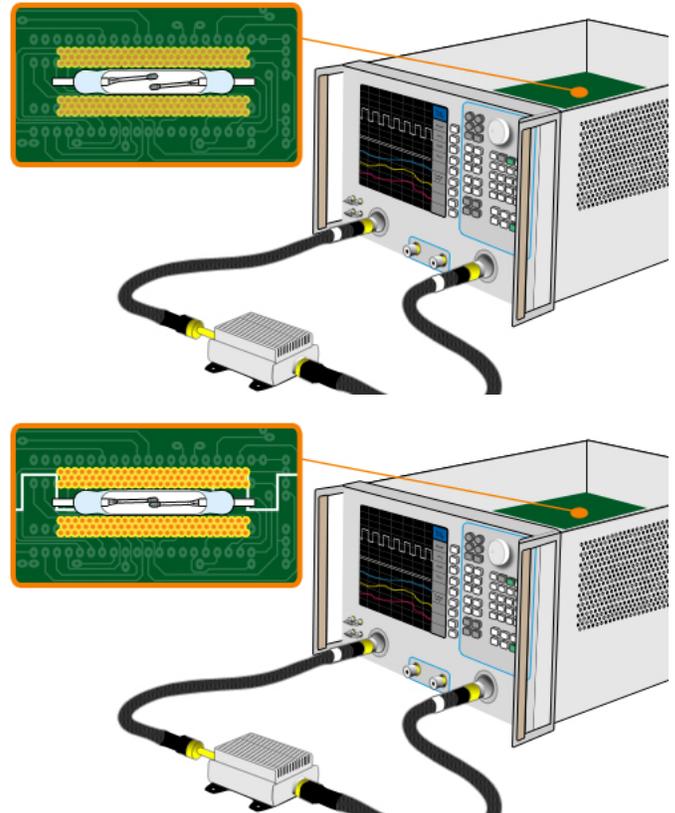


Figure 2. This is a typical network analyzer with High Frequency Reed Relays used in their attenuator circuit.

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

Applications

- Excellent for attenuation circuits in network analyzers and other instruments requiring RF attenuation

Specifications (@ 20°C) CRF Series				
	Min	Typ	Max	Units
Coil characteristics				
Coil resistance	135	150	165	Ω
Coil voltage		5.0		V
Pull-In			3.75	V
Drop-Out	0.85			V
Switch characteristics				
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

*Coil parameters will vary by 0.2% /oC

Standex-Meder's line of ultra small reed relays,

dramatically smaller than the RF electromechanical relays, can switch and carry RF frequencies up to 20 GHz in a 50 Ω impedance environment. Standex-Meder's SRF series uses 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 discernible 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, Both series are ultra small with surface mount lead configurations.

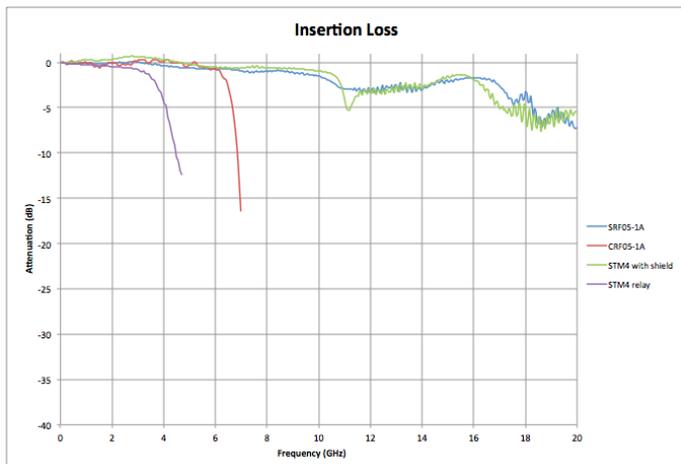
Standex-Meder's reed relays use hermetically

Surface Mount RF Reed Relay Series				
Series	Dimensions	mm	inches	Illustration
		W	4.0	
SRF	H	3.2	0.126	
	L	7.5	0.295	
	W	4.4	0.173	
CRF	H	3.5	0.137	
	L	8.6	0.338	

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 or by giving us a hello@standexelectronics.com today! One of our brilliant engineers or solution selling sales leaders will listen to you immediately.