



Application Alley

Network Analyzers - RF Reed Relays

Network Analyzers Use High Frequency Reed Relays in Their Attenuator Circuit

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 Electronics's high frequency reed relays with life times in the billions of operations have found their niche.

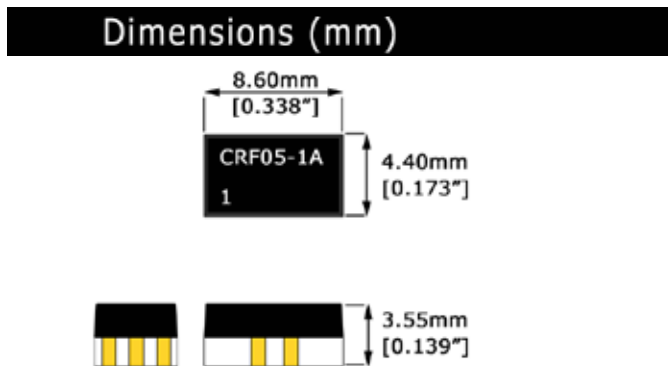


Figure 1. CRF physical layout

Network Analyzers Use Reed Relays in Their Attenuator Circuit

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. Electromechanical 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

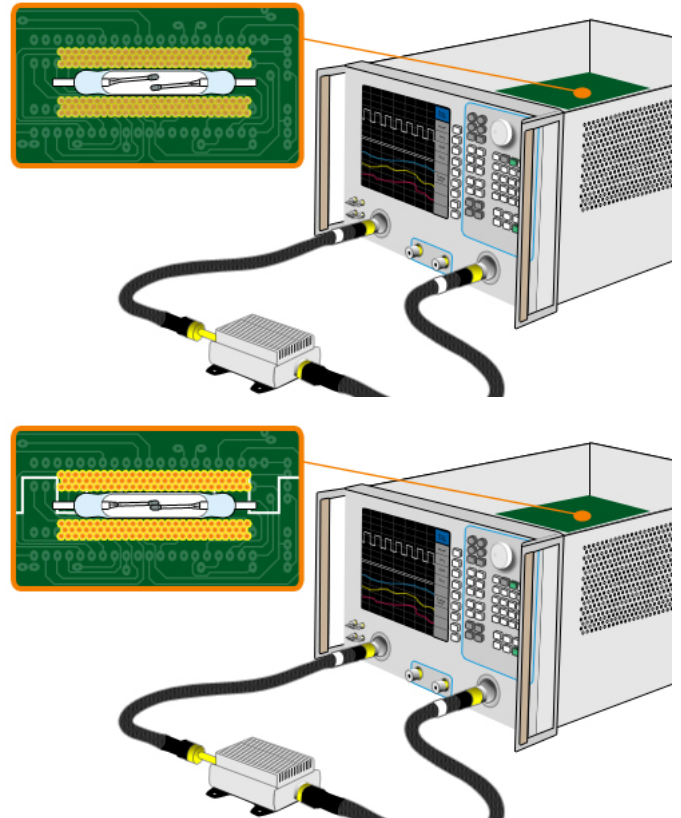


Figure 2. This is a typical network analyzer with High Frequency Reed Relays used in their attenuator circuit.

a network analyzer.

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
- Standex Electronics's line of ultra small reed relays, dramatically smaller than the RF elec-

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

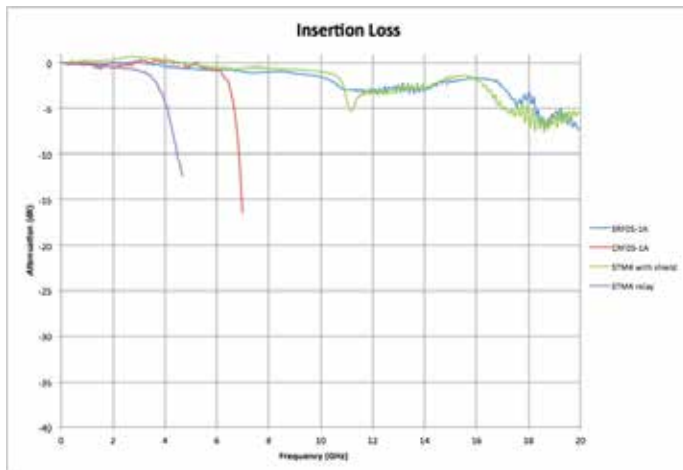
*Coil parameters will vary by 0.2% /oC

tromechanical relays, can switch and carry RF frequencies up to 20 GHz in a 50 Ω impedance environment. Standex Electronics'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 Electronics's CRF series offers a flat insertion loss from DC up to 7 GHz, Both series are ultra small with surface mount lead configurations.

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

About Standex Electronics

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

Our magnetics offerings include planar, current sense, and conventional low- and high-frequency transformers and inductors. Reed switch-based solutions include Meder, Kent, and KOFU 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 range of product applications in the transportation, automotive, medical, test and measurement, military and aerospace, aviation, HVAC, appliance, security and safety, and general power and industrial markets.

Standex Electronics has a commitment to absolute customer satisfaction through a partner, solve, and deliver approach. With a global organization that offers sales support, engineering capabilities, and technical resources worldwide – we implement customer driven innovation that puts the customer first.

For more information on Standex Electronics, visit us on the web at standexelectronics.com.

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