Application Alley

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Airplane TVS - Reed Relays

Transient Voltage Suppressors (TVS) use Reed Relays in Their Test Equipment

Standex MEDER ELECTRONICS

Custom Engineered Solutions for Tomorrow

Transient Voltage Suppressors (TVS) use Reed Relays in Their Test Equipment

Introduction

When test equipment is used to test discrete power semiconductors, the testers often require the application of high currents to properly test the semiconductor devices, such as, Transient voltage Suppressors (TVS) that prevent ESD and lightning damage to sensitive electronic equipment. To perform the high current test, switching devices within the testers are needed that can carry high pulsed currents that do not distort the pulsed current, and at the same time, isolate other circuits that are also used to do a battery of other tests to the device under test. Using reed relays achieves the goal of billions of successful pulsed operations.

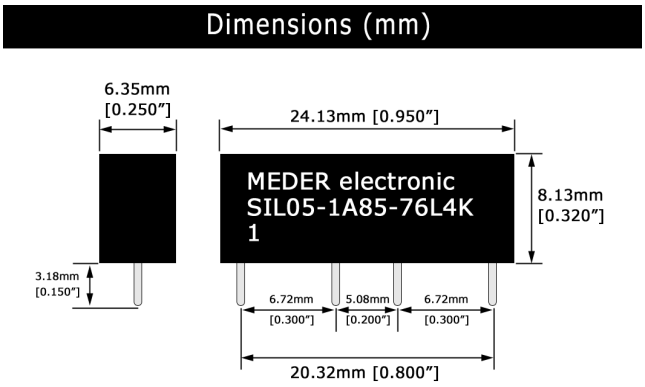

Figure 1. SIL HV Physical layout

Features

- In excess of 1 billion operations of pulsed high carry currents
- Small Size
- Ability to carry pulsed currents up to 5 Amps
- Ability to Switch up to 1000 Volts
- Dielectric strength across the contacts 3000 volts
- Round leads allow for better adherence when socketed
- Contacts dynamically tested

Applications

- Ideal for testing power discrete semiconductors like Transient voltage Suppressors (TVS).
- Also good for testing power mosfets, surge suppressors, power transistors, etc.

Discrete Semiconductor Testers use High Current Pulsing for Component Testing

When testing high power discrete semiconductors like transient voltage suppressors (TVS) and other power semiconductors, pulsed currents as high as 100 amps may be needed to test the extreme cases for these devices. This high current tests whether these devices are capable of carrying these extreme currents without failing. Also, the high current pulses produce an instantaneous heat rise across the power chip that verifies that the chip is adequately bonded to its substrate. At the same time, high voltages may be needed to hold off the high switching voltages that may be part of the specification for the chip. Since multiple tests take place for each component, requiring different voltages, currents and detection devices, isolation from each test is critical. So choosing the correct switching device can go a long way to making a successful system. Since the switching device is constantly being turned on and off hundreds of millions of operations over the course of its life, reliability of the switching device is essential as well. Electromechanical devices do well for carrying high currents, but begin to wear mechanically after 1 million operations. Semiconductor switching devices generally can not support both high currents and high voltages in one chip, and therefore, eliminate itself from these kinds of switching requirements. For these reasons designers have turned to Standex-Meder's reed relays for meeting the above requirements.

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Standex-Meder's SIL HV Series was designed for this very requirement. This series can switch low level signals well into the billions of operations as well as carry high current pulses for an equal number of times. The SIL HV Series can carry 3 amps continuously and can carry 5 amp pulsed currents for up to 5 milliseconds through the relay with no distortion to its leading or trailing edge. For the higher pulsed currents, it is recommended to wait at least 5 msec after the coil has been energized before applying the high pulsed current. The pulsed currents allow the designer to determine the integrity of the chip and to make sure it is properly placed on its substrate for efficient operation. So the key question is how do the designers use a 5 amp carry current thru the relay to accomplish a 100 amp pulse thru the semiconductor device under test. The designer simply uses 20 of Standex-Meder's reed relays in parallel with a power resistor in series with each relay contact. The resistors equally distribute the 100 amps thru the 20 relays accomplishing the successful operation of the high current pulse.

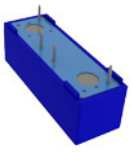
This reed relay series can also switch up to 1000 volts, and has a dielectric strength of 3000 volts minimum, because Standex-Meder uses an evacuated reed switch.

Specifications (@ 20°C) SIL HV Series

	Min	Typ	Max	Units
Coil Characteristics*				
Coil resistance	198	220	242	Ohms
Coil voltage		5		Volts
Pull-In max.			3.0	Volts
Drop-Out min.	0.5			Volts
Load characteristics				
Contact rating			100	Watts
Switching voltage	0		1000	Volts
Switching current	0		1.0	Amps
Carry current	0		3.0	Amps
Max carry current for 5 Ms			5.0	Amps
DC contact resistance		150	150	mΩ
Dynamic contact resistance		200	200	mΩ
Breakdown voltage	3000			Volts
Operate time		0.5	0.75	msec
Release time		50	100	µsec
Operate temp	-20		85	°C
Storage temp	-30		100	°C

*Coil parameters will vary by 0.2% / 1 °C

Through Hole Reed Relay Series

		Dimenstions mm	inches	Illustration
Series				
SIL HV	W	6.35	0.250	
	H	8.13	0.320	
	L	24.13	0.950	
LI	W	10	0.394	
	H	10.4	0.409	
	L	30	1.181	

Standex-Meder's reed relays use hermetically sealed reed switches that are further packaged in strong high strength plastic, 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.

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Through Hole Reed Relay Series				
	Dimenstions	mm	inches	Illustration
Series				
SIL	W	5.08	0.394	
	H	7.8	0.394	
	L	19.8	1.299	
BE	W	10	0.394	
	L	10	0.394	
	H	33	1.299	

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.

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