

FEATURES

- · Ceramic / thermoset molded package
- · Patent pending
- Smallest in the industry
- No lead frame surface mount design eliminates skewing of leads and coplanarity issues
- · Minimum path length for RF
- Up to 7 GHz switching frequencies
- Ability to switch fast pulses with rise times of 40 pico seconds or less
- · Available with BGA
- · Internal magnetic shield standard
- · Very low profile
- · Gold plated leads for high conductivity RF path
- Low thermal offset typical 1 μV
- TCE matching of all internal components
- Insulation resistance typical 1014 ohms
- · 3 Volt option available

DESCRIPTION

The MEDER CRF Reed Relay Series is a low-profile device made with a ceramic case that exactly matches the thermal coefficient of expansion of the Reed Switch glass and the reed lead to eliminate any potential packaging stress. Capable of switching up to 7 GHz with <40 ps rise times for digital operations, this leadless 50 Ohm reed relay is the smallest in the industry and switches into the billions of operations.

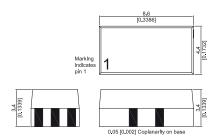
This Relay has 1 μ V typical thermal offset voltage. Measuring only 8.6 mm x 4.4 mm x 3.4 mm, the leadless design eliminates skewing of leads and coplanarity issues.

APPLICATIONS

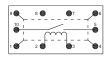
- · Test and measurement
- Medical Equipment
- Telecommunications
- · High frequency applications

DIMENSIONS (Non-BGA)

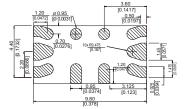
*All dimensions in mm (inch)



PIN OUT (Top View)

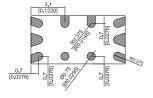


PCB LAYOUT



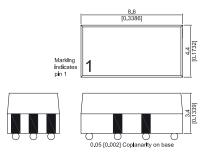
PAD LAYOUT

(Bottom View)



DIMENSIONS (with BGA)

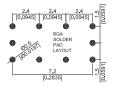
*All dimensions in mm (inch)



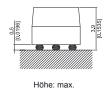
PIN OUT (Top View)

PAD / PCB LAYOUT

(Bottom View)



POST REFLOW



ORDER INFORMATION

Part Number Example

CRF05 - 1AS

05 is the nominal voltage1A is the contact formS is the solder ball option

Series	Nominal Voltage	Contact Form	Option
CRF	05-	1A	x
Options			S*
	,		

 $^{^{\}star}$ Solder Ball Option (non-BGA part number is CRF05-1A)

COIL DATA

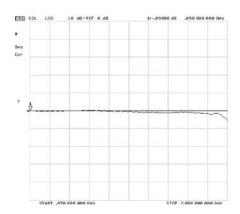
Contact Form	Switch Model	Coil Voltage		Coil Resistance		Pull-In Voltage	Drop-Out Voltage	Nominal coil Power	
All Data at 20 °C *		VI	VDC		Ω	VDC		VDC	mW
		Nom.	Max.	Min.	Тур.	Max.	Max.	Min.	Тур.
1A	80	5	7.5	135	150	165	3.75	0.75	167
1A	80	3	5	63	70	77	2.25	0.45	129

^{*} the pull-in / drop-out voltages and coil resistance will change at the rate 0,4% per °C

RELAY DATA

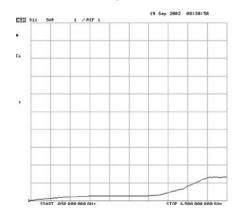
All Data at 20° C	Switch Model → Contact Form →	Co			
Contact Ratings	Conditions	Min.	Тур.	Max.	Units
Contact Ratings	Any DC combination of V & A not to exceed their individual max.'s.			10	W
Switching Voltage	DC or peak AC			170	V
Switching Current	DC or peak AC			0.5	Α
Carry Current	DC or peak AC			0.5	Α
Bulk Resistance	Through all plated material on substrate		200	350	mΩ
Static Contact Resistance	w/ 0.5 V & 50 mA		75	100	mΩ
Dynamic Contact Resistance	Measured w/ 0.5 V & 50mA		100	150	mΩ
Insulation Resistance (100 Volts applied)	Across Contact Contact to coil and shield	10 ¹⁰ 10 ¹³	10 ¹² 10 ¹⁴		Ω
Breakdown Voltage	Across Contact Coil to contact	210 1500			VDC
Operate Time incl. Bounce	Measured w/ nominal voltage			0.1	ms
Release Time	No coil suppression			0.02	ms
Capacitance (@ 10 kHz)	Across Contact Contact to coil and shield		0.1 0.7		pF
Life Expectancies					
Switching 5 V - 10mA	DC <10 pF stray cap.		1000		10 ⁶ Cycles
For other load requirements, se	e the life test section on P. 120.				
Environmental Data					
Shock Resistance	1/2 Sine wave duration for 11 ms			50	g
Vibration Resistance	From 10 - 2000 Hz			10	g
Ambient Temperature	10 °C/ minute max. allowable	-40		125	°C
Storage Temperature	10 °C/ minute max. allowable	-55		125	°C
Soldering Temperature	5 sec. dwell			260	°C
Material of Case	Themoset / Ceramic				
Material of pads	Au plated				

Insertion Loss:



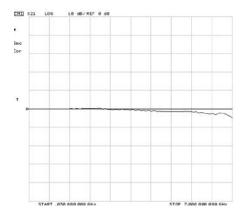
Insertion loss tested to 7 GHz for the CRF Reed Relay. Horizontal full scale: 7.0 GHz. Vertical scale: 10 dB/div referenced from the 0 mark.

VSWR:



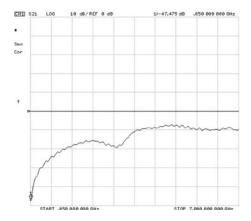
Voltage Standing Wave Ratio (VSWR) tested to 6.5 GHz for the CRF Reed Relays. Horizontal full scale: 6.5 GHz. Vertical scale: 1.0/div referenced from the bottom line 1.0 mark.

Copper Wire Insertion Loss:



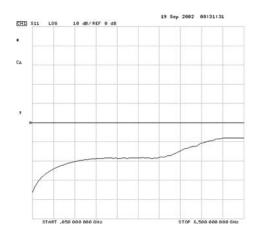
Insertion loss tested to 7 GHz for the CRF Reed Relay but with the internal Reed Switch replaced with a bare copper wire. Horizontal full scale: 7.0 GHz. Vertical scale: 10 dB/div referenced from the 0 mark.

Isolation:



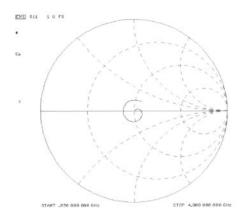
Isolation tested to 7 GHz for the CRF Reed Relay. Horizontal full scale: 7.0 GHz. Vertical scale: 10 dB/div referenced from the 0 mark.

Return Loss:



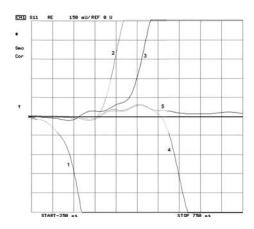
Return loss tested to 6.5 GHz for the CRF Reed Relay. Horizontal full scale: 6.5 GHz. Vertical scale: 10 dB/div referenced from the 0 mark.

Smith Chart:



Shows a Smith Chart plotted for frequencies to 4 GHz. The second dotted circle starting from the right is the 50 Ohm impedance point.

Characteristic Impedance:



Represents the characteristic impedance going through the CRF Reed Relay. Waves 1 through 5 depict calibration points. Horizontal full scale: 750 ps. Vertical scale: 150 mUnit/div referenced from the 0 unit mark. The vertical scale measures the reflection coefficient.

- 1 Short Before Relay
- 2 Open Contacts
- 3 Close Contacts
- 4 Closed Contacts Shorted
- 5 Closed Contacts 50 Ohm