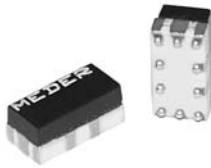


7 GHz High Frequency Reed Relay for 50 Ω Impedance



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.

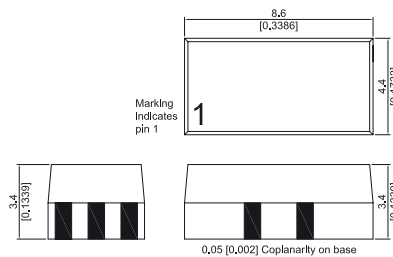
This Relay has 1 μV typical thermal offset voltage. Measuring only 8.6 mm x 4.4 mm x 3.4 mm, the leadless design eliminates skewing of leads and coplanarity issues.

APPLICATIONS

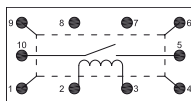
- Test and measurement
- Medical Equipment
- Telecommunications
- High frequency applications

DIMENSIONS (Non-BGA)

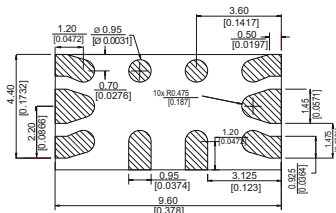
*All dimensions in mm (inch)



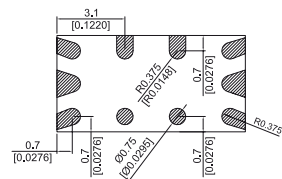
PIN OUT (Top View)



PCB LAYOUT

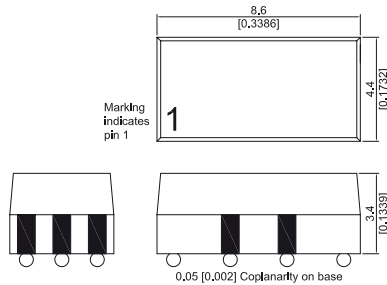


PAD LAYOUT (Bottom View)

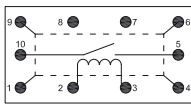


DIMENSIONS (with BGA)

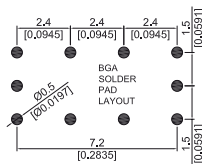
*All dimensions in mm (inch)



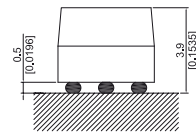
PIN OUT
(Top View)



PAD / PCB LAYOUT
(Bottom View)



POST REFLOW



Höhe: max.

ORDER INFORMATION

Part Number Example

CRF05 - 1AS

05 is the nominal voltage
1A is the contact form
S is the solder ball option

| Series | Nominal Voltage | Contact Form | Option |
|----------------|-----------------|--------------|----------|
| CRF | 05- | 1A | X |
| Options | | | S* |

* Solder Ball Option (non-BGA part number is CRF05-1A)

COIL DATA

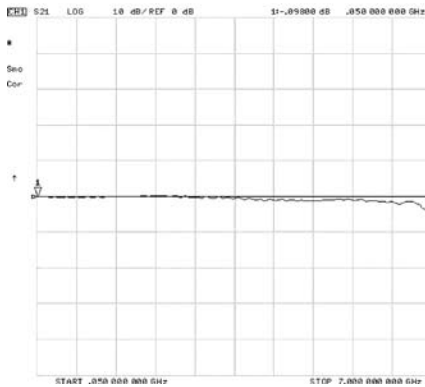
| Contact Form | Switch Model | Coil Voltage | | Coil Resistance | | | Pull-In Voltage | Drop-Out Voltage | Nominal coil Power |
|---------------------|--------------|--------------|-----------|-----------------|------|------|-----------------|------------------|--------------------|
| | | VDC | | Ω | | | VDC | VDC | mW |
| All Data at 20 °C * | | Nom. | Max. | Min. | Typ. | Max. | Max. | Min. | Typ. |
| | | 1A | 80 | 5 | 7.5 | 135 | 150 | 165 | 3.75 |
| 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

**7 GHz High Frequency Reed Relay
for 50 Ω Impedance**
RELAY DATA

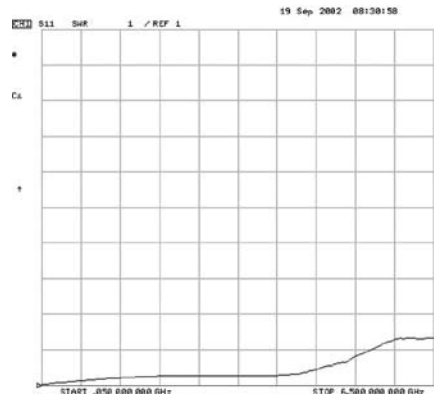
| All Data at 20° C | Switch Model → Contact Form → | Contact 80 Form A | | | Units |
|---|--|--------------------------------------|--------------------------------------|------|---------------------------|
| | Conditions | Min. | Typ. | Max. | |
| Contact Ratings | Any DC combination of V & A not to exceed their individual max.'s. | | | 10 | W |
| Switching Voltage | DC or peak AC | | | 170 | V |
| Switching Current | DC or peak AC | | | 0.5 | A |
| Carry Current | DC or peak AC | | | 0.5 | A |
| 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, see 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 | Themosect / Ceramic | | | | |
| Material of pads | Au plated | | | | |

Insertion Loss:



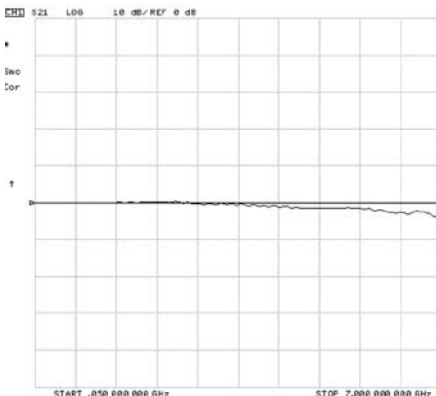
Insertion loss tested to 7 GHz for the CRF Reed Relay. Horizontal full scale: 7.0 GHz. Vertical scale: 10 dB/div referenced from the 0 mark.

VSWR:



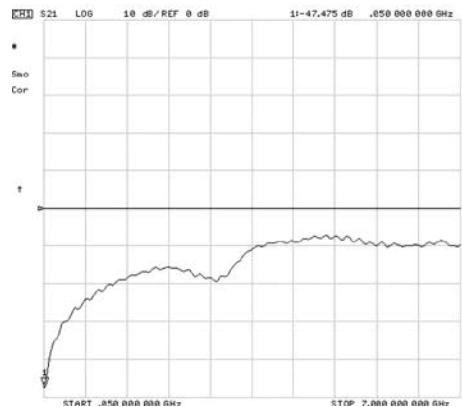
Voltage Standing Wave Ratio (VSWR) tested to 6.5 GHz for the CRF Reed Relays. Horizontal full scale: 6.5 GHz. Vertical scale: 1.0/div referenced from the bottom line 1.0 mark.

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.

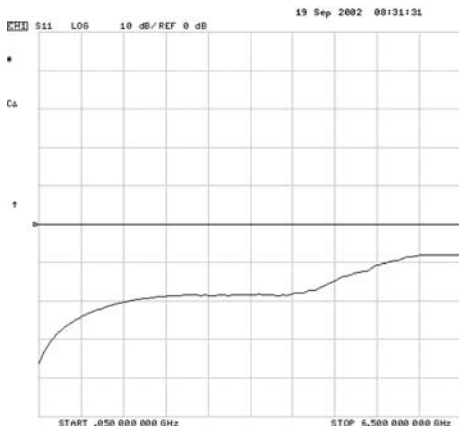
Isolation:



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.

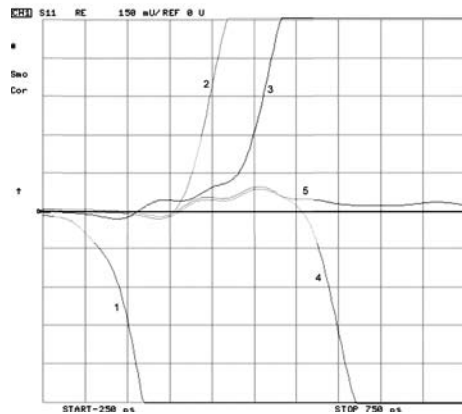
7 GHz High Frequency Reed Relay for 50 Ω Impedance

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.

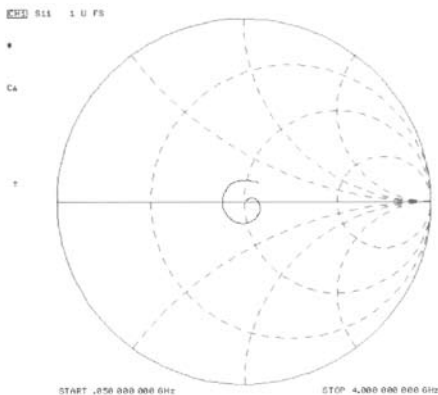
Characteristic Impedance:



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

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.