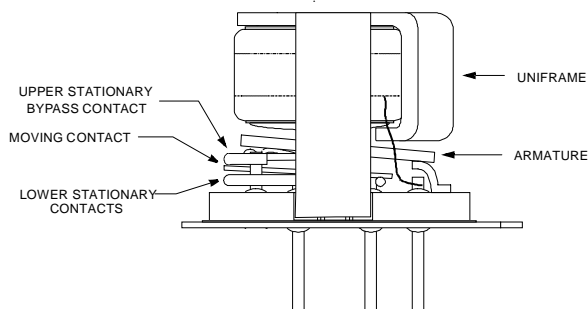



**TELEDYNE RELAYS**
**HIGH REPEATABILITY  
ULTRAMINIATURE T0-5,  
RF BYPASS RELAY  
DC TO 3 GHz**
**SERIES  
RF310  
RF313**

SERIES DESIGNATION	RELAY TYPE
RF310	Repeatable, RF, N.C. Bypass relay
RF313	Sensitive, repeatable, RF N.C. Bypass relay

**INTERNAL CONSTRUCTION**

**PERFORMANCE FEATURES**

The ultraminiature RF310 and RF313 relays are designed with an internal bypass (through path), when the coil is de-energized, to provide low insertion loss and VSWR through the bypass and simplicity of design for the user. Relays have improved RF insertion loss repeatability over the frequency range from dc to 3 GHz. Highly suitable for use in attenuator, linear amplifier and other RF circuits. The RF310 and RF313 feature:

- N.C. bypass configuration.
- Repeatable insertion loss.
- Broad bandwidth.
- Metal enclosure for EMI shielding.
- Ground pin option to improve case grounding.
- High isolation between control and signal paths.
- High resistance to ESD.

**ENVIRONMENTAL AND  
PHYSICAL SPECIFICATIONS**

<b>Temperature</b>	-55 °C to +85 °C	
<b>Vibration (General Note 1)</b>	10 G to 500 Hz	
<b>Shock (General Note 1)</b>	30 G, 6 ms. half sine	
<b>Enclosure</b>	Hermetically sealed	
<b>Weight</b>	<b>RF310</b>	0.09 oz. (2.55 g) max.
	<b>RF313</b>	0.16 oz. (4.50 g) max.

**CONSTRUCTION FEATURES**

The following unique construction features and manufacturing techniques provide excellent resistance to environmental extremes and overall high reliability.

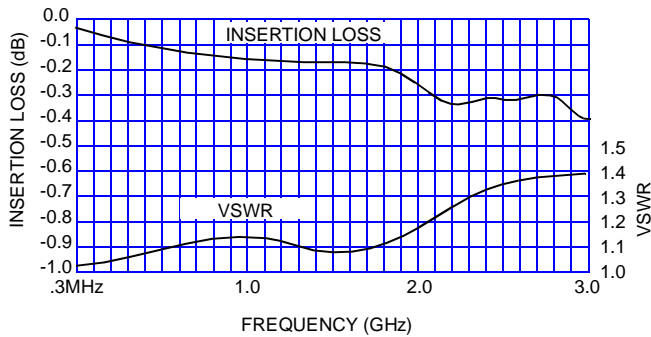
- Uni-frame motor design provides high magnetic efficiency and mechanical rigidity.
- Minimum mass components and welded construction provide maximum resistance to shock and vibration.
- Advanced cleaning techniques provide maximum assurance of internal cleanliness.
- Gold plated precious metal alloy contacts ensure reliable switching.

# SERIES RF310 and RF313

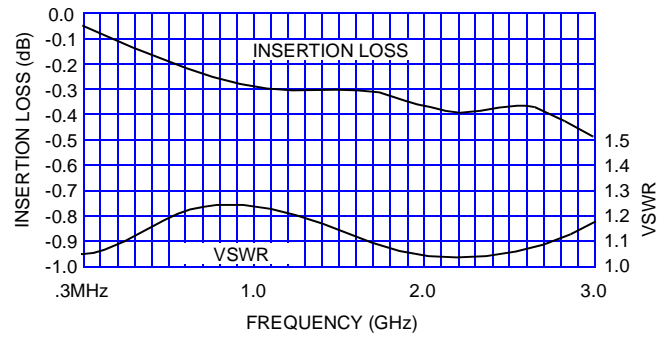
## TYPICAL RF CHARACTERISTICS (Notes 1, 2 and 3)

### INSERTION LOSS AND VSWR CHARACTERISTICS RF310 RELAYS

TYPICAL CHARACTERISTICS FOR N.O. CONTACTS, PER POLE, COIL ENERGIZED (NOTE 4)

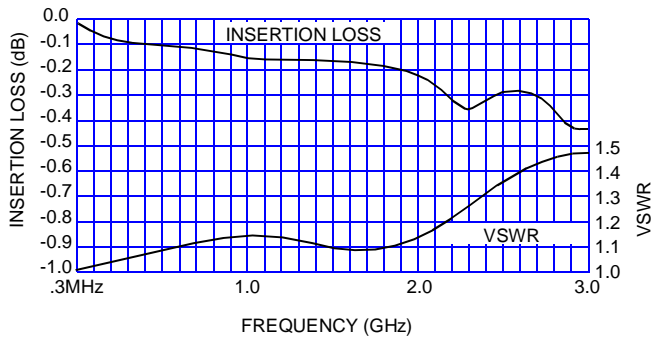


TYPICAL CHARACTERISTICS FOR N.C. BYPASS PATH, COIL DE-ENERGIZED

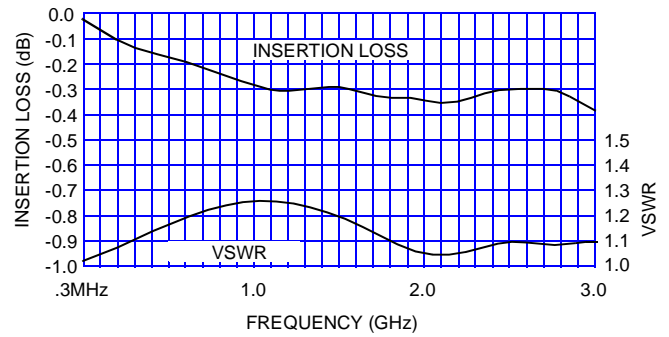


### INSERTION LOSS AND VSWR CHARACTERISTICS RF313 RELAYS

TYPICAL CHARACTERISTICS FOR N.O. CONTACTS, PER POLE, COIL ENERGIZED (NOTE 4)

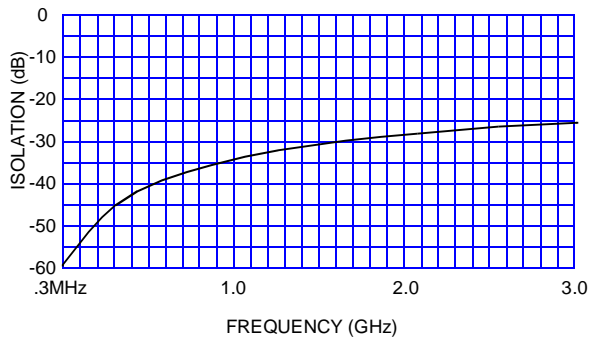


TYPICAL CHARACTERISTICS FOR N.C. BYPASS PATH, COIL DE-ENERGIZED

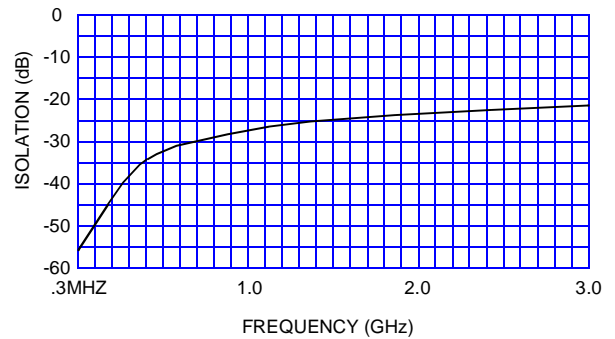


### ISOLATION CHARACTERISTICS RF310 AND RF313 RELAYS

ISOLATION POLE TO POLE (COIL ENERGIZED) (NOTE 5)



ISOLATION N.O. CONTACTS TO N.C. BYPASS PATH (COIL DE-ENERGIZED) (NOTE 6)

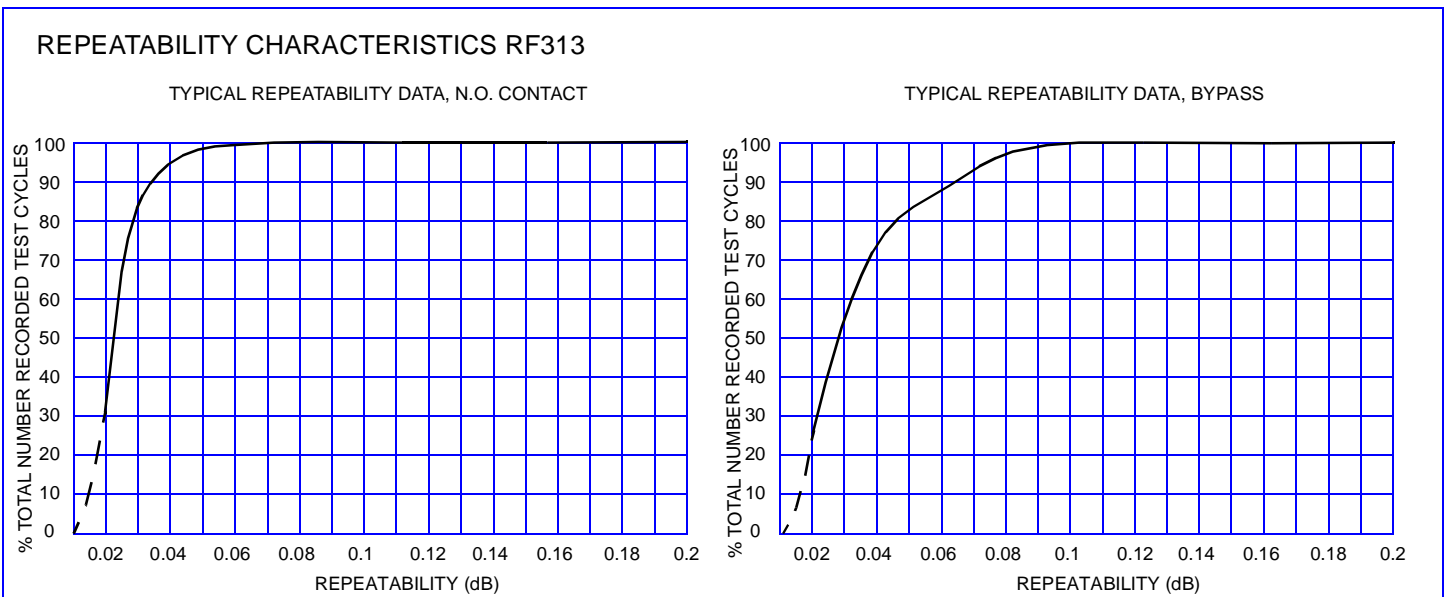
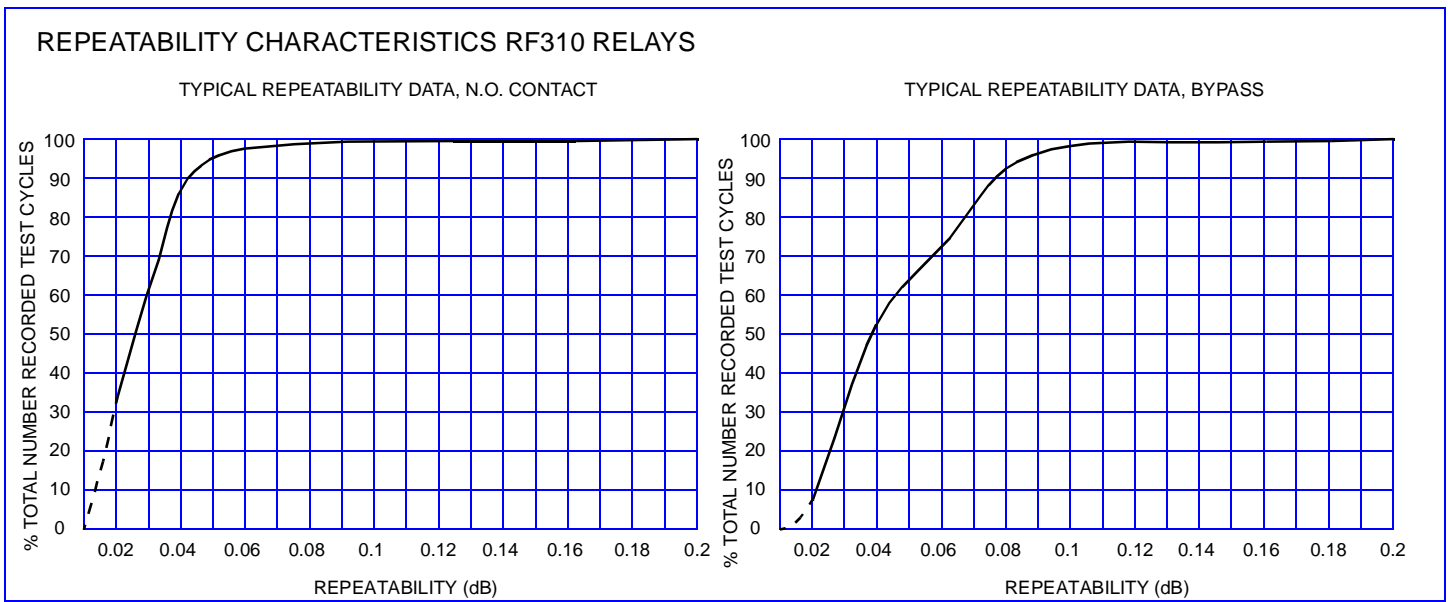


#### RF Notes:

- Test conditions:
  - Fixture: .031" copper clad, reinforced PTFE, duroid 6002<sup>®</sup> with SMA connectors. (Duroid is a registered trademark of Rogers Corporation).
  - Relays header is not soldered to ground plane or connected to ground via ground pin.
  - Test performed at room ambient temperature.
  - Terminals not tested were terminated with 50 ohm load.
  - Contact signal level: 0 dBm.
- Data presented herein represents typical characteristics and is not intended to be used as specification limits.
- Data is per pole.
- Measurement points are from pins 2 & 3 to pins 7 & 8.
- Data is the average of both N.O. contacts to the bypass path
- Relays operate at frequencies above 3 GHz with reduced RF performance characteristics.

# SERIES RF310 and RF313

## TYPICAL INSERTION LOSS REPEATABILITY CHARACTERISTICS (Notes 1 and 2)



### RF Insertion Loss Repeatability Notes

- Test conditions:
  - Fixture: .031" copper clad, reinforced PTFE, duroid 6002<sup>®</sup> with SMA connectors. (Duroid is a registered trademark of Rogers Corporation).
  - Relays header is not soldered to ground plane nor connected via ground pin.
  - Test performed at room ambient temperature.
  - Contact signal level: 0 dBm.
- Data presented herein represents typical characteristics and is not intended to be used as specification limits.
- N.O. path contacts connected in series externally.
- Insertion loss repeatability measured over frequency range from .3 MHz to 3 GHz.

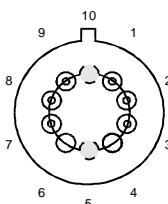
### GENERAL ELECTRICAL SPECIFICATIONS (@25°C)

Contact arrangement	N.C. side (coil de-energized)	N.O. side (coil energized)
	SPST, Normally Closed Double Break	DPST, Normally Open
Rated duty	Continuous	
Contact resistance (General note 2)	0.15 ohm max. initial (measured 1/8" from the header)	
Contact load rating	Low level: 10 to 50 $\mu$ A, 10 to 50 mV	
Contact life rating	10,000,000 cycles typical at low level	
Coil operating power	RF310: 450 mW typical @ nominal rated voltage RF313: 200 mW typical @ nominal rated voltage	
Operate time	RF310	4.0 ms. max.
	RF313	6.0 ms. max.
Release time	RF310	3.0 ms. max.
	RF313	3.0 ms. max.
Intercontact capacitance	0.4 pF typical	
Insulation resistance	1,000 M $\Omega$ min. (between mutually isolated terminals)	
Dielectric strength	350 VRMS / 60 Hz @ atmospheric pressure	

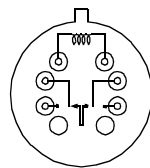
### DETAILED ELECTRICAL SPECIFICATIONS (@ 25°C)

BASE PART NUMBERS	RF310-5 RF313-5	RF310-12 RF313-12
Coil voltage, nominal, VDC	5.0	12.0
Coil resistance, ohms $\pm$ 20%	RF310	390
	RF313	850
Pick-up voltage max, VDC	3.6	9.0

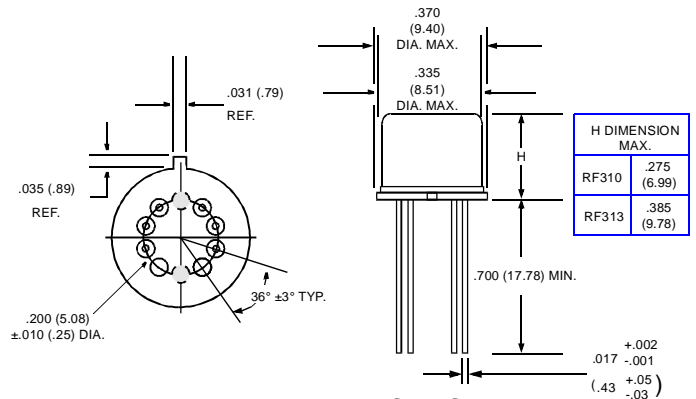
### OUTLINE DIMENSIONS



TERMINAL NUMBERING



SCHEMATIC



EXTERNAL DIMENSIONS

- HEADER DIMENSIONS, TERMINAL NUMBERING AND SCHEMATIC ARE AS VIEWED FROM THE TERMINALS.
- DIMENSIONS ARE IN INCHES (MILLIMETERS).
- POSITIONS 5 AND 10 ARE FOR UNINSULATED CASE GROUND OPTIONS.
- NO PROTRUSION BELOW BOTTOM OF HEADER WHEN GROUND PINS ARE INSTALLED IN POSITIONS 5 OR 10.
- SCHEMATIC AND EXTERNAL DIMENSIONS SHOWN WITHOUT GROUND PINS.
- TO ORDER THE CASE GROUND OPTION, AFTER THE SERIES DESIGNATOR, ADD "Y" TO THE PART NUMBER FOR POSITION 5 OR "Z" TO THE PART NUMBER FOR POSITION 10.

EXAMPLE: RF3##Y-COIL VOLTAGE

### GENERAL NOTES

1. Relays exhibit no contact chatter in excess of 10  $\mu$ s or transfer in excess of 1  $\mu$ s.
2. Contact resistance value applies to each closed contact as well as the bypass path.