TELEDYNE RELAYS
A Teledyne Technologies Company

NEW!

# Series RF312/RF332

DPDT Non-Latching Electromechanical Relay
Signal Integrity up to 12Gbps

## HIGH REPEATABILITY, DC-8 GHz TO-5 RELAYS DPDT

| SERIES | RELAY TYPE |
|---|---|
| RF312 | Repeatable, RF relay |
| RF332 | Sensitive Repeatable, RF relay |

DESCRIPTION

The ultra miniature RF312 is designed to improve upon the RF300/RF303 relay's high frequency performance. The RF312/RF332 offers monotonic insertion loss to 8 GHz. This improvement in RF insertion loss over the frequency range, makes these relays highly suitable for use in attenuator and other RF circuits. The sensitive RF332 relay has a high resistance coil, thus requiring extremely low operating power (200 mW typical). The advantages of reduced heat dissipation and power supply demands are a plus. The RF312/RF332 features:

- High repeatability.
- Broader bandwidth.
- Metal enclosure for EMI shielding.
- Ground pin option to improve case grounding.
- High isolation between control and signal paths.
- Highly resistant to ESD.

CONSTRUCTION FEATURES

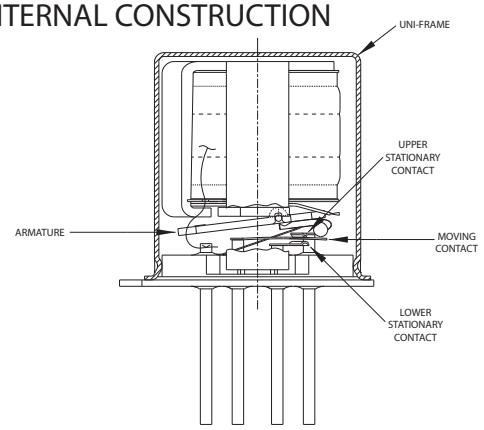
The following unique construction features and manufacturing techniques provide excellent resistance to environmental extremes and overall high reliability.

- 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.
- Hermetically sealed.
- Solder-Dipped Leads, (RoHS compliant solder option available)

## ENVIRONMENTAL AND PHYSICAL SPECIFICATIONS

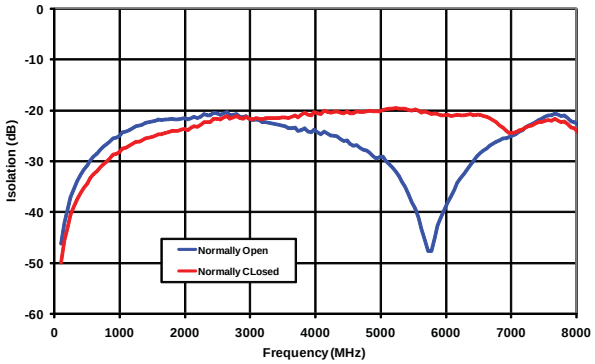
| | | |
|---|---|---|
| Temperature (Ambient) | Storage | –65°C to +125°C |
| | Operating | –55°C to +85°C |
| Vibration (General Note I) | | 10 g's to 500 Hz |
| Shock (General Note I) | | 30 g's, 6ms half sine |
| Enclosure | | Hermetically sealed |
| Weight | | 0.09 oz. (2.55g) max. |

## INTERNAL CONSTRUCTION

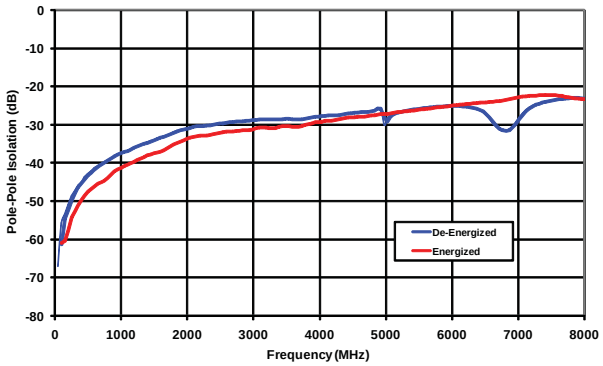


## SERIES RF312/RF332
## TYPICAL RF CHARACTERISTICS (See RF Notes)

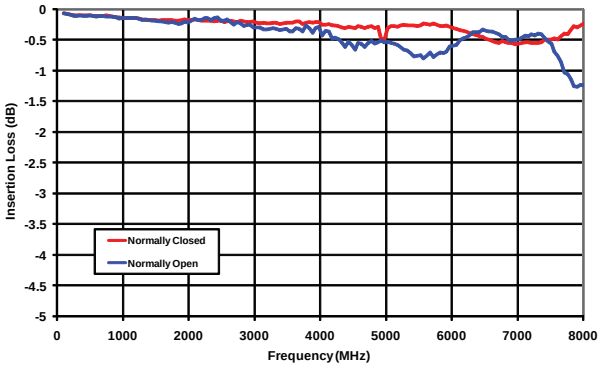
Isolation Across Contacts (RF Note 4)



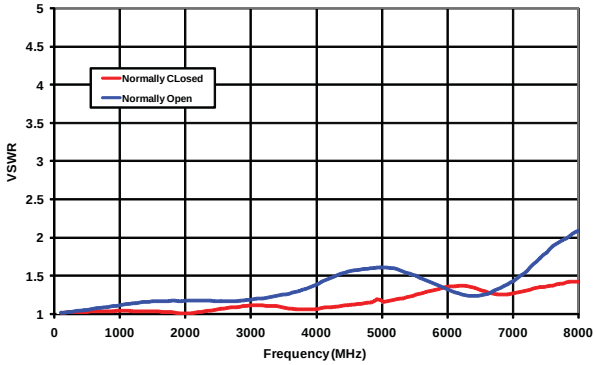

Isolation Pole to Pole (RF Note 5)



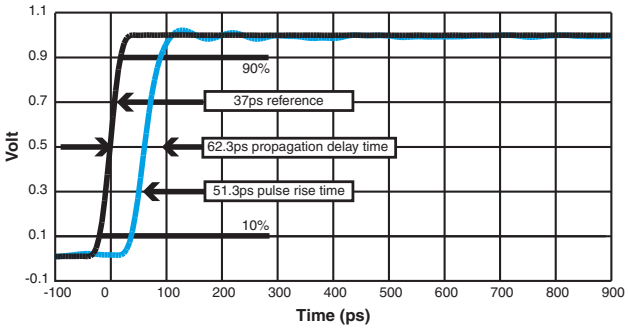

Insertion Loss (RF Note 6)




VSWR (RF Note 6)




RF312/RF332 Time Response (RF Note 6)




## RF NOTES

1. Test conditions:
   a. Fixture: .031" copper clad, reinforced PTFE, RT/duroid® 6002 with SMA connectors. (RT/duroid® is a registered trademark of Rogers Corporation.)
   b. Room ambient temperature.
   c. Terminals not tested were terminated with 50-ohm load.
   d. Contact signal level: –10 dBm.
   e. No. of test samples: 4.
2. Data presented herein represents typical characteristics and is not intended for use as specification limits.
3. Data is per pole, except for pole-to-pole data.
4. Data is the average from readings taken on all open contacts.
5. Data is the average from readings taken on poles with coil energized and de-energized.
6. Data is the average from readings taken on all closed contacts.
7. Test fixture effect de-embedded from frequency and time response data.

SERIES RF312/RF332
GENERAL ELECTRICAL SPECIFICATIONS (@25°C)

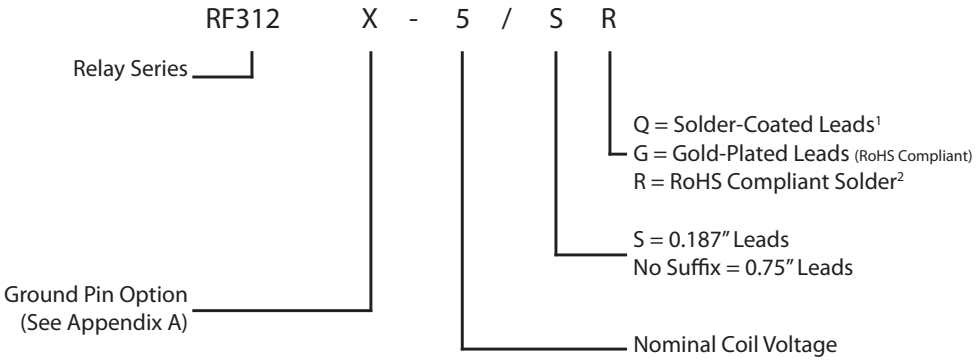
| | |
|---|---|
| Contact Arrangement | 2 Form C (DPDT) |
| Rated Duty | Continuous |
| Contact Resistance | 0.15 Ω max. |
| Contact Load Rating | Resistive: 1Amp/28Vdc<br>Low level: 10 to 50 µA @ 10 to 50 mV |
| Contact Life Ratings | 10,000,000 cycles (typical) at low level |
| Coil Operating Power | RF312: 450 mW typical at nominal rated voltage<br>RF332: 200 mW typical at nominal rated voltage |
| Operate Time | RF312: 4.0 mS max.<br>RF332: 6.0 mS max. |
| Release Time | 3.0 mS max. |
| Intercontact Capacitance | 0.4 pf typical |
| Insulation Resistance | 1,000 MΩ min. between mutually isolated terminals |
| Dielectric Strength | 350 Vrms (60 Hz) @ atmospheric pressure |

DETAILED ELECTRICAL SPECIFICATIONS (@25°C)

| BASE PART NUMBERS (RF312) | RF312-5 | RF312-12 |
|---|---|---|
| Coil Voltage, Nominal (Vdc) | 5.0 | 12.0 |
| Coil Resistance (Ohms ±20%) | 50 | 390 |
| Pick-up Voltage (Vdc max.) | 3.6 | 9.0 |

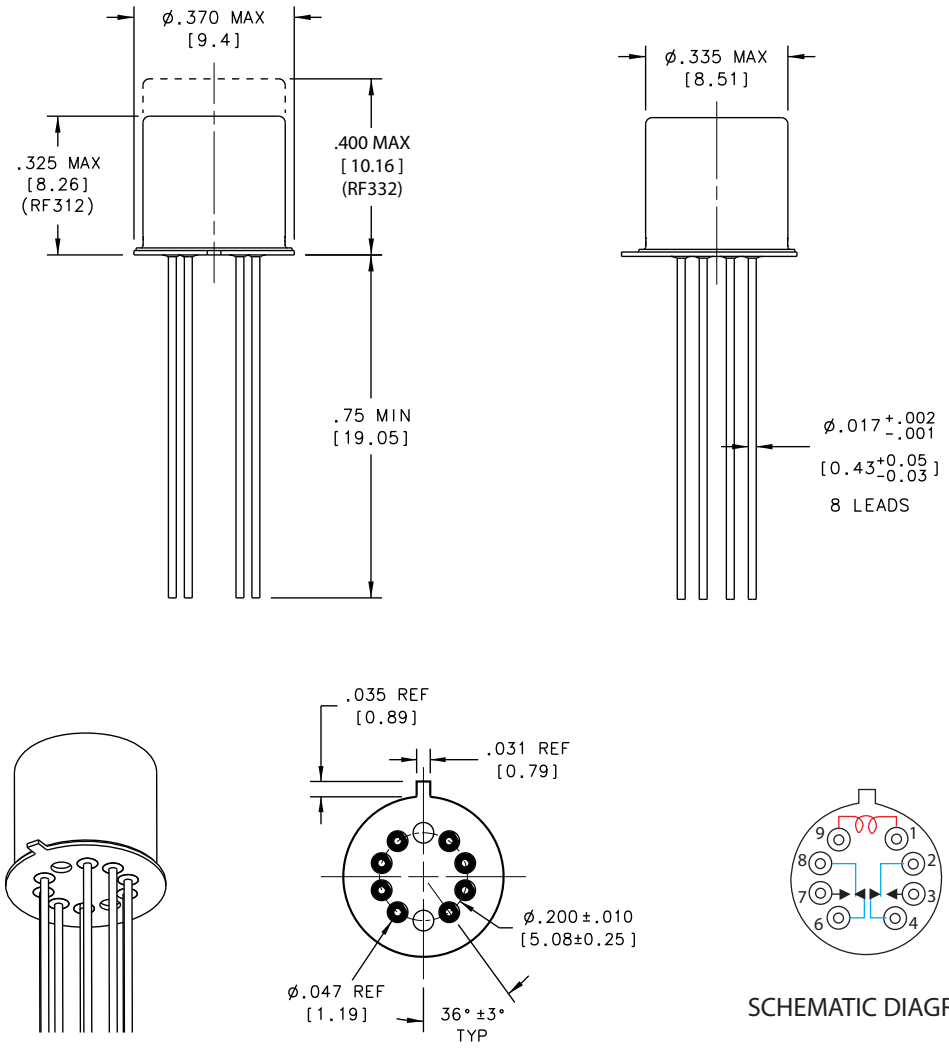
| BASE PART NUMBERS (RF332) | RF332-5 | RF332-12 |
|---|---|---|
| Coil Voltage, Nominal (Vdc) | 5.0 | 12.0 |
| Coil Resistance (Ohms ±20%) | 100 | 850 |
| Pick-up Voltage (Vdc max.) | 3.6 | 9.0 |

## Teledyne Part Numbering System for RF312/RF332




General Note: Parts ordered without suffix may be supplied with Solder-Coated or Gold-Plated leads
[1] Parts ordered with Solder-Coated leads will have (Sn60/Pb40)
[2] Parts ordered with RoHS Solder-Coated leads will have (Sn99.3/Cu0.7)

SERIES RF312/RF332
OUTLINE DIMENSIONS




SCHEMATIC DIAGRAM

NOTES:

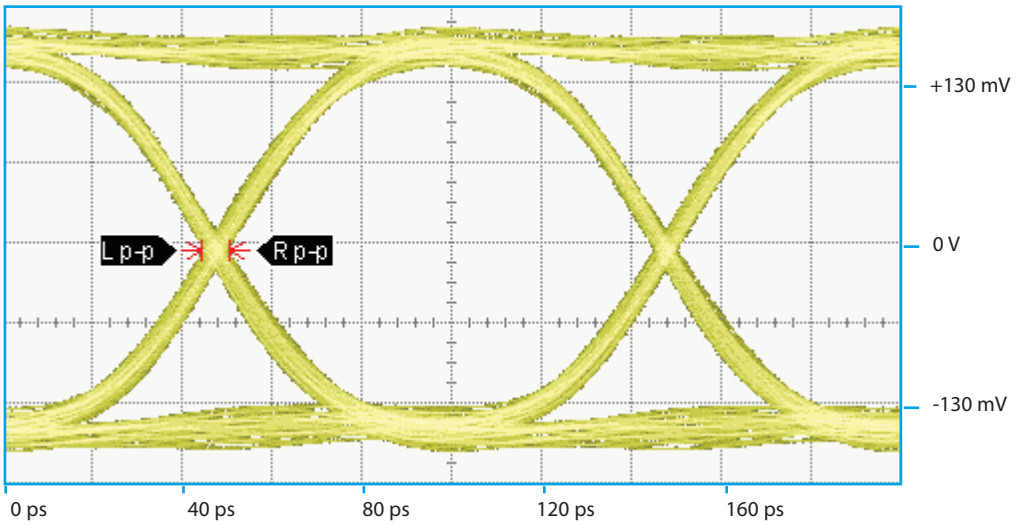
1. DIMENSIONS ARE IN INCHES, METRIC EQUIVALENTS SHOWN IN [ ].
2. POSTITIONS 5 AND 10 ARE FOR UNINSULATED CASE GROUND OPTIONS.
3. NO PROTRUSION BELOW BOTTOM OF HEADER WHEN GROUND PINS ARE INSTALLED
4. TO ORDER THE CASE GROUND OPTION, AFTER THE SERIES DESIGNATOR, ADD "Y" TO THE PART NUMBER FOR POSITION 5 OR "Z" TO THE PART NUMBER FOR POSITION 10.

GENERAL NOTES

I. Relays will exhibit no contact chatter in excess of 10 µsec or transfer in excess of 1 µsec.
II. For reference only. Coil resistance not directly measureable at relay terminals due to internal series diode.

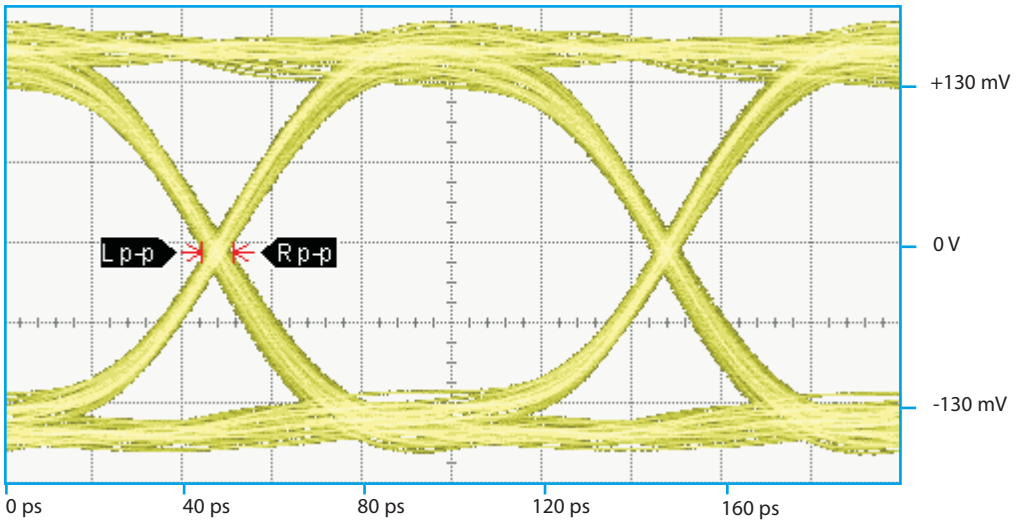
SERIES RF312/RF332
TYPICAL SIGNAL INTEGRITY CHARACTERISTICS

Normally Closed (Typ.)




| Eye Height | Eye Width | SNR | Jitter$_{P-P}$ |
|---|---|---|---|
| 272.2 mV | 92.62 ps | 20.76 | 6.22 ps |

Normally Open (Typ.)




| Eye Height | Eye Width | SNR | Jitter$_{P-P}$ |
|---|---|---|---|
| 238.4 mV | 92.82 ps | 12.85 | 7.11 ps |

PATTERN GENERATOR SETTINGS

- 10 Gbps Random Pulse Pattern Generator
- $2^{31}$ - 1 PRBS signal
- PRBS output of 300 mV$_{P-P}$ (nominal)
- RF PCB effect (negligible) not removed from measurement
- Data shown is typical of both poles