



**HIGH REPEATABILITY,
BROADBAND TO-5 RELAYS
DPDT**



| SERIES | RELAY TYPE |
|---------|--|
| RF300 | Repeatable, RF relay |
| RF300D | Repeatable, RF relay with internal diode for coil transient suppression |
| RF300DD | Repeatable, RF relay with internal diodes for coil transient suppression and polarity reversal protection |
| RF303 | Sensitive, repeatable, RF relay |
| RF303D | Sensitive, repeatable, RF relay with internal diode for coil transient suppression |
| RF303DD | Sensitive, repeatable, RF relay with internal diodes for coil transient suppression and polarity reversal protection |

DESCRIPTION

The ultraminiature RF300 and RF303 relays are designed to provide improved RF signal switching repeatability over the frequency range. These relays are engineered for use in RF attenuator, RF switch matrices, ATE and other applications that require dependable high frequency signal fidelity and performance.

The RF300 and RF303 feature:

- High repeatability
- Broader bandwidth
- Metal enclosure for EMI shielding
- High isolation between control and signal paths
- High resistance to ESD

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

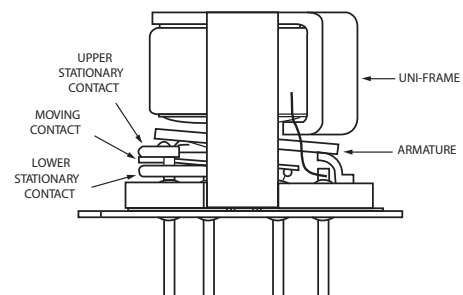
- Uniframe motor design provides high magnetic efficiency and mechanical rigidity
- Minimum mass components and welded construction provide maximum resistance to shock and vibration
- Advanced cleaning techniques provide maximum assurance of internal cleanliness
- Hermetically sealed
- Solder Dipped Leads, (RoHS compliant solder option available)

The Series RF300D/RF303D and RF300DD/RF303DD relays have internal discrete silicon diodes for coil suppression and polarity reversal protection. This hybrid package reduces required PC board floor space by reducing the number of external components needed to drive the relay.

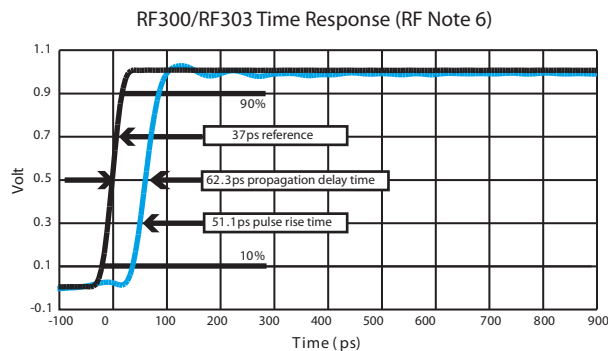
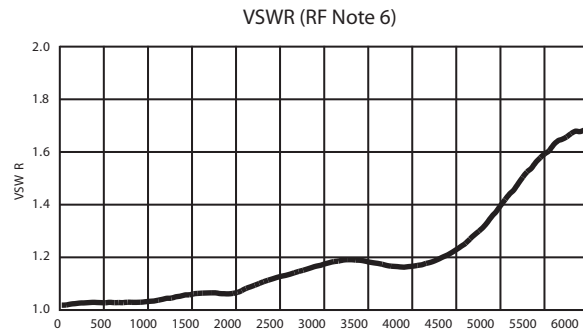
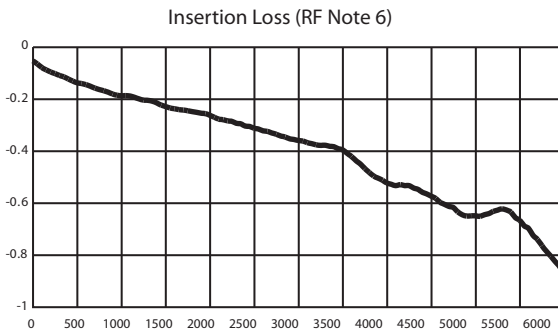
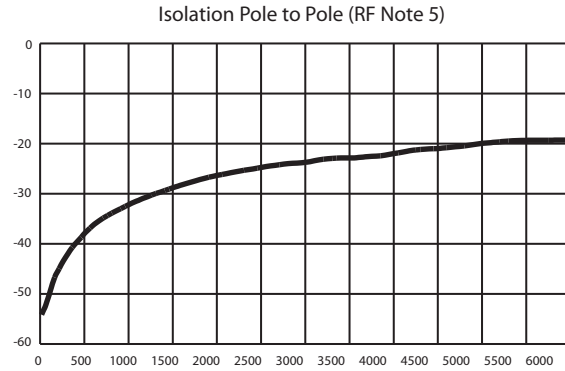
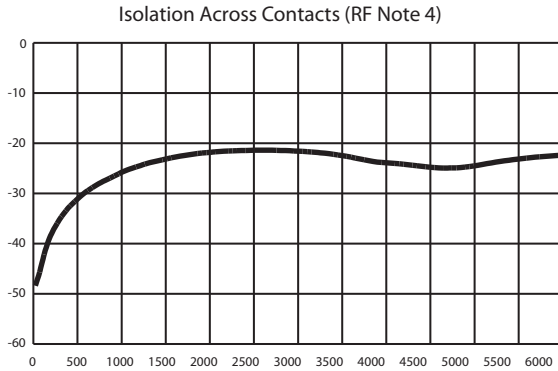
**ENVIRONMENTAL AND
PHYSICAL SPECIFICATIONS**

| | | |
|----------------------------|-----------|-----------------------|
| 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 | RF300 | 0.09 oz. (2.55g) max. |
| | RF303 | 0.16 oz. (4.5g) max. |

INTERNAL CONSTRUCTION



SERIES RF300/RF303
TYPICAL RF CHARACTERISTICS (See RF Notes)

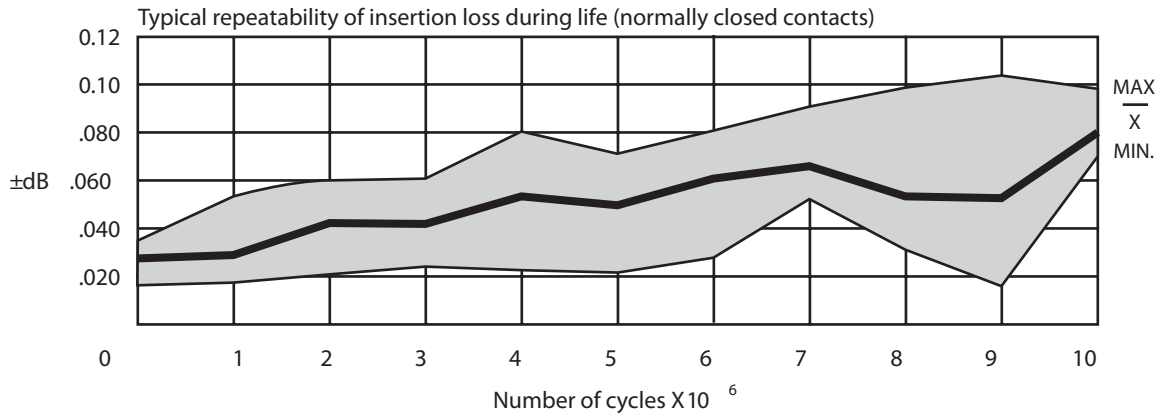
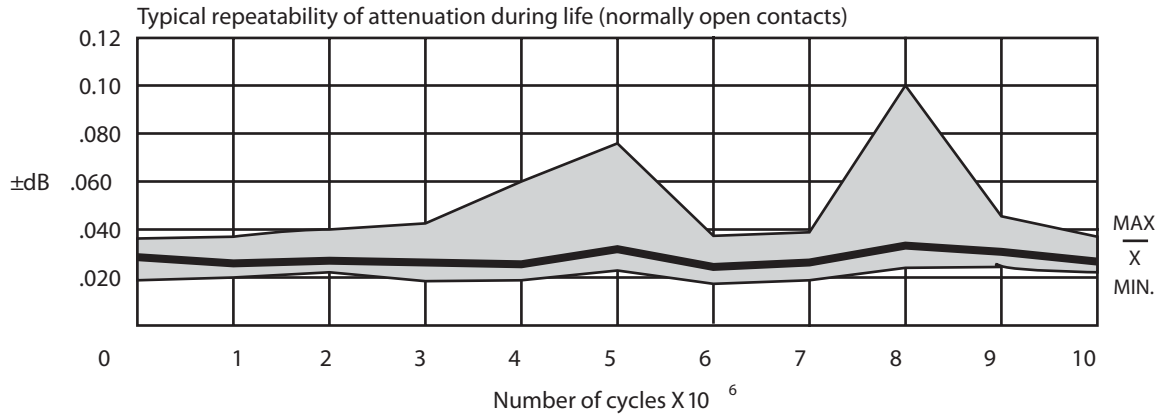


RF NOTES

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

SERIES RF300/RF303
TYPICAL RF REPEATABILITY PERFORMANCE (See RF Notes 1,2 and 3)

1 Million Cycle Repeatability ± 0.1 dB from DC to 3GHz



RF NOTES

1. One million cycle repeatability data is based upon 396 observations with an average repeatability ± 0.033 dB and a range of ± 0.093 dB.
2. Repeatability of attenuation values were obtained from tests conducted in a 20 dB attenuator network with a 0 dBm input signal.
3. Relay operates at frequencies higher than 3 GHz with reduced RF performance characteristics.
4. Curves were developed from tests performed on a 0.031" copper clad, reinforced PTFE circuit board at 20°C (ref). The unutilized contacts were terminated in 50 ohms; characteristic impedance of measuring equipment is 50 ohms. The relays were mounted flush to the circuit board ground plane without the relay header soldered to the ground plane.

SERIES RF300/RF303
GENERAL ELECTRICAL SPECIFICATIONS (@25°C)

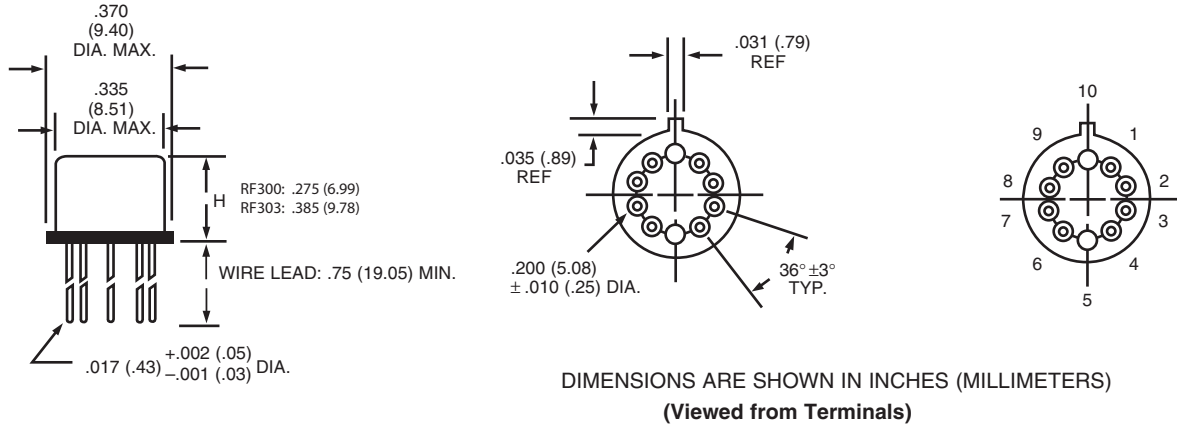
| | | |
|-------------------------------|--|------------------------------|
| Contact Arrangement | 2 Form C (DPDT) | |
| Rated Duty | Continuous | |
| Contact Resistance | 0.15 Ω max. | |
| Contact Load Rating | Resistive: 1Amp/28Vdc Low level: 10 to 50 μA @ 10 to 50 mV | |
| Contact Life Ratings | 10,000,000 cycles (typical) at low level | |
| Coil Operating Power | RF300: 450 mW typical at nominal rated voltage RF303: 200 mW typical at nominal rated voltage | |
| Operate Time | RF300: 4.0 mS max. RF303: 6.0 mS max. | |
| Release Time | RF300: 3.0 mS max. | RF300D, RF300DD: 6.0 mS max. |
| | RF303: 3.0 mS max. | RF303D, RF303DD: 7.5 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 | |
| Negative Coil Transient (Vdc) | RF300D/RF303D,RF300DD/RF303DD | 2.0 max |
| Diode P.I.V. (Vdc) | RF300D/RF303D,RF300DD/RF303DD | 60 min. |

DETAILED ELECTRICAL SPECIFICATIONS (@25°C)

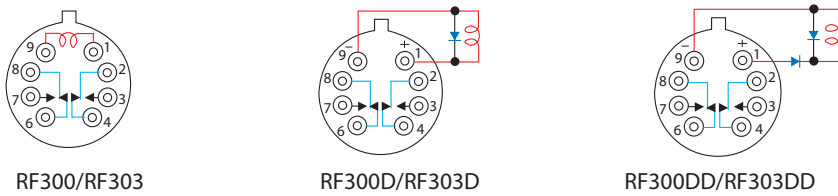
| BASE PART NUMBERS (RF300, RF300D, RF300DD) | | RF300-5 RF300D-5 RF300DD-5 | RF300-12 RF300D-12 RF300DD-12 |
|--|---------------------------|----------------------------------|-------------------------------------|
| Coil Voltage, Nominal (Vdc) | | 5.0 | 12.0 |
| Coil Resistance (Ohms ±20%) | RF300, RF300D | 50 | 390 |
| | RF300DD (General Note II) | 39 | 390 |
| Coil Current (mAdc@ 25 °C) (RF300DD Series) | Min. | 93.2 | 25.6 |
| | Max. | 128.2 | 32.8 |
| Pick-up Voltage (Vdc max.) | RF300, RF300D, RF300DD | 3.6 | 9.0 |

| BASE PART NUMBERS (RF303, RF303D, RF303DD) | | RF303-5 RF303D-5 RF303DD-5 | RF303-12 RF303D-12 RF303DD-12 |
|--|---------------------------|----------------------------------|-------------------------------------|
| Coil Voltage, Nominal (Vdc) | | 5.0 | 12.0 |
| Coil Resistance (Ohms ±20%) | RF303, RF303D | 100 | 850 |
| | RF303DD (General Note II) | 64 | 850 |
| Coil Current (mAdc@ 25 °C) (RF303DD Series) | Min. | 56.8 | 11.7 |
| | Max. | 78.1 | 15.0 |
| Pick-up Voltage (Vdc max.) | RF303, RF303D, RF303DD | 3.6 | 9.0 |

**SERIES RF300/RF303
OUTLINE DIMENSIONS**



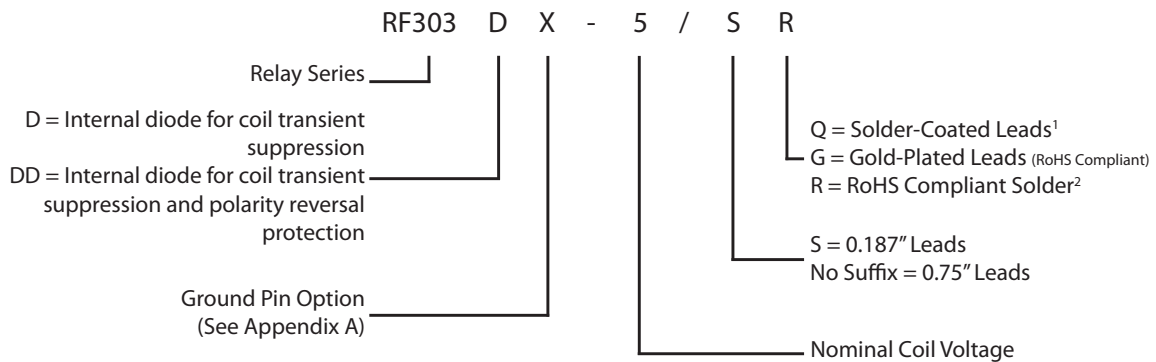
SCHEMATIC DIAGRAMS



NOTES:

1. DIMENSIONS ARE IN INCHES, METRIC EQUIVALENTS SHOWN IN [].
2. POSITIONS 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.

Teledyne Part Numbering System for RF300/RF303 Relays



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)

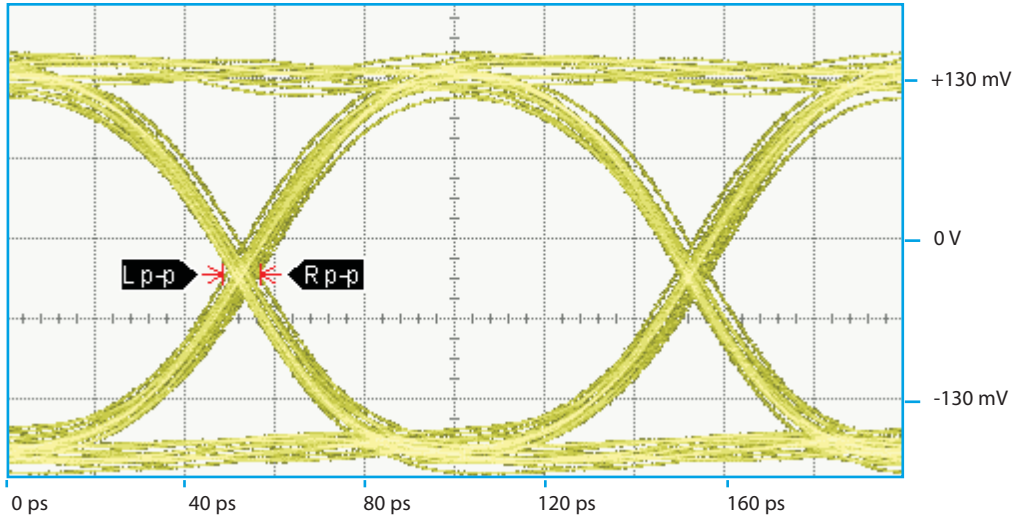
² Parts ordered with RoHS Solder-Coated leads will have (Sn99.3/Cu0.7)

GENERAL NOTES

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

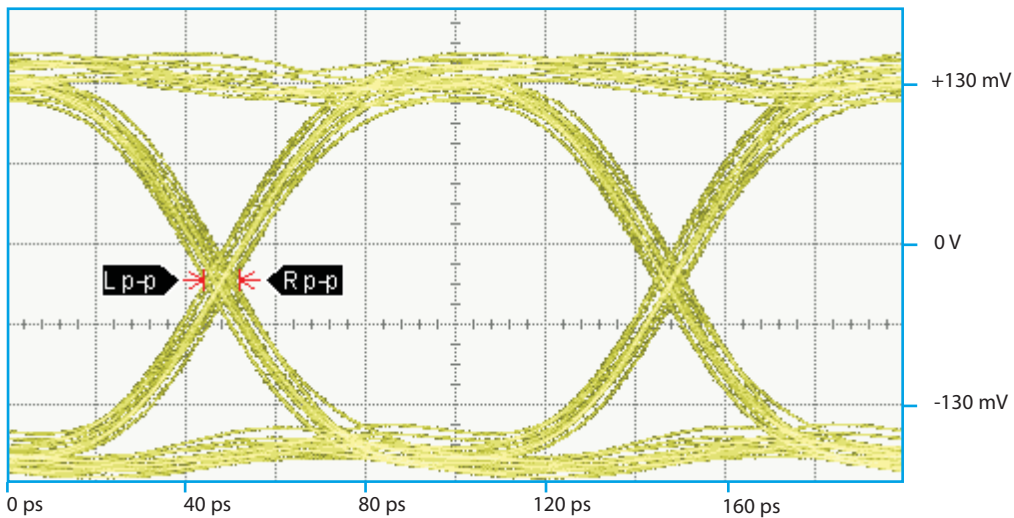
SERIES RF300/RF303
TYPICAL SIGNAL INTEGRITY CHARACTERISTICS

Normally Closed (Typ.)



| Eye Height | Eye Width | SNR | Jitter _{p-p} |
|------------|-----------|-------|-----------------------|
| 254.7 mV | 90.38 ps | 18.52 | 8.44 ps |

Normally Open (Typ.)



| Eye Height | Eye Width | SNR | Jitter _{p-p} |
|------------|-----------|-------|-----------------------|
| 250.9 mV | 88.21 ps | 16.84 | 8.00 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

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