
TELEDYNE RELAYS

A Teledyne Technologies Company

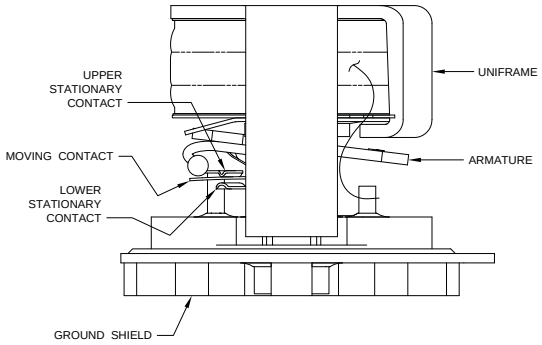
NEW!

# SURFACE MOUNT HIGH REPEATABILITY 8 GHz TO-5 Relays SIGNAL INTEGRITY TO 12 Gbps DPDT

SERIES
GRF312

| SERIES DESIGNATION | RELAY TYPE |
|---|---|
| GRF312 | Repeatable, RF TO-5 relay |

## INTERNAL CONSTRUCTION




| ENVIRONMENTAL AND PHYSICAL SPECIFICATIONS | | |
|---|---|---|
| Temperature (Ambient) | Storage | –65°C to +125°C |
| | Operating | –55°C to +85°C |
| Vibration (General Note 1) | | 10 g's to 500 Hz |
| Shock (General Note 1) | | 30 g's, 6ms half sine |
| Enclosure | | Hermetically sealed |
| Weight | | 0.09 oz. (2.55g) max. |

## PERFORMANCE FEATURES

The ultraminiature GRF312 relay is designed to improve upon the GRF300/GRF303 relay's high frequency performance. The GRF312 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 GRF312 features:

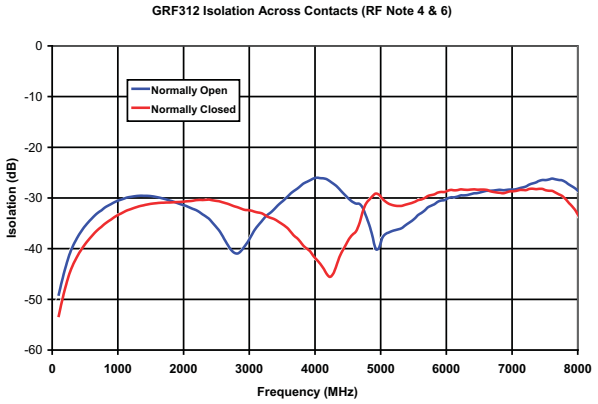
- High repeatability.
- Broader bandwidth.
- Metal enclosure for EMI shielding.
- High isolation between control and signal paths.
- Highly resistant to ESD.

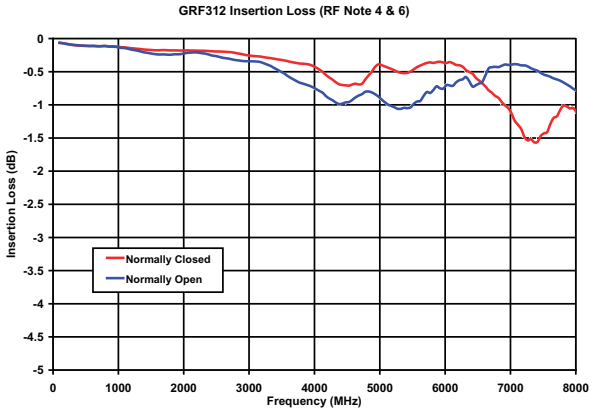
## CONSTRUCTION FEATURES

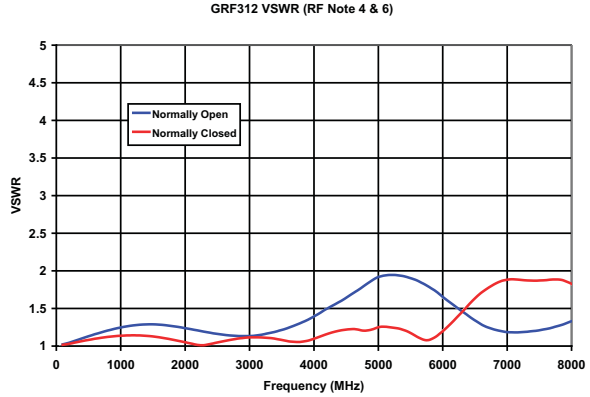
The following unique construction features and manufacturing techniques provide excellent resistance to environmental extremes and overall high reliability.

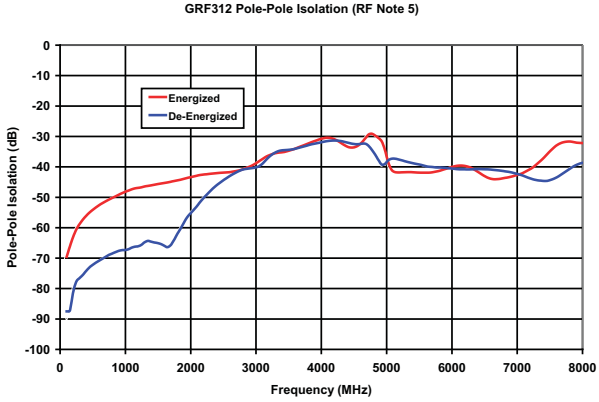
- Uni-frame motor design provides high magnetic efficiency and mechanical rigidity.
- Minimum mass components and welded construction provide maximum resistance to shock and vibration.
- Advanced cleaning techniques provide maximum assurance of internal cleanliness.
- Gold-plated precious metal alloy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

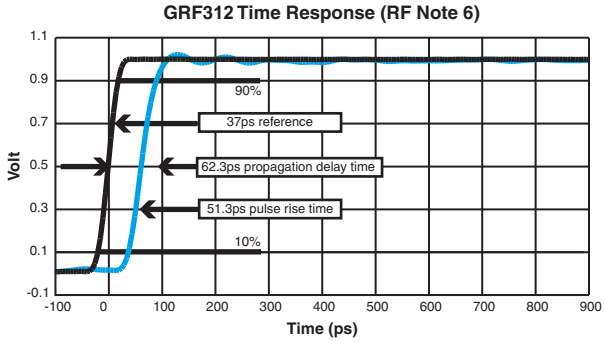
SERIES GRF312
TYPICAL RF CHARACTERISTICS (See RF Notes)




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. RF ground shield is soldered to PCB RF ground plane.
   c. Room ambient temperature.
   d. Terminals not tested were terminated with 50-ohm load.
   e. Contact signal level: –10 dBm.
   f. No. of test samples: 2.
2. Data presented herein represents typical characteristics and is not intended for use as specification limits.
3. Data is per pole, except fpr pole-to-pole data.
4. Data is the average from readings taken on all open contacts.
5. Data is the average from readings taken between 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 GRF312

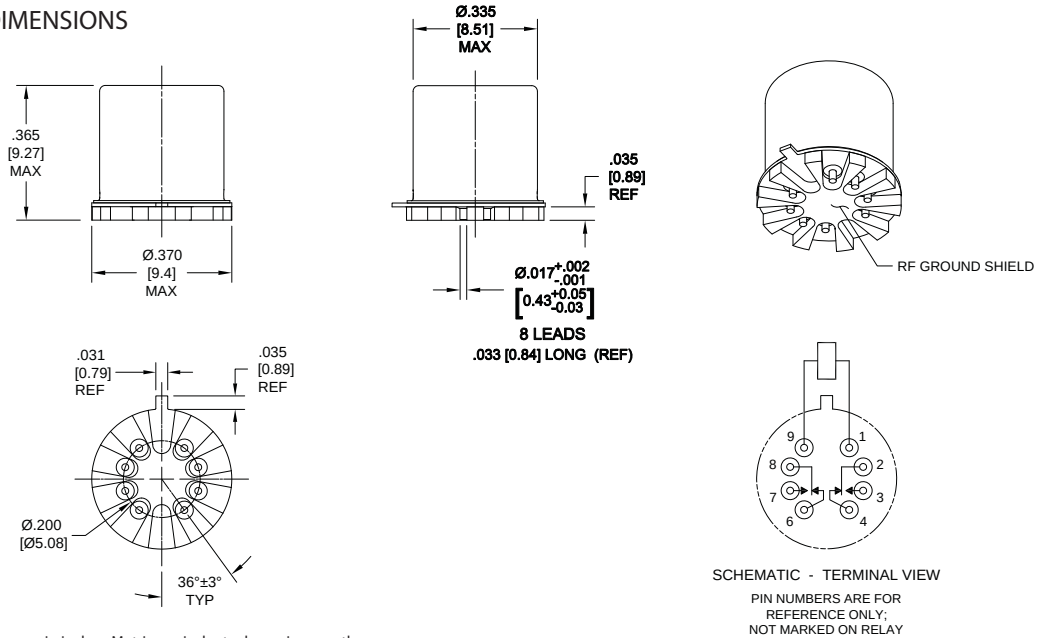
GENERAL ELECTRICAL SPECIFICATIONS (@25°C unless otherwise noted) (Notes 2 & 3)

| | |
|---|---|
| Contact Arrangement | 2 Form C (DPDT) |
| Rated Duty | Continuous |
| Contact Resistance | 0.15 Ω max. initial (measured 1/8" from the header) |
| 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 | 450 mW typical @ nominal rated voltage |
| Operate Time | 4.0 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 | GRF312-5 | GRF312-12 | GRF312-18 | GRF312-26 |
|---|---|---|---|---|
| Coil Voltage, Nominal (Vdc) | 5.0 | 12.0 | 18.0 | 26.5 |
| Coil Resistance (Ohms ±20%) | 50 | 390 | 880 | 1560 |
| Pick-up Voltage (Vdc max.) | 3.6 | 9.0 | 12.3 | 16.5 |

OUTLINE DIMENSIONS




SCHEMATIC - TERMINAL VIEW

PIN NUMBERS ARE FOR REFERENCE ONLY; NOT MARKED ON RELAY

NOTES

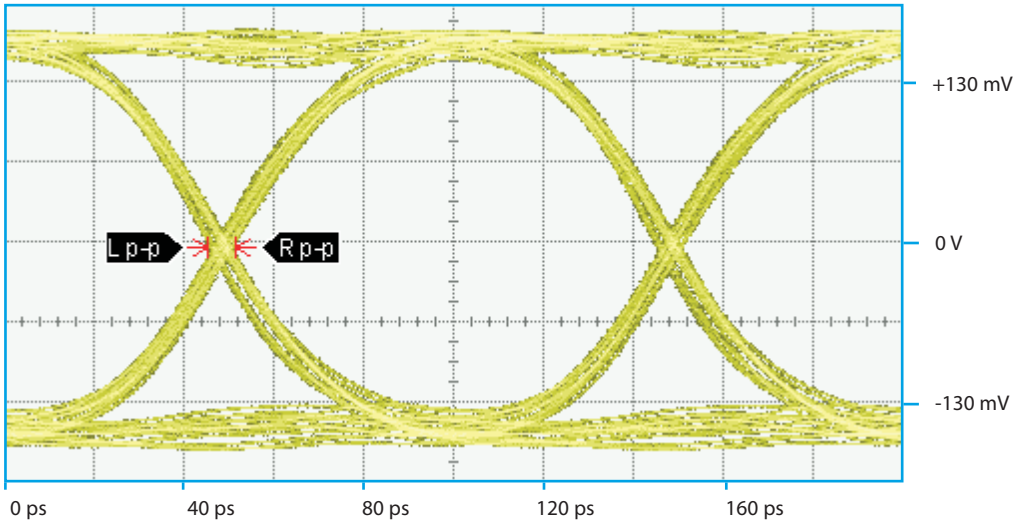
1. Dimensions are in inches. Metric equivalents shown in parentheses.
2. Header dimensions, terminal numbering and schematic are as viewed from the terminals.
3. Positions 5 and 10 are for uninsulated case ground options.
4. To order the case ground option, after the series designator, add "Y" to the part number for position 5 or "Z" to the part number for position 10.
   Example: GRF312Y-5

GENERAL NOTES

1. Relays will exhibit no contact chatter in excess of 10 µsec or transfer in excess of 1 µsec.
2.. Relays may be subjected to 260 °C peak solder reflow temperature, 1 minute, 3 passes.
3. Butt-lead ends are coplanar within .003" (0.08mm).
4. Application notes available for PCB mounting information.

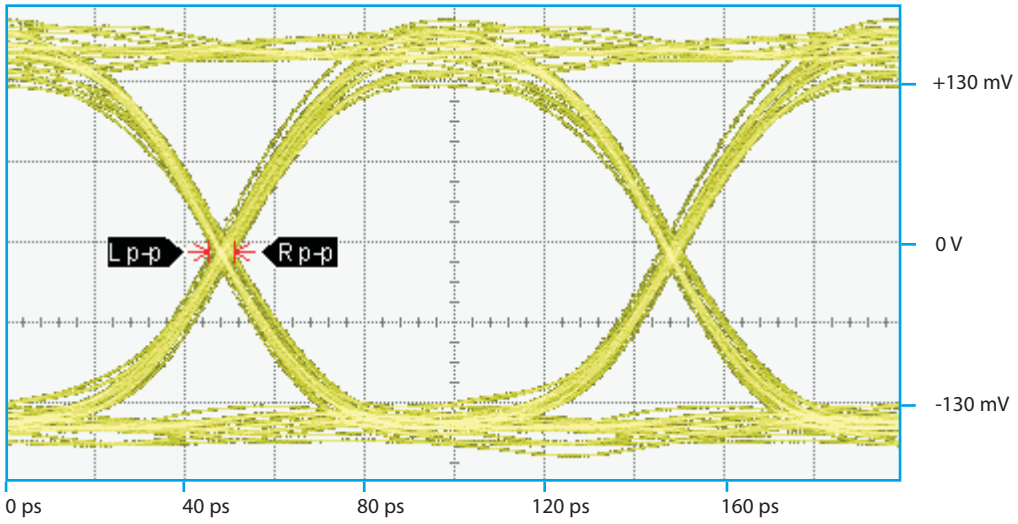
## TYPICAL SIGNAL INTEGRITY CHARACTERISTICS

### Normally Closed (Typ.)




| Eye Height | Eye Width | SNR | $Jitter_{P-P}$ |
|---|---|---|---|
| 266.5 mV | 91.09 ps | 20.75 | 6.22 ps |

### Normally Open (Typ.)




| Eye Height | Eye Width | SNR | $Jitter_{P-P}$ |
|---|---|---|---|
| 239.6 mV | 92.77 ps | 14.52 | 5.78 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