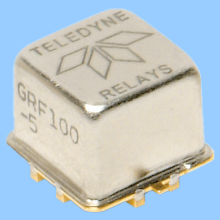
TELEDYNE RELAYS
Everywhereyoulook™

Series GRF100/GRF103

SPDT Non-Latching
DC-6 GHz, RF Relay

HIGH REPEATABILITY, SMT DPDT, BROADBAND 6 GHz, CENTIGRID® RELAYS



SERIES	RELAY TYPE
GRF100	Surface Mount, DPDT, Repeatable, RF Centigrid® relay, DC-6 GHz,
GRF103	Sensitive, Surface Mount, DPDT, Repeatable, RF Centigrid® relay

DESCRIPTION

The ultraminiature GRF100 and GRF103 relays are designed to provide a practical surface-mount solution with improved RF signal repeatability over the frequency range. GRF100 and GRF103 relays feature a unique ground shield that isolates and shields each lead to ensure excellent contact-to-contact and pole-to-pole isolation. This ground shield provides a ground interface that results in improved high-frequency performance as well as parametric repeatability. The GRF100 and GRF103 extend performance advantages over similar RF devices that simply offer formed leads for surface mounting.

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 GRF100 and SGRF103 feature:

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

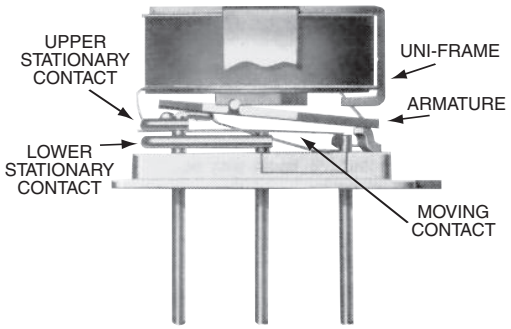
The following unique construction features and manufacturing techniques provide excellent robustness to environmental extremes and overall high reliability:

- 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
- Gold-plated precious metal alloy contacts ensure reliable switching
- Hermetically sealed
- RoHS Compliant

ENVIRONMENTAL AND PHYSICAL SPECIFICATIONS

Temperature (Ambient)	Storage	–55°C to +125°C
	Operating	–55°C to +85°C
Vibration (Note 1)		10 g's, 10 to 500 Hz
Shock (Note 1)		30 g's, 6 ms, half sine
Enclosure		Hermetically sealed
Weight	**GRF100**	0.09 oz. (2.55g) max.
	GRF103	0.16 oz. (4.5g) max.

INTERNAL CONSTRUCTION



GENERAL ELECTRICAL SPECIFICATIONS (-65 °C to 125 °C unless otherwise noted)(Notes 2 & 3)

Contact Arrangement	DPDT
Rated Duty	Continuous
Contact Resistance	0.100 Ω max. initial
Contact Load Rating	Low level: 10 to 50 µA @ 10 to 50 mV
Contact Life Ratings	10,000,000 cycles (typical) at low level
Coil Operating Power	GRF100-5: 500 mW typical @ nominal rated voltage GRF100-12: 369 mW typical @ nominal rated voltage GRF103-5: 250 mW typical @ nominal rated voltage GRF103-12: 180 mW typical @ nominal rated voltage
Operate Time	GRF100: 4.0 ms max. GRF103: 6.0 ms max.
Release Time	GRF100: 3.0 ms max. GRF103: 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 (-65 °C to 125 °C unless otherwise noted.) (Note 3)

BASE PART NUMBERS		GRF100-5/GRF103-5	GRF100-12/GRF103-12
Coil Voltage, Nominal (Vdc)		5.0	12.0
Coil Resistance (Ohms ±20%)	**GRF100**	50	390
	GRF103	100	800
Pick-up Voltage (Vdc max.)		3.6	9.0

Part Numbering System (Notes 4 & 5)

GRF100 - 12 / Q

Relay Series
GRF100
GRF103

Coil Voltage
5 = 5Vdc
12 = 12Vdc

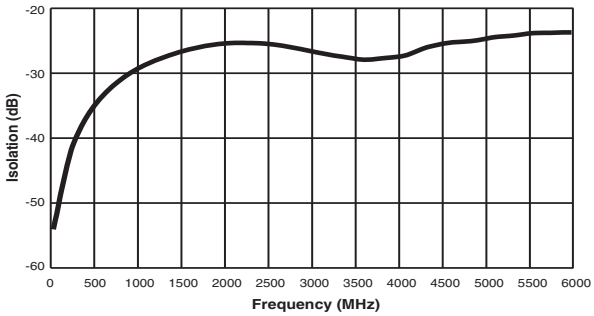
Lead Finish
Q = Solder-Dipped Leads (Sn60/Pb40)
R = RoHS Compliant Solder (Sn99.3/Cu0.7)
No Suffix = Gold-plated Leads

NOTES

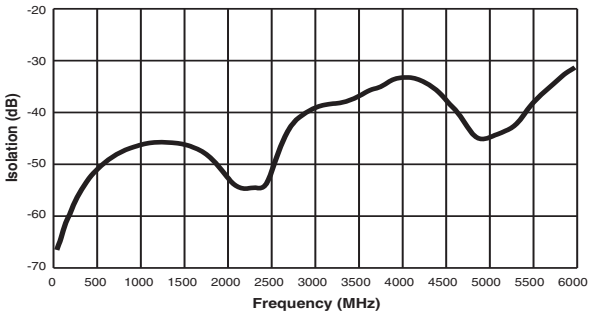
1. Relay contacts will exhibit no chatter in excess of 10 µs or transfer in excess of 1 µs.
2. Characteristics shown as “typical” are based on available data and are best estimates. No ongoing verification tests are performed.
3. Unless otherwise specified, parameters are initial values.
4. Parts ordered with no suffix option will be provided with Gold-Plated leads which have a typical plating thickness of 25-40 µin.
5. The slash and characters appearing after the slash are not marked on the relay.
6. Using an operate voltage less than the specified minimum may result in unreliable operation.
7. Relay temperature during soldering shall not exceed 250°C, and reflow temperature shall not exceed 250°C, 3 passes, 1 minute each.

TYPICAL RF CHARACTERISTICS (See RF Notes)

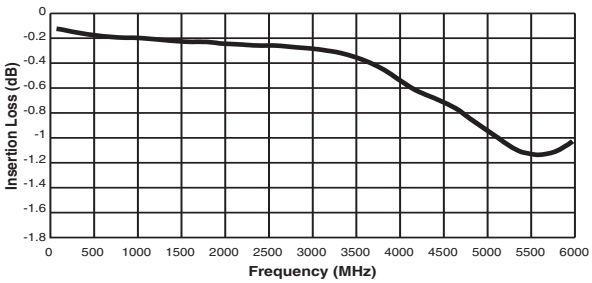
Isolation Across Contacts (RF Note 4)



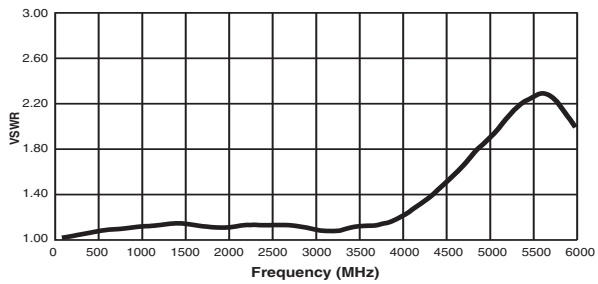
Isolation Pole to Pole (RF Note 5)



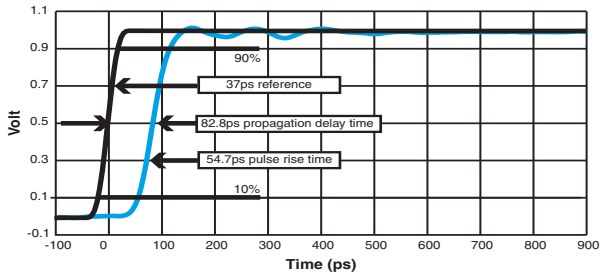
Insertion Loss (RF Note 6)



VSWR (RF Note 6)



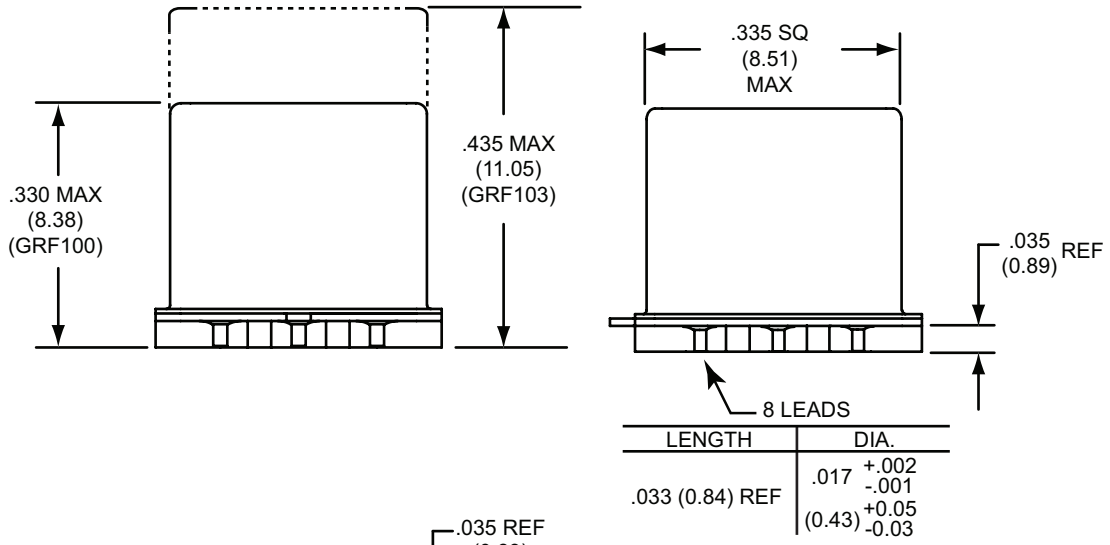
GRF100 Time Response (RF Note 6)

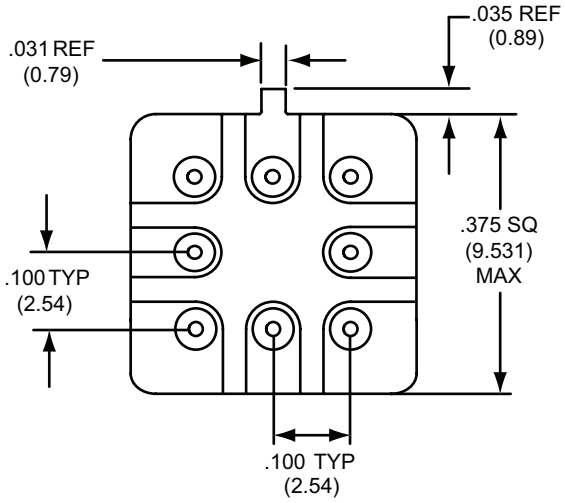


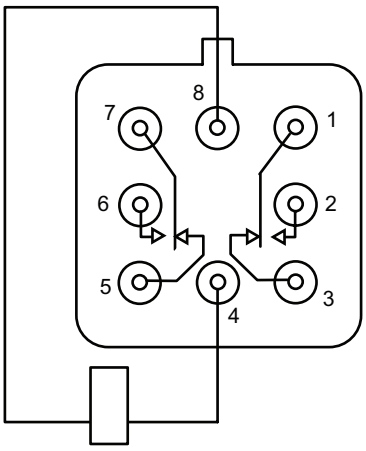
RF NOTES

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.* 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 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.

OUTLINE DIMENSIONS

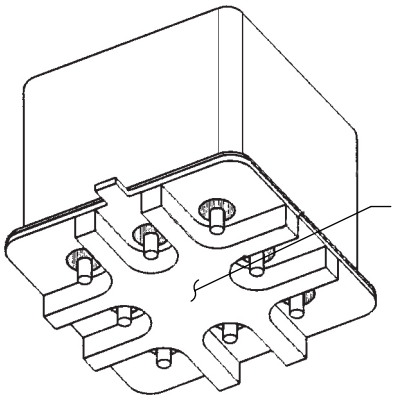






SCHEMATIC-TERMINAL VIEW

PIN NUMBERS ARE
FOR REFERENCE ONLY,
NOT MARKED ON RELAY



U.S. PATENT PENDING

NOTES:
1. DIMENSIONS ARE IN INCHES. METRIC EQUIVALENTS IN MILLIMETERS ARE SHOWN IN ( ).
2. UNLESS OTHERWISE SPECIFIED, TOLERANCES ON DIMENSIONS ARE .010 INCH (0.025 mm).
3. FOR OPTIMAL RF PERFORMANCE, SOLDER BOTTOM OF GROUND SHIELD TO PCB RF GROUND PLANE.