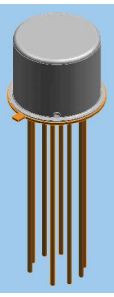
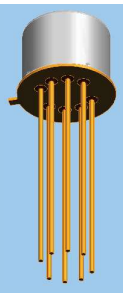
TELEDYNE RELAYS
Everywhereyoulook™

Series RF700/RF703

DPDT Non-Latching Electromechanical Relay
DC-4 GHz



HIGH REPEATABILITY, TO-5 RELAYS DPDT



SERIES	RELAY TYPE
RF700	Repeatable, RF relay
RF703	Sensitive, repeatable, RF relay

DESCRIPTION

The ultraminiature RF700 and RF703 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 RF700 and RF703 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:

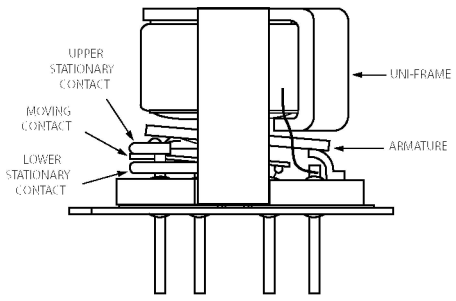
- Uniframe motor design provides high magnetic efficiency and mechanical rigidity
- Minimum mass components and welded construction provide maximum resistance to shock and vibration
- Advanced cleaning techniques provide maximum assurance of internal cleanliness
- Hermetically sealed
- Solder Dipped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

The Series RF700D/RF703 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

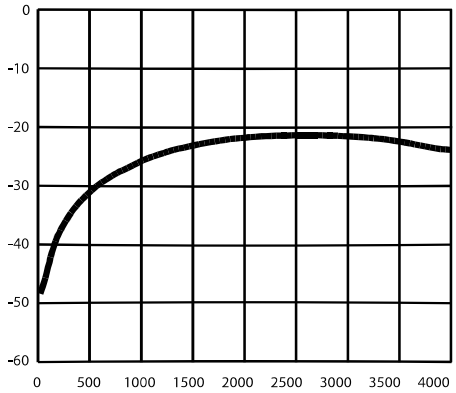
Temperature (Ambient)	**Storage**	–55°C to +85°C
	Operating	–45°C to +65°C
Vibration (General Note I)		10 g's to 500 Hz
Shock (General Note I)		30 g's, 6ms half sine
Enclosure		Hermetically sealed
Weight	**RF700**	0.09 oz. (2.55g) max.
	RF703	0.16 oz. (4.5g) max.

INTERNAL CONSTRUCTION

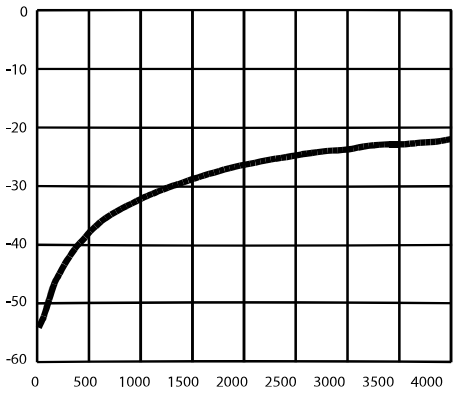


SERIES RF700/RF703
TYPICAL RF CHARACTERISTICS (See RF Notes)

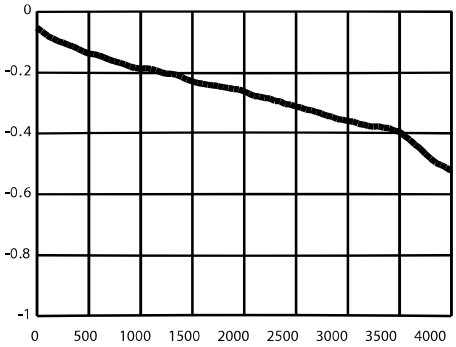
Isolation Across Contacts (RF Note 4)



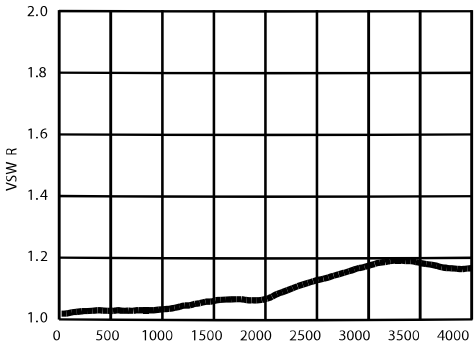
Isolation Pole to Pole (RF Note 5)



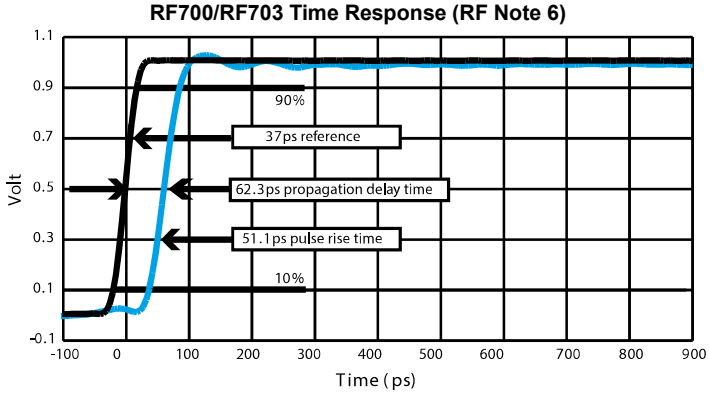
Insertion Loss (RF Note 6)



VSWR (RF Note 6)



RF700/RF703 Time Response (RF Note 6)

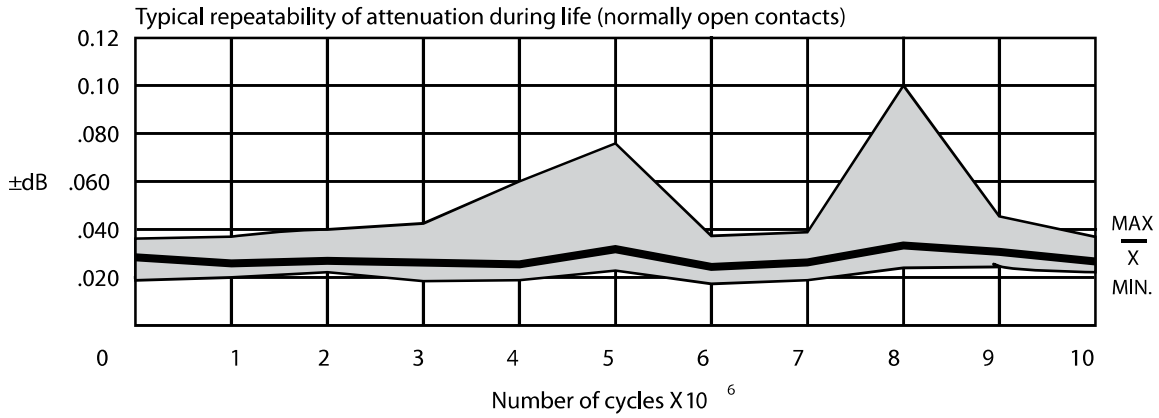


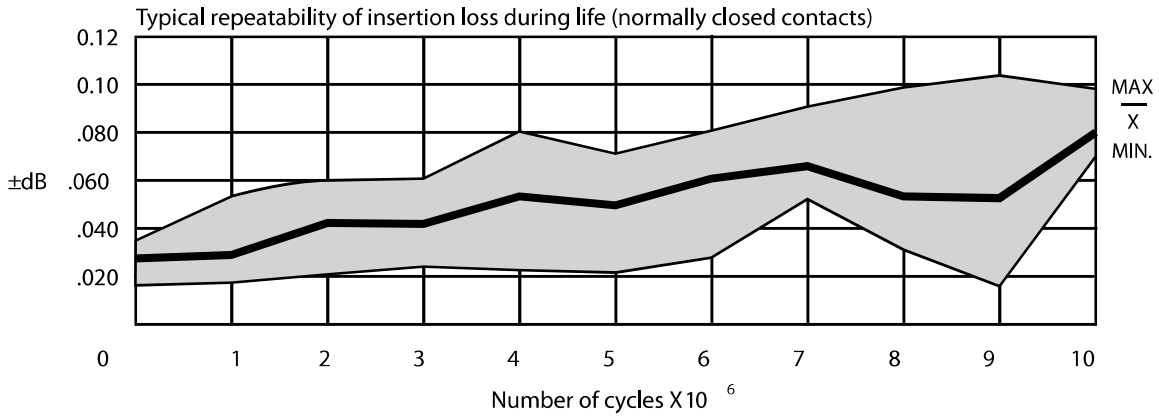
RF NOTES

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 RF700/RF703
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 RF700/RF703
GENERAL ELECTRICAL SPECIFICATIONS (@25°C)

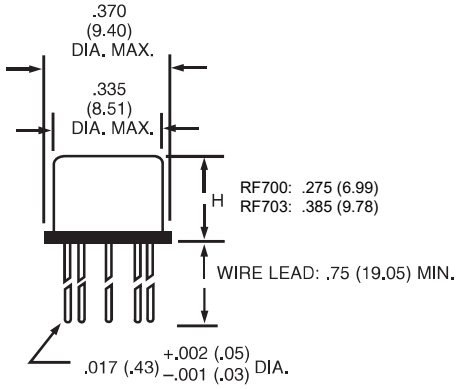
Contact Arrangement	2 Form C (DPDT)
Rated Duty	Continuous
Contact Resistance	0.15 Ω max.
Contact Load Rating	Resistive: 1Amp/28Vdc Low level: 10 to 50 µA @ 10 to 50 mV
Contact Life Ratings	5,000,000 cycles (typical) at low level
Coil Operating Power	RF700-5: 500 mW @ nominal coil
	RF703-5: 250 mW @ nominal coil
Operate Time	RF700: 4.0 mS max. RF703: 6.0 mS max.
Release Time	RF700: 3.0 mS max.
	RF703: 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

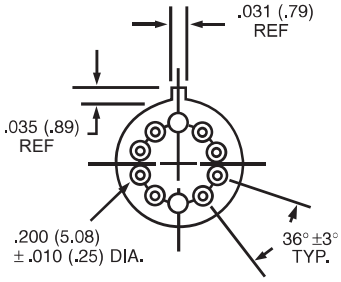
DETAILED ELECTRICAL SPECIFICATIONS (@25°C)

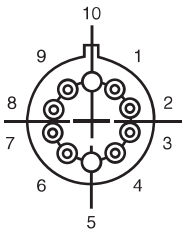
BASE PART NUMBERS (RF700)	RF700-5	RF700-12
Coil Voltage, Nominal (Vdc)	5.0	12.0
Coil Resistance (Ohms ±20%)	50	390

BASE PART NUMBERS (RF703)	RF703-5	RF703-12
Coil Voltage, Nominal (Vdc)	5.0	12.0
Coil Resistance (Ohms ±20%)	100	850

SERIES RF700/RF703 OUTLINE DIMENSIONS

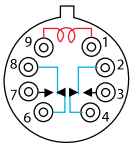






DIMENSIONS ARE SHOWN IN INCHES (MILLIMETERS)
(Viewed from Terminals)

SCHEMATIC DIAGRAMS



RF700/RF703

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.**

Teledyne Part Numbering System for RF700/RF703 Relays

RF703 YZ - 5 / S R

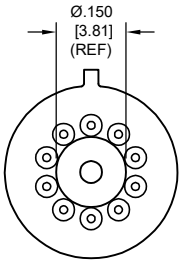
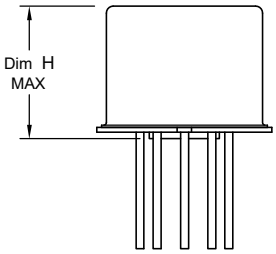
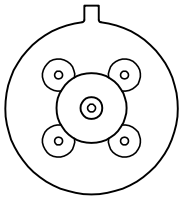
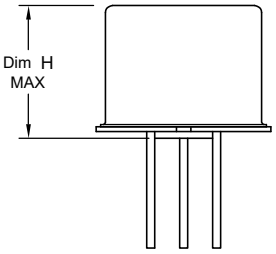
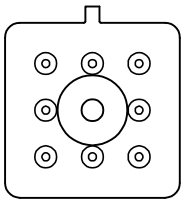
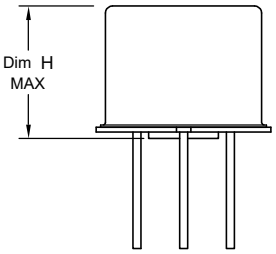
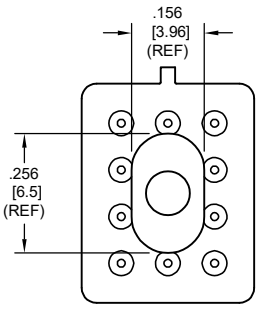
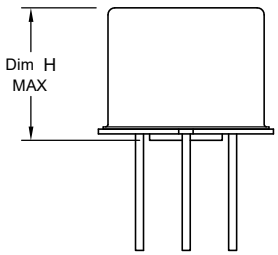
- Relay Series
- Ground Pin Option (See Appendix A)
- Nominal Coil Voltage
- S = 0.187" Leads; No Suffix = 0.75" Leads
- Q = Solder-Coated Leads[1]; G = Gold-Plated Leads (RoHS Compliant); R = RoHS Compliant Solder[2]

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)
[3] The slash and characters appearing after the slash are not marked on the relay.

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.

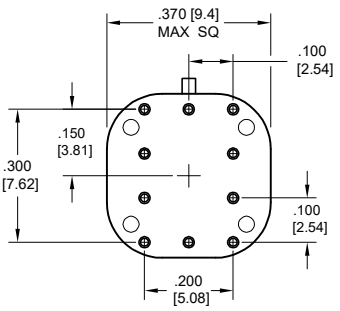
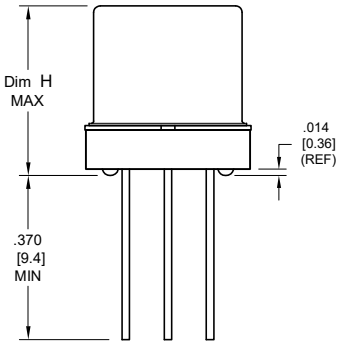
APPENDIX A : Spacer Pads

Pad designation and bottom view dimensions	Height	For use with the following:	Dim. H Max.
 “M4” Spacer Pad for TO-5		ER412	.295 (7.49)
		712, RF300, RF, RF700, RF703	.300 (7.62)
		ER422, 722	.305 (7.75)
		ER432	.400 (10.16)
		732, RF303	.410 (10.41)
		RF312	.350 (8.89)
 “M4”Spacer Pad for TO-5		ER411	.295 (7.49)
		RF311	.300 (7.62)
		RF331	.410 (10.41)
 “M4” Spacer Pad for Centigrid®		172	.305 (7.75)
		ER114, J114	.300 (7.62)
		ER134, J134	.400 (10.16)
		RF100	.315 (8.00)
		RF103	.420 (10.67)
 “M9”Spacer Pad for Centigrid®		122C, A152	.320 (8.13)
		ER116C, J116C	.300 (7.62)
		ER136C, J136C	.400 (10.16)
		RF180	.325 (8.25)
		A150	.305 (7.75)

Notes:

1. Spacer pad material: Polyester film.
2. To specify an “M4” or “M9” spacer pad, refer to the mounting variants portion of the part numbering example in the applicable datasheet.
3. Dimensions are in inches (mm).
4. Unless otherwise specified, tolerance is ± .010” (.25 mm).
5. Add 10 mΩ to the contact resistance shown in the datasheet.
6. Add 0.01 oz. (0.25 g) to the weight of the relay assembly shown in the datasheet.

APPENDIX A : Spreader Pads

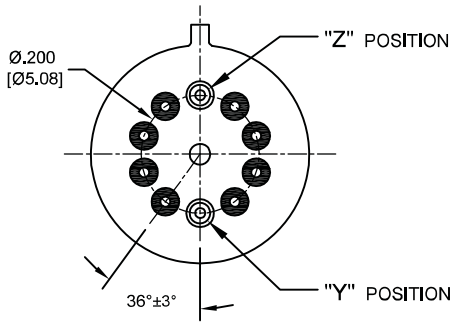
Pad designation and bottom view dimensions	Height	For use with the following:	Dim. H Max.
 "M" Spreader Pad 5/ 6/		ER411T, ER412, J412	.388 (9.86)
		712	.393 (9.99)
		ER432, J432	.493 (12.52)
		732	.503 (12.78)
		J421, J422, ER422, 722	.398 (10.11)

Notes:

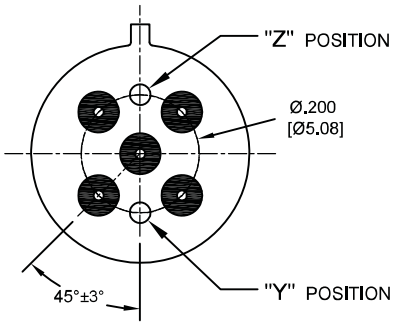
1. Spreader pad material: Diallyl Phthalate.
2. To specify an "M", "M2" or "M3" spreader pad, refer to the mounting variants portion of the part number example in the applicable datasheet.
3. Dimensions are in inches (mm).
4. Unless otherwise specified, tolerance is ± .010" (0.25 mm).

5/. Add 25 mΩ to the contact resistance shown in the datasheet.
6/. Add .01 oz. (0.25 g) to the weight of the relay assembly shown in the datasheet.
7/. Add 50 mΩ to the contact resistance shown in the datasheet.
8/. Add 0.025 oz (0.71 g) to the weight of the relay assembly shown in the datasheet.
9/. M3 pad to be used only when the relay has a center pin (e.g. ER411M3-12A, 722XM3-26.)

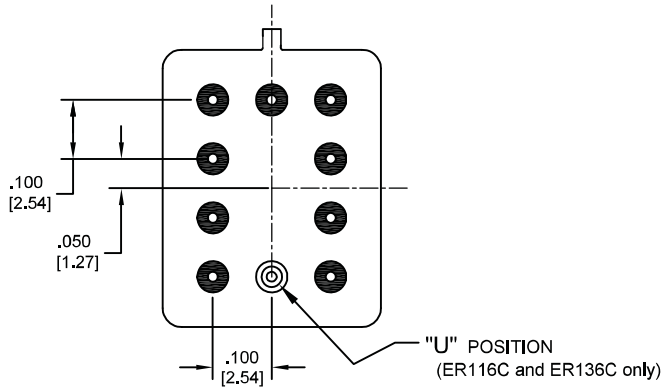
APPENDIX A : Ground Pin Positions



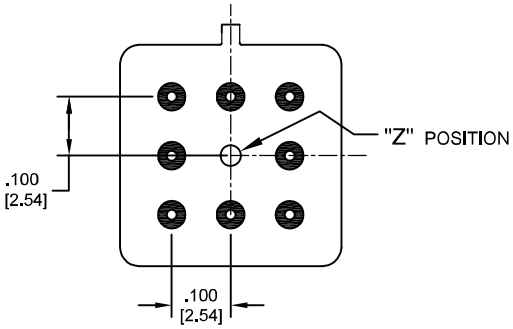
TO-5 Relays:
ER412, ER412T, ER422, ER432, ER432T, 712, 712TN, 400H, 400K, 400V, RF300, RF303, RF341, RF312, RF332, RF310, RF313, RF320, RF323, SI800, SI803, RF700, RF703



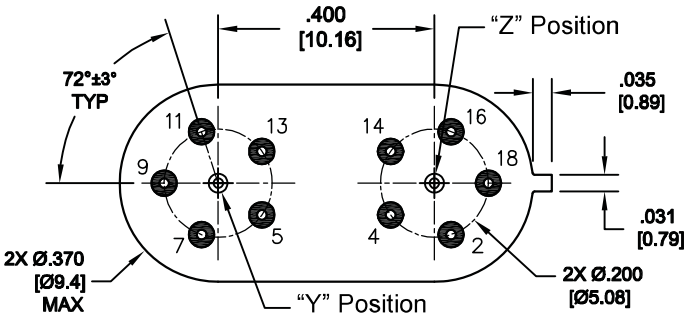
TO-5 Relays:
ER411, RF311, RF331



Centigrid® Relays:
RF180, ER116C, 122C, ER136C



Centigrid® Relays:
RF100, RF103, ER114, ER134, 172



Loopback Relays:
LB363

◯ Indicates ground pin position

● Indicates glass insulated lead position

◎ Indicates ground pin or lead position depending on relay type

NOTES

1. Terminal views shown
2. Dimensions are in inches (mm)
3. Tolerances: ± .010 (±.25) unless otherwise specified
4. Ground pin positions are within .015 (0.38) dia. of true position
5. Ground pin head dia., 0.035 (0.89) ref: height 0.010 (0.25) ref.
6. Lead dia. 0.017 (0.43) nom.