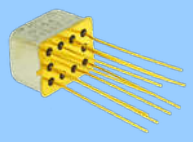


MAGNETIC-LATCHING BROADBAND RF RELAYS DPDT



SERIES	RELAY TYPE
RF180	DPDT Magnetic-Latching Relay

DESCRIPTION

The Series RF180 relay is an ultraminiature, hermetically sealed, magnetic-latching relay featuring extremely low intercontact capacitance for exceptional RF performance over the full UHF spectrum. Its low profile height and .100" grid spaced terminals make it ideal for applications where extreme packaging density and/or close PC board spacing are required.

The RF180 design has been optimized for use in RF attenuators, RF switch matrices, and other applications requiring magnetic latching, high isolation, low insertion loss and low VSWR.

Unique construction features and manufacturing techniques provide high reliability and excellent robustness to environmental extremes.

The RF180 feature:

- All welded construction.
- Unique uniframe design provides high magnetic efficiency and mechanical rigidity.
- High force/mass ratios for resistance to shock and vibration.
- Advanced cleaning techniques provide maximum assurance of internal cleanliness.
- Gold-plated precious metal alloy contacts ensure reliable

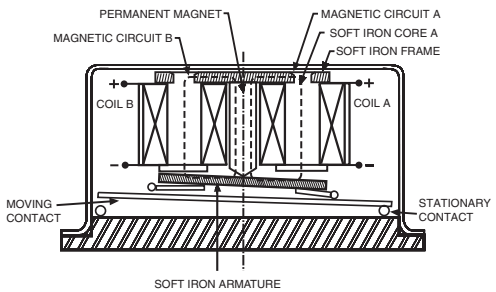
DC switching from dry-circuit to 1/4 amp, as well as low and stable insertion loss in RF applications.

The RF180 relay is ideally suited for applications where power dissipation must be minimized. The relays can be operated with a short-duration coil voltage pulse. After the contacts have transferred, no coil power is required.

The magnetic-latching feature of the RF180 provides a nonvolatile memory capability, since the relays will not reset upon removal of coil power.

ENVIRONMENTAL AND PHYSICAL SPECIFICATIONS	
Temperature (Ambient)	–65°C to +125°C
Vibration (Note 3)	30 g's to 2000 Hz
Shock (Note 3)	75 g's, 6ms half sine
Enclosure	Hermetically sealed
Weight	0.10 oz. (2.9g) max.

INTERNAL CONSTRUCTION



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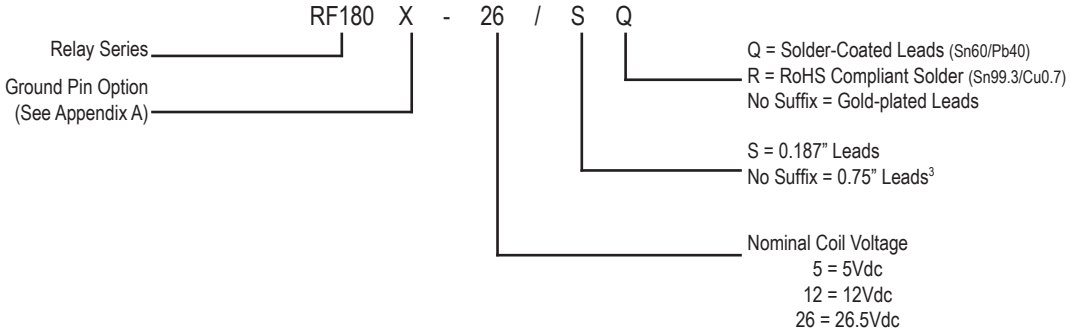
GENERAL ELECTRICAL SPECIFICATIONS (@25°C)

Contact Arrangement	2 Form C (DPDT)
Rated Duty	Continuous
Contact Resistance	0.15 Ω max.; 0.25 Ω max. afterlife at 0.25A / 28 Vdc
Contact Load Rating (DC)	Resistive: 0.25 A/ 28 Vdc
Contact Life Ratings	10,000,000 cycles (typical) at low level 1,000,000 cycles (typical) at 0.5 A / 28 Vdc resistive 100,000 cycles min. at all other loads specified above
Contact Overload Rating	2 A / 28 Vdc Resistive (100 cycles min.)
Coil Operating Power (typical)	290 mW (at nominal rated voltage at 25°C)
Contact Carry Rating	Contact Factory
Operate Time	2.0 ms max. at nominal rated coil voltage
Minimum Operatue Pulse	6.0 ms width @ rated voltage
Intercontact Capacitance	0.2 pf typical
Insulation Resistance	10,000 MΩ min. between mutually isolated terminals
Dielectric Strength	350 Vrms (60 Hz) @ atmospheric pressure

DETAILED ELECTRICAL SPECIFICATIONS (@25°C)

BASE PART NUMBERS (RF180)		**RF180-5**	**RF180-12**	**RF180-26**
Coil Voltage (Vdc)	**Nom.**	5.0	12.0	26.5
	Max.	6.0	16.0	32.0
Coil Resistance (Ohms ±20%)		61	500	2,000
Set and Reset Voltage (Vdc)	**Max.**	3.5	9.0	18.0

Part Numbering System (Note 4 & 5)



NOTES

1. Characteristics shown as "typical" are based on available data and are best estimates. No ongoing verification tests are performed.
2. Unless otherwise specified, parameters are initial values.
3. Relay contacts will exhibit no chatter in excess of 10 µs or transfer in excess of 1 µs.
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.

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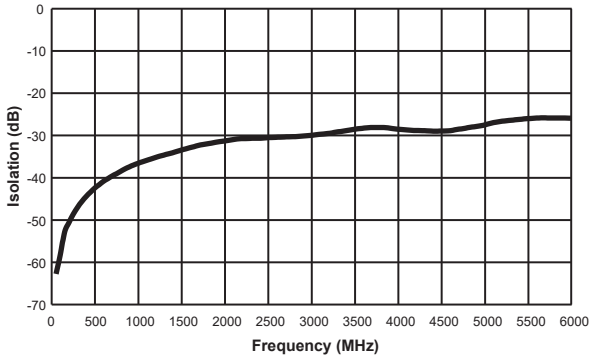
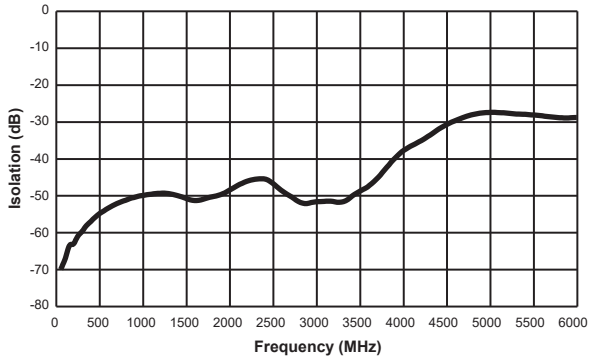
TYPICAL RF CHARACTERISTICS

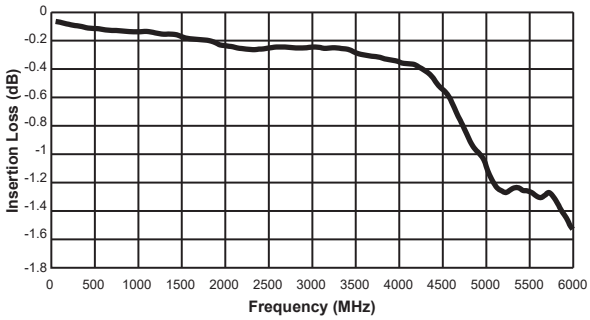
Isolation Across Contacts (RF Note 4)



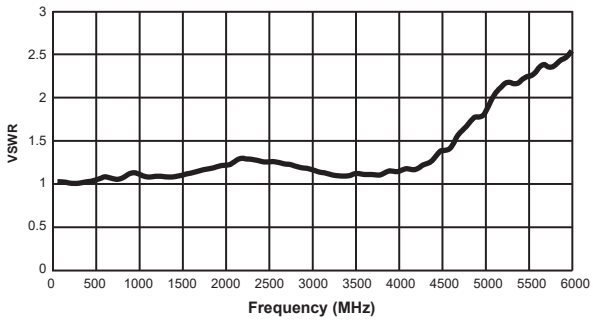
Isolation Pole to Pole (RF Note 5)



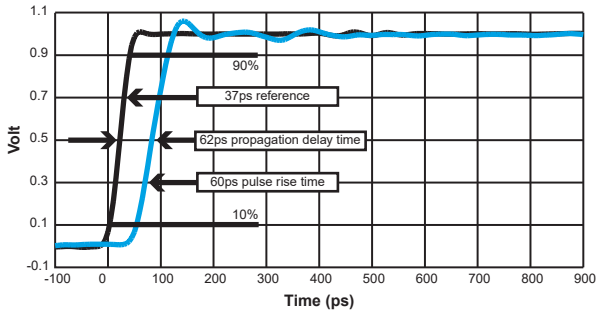
Insertion Loss (RF Note 6)



VSWR (RF Note 6)



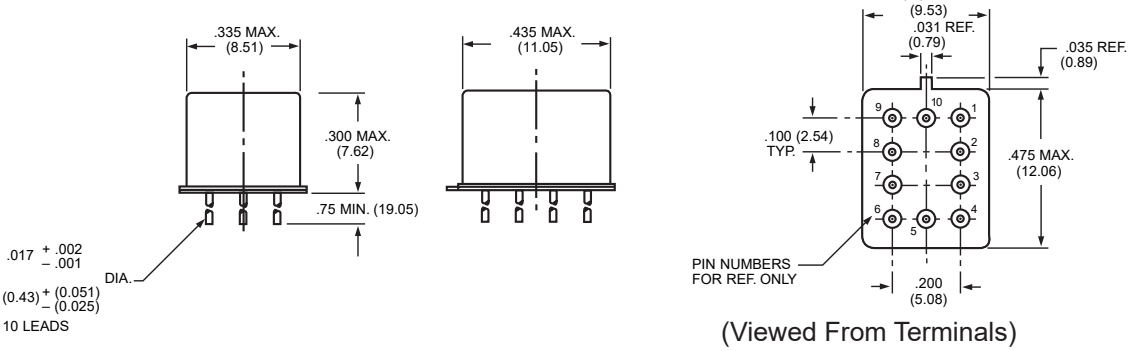
RF180 Time Response (RF Note 6)



RF NOTES:

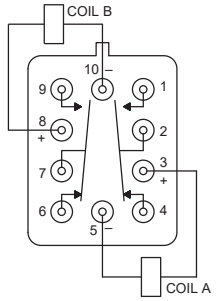
1. DATA REPRESENTS AN AVERAGE BETWEEN THE TYPICAL READING OF PINS 8 AND 6 (CLOSED, COIL A LAST ENERGIZED) AND PINS 8 AND 1 (CLOSED, COIL B LAST ENERGIZED).
2. DATA REPRESENTS AN AVERAGE BETWEEN THE TYPICAL READING OF PINS 8 AND 6 (OPEN, COIL B LAST ENERGIZED) AND PINS 8 AND 1 (OPEN,COIL A LAST ENERGIZED).
3. 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. RELAY HEADER IS IN CONTACT WITH, BUT NOT SOLDERED TO, GROUND PLANE OR CONNECTED TO GROUND VIA GROUND PIN.
   C. TEST PERFORMED AT ROOM AMBIENT TEMPERATURE.
   D. TERMINALS NOT TESTED WERE TERMINATED WITH 50-OHM LOAD.
   E. CONTACT SIGNAL LEVEL: 20 DBM.
4. DATA PRESENTED HEREIN REPRESENTS TYPICAL CHARACTERISTICS AND IS NOT INTENDED FOR USE AS SPECIFICATION LIMITS.

OUTLINE DIMENSIONS



(Viewed From Terminals)

SCHEMATIC DIAGRAM



SCHEMATIC-TERMINAL VIEW
(SHOWN - COIL B LAST
ENERGIZED CONDITION)

PIN NUMBERS ARE
FOR REFERENCE ONLY,
NOT MARKED ON RELAY

OUTINE 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.
5. unless otherwise specified, tolerances on dimensions are ± .010 inch (0.025 mm)

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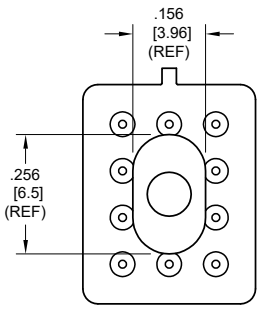
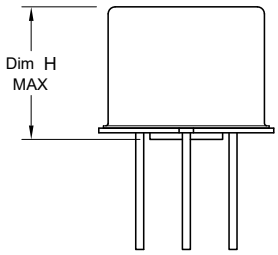
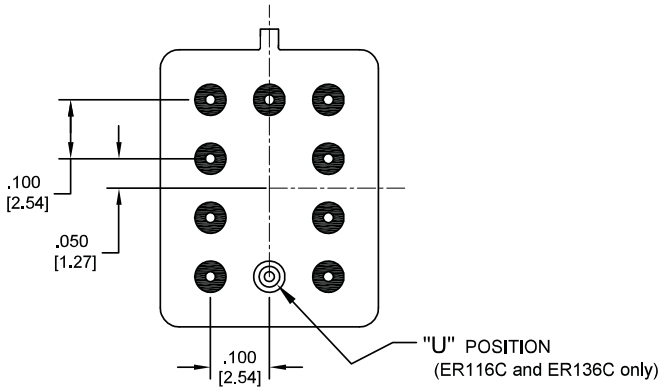
APPENDIX A : Spacer Pads & Ground Pin Positions

Pad designation and bottom view dimensions	Height	For use with the following:	Dim. H Max.
		RF180	.325 (8.25)

Notes:
1. Spacer pad material: Polyester film.
2. To specify an “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.



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

○ 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.