ULTRAMINIATURE BROADBAND ATTENUATOR RELAYS

SERIES	RELAY TYPE
GA152	Attenuator Relay series, DC- 5 GHz

DESCRIPTION

The Series GA152 highly repeatable ultraminiature attenuator relays are designed for attenuating RF signals in50-ohm systems over a frequency range from DC to 5 GHz. Their low profile and small grid spacing makes them ideal for use when packaging density is a prime consideration. The GA152 relays eliminate the need for additional external resistors/attenuators.

These single section, switchable attenuator relays have an internal matched thin film attenuator pad in a "Pi" configuration. Relays are available in a fixed increment of 20 dB.

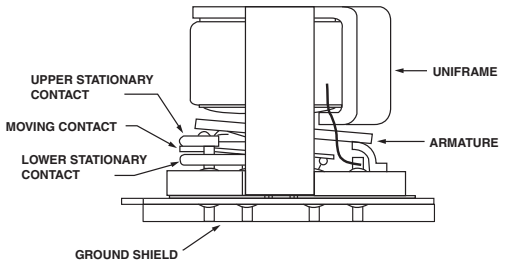
The GA152 feature:

- Unique uni-frame motor design which provides high magnetic efficiency and mechanical rigidity.
- Minimum mass components and welded construction for maximum resistance to shock and vibration.
- Advanced cleaning techniques which assures internal cleanliness.
- Gold plated, precious metal contacts, which provide excellent intermodulation performance.
- Flat amplitude vs. frequency response.
- High isolation between control and signal path.
- Stable attenuation vs. temperature.
- Excellent phase linearity.
- Highly resistant to ESD.

Patent No. 5,315,273

ENVIRONMENTAL AND PHYSICAL SPECIFICATIONS	
Temperature (Ambient)	-65°C to +125°C
Vibration (Note 1)	10 g's to 2000 Hz
Shock (Note 1)	30 g's, 6ms half sine
Enclosure	Hermetically sealed
Weight	0.11 oz. (3.2g) max.

INTERNAL CONSTRUCTION



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

Contact Life Ratings		10,000,000 cycles (typical) at low level
Operate Time (Note 8)	**Max.**	4.0 ms max. at nominal rated coil voltage
	Typ.	2.0 ms max. at nominal rated coil voltage
Insulation Resistance		1,000 MΩ min. between mutually isolated terminals
Dielectric Strength		350 (Vrms/60 Hz) @ atmospheric pressure

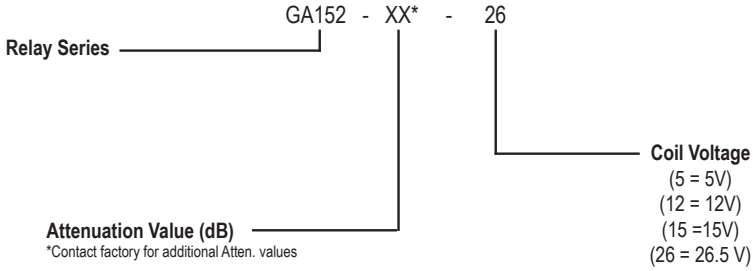
DETAILED ELECTRICAL SPECIFICATIONS (-65°C to +125°C unless otherwise noted)(Note 3)

BASE PART NUMBERS (A152)		A152-dB-5	A152-dB-12	A152-dB-15	A152-dB-26
Coil Voltage (Vdc)	**Nom.**	5.0	12.0	15	26.5
	Max.	5.8	16.0	20.0	32.0
Coil Resistance (Ohms ±20%)		50	390	610	1,560
Pick-Up Voltage (Vdc, Max.)		3.8	9.0	11.3	18.0

GENERAL PERFORMANCE (-55°C to +85°C)

PARAMETER	MINIMUM	TYPICAL	MAXIMUM
Operating Frequency (GHz)	0.0	-	5.0
Power (W) (Notes 5 and 6)	-	-	1.0
Impedance (Ω)	-	50	-

Part Numbering System (Note 11)



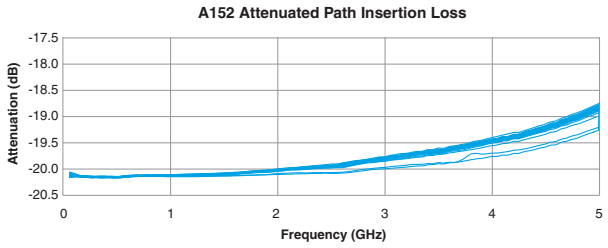
NOTES:
1. Contacts will exhibit no contact chatter in excess of 10 µs or transfer in excess of 1 µs.
2. "Typical" characteristics are based on available data and are best estimates. No on-going verification tests are performed.
3. Unless otherwise specified, parameters are initial values.
4. Relays may be operated at higher frequencies with reduced RF performance.
5. For optimal RF performance, solder case to RF ground plane.
6. Attenuation values shown are with reference to the through path (low loss state).
7. Power handling for case temperatures of –55°C to +55°C is 1 Watt. Derate power handling 25 mW/°C above +55°C. Case measurement point is adjacent to the relay tab.
8. Do not operate coil at maximum coil voltage continuously.
9. Insert attenuation value, see part numbering system.
10. Switching time includes bounce.
11. Unless otherwise specified, relays will be supplied with gold-plated.

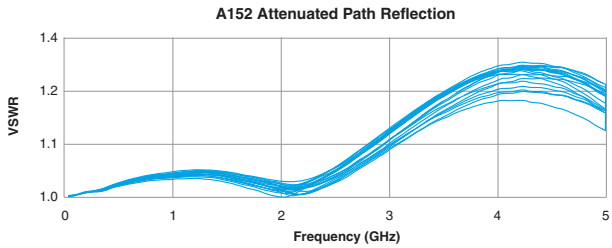
RF Performance (-55°C to +85°C)

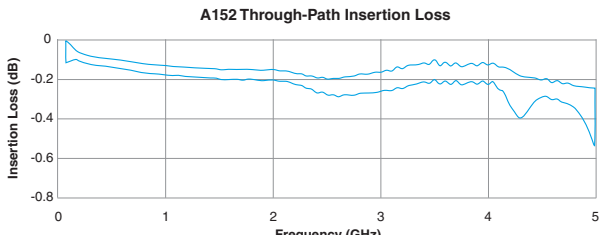
BASE PART NUMBERS (RF180)	RANGE	TYPICAL	MAXIMUM
Insertion Loss (dB)	DC - 1 GHz	0.1	0.25
	1 - 2 GHz	0.2	0.35
	2 - 3 GHz	0.3	0.055
	3-5 GHz	See Graph	
VSWR (Through Path)	DC - 1 GHz	1.10	1.20
	1 - 2 GHz	1.20	1.25
	2 - 3 GHz	1.25	1.30
	3-5 GHz	See Graph	
VSWR (Attenuated Path)	DC - 1 GHz	1.20	1.25
	1 - 2 GHz	1.30	1.35
	2 - 3 GHz	1.40	1.45
	3-5 GHz	See Graph	

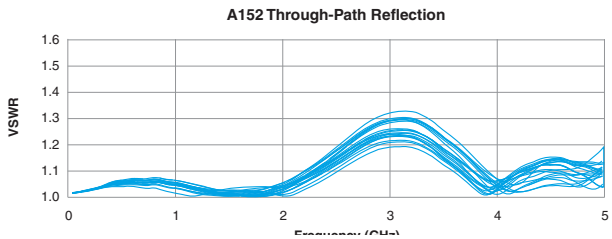
ATTENUATION	RANGE	MINIMUM	TYPICAL	MAXIMUM
Insertion Loss (dB)	DC - 1 GHz	19.8	20.0	20.2
	1 - 2 GHz	19.6	20.0	20.4
	2 - 3 GHz	19.0	20.0	21.0
	3-5 GHz	See Graph		

TYPICAL RF CHARACTERISTICS



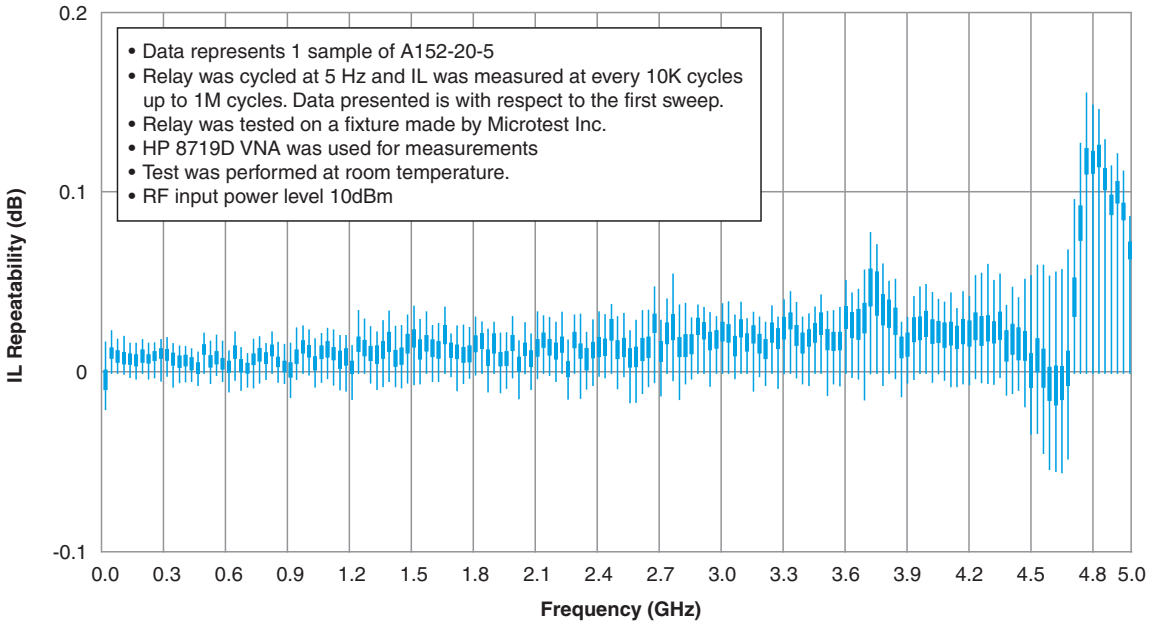




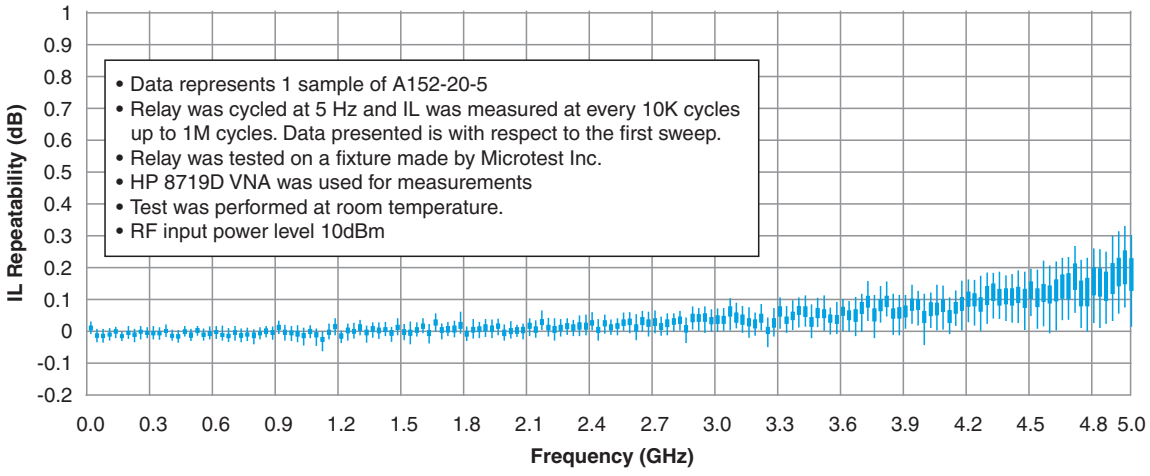


TYPICAL RF INSERTION LOSS REPEATABILITY CHARACTERISTICS

A152 Insertion Loss Repeatability (Through Path)



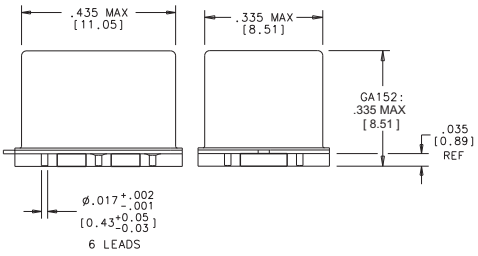
A152 Insertion Loss Repeatability (Attenuated Path)



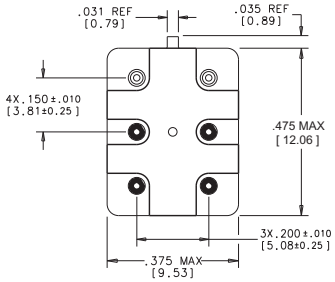
RF INSERTION LOSS REPEATABILITY NOTES

1. RF PERFORMANCE SHOWN IS FOR A152. GA152 RF DATA IS TBD. RF PERFORMANCE IS THE SAME OR BETTER THAN A152.
2. TEST CONDITIONS: a. FIXTURE: CUSTOM PLUG-IN TEST FIXTURE.
   b. RELAY HEADER IS IN CONTACT WITH, BUT NOT SOLDERED TO, GROUND PLANE.
   c. TEST PERFORMED AT ROOM AMBIENT TEMPERATURE.
   d. CONTACT SIGNAL LEVEL: 10 DBM.
3. DATA PRESENTED HEREIN REPRESENTS TYPICAL CHARACTERISTICS AND IS NOT INTENDED FOR USE AS SPECIFICATION LIMITS.
4. INSERTION LOSS REPEATABILITY MEASURED OVER FREQUENCY RANGE FROM 3 MHZ TO 5 GHZ.

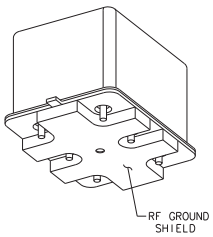
OUTLINE DIMENSIONS



Inches (mm)



(Viewed From Terminals)



SCHEMATIC DIAGRAMS