

ULTRAMINIATURE BROADBAND ATTENUATOR RELAYS



SERIES	RELAY TYPE
A150	Attenuator Relay series, DC- 3 GHz

DESCRIPTION

The Series A150 ultraminiature Attenuator Relays are designed for attenuating RF signals in 50-ohm systems over a frequency range from DC to 3 GHz. Their low profile and small grid spacing makes them ideal for use when packaging density is a prime consideration. The A150 relays eliminate the need for additional external resistors.

These single section, switchable attenuator relays have internal matched thin film attenuator pads in "L," "T" or "Pi" configurations, as applicable. Relays are available in fixed increments of 1, 2, 3, 4, 5, 6, 8, 10, 16 and 20 dB, which can be used individually or in combination to achieve the attenuation levels desired.

The A150 feature:

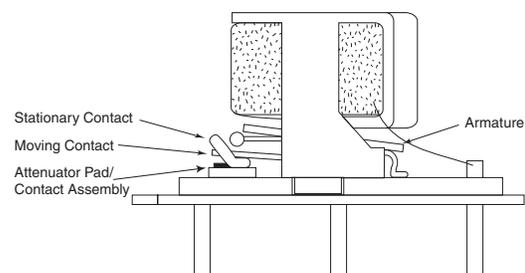
- Unique uni-frame motor design which provides high magnetic efficiency and mechanical rigidity.
- Minimum mass components and welded construction for maximum resistance to shock and vibration.
- Advanced cleaning techniques which assures internal cleanliness.
- Gold plated, precious metal contacts, 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, 6 ms half sine
Enclosure	Hermetically sealed
Weight	0.11 oz. (3.12g) 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	

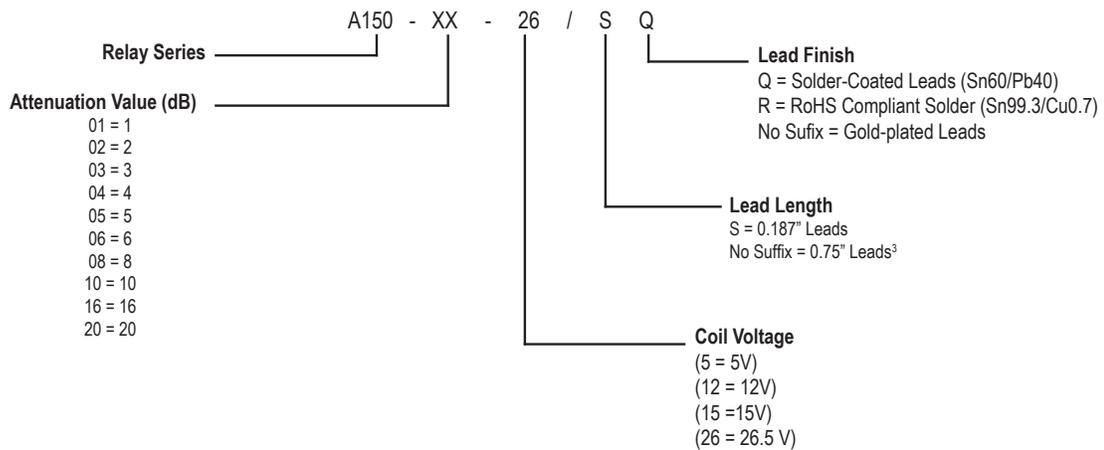
DETAILED ELECTRICAL SPECIFICATIONS (-65°C to +125°C unless otherwise noted)(Note 3)

BASE PART NUMBERS (A150)	A150-dB-5	A150-dB-12	A150-dB-15	A150-dB-26	
Coil Voltage (Vdc)	Nom.	5.0	12.0	15.0	26.5
	Max.	6.0	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	-	3.0
Power (W) (Notes 5 and 6)	-	-	1.0
Impedance (Ω)	-	50	-

Part Numbering System (Notes 11 & 12)

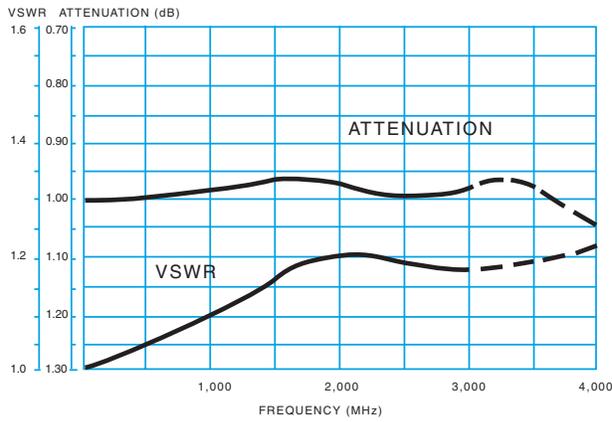


NOTES:

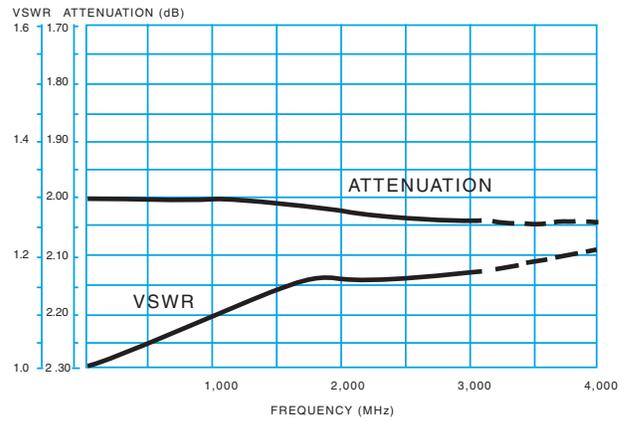
1. Contacts will exhibit no contact chatter in excess of 10 μs or transfer in excess of 1 μs.
2. "Typical" characteristics are based on available data and are best estimates. No on-going verification tests are performed.
3. Unless otherwise specified, parameters are initial values.
4. Relays may be operated 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. The slash and characters appearing after the slash are not marked on the relay.
12. Unless otherwise specified, relays will be supplied with gold-plated.

TYPICAL RF CHARACTERISTICS

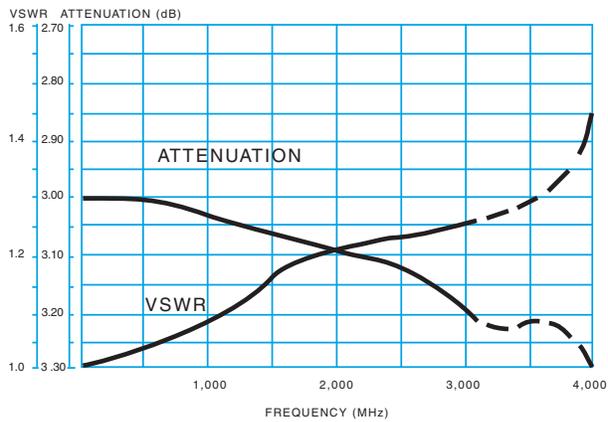
1 dB ATTENUATOR



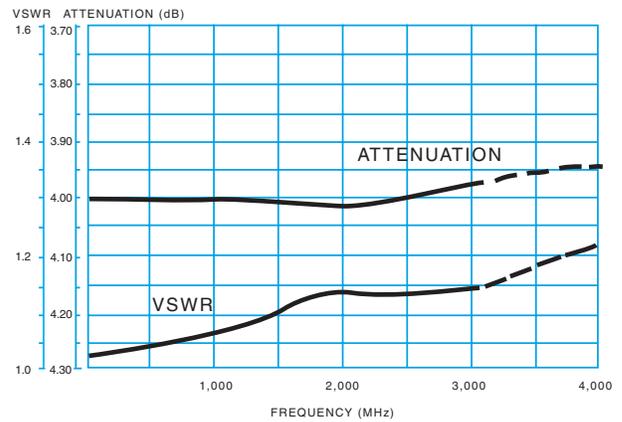
2 dB ATTENUATOR



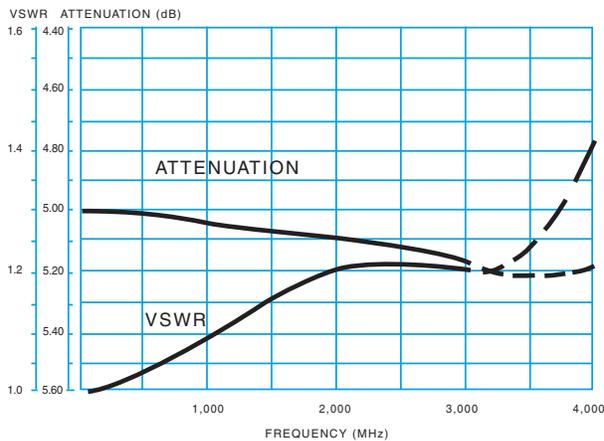
3 dB ATTENUATOR



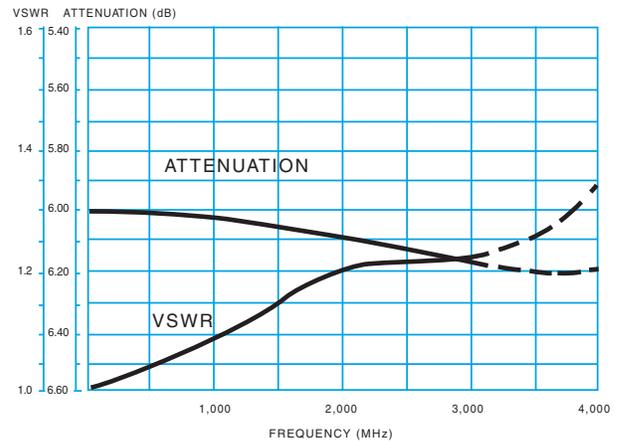
4 dB ATTENUATOR



5 dB ATTENUATOR

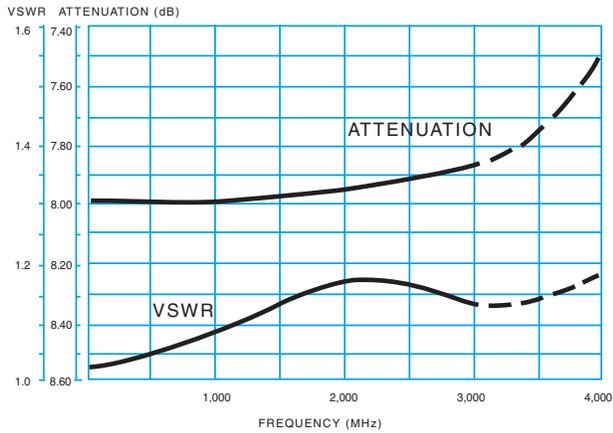


6 dB ATTENUATOR

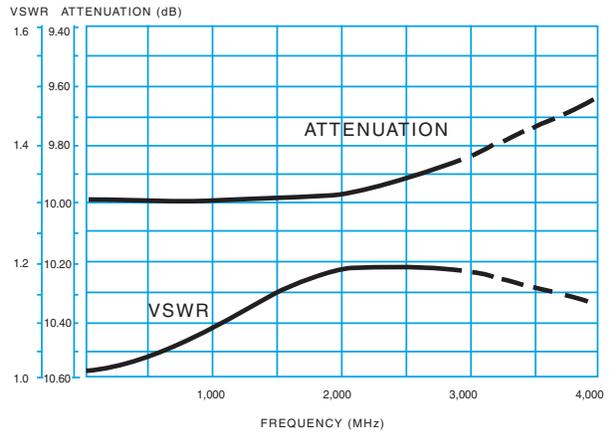


TYPICAL RF CHARACTERISTICS

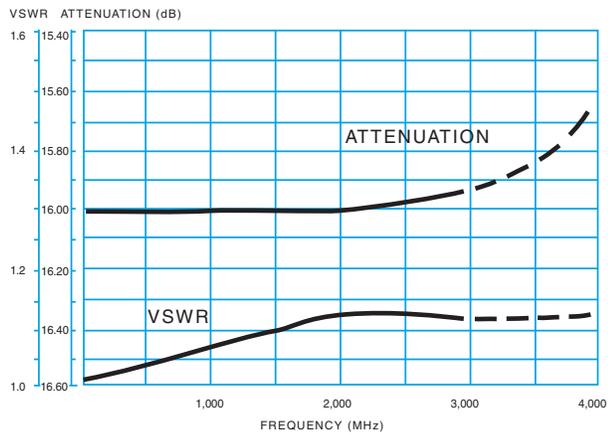
8 dB ATTENUATOR



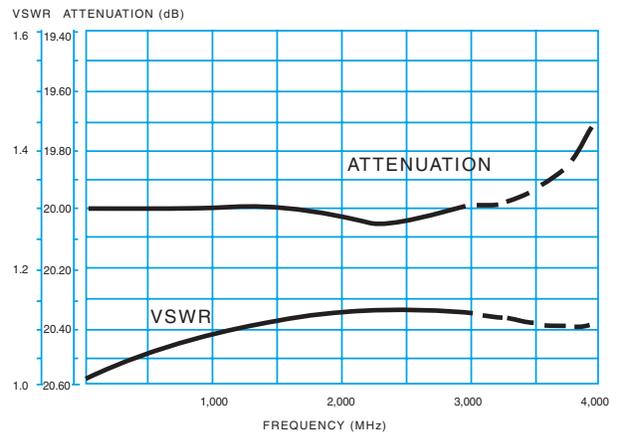
10 dB ATTENUATOR



16 dB ATTENUATOR



20 dB ATTENUATOR



THROUGH PATH

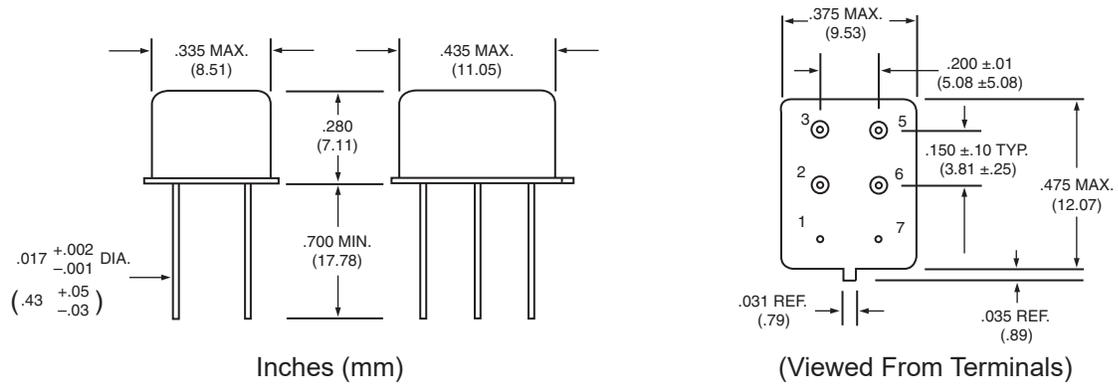


RF Performance (-55°C to +85°C)

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
VSWR (Through Path)	DC - 1 GHz	1.10	1.20
	1 - 2 GHz	1.20	1.25
	2 - 3 GHz	1.25	1.30
VSWR (Attenuated Path)	DC - 1 GHz	1.20	1.25
	1 - 2 GHz	1.30	1.35
	2 - 3 GHz	1.40	1.45

ATTENUATION (dB)	RANGE	MINIMUM	TYPICAL	MAXIMUM
1	DC - 1 GHz	0.95	1.0	1.05
	1 - 2 GHz	0.925	1.0	1.075
	2 - 3 GHz	0.875	1.0	1.125
2	DC - 1 GHz	1.9	2.0	2.15
	1 - 2 GHz	1.85	2.0	2.15
	2 - 3 GHz	1.75	2.0	2.25
3	DC - 1 GHz	2.85	3.0	3.15
	1 - 2 GHz	2.77	3.0	3.23
	2 - 3 GHz	2.62	3.0	3.38
4	DC - 1 GHz	3.8	4.0	4.2
	1 - 2 GHz	3.7	4.0	4.3
	2 - 3 GHz	3.5	4.0	4.5
5	DC - 1 GHz	4.75	5.0	5.25
	1 - 2 GHz	4.62	5.0	5.38
	2 - 3 GHz	4.37	5.0	5.63
6	DC - 1 GHz	5.7	6.0	6.3
	1 - 2 GHz	5.55	6.0	6.45
	2 - 3 GHz	5.25	6.0	6.75
8	DC - 1 GHz	7.88	8.0	8.12
	1 - 2 GHz	7.76	8.0	8.24
	2 - 3 GHz	7.52	8.0	8.48
10	DC - 1 GHz	9.85	10.0	10.15
	1 - 2 GHz	9.7	10.0	10.3
	2 - 3 GHz	9.4	10.0	10.6
16	DC - 1 GHz	15.76	16.0	16.25
	1 - 2 GHz	15.52	16.0	16.48
	2 - 3 GHz	15.04	16.0	16.96
20	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

OUTLINE DIMENSIONS



SCHEMATIC DIAGRAMS

