

Series 195 Octave-Band PIN Diode Attenuator/Modulators

SERIES 195

Series 195 current-controlled attenuator/modulators provide small size with greater than octave-bandwidth performance at low cost. All models except the 1950A* provide a minimum of 60 dB of attenuation with fall times of 20 nsec max, and rise times ranging from 25 nsec max for the 1951 and 1952 to 125 nsec max for the 1956 and 1958. The 1950A* provides a minimum of 80 dB of attenuation with a fall time of 50 nsec max and a rise time of 250 nsec max. These characteristics make this series suitable for a wide range of applications including level setting, complex amplitude modulation, pulse modulation and high-speed switching. The eight models in the Series 195 encompass a frequency range from 0.5 to 18 GHz. All models except the 1950A* are capable of extended bandwidth operation, typically 3:1, with only moderate degradation in performance at the band edges.

As shown in figures 1 and 2 below, the rf circuit employed in all models except the Model 1950A* uses two shunt arrays of PIN diodes and two quadrature hybrid couplers. The quadrature hybrids are of a unique GMC microstrip design which are integrated with the diode arrays to yield a minimal package size. The rf circuit employed in the Model 1950A* uses one shunt array of PIN diodes with input and output impedance matching circuits.

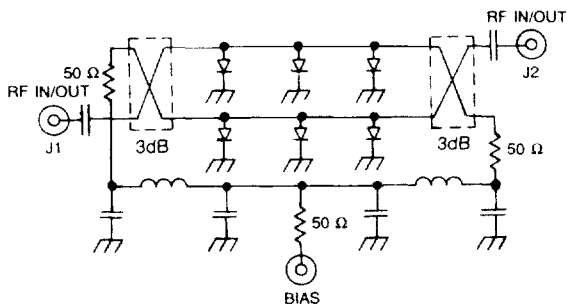


Fig. 1-Models 1951-1958, rf schematic diagram

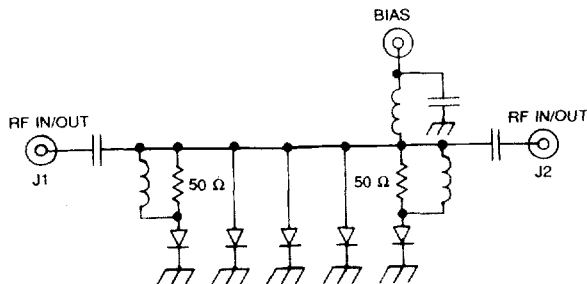
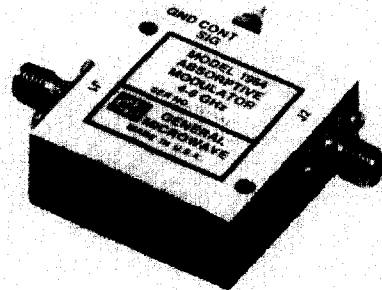
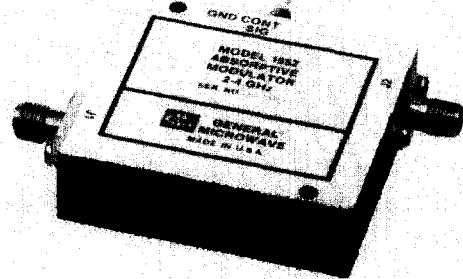
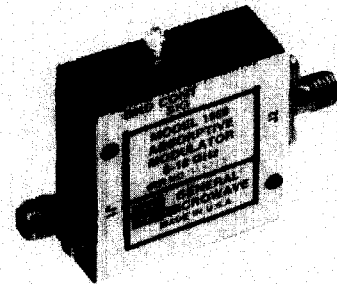


Fig. 2-Model 1950A*, rf schematic diagram

- Absorptive
- Current controlled
- 0.5 to 18 GHz frequency range
- High performance MIC quadrature hybrid design
- High speed



*Model 1950A is a special-order product. Consult factory before ordering.



Series 195 Specifications

MODEL	FREQUENCY RANGE (GHz)	MAX. INSERTION LOSS (dB)	MAX. VSWR	FLATNESS (\pm dB) AT MEAN ATTENUATION LEVELS UP TO				
				10 dB	20 dB	40 dB	60 dB	80 dB
1950A*	0.5 – 1.0	1.4	2.0	0.3	0.8	1.7	2.2	3.2
1951	1.0 – 2.0	1.3	1.5	0.3	0.8	1.5	1.6	
	0.75 – 2.25	1.4	2.0	0.5	1.4	3.0	3.5	
1952	2.0 – 4.0	1.5	1.5	0.3	0.8	1.5	1.6	
	1.5 – 4.5	1.6	2.0	0.5	1.4	3.0	3.5	
1953	2.6 – 5.2	1.7	1.6	0.3	0.8	1.5	1.6	
	1.95 – 5.85	1.8	2.1	0.5	1.4	3.0	3.5	
1954	4.0 – 8.0	2.0	1.7	0.3	0.8	1.5	1.6	
	3.0 – 9.0	2.1	2.2	0.5	1.4	3.0	3.5	
1955	5.0 – 10.0	2.2	1.7	0.5	0.9	1.5	1.6	
	3.75 – 11.25	2.3	2.2	0.7	1.4	3.0	3.5	
1956	6.0 – 12.0	2.3	1.8	0.7	1.0	1.5	1.6	
	4.5 – 13.5	2.4	2.2	0.9	1.5	3.0	3.5	
1958	8.0 – 18.0	2.5 ⁽¹⁾	1.8 ⁽¹⁾	0.7	1.0	1.5	1.6	
	6.0 – 18.0	2.5 ⁽¹⁾	1.8 ⁽¹⁾	0.9	1.5	3.0	3.5	

Note: Specifications for the extended frequency ranges are typical.

PERFORMANCE CHARACTERISTICS

Mean Attenuation Range

1950A* 80 dB

All other units 60 dB

Monotonicity Guaranteed

Phase Shift See page 11

Temperature Effects See Fig. 3

Power Handling Capability

Without Performance Degradation

1950A*, 1951 10 mW cw or peak

All other units 100 mW cw or peak

Survival Power (from -65°C to $+25^{\circ}\text{C}$;
see Fig. 4 for higher temperatures)

All units 1 W average

25W peak (1 μsec max
pulse width)

Switching Speed

Fall Time

1950A* 50 nsec max⁽²⁾

All other units 20 nsec max⁽²⁾

Rise Time

1950A* 250 nsec max

All other units 125 nsec max

Bias Current for Maximum Attenuation

1950A* 5 to 35 mA

All other units 15 to 70 mA

*Model 1950A is a special-order product. Consult factory before ordering.

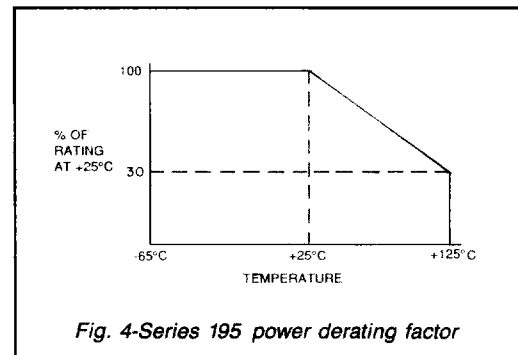


Fig. 4-Series 195 power derating factor



(1) Except from 16 - 18 GHz where insertion loss is 3.5 dB max and VSWR is 2.0 max.
(2) For attenuation steps of 10 dB or more.

Series 195 Specifications

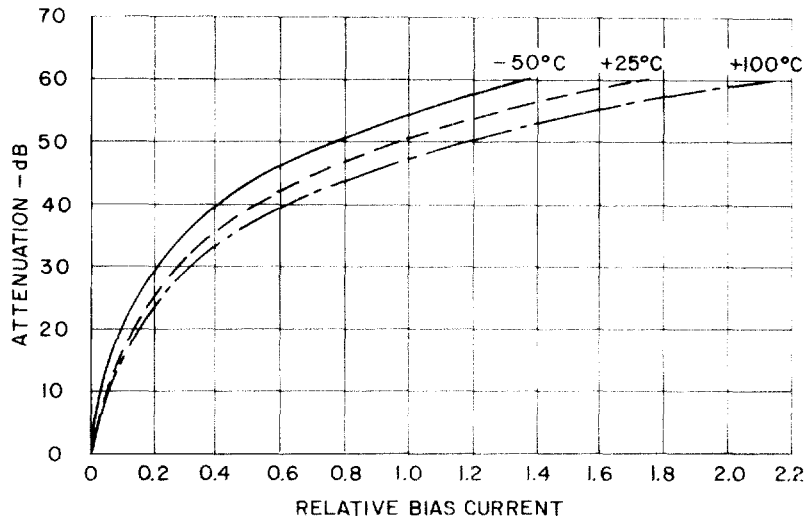


Fig. 3-Series 195, typical effects of temperature on attenuation

ENVIRONMENTAL RATINGS

Operating Temperature	
Range	- 54°C to + 125°C
Non-Operating	
Temperature Range	- 65°C to + 125°C
Humidity	MIL-STD-202F, Method 103B, Cond. B (96 hrs. at 95%)
Shock	MIL-STD-202F, Method 213B, Cond. B (75G, 6 msec)
Vibration	MIL-STD-202F, Method 204D, Cond. B (.06" double amplitude or 15G, whichever is less)
Altitude	MIL-STD-202F, Method 105C, Cond. B (50,000 ft.)
Temp. Cycling	MIL-STD-202F, Method 107D, Cond. A, 5 cycles

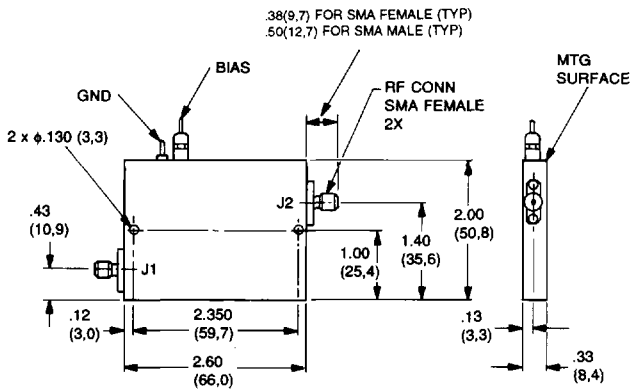
AVAILABLE OPTIONS

Option No.	Description
3	SMA female bias connector
7	Two SMA male rf connectors
10	One SMA male (J1) and one SMA female (J2) rf connector
64	SMC male bias connector
64A	SMB male bias connector



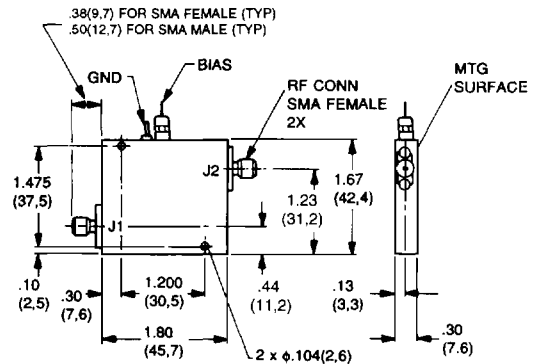
Series 195 Specifications

DIMENSIONS AND WEIGHTS

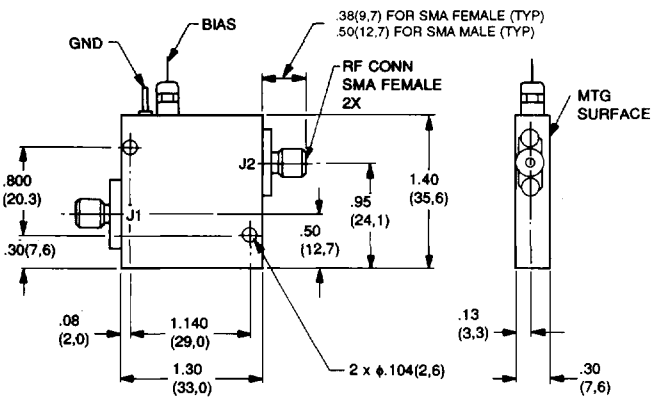


MODELS 1950A* AND 1951
Wt: 3 oz. (85 gm) approx.

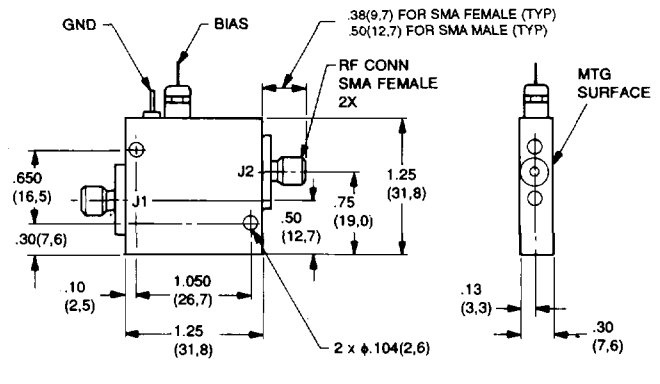
*Model 1950A is a special-order product. Consult factory before ordering.



MODELS 1952 AND 1953
Wt: 2 oz. (57 gm) approx.



MODELS 1954, 1955 AND 1956
Wt: 1 oz. (28 gm) approx.



MODEL 1958
Wt: 1 oz. (28 gm) approx.



Dimensional Tolerances, unless otherwise indicated: .XX \pm .02; .XXX \pm .005