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Series D195 Octave-Band PIN Diode Attenuator/Modulators

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The Series D195 voltage-controlled linearized attenuator/modulators are integrated assemblies consisting of a Series 195 unit and a hybridized driver circuit which provides a nominal transfer function of 10 dB per volt. (See figure 1 below.)

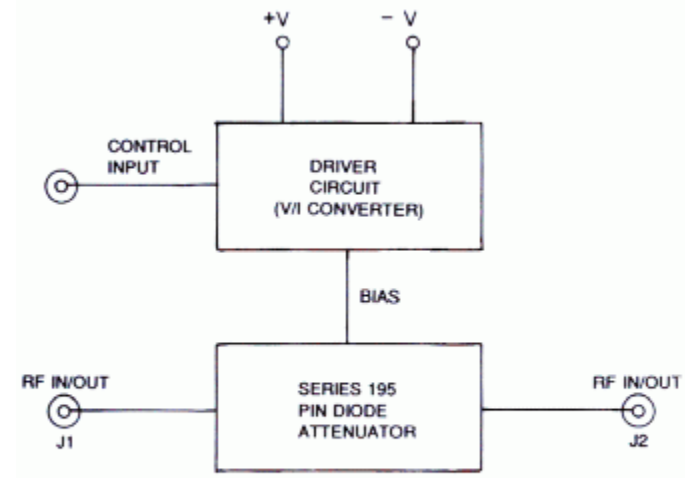
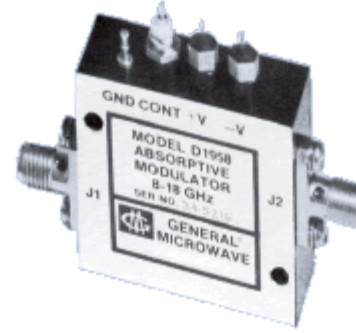


Fig. 1-Series D195, block diagram

All of the Series D195 units except the D1950A* exhibit fall times of 20 nsec max and rise times of 1.5 μ sec max for attenuation steps of 10 dB or more. For smaller excursions, the fall times can increase to several hundred nsec, while the rise times remain essentially unchanged. In applications where a rapid return to insertion loss from any level of attenuation is required, Option 59 is available. With this option, an external pulse is applied to trigger a high-speed reset circuit, and recovery times of 200 nsec max are obtained. Where use of an external reset pulse as described above is not feasible, an internal reset option (Option 58) is available which will automatically reset the unit to insertion loss within 200 nsec for a step of 50 dB or more. The fall and rise time specifications for the D1950A* are 500 nsec max and 10 μ sec max, respectively. Options 58 and 59 are not available for this model.

*Model D1950A is a special-order product. Consult factory before ordering.

- Absorptive
- Linearized
- Frequency range: 0.5 to 18 GHz
- High performance MIC quadrature hybrid design
- High speed



**ALL UNITS
IN THIS SERIES
ARE EQUIPPED
WITH INTEGRATED DRIVERS**

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
D1950A*	0.5 - 1.0	1.4	2.0	0.3	0.8	1.7	3.0	3.6
D1951	1.0 - 2.0	1.6	1.5	0.3	0.8	1.5	1.6	
	0.75 - 2.25 ⁽¹⁾	1.7	2.0	0.5	1.4	3.0	3.5	
D1952	2.0 - 4.0	1.8	1.5	0.3	0.8	1.5	1.6	
	1.5 - 4.5 ⁽¹⁾	1.9	2.0	0.5	1.4	3.0	3.5	
D1953	2.6 - 5.2	2.0	1.6	0.3	0.8	1.5	1.8	
	1.95 - 5.85 ⁽¹⁾	2.1	2.1	0.5	1.4	3.0	3.5	
D1954	4.0 - 8.0	2.4	1.7	0.3	0.8	1.5	1.6	
	3.0 - 9.0 ⁽¹⁾	2.5	2.2	0.5	1.4	3.0	3.5	
D1955	5.0 - 10.0	2.6	1.7	0.5	0.9	1.5	1.6	
	3.75 - 11.25 ⁽¹⁾	2.7	2.2	0.7	1.4	3.0	3.5	
D1956	6.0 - 12.0	2.7	1.8	0.7	1.0	1.5	1.6	
	4.5 - 13.5 ⁽¹⁾	2.8	2.2	0.9	1.5	3.0	3.5	
D1958	8.0 - 18.0	3.0 ⁽²⁾	1.8 ⁽²⁾	0.7	1.0	1.5	1.6	
	6.0 - 18.0 ⁽¹⁾	3.0 ⁽²⁾	1.8 ⁽²⁾	0.9	1.5	3.0	3.5	

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

(1) Specifications for the extended frequency ranges are typical.

(2) Except from 16 - 18 GHz where insertion loss is 4.0 dB max and VSWR is 2.0 max.

PERFORMANCE CHARACTERISTICS

Mean Attenuation Range

D1950A* 80 dB
All other units 60dB

Accuracy of Attenuation

0 to 30dB \pm 0.5 dB
> 30 to 50 dB \pm 1.0 dB
> 50 to 60 dB \pm 1.5 dB
> 60 to 80 dB \pm 2.0 dB
(D1950A* only)

Monotonicity Guaranteed

Phase Shift [See Application Note](#)

Temperature Coefficient \pm 0.025 dB/ C

Power Handling Capability

Without Performance Degradation

D1950A*, D1951 10 mW cw or peak
All other units 100 mW cw or peak

Survival Power (from -65°C to +25°C;
see Fig. 2 for higher temperatures)

All units 1 W average 25W peak (1 μ sec max pulse width)

Switching Characteristics

Off Time

D1950A* 600 nsec max
All other units 100 nsec max

On Time

D1950A* 10 μ sec max
All other units 1.6 μ sec max

Fall Time

D1950A* 500 nsec max
All other units 20 nsec max

Rise Time

D1950A* 10 μ sec max
All other units 1.5 μ sec max

Nominal Control Voltage Characteristics Range

	Operating	Maximum
D1950A*	0 to +8V	\pm 15V
All Other Units	0 to +6V	\pm 15V

Transfer Function 10 dB / volt

Input Impedance 10 Kohms

Modulation Bandwidth

Small Signal

D1950A* 25 kHz
All other units 500 kHz

Large Signal	
D1950A*	5 kHz
All other	50 kHz
units	
Power Supply	+12V 5%, 100 mA
Requirements	-12V 5%, 50 mA
Power Supply	Less than 0.1 dB / volt change in
Rejection	either supply

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

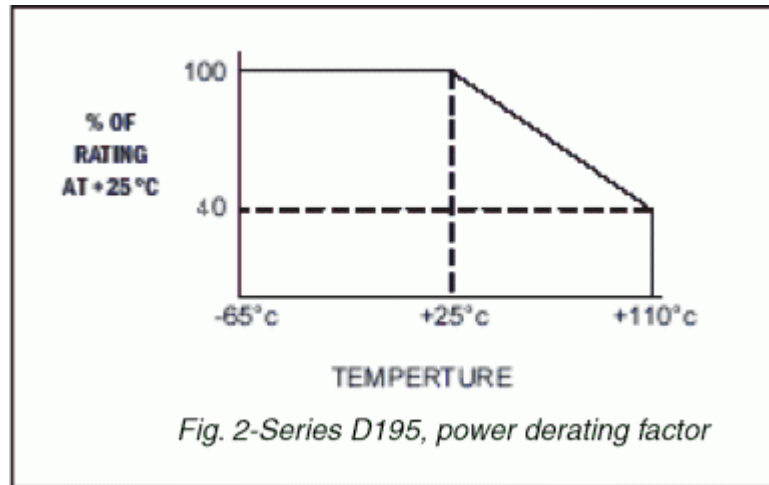
ENVIRONMENTAL RATINGS

Operating Temperature	
Range	-54°C to + 110°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 control connector
7	Two SMA male rf connectors
10	One SMA male (J1) and one SMA female (J2) RF connector
58	Internally-generated reset to insertion loss (not available on D1950A) ⁽¹⁾
59	Externally-triggered reset to insertion loss (not available on D1950A) ⁽²⁾⁽³⁾
61	20 dB / volt transfer function with 0 to +3V control signal input (+4V for the D1950A*)
62	± 15 volt operation
64	SMC male control connector
64A	SMB male control connector

- (1) Where use of an Option 59 external reset pulse (see note 2 below) is not feasible, this option is available which will automatically sense the slope and magnitude of the control signal and reset the unit to the insertion loss state within 200 nsec for a stop of 50 dB or more.
- (2) An external terminal is provided for the user to apply a fast (10 nsec, max rise time) positive-going 3-volt pulse at least 0.5 usec wide to accelerate the return of the attenuator to the insertion loss state with the simultaneous lowering of the control signal to the zero voltage level. This reset can be accomplished within 200 nsec.
- (3) The input impedance of units equipped with Option 59 is a circuit equivalent to approximately 50 pF in series with a parallel combination of 100 pF and 1000 ohms.



Dimensions and Weights

MODEL	DIM "A"
D1950A	.70 (17.8)
D1951	.50 (12.7)

MODELS D1950A* AND D1951
Wt: 3 oz. (85 gm) approx.

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

MODELS D1952 AND D1953
Wt: 2 oz. (57 gm) approx.

MODELS D1954, D1955 AND D1956
Wt: 1 oz. (28 gm) approx.

MODEL D1958
Wt: 1 oz. (28 gm) approx.

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

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