

Features

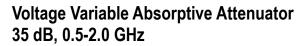
Description

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108.



Single Positive Voltage Control: 0 to +5 Volts

M/A-COM's AT-109 is a GaAs MMIC voltage variable absorptive attenuator in a low-cost SOIC-8 lead surface mount plastic package. The AT-109 is more linear than the higher attenuation range AT-

The AT-109 is ideally suited for use where linear

attenuation fine tuning and very low power consumption are required. Typical applications

include radio, cellular, GPS equipment and

The AT-109 is fabricated with a monolithic GaAs MMIC using a mature 1-micron process. The process features full chip passivation for increased

35 dB Attenuation Range at 0.9 GHz

Temperature Range: -40°C to +85°C

Tape and Reel Packaging Available

± 2 dB Linearity from BSL

SOIC-8 Plastic Package

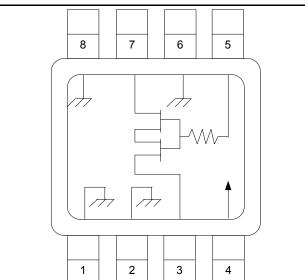
Low DC Power Consumption



AT-109

**V**5

## Functional Schematic <sup>1,2,3</sup>



1.  $V_{CC}$  = +5 VDC ± 0.5 VDC @ 50 µA maximum.

2.  $V_c = 0$  VDC to +5 VDC @ 50  $\mu$ A maximum.

3. External DC blocking capacitors are required on all RF ports.

### **Pin Configuration**

Pin No.	Function	Pin No.	Function	
1	Ground	5	Vc	
2	Ground	6	Ground	
3	RF Port	7	RF Port	
4	V <sub>CC</sub>	8	Ground	

### Absolute Maximum Ratings <sup>4,5</sup>

Parameter	Absolute Maximum		
Input Power	+21 dBm		
Supply Voltage V <sub>CC</sub>	-1 V <u>&lt;</u> V <sub>CC</sub> <u>&lt;</u> +8 V		
Control Voltage $V_{C}$	-1 V <u>&lt;</u> V <sub>C</sub> <u>&lt;</u> V <sub>CC</sub> + 0.5 V		
Operating Temperature	-40°C to +85°C		
Storage Temperature	-65°C to +150°C		

4. Exceeding any one or combination of these limits may cause permanent damage to this device.

 M/A-COM does not recommend sustained operation near these survivability limits.

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Ordering Information

performance and reliability.

automatic gain/level control circuits.

Part Number	Package		
AT-109	SOIC 8-Lead Plastic Package		
AT-109TR	Forward Tape and Reel		
AT-109SMB	Sample Test Board		

Note: Reference Application Note M513 for reel size information.

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# Voltage Variable Absorptive Attenuator 35 dB, 0.5-2.0 GHz

AT-109 V5

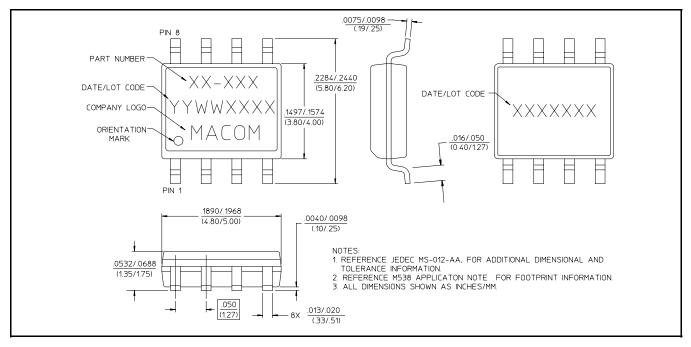
## Electrical Specifications<sup>6</sup>: $T_A = 25^{\circ}C$ , $Z_0 = 50 \Omega$

Parameter	Test Conditions	Units	Min.	Тур.	Max.
Insertion Loss	0.5 - 1.0 GHz 1.0 - 2.0 GHz	dB dB		2.5 3.2	2.7 3.5
Attenuation	0.5 - 1.0 GHz 1.0 - 2.0 GHz	dB dB	35 30		_
Flatness (Peak to Peak)	0.5 - 1.0 GHz 1.0 - 2.0 GHz	dB dB		± 0.5 ± 1.2	± 0.8 ± 1.5
VSWR	_	Ratio	—	2:1	_
Trise, Tfall	10% to 90% RF, 90% to 10% RF	μS	—	25	_
Ton, Toff	50% Control to 90% RF, 50% Control to 10% RF	μS	—	35	—
Transients	In-band	mV	—	12	—

6. The RF ports must be blocked outside of the package from ground or any other voltage.

### SOIC-8

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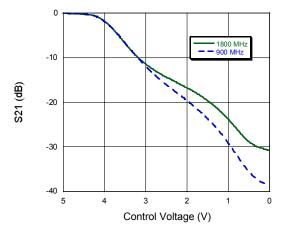


# Voltage Variable Absorptive Attenuator 35 dB, 0.5-2.0 GHz

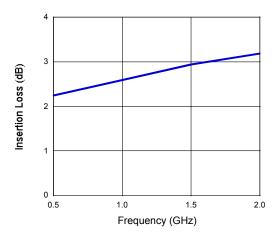
## AT-109 V5

### Typical Performance Curves @ 25°C

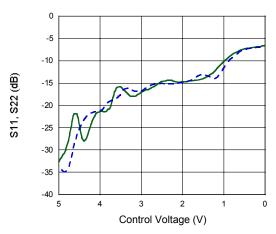
### Attenuation vs. Control Voltage, F = 900, 1800 MHz



#### Insertion Loss vs. Frequency



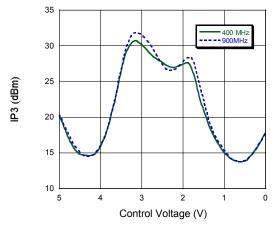
Return Loss vs. Control Voltage, F = 900 MHz



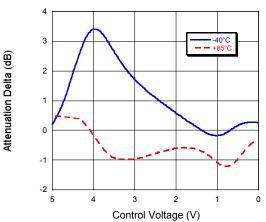
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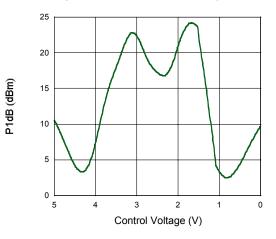
#### IP3 vs. Control Voltage



Attenuation vs. Temperature, Normalized to 25°C, F = 900 MHz



1 dB Compression vs. Control Voltage, F = 900 MHz



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