Voltage Variable Absorptive Attenuator 35 dB, 0.5-2.0 GHz

AT-109
V5

Features

- Single Positive Voltage Control: 0 to +5 Volts
- 35 dB Attenuation Range at 0.9 GHz
- ± 2 dB Linearity from BSL
- Low DC Power Consumption
- Temperature Range: -40°C to +85°C
- SOIC-8 Plastic Package
- Tape and Reel Packaging Available

Description

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-108.

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 automatic gain/level control circuits.

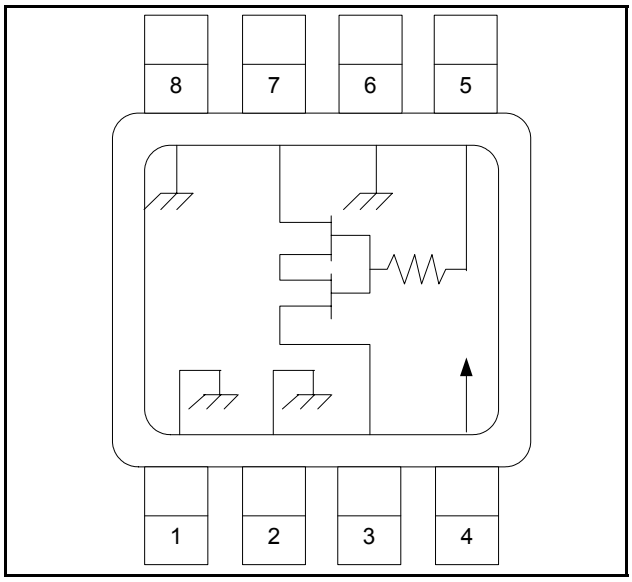
The AT-109 is fabricated with a monolithic GaAs MMIC using a mature 1-micron process. The process features full chip passivation for increased performance and reliability.

Ordering Information

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.

Functional Schematic [1,2,3]



1. V_{CC} = +5 VDC ± 0.5 VDC @ 50 µA maximum.
2. V_C = 0 VDC to +5 VDC @ 50 µA maximum.
3. External DC blocking capacitors are required on all RF ports.

Pin Configuration

Pin No.	Function	Pin No.	Function
1	Ground	5	V_C
2	Ground	6	Ground
3	RF Port	7	RF Port
4	V_{CC}	8	Ground

Absolute Maximum Ratings [4,5]

Parameter	Absolute Maximum
Input Power	+21 dBm
Supply Voltage V_{CC}	-1 V ≤ V_{CC} ≤ +8 V
Control Voltage V_C	-1 V ≤ V_C ≤ V_{CC} + 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.
5. M/A-COM does not recommend sustained operation near these survivability limits.

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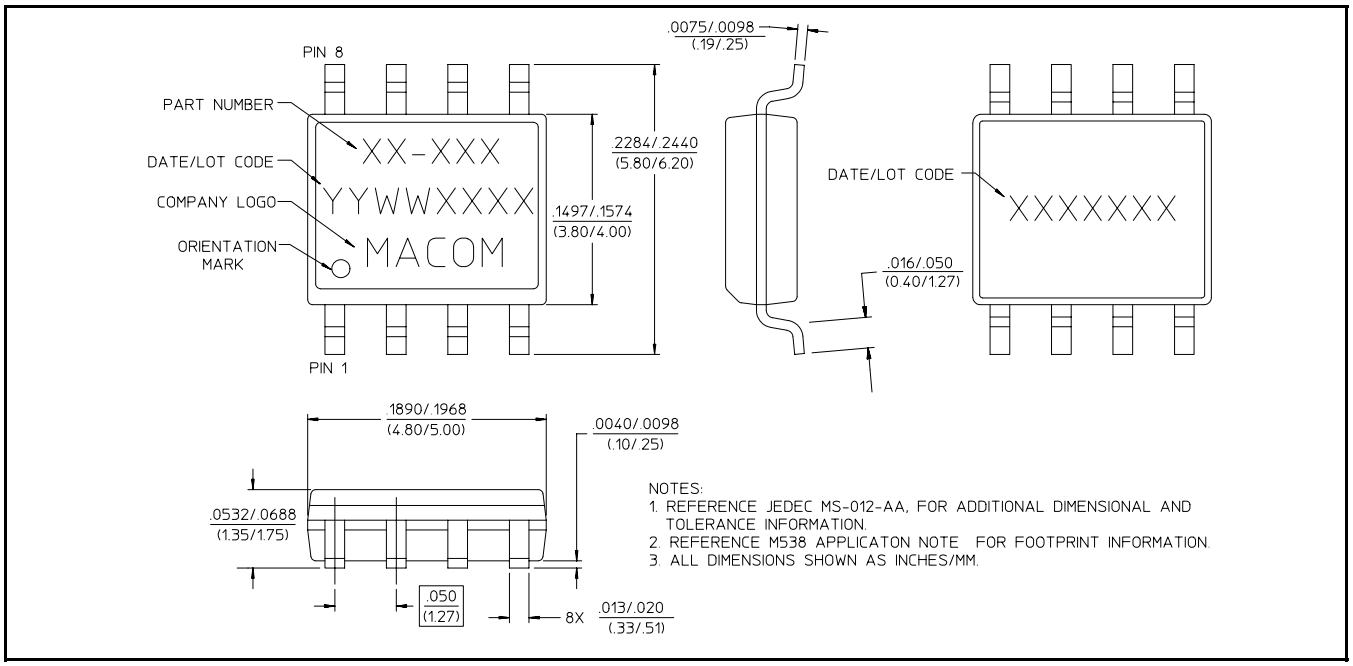
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Electrical Specifications[6]: T_A = 25°C, Z_0 = 50 Ω

Parameter	Test Conditions	Units	Min.	Typ.	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



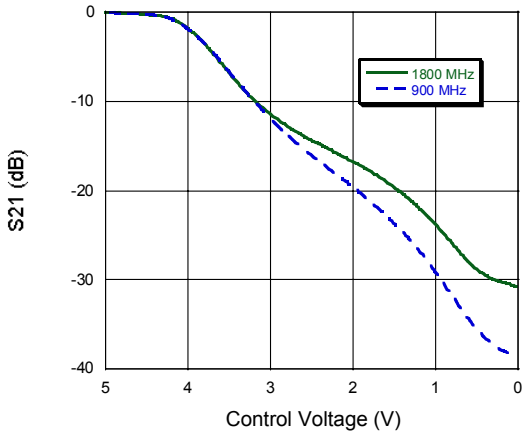
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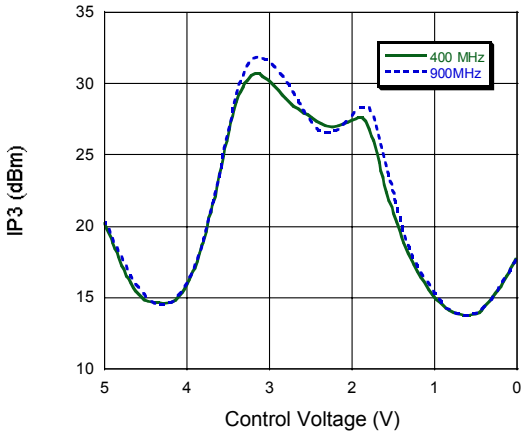
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Typical Performance Curves @ 25°C

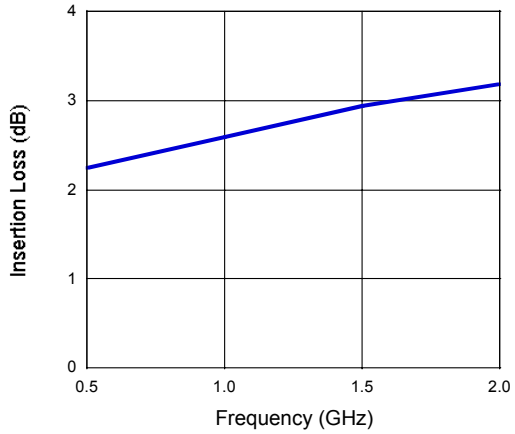
Attenuation vs. Control Voltage, F = 900, 1800 MHz



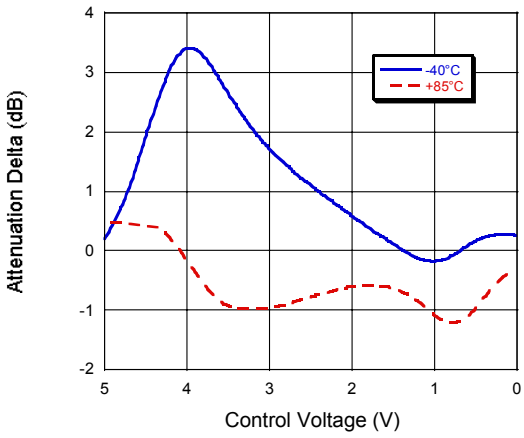
IP3 vs. Control Voltage



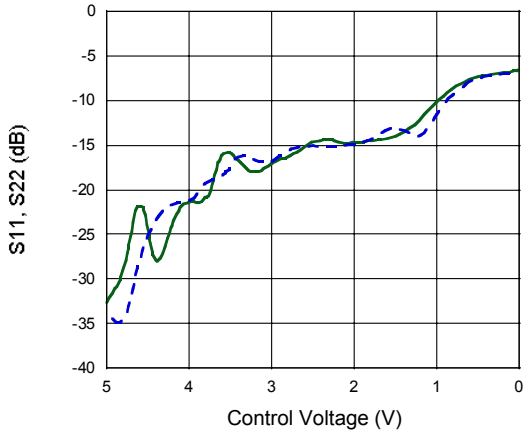
Insertion Loss vs. Frequency



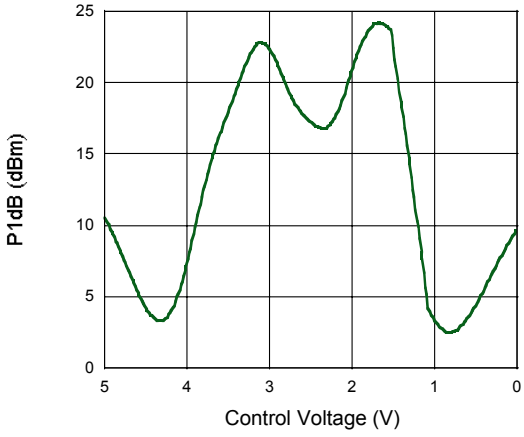
Attenuation vs. Temperature, Normalized to 25°C, F = 900 MHz



Return Loss vs. Control Voltage, F = 900 MHz



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



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