

## Voltage Variable Absorptive Attenuator 30 dB, 0.5 - 2.0 GHz

Rev. V1

### Features

- Single Positive Voltage Control: 0 to +5 Volts
- 30 dB Voltage Variable Attenuation
- $\pm 2$  dB Linearity from BSL
- Low DC Power Consumption
- Temperature Range:  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$
- SOIC-8 Plastic Package
- Tape and Reel Packaging Available
- Fast Switching Speed

### Description

M/A-COM's AT-110-2 is a GaAs MMIC voltage variable absorptive attenuator in a low-cost SOIC 8-lead surface mount plastic package. The AT-110-2 has a faster switching speed than the AT-108 or AT-109. The AT-110-2 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.

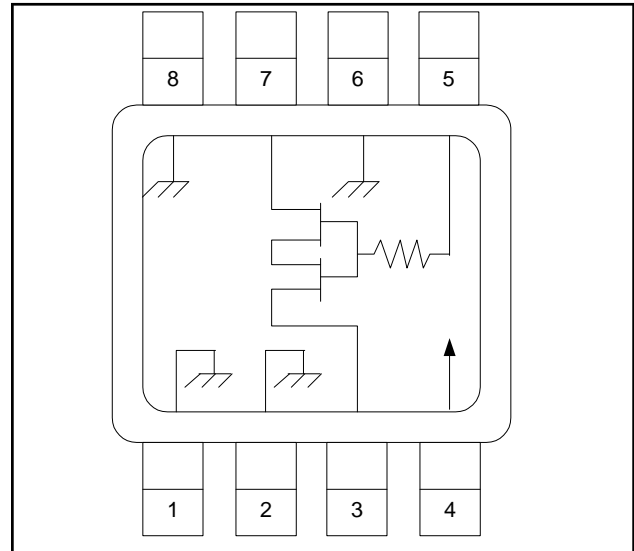
The AT-110-2 is fabricated with a monolithic GaAs MMIC using a mature 1-micron process. The process features full chip passivation for increased performance and reliability.

### Ordering Information <sup>1</sup>

Part Number	Package
AT-110-2	SOIC 8-Lead Plastic Package
AT-110-2TR	Forward Tape and Reel

1. Reference Application Note M513 for reel size information.

### Functional Schematic <sup>2,3,4</sup>



2.  $V_{CC} = +5 \text{ VDC} \pm 0.5 \text{ VDC}$  @ 300  $\mu\text{A}$  maximum.
3.  $V_C = 0 \text{ VDC}$  to  $+5 \text{ VDC}$  @ 6 mA maximum.
4. 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 <sup>5,6</sup>

Parameter	Absolute Maximum
Input Power	+21 dBm
Supply Voltage $V_{CC}$	$-1 \text{ V} \leq V_{CC} \leq +8 \text{ V}$
Control Voltage $V_C$	$-1 \text{ V} \leq V_C \leq V_{CC} + 0.5 \text{ V}$
Operating Temperature	$-40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$
Storage Temperature	$-65^{\circ}\text{C}$ to $+150^{\circ}\text{C}$

5. Exceeding any one or combination of these limits may cause permanent damage to this device.
6. M/A-COM does not recommend sustained operation near these survivability limits.

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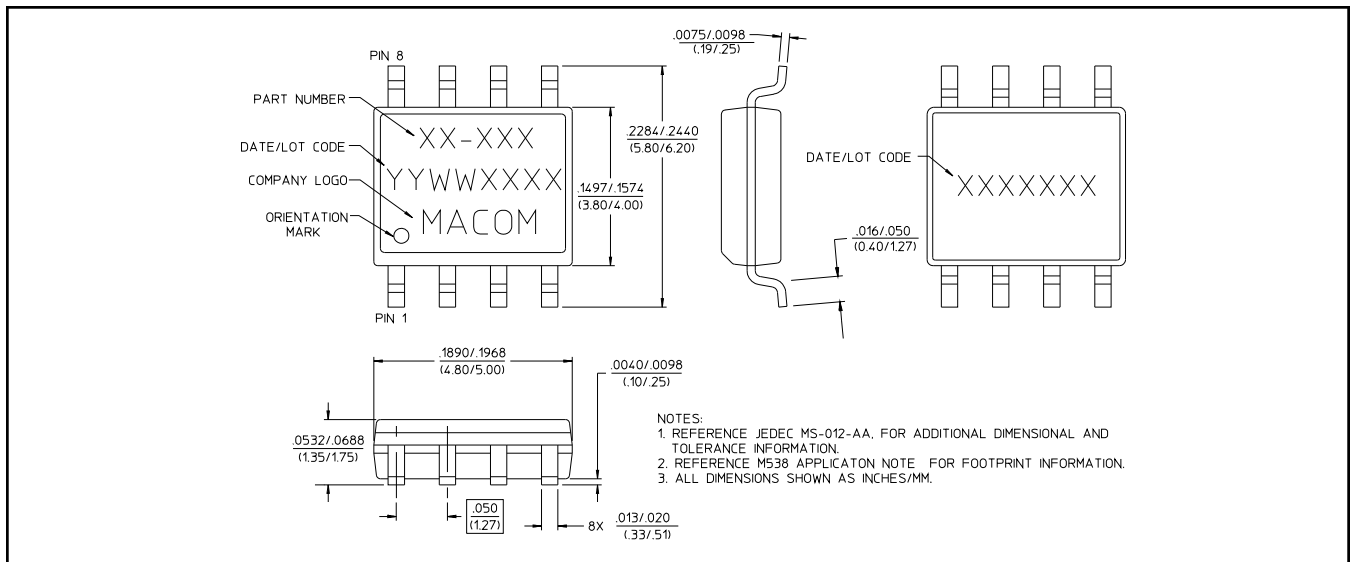
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### Electrical Specifications <sup>7</sup>: $T_A = 25^\circ\text{C}$ , $Z_0 = 50 \Omega$

Parameter	Test Conditions	Units	Min.	Typ.	Max.
Insertion Loss	0.5 - 1.0 GHz	dB	—	2.8	3.0
	1.0 - 2.0 GHz	dB	—	3.3	3.6
Attenuation	1.0 GHz	dB	37.5	—	—
	1.0 - 2.0 GHz	dB	25	—	—
Flatness (Peak to Peak)	0.5 - 1.0 GHz	dB	—	$\pm 0.5$	$\pm 0.8$
	1.0 - 2.0 GHz	dB	—	$\pm 1.2$	$\pm 1.5$
VSWR	—	Ratio	—	2:1	—
Trise, Tfall	10% to 90% RF, 90% to 10% RF	$\mu\text{S}$	—	0.2	—
Ton, Toff	50% Control to 90% RF, 50% Control to 10% RF	$\mu\text{S}$	—	0.2	—
Transients	In-band	mV	—	70	—

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

### SOIC-8



**ADVANCED:** Data Sheets contain information regarding a product M/A-COM Technology Solutions is considering for development. Performance is based on target specifications, simulated results, and/or prototype measurements. Commitment to develop is not guaranteed.  
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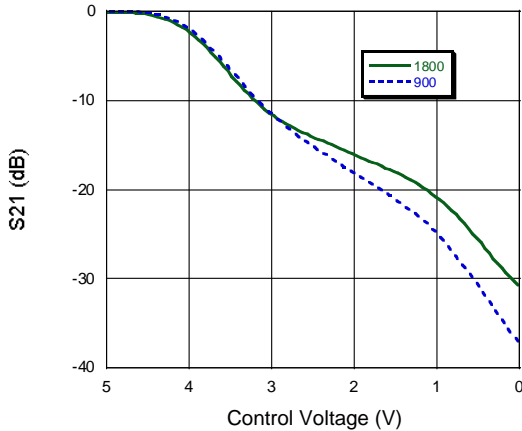
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Visit [www.macomtech.com](http://www.macomtech.com) for additional data sheets and product information.

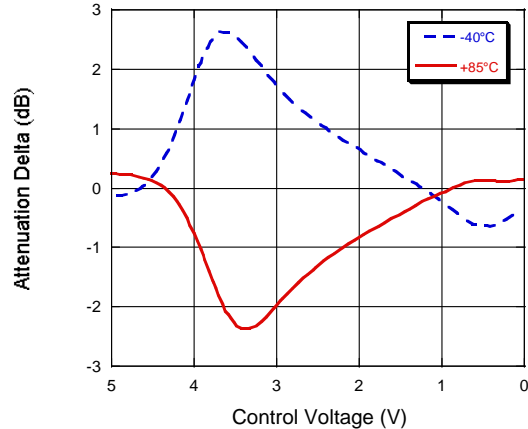
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## Typical Performance Curves @ 25°C

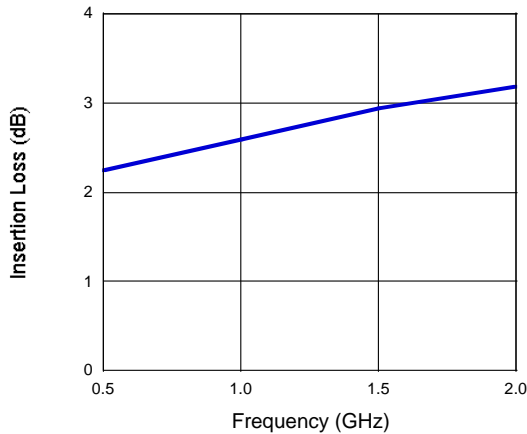
Attenuation vs. Control Voltage,  $F = 900, 1800$  MHz



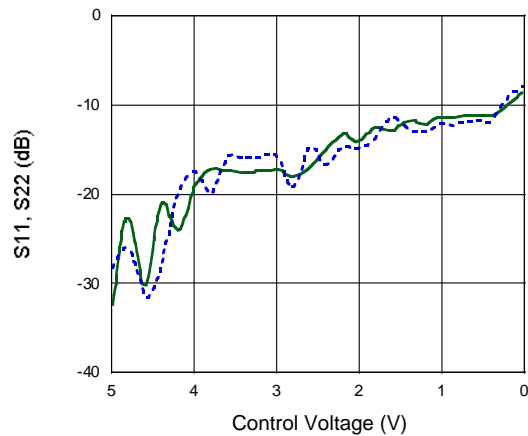
Attenuation vs. Temperature  
Normalized to +25°C,  $F = 900$  MHz



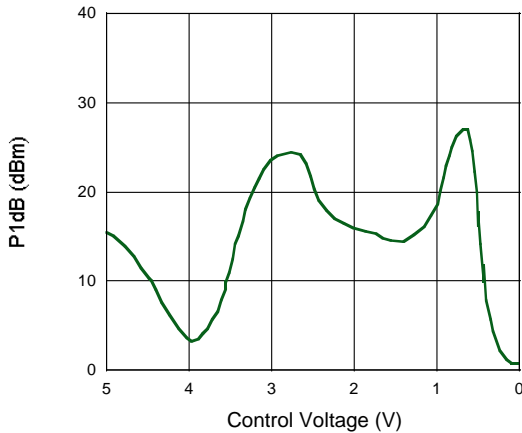
Insertion Loss vs. Frequency



Return Loss vs. Control Voltage,  $F = 900$  MHz



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



IP3 vs. Control Voltage

