

## 3 Volt Voltage Variable Absorptive Attenuator 40 dB, 0.5 - 2.0 GHz

Rev. V6

#### **Features**

- Single Positive Voltage Control: 0 to +3 Volts
- 40 dB Attenuation Range at 0.9 GHz
- ± 2 dB Linearity from BSL
- Low DC Power Consumption
- **SOIC-8 Plastic Package**
- Tape and Reel Packaging Available

### **Description**

M/A-COM's AT-113 is a GaAs MMIC voltage variable absorptive attenuator in a low-cost SOIC 8lead surface mount plastic package. The AT-113 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.

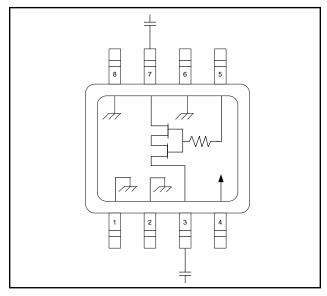
The AT-113 is fabricated with a monolithic GaAs MMIC using a mature 1-micron process. The process features full chip passivation for increased performance and reliability.

## Ordering Information 1,2

Part Number	Package
AT-113	Bulk Packaging
AT-113TR	Forward Tape and Reel
AT-113SMB	Sample Board

- 1. Reference Application Note M513 for reel size information.
- 2. All sample boards include 5 loose parts.

# Functional Schematic 3,4,5,6



- 3. VCC = +3 VDC @ 50  $\mu$ A maximum.
- 4. VC = 0 VDC to +3 VDC @ 50  $\mu$ A maximum.
- 5. External DC blocking capacitors are required on all RF ports.
- 6. 39 pF used for data measurements.

# Pin Configuration

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

# Absolute Maximum Ratings <sup>7</sup>

Parameter	er 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 <sub>C</sub>	-1 V ≤ V <sub>C</sub> ≤ V <sub>CC</sub> + 0.5 V	
Operating Temperature	-40°C to +85°C	
Storage Temperature	-65°C to +150°C	

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

North America Tel: 800.366.2266 / Fax: 978.366.2266

Europe Tel: 44.1908.574.200 / Fax: 44.1908.574.300

Asia/Pacific Tel: 81.44.844.8296 / Fax: 81.44.844.8298 Visit www.macomtech.com for additional data sheets and product information.



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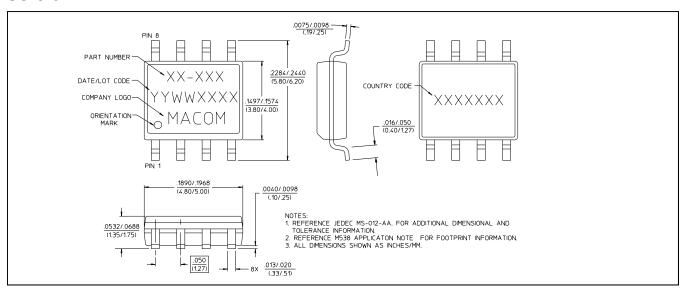
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## Electrical Specifications<sup>8</sup>: $T_A = 25$ °C, $Z_0 = 50 \Omega$

Parameter	Test Conditions	Units	Min.	Тур.	Max.
Insertion Loss	0.5 - 1.0 GHz 1.0 - 2.0 GHz	dB dB		2.7 3.0	3.0 3.5
Attenuation	0.5 - 1.0 GHz 1.0 - 2.0 GHz	dB dB	40 35	_	_
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	_	10	_
Ton, Toff	50% Control to 90% RF, 50% Control to 10% RF	μS	_	12	_
Transients	In-band	mV	_	10	_

<sup>8.</sup> The RF ports must be blocked outside of the package from ground or any other voltage.

### SOIC-8<sup>†</sup>



<sup>&</sup>lt;sup>†</sup> Meets JEDEC moisture sensitivity level 1 requirements.

### **Handling Procedures**

Please observe the following precautions to avoid damage:

### **Static Sensitivity**

Gallium Arsenide Integrated Circuits are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Proper ESD control techniques should be used when handling these devices.

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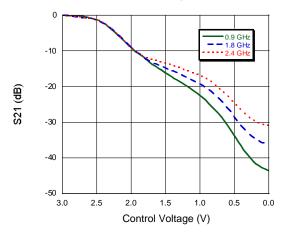


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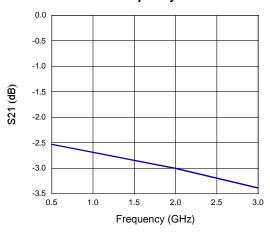
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## Typical Performance Curves @ 25°C

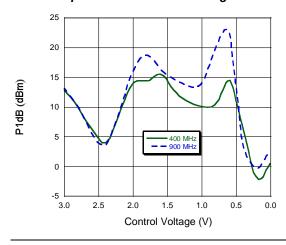
### Attenuation vs. Control Voltage



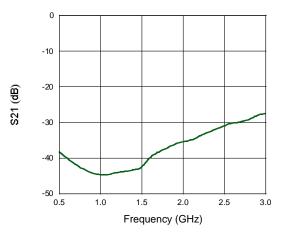
#### Insertion Loss vs. Frequency



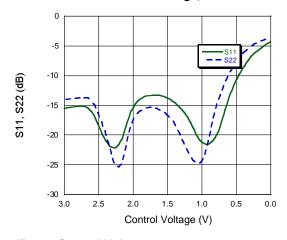
#### 1 dB Compression vs. Control Voltage



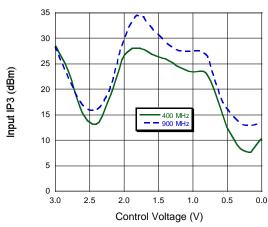
### Attenuation vs. Frequency @ 0V



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



### IP3 vs. Control Voltage



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## **Typical Performance Curves**

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

