AT-119

2.25 Volt Voltage Variable Absorptive Attenuator 42 dB, 1.8 - 2.5 GHz

Rev. V9

Features

- Single Positive Voltage Control: 0 to +2.25 Volts
- 42 dB Typical Attenuation Range at 2.4 GHz
- Low DC Power Consumption
- SOT-25 Plastic Package
- Tape and Reel Packaging Available

Description

M/A-COM's AT-119 is a GaAs MMIC voltage variable absorptive attenuator in a low cost, SOT-25 five-lead, surface mount plastic package. M/A-COM fabricates the AT-119 with a proven monolithic GaAs 0.5 micron gate process that features full chip passivation for performance and reliability.

Applications

The AT-119 is ideally suited for applications that require fine tuning, linear attenuation with voltage, and very low power consumption.

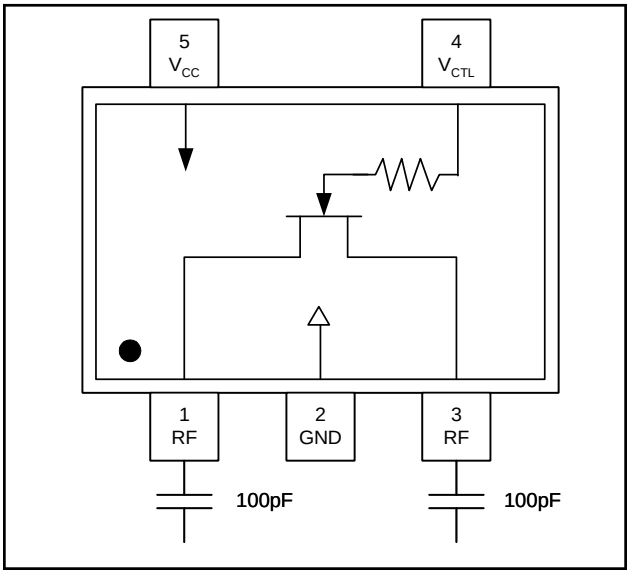
Typical applications for the AT-119 include automatic gain control circuits in satellite radio receivers and other wireless receivers.

Ordering Information [1]

Part Number	Package
AT-119	SOT-25 Plastic Package
AT-119TR-3000	3000 piece reel
AT-119SMB	Sample Test Board (Includes 5 Samples)

1. Reference Application Note M513 for reel size information.

Functional Schematic



Pin Configuration

Pin	Function	Description
1	RF	RF (input / output)
2	GND	Ground
3	RF	RF (input / output)
4	V_{CTL}	Control Voltage
5	V_{CC}	DC Supply Voltage

Absolute Maximum Ratings [2,3]

T_A = +25°C (unless otherwise specified)

Parameter	Absolute Maximum
Input Power	+21 dBm
Supply Voltage V_{CC}	-1V ≤ V_{CC} ≤ +8 V
Control Voltage V_{CTL}	-1V ≤ V_{CTL} ≤ V_{CC} +0.5 V
Operating Temperature	-40°C to +85°C
Storage Temperature	-65°C to +150°C

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

- **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.

2.25 Volt Voltage Variable Absorptive Attenuator
42 dB, 1.8 - 2.5 GHz

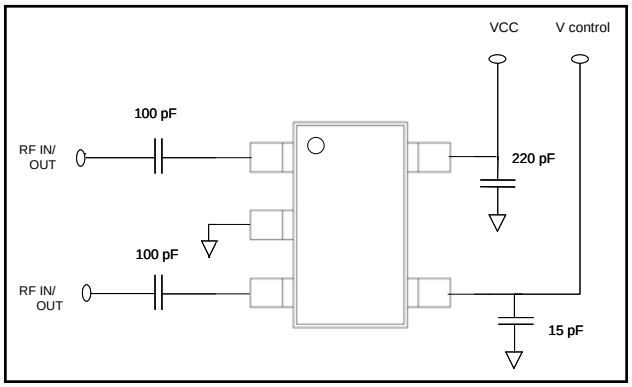
Rev. V9

Electrical Specifications: T_A = 25°C, Frequency = 2.4 GHz, V_{CC} = 3.3 V, Z_0 = 50 Ω

Parameter	Test Conditions [4,5]	Units	Min.	Typ.	Max.
Insertion Loss	V_{CTL} = 2.25 V	dB	—	2.4	3.2
Maximum Attenuation	V_{CTL} = 0.5 V	dB	37	42	—
Attenuation Slope	0.75 V < V_{CTL} < 1.75 V	dB/V	24	—	—
Return Loss	0.0 V < V_{CTL} < 0.75 V 0.75 V < V_{CTL} < 1.75 V 1.75 V < V_{CTL} < 2.25 V	dB dB dB	— — —	6 10 14	— — —
Input Power for 1dB Change in Attenuation	0.75 V < V_{CTL} < 2.25 V	dBm	—	10	—
Input 3rd Order Intercept Point	0.75 V < V_{CTL} < 2.25 V	dBm	—	15	—
Switching Speed	50% V_{CTL} to 10% / 90% RF	nS	—	100	—
Transients	V_{CTL} = 3 V, In-Band	mV	—	10	—

4. External DC blocking capacitors are required on all RF ports.
5. VCC = +3.3 V @ 50 µA typical. VCTL = 0 V to +2.25 V @ 50 µA typical.

Application Schematic



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.

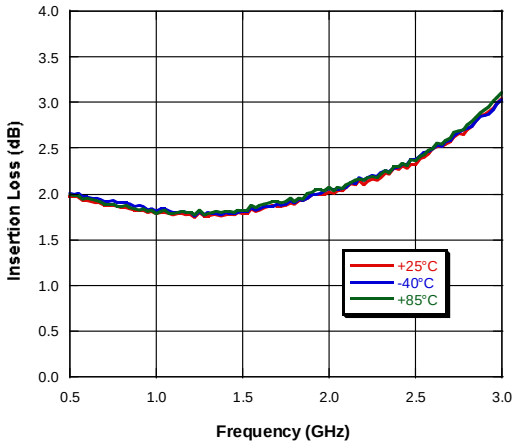
- **North America** Tel: 800.366.2266 / Fax: 978.366.2266
- **Europe** Tel: 44.1908.574.200 / Fax: 44.1908.574.300
- **Asia/Pacific** Tel: 81.44.844.8296 / Fax: 81.44.844.8298

Visit www.macomtech.com for additional data sheets and product information.

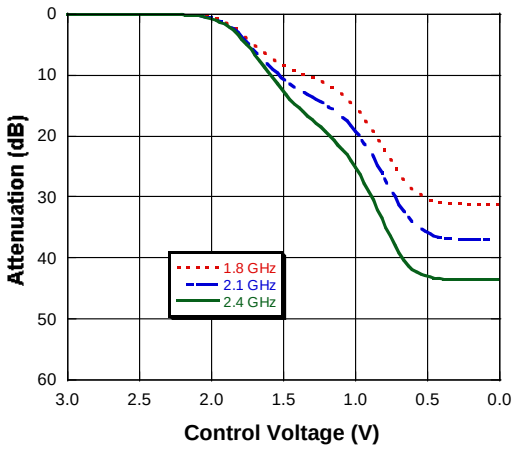
2.25 Volt Voltage Variable Absorptive Attenuator
42 dB, 1.8 - 2.5 GHz

Typical Performance Curves

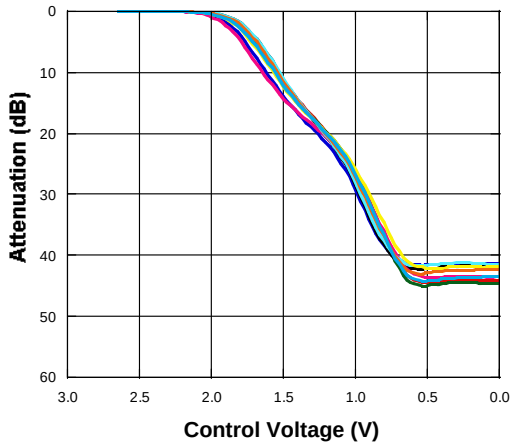
Insertion Loss vs. Frequency @ 2.25 V Control Voltage



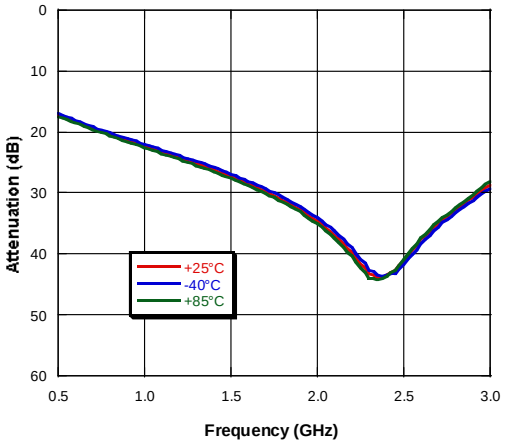
Attenuation vs. Control Voltage @ +25°C



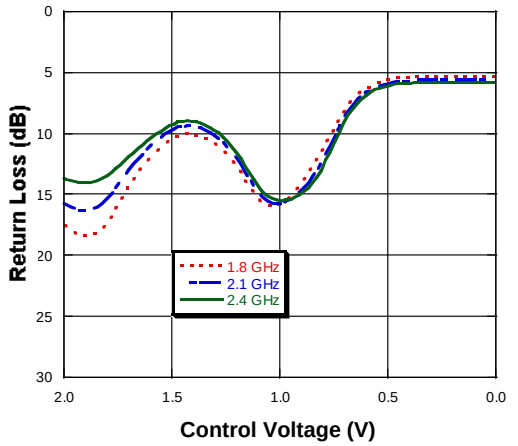
Typical Device Variation, 2.4 GHz



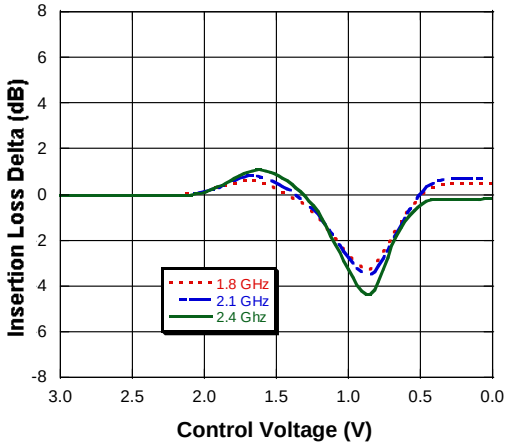
Attenuation vs. Frequency @ 0.0 V Control Voltage



Return Loss vs. Control Voltage



Insertion Loss Delta Normalized to +25°C (-40°C)



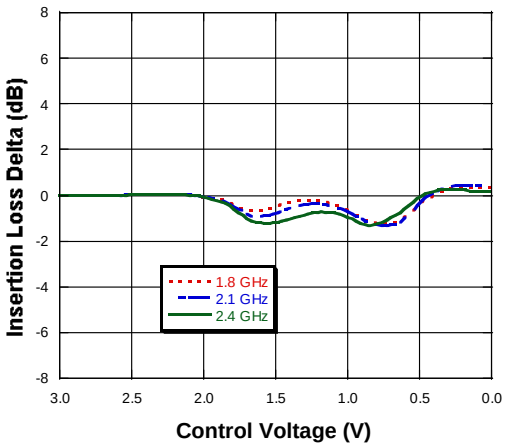
- **North America** Tel: 800.366.2266 / Fax: 978.366.2266
- **Europe** Tel: 44.1908.574.200 / Fax: 44.1908.574.300
- **Asia/Pacific** Tel: 81.44.844.8296 / Fax: 81.44.844.8298

Visit www.macomtech.com for additional data sheets and product information.

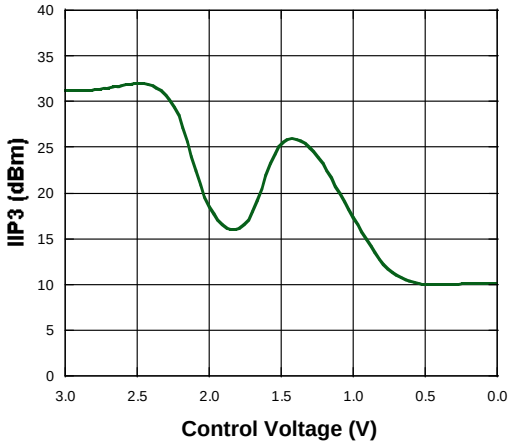
2.25 Volt Voltage Variable Absorptive Attenuator
42 dB, 1.8 - 2.5 GHz

Typical Performance Curves

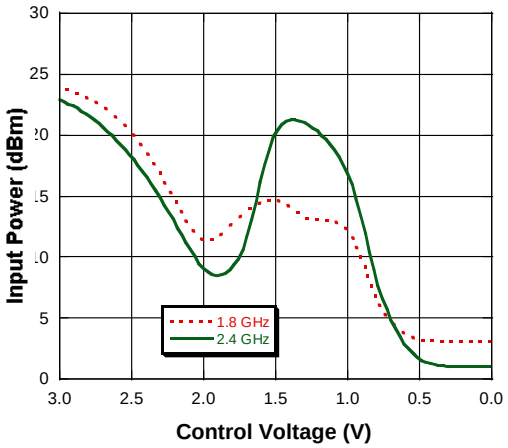
Insertion Loss Delta Normalized to +25°C (+85°C)



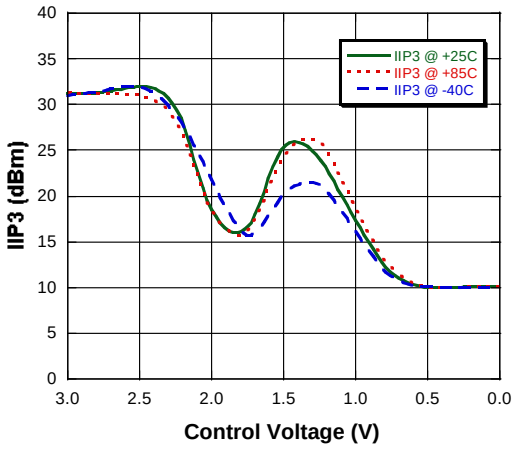
Input IP3 vs. Control Voltage @ +25°C



Input Power for 1 dB Change in Attenuation



Input IP3 vs. Control Voltage over Temperature



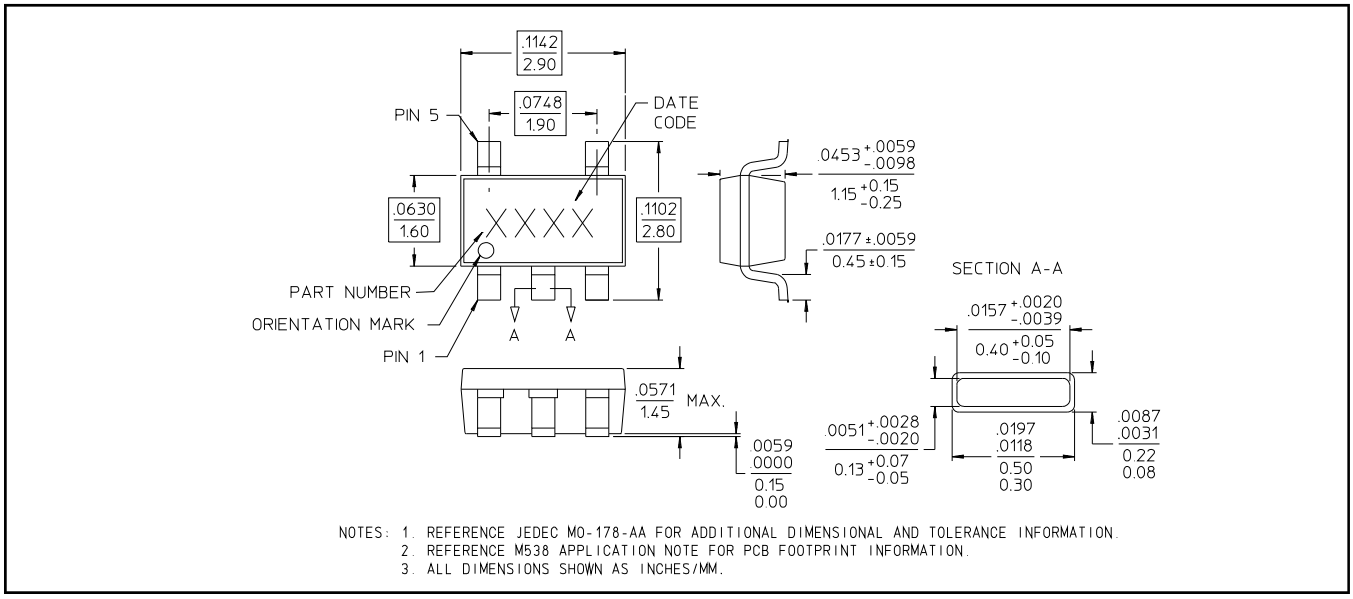
- **North America** Tel: 800.366.2266 / Fax: 978.366.2266
- **Europe** Tel: 44.1908.574.200 / Fax: 44.1908.574.300
- **Asia/Pacific** Tel: 81.44.844.8296 / Fax: 81.44.844.8298

Visit www.macomtech.com for additional data sheets and product information.

2.25 Volt Voltage Variable Absorptive Attenuator
42 dB, 1.8 - 2.5 GHz

Rev. V9

SOT-25



NOTES: 1. REFERENCE JEDEC MO-178-AA FOR ADDITIONAL DIMENSIONAL AND TOLERANCE INFORMATION.
2. REFERENCE M538 APPLICATION NOTE FOR PCB FOOTPRINT INFORMATION.
3. ALL DIMENSIONS SHOWN AS INCHES/MM.

- **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.