

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

AT-113
V5

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 8-lead 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.

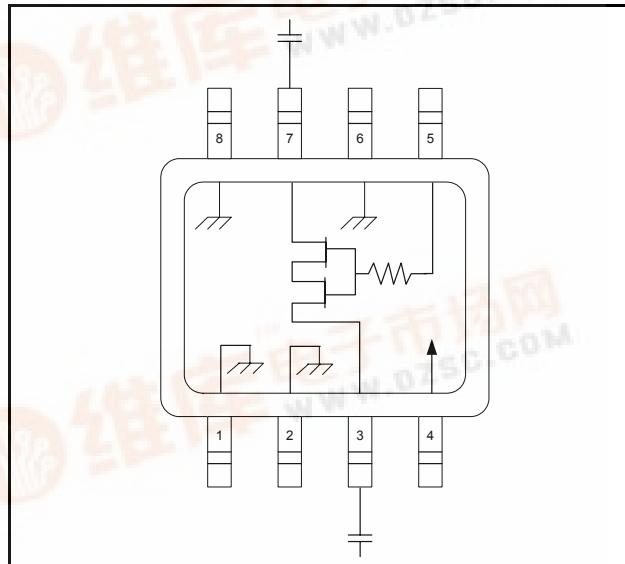
The AT-113 is fabricated with a monolithic GaAs MMIC using a mature 1-micron process. The process features full chip passivation for increased performance and reliability.

Ordering Information

Part Number	Package
AT-113	SOIC 8-Lead Plastic Package
AT-113TR	Forward Tape and Reel

Note: Reference Application Note M513 for reel size information.

Functional Schematic ^{1,2,3,4}



1. $V_{CC} = +3$ VDC @ 50 μ A maximum.
2. $V_C = 0$ VDC to +3 VDC @ 50 μ A maximum.
3. External DC blocking capacitors are required on all RF ports.
4. 39 pF used for data measurements.

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 ⁵

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

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

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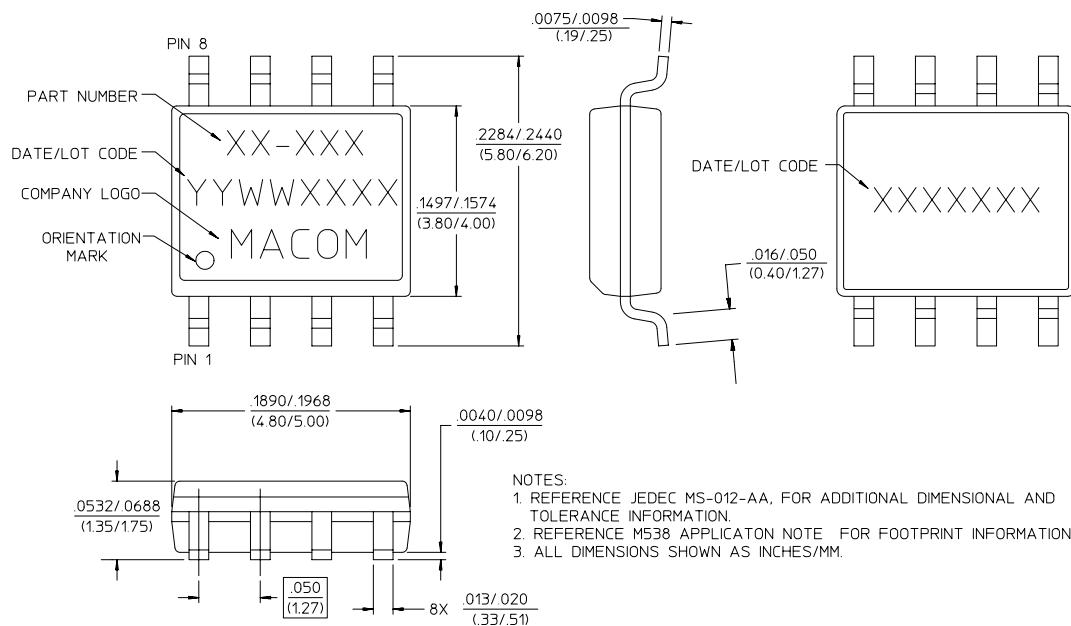
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Electrical Specifications⁶: $T_A = 25^\circ\text{C}$, $Z_0 = 50 \Omega$

Parameter	Test Conditions	Units	Min	Typ	Max
Insertion Loss	0.5 - 1.0 GHz 1.0 - 2.0 GHz	dB	—	2.7 3.0	3.0 3.5
Attenuation	0.5 - 1.0 GHz 1.0 - 2.0 GHz	dB	40 35	—	—
Flatness (Peak to Peak)	0.5 - 1.0 GHz 1.0 - 2.0 GHz	dB	—	± 0.5 ± 1.2	± 0.8 ± 1.5
VSWR	—	Ratio	—	2:1	—
$T_{\text{rise}}, T_{\text{fall}}$	10% to 90% RF, 90% to 10% RF	μs	—	10	—
$T_{\text{on}}, T_{\text{off}}$	50% Control to 90% RF, 50% Control to 10% RF	μs	—	12	—
Transients	In-band	mV	—	10	—

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

SOIC-8

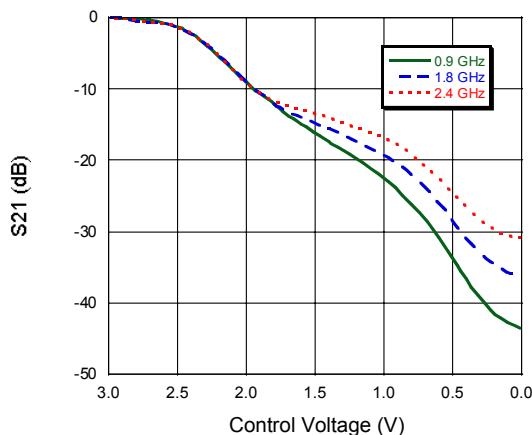


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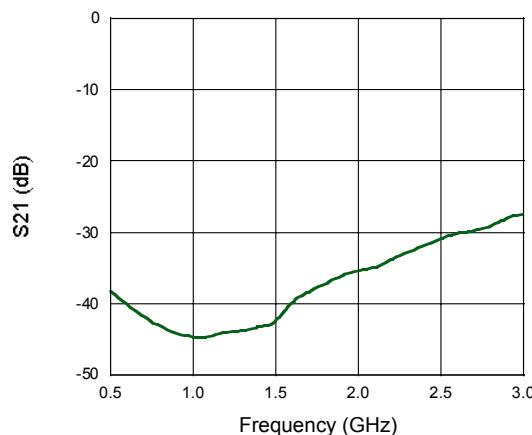
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Typical Performance Curves @ 25°C

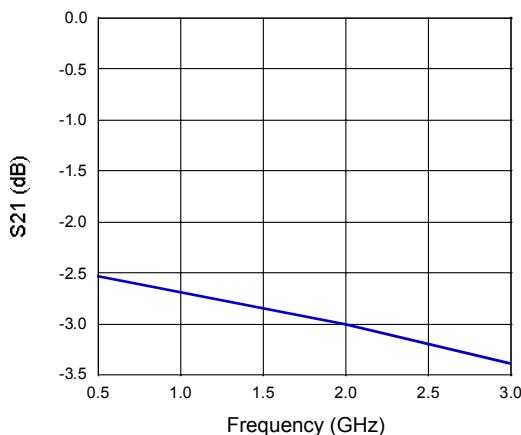
Attenuation vs. Control Voltage



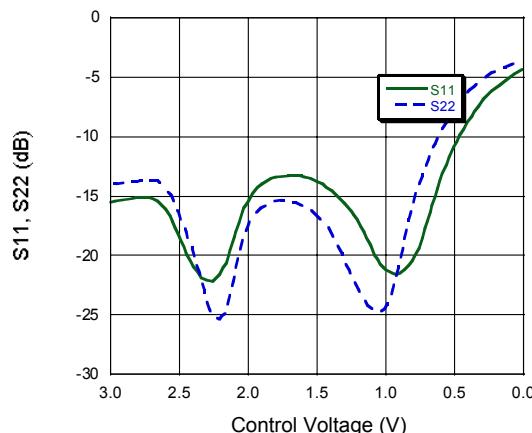
Attenuation vs. Frequency @ 0V



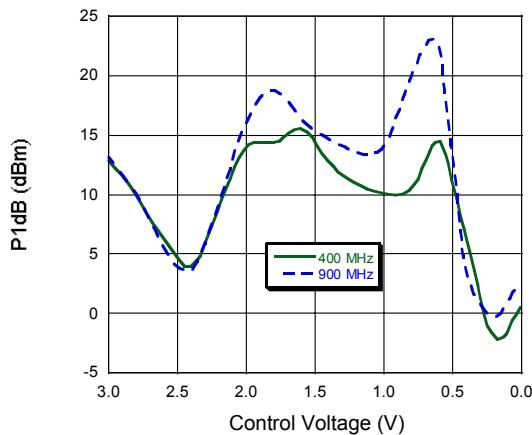
Insertion Loss vs. Frequency



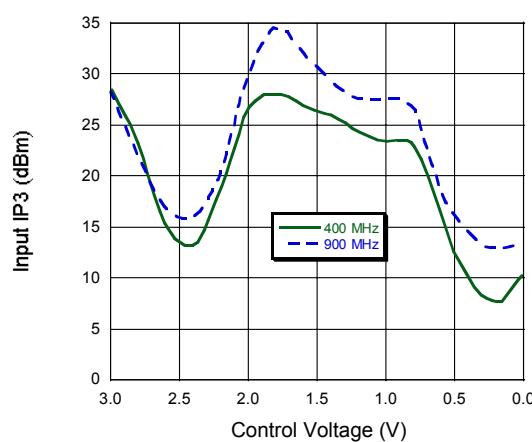
**Return Loss vs. Control Voltage
F = 900 MHz**



1 dB Compression vs. Control Voltage



IP3 vs. Control Voltage



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Typical Performance Curves

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

