

Features

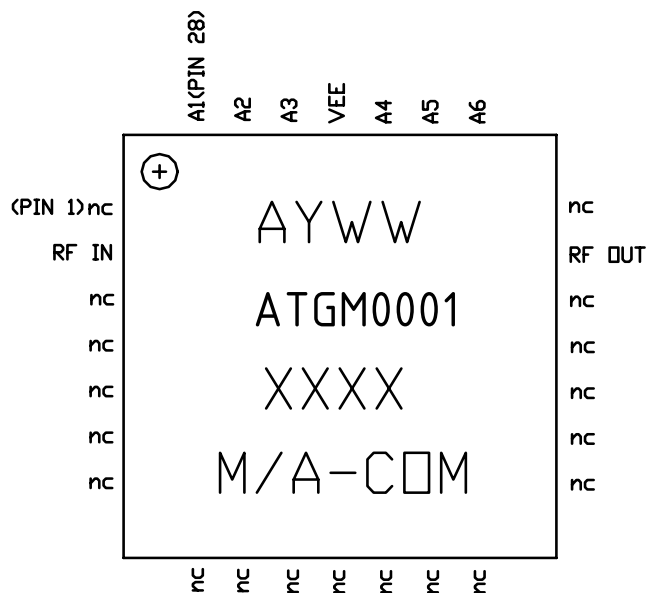
- ◆ 6 Bit Attenuator Range
- ◆ 35dB Coverage, LSB = 0.56dB
- ◆ TTL Control Inputs
- ◆ MSAG™ MESFET Process

Description

The MAATGM0001 is a 6-bit Attenuator with Parallel Input Control. This product is fully matched to 50 ohms on both the input and output.

Fabricated using M/A-COM's repeatable, high performance and highly reliable GaAs Multifunction Self-Aligned Gate MESFET Process, each device is 100% RF tested on wafer to ensure performance compliance.

M/A-COM's MSAG™ process features robust silicon-like manufacturing processes, planar processing of ion implanted transistors, multiple implant capability enabling power, low-noise, switch and digital FETs on a single chip, and polyimide scratch protection for ease of use with automated manufacturing processes. The use of refractory metals and the absence of platinum in the gate metal formulation prevents hydrogen poisoning when employed in hermetic packaging.



Primary Applications

- ◆ Satellite Communication
- ◆ Phased Array Radar

Maximum Operating Conditions ¹

Parameter	Symbol	Absolute Maximum	Units
Input Power	PIN	36	dBm
Source Supply Voltage	VEE	-6	V
Junction Temperature	TJ	180	°C
Storage Temperature	TSTG	-55 to +150	°C

1. Operation outside of these ranges may reduce product reliability. Operation at other than the typical values may result in performance outside the guaranteed limits.

Truth Table

Pin	Designation	Description	Level	State
22	A6	18.0dB Attenuation Bit : MSB	Logic High	Attenuation ≈ 18.0dB
23	A5	9.0dB Attenuation Bit	Logic High	Attenuation ≈ 9.0dB
24	A4	4.5dB Attenuation Bit	Logic High	Attenuation ≈ 4.5dB
25	VEE	DC Suply Voltage	-5V	ON
26	A3	2.25db Attenuation Bit	Logic High	Attenuation ≈ 2.25dB
27	A2	1.12dB Attenuation Bit	Logic High	Attenuation ≈ 1.12dB
28	A1	0.56dB Attenuation Bit : LSB	Logic High	Attenuation ≈ 0.56dB

2. All Attenuation Bits at Logic Low = Reference State. Logic Low = 0 to 0.8V, Logic High = 2.8 to 5V

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

DC – 6.0 GHz Attenuator

MAATGM0001
RO-P-DS-3098 ---
Preliminary Information

Recommended Operating Conditions

Characteristic	Symbol	Min	Typ	Max	Unit
Control Voltage	A1 thru A6				
Logic High		2.8	5	5	V
Logic Low		0	0	0.8	V
Junction Temperature	T _J			150	°C
Digital Supply Voltage	V _{EE}	-5.2	-5	-4.8	V

Electrical Characteristics: T_B = 25°C, Z₀ = 50Ω, V_{EE} = -5V

Parameter	Symbol	Typical	Units
Bandwidth	f	dc - 6	GHz
Reference State Insertion Loss	IL	4	dB
Input VSWR (All States)	VSWR	1.5:1	
Output VSWR (All States)	VSWR	1.5:1	
RMS Attenuation Error	RMS	2	dB
RMS Attenuation Error — Calibrated	RMS	0.2	dB
Attenuation Range	ΔG	35	dB
Phase Variation over all Attenuator settings	ΔΦ	<8	°
Digital Supply Current	IEE	<10	mA
Input Third Order Intercept	ITOI	36	dBm
Input 1-dB Compression Point	P1dB	26	dBm

Operating Instructions

This device is static sensitive. Please handle with care. To operate the device, follow these steps.

1. Apply V_{EE} = -5 V.
2. Apply Logic Voltages to control circuit as listed in Recommended Operating Conditions Table.
3. Power Down. Set V_{EE} = 0.



DC – 6.0 GHz Attenuator

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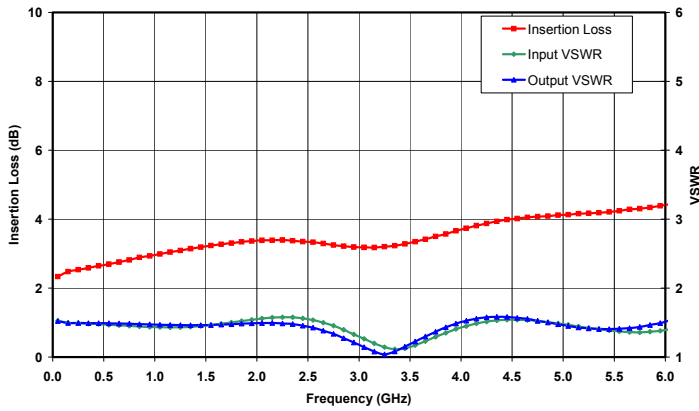


Figure 1. Reference State Insertion Loss, Input and Output VSWR vs. Frequency

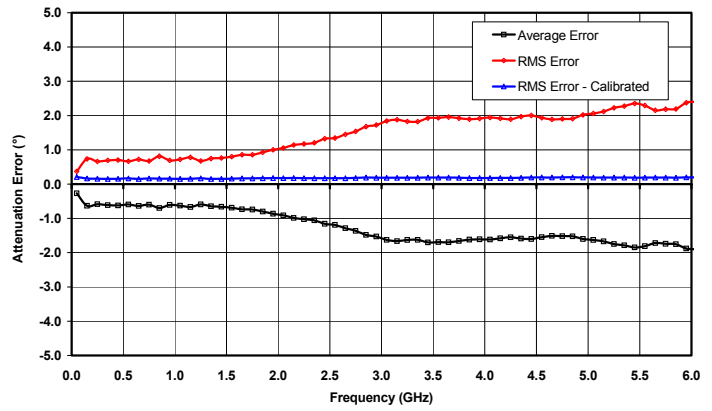


Figure 2. Attenuator Figures of Merit: Average Error, RMS Error, and Calibrated RMS Error Over All States vs. Frequency

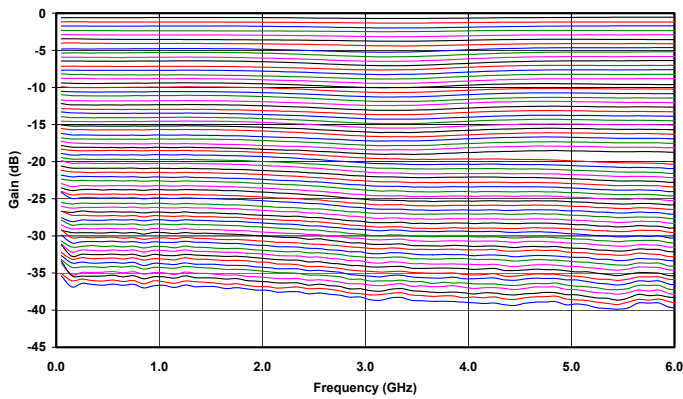


Figure 3. Relative Gain vs. Frequency Over All Attenuator States

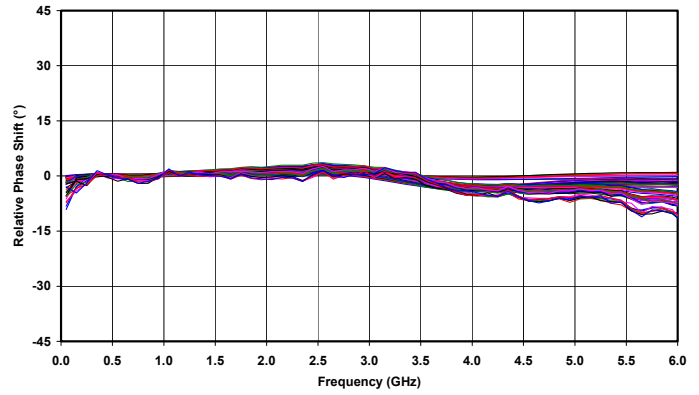


Figure 4. Relative Phase Shift vs. Frequency Over All Attenuator States

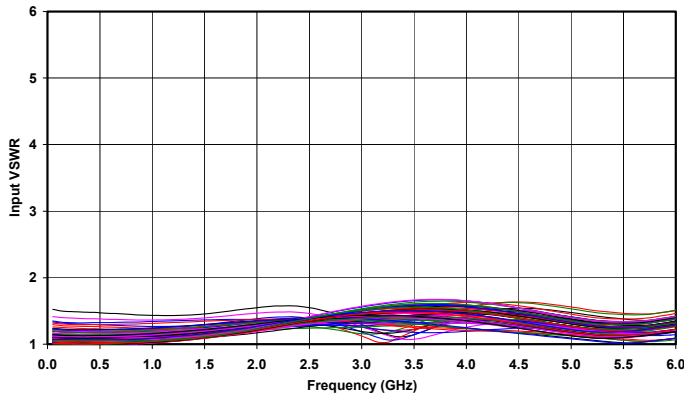


Figure 5. Input VSWR vs. Frequency Over All Attenuator States

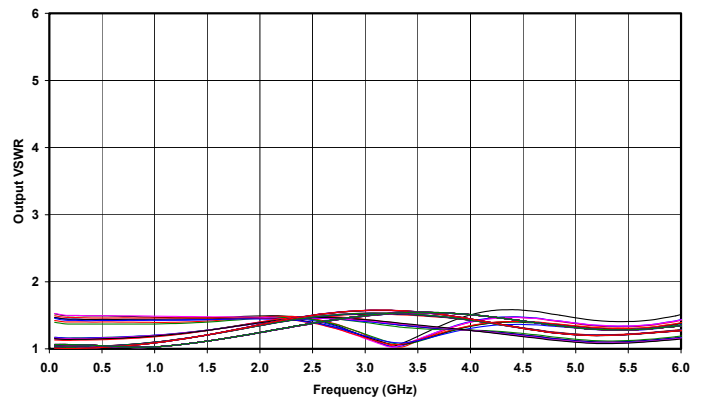


Figure 6. Output VSWR vs. Frequency Over All Attenuator States

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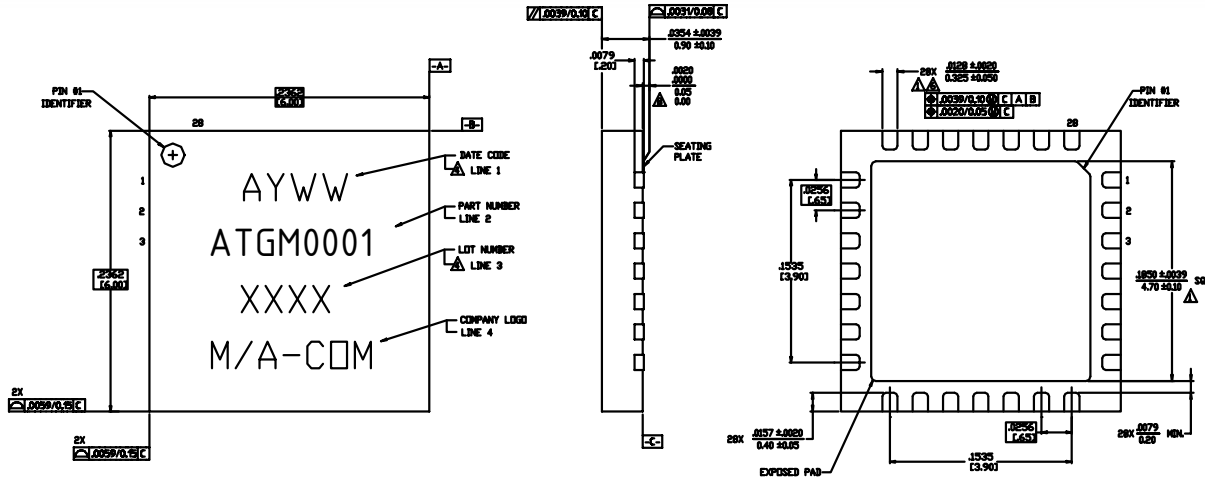


Figure 7. 6mm PQFN 28 Lead Package Drawing

Reference JEDEC M0-220 (see <http://www.jedec.org>), VAR. VJJC-3 (Issue E) for additional dimensional and tolerance information.

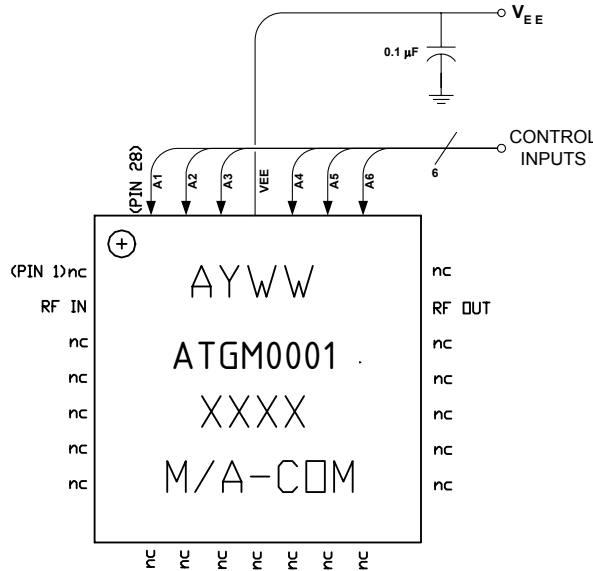


Figure 8. Recommended Bias Configuration

Refer to M/A-COM Application Note **Surface Mounting Instructions for PQFN Packages #S2083*** for assembly guidelines.

Application Notes can be found by going to the Site Search Page on M/A-COM's web page (<http://www.macom.com/search/search.jsp>) and searching for the required Application Note.

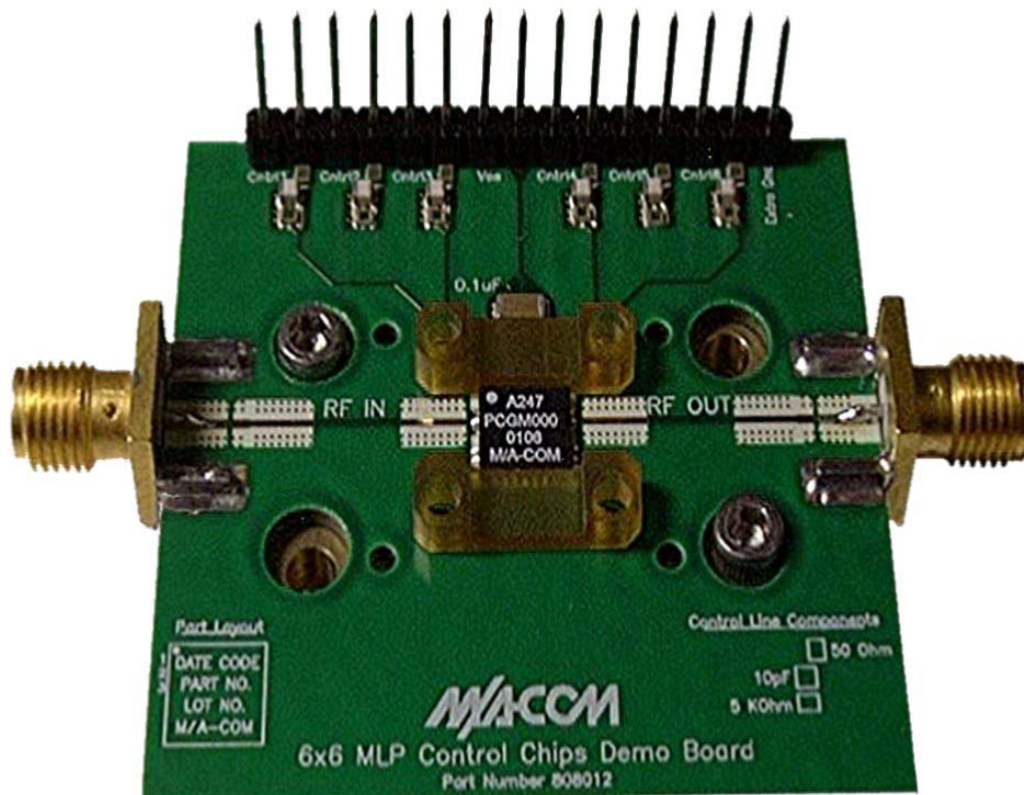


Figure 9. Demonstration Board PN MAATGM0001-SMB (available upon request).