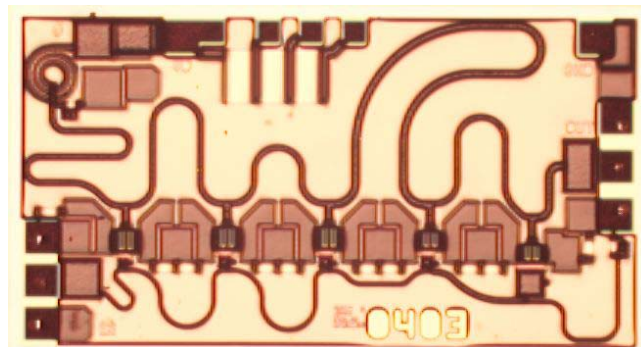


Features

- ◆ 0.15 Watt Saturated Output Power Level
- ◆ Single Bias Operation
- ◆ Variable Drain Voltage (4-6V) Operation
- ◆ GaAs MSAG™ Process
- ◆ Proven Manufacturability and Reliability
 - No Airbridges
 - Polyimide Scratch Protection
 - No Hydrogen Poisoning Susceptibility



Description

The MAAMGM0007-Die is a single stage distributed amplifier with single bias operation. This product is fully matched to 50 ohms on both the input and output. It can be used as a driver stage in high power applications.

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

- ◆ Test Equipment
- ◆ Electronic Warfare
- ◆ Radar

Electrical Characteristics: $T_B = 40^\circ\text{C}^1$, $Z_0 = 50\Omega$, $V_{DD} = 5\text{V}$, $P_{in} = 16\text{ dBm}$

Parameter	Symbol	Typical	Units
Bandwidth	f	2.0-18.0	GHz
Output Power	P_{OUT}	22	dBm
1-dB Compression Point	P_{1dB}	19	dBm
Small Signal Gain	G	8	dB
Noise Figure	NF	6	dB
Input VSWR	VSWR	2.0:1	
Output VSWR	VSWR	2.0:1	
Drain Supply Current	I_{DD}	< 250	mA

1. T_B = MMIC Base Temperature

2.0-18.0 GHz Distributed Amp/Gain Block

MAAMGM0007-DIE

Maximum Operating Conditions ²

Parameter	Symbol	Absolute Maximum	Units
Input Power	P_{IN}	20.0	dBm
Drain Supply Voltage	V_{DD}	+8.0	V
Junction Temperature	T_J	180	°C
Storage Temperature	T_{STG}	-55 to +150	°C
Die Attach Temperature		310	°C

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

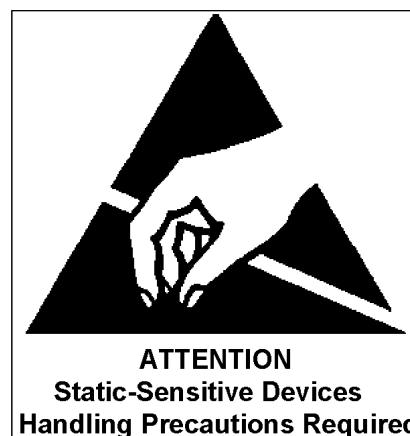
Recommended Operating Conditions

Characteristic	Symbol	Min	Typ	Max	Unit
Drain Supply Voltage	V_{DD}	4.0	5.0	6.0	V
Input Power	P_{IN}		16.0	18.0	dBm
Junction Temperature	T_J			150	°C
Thermal Resistance	Θ_{JC}		58		°C/W
MMIC Base Temperature	T_B			Note 3	°C

3. Maximum MMIC Base Temperature = $150^{\circ}\text{C} - \Theta_{JC} * V_{DD} * I_{DD}$

Operating Instructions

This device is static sensitive.
Please handle with care.



Specifications subject to change without notice.

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2.0-18.0 GHz Distributed Amp/Gain Block MAAMGM0007-DIE

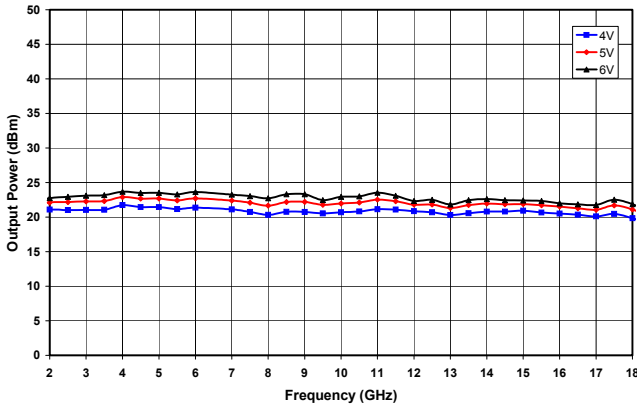


Figure 1. Output Power vs. Frequency and Drain Voltage at $P_m=16\text{dBm}$.

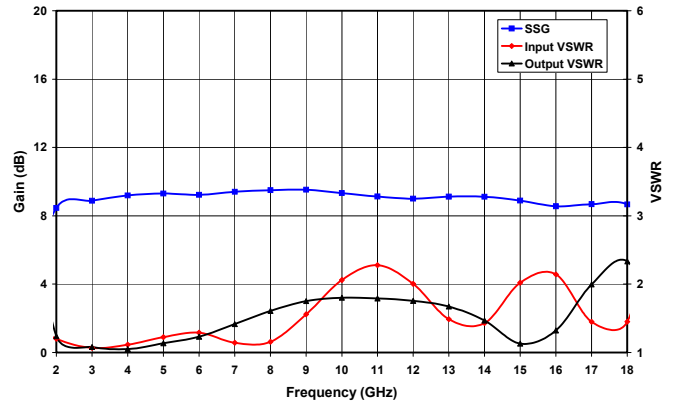


Figure 2. Small Signal Gain and Input and Output VSWR vs. Frequency at $V_p=5\text{V}$

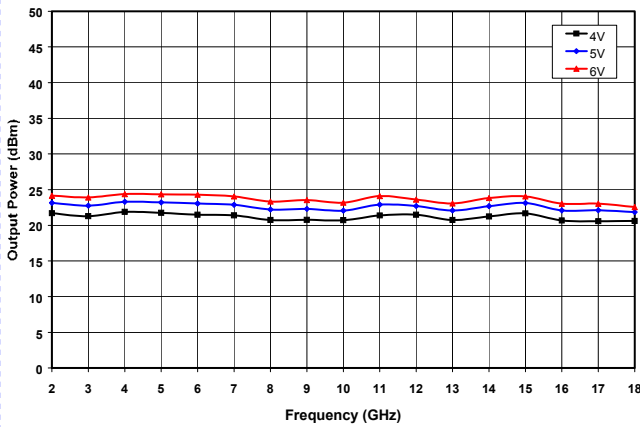


Figure 3. Saturated Output Power vs. Frequency and Drain Voltage.

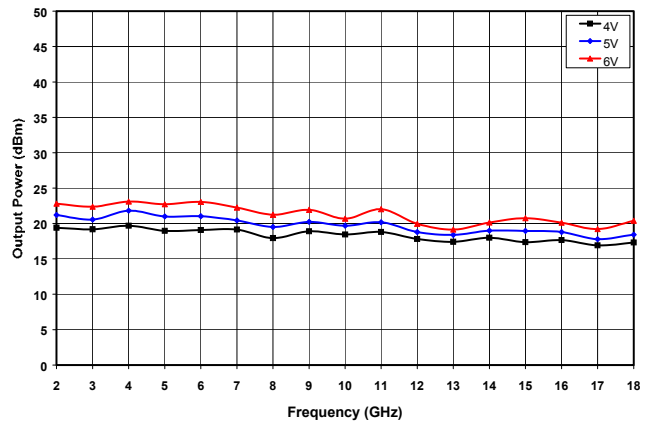


Figure 4. 1dB Compression Point vs. Frequency and Drain Voltage.

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2.0-18.0 GHz Distributed Amp/Gain Block MAAMGM0007-DIE

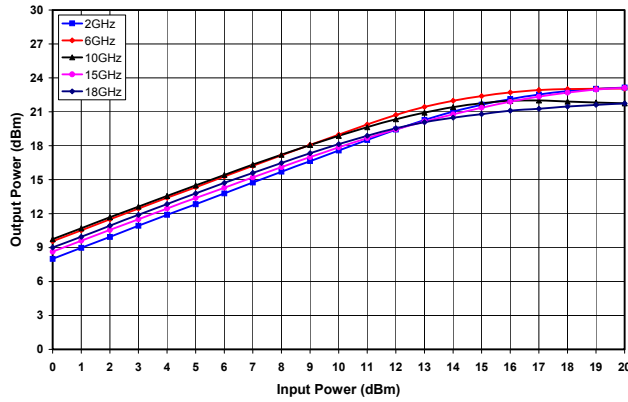


Figure 5. Output Power vs. Input Power and Frequency at $V_D=5V$.

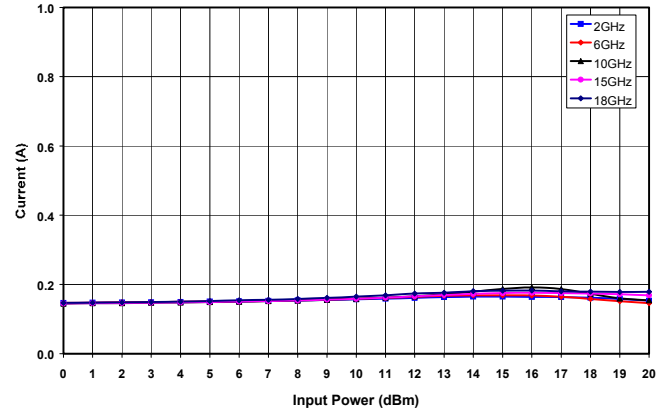


Figure 6. RF Drain Current vs. Input Power and Frequency at $V_D=5V$.

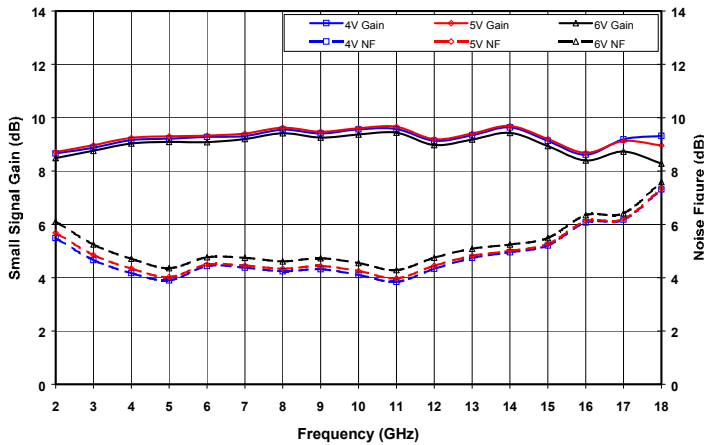


Figure 7. Small Signal Gain and Noise Figure vs. Frequency and Drain Voltage.

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2.0-18.0 GHz Distributed Amp/Gain Block **MAAMGM0007-DIE**

Mechanical Information

Chip Size: 1.67 x 3.00 x 0.075 mm (65 x 118 x 3 mils)

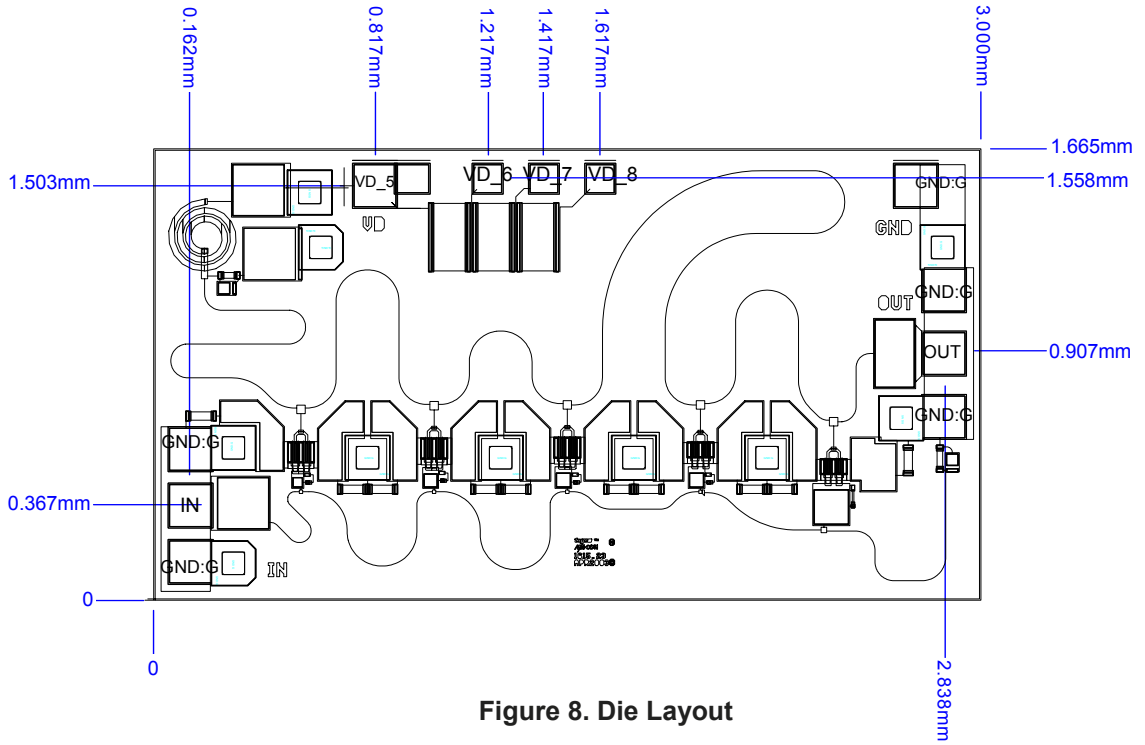


Figure 8. Die Layout

Chip edge to bond pad dimensions are shown to the center of the bond pad.

Bond Pad Dimensions

Pad	Size (µm)	Size (mils)
RF In and Out	150 x 150	6 x 6
5 Volt Supply: VD_5	150 x 150	6 x 6
6 Volt Supply: VD_6	100 x 100	4 x 4
7 Volt Supply: VD_7	100 x 100	4 x 4
8 Volt Supply: VD_8	100 x 100	4 x 4

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2.0-18.0 GHz Distributed Amp/Gain Block

MAAMGM0007-DIE

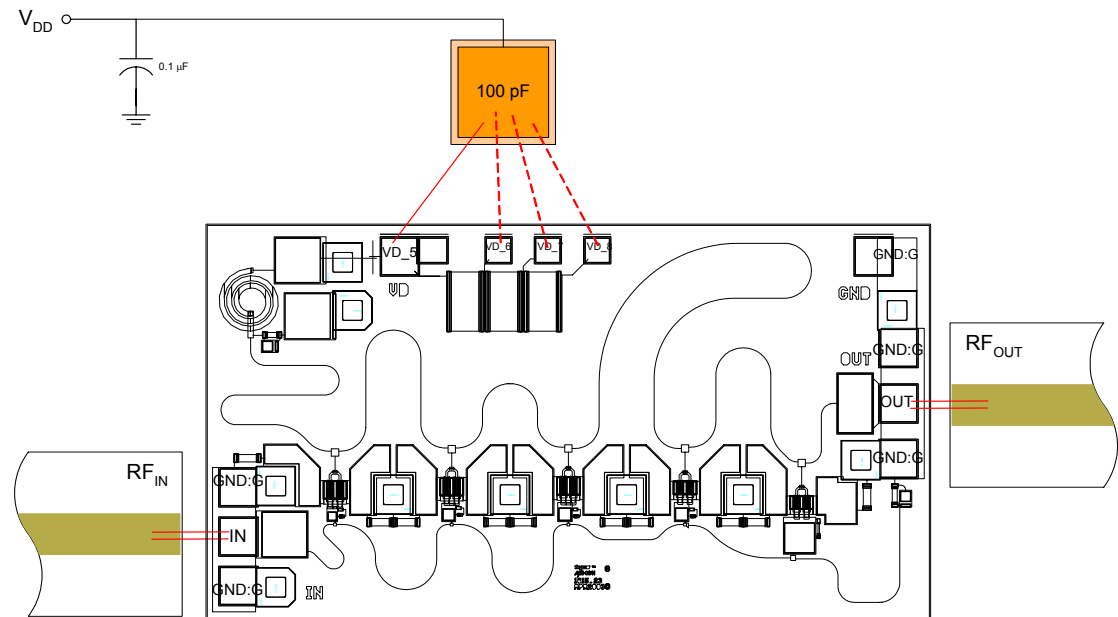


Figure 9. Recommended bonding diagram for pedestal mount. Support circuitry typical of MMIC characterization fixture for CW testing. Refer to table below for bonding to achieve desired operation.

Drain Voltage to Pad Connection	Applied Voltage (Volts)	Operational Voltage (Volts)
5 Volt Supply: VD_5	4 5 6	4 5 6
6 Volt Supply: VD_6	6	5
7 Volt Supply: VD_7	7	5
8 Volt Supply: VD_8	8	5

Assembly Instructions:

Die attach: Use AuSn (80/20) 1-2 mil. preform solder. Limit time @ 300 °C to less than 5 minutes.

Wirebonding: Bond @ 160 °C using standard ball or thermal compression wedge bond techniques. For DC pad connections, use either ball or wedge bonds. For best RF performance, use wedge bonds of shortest length, although ball bonds are also acceptable.

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