

**Amplifier, Distributed, 0.1W
1.0-18.0 GHz**

MAAMGM0002

903216 —
PRELIMINARY INFORMATION

Features

- ◆ **0.1 Watt Saturated Output Power Level**
- ◆ **4 dB Typical Noise Figure**
- ◆ **MSAG™ Process**

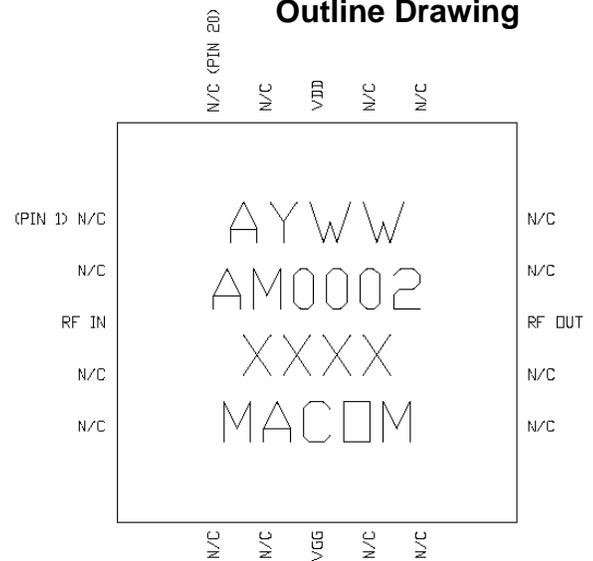
Description

The MAAMGM0002 is a 0.1W Distributed Amplifier with on-chip bias networks. This product is fully matched to 50 ohms on both the input and output. The MMIC can be used as a broadband amplifier stage or 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 (MSAG™) 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.

Outline Drawing



Primary Applications

- ◆ **Test Equipment**
- ◆ **Electronic Warfare**
- ◆ **Radar**

Maximum Operating Conditions ¹

Parameter	Symbol	Absolute Maximum	Units
Input Power	P _{IN}	18.0	dBm
Drain Supply Voltage	V _{DD}	+12.0	V
Gate Supply Voltage	V _{GG}	-2.0	V
Quiescent Drain Current (No RF, 60% I _{DSS})	I _{DQ}	130	mA
Quiescent DC Power Dissipation (No RF)	P _{DISS}	0.9	W
Junction Temperature	T _J	180	°C
Storage Temperature	T _{STG}	-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.

Recommended Operating Conditions

Parameter	Symbol	Min	Typ	Max	Unit
Drain Voltage	V _{DD}	4.5	5.0	5.5	V
Gate Voltage	V _{GG}	-1.0	-0.6	-0.3	V
Input Power	P _{IN}		14	17	dBm
Junction Temperature	T _J			150	°C
Thermal Resistance	Θ _{JC}		91.2		°C/W
Package Base Temperature	T _B			Note 2	°C

2. Maximum Package Base Temperature = 150°C — Θ_{JC} * V_{DD} * I_{DQ}

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

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Electrical Characteristics: $T_B = 40^\circ\text{C}^1$, $Z_0 = 50\Omega$, $V_{DD} = 5\text{V}$, $I_{DQ} = 100\text{ mA}$ (~50% I_{dss}), $P_{in} = 14\text{ dBm}$

Parameter	Symbol	Typical	Units
Bandwidth	f	1.0 - 18.0	GHz
Output Power	P_{OUT}	21	dBm
Power Added Efficiency	PAE	16	%
1-dB Compression Point	P1dB	20	dBm
Small Signal Gain	G	10	dB
Noise Figure	NF	4	dB
Output TOI	OTOI	31	dBm
Input VSWR	VSWR	1.8:1	
Output VSWR	VSWR	1.8:1	
Gate Supply Current	I_{GG}	< 2	mA
Drain Supply Current	I_{DD}	140	mA

3. Adjust V_{GG} between -1.0V and -0.3V to achieve I_{DQ} indicated.

Operating Instructions

This device is static sensitive. Please handle with care. To operate the device, follow these steps according to which configuration you are using.

1. With $V_{DD} = 0\text{ V}$, set $V_{GG} = -0.8\text{ V}$.
2. Set $V_{DD} = 5\text{ V}$.
3. Adjust V_{GG} for desired I_{DQ} .
4. Power down sequence in reverse.
5. Turn off V_{GG} last.



Typical Performance Curves

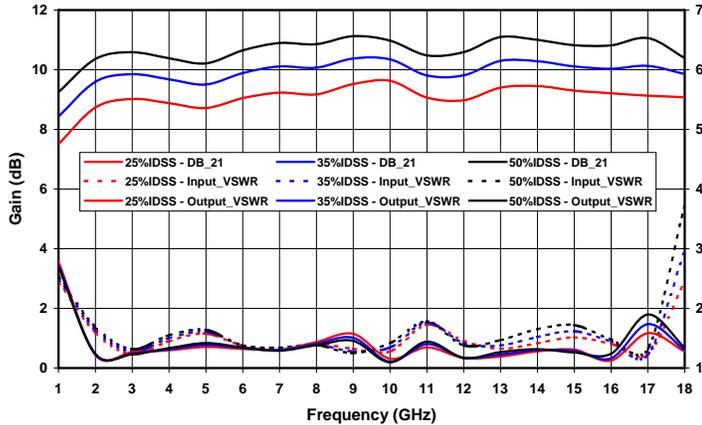


Figure 1. Small Signal Gain, Input and Output VSWR vs. Frequency with I_{DQ} as a Percentage of I_{DSS} at $V_{DS} = 3V$.

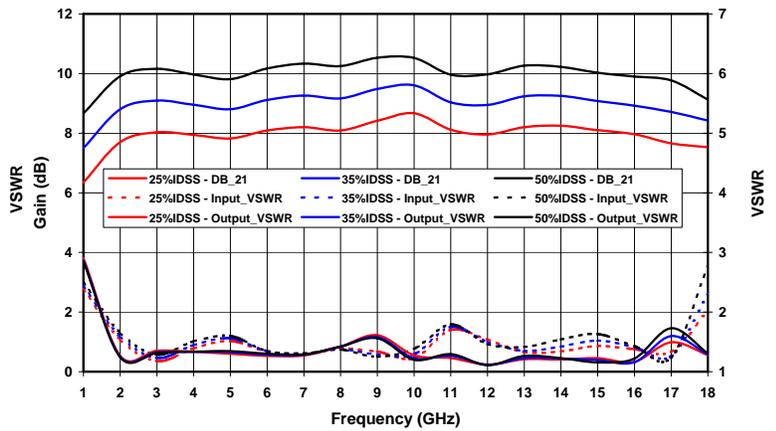


Figure 2. Small Signal Gain, Input and Output VSWR vs. Frequency with I_{DQ} as a Percentage of I_{DSS} at $V_{DS} = 5V$.

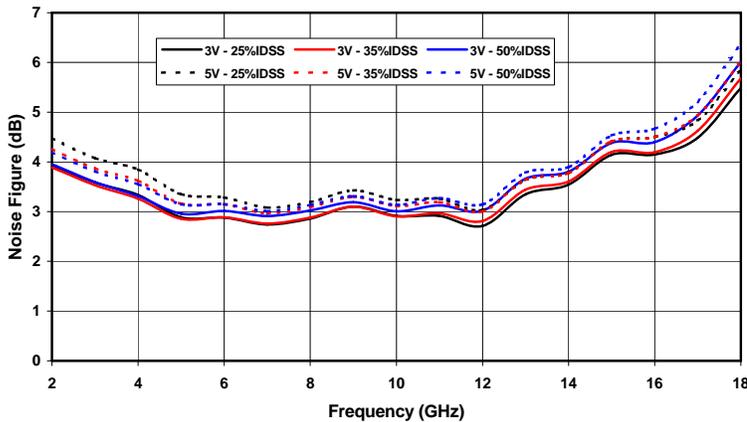


Figure 3. Noise Figure vs. Frequency and I_{DQ} as a Percentage of I_{DSS} at $V_{DS} = 3V$ and $5V$.

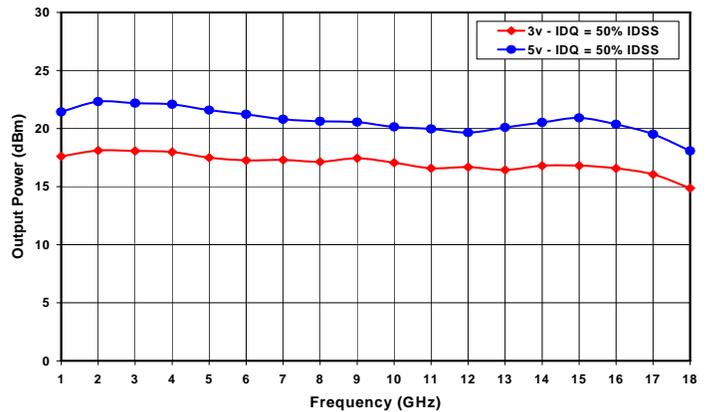


Figure 4. Output Power at 1-dB Compression vs. Frequency

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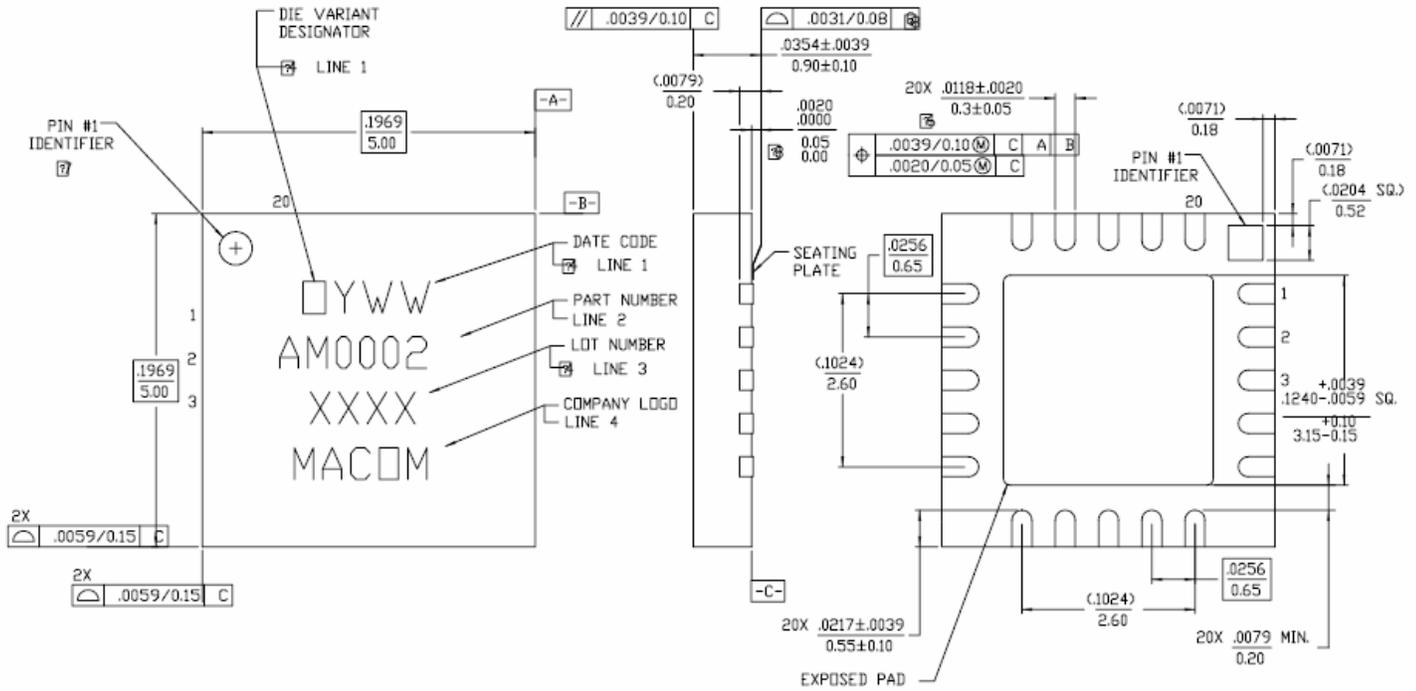


Figure 5. 5x5 mm 20-Lead MLP.

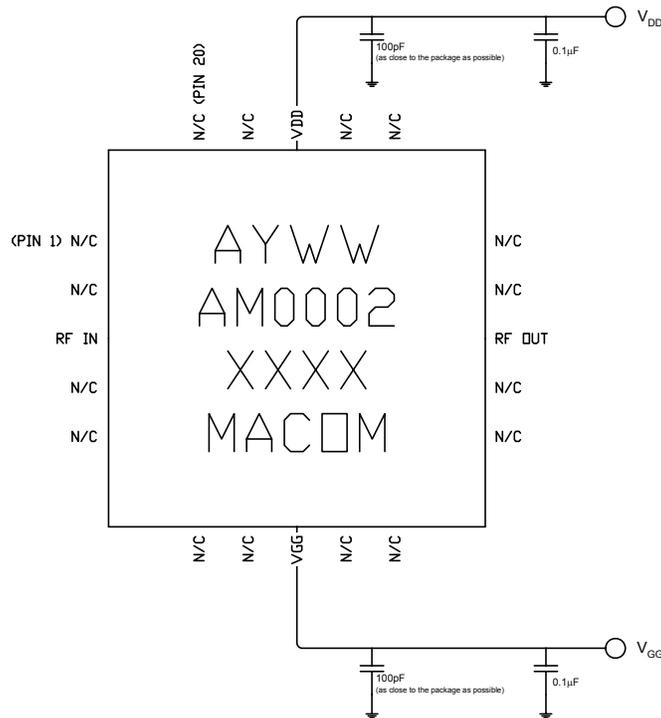


Figure 6. Recommended Bias Configuration.

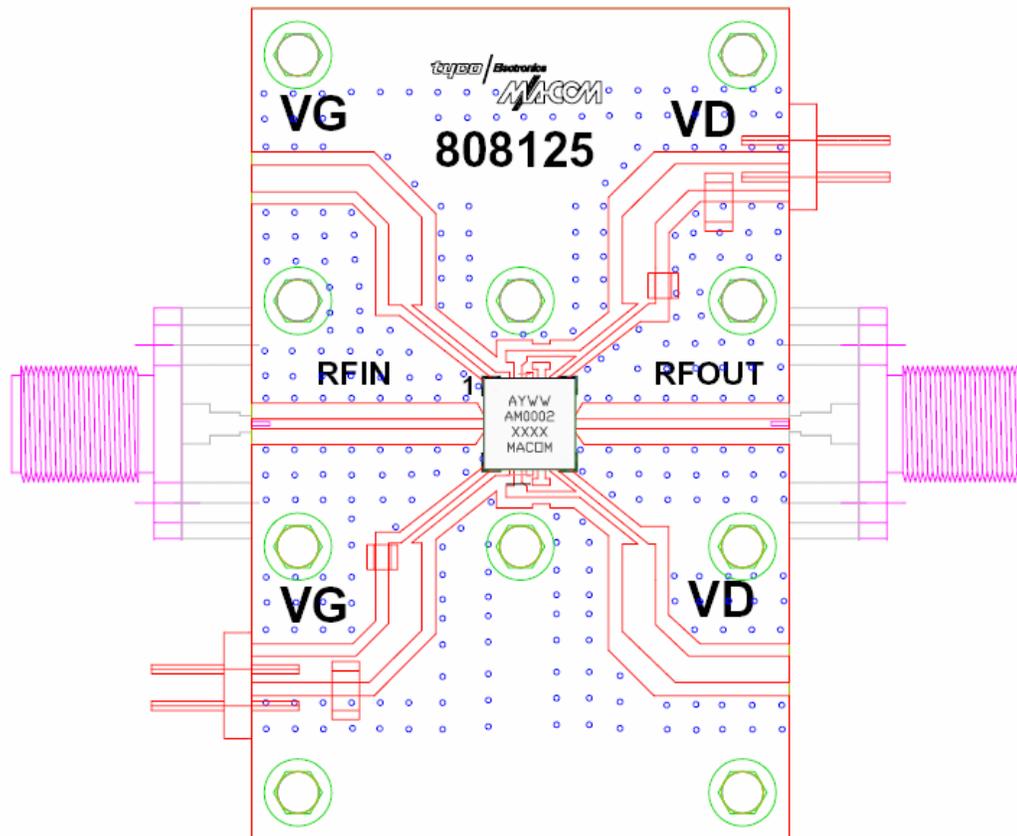


Figure 7. Demonstration Board PN MAAMGM0002-SMB (available upon request).