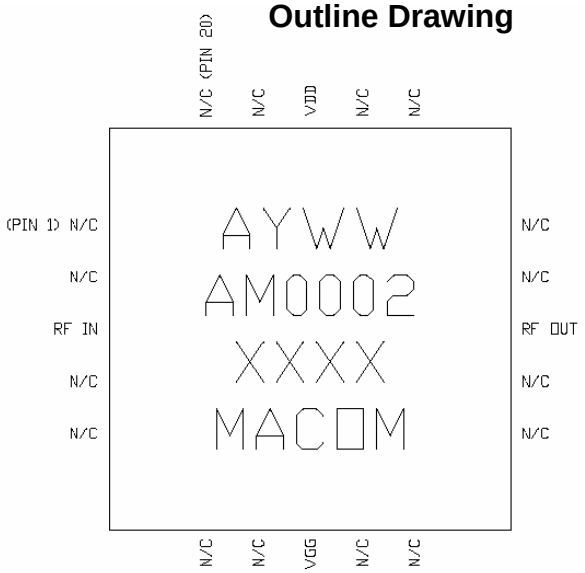
Amplifier, Distributed, 0.1W 1.0-18.0 GHz

Features

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

Outline Drawing



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.

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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• **Europe** Tel: 44.1908.574.200 / Fax: 44.1908.574.300
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Electrical Characteristics: T_B = 40°C[1], Z_0 = 50W, V_{DD} = 5V, I_{DQ} = 100 mA (~50% I_{dss}), P_{in} = 14 dBm

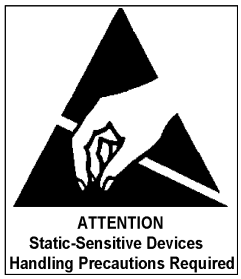
Parameter	Symbol	Typical	Units
Bandwidth	f	1.0 - 18.0	GHz
Output Power	P_{OUT}	21	dBm
Power Added Efficiency	PAE	16	%
1-dB Compression Point	P1dB	20	dBm
Small Signal Gain	G	10	dB
Noise Figure	NF	4	dB
Output TOI	OTOI	31	dBm
Input VSWR	VSWR	1.8:1	
Output VSWR	VSWR	1.8:1	
Gate Supply Current	I_{GG}	< 2	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 V, set V_{GG} = -0.8 V.
2. Set V_{DD} = 5 V.
3. Adjust V_{GG} for desired I_{DQ}.
4. Power down sequence in reverse.
5. Turn off V_{GG} last.



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Typical Performance Curves

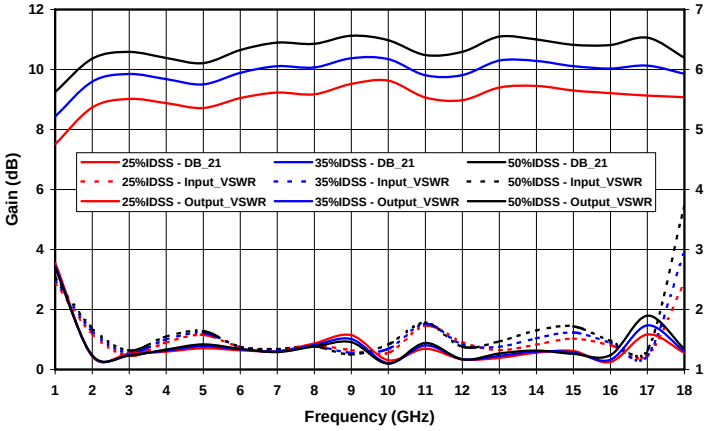

Figure 1. Small Signal Gain, Input and Output VSWR vs. Frequency with I_{DQ} as a Percentage of I_{DSS} at V_{DS} = 3V.

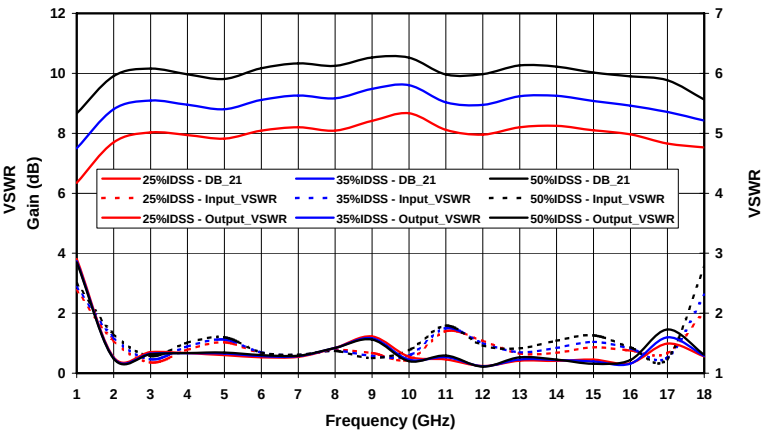

Figure 2. Small Signal Gain, Input and Output VSWR vs. Frequency with I_{DQ} as a Percentage of I_{DSS} at V_{DS} = 5V.

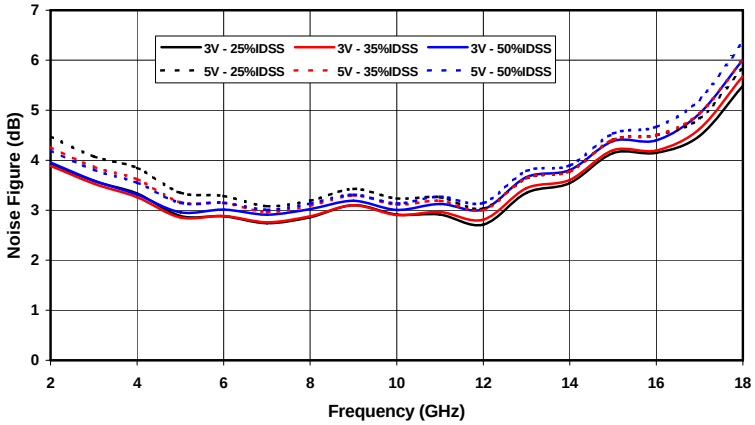

Figure 3. Noise Figure vs. Frequency and I_{DQ} as a Percentage of I_{DSS} at V_{DS} = 3V and 5V.

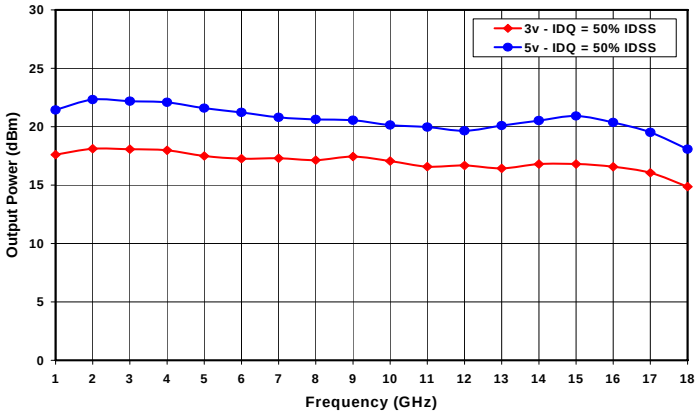

Figure 4. Output Power at 1-dB Compression vs. Frequency

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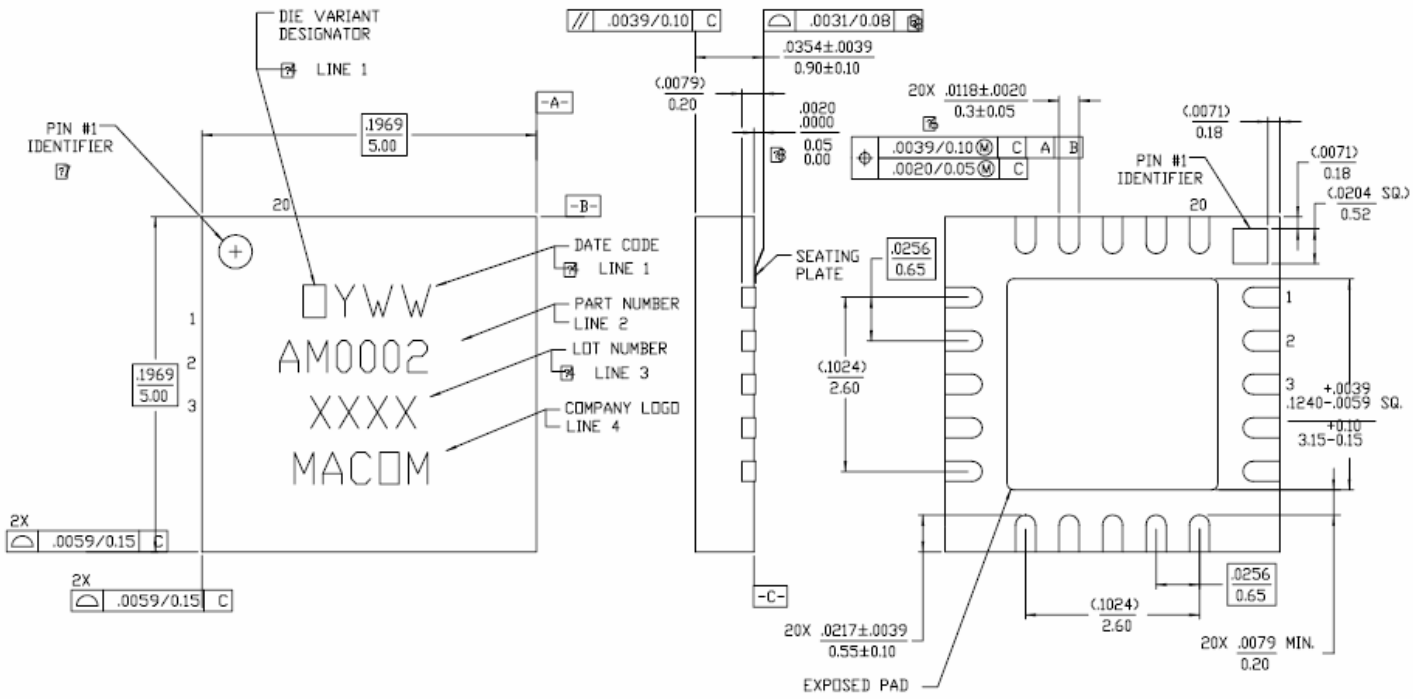

Figure 5. 5x5 mm 20-Lead MLP.

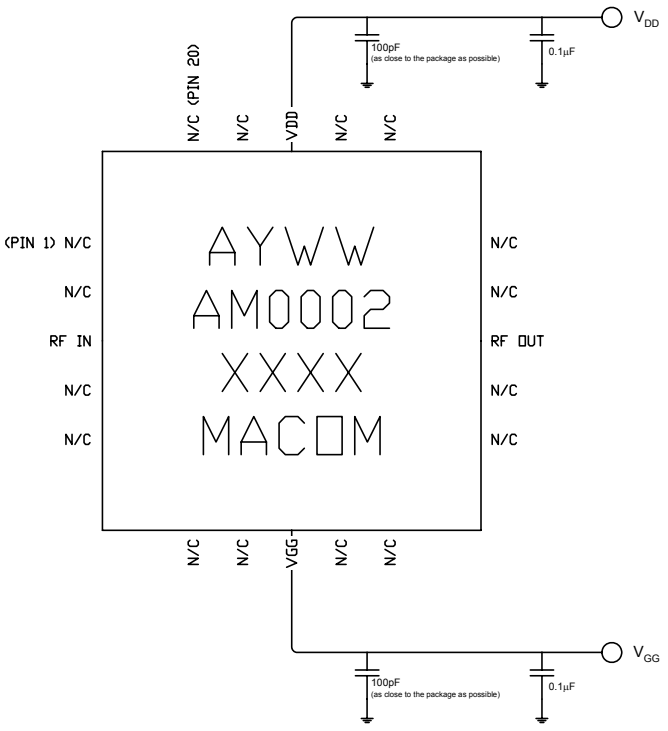

Figure 6. Recommended Bias Configuration.

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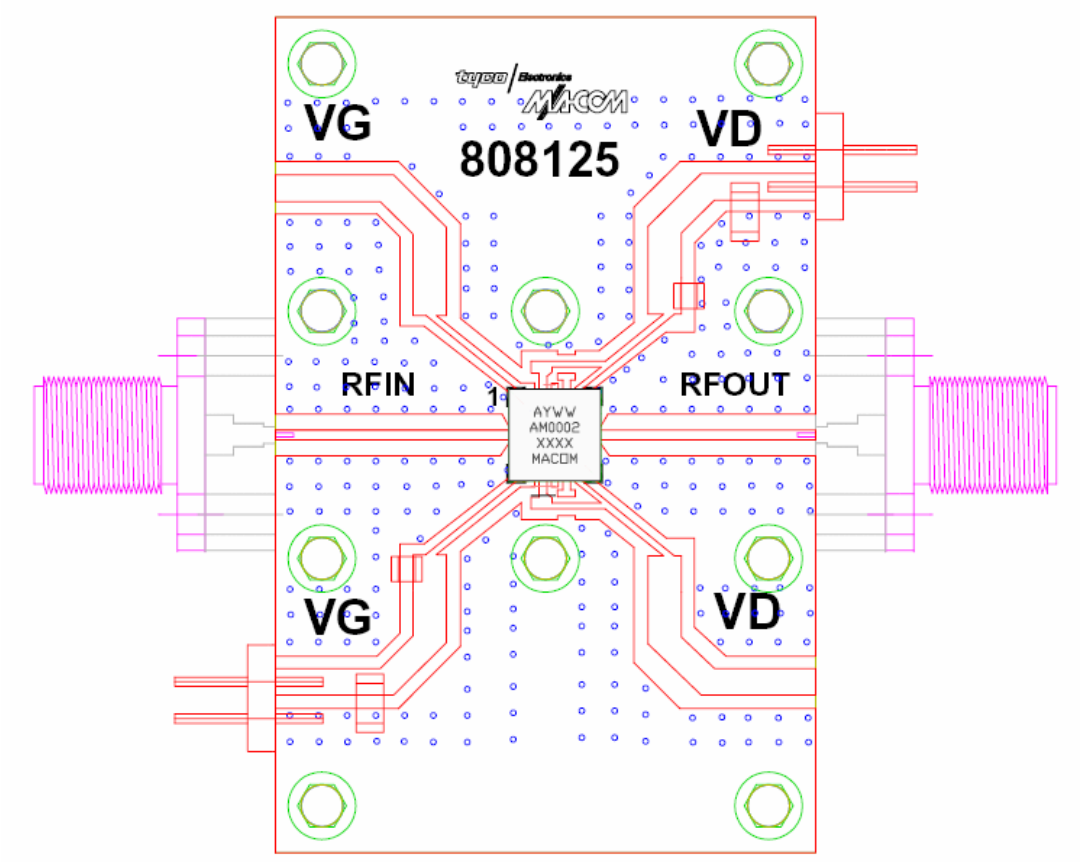

Figure 7. Demonstration Board PN MAAMGM0002-SMB (available upon request).

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