

Amplifier, Power, 2W
7.1-11.7 GHz
MAAP-000069-PKG003

 Rev —
 Advance Information

Features

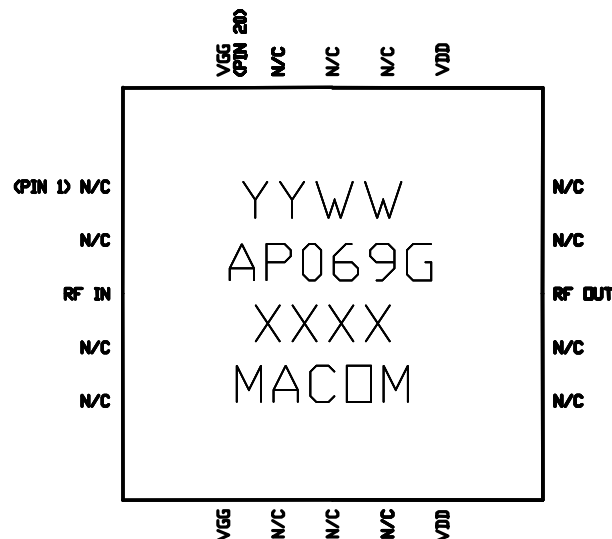
- ◆ **2 Watt Saturated Output Power Level**
- ◆ **Variable Drain Voltage (6-10V) Operation**
- ◆ **MSAG™ Process**

Description

The MAAP-000069-PKG003 is a 4-stage 2 W power amplifier with on-chip bias networks in a 20 lead MLP package, allowing easy assembly. This product is fully matched to 50 ohms on both the input and output. It can be used as a power amplifier stage or as a driver stage in high power applications.

Each device is 100% RF tested to ensure performance compliance. The part is fabricated using M/A-COM's GaAs Multifunction Self-Aligned Gate (MSAG) Process.

M/A-COM's MSAG™ process features robust silicon-like manufacturing processes, planar processing of ion implanted transistors and multiple implant capability enabling power, low-noise, switch and digital FETs on a single chip. 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

- ◆ **Point-to-Point Radio**
- ◆ **7, 8 and 11 GHz Bands**

Also Available in:

Description	Die	Ceramic Package	Die Sample Board	Die Mechanical Sample	Packaged Sample Board
Part Number	MAAPGM0069-DIE	MAAPGM0069	MAAP-000069-SMB004	MAAP-000069-MCH000	MAAP-000069-SMB003 (Lead Free)

Electrical Characteristics: $T_B = 30^\circ\text{C}^1$, $Z_0 = 50 \Omega$, $V_{DD} = 8\text{V}$, $I_{DQ} = 760\text{mA}^2$, $P_{in} = 4 \text{ dBm}$, $R_G = 100 \Omega$

Parameter	Symbol	Typical	Units
Bandwidth	f	7.1-11.7	GHz
Output Power	P_{OUT}	33	dBm
1-dB Compression Point	P_{1dB}	32	dBm
Power Added Efficiency	PAE	27	%
Small Signal Gain	G	31	dB
Input VSWR	VSWR	1.8:1	
Output VSWR	VSWR	2.0:1	
Gate Current	I_{GG}	2	mA
Drain Current	I_{DD}	960	mA
Output Third Order Intercept	TOI	44	dBm
Output Third Order Intermod, $P_{out} = 25 \text{ dBm}$ (DCL)	IM3	45	dBc

1. $T_B = \text{MMIC Base Temperature}$
2. **Adjust V_{GG} between -2.6 and -1.2V to achieve specified I_{dq} .**

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

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Maximum Ratings³

Parameter	Symbol	Absolute Maximum	Units
Input Power	P_{IN}	13.0	dBm
Drain Supply Voltage	V_{DD}	+12.0	V
Gate Supply Voltage	V_{GG}	-3.0	V
Quiescent Drain Current (No RF)	I_{DQ}	1.22	A
Quiescent DC Power Dissipated (No RF)	P_{DISS}	12.2	W
Junction Temperature	T_J	170	°C
Storage Temperature	T_{STG}	-55 to +150	°C

3. Operation beyond these limits may result in permanent damage to the part.

Recommended Operating Conditions⁴

Characteristic	Symbol	Min	Typ	Max	Unit
Drain Voltage	V_{DD}	6.0	8.0	10.0	V
Gate Voltage	V_{GG}	-2.6	-2.0	-1.2	V
Input Power	P_{IN}		8.0	10.0	dBm
Thermal Resistance	Θ_{JC}		12.4		°C/W
MMIC Base Temperature	T_B			Note 5	°C

4. Operation outside of these ranges may reduce product reliability.

5. MMIC Base Temperature = 170°C — $\Theta_{JC} * V_{DD} * I_{DQ}$

Operating Instructions

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

1. Apply $V_{GG} = -2.7$ V, $V_{DD} = 0$ V.
2. Ramp V_{DD} to desired voltage, typically 8.0 V.
3. Adjust V_{GG} to set I_{DQ} , (approximately @ -2.0 V).
4. Set RF input.
5. Power down sequence in reverse. Turn V_{GG} off last.



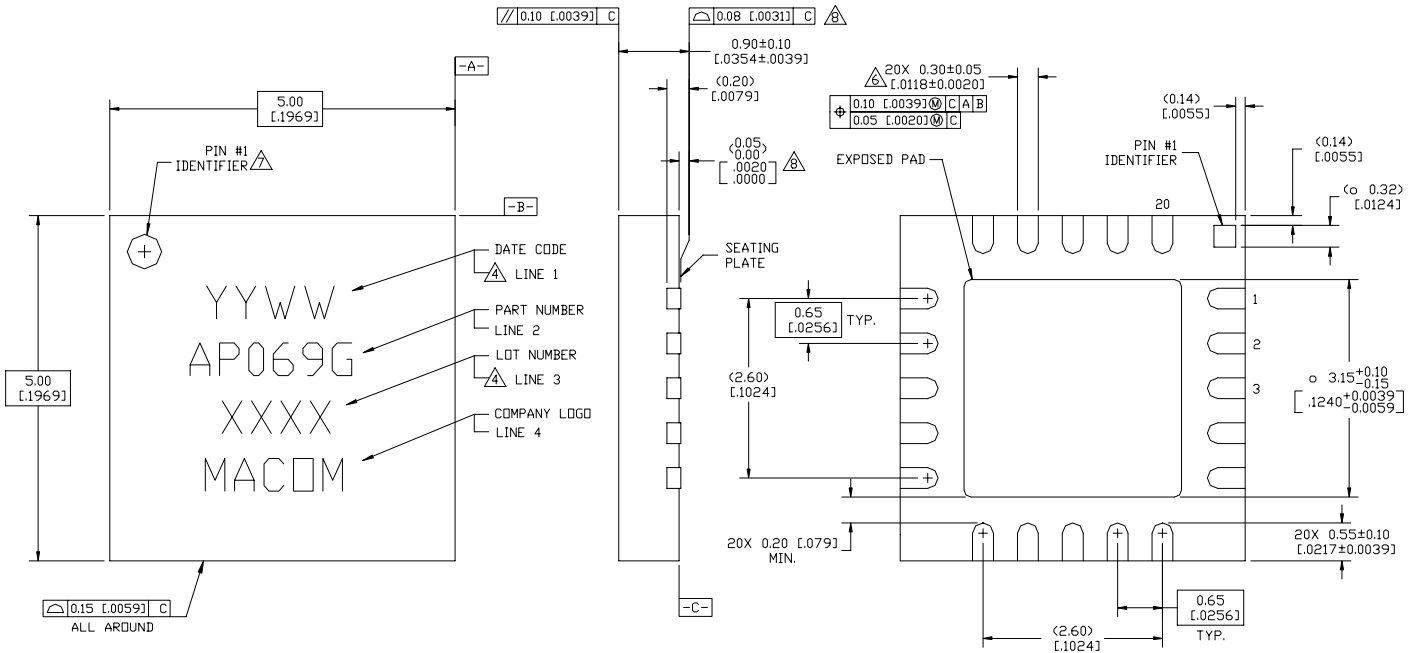


Figure 1. 5x5 mm 20-Lead MLP.

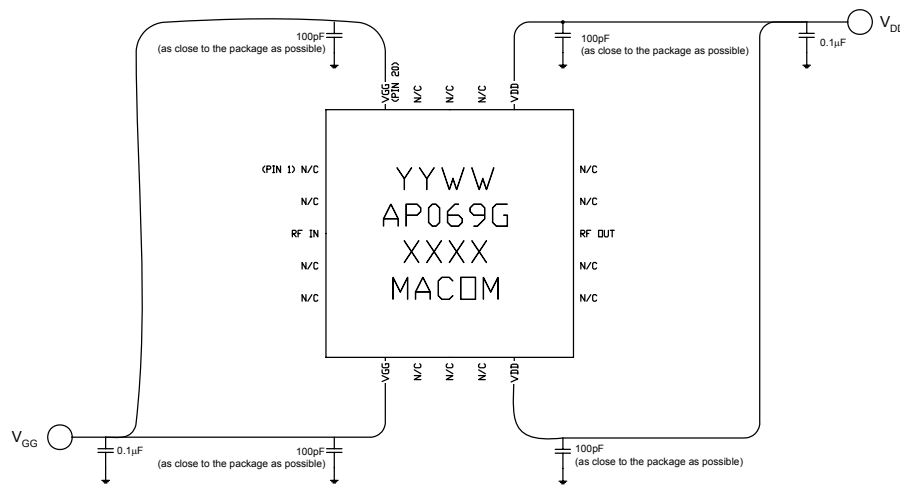


Figure 2. Recommended Bias Configuration.

Note: The exposed pad centered on the package bottom must be connected to RF and dc ground for proper electrical and thermal operation.

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

Additional Precaution: All parts must receive a bake-out of 125°C for 24 hours prior to any solder reflow operation.

*Application Notes can be found by going to the Site Search Page of M/A-COM's web page (<http://www.macom.com/Application%20Notes/index.htm>) and searching for the required Application Note.

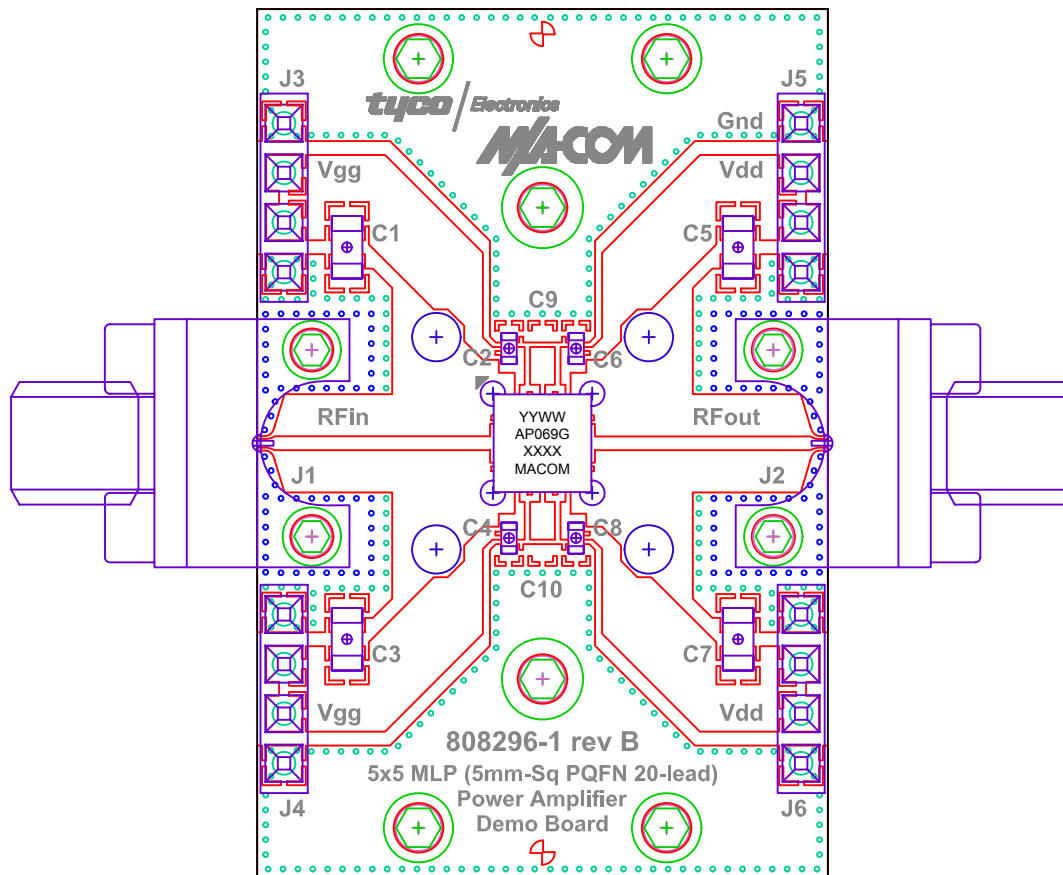


Figure 3. Demonstration Board PN MAAP-000069-SMB003 (available upon request).