

**Amplifier, Power, 2W  
7.1-11.7 GHz**

**MAAP-000069-PKG003**  
Rev —  
Advance Information

**Features**

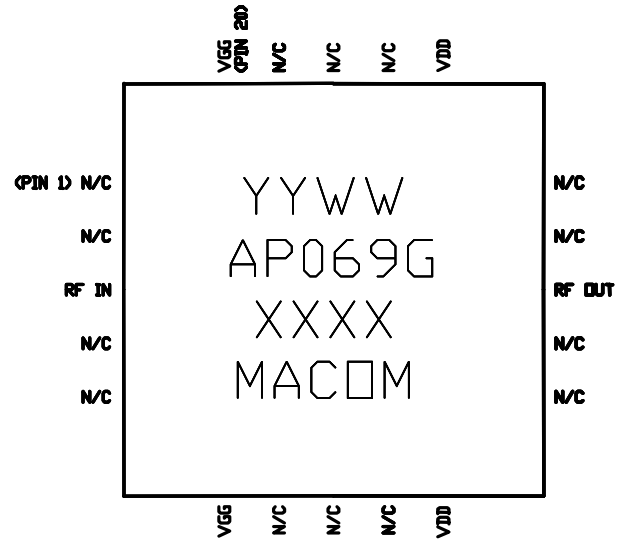
- ◆ **2 Watt Saturated Output Power Level**
- ◆ **Variable Drain Voltage (6-10V) Operation**
- ◆ **MSAG™ Process**

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

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, $P_{out} = 25 dBm$ (DCL)	IM3	45	dBc

1.  $T_B =$  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](http://www.macom.com) for additional data sheets and product information.

### Maximum Ratings<sup>3</sup>

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 Conditions<sup>4</sup>

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	$\Theta_{JC}$		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.

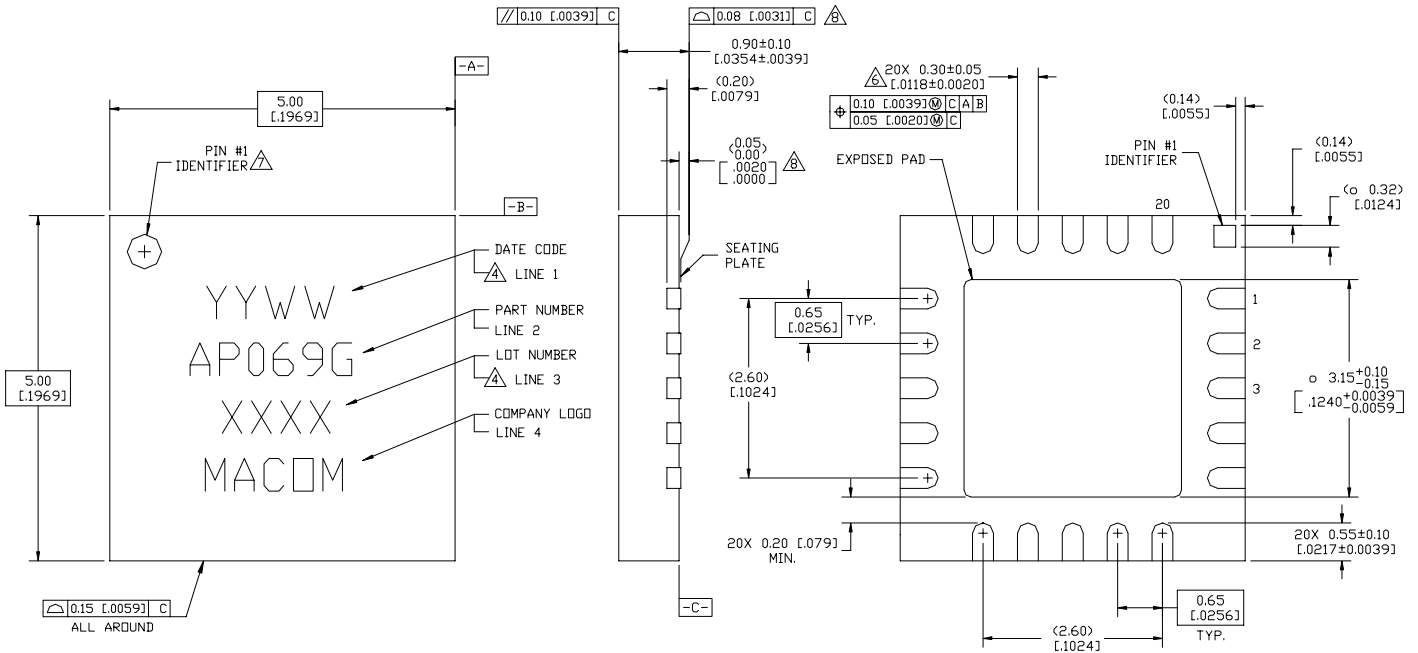
1. Apply  $V_{GG} = -2.7$  V,  $V_{DD} = 0$  V.
2. Ramp  $V_{DD}$  to desired voltage, typically 8.0 V.
3. Adjust  $V_{GG}$  to set  $I_{DQ}$ , (approximately @ -2.0 V).
4. Set RF input.
5. Power down sequence in reverse. Turn  $V_{GG}$  off last.



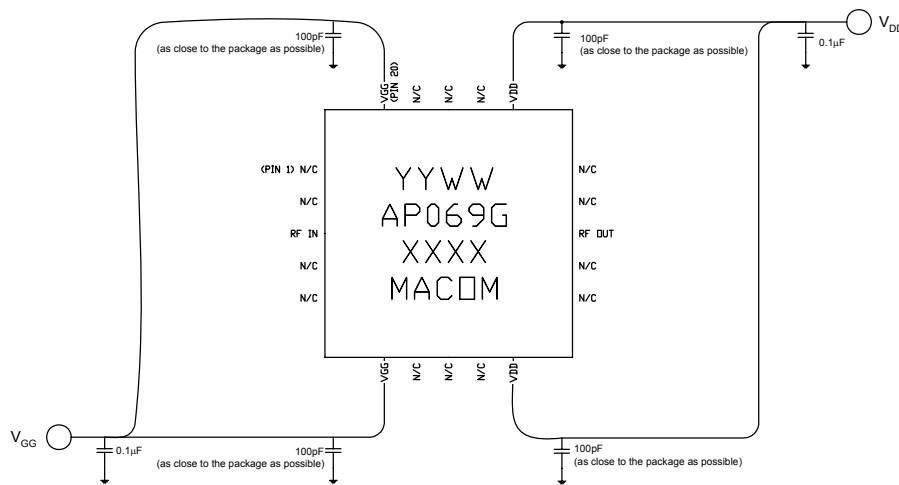
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**Figure 1. 5x5 mm 20-Lead MLP.**



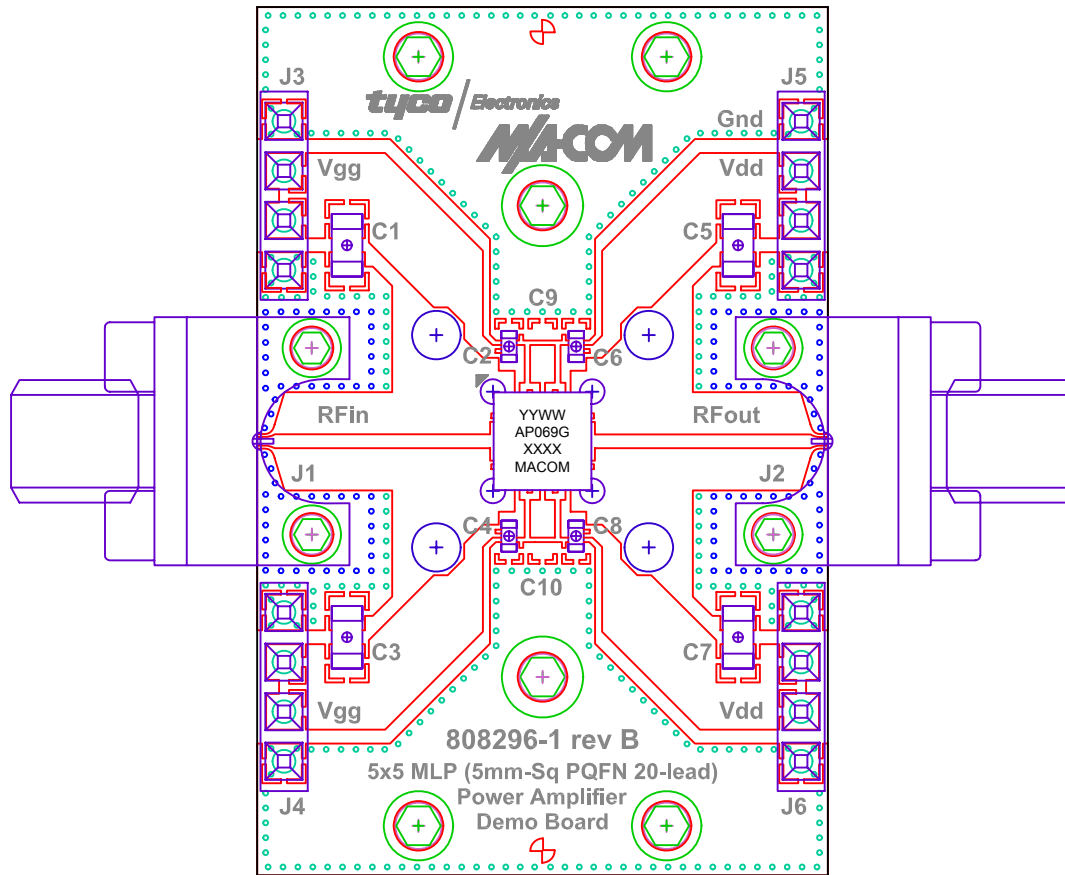
**Figure 2. Recommended Bias Configuration.**

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).**