

Amplifier, Power, 1.3W
17.7-19.7 GHz
MAAP-000072-PKG003

 Rev —
 Advance Information

Features

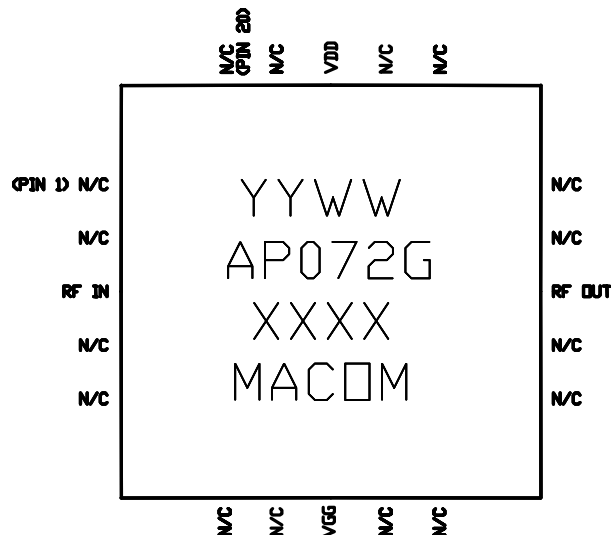
- ◆ **1.3 Watt Saturated Output Power Level**
- ◆ **Variable Drain Voltage (4-10V) Operation**
- ◆ **MSAG™ Process**

Description

The MAAP-000072-PKG0003 is a 4-stage 1.3 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 Radios**
- ◆ **18 GHz Band**

Also Available in:

| Description | Die | Ceramic Package | Die Sample Board | Die Mechanical Sample | Packaged Sample Board |
|-------------|----------------|-----------------|--------------------|-----------------------|-----------------------------------|
| Part Number | MAAPGM0072-DIE | MAAPGM0072 | MAAP-000072-SMB004 | MAAP-000071-MCH000 | MAAP-000072-SMB003 (Lead Free) |

Electrical Characteristics: $T_B = 40^\circ\text{C}^1$, $Z_0 = 50 \Omega$, $V_{DD} = 8\text{V}$, $I_{DQ} = 500\text{mA}^2$, $P_{in} = 12 \text{ dBm}$, $R_G = 200 \Omega$

| Parameter | Symbol | Typical | Units |
|------------------------|-----------|-----------|-------|
| Bandwidth | f | 17.7-19.7 | GHz |
| Output Power | P_{OUT} | 31 | dBm |
| 1-dB Compression Point | P_{1dB} | 30 | dBm |
| Small Signal Gain | G | 19 | dB |
| Input VSWR | VSWR | 2.0:1 | |
| Output VSWR | VSWR | 1.6:1 | |
| Gate Current | I_{GG} | 10 | mA |
| Drain Current | I_{DD} | 750 | mA |

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 for additional data sheets and product information.

Maximum Operating Conditions ³

| Parameter | Symbol | Absolute Maximum | Units |
|---------------------------------------|------------|------------------|-------|
| Input Power | P_{IN} | 17.0 | dBm |
| Drain Supply Voltage | V_{DD} | +12.0 | V |
| Gate Supply Voltage | V_{GG} | -3.0 | V |
| Quiescent Drain Current (No RF) | I_{DQ} | 790 | mA |
| Quiescent DC Power Dissipated (No RF) | P_{DISS} | 7.9 | 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} | 4.0 | 8.0 | 10.0 | V |
| Gate Voltage | V_{GG} | -2.6 | -2.0 | -1.2 | V |
| Input Power | P_{IN} | | 12.0 | 14.0 | dBm |
| Junction Temperature | T_J | | | 150 | °C |
| Thermal Resistance | Θ_{JC} | | 16.4 | | °C/W |
| MMIC Base Temperature | T_B | | | Note 4 | °C |

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

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

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.



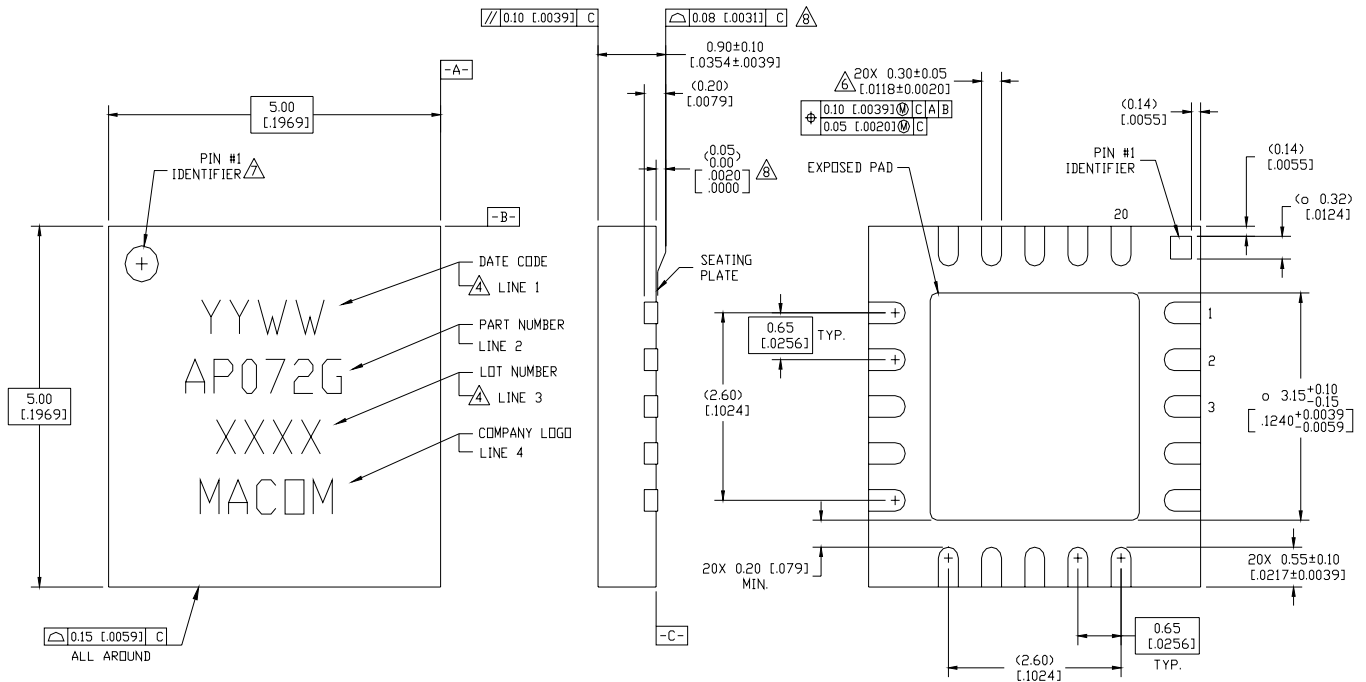


Figure 1. 5x5 mm 20-Lead MLP.

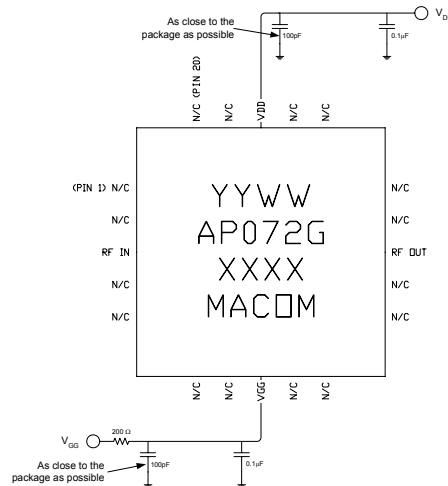


Figure 2. Recommended Bias Configuration.

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.

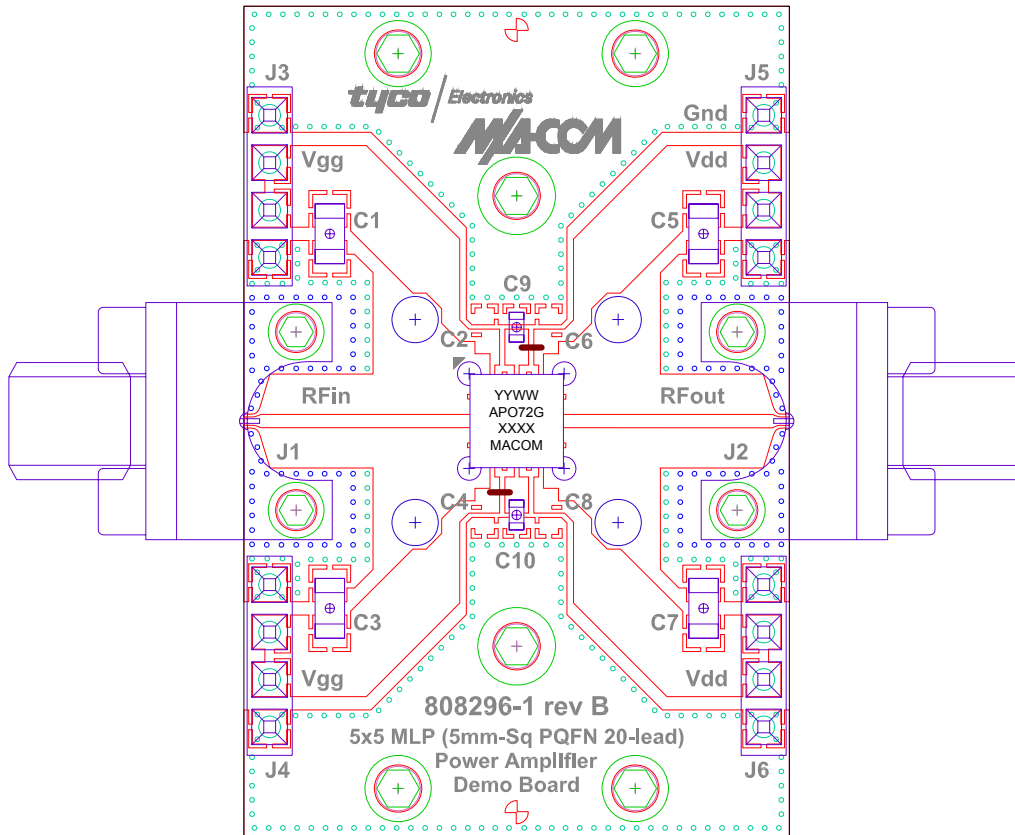


Figure 3. Demonstration Board PN MAAP-000072-SMB003 (available upon request).