

**RF Driver Amplifier  
250 - 4000 MHz**

**MAAMSS0072  
V2**

**Features**

- Broadband High Gain Operation
- Optimized Performance for WiMax Applications
- Excellent EVM Performance: 1.5% @ 18 dBm
- High Efficiency
- Lead-Free 4x4 mm PQFN Package
- 100% Matte Tin Plating over Copper
- Halogen-Free “Green” Mold Compound
- RoHS\* Compliant and 260°C Reflow Compatible

**Description**

M/A-COM's MAAMSS0072 RF driver amplifier is a two-stage GaAs MMIC which exhibits exceptional linearity performance as well as high gain in a lead-free 4x4 mm PQFN surface mount plastic package. The device is biased with a single +5 volt supply and consumes 200 mA typically.

The MAAMSS0072 is fabricated using a high linearity HBT process to realize low current and high power functionality. The process features full passivation for increased performance and reliability.

The MAAMSS0072 can be externally tuned for operation anywhere within the 250 to 4000 MHz frequency band.

**Ordering Information <sup>1</sup>**

| Part Number        | Package                        |
|--------------------|--------------------------------|
| MAAMSS0072TR-3000  | 3000 piece reel                |
| MAAM-000072-000SMB | Sample Only, General Frequency |
| MAAM-000072-001SMB | 3500 MHz Configuration         |

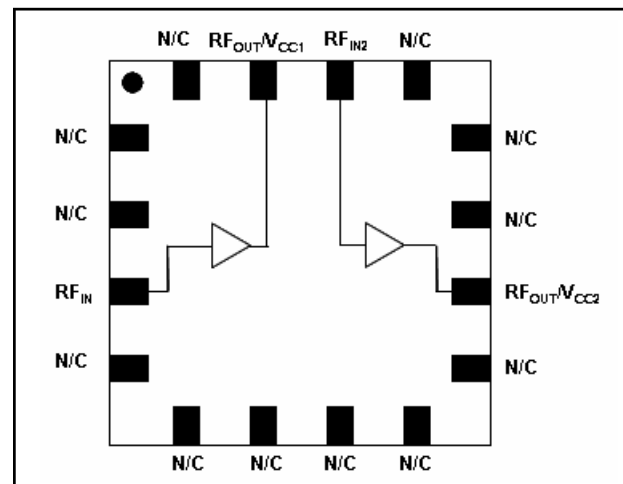
1. Reference Application Note M513 for reel size information.

**Absolute Maximum Ratings <sup>2,3</sup>**

| Parameter             | Absolute Maximum |
|-----------------------|------------------|
| RF Output Power       | +28.5 dBm        |
| Voltage               | 6 volts          |
| Operating Temperature | -40°C to +85°C   |
| Storage Temperature   | -65°C to +150°C  |

- Exceeding any one or combination of these limits may cause permanent damage to this device.
- M/A-COM does not recommend sustained operation near these survivability limits.

**Functional Block Diagram**



**Pin Configuration**

| Pin No. | Pin Name                             | Description                 |
|---------|--------------------------------------|-----------------------------|
| 1       | N/C                                  | No Connection               |
| 2       | N/C                                  | No Connection               |
| 3       | RF <sub>IN</sub>                     | RF Input                    |
| 4       | N/C                                  | No Connection               |
| 5       | N/C                                  | No Connection               |
| 6       | N/C                                  | No Connection               |
| 7       | N/C                                  | No Connection               |
| 8       | N/C                                  | No Connection               |
| 9       | N/C                                  | No Connection               |
| 10      | RF <sub>OUT</sub> / V <sub>CC2</sub> | RF Output, 2nd Stage Supply |
| 11      | N/C                                  | No Connection               |
| 12      | N/C                                  | No Connection               |
| 13      | N/C                                  | No Connection               |
| 14      | RF <sub>IN2</sub>                    | 2nd Stage RF Input          |
| 15      | RF <sub>OUT</sub> /V <sub>CC1</sub>  | RF Output, 1st Stage Supply |
| 16      | N/C                                  | No Connection               |
| 17      | Paddle <sup>4</sup>                  | RF and DC Ground            |

4. The exposed pad centered on the package bottom must be connected to RF and DC ground.

\* Restrictions on Hazardous Substances, European Union Directive 2002/95/EC.

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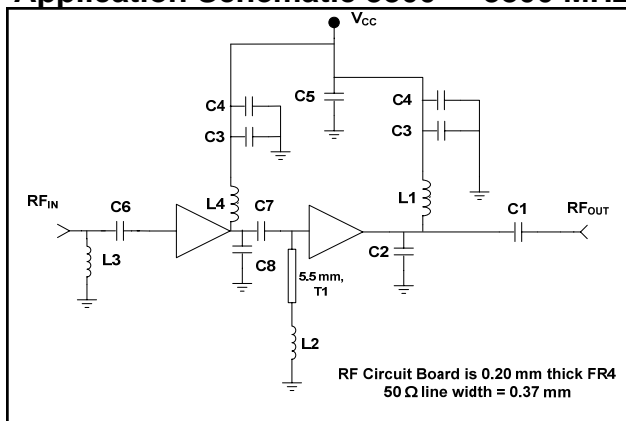
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**Electrical Specifications:  $V_{CC} = +5\text{ V}$ ,  $T_A = 25^\circ\text{C}$ ,  $Z_0 = 50\ \Omega$**

| Parameter          | Test Conditions   | Units | Min. | Typ. | Max. |
|--------------------|---|-------|------|------|------|
| Gain               | 3500 MHz  | dB    | 21   | 23   | —    |
| Input Return Loss  | 3500 MHz  | dB    | —    | 15   | —    |
| Output Return Loss | 3500 MHz  | dB    | —    | 15   | —    |
| Output P1dB        | 3500 MHz  | dBm   | —    | 27   | —    |
| EVM                | +18 dBm channel power 54 Mbps OFDM (includes 1% system level) | % rms | —    | 1.5  | —    |
| OIP3               | 17 dBm / Tone, 1 MHz Tone Spacing                             | dBm   | 36   | 39   | —    |
| Noise Figure       | 3500 MHz  | dB    | —    | 3.7  | —    |
| Quiescent Current  | +5 V  | mA    | —    | 200  | —    |
| Current            | 17 dBm / Tone, 1 MHz Tone Spacing                             | mA    | —    | 235  | 300  |

**Application Schematic 3300 - 3800 MHz**

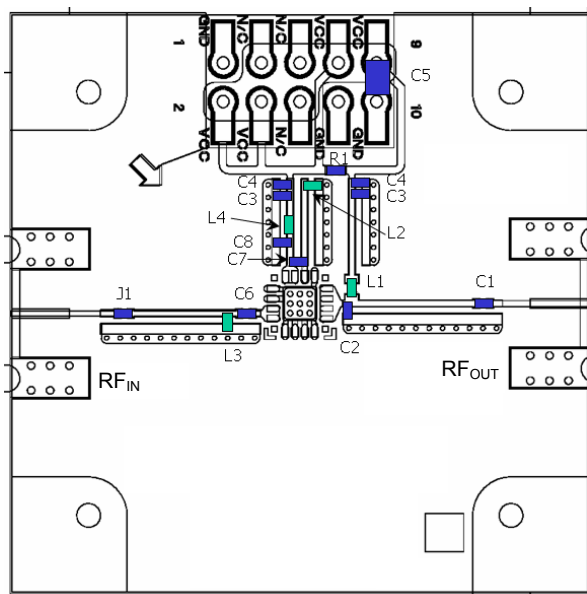


**Maximum Operating Conditions<sup>5</sup>**

| Parameter                         | Maximum Operating Conditions |
|-----------------------------------|------------------------------|
| Junction Temperature <sup>6</sup> | 160°C                        |
| RF Output Power                   | 28.5 dBm                     |
| Operating Temperature             | -40°C to +85°C               |

5. Operating at or within these conditions will ensure MTTF > 1 x 10<sup>6</sup> hours.  
6. Typical thermal resistance ( $\Theta_{jc}$ ) = 65°C/W.

**Sample Board**



**MAAMSS0072 External Parts List**

| Component | Value                         | Case Size | Manufacturer |
|-----------|-------------------------------|-----------|--------------|
| C1        | 1000 pF                       | 0402      | Murata       |
| C2        | 0.5 pF                        | 0402      | Murata       |
| C3        | 1000 pF                       | 0402      | Murata       |
| C4        | 0.1 $\mu\text{F}$             | 0402      | Murata       |
| C5        | 10 $\mu\text{F}$              | 1206      | Kemet        |
| C6        | 1.2 pF                        | 0402      | Murata       |
| C7        | 2.7 pF                        | 0402      | Murata       |
| C8        | 1 pF                          | 0402      | Murata       |
| L1        | 8.2 nH                        | 0402      | Coilcraft    |
| L2        | 1 nH                          | 0402      | Toko         |
| R1        | 0                             | 0402      | -            |
| L3        | 1 nH                          | 0402      | Toko         |
| L4        | 1.8 nH                        | 0402      | Toko         |
| J1        | Jumper                        | -         | -            |
| T1        | 50 $\Omega$ , 120° @ 3500 MHz |           |              |

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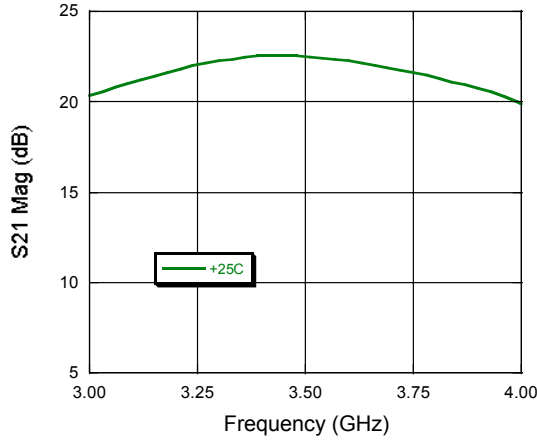
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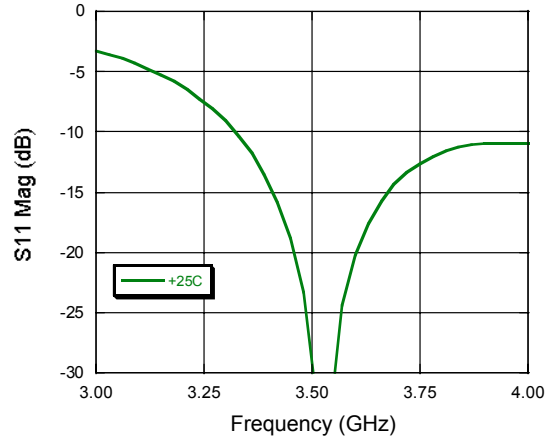
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**Typical Performance Curves: @ +25°C**

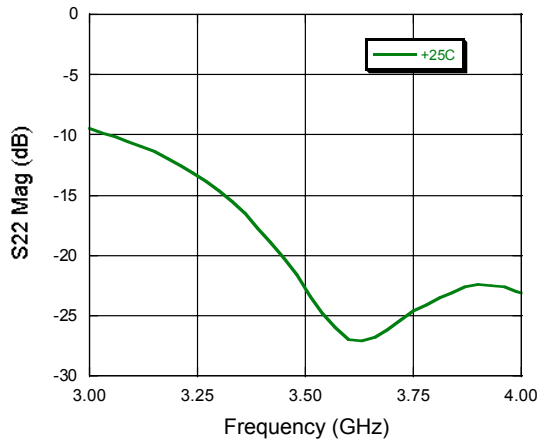
**Gain**



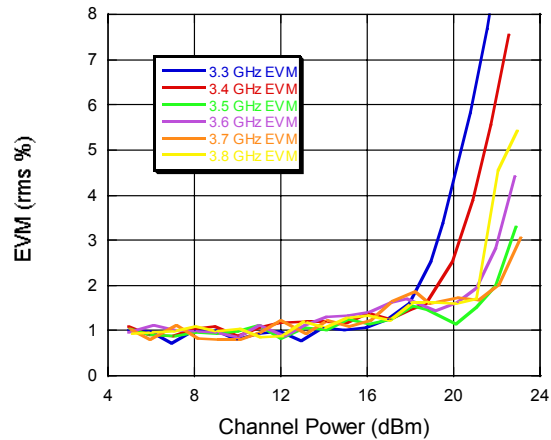
**Input Return Loss**



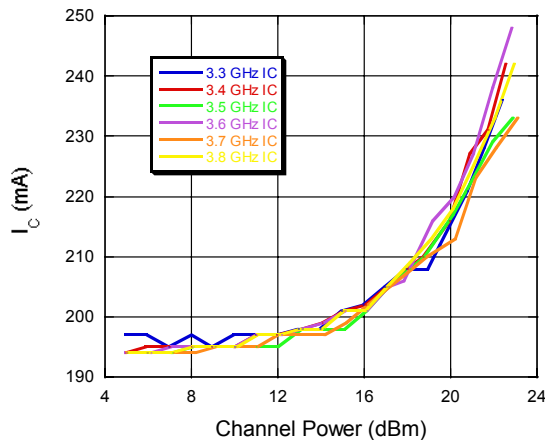
**Output Return Loss**



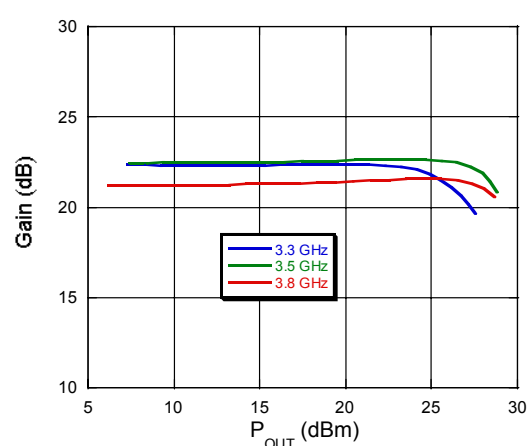
**EVM**



**Current**

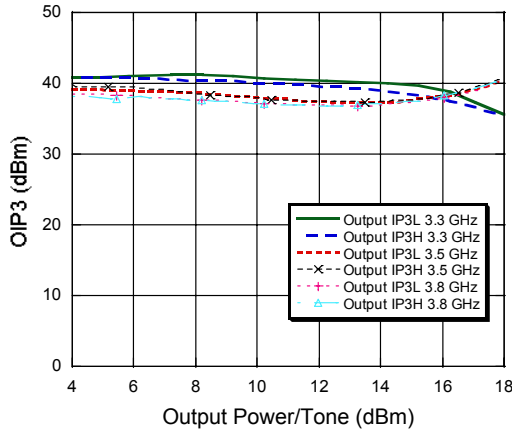


**P1dB**

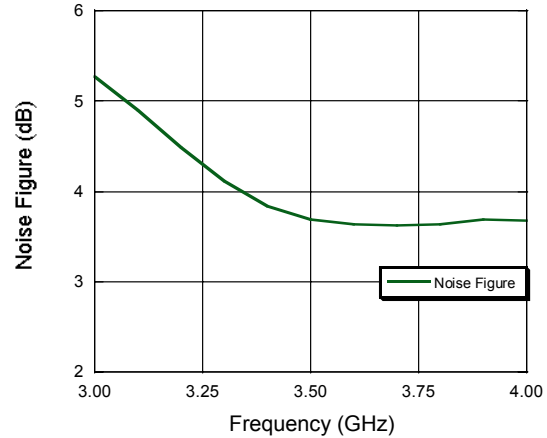


**Typical Performance Curves: @ +25°C**

**Output IP3**



**Noise**



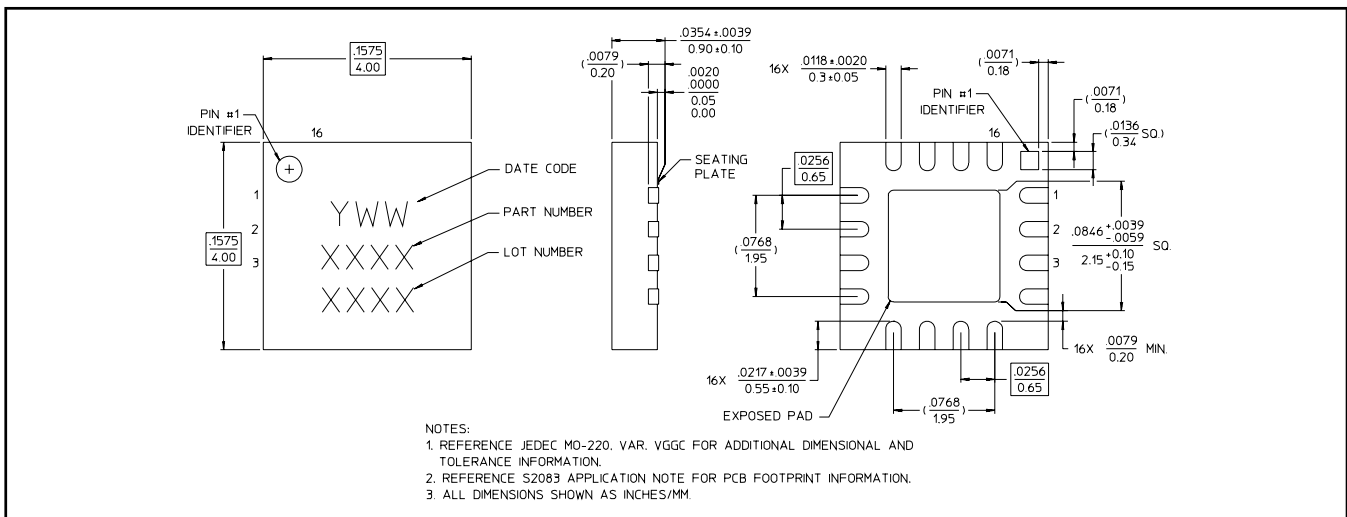
**Handling Procedures**

Please observe the following precautions to avoid damage:

**Static Sensitivity**

Gallium Arsenide Integrated Circuits are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Proper ESD control techniques should be used when handling these devices.

**Lead-Free 4 mm 16-Lead PQFN†**



† Reference Application Note M538 for lead-free solder reflow recommendations. Meets JEDEC moisture sensitivity level 1 requirements.