

Features

- OIP3: 44 dBm
- Gain: 20 dB
- P1dB: 31 dB
- Lead-Free 5 mm 20-lead PQFN Package
- Halogen-Free “Green” Mold Compound
- RoHS* Compliant and 260°C Reflow Compatible
- Class 1C ESD Rating

Description

The MAAP-008924 is a 3-stage, high linearity 1.2 W GaAs power amplifier in a 5mm, 20 lead PQFN package, allowing easy assembly. This PA 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. It is ideally suited for Point-to-Point Radios.

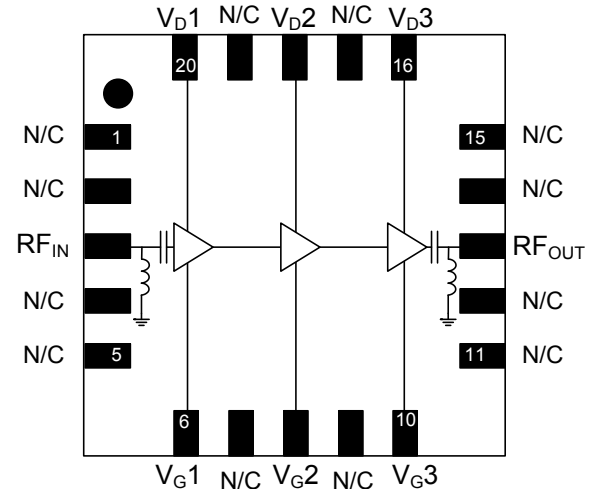
Each device is 100% RF tested to ensure performance compliance. The part is fabricated using M/A-COM Technology Solutions’ high linearity MESFET Process.

Ordering Information ¹

| Part Number | Package |
|--------------------|-----------------|
| MAAP-008924-TR0500 | 500 piece reel |
| MAAP-008924-TR1000 | 1000 piece reel |
| MAAP-008924-001SMB | Sample Board |

1. Reference Application Note M513 for reel size information.

Functional Schematic



Pin Configuration ^{2,3}

| Pin No. | Function | Pin No. | Function |
|---------|------------------|---------|-------------------|
| 1 | No Connect | 11 | No Connect |
| 2 | No Connect | 12 | No Connect |
| 3 | RF _{IN} | 13 | RF _{OUT} |
| 4 | No Connect | 14 | No Connect |
| 5 | No Connect | 15 | No Connect |
| 6 | V _{G1} | 16 | V _{D3} |
| 7 | No Connect | 17 | No Connect |
| 8 | V _{G2} | 18 | V _{D2} |
| 9 | No Connect | 19 | No Connect |
| 10 | V _{G3} | 20 | V _{D1} |

2. M/A-COM Technology Solutions recommends connecting unused package pins to ground.
3. 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.

Electrical Specifications: Freq. 10 - 13.3 GHz, $V_{DD} = 6\text{ V}$, $I_{DQ} = 1000\text{ mA}^4$, $Z_0 = 50\ \Omega$

| Parameter | Test Conditions | Units | Min. | Typ. | Max. |
|------------------------------------|---|-------|--------------|----------------|-------------|
| Small Signal Gain | 10 GHz 11.7 GHz 13.3 GHz | dB | — — 20 | 21 20 22 | — — — |
| Input Return Loss | — | dB | — | 12 | — |
| Output Return Loss | — | dB | — | 10 | — |
| Noise Figure | — | dB | — | 7 | — |
| P1dB | — | dBm | — | 31 | — |
| OIP3 | 10 GHz, @ 15 dBm / tone 11.7 GHz, @ 15 dBm / tone 13.3 GHz, @ 15 dBm / tone | dBm | — — 39 | 42 44 41 | — — — |
| P_{SAT} | — | dBm | — | 32 | — |
| Current, $P_{OUT} = 31\text{ dBm}$ | I_{DD} | mA | — | 1100 | — |

4. Set V_{GG} to -1.5 V prior to applying V_{DD} , once V_{DD} is applied adjust V_{GG} to achieve specific I_{DQ} .

Maximum Operating Ratings ^{5,6}

| Parameter | Absolute Maximum |
|-------------------------------------|---|
| Input Power | +12 dBm |
| Drain Supply Voltage | +7 Volts |
| Operating Temperature | -40°C to $+85^\circ\text{C}$ |
| Junction Temperature ^{7,8} | $+150^\circ\text{C}$ |
| Storage Temperature | -55°C to $+150^\circ\text{C}$ |

- Exceeding any one or combination of these limits may cause permanent damage to this device.
- M/A-COM Technology Solutions does not recommend sustained operation near these survivability limits.
- Operating at nominal conditions with $T_J \leq +150^\circ\text{C}$ will ensure $MTTF > 1 \times 10^6$ hours.
- Junction Temperature (T_J) = $T_C + \Theta_{jc} * ((V * I) - (P_{OUT} - P_{IN}))$
Typical thermal resistance (Θ_{jc}) = 9.1°C/W .
 - For $T_C = 25^\circ\text{C}$,
 $T_J = 74^\circ\text{C}$ @ 6 V, 1100 mA, $P_{OUT} = 31\text{ dBm}$, $P_{IN} = 11\text{ dBm}$
 - For $T_C = 85^\circ\text{C}$,
 $T_J = 134^\circ\text{C}$ @ 6 V, 1100 mA, $P_{OUT} = 31\text{ dBm}$, $P_{IN} = 11\text{ dBm}$

Handling Procedures

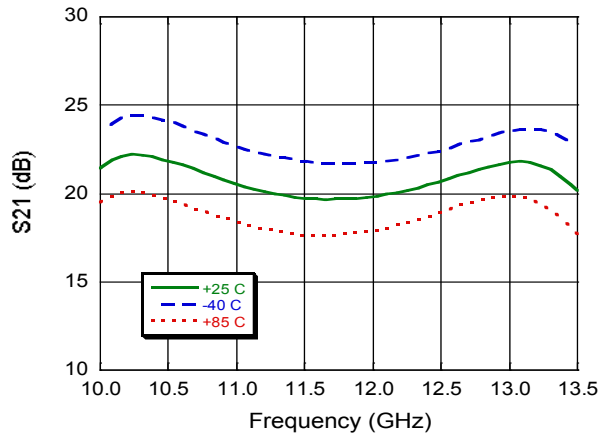
Please observe the following precautions to avoid damage:

Static Sensitivity

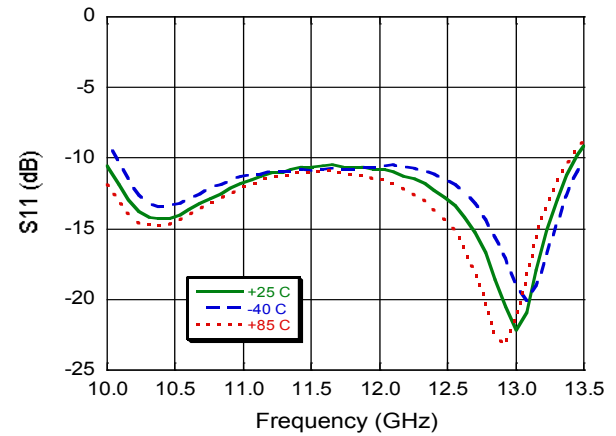
Gallium Arsenide Integrated Circuits are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Proper ESD control techniques should be used when handling these class 1C devices.

Typical Performance Curves

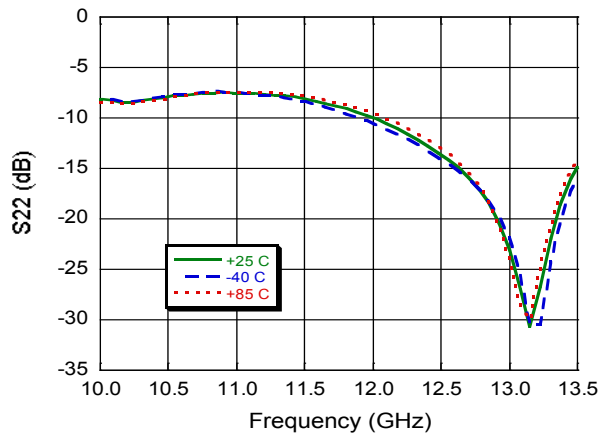
Gain



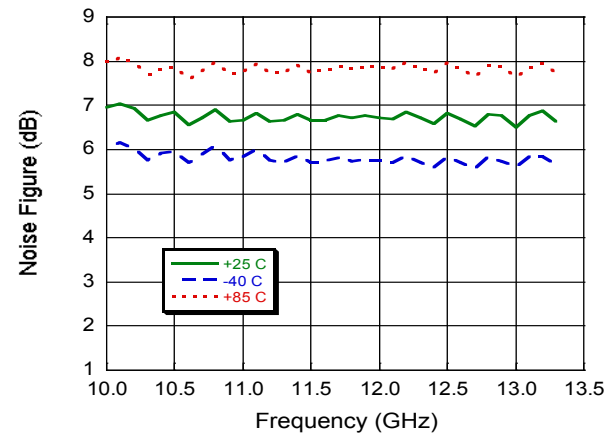
Input Return Loss



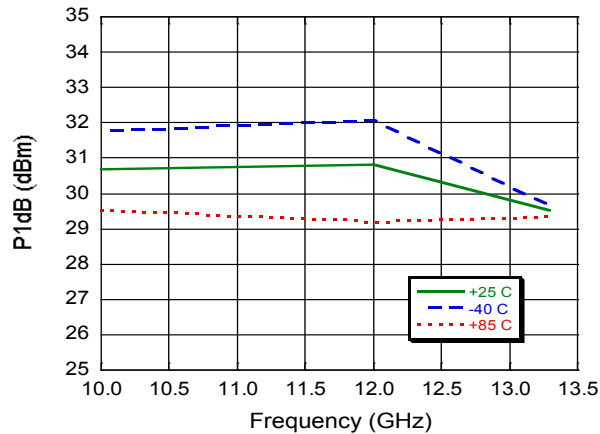
Output Return Loss



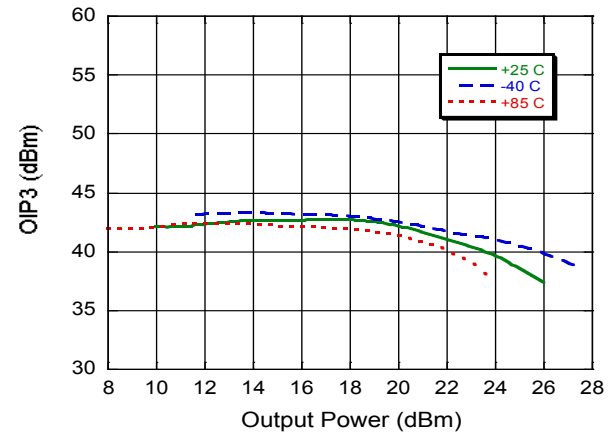
Noise Figure



P1dB

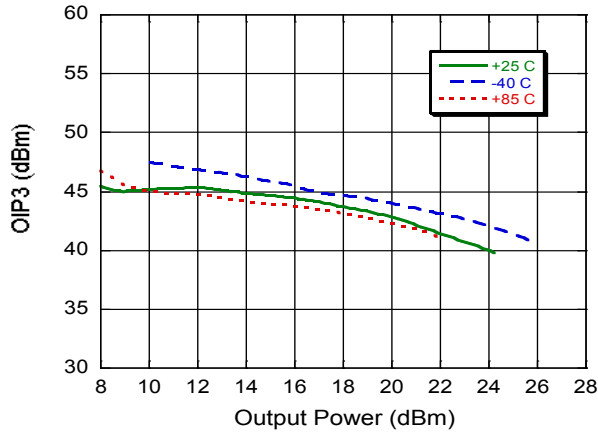


Output IP3 @ 10 GHz

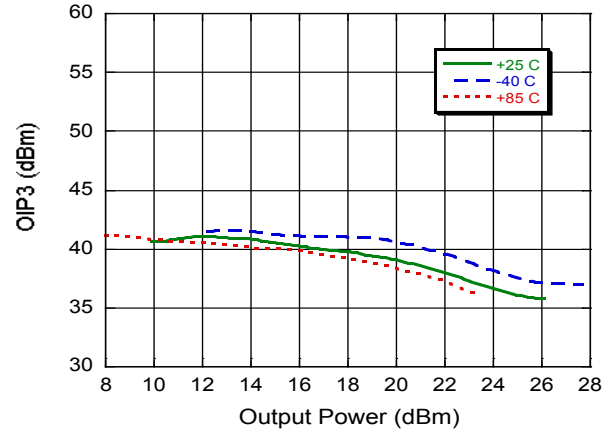


Typical Performance Curves (cont.)

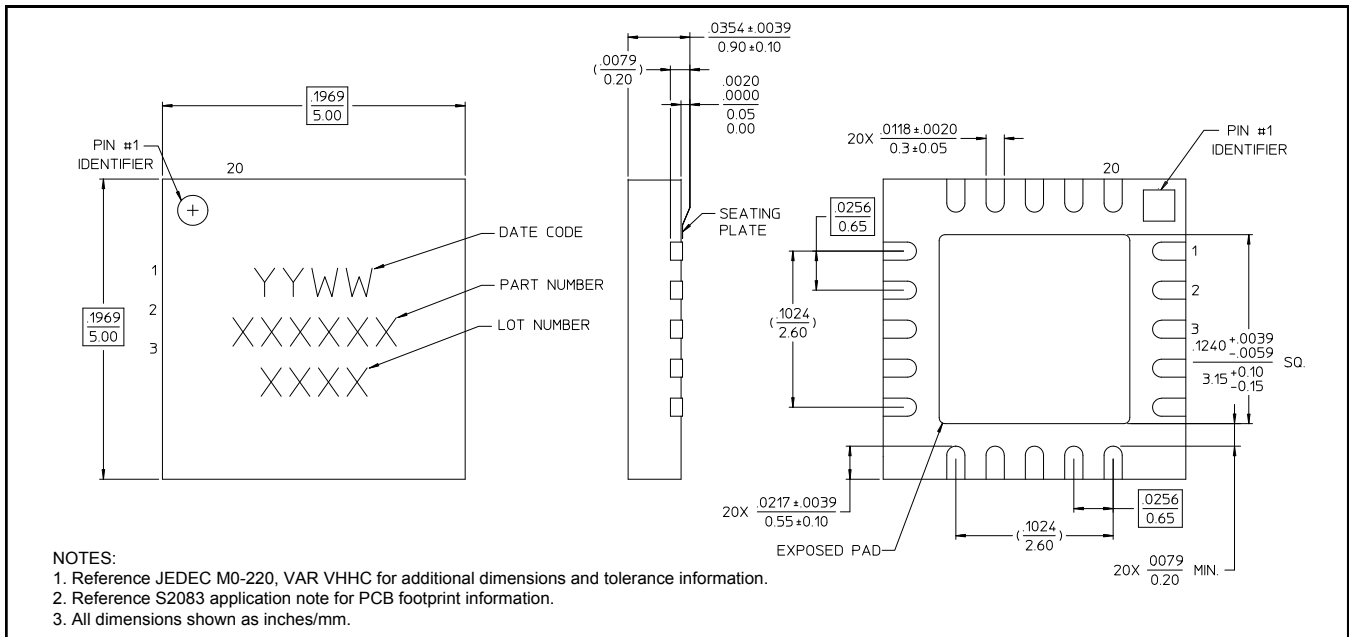
Output IP3 @ 11.7 GHz



Output IP3 @ 13.3 GHz



Lead-Free 5 mm 20-Lead PQFN†



† Reference Application Note S2083 for lead-free solder reflow recommendations.
Meets JEDEC moisture sensitivity level 1 requirements.
Plating is 100% matte tin over copper.

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