MAAP-010171

Amplifier, Power, 8 W
2.5 - 3.5 GHz

Rev. V2

Features

- Linear Gain: 27 dB
- Saturated Output Power: +39 dBm Pulsed
- 50 Ω Input / Output Match
- Lead-Free 5 mm 20-lead PQFN Package
- Halogen-Free "Green" Mold Compound
- RoHS* Compliant and 260°C Reflow Compatible

Description

The MAAP-010171 is a 2-stage, 8.0 W saturated S-band power amplifier in a 5mm 20 lead PQFN 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 pulsed applications. It is ideally suited for Air Traffic Control, Weather, Military and S-band radar applications.

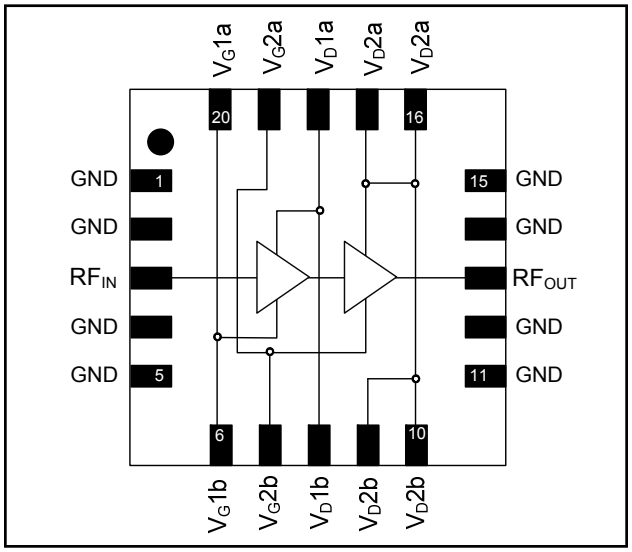
Each device is 100% RF tested to ensure performance compliance. The part is fabricated using M/A-COM Technology Solutions' high linearity pHEMT Process.

Ordering Information [1]

Part Number	Package
MAAP-010171-TR0500	500 piece reel
MAAP-010171-TR1000	1000 piece reel
MAAP-010171-001SMB	Sample Board

1. Reference Application Note M513 for reel size information.

Functional Schematic



Pin Configuration [2]

Pin No.	Function	Pin No.	Function
1	Ground	11	Ground
2	Ground	12	Ground
3	RF_{IN}	13	RF_{OUT}
4	Ground	14	Ground
5	Ground	15	Ground
6	V_G1b	16	V_D2a
7	V_G2b	17	V_D2a
8	V_D1b	18	V_D1a
9	V_D2b	19	V_G2a
10	V_D2b	20	V_G1a
		21	Paddle [3]

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, DC, and thermal ground.

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

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• **India** Tel: +91.80.43537383 • **China** Tel: +86.21.2407.1588
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Electrical Specifications:
Freq. 2.5 - 3.5 GHz, V_{DD} = 9 V Pulsed, 100 µs Pulse Width, 10% Duty Cycle, Z_0 = 50 Ω

Parameter	Units	Min.	Typ.	Max.
Gain	dB	25	27	—
Input Return Loss	dB	—	10	—
Output Return Loss	dB	—	10	—
Psat	dBm	37	39	—
Small Signal Current (I_{DD})	A	—	1	—
Efficiency	%	—	38	—

Absolute Maximum Ratings [4,5]

Parameter	Absolute Maximum
Input Power	+22 dBm
Supply Voltage	11 V
Gate Current	25 mA
Duty Cycle	50 %
Operating Temperature	-40°C to +85°C
Junction Temperature[6,7]	+150 °C
Storage Temperature	-55°C to +150°C

4. Exceeding any one or combination of these limits may cause permanent damage to this device.
5. M/A-COM Technology Solutions does not recommend sustained operation near these survivability limits.
6. Operating at nominal conditions with $T_J \leq 150°C$ will ensure MTTF > 1 x 10^6 hours.
7. Junction Temperature (T_J) = T_C + Θjc * (V * I)
   Typical thermal resistance (Θjc) = 5.75° C/W

Operating the MAAP-010171

To operate the MAAP-010171, follow these steps. Ramp down or shut down in reverse order.

1. Apply V_G between -1 V and -0.5 V to set IDQ to 1 A
2. Apply RF Power ON
3. Apply V_{DD} Pulsed

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.

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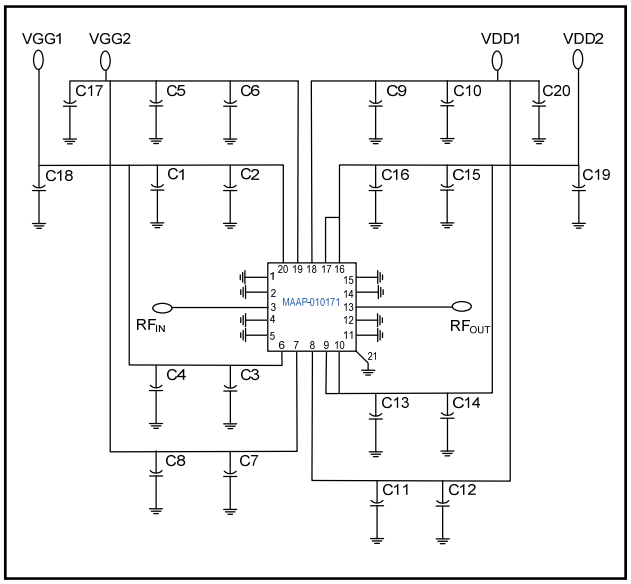
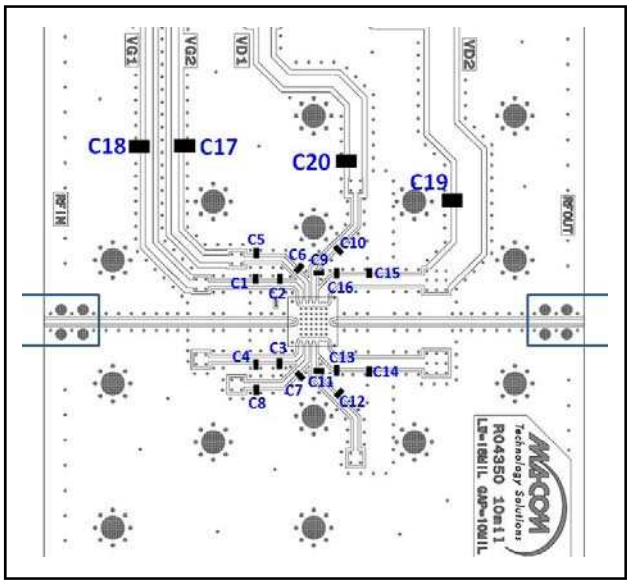
Schematic



Recommended PCB Layout



Parts List

Component	Value	Package
C2, C3, C6, C7, C9, C11, C13, C16	100 pF	0402
C1, C4, C5, C8, C10, C12, C14, C15	1000 pF	0402
C17, C18	1 µF	0805
C19, C20	10 nF	0805

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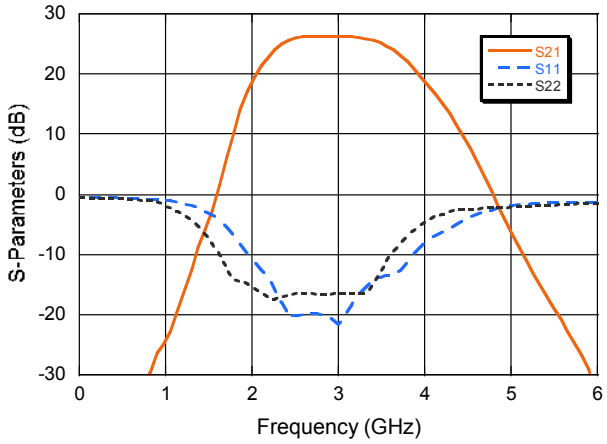
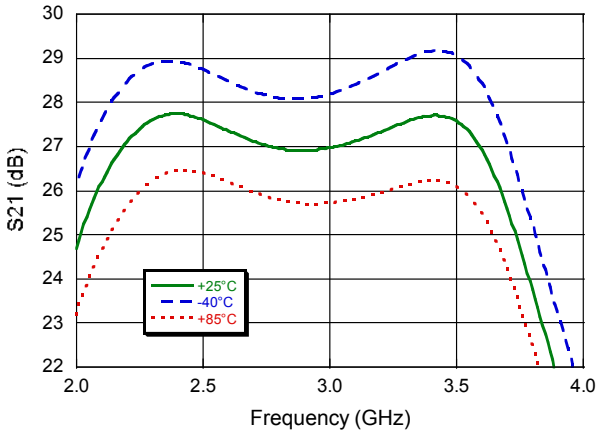
Typical Performance Curves

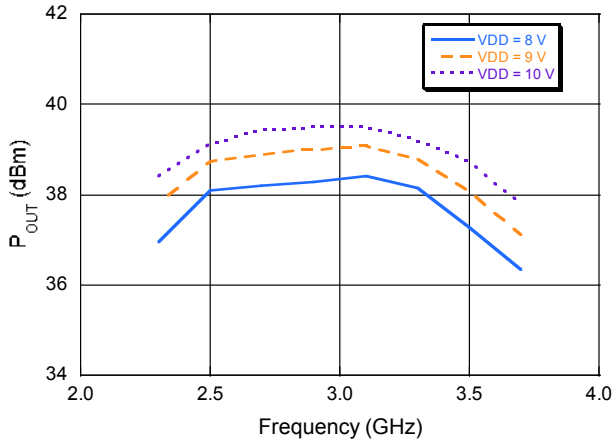
S-Parameters



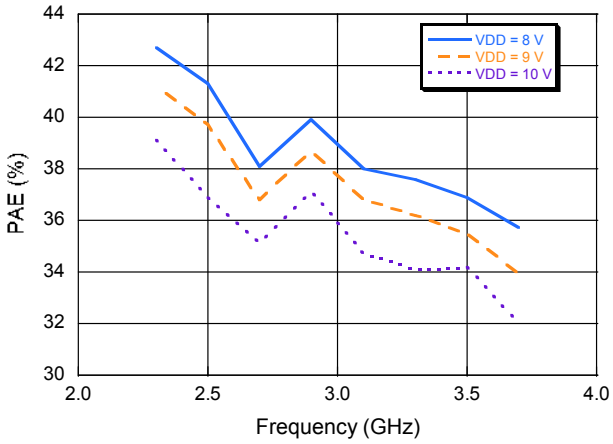
Small Signal Gain



Output Power, Pin = 19 dBm



PAE



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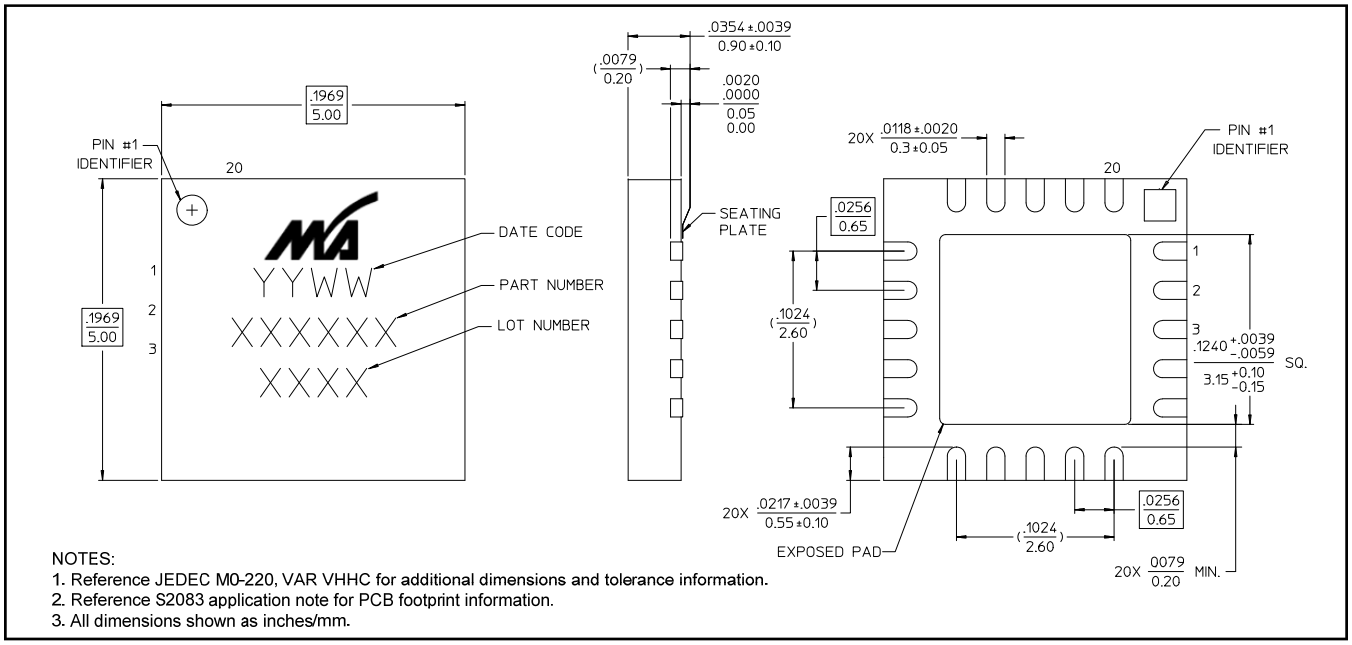
Lead-Free 5 mm 20-Lead PQFN†



NOTES:
1. Reference JEDEC M0-220, VAR VHHC for additional dimensions and tolerance information.
2. Reference S2083 application note for PCB footprint information.
3. All dimensions shown as inches/mm.

† 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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