MAAP-000082

PHS Power Amplifier
1880 - 1930 MHz

Rev. V2

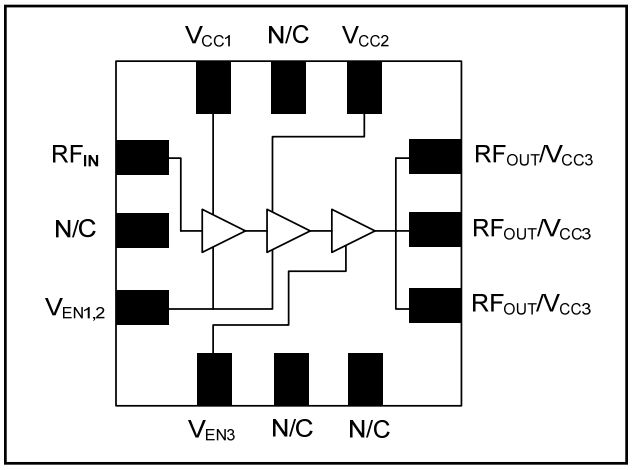
Features

- Ideal for PHS Applications
- Linear Output Power: +24 dBm Typical @ 3.6 V
- Small Signal Gain: 36 dB Typical
- Low Current: 200 mA at +21 dBm Pout
- Passes 1KV ESD rating
- Micro-Amp Shutdown
- Operates from 2.8 V to 4.2 V
- Lead-Free 3 mm, 12-Lead PQFN Package
- 100% Matte Tin Plating over Copper
- Halogen-Free "Green" Mold Compound
- RoHS* Compliant and 260°C Reflow Compatible

Description

The MAAP-000082 is a three stage power amplifier designed for PHS applications. This power amplifier is packaged in a lead-free standard outline 3 mm, 12-lead PQFN plastic package.

Functional Block Diagram



Ordering Information[1,2]

Part Number	Package
MAAP-000082-TR3000	3000 piece reel
MAAP-000082-001SMB	Sample Test Board 1880 - 1930 MHz Tuning

1. Reference Application Note M513 for reel size information.
2. All sample boards include 5 loose parts.

Absolute Maximum Ratings[3,4]

Parameter	Absolute Maximum
Input Power	0 dBm
Operating Supply Voltage	+4.2 Volts
Operating Control Voltage	+3.0 Volts
Operating Temperature	-40°C to +85°C
Channel Temperature	+150 °C
Storage Temperature	-50°C to +150°C

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

Pin Configuration

Pin No.	Pin Name	Description
1	RF_{IN}	RF Input
2	N/C	No Connection
3	$V_{EN1,2}$	Power Enable
4	V_{EN3}	Power Enable
5	N/C	No Connection
6	N/C	No Connection
7	RF_{OUT} / V_{CC3}	RF Output, 3rd Stage Supply
8	RF_{OUT} / V_{CC3}	RF Output, 3rd Stage Supply
9	RF_{OUT} / V_{CC3}	RF Output, 3rd Stage Supply
10	V_{CC2}	2nd Stage Supply
11	N/C	No Connection
12	V_{CC1}	1st Stage Supply
Pad[5]	GND	RF & DC Ground

5. 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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- **Europe** Tel: 44.1908.574.200 / Fax: 44.1908.574.300
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Electrical Specifications: F = 1905 MHz, T_A = +25 °C, V_{CC} = 3.6 V, V_{EN} = 3.0 V, Z_O = 50 Ω

Parameter	Test Conditions	Units	Min.	Typ.	Max.
Gain	P_{OUT} = +21 dBm	dB	34	36	38
Input Return Loss	—	dB	—	15	—
ACPR	P_{OUT} = +21 dBm, 600 KHz offset P_{OUT} = +24 dBm, 600 KHz offset	dBc dBc	— —	-63 -60	-60 —
ALT	P_{OUT} = +21 dBm, 900 KHz offset P_{OUT} = +24 dBm, 900 KHz offset	dBc dBc	— —	-72 -70	-69 —
P1dB	—	dBm	—	26.5	—
PAE	P_{OUT} = +21 dBm P_{OUT} = +24 dBm	% %	— —	17 25	— —
Operating Current	P_{OUT} = +21 dBm P_{OUT} = +24 dBm	mA mA	— —	200 280	240 —
Idle Current	No RF applied	mA	—	90	150
Current, Off	V_{EN} = 0 V	µA	—	3	—
Enable Current	V_{EN} = 3.0 V	mA	—	4	—
Forward Isolation	V_{EN} = 0 V	dB	—	39	—
Stability	P_{OUT} <27 dBm, VSWR < 4:1 -20°C < T_A < +70ºC		All spurs < -60 dBc		

Handling Procedures

Please observe the following precautions to avoid damage:

Static Sensitivity

Silicon germanium 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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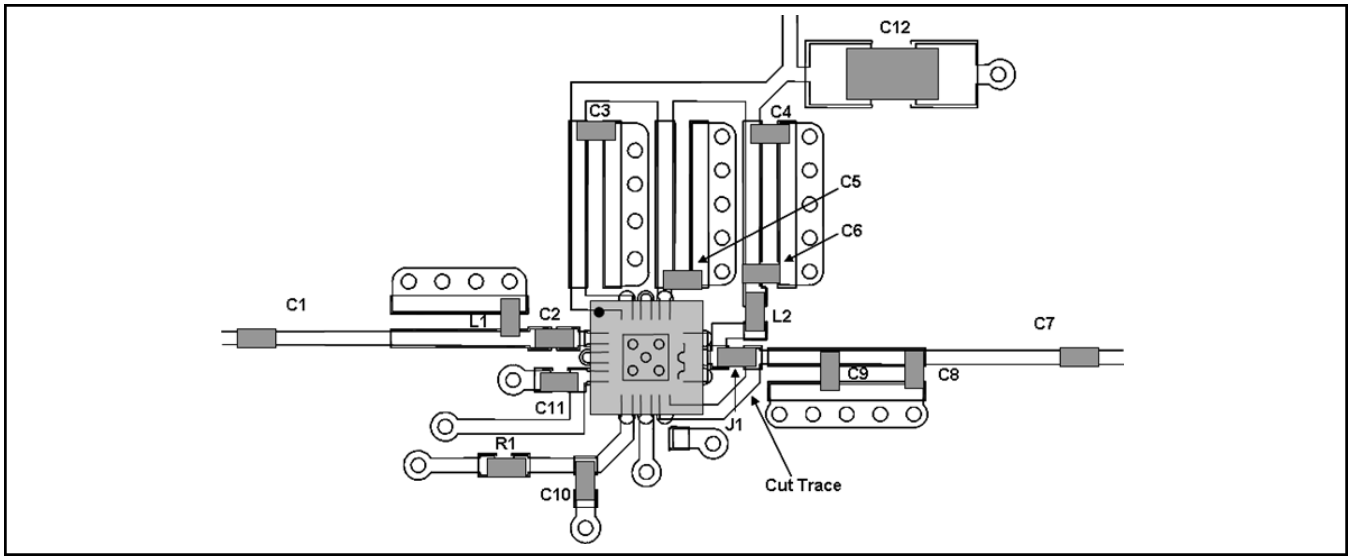
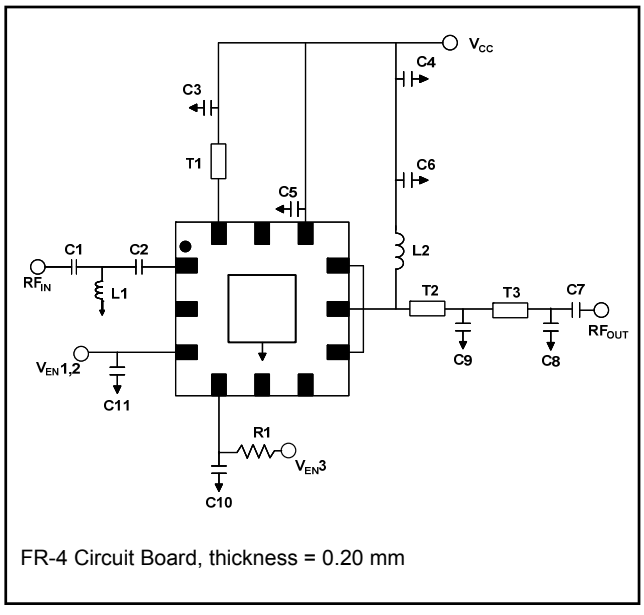
Recommended PCB Configuration



Schematic



FR-4 Circuit Board, thickness = 0.20 mm

External Parts List

Designator	Value	Foot Print	Manufacturer
C1	1000 pF	0402	Murata
C2	18 pF	0402	Murata
C3, C4, C5, C10, C11	0.1 µF	0402	Murata
C6	15 pF	0402	Murata
C7	47 pF	0402	Murata
C8	0.5 pF	0402	Murata
C9	2.7 pF	0402	Murata
L1	2.2 nH	0402	Coilcraft
L2	15 nH	0402	Coilcraft
R1	820 Ω	0402	Panasonic

Frequency = 1905 MHz		
	Impedance	Electrical Length (mils)
T1	50 Ω	200
T2	50 Ω	120
T3	50 Ω	70

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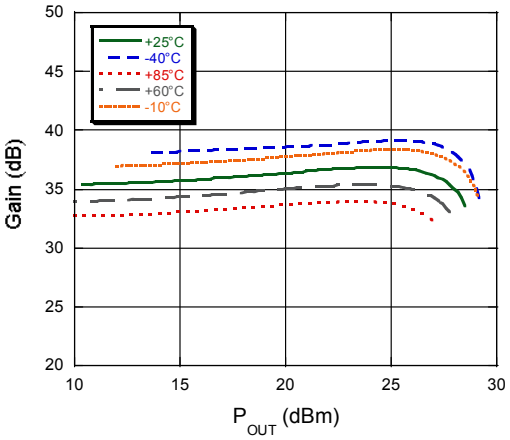
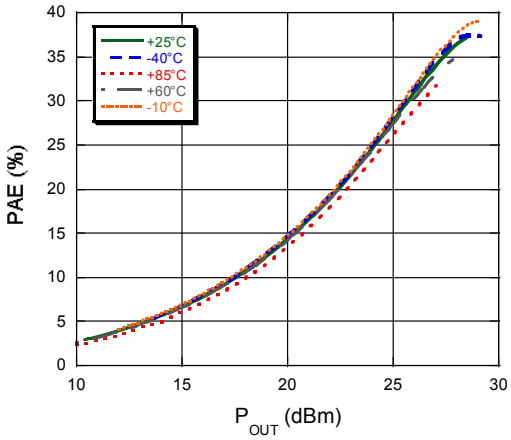
Typical Characteristics @ +25°C, -40°C, +85°C, +60°C, -10°C, V_{CC} = 3.6 V

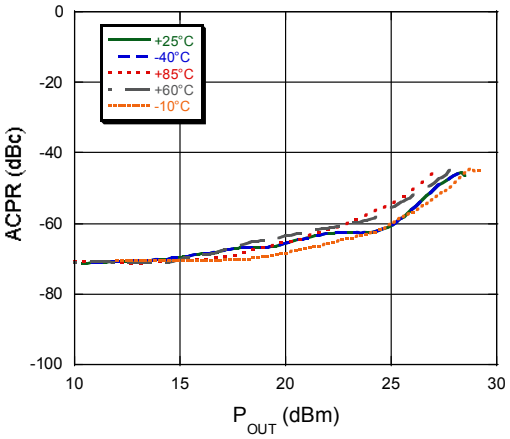
Gain vs. P_{OUT} @ 1905 MHz



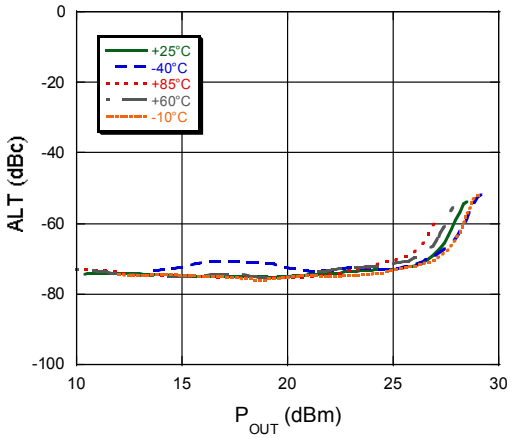
PAE vs. P_{OUT} @ 1905 MHz



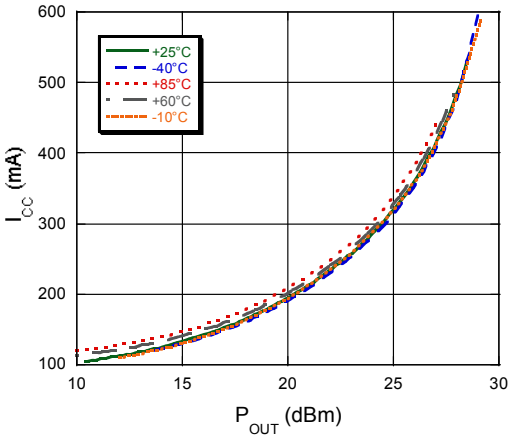
ACPR vs. P_{OUT} @ 1905 MHz



ALT vs. P_{OUT} @ 1905 MHz



I_{CC} vs. P_{OUT} @ 1905 MHz



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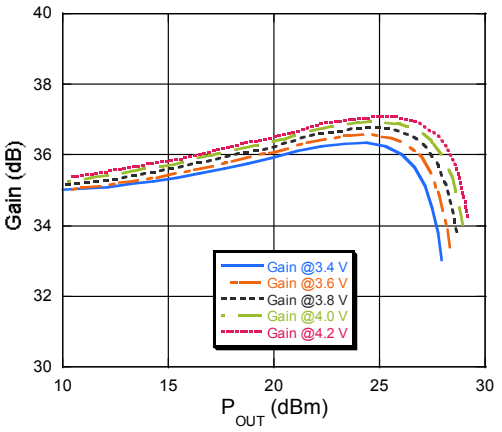
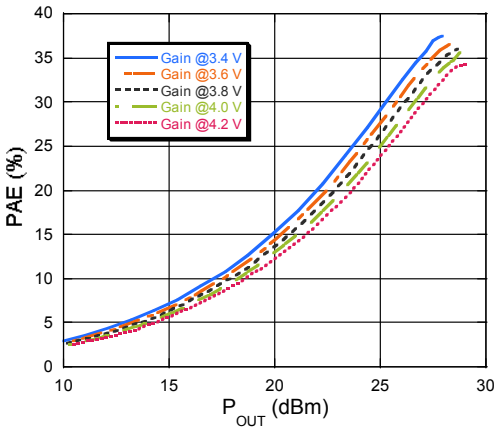
Typical Performance Curves, 1905 MHz, V_{CC} swept from 3.4 V to 4.2 V by 0.2 steps

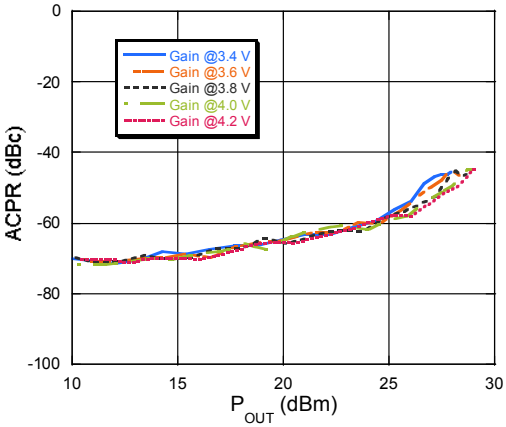
Gain vs. P_{OUT}



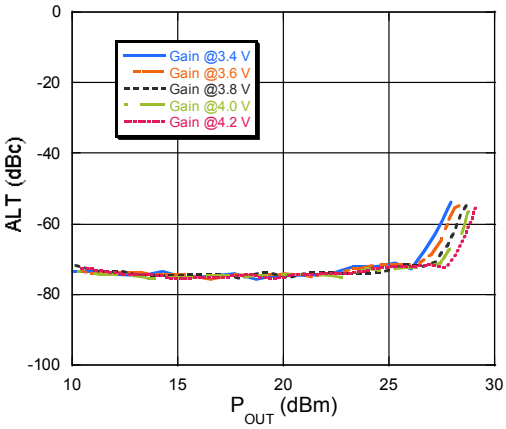
PAE vs. P_{OUT}



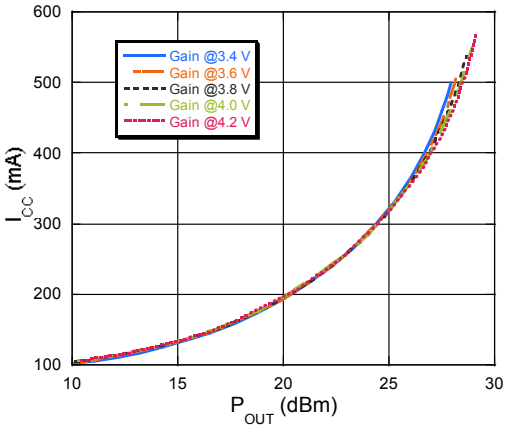
ACPR vs. P_{OUT}



ALT vs. P_{OUT}



I_{CC} vs. P_{OUT}



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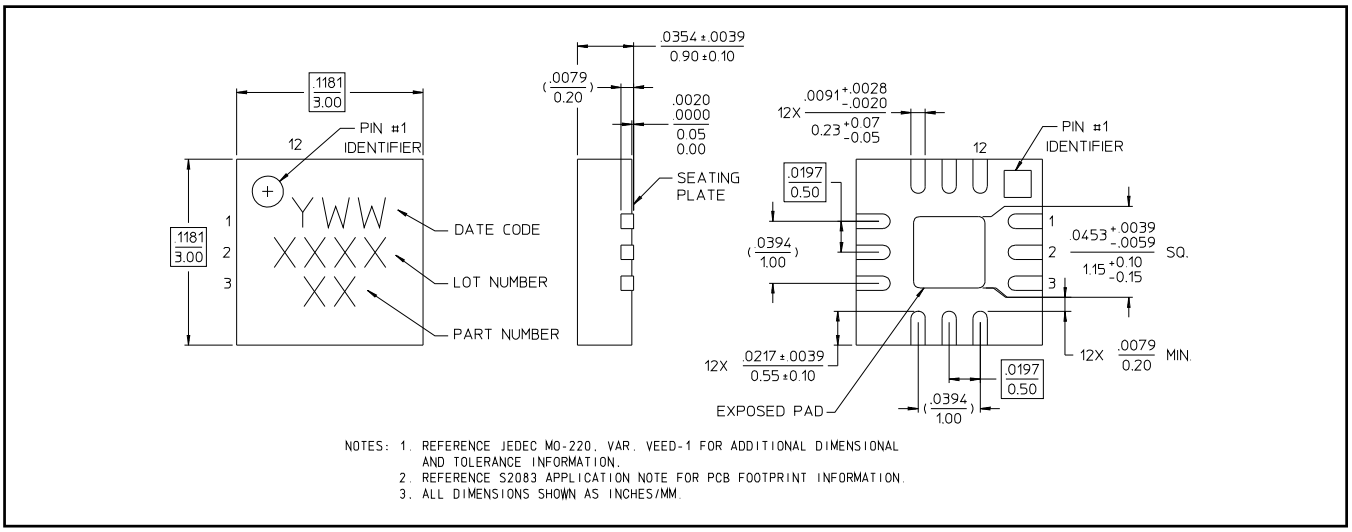
Lead-Free 3 mm 12-Lead PQFN†



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

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