High Power Linear Amplifier
3.3 – 3.8 GHz

MAAPSS0104
V1

Features

- Ideal for WiMax, MESH Network, and Linear Applications
- P1dB: +32 dBm Typical
- Small Signal Gain: 32 dB Typical
- EVM: 2.5% at 26 dBm Linear (OFDM) P_{OUT}
- Integrated Detector
- Lead-Free 4 mm 16 lead 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 MAAPSS0104 RF power amplifier is a three stage GaAs MMIC which exhibits high gain and linearity performance in a lead-free 4 mm 16-lead PQFN surface mount plastic package. This product is designed for the 3.5 GHz IEEE 802.16 / WiMax band. The MAAPSS0104 also features an integrated power detector.

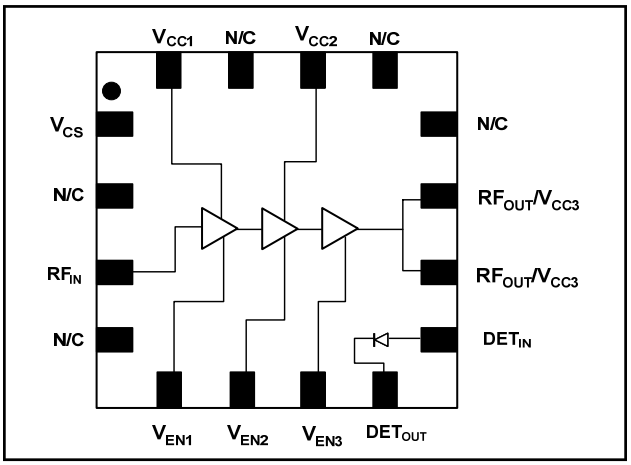
The MAAPSS0104 is fabricated using a high reliability GaAs HBT process to realize low current and high power functionality. The process features full passivation for increased performance and reliability.

Ordering Information [1]

Part Number	Package
MAAPSS0104TR-3000	3000 piece reel
MAAPSS0104SMB	Sample Test Board (Includes 5 Samples)

1. Reference Application Note M513 for reel size information.

Block Diagram



Pin Configuration

Pin No.	Pin Name	Description
1	V_{CS}	Bias Supply Voltage
2	N/C	No Connect
3	RF_{IN}	RF Input
4	N/C	No Connect
5	V_{EN1}	Power Enable
6	V_{EN2}	Power Enable
7	V_{EN3}	Power Enable
8	DET_{OUT}	Detector Output
9	DET_{IN}	Detector Input
10	RF_{OUT}/V_{CC3}	RF Output, 3rd Stage Supply
11	RF_{OUT}/V_{CC3}	RF Output, 3rd Stage Supply
12	N/C	No Connect
13	N/C	No Connect
14	V_{CC2}	2nd Stage Supply
15	N/C	No Connect
16	V_{CC1}	1st Stage Supply
17	Paddle [2]	RF & DC Ground

2. 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.

- **North America** Tel: 800.366.2266 / Fax: 978.366.2266
- **Europe** Tel: 44.1908.574.200 / Fax: 44.1908.574.300
- **Asia/Pacific** Tel: 81.44.844.8296 / Fax: 81.44.844.8298

Visit www.macom.com for additional data sheets and product information.

Electrical Specifications: T_A = +25 °C, V_{CC} = 5.0 V, Z_0 = 50 Ω

Parameter	Test Conditions	Units	Min.	Typ.	Max.
Gain	3.5 GHz	dB	29	32	—
Gain Flatness	3.3 - 3.8 GHz	dB	—	± 1	—
Input Return Loss	3.3 - 3.8 GHz	dB	—	10	—
Output Return Loss	3.3 - 3.8 GHz	dB	—	7	—
Output P1dB	3.5 GHz	dBm	—	32	—
EVM [3]	3.5 GHz, P_{OUT} = 26 dBm OFDM, QAM-64, 54 Mbps	%	—	2.5	—
Enable Voltage	V_{EN}	V	—	3	—
Device / Supply Voltage	3.3 - 3.8 GHz	V	—	5	—
Quiescent Current Operating Current	3.5 GHz, No RF 3.5 GHz, P_{OUT} = 26 dBm	mA mA	— —	250 600	— 700
PAE	3.5 GHz, P_{OUT} = 26 dBm CW	%	—	14	—
Detector Output Range	3.5 GHz, P_{OUT} = 14 - 28 dBm, OFDM	V	—	0.5 - 2.0	—
Thermal Resistance	@ 85°C package paddle temperature	°C/W	—	25	—

3. Includes system EVM of 0.8%.

Absolute Maximum Ratings [4,5]

Parameter	Absolute Maximum
Input Power	+ 5 dBm
Operating Supply Voltage	+6.0 Volts
Operating Control Voltage	+3.6 Volts
Operating Temperature	-40 °C t o +85 °C
Channel Temperature	+150 °C
Storage Temperature	-40 °C t o +150 ° C

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

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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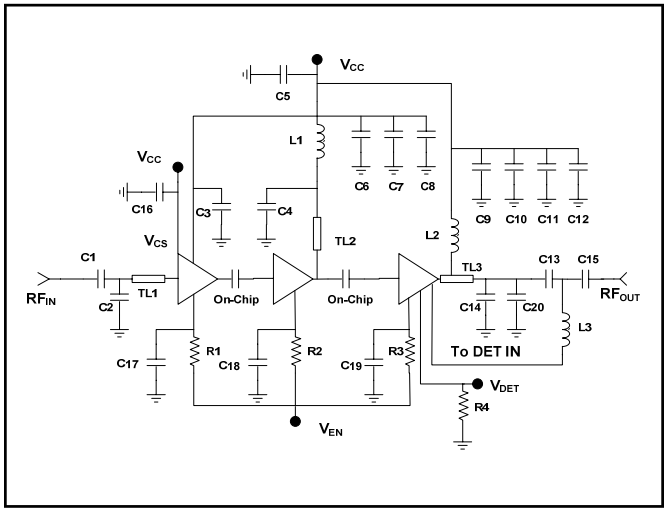
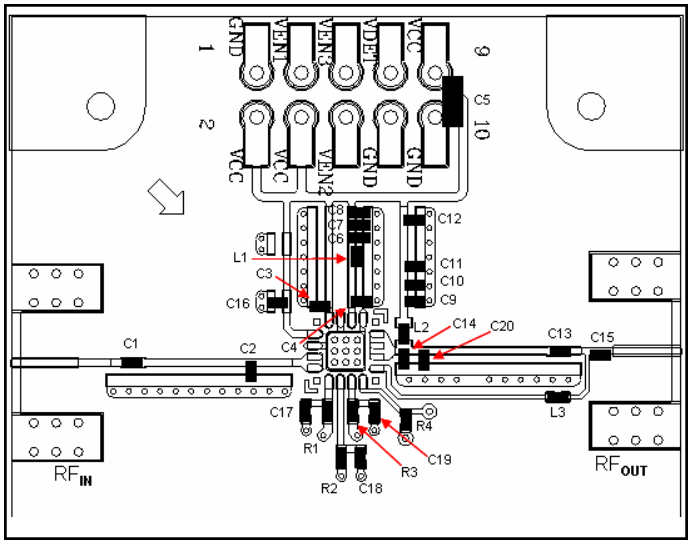
Application Schematic



Sample Board[6]



6. PCB Material FR4 - 50 W Line = 0.37 mm (W)

External Parts List

Component	Value	Case Size	Manufacturer
C1, C7, C10, C13, C15, C16, C17, C18, C19	1000 pF	0402	Murata
C2	1.2 pF	0402	Johanson
C3	5.6 pF	0402	Murata
C4	1.8 pF	0402	Murata
C5	3.3 µF	1206	Kemet
C6, C9	15 pF	0402	Murata
C8, C11, C12	0.1 µF	0402	Murata
C14	1.5 pF	0603	ATC 600S
C20	0.5 pF	0402	Murata
L1	30 nH	0402	Coilcraft
L2	9.5 nH	0402	Coilcraft
L3	15 nH	0402	Coilcraft
R1	0 Ω	0402	-
R2	10.2 Ω	0402	-
R3	39 Ω	0402	-
R4	100 kΩ	0402	-
TL1	3.5 mm (L) 0.37 mm (W)	-	-
TL2	1 mm (L) 0.37 mm (W)	-	-
TL3	0.8 mm inc. Taper (L)	-	-

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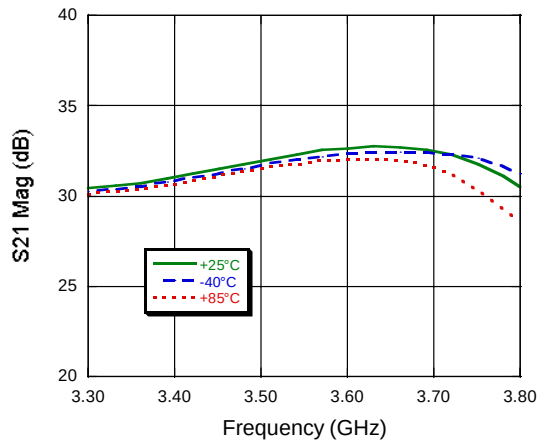
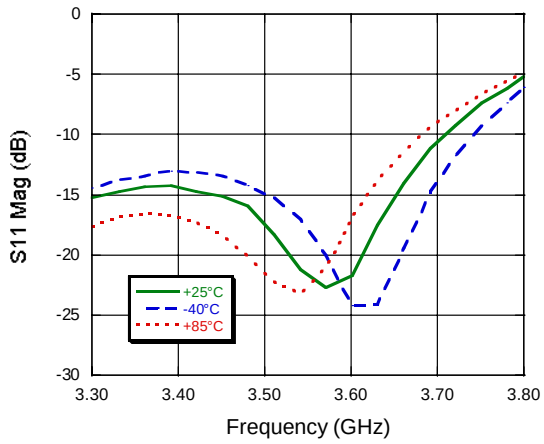
Typical Performance Curves: Over Temperature

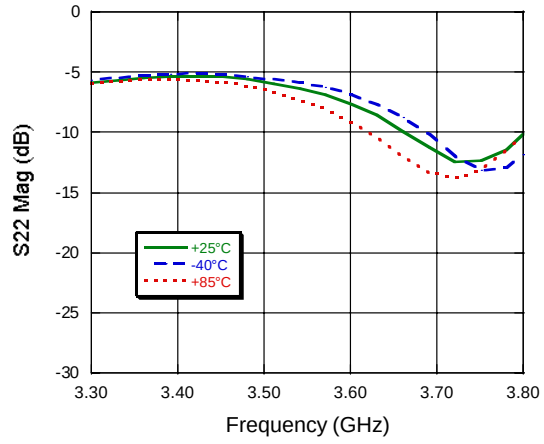
Gain



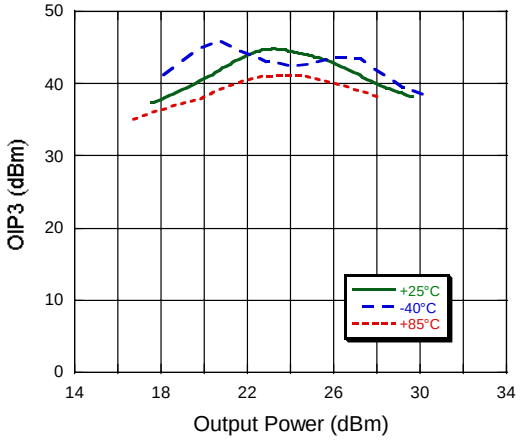
S11



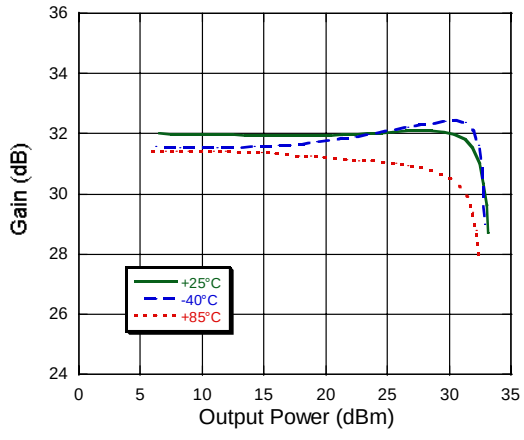
S22



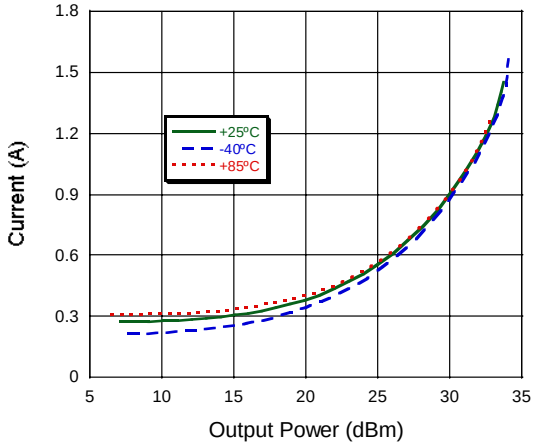
OIP3



P1dB



Current



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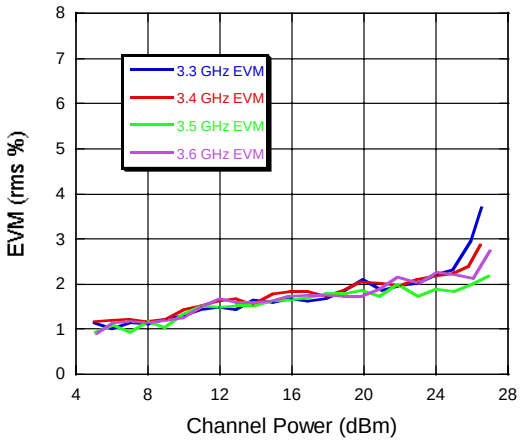
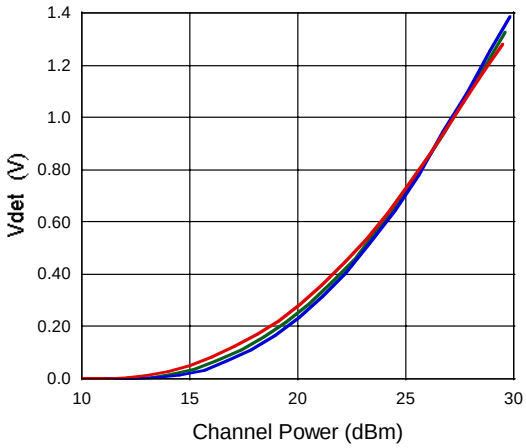
Typical Performance Curves: @ +25°C

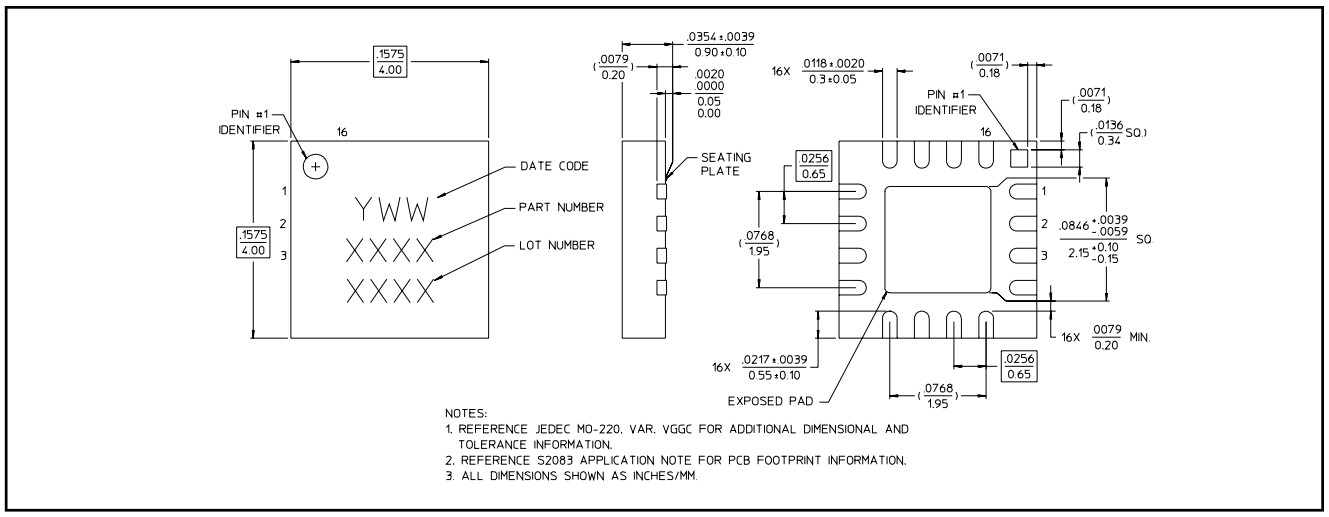
EVM



V_{DET}



Lead-Free 4 mm 16-Lead PQFN†



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

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