

Rev. V3

Features

- Linear Output Power: 33 dBm
- · Gain with Saw Filter on Input: 30 dB
- ACPR = -34.0 dBc @ 41.67 kHz offset,
 P_{OUT} = 33 dBm
- High PAE: >30%
- · Integrated Active Bias Circuit
- Power-Down Function
- InGaP HBT device technology
- Rugged single supply power amplifier design
- High Peak-Power Efficiency
- Lead-Free 6 mm 12-Lead LGA package
- Halogen-Free "Green" Mold Compound
- RoHS* Compliant and 260°C Reflow Compatible

Description

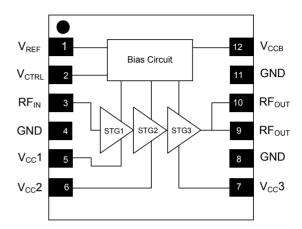
The MAAP-011060 is a power amplifier module assembled in a 6 mm land grid array (LGA) that is self-contained with 50 Ω input and output terminals. The input and output ports are also DC blocked.

This device utilizes a GaAs HBT process for optimal 5 V performance in 1.6 GHz satellite applications.

Ordering Information

Part Number	Package	
MAAP-011060	Bulk Packaging	
MAAP-011060-TR0500	500 Piece Reel	
MAAP-011060-001SMB	Sample Test Board	

Functional Schematic



Pin Configuration

Pin No.	Pin Name Description		
1	V _{REF} Reference Voltage		
2	V _{CTRL} Control Voltage		
3	RF _{IN}	RF Input	
4	GND	GND Ground	
5	V _{CC} 1	Supply Voltage 1	
6	V _{CC} 2	Supply Voltage 2	
7	V _{CC} 3	Supply Voltage 3	
8	GND	Ground	
9	RF _{OUT} RF Output		
10	RF _{OUT}	RF Output	
11	GND	Ground	
12	V _{CCB}	Supply Voltage Bias Circuit	
Paddle ¹	RF and DC Ground		

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

1

^{*} Restrictions on Hazardous Substances, European Union Directive 2011/65/EU.



Rev. V3

Electrical Specifications:

Freq: 1621.25 MHz, $V_{CC} = 5 \text{ V}$, $V_{REF} = 3 \text{ V}$, $V_{Ctrl} = 1.35 \text{ V}$, $T_A = 25^{\circ}\text{C}$

Parameter	Test Conditions	Units	Min.	Тур.	Max.
Rated Output Power	V_{CC} = 5 Volts, 5.5 Volts V_{CC} = 4.5 Volts	dBm	33 32.6	33 32	_
Gain @ Rated pout	VSWR = 1:1	dB	30	30.5	_
Gain Variation over Freq	VSWR = 1:1, 1616 MHz - 1626.5 MHz	dB	-2	+/-0.5	2
Gain Variation over Temperature	VSWR = 1:1	dB	-2	+/-2.5	2
Gain Variation vs. Load Phase Angle	VSWR = 1.7:1	dB	-2	+/-1	2
Harmonic Suppression Power	Freq = $2f_0$, $3f_0$	dBm	_	-16	_
Adjacent Channel Power	+/- 41.67 kHz offset, BW ² = 41.67 kHz @ Rated Pout	dBc	_	-35	-30
Adjacent Channel Power, Extreme Conditions	+/- 41.67 kHz offset, BW = 25 kHz @ Rated Pout, Over Freq. and Temp. Range, VSWR = 1.7:1	dBc	_	-28	-27
Alternate Channel Power	+/- 83.33 kHz offset, BW ² = 41.67 kHz @ Rated Pout	dBc	_	-47	-44
Power Added Efficiency	@ Rated Pout	%	27	30	_
Pulse Period	_	ms	_	8.28	_
Pulse Duty Cycle	_	ms	_	90	_
Reference Voltage Sink Current	_	mA	_	6.5	10

^{2.} Using DQPSK Signal with PAR = 2.78 dB, main channel BW = 41.67 kHz

Absolute Maximum Ratings^{3,4,5}

Parameter	Absolute Maximum		
DC Supply Voltage	5.5 V		
RF Input Power	9 dBm		
Junction Temperature ⁶	150°C		
Operating Temperature	-40°C to +85°C		
Storage Temperature	-55°C to +150°C		

- 3. Exceeding any one or combination of these limits may cause permanent damage to this device.
- MACOM does not recommend sustained operation near these survivability limits.
- 5. Operating at nominal conditions with $T_J \le +150^{\circ}C$ will ensure MTTF > 1 x 10^6 hours.
- 6. Junction Temperature (T_J) = T_C + Θ jc * ((V * I) (P_{OUT} P_{IN}))

 Typical thermal resistance (Θ jc) = 10.8° C/W.

a) For $T_C = 25^{\circ}C$,

T_J = 74°C @ 5 V, 1300 mA

b) For $T_C = 85^{\circ}C$,

T_{.I} = 134°C @ 5 V, 1300 mA

Handling Procedures

Please observe the following precautions to avoid damage:

Static Sensitivity

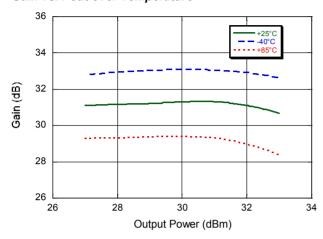
Gallium Arsenide Integrated Circuits are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Proper ESD control techniques should be used when handling these Class 1B devices.



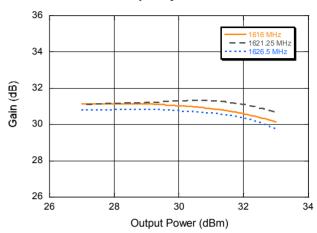
Rev. V3

Typical Performance Curves: DQPSK Signal with 2.78 dB PAR

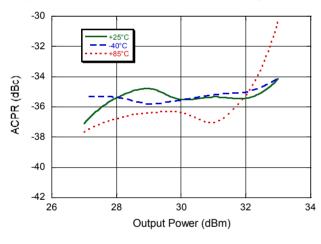
Gain vs. Pout over Temperature



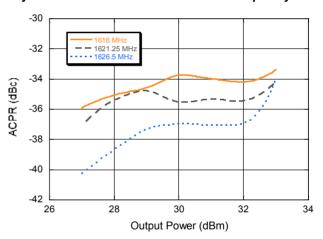
Gain vs. Pout over Frequency Band



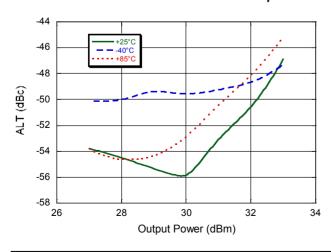
Adjacent Channel Power vs. Pout over Temperature



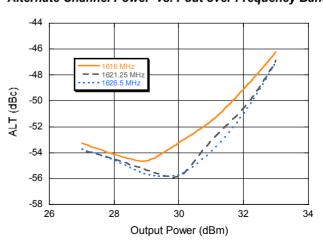
Adjacent Channel Power vs. Pout over Frequency Band



Alternate Channel Power vs. Pout over Temperature



Alternate Channel Power vs. Pout over Frequency Band



3

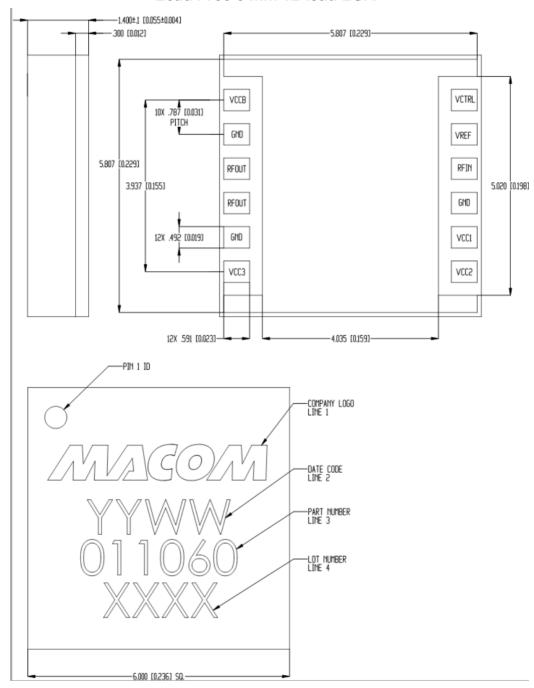
MACOM Technology Solutions Inc. (MACOM) and its affiliates reserve the right to make changes to the product(s) or information contained herein without notice.

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



Rev. V3

Lead Free 6 mm 12-lead LGA[†]



[†] Reference Application Note S2083 for lead-free solder reflow recommendations. Meets JEDEC moisture sensitivity level 3 requirements.

MAAP-011060



Power Amplifier Module 1616 - 1626.5 MHz, 2 Watts

Rev. V3

MACOM Technology Solutions Inc. All rights reserved.

Information in this document is provided in connection with MACOM Technology Solutions Inc ("MACOM") products. These materials are provided by MACOM as a service to its customers and may be used for informational purposes only. Except as provided in MACOM's Terms and Conditions of Sale for such products or in any separate agreement related to this document, MACOM assumes no liability whatsoever. MACOM assumes no responsibility for errors or omissions in these materials. MACOM may make changes to specifications and product descriptions at any time, without notice. MACOM makes no commitment to update the information and shall have no responsibility whatsoever for conflicts or incompatibilities arising from future changes to its specifications and product descriptions. No license, express or implied, by estoppels or otherwise, to any intellectual property rights is granted by this document.

THESE MATERIALS ARE PROVIDED "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, RELATING TO SALE AND/OR USE OF MACOM PRODUCTS INCLUDING LIABILITY OR WARRANTIES RELATING TO FITNESS FOR A PARTICULAR PURPOSE, CONSEQUENTIAL OR INCIDENTAL DAMAGES, MERCHANTABILITY, OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT. MACOM FURTHER DOES NOT WARRANT THE ACCURACY OR COMPLETENESS OF THE INFORMATION, TEXT, GRAPHICS OR OTHER ITEMS CONTAINED WITHIN THESE MATERIALS. MACOM SHALL NOT BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, INCLUDING WITHOUT LIMITATION, LOST REVENUES OR LOST PROFITS, WHICH MAY RESULT FROM THE USE OF THESE MATERIALS.

MACOM products are not intended for use in medical, lifesaving or life sustaining applications. MACOM customers using or selling MACOM products for use in such applications do so at their own risk and agree to fully indemnify MACOM for any damages resulting from such improper use or sale.