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AP1098

2.4~2.5 GHz Power Amplifier

2004.07.19 Preliminary

DESCRIPTION

The AP1098 is a linear, low current power amplifier in ISM band utilizing InGaP /GaAs HBT process. It features a LOW current of ***85mA***, small signal gain of 25 dB, linear power of ***19dBm*** and PAE of ***28%*** for 802.11g under 3.3V. It can also be adjusted to smaller current(~60mA) with lower linear power (~16dBm). The AP1098 is housed in a 3 x 3 (mm), 16-pin, and QFN leadless package. The AP1098 is suitable to be used in portable, low current 802.11b and 802.11g WLAN applications.

KEY FEATURES

- **Ultra LOW Current (see below specs)**
- **Ultra High Efficiency:**

  PAE>28% @802.11g linear power
- **Gain: 25 dB**

Under Vc=3.3V, Vref=3V

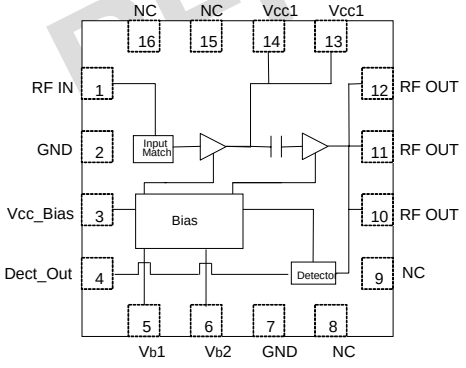
*** 11g**
linear power: 19dBm
current: 85mA
*** 11b**
linear power: 23dBm
current: 165mA

- **Low Idle Current: 25mA**

Major Applications

- IEEE 802.11b/g WLAN system
- WLAN Portable Devices
- WLAN USB Devices
- Bluetooth and other 2.4 GHz ISM Band Application

Functional Block Diagram



QFN- 16 pin, 3 x 3 (mm)

Pin Details

Pin Number	Name	Description
1	RF_IN	RF input.
2	GND	DC and RF ground.
3	Vcc_Bias	Supply voltage for bias circuit.
4	Dect_Out	Power detector output.
5	Vb1	1st-stage control voltage
6	Vb2	2nd-stage control voltage
7	GND	DC and RF ground.
8	NC	No contact (Connect to ground for better thermal dissipation.)
9	NC	
10	RF_OUT	RF output. Require external matching. The detail configuration can be found in Application Notes
11	RF_OUT	
12	RF_OUT	
13	VCC1	Supply voltage for first stage. Some bypass capacitors are needed for system application. The detail configuration can be found in Application Notes.
14	VCC1	
15	NC	No contact (Connect to ground for better thermal dissipation.)
16	NC	
Package Base	Center Metal	The package ground provides circuit ground as well as heat dissipation path for the power amplifier.

◎ Vb2 can be connected with Vb1 pin into a single Vref through external resistor. (Please refer to the AP1098 Application note)

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Electrical Characteristics

Under Vc=3.3V, Vref=3V, Ta=25ºC

Parameter	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Freq.	f		2.4		2.5	GHz
Total current	Icc	@ Pout=19dBm, 64QAM/54Mbps @ Pout=23dBm, CCK/11Mbps		85 165		mA
Bias control reference current	Iref	@Icq=25mA		0.7		mA
Power Gain	Gp	@ Pout=19dBm, 64QAM/54Mbps		25		dB
Quiescent current	Icq			25		mA
EVM at Output power 19dBm	EVM	@ Pout=19dBm, 64QAM/54Mbps		3		%
802.11b ACP-1st Side Lobe		@Pout=23dBm, CCK/11Mbps		-36		dBc
802.11b ACP-2nd Side Lobe		@Pout=23dBm, CCK/11Mbps		-56		dBc
Input VSWR				2		
Output VSWR				2.5		
PAE @ linear power	PAE	@Pout=19dBm, 64QAM/54Mbps @Pout=23dBm, CCK/11Mbps		28 37		%

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Absolute Maximum Ratings

Parameter	***Rating***	***Unit***
DC Power Supply For Collector	+5	V
DC Supply Current For Collector	280	mA
RF Input Power	+5	dBm
Operating Ambient Temperature	-40 to +85	˚C
Storage Temperature	-40 to +125	˚C

Important Note:

The information provided in this datasheet is deemed to be accurate and reliable only at present time. RF Integrated Corp. reserves the right to make any changes to the specifications in this datasheet without prior notice.

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Data Charts

Fig. 1

EVM & Icc vs. Pout (dBm)@3.3V

(Vc1=Vc2=Vcc_bias=3.3V, Vref=3V, f=2.447GHz, 54Mbps OFDM Signal)

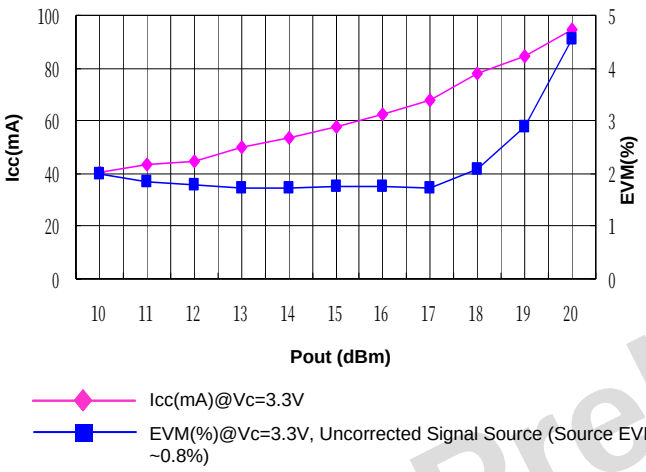


Fig. 2

Gain, EVM,PAE vs Pout

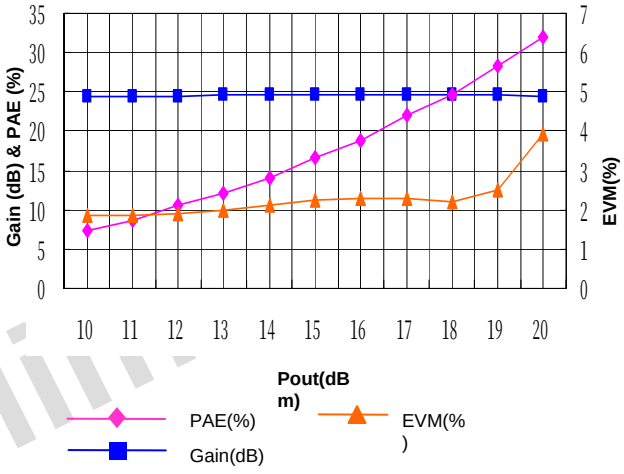


Fig. 3

Detector Output vs. Output Power

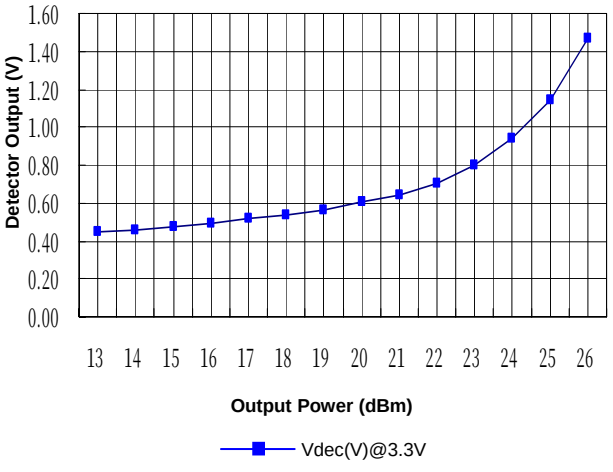
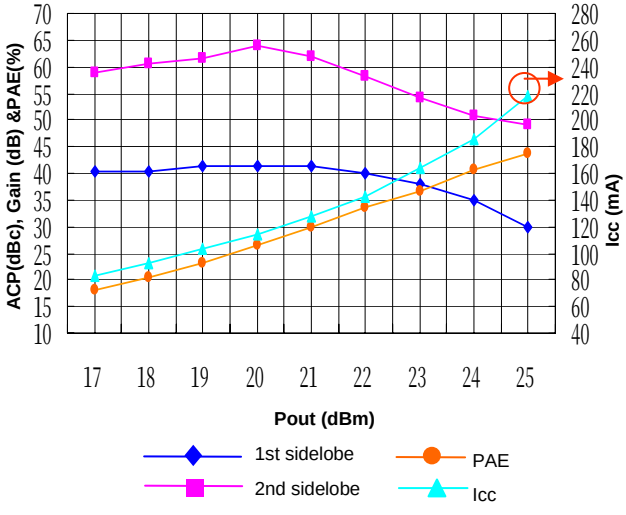


Fig. 4

Gain, ACP, PAE, Icc vs Pout_3.3V

(With 11b CCK Modulation)



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Data Charts

Fig.5

Power Gain vs. Frequency

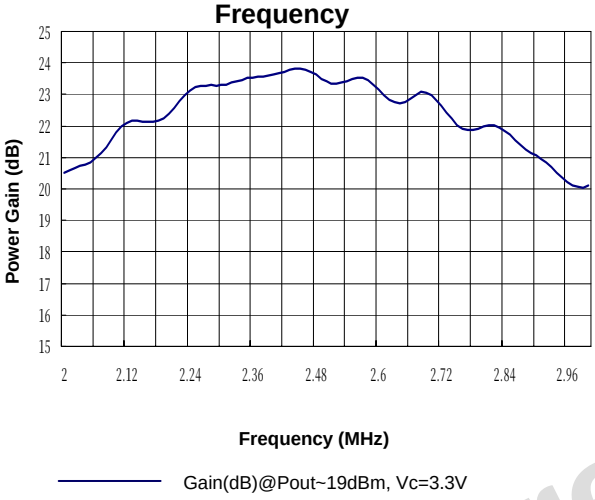


Fig. 6

Input Return Loss vs. Frequency

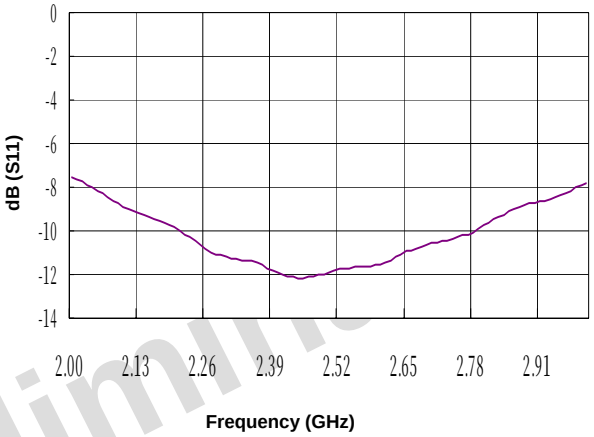


Fig. 7

Output Return Loss vs. Frequency

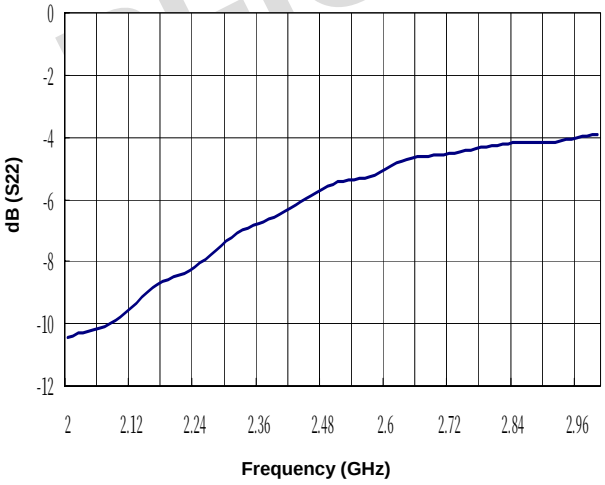
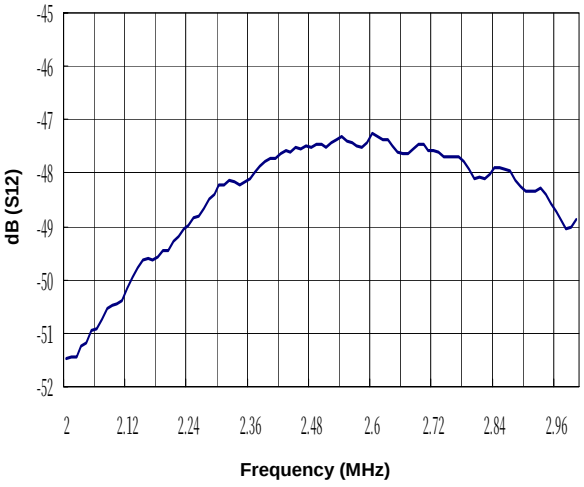


Fig. 8

Reverse Isolation vs. Frequency



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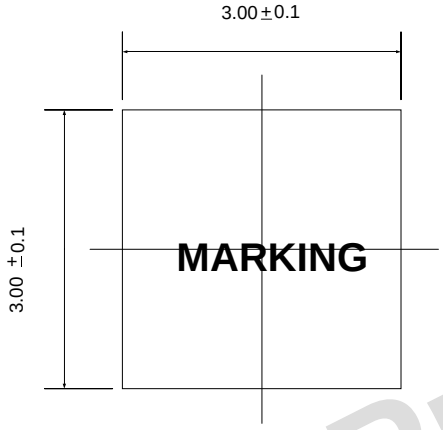
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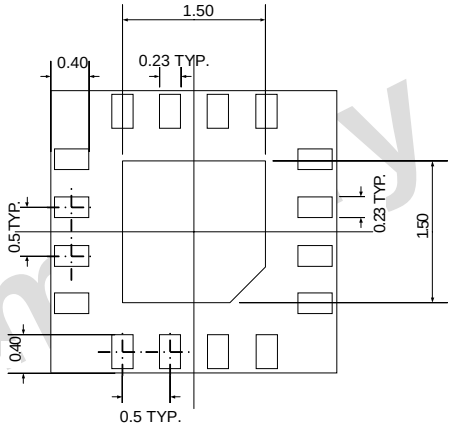
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Package Outline

Top View

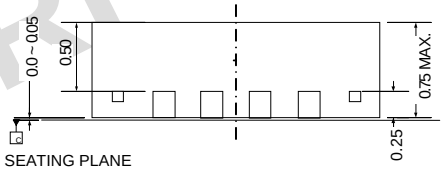


Bottom View



Unit: mm

Side View



Note：

1. Dimension and tolerance conform to ASME Y14.5M-1994.
2. Refer to JEDEC STD. MO-220 WEED-2 ISSUE B

◎ For more detailed information, please refer to AP1098 Application Note.

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