RM806

TDMA/AMPS 3 to 4-Volt Power Amplifier (824—849 MHz)

The RM806 dual mode Time Division Multiple Access (TDMA)/Advanced Mobile Phone Service (AMPS) Power Amplifier is a fully matched 6-pin LCC surface mount module designed for mobile units operating in the 824-849 MHz cellular band width. This device meets stringent IS-136 linearity requirements beyond 30 dBm output power and can be driven to power output levels beyond 31 dBm for high efficiency FM mode operation. A single GaAs Microwave Monolithic Integrated Circuit (MMIC) contains all active circuitry in the module. The MMIC contains on-board bias circuitry, as well as input and inter-stage matching circuits. The output match is realized off-chip within the module package to optimize efficiency and power performance into a 50 Ω load. This device is manufactured with Conexant's GaAs HBT process that provides for all positive voltage DC supply operation while maintaining high efficiency and good linearity. Primary bias to the RM806 can be supplied directly from a three cell nickel-cadmium, single cell lithium-ion, or other suitable battery with output in the 3-4 volt range. Power down is accomplished by setting the voltage on the low current reference pin to zero volts. No external supply side switch is needed as typical "off" leakage is a few microamperes with full primary voltage supplied from the battery.

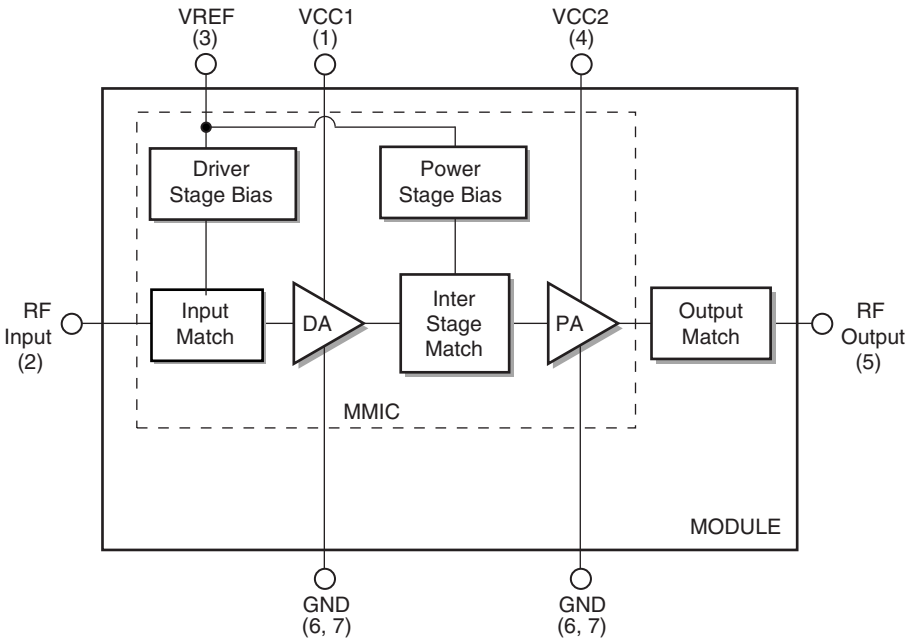
Distinguishing Features

- Low voltage positive bias supply
- Good linearity
- High efficiency
- Dual mode operation
- Large dynamic range
- 6-pin LCC package (6 x 6 x 1.5 mm)
- Power down control

Applications

- Digital cellular (TDMA)
- Analog cellular (AMPS)
- Wireless local loop

Functional Block Diagram



Electrical Specifications

The following tables list the electrical characteristics for the RM806 Power Amplifier. Table 1, lists the absolute maximum rating for continuous operation. Table 2, lists the recommended operating conditions for achieving the electrical performance listed in Table 3. Table 3, lists the electrical performance of the RM806 Power Amplifier over the recommended operating conditions.

Table 1. Absolute Maximum Ratings(1)

Parameter	Symbol	Min	Nominal	Max	Unit
Rf Input Power	Pin	—	3	8	dBm
Supply Voltage	Vcc	—	3.4	5	Volts
Reference Voltage	Vref	—	3.1	3.3	Volts
Case Operating Temperature	Tc	–30	25	+110	°C
Storage Temperature	Tstg	–55	—	+125	°C

NOTE(S):
(1) No damage assuming only one parameter is set at limit at a time with all other parameters set at or below nominal value.

Table 2. Recommended Operating Conditions

Parameter	Symbol	Min	Nominal	Max	Unit
Supply Voltage	Vcc	3.0	3.4	4.2	Volts
Reference Voltage	Vref	—	3.1	—	Volts
Operating Frequency	Fo	824	836.5	849	MHz
Operating Temperature	To	–30	+25	+85	°C

Table 3. Electrical Specifications

Characteristics	Condition	Symbol	Min	Typical	Max	Unit
Quiescent current	—	—	—	150	185	mA
Reference current	Po ≤ 32 dBm	Iref	—	6	9	mA
Leakage current	PA Off	—	—	2	25	uA
Gain	Po = 0 dBm	G	27	31	—	dB
Gain	Po = 30 dBm	G_p	26	28	—	dB
Analog Mode Power Added Efficiency	Po = 31 dBm	PAEa	41	43	—	%
Digital Mode Power Added Efficiency	Po = 30 dBm	PAEd	37	40	—	%
Adjacent Channel Power *(4)*	Po ≤ 30 dBm	—	—	—	—	—
–30 kHz Offset	Po ≤ 30 dBm	ACP1	–27	–31	—	dBc
–60 kHz Offset	Po ≤ 30 dBm	ACP2	–46	–51	—	dBc
–90 kHz Offset	Po ≤ 30 dBm	ACP3	–50	–58		dBc
Harmonics			—	—	—	—
Second	Po ≤ 31 dBm	H2	—	–40	–30	dBc
Third	Po ≤ 31 dBm	H3	—	–40	–30	dBc
PA “Turn Off Time”	—	—	—	10	30	uS
PA “Turn On Time”	—	—	—	10	30	uS
Noise Power in RX Band 869-894 MHz*(5)*	Po ≤ –31 dBm	No	—	–132	—	dBm/Hz
Noise Figure	—	NF	—	5	7	dB
Input VSWR	—	—	—	2:1	—	—
Stability (Spurious output)*(3)*	5:1 VSWR All phases	S	—	–60	—	dBc
Ruggedness – No damage Po ≤ 31 dBm	No damage	Ru	8:1	—	—	VSWR

NOTE(S):

1. Vcc = +3.4 V, Vref = +3.1 V, FREQ’ = 824–849 MHz, Tc = –30 °C to +85 °C.
2. Min/Max values in table indicate performance over process corners and conditions specified in Note 1 unless otherwise detailed.

(3) Tc = 25 °C.

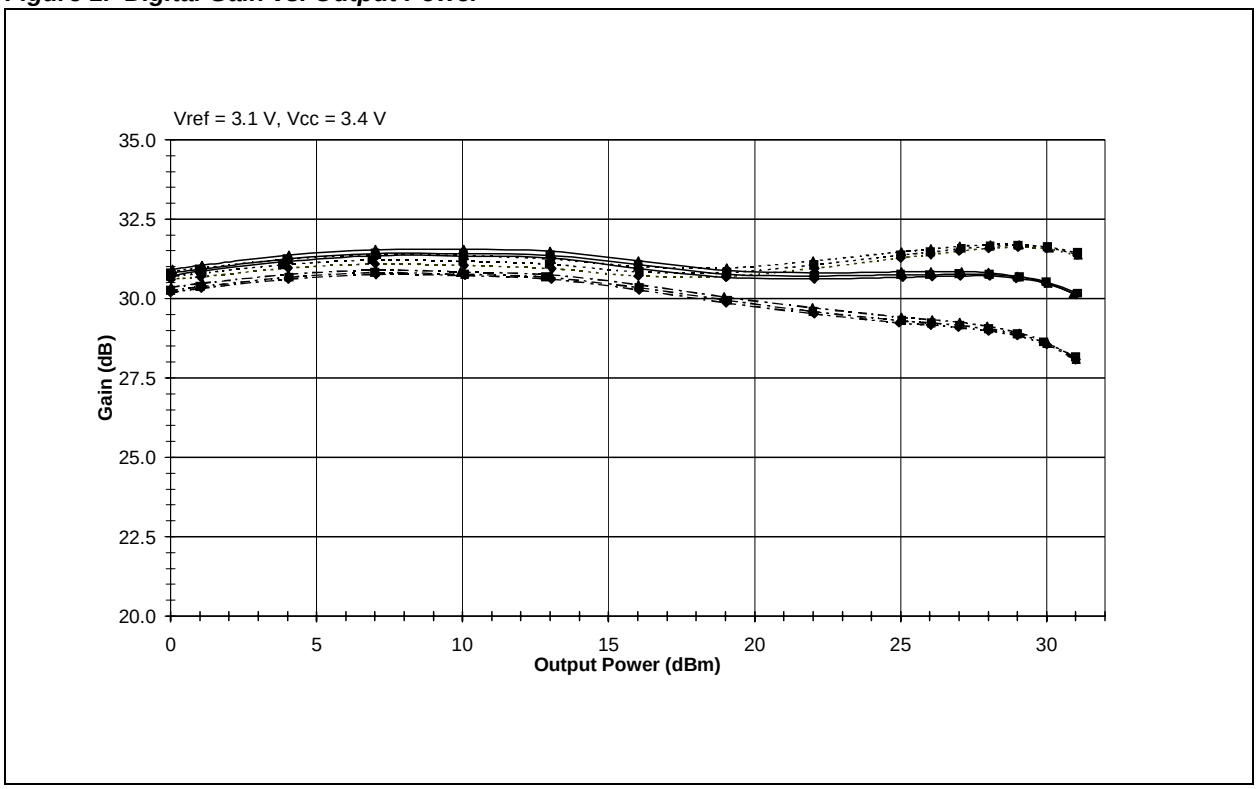
(4) Also meets same linearity for Po ≤ 28.5 dBm @ Vcc = +3.0 V and as further specified in Note 1.

(5) With NADC modulation applied. Tc = 25 ^{o}C

Characterization Data

The following graphs illustrate characteristics for a typical RM806 Power Amplifier. The amplifier was selected by characterizing a group of devices and selecting a part having average electrical performance both at nominal and worst case. Figures 1 through 5 illustrate the digital signal characteristics and Figures 6 through 9 illustrate the analog characteristics for the RM806.

Figure 1. Digital Gain vs. Output Power



Legend

824 MHz @ –30 °C	824 MHz @ +25 °C	824 MHz @ +85 °C
837 MHz @ –30 °C	837 MHz @ +25 °C	837 MHz @ +85 °C
849 MHz @ –30 °C	849 MHz @ +25 °C	849 MHz @ +85 °C

Figure 2. Digital Power Added Efficiency

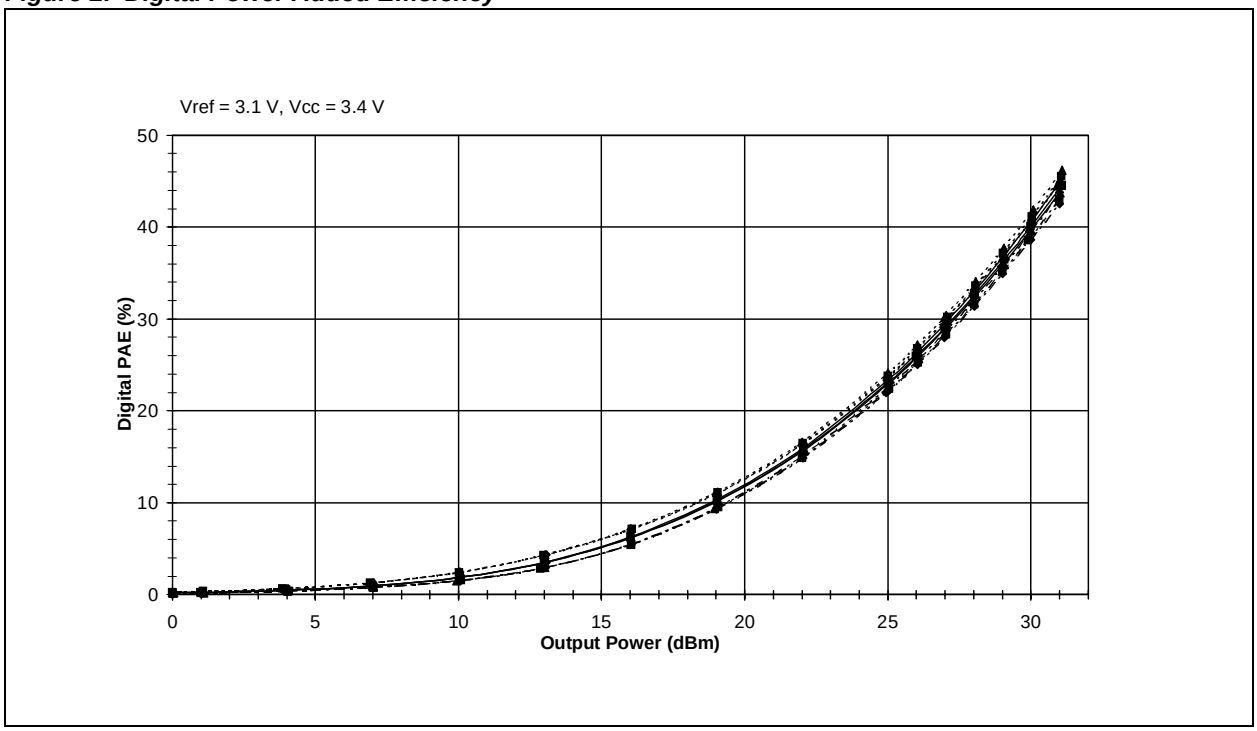
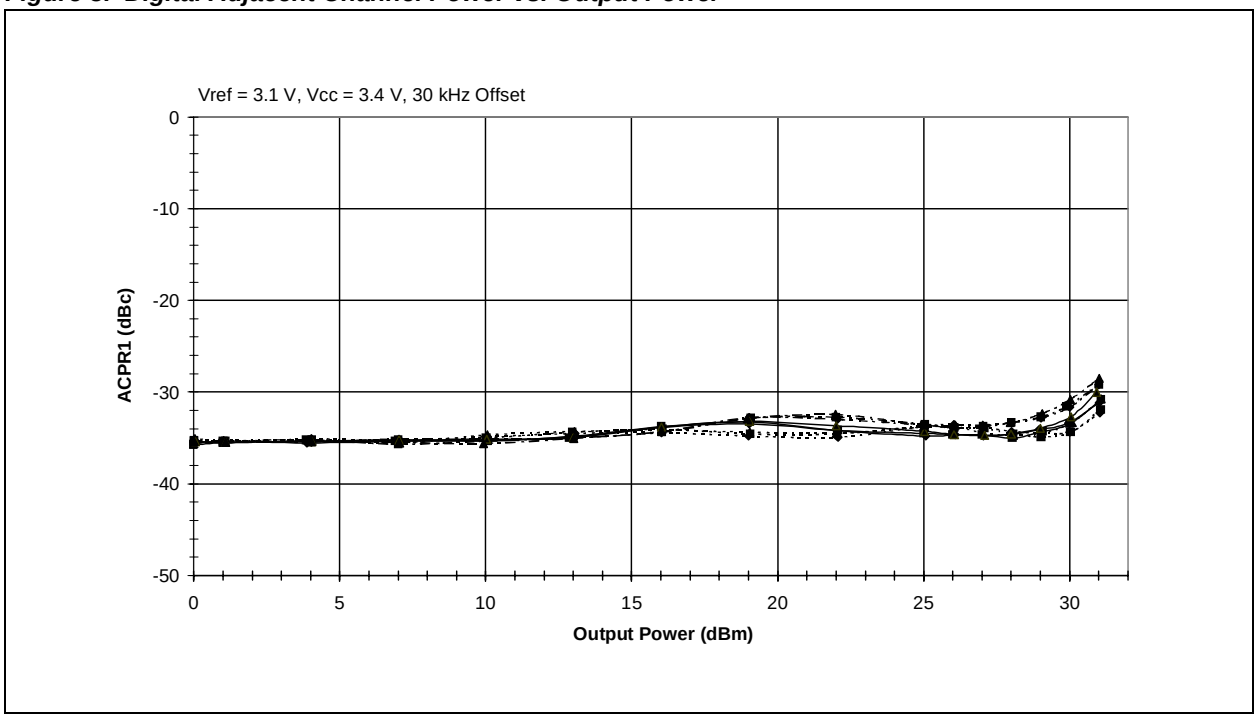


Figure 3. Digital Adjacent Channel Power vs. Output Power



Legend

824 MHz @ –30 °C	824 MHz @ +25 °C	824 MHz @ +85 °C
837 MHz @ –30 °C	837 MHz @ +25 °C	837 MHz @ +85 °C
849 MHz @ –30 °C	849 MHz @ +25 °C	849 MHz @ +85 °C

Figure 4. Digital Alternate1 Channel Power vs. Output Power

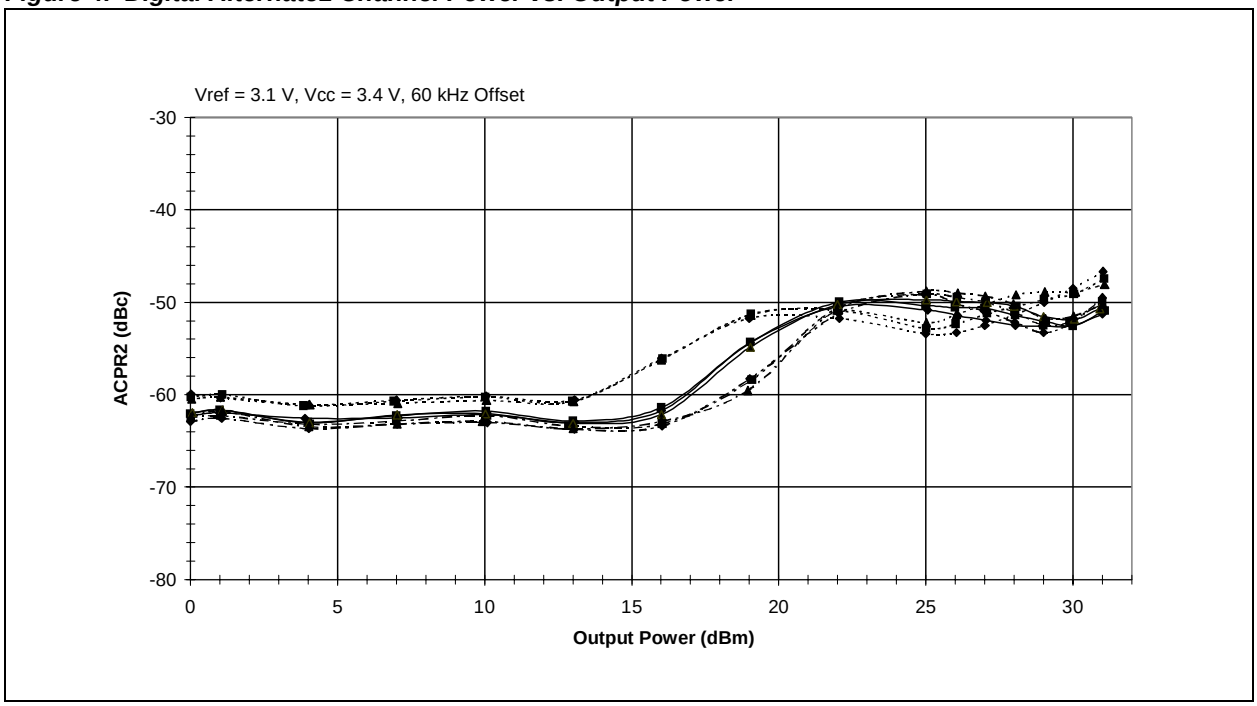
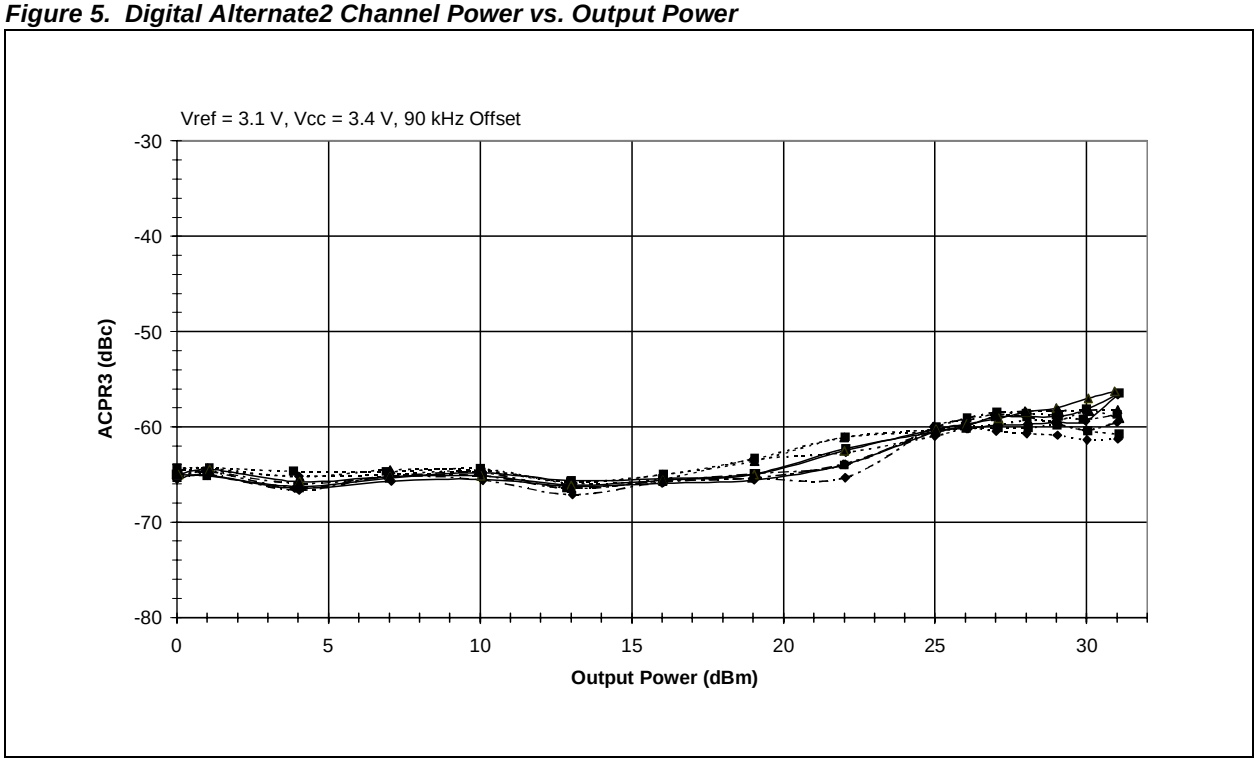


Figure 5. Digital Alternate2 Channel Power vs. Output Power



Legend

824 MHz @ –30 °C	824 MHz @ +25 °C	824 MHz @ +85 °C
837 MHz @ –30 °C	837 MHz @ +25 °C	837 MHz @ +85 °C
849 MHz @ –30 °C	849 MHz @ +25 °C	849 MHz @ +85 °C

Figure 6. Analog Gain vs. Output Power

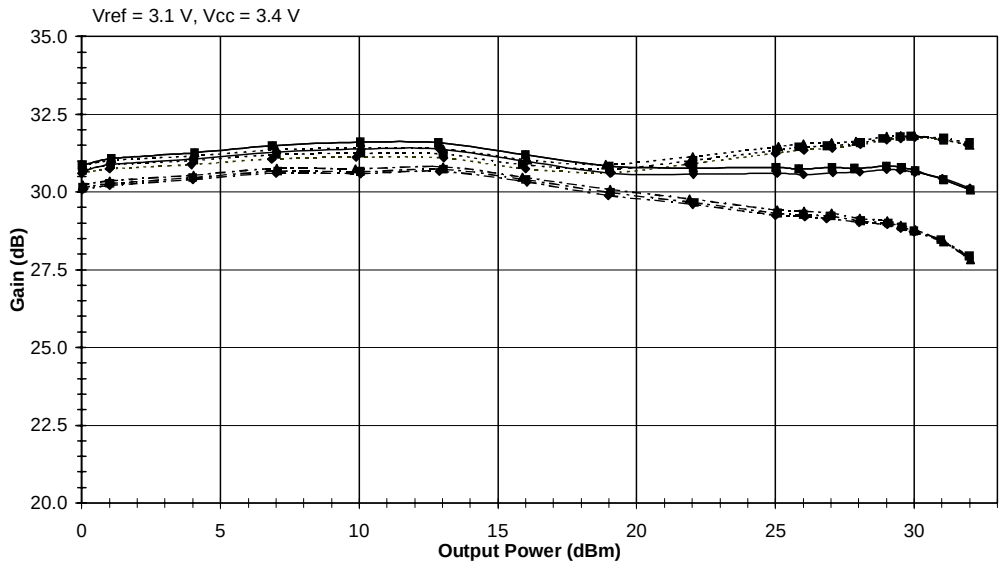
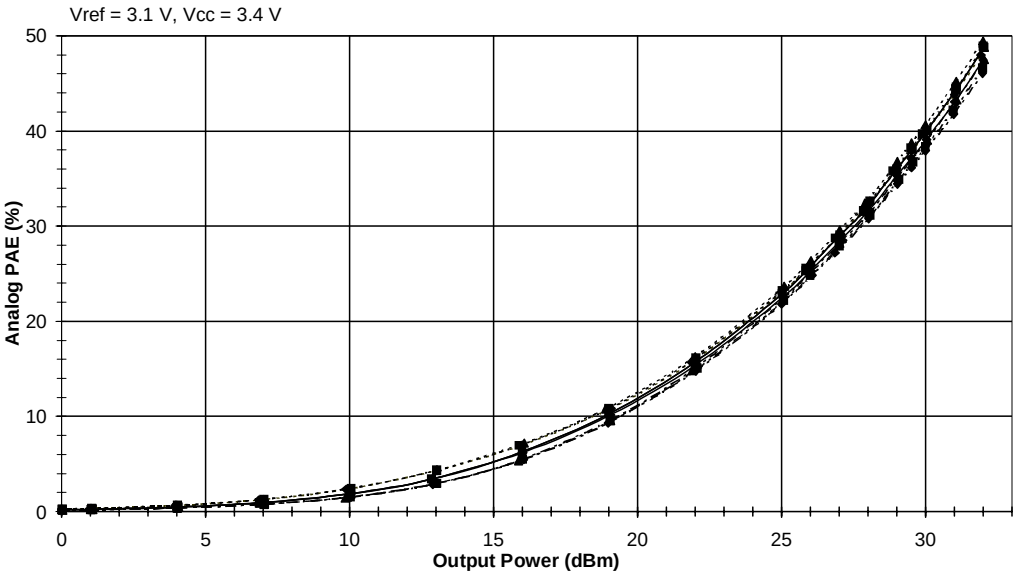


Figure 7. Analog Power Added Efficiency vs. Output Power



Legend

824 MHz @ –30 °C	824 MHz @ +25 °C	824 MHz @ +85 °C
837 MHz @ –30 °C	837 MHz @ +25 °C	837 MHz @ +85 °C
849 MHz @ –30 °C	849 MHz @ +25 °C	849 MHz @ +85 °C

Figure 8. Analog Second Order Harmonic

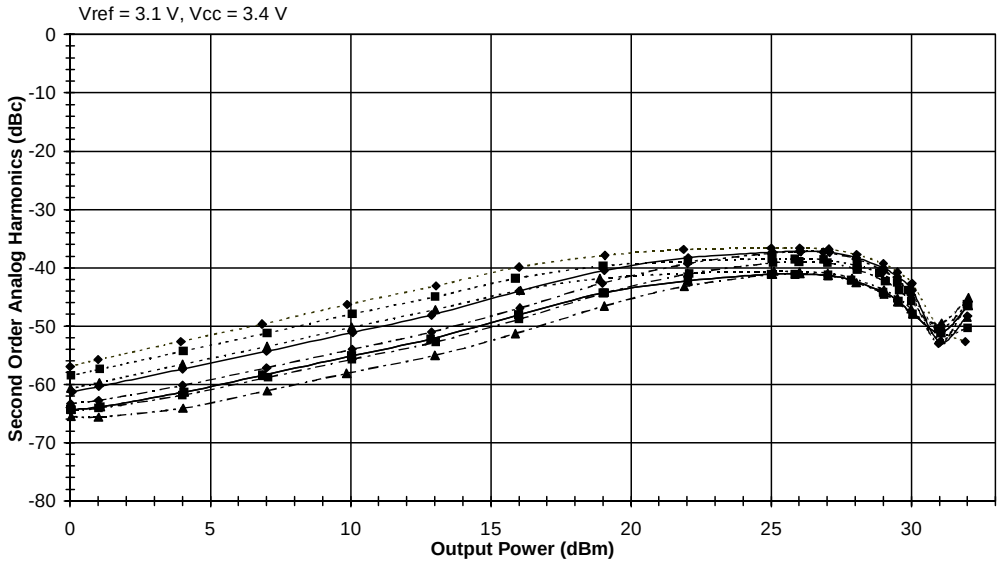
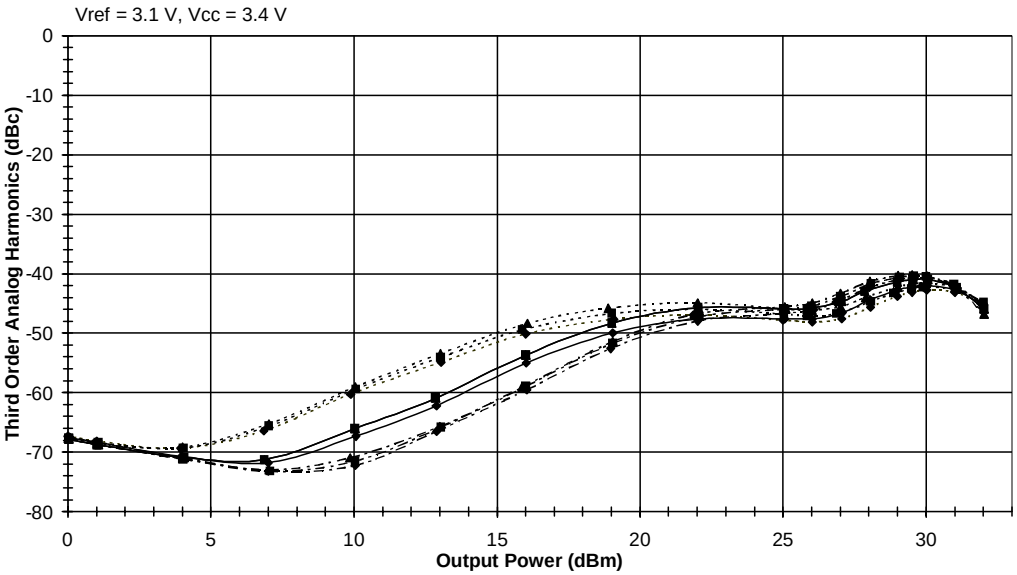


Figure 9. Analog Third Order Harmonic



Legend

824 MHz @ –30 °C	824 MHz @ +25 °C	824 MHz @ +85 °C
837 MHz @ –30 °C	837 MHz @ +25 °C	837 MHz @ +85 °C
849 MHz @ –30 °C	849 MHz @ +25 °C	849 MHz @ +85 °C

Package Dimensions and Pin Description

Figure 10. RM806 Package Drawing

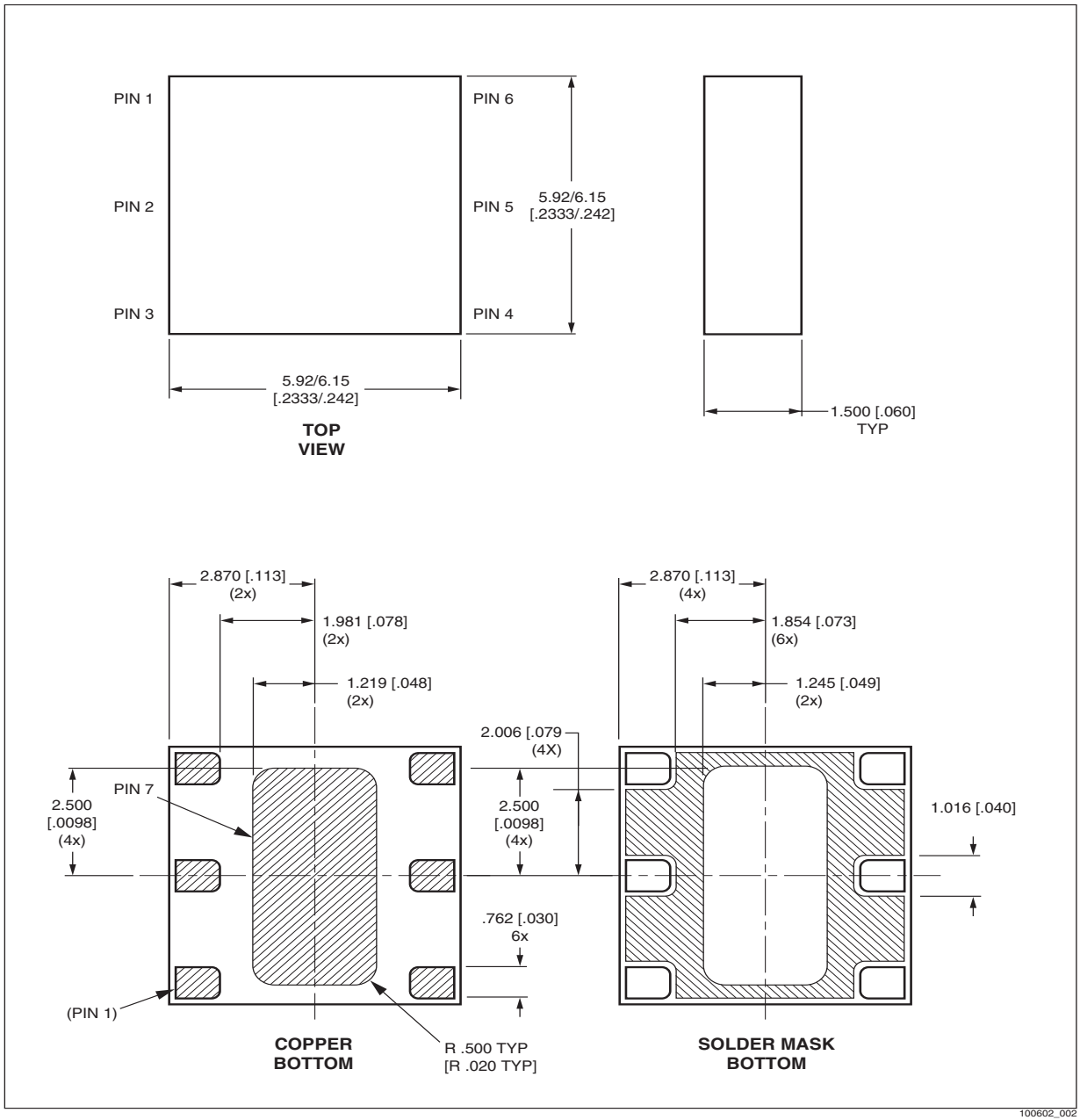


Table 4. Pin Description

Pin #	Function
1	VCC1[1]
2	RF Input
3	VREF
4	VCC2[1]
5	RF Output
6	GND
7	GND[2]

NOTE(S):
(1) All supply pins may be connected together at the supply.
(2) Package underside is GND.

Ordering Information

Model Number	Manufacturing Part Number	Product Revision	Package	Operating Temperature

Revision History

Revision	Level	Date	Description

Reader Response: Conexant strives to produce quality documentation and welcomes your feedback. Please send comments and suggestions to tech.pubs@conexant.com. For technical questions, contact your local Conexant sales office or field applications engineer.

Further Information
literature@conexant.com
(800) 854-8099 (North America)
(949) 483-6996 (International)
Printed in USA

World Headquarters
Conexant Systems, Inc.
4311 Jamboree Road
Newport Beach, CA
92660-3007
Phone: (949) 483-4600
Fax 1: (949) 483-4078
Fax 2: (949) 483-4391

Americas

U.S. Northwest/
Pacific Northwest – Santa Clara
Phone: (408) 249-9696
Fax: (408) 249-7113

U.S. Southwest – Los Angeles
Phone: (805) 376-0559
Fax: (805) 376-8180

U.S. Southwest – Orange County
Phone: (949) 483-9119
Fax: (949) 483-9090

U.S. Southwest – San Diego
Phone: (858) 713-3374
Fax: (858) 713-4001

U.S. North Central – Illinois
Phone: (630) 773-3454
Fax: (630) 773-3907

U.S. South Central – Texas
Phone: (972) 733-0723
Fax: (972) 407-0639

U.S. Northeast – Massachusetts
Phone: (978) 367-3200
Fax: (978) 256-6868

U.S. Southeast – North Carolina
Phone: (919) 858-9110
Fax: (919) 858-8669

U.S. Southeast – Florida/
South America
Phone: (727) 799-8406
Fax: (727) 799-8306

U.S. Mid-Atlantic – Pennsylvania
Phone: (215) 244-6784
Fax: (215) 244-9292

Canada – Ontario
Phone: (613) 271-2358
Fax: (613) 271-2359

Europe

Europe Central – Germany
Phone: +49 89 829-1320
Fax: +49 89 834-2734

Europe North – England
Phone: +44 1344 486444
Fax: +44 1344 486555

Europe – Israel/Greece
Phone: +972 9 9524000
Fax: +972 9 9573732

Europe South – France
Phone: +33 1 41 44 36 51
Fax: +33 1 41 44 36 90

Europe Mediterranean – Italy
Phone: +39 02 93179911
Fax: +39 02 93179913

Europe – Sweden
Phone: +46 (0) 8 5091 4319
Fax: +46 (0) 8 590 041 10

Europe – Finland
Phone: +358 (0) 9 85 666 435
Fax: +358 (0) 9 85 666 220

Asia – Pacific

Taiwan
Phone: (886-2) 2-720-0282
Fax: (886-2) 2-757-6760

Australia
Phone: (61-2) 9869 4088
Fax: (61-2) 9869 4077

China – Central
Phone: 86-21-6361-2515
Fax: 86-21-6361-2516

China – South
Phone: (852) 2 827-0181
Fax: (852) 2 827-6488

China – South (Satellite)
Phone: (86) 755-5182495

China – North
Phone: (86-10) 8529-9777
Fax: (86-10) 8529-9778

India
Phone: (91-11) 692-4789
Fax: (91-11) 692-4712

Korea
Phone: (82-2) 565-2880
Fax: (82-2) 565-1440

Korea (Satellite)
Phone: (82-53) 745-2880
Fax: (82-53) 745-1440

Singapore
Phone: (65) 737 7355
Fax: (65) 737 9077

Japan
Phone: (81-3) 5371 1520
Fax: (81-3) 5371 1501