

# 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  $\Omega$  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.

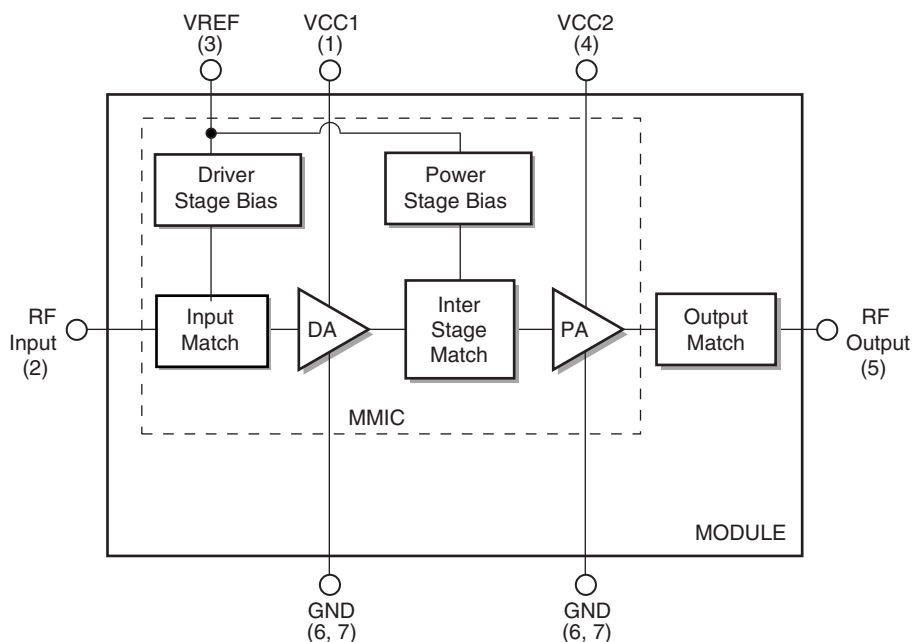
### Distinguishing Features

- 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<sup>(1)</sup>**

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
<b>NOTE(S):</b> (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	$P_o \leq 32$ dBm	I <sub>ref</sub>	—	6	9	mA
Leakage current	PA Off	—	—	2	25	uA
Gain	$P_o = 0$ dBm	G	27	31	—	dB
Gain	$P_o = 30$ dBm	G <sub>p</sub>	26	28	—	dB
Analog Mode Power Added Efficiency	$P_o = 31$ dBm	PAE <sub>a</sub>	41	43	—	%
Digital Mode Power Added Efficiency	$P_o = 30$ dBm	PAE <sub>d</sub>	37	40	—	%
Adjacent Channel Power <sup>(4)</sup>	$P_o \leq 30$ dBm	—	—	—	—	—
–30 kHz Offset	$P_o \leq 30$ dBm	ACP1	–27	–31	—	dBc
–60 kHz Offset	$P_o \leq 30$ dBm	ACP2	–46	–51	—	dBc
–90 kHz Offset	$P_o \leq 30$ dBm	ACP3	–50	–58	—	dBc
Harmonics			—	—	—	—
Second	$P_o \leq 31$ dBm	H2	—	–40	–30	dBc
Third	$P_o \leq 31$ 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 <sup>(5)</sup>	$P_o \leq -31$ dBm	No	—	–132	—	dBm/Hz
Noise Figure	—	NF	—	5	7	dB
Input VSWR	—	—	—	2:1	—	—
Stability (Spurious output) <sup>(3)</sup>	5:1 VSWR All phases	S	—	–60	—	dBc
Ruggedness – No damage $P_o \leq 31$ dBm	No damage	Ru	8:1	—	—	VSWR

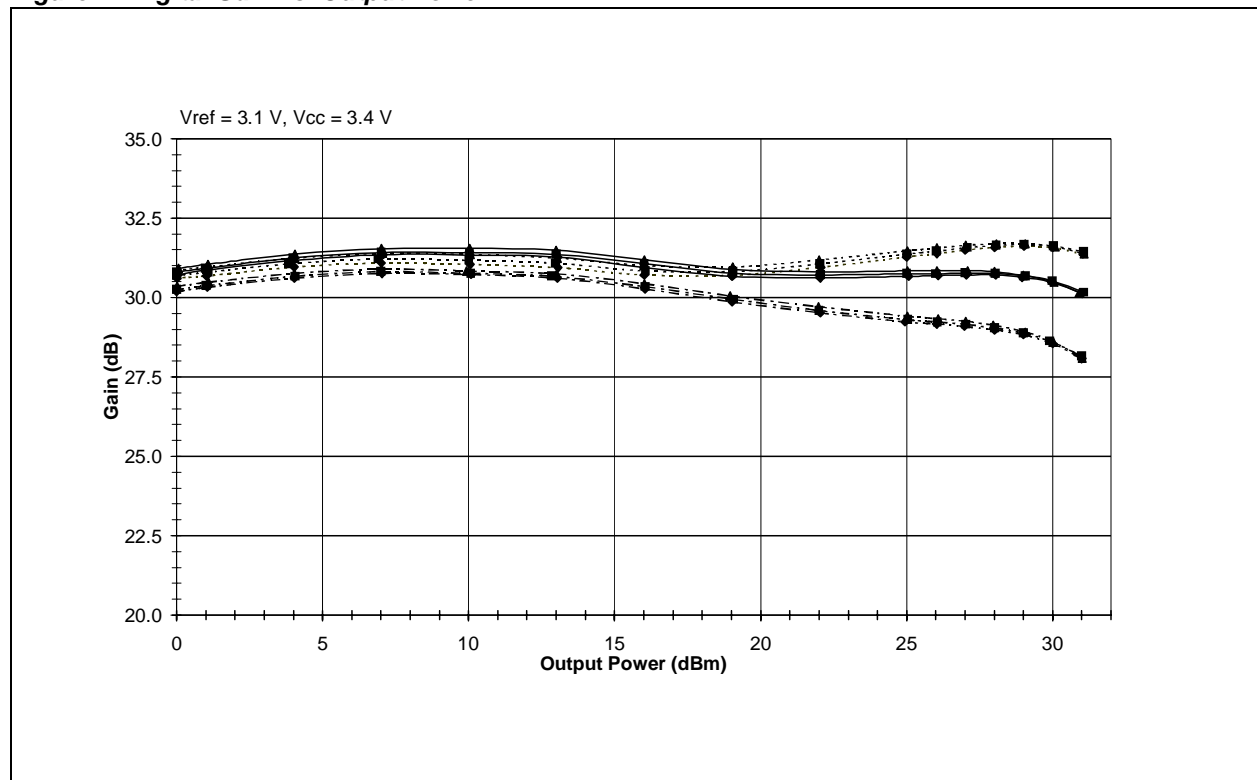
**NOTE(S):**

1.  $V_{cc} = +3.4$  V,  $V_{ref} = +3.1$  V,  $FREQ' = 824-849$  MHz,  $T_c = -30$  °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)  $T_c = 25$  °C.
- (4) Also meets same linearity for  $P_o \leq 28.5$  dBm @  $V_{cc} = +3.0$  V and as further specified in Note 1.
- (5) With NADC modulation applied.  $T_c = 25$  °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

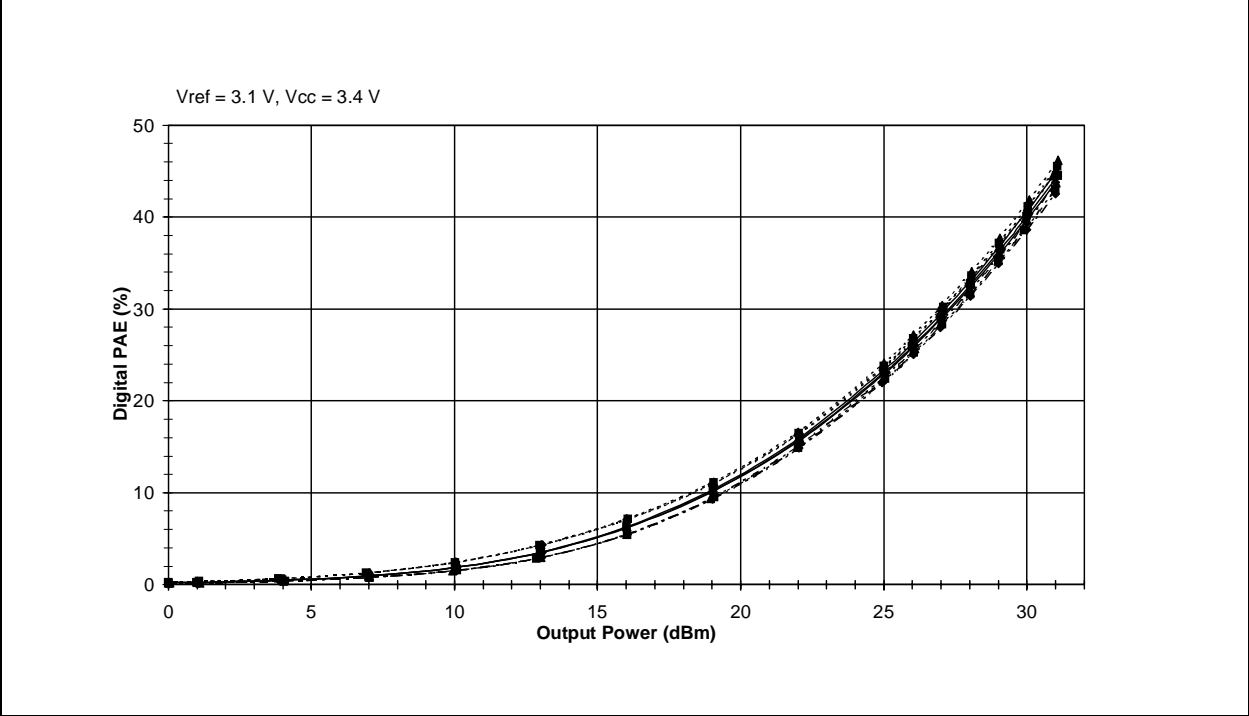
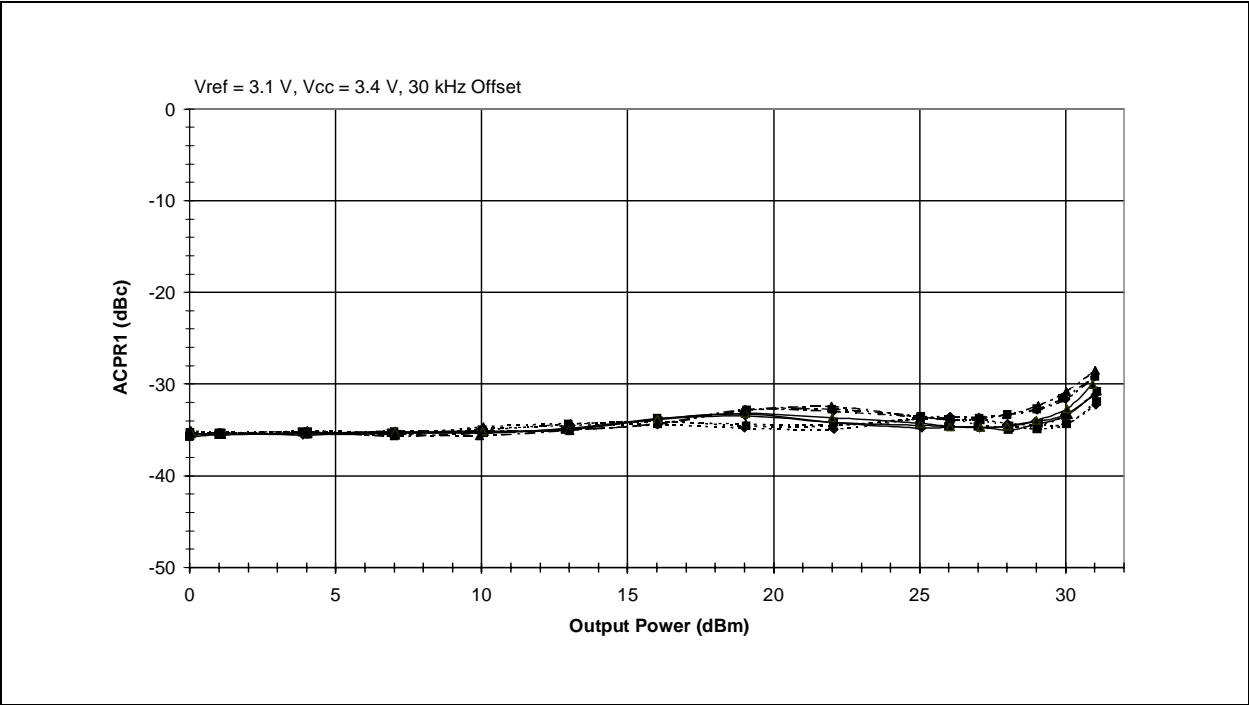
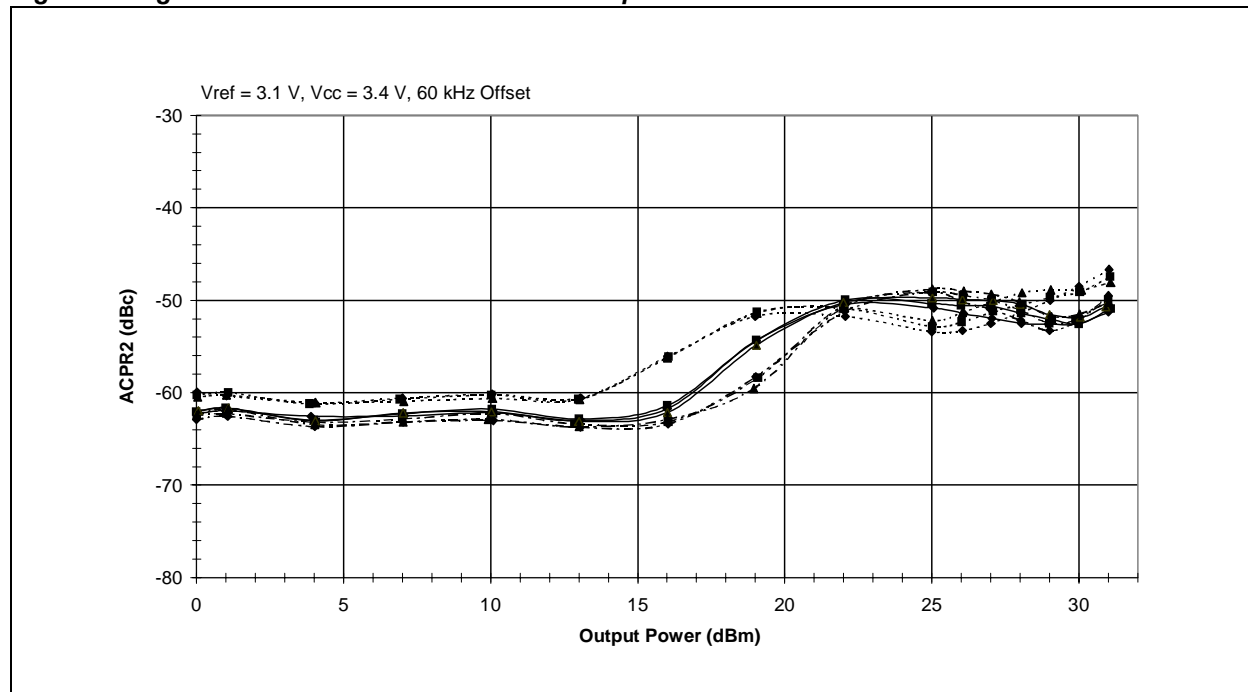
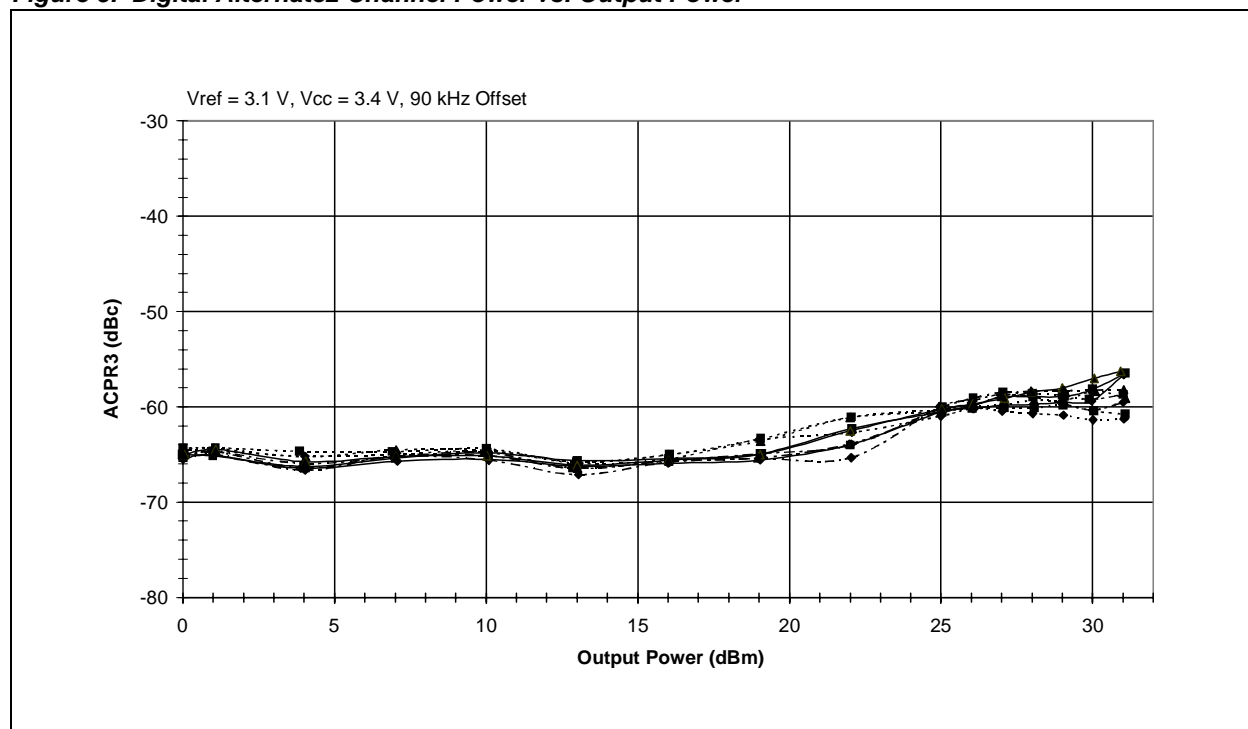


Figure 3. Digital Adjacent Channel Power vs. Output Power



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

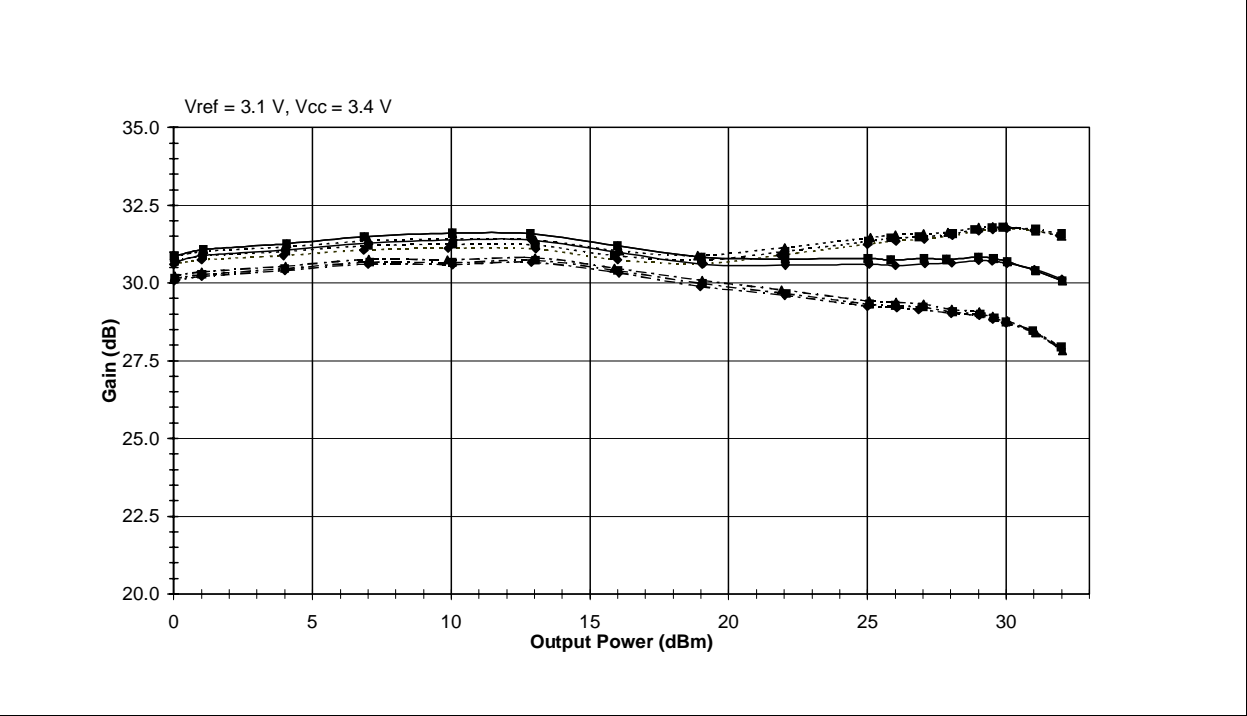
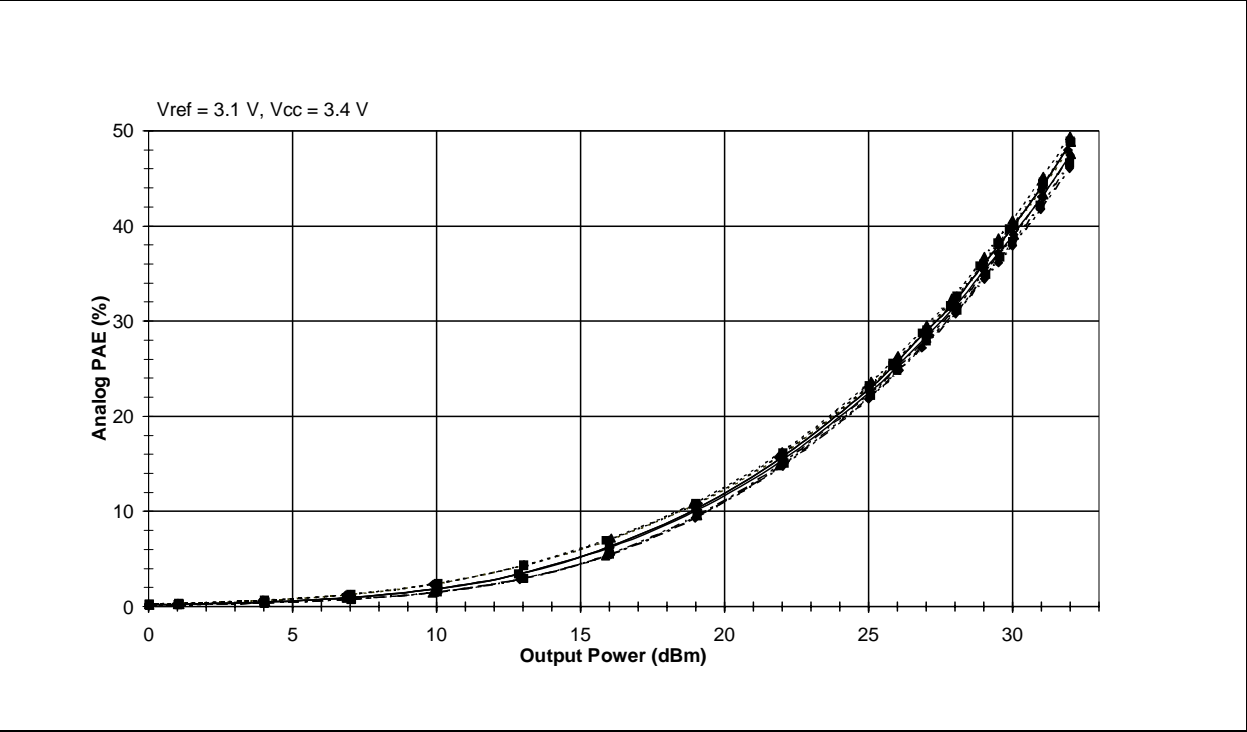
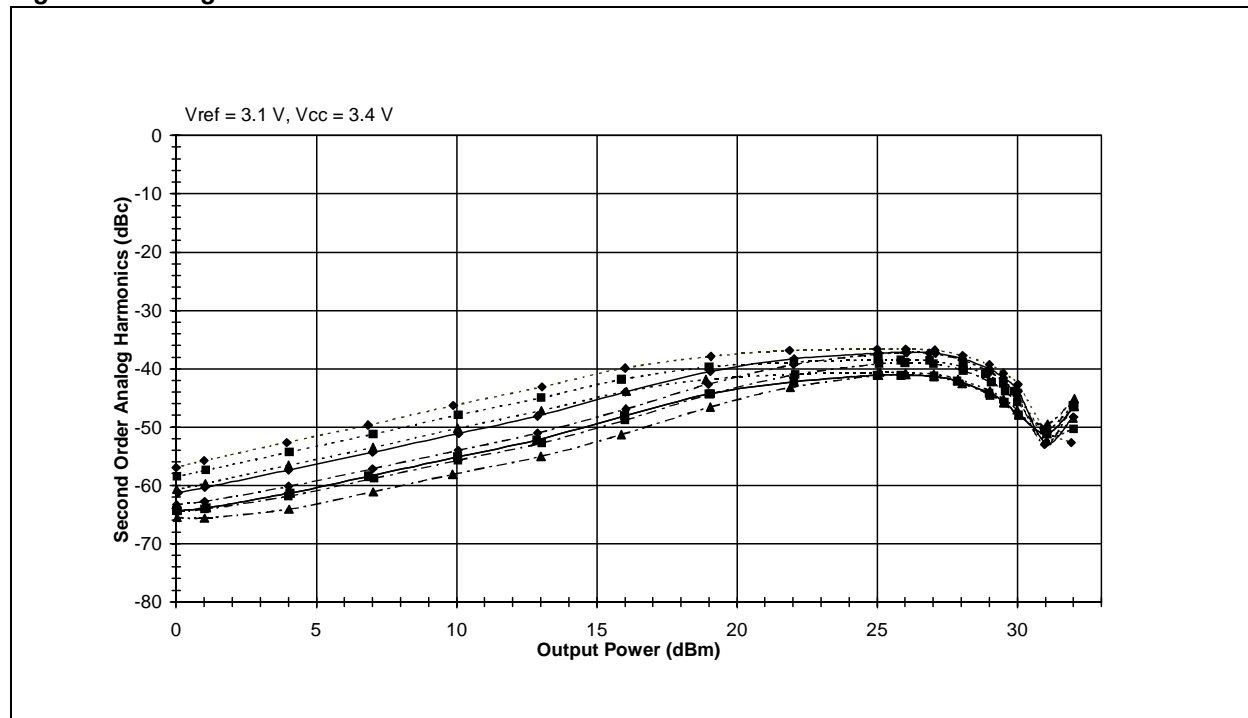
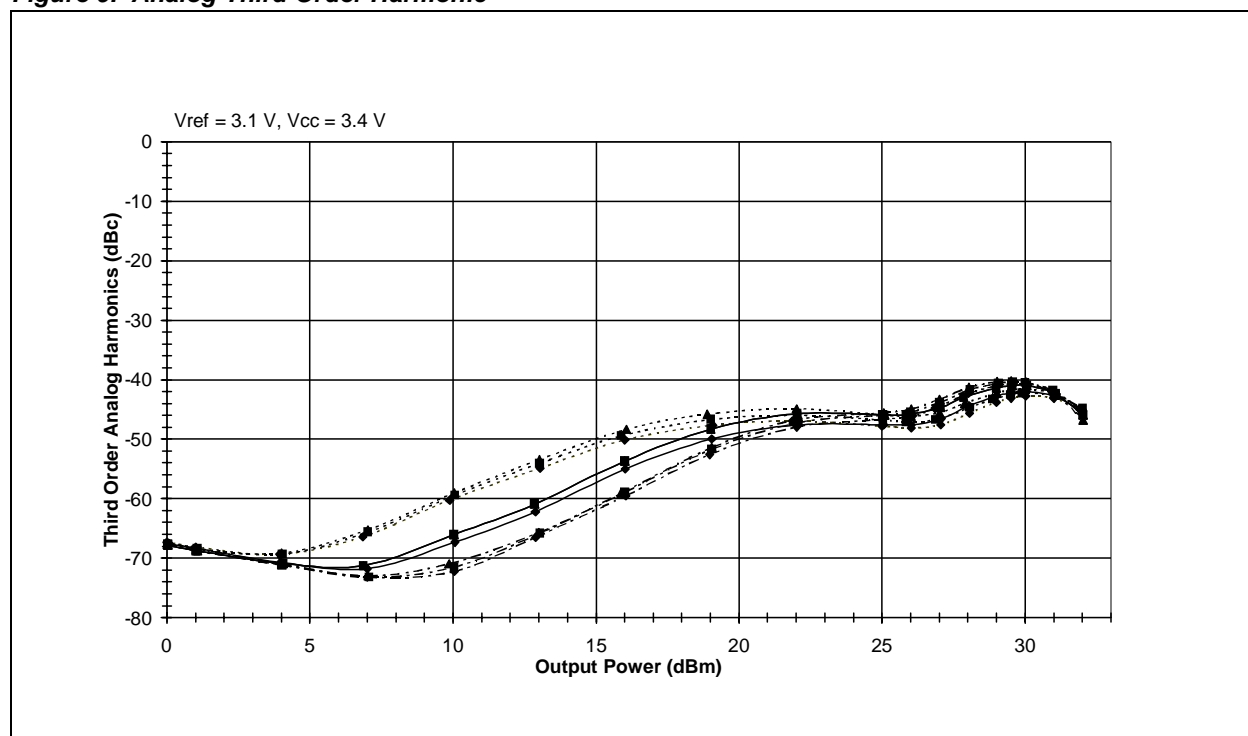


Figure 7. Analog Power Added Efficiency vs. Output Power



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

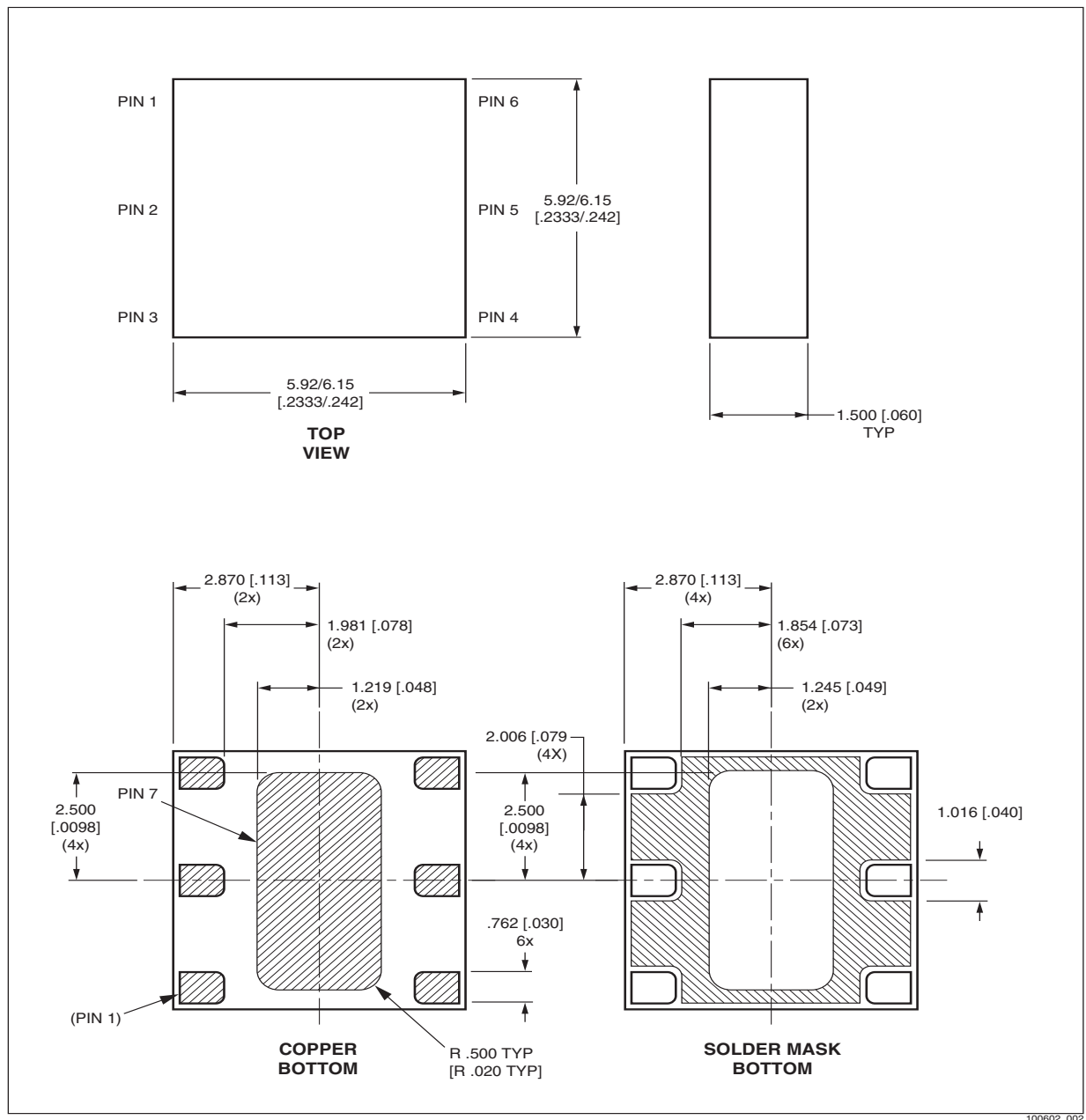
**Figure 8. Analog Second Order Harmonic****Figure 9. Analog Third Order Harmonic****Legend**

---◆---	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



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*TDMA/AMPS 3 to 4-Volt Power Amplifier (824—849 MHz)***Table 4. Pin Description**

Pin #	Function
1	VCC1 <sup>(1)</sup>
2	RF Input
3	VREF
4	VCC2 <sup>(1)</sup>
5	RF Output
6	GND
7	GND <sup>(2)</sup>
<b>NOTE(S):</b> <sup>(1)</sup> All supply pins may be connected together at the supply. <sup>(2)</sup> Package underside is GND.	

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## Ordering Information

Model Number	Manufacturing Part Number	Product Revision	Package	Operating Temperature

## Revision History

Revision	Level	Date	Description

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