

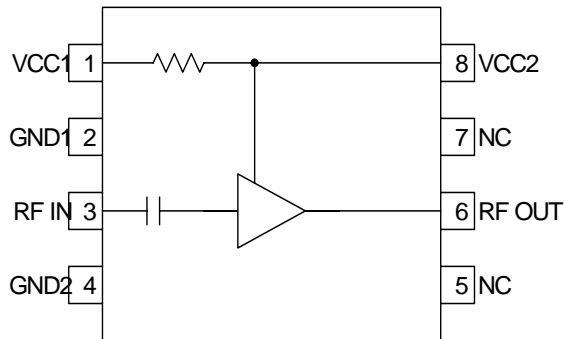
RoHS Compliant & Pb-Free Product   
 Package Style: MSOP-8

**Features**

- Low Noise and High Intercept Point
- External Bias Control
- Single 2.5V to 5.0V Power Supply
- 500MHz to 2500MHz Operation
- Extremely Small MSOP-8 Package

**Applications**

- TDMA/CDMA/FM Cellular Rx LNA
- TDMA/CDMA PCS Rx LNA
- Low Noise Transmit Driver Amplifier
- ISM Band LNA/Driver
- General Purpose Amplification
- Commercial and Consumer Systems



Functional Block Diagram

**Product Description**

The RF2442 is a low noise amplifier with a very high dynamic range designed for the receive front end of digital cellular applications at 900MHz, 1900MHz, and 2400MHz. It is designed to amplify low level signals with minimum noise contribution while operating in the harsh, interference-rich environments of newly deployed digital subscriber units. The device also functions as an outstanding PA driver amplifier in the transmit chain of digital subscriber units where low transmit noise power is a concern. The device supports trade-offs between linearity and current drain. The designer has control of these trade-offs with the choice of an external bias resistor. The IC is featured in a standard miniature 8-lead plastic MSOP package.

**Ordering Information**

RF2442	High-Linearity Low Noise Amplifier
RF2442 PCBA-L	Fully Assembled Evaluation Board (~900MHz)
RF2442 PCBA-M	Fully Assembled Evaluation Board (~1900MHz)
RF2442 PCBA-H	Fully Assembled Evaluation Board (~2400MHz)

**Optimum Technology Matching® Applied**

- |  |                                      |                                     |                                   |
|--|--------------------------------------|-------------------------------------|-----------------------------------|
| <input checked="" type="checkbox"/> GaAs HBT | <input type="checkbox"/> SiGe BiCMOS | <input type="checkbox"/> GaAs pHEMT | <input type="checkbox"/> GaN HEMT |
| <input type="checkbox"/> GaAs MESFET         | <input type="checkbox"/> Si BiCMOS   | <input type="checkbox"/> Si CMOS    |                                   |
| <input type="checkbox"/> InGaP HBT           | <input type="checkbox"/> SiGe HBT    | <input type="checkbox"/> Si BJT     |                                   |

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## Absolute Maximum Ratings

Parameter	Rating	Unit
Supply Voltage	-0.5 to +6.0	V <sub>DC</sub>
Input RF Level	+10	dBm
Operating Ambient Temperature	-40 to +85	°C
Storage Temperature	-40 to +150	°C



**Caution!** ESD sensitive device.

Exceeding any one or a combination of the Absolute Maximum Rating conditions may cause permanent damage to the device. Extended application of Absolute Maximum Rating conditions to the device may reduce device reliability. Specified typical performance or functional operation of the device under Absolute Maximum Rating conditions is not implied.

RoHS status based on EU Directive 2002/95/EC (at time of this document revision).

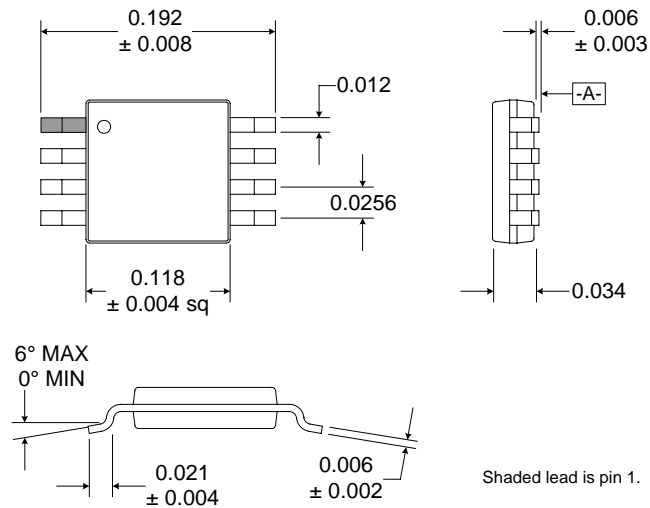
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Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
<b>Overall</b>					
RF Frequency Range		500 to 2500		MHz	Requires input tuning inductor below 1GHz
<b>881MHz Performance</b>					Schematic Evaluation Board L (R <sub>C</sub> =0), T=25 °C, RF=881MHz
Gain	18	20	22	dB	V <sub>CC</sub> =3.6V
	17	19	21	dB	V <sub>CC</sub> =3.0V
	16	18	20	dB	V <sub>CC</sub> =2.5V
Output P1dB		+13		dBm	V <sub>CC</sub> =3.6V
		+11		dBm	V <sub>CC</sub> =3.0V
Output IP3	+21	+27		dBm	V <sub>CC</sub> =3.6V
	+16	+22		dBm	V <sub>CC</sub> =3.0V
	+10	+16		dBm	V <sub>CC</sub> =2.5V
Noise Figure		1.6	2.5	dB	V <sub>CC</sub> =3.6V
		1.5	2.5	dB	V <sub>CC</sub> =3.0V
		1.4	2.5	dB	V <sub>CC</sub> =2.5V
Reverse Isolation	22	24		dB	V <sub>CC</sub> =3.6V
	22	24		dB	V <sub>CC</sub> =3.0V
	21	23		dB	V <sub>CC</sub> =2.5V
<b>1960MHz Performance</b>					Schematic Evaluation Board M (R <sub>C</sub> =0), T=25 °C, RF=1960MHz
Gain	10	12	14	dB	V <sub>CC</sub> =3.6V
	10	12	14	dB	V <sub>CC</sub> =3.0V
	10	12	14	dB	V <sub>CC</sub> =2.5V
Output P1dB		+16		dBm	V <sub>CC</sub> =3.6V
		+13		dBm	V <sub>CC</sub> =3.0V
Output IP3	+20	+26		dBm	V <sub>CC</sub> =3.6V
	+15	+21		dBm	V <sub>CC</sub> =3.0V
	+9	+15		dBm	V <sub>CC</sub> =2.5V
Noise Figure		1.6	2.3	dB	V <sub>CC</sub> =3.6V
		1.5	2.1	dB	V <sub>CC</sub> =3.0V
		1.4	2.0	dB	V <sub>CC</sub> =2.5V
Reverse Isolation	18	20		dB	V <sub>CC</sub> =3.6V

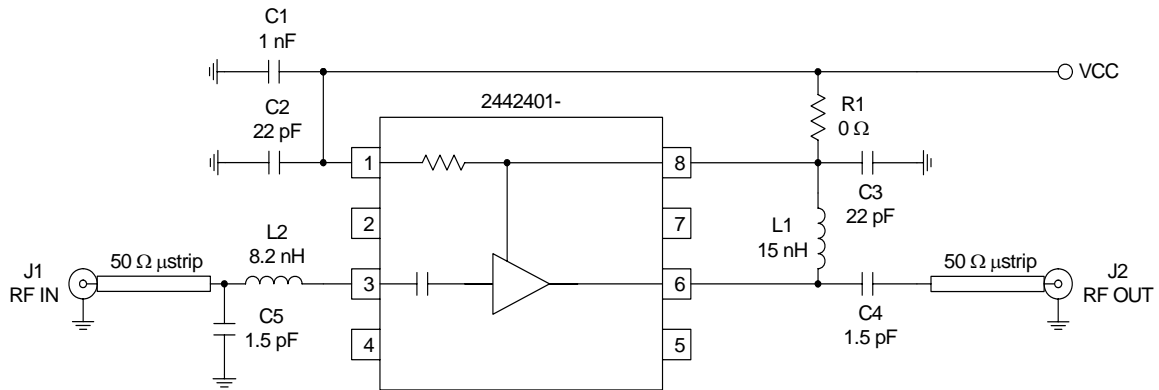
Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
<b>1960MHz Performance, cont.</b>					
	17	19		dB	V <sub>CC</sub> =3.0V
	17	19		dB	V <sub>CC</sub> =2.5V
<b>2400 MHz Performance</b>					Schematic Evaluation Board H (R <sub>C</sub> =0), T=25 °C, RF=2400MHz
Gain	7	9	11	dB	V <sub>CC</sub> =3.6V
	7	9	11	dB	V <sub>CC</sub> =3.0V
	6	8	10	dB	V <sub>CC</sub> =2.5V
Output IP3	+20	+26		dBm	V <sub>CC</sub> =3.6V
	+15	+21		dBm	V <sub>CC</sub> =3.0V
	+9	+15		dBm	V <sub>CC</sub> =2.5V
Noise Figure		1.6	2.5	dB	V <sub>CC</sub> =3.6V
		1.5	2.3	dB	V <sub>CC</sub> =3.0V
		1.4	2.1	dB	V <sub>CC</sub> =2.5V
Reverse Isolation	16	17		dB	V <sub>CC</sub> =3.6V
	16	17		dB	V <sub>CC</sub> =3.0V
	16	17		dB	V <sub>CC</sub> =2.5V
<b>Power Supply</b>					T=25 °C
Voltage		2.5 to 5.0		V	
Current Consumption	17	19	30	mA	V <sub>CC</sub> =3.6V
	10	12	23	mA	V <sub>CC</sub> =3.0V
	7	9	20	mA	V <sub>CC</sub> =2.5V

Pin	Function	Description	Interface Schematic
1	VCC1	Supply voltage for the LNA. External RF and IF bypassing is required. The trace length between the pin and the bypass capacitors should be minimized. The ground side of the bypass capacitors should connect immediately to ground plane. This pin connects to pin 8 through a 150Ω resistor. This allows for simple biasing of the collector at pin 6. Refer to Application Schematics 1 and 3.	
2	GND1	Ground connection. For best performance, keep traces physically short and connect immediately to ground plane.	
3	RF IN	RF input pin. This pin is internally DC-blocked and matched to 50Ω for frequencies above 1GHz. When using below 1GHz, it is recommended that this pin be matched with series inductance to series-resonate out the internal blocking capacitor. Refer to Application Schematics 1 and 2.	
4	GND2	Ground connection. For best performance, keep traces physically short and connect immediately to ground plane.	
5	NC	No connection. This pin is typically left unconnected or grounded.	
6	RF OUT	LNA Output pin. This pin is an open-collector output. It must be biased to either V <sub>CC</sub> or pin 8 through a choke or matching inductor. This pin is typically matched to 50Ω with a shunt bias/matching inductor and series blocking/matching capacitor. Refer to application schematics.	See pin 3.
7	NC	No connection. This pin is typically left unconnected or grounded.	
8	VCC2	Optional power supply connection for biasing pin 6. This pin connects to pin 1 through a 150Ω resistor. This allows for simple biasing of the collector at pin 6. When used, this pin should be RF bypassed. Refer to Application Schematics 1 and 3.	See pin 1.

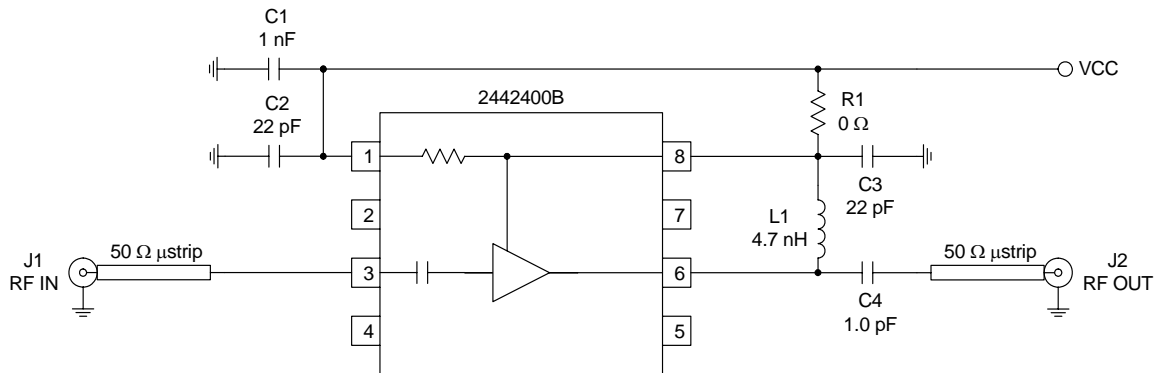
## Package Drawing



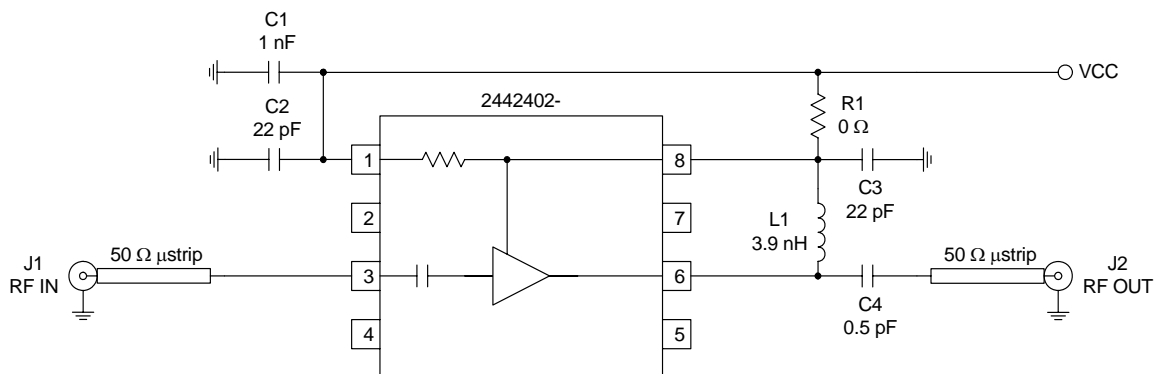
**Evaluation Board Schematic (L board)  
~900 MHz**



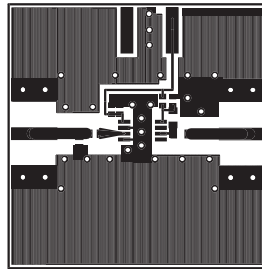
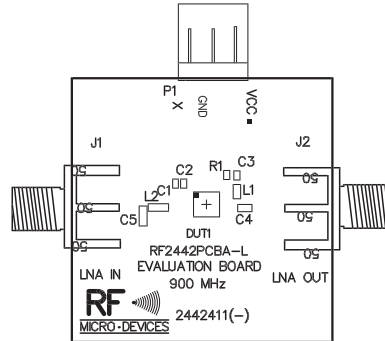
**Evaluation Board Schematic (M board)  
~1900 MHz**



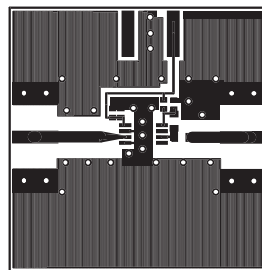
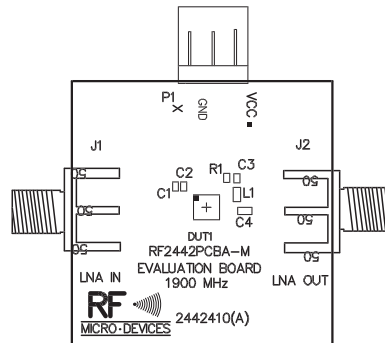
**Evaluation Board Schematic (H board)  
~2400 MHz**



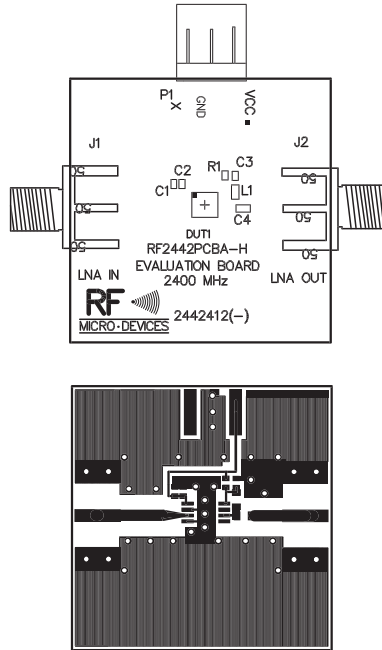
## Evaluation Board Layout 900 MHz Board Size 1.150" x 1.165"



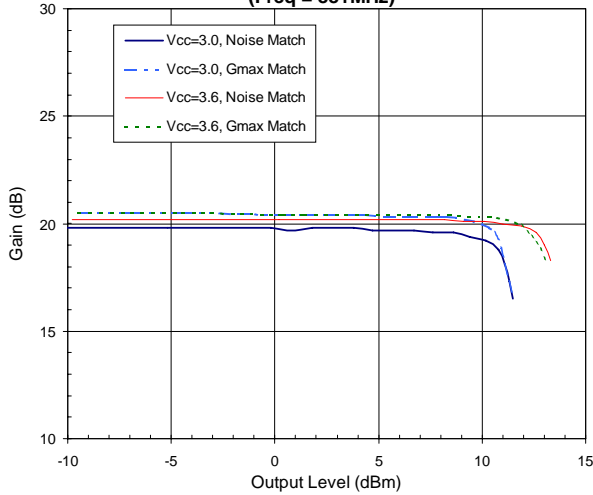
## Evaluation Board Layout 1900 MHz Board Size 1.150" x 1.165"



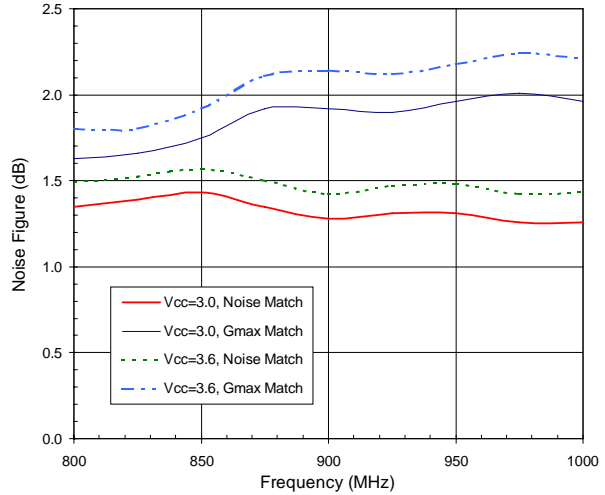
**Evaluation Board Layout 2400MHz  
Board Size 1.150" x 1.165"**



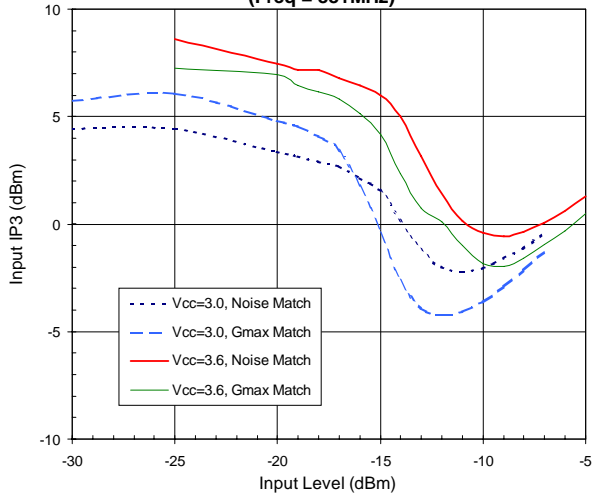
**Gain vs. Output Level**  
(Freq = 881MHz)



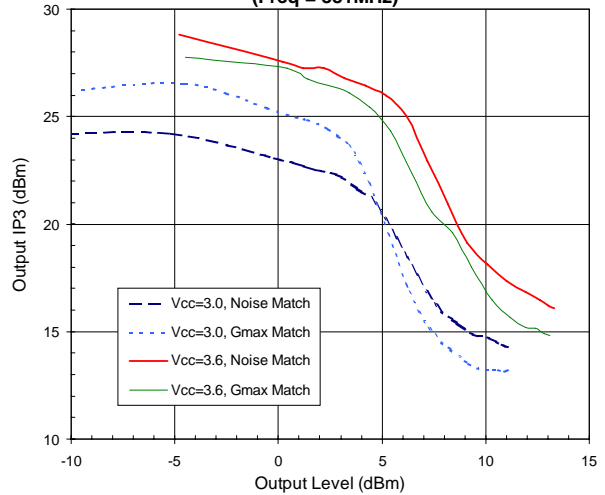
**Noise Figure vs. Frequency**



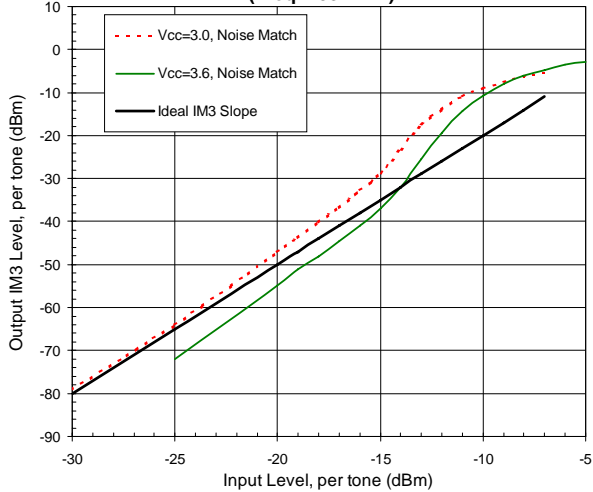
**Input IP3 vs. Input Level**  
(Freq = 881MHz)



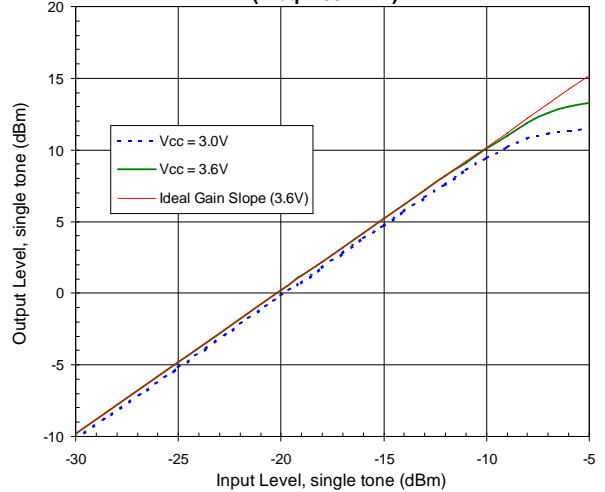
**Output IP3 vs. Output Level**  
(Freq = 881MHz)



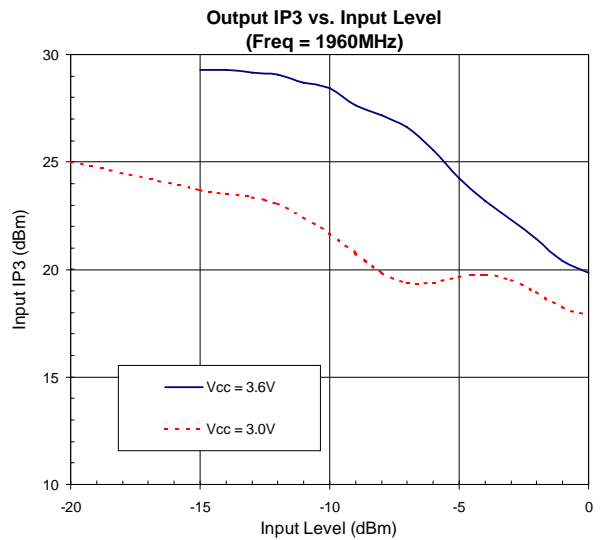
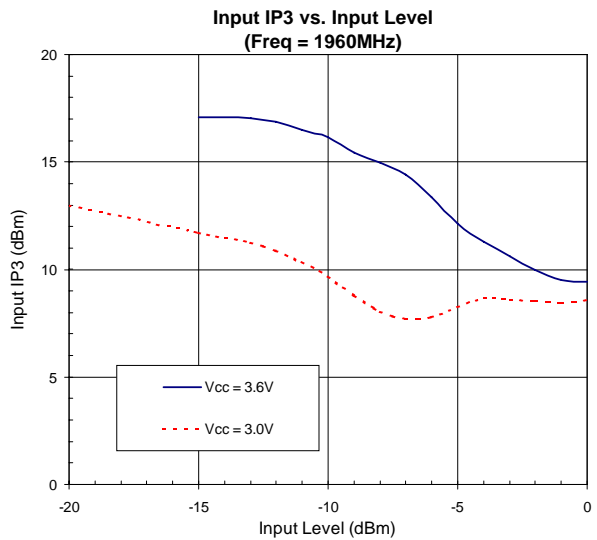
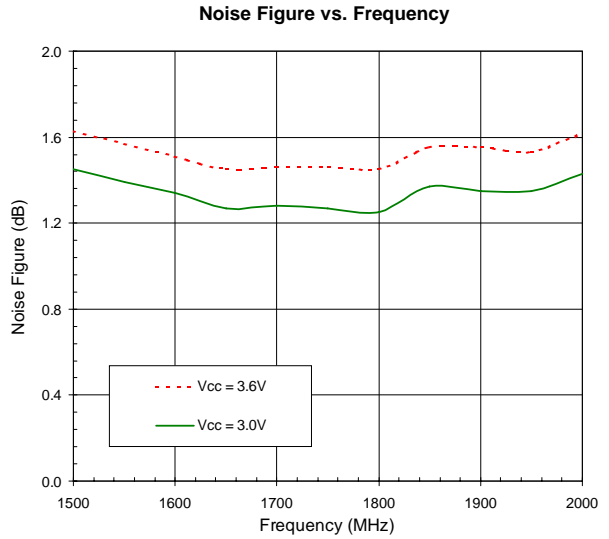
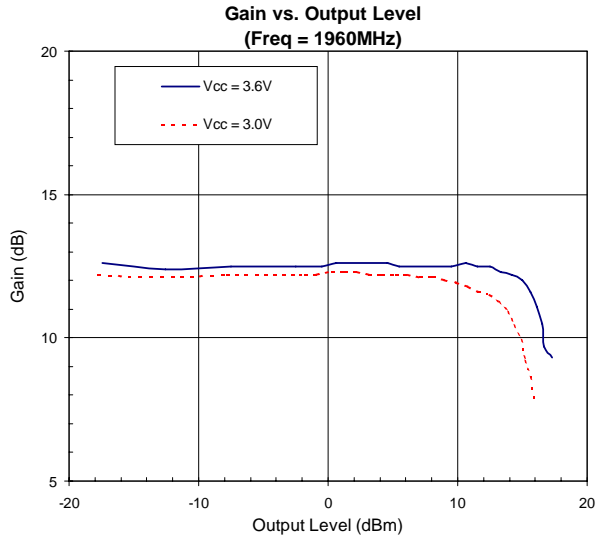
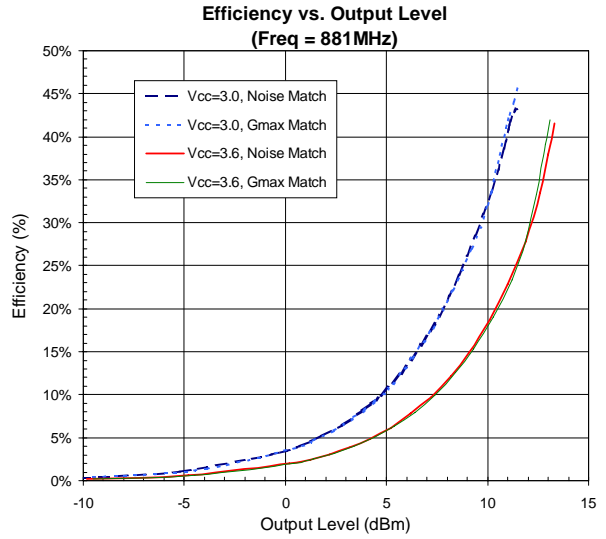
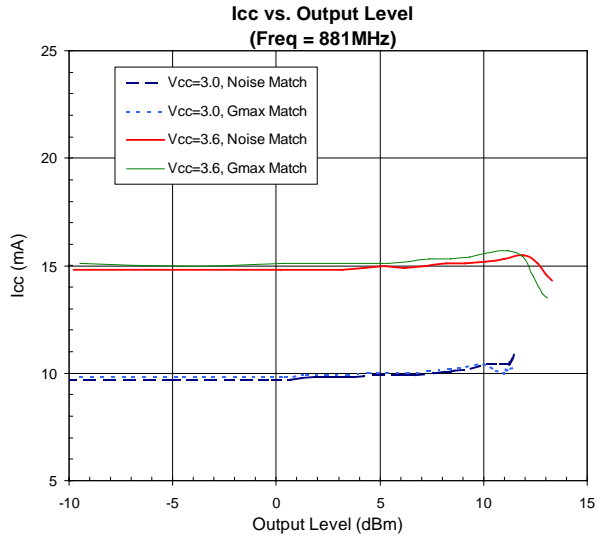
**Output IM3 Level vs. Input Level**  
(Freq = 881MHz)

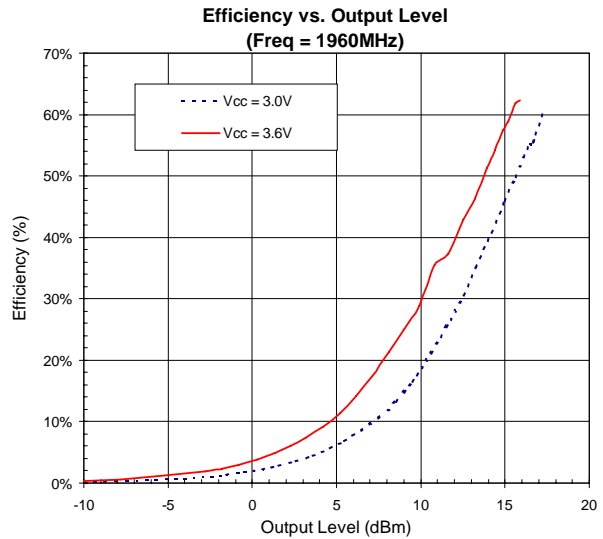
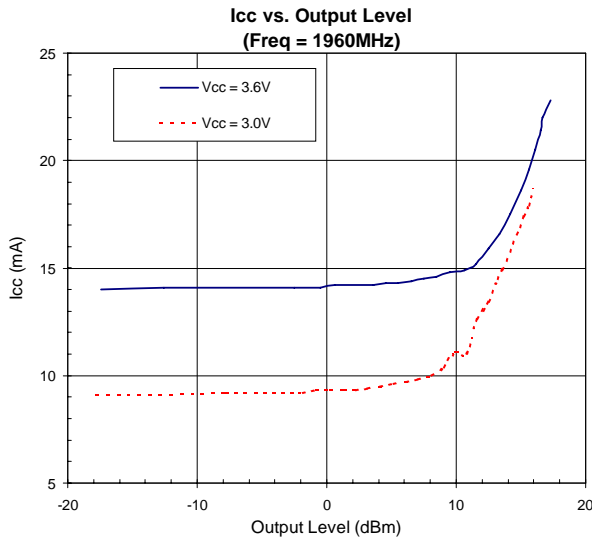
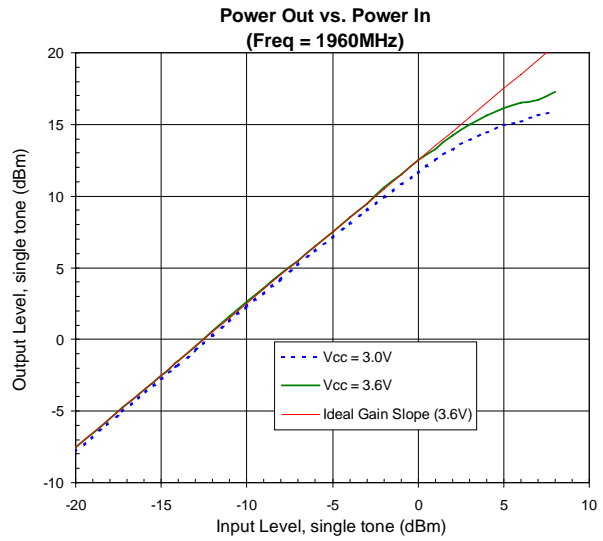
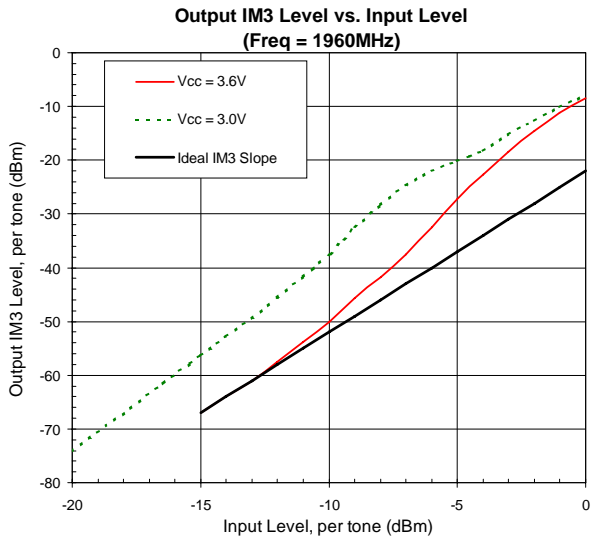


**Power Out vs. Power In**  
(Freq = 881MHz)









**RoHS\* Banned Material Content**

RoHS Compliant: Yes  
 Package total weight in grams (g): 0.025  
 Compliance Date Code: 0629  
 Bill of Materials Revision: -  
 Pb Free Category: e3

Bill of Materials	Parts Per Million (PPM)					
	Pb	Cd	Hg	Cr VI	PBB	PBDE
Die	0	0	0	0	0	0
Molding Compound	0	0	0	0	0	0
Lead Frame	0	0	0	0	0	0
Die Attach Epoxy	0	0	0	0	0	0
Wire	0	0	0	0	0	0
Solder Plating	0	0	0	0	0	0

**This RoHS banned material content declaration was prepared solely on information, including analytical data, provided to RFMD by its suppliers, and applies to the Bill of Materials (BOM) revision noted**

\* DIRECTIVE 2002/95/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment

