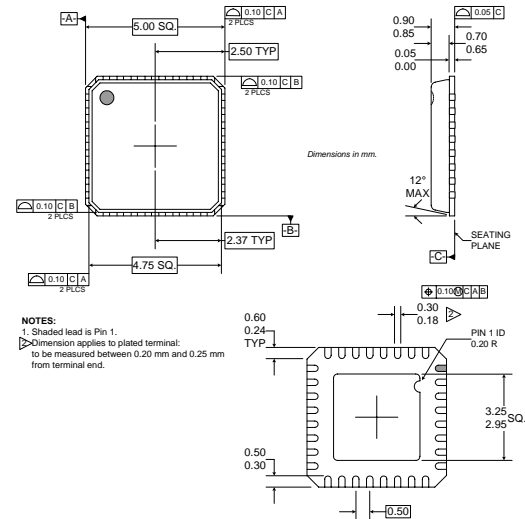


Typical Applications

- CDMA/Cellular/PCS/GPS Handsets
- CDMA450 Handsets/Data Cards
- JCDMA/GPS Handsets
- CDMA Modem Data Cards
- Commercial and Consumer Systems
- Portable Battery-Powered Equipment

Product Description

The RF2496 is a high performance CDMA tri-band/quad-mode integrated LNA/mixer with GPS capability. The device is designed to meet all IS-98 sensitivity, intermodulation and single-tone requirements. The RF2496 is designed for two state gain control solutions using a single control line for IS-98 IMD testing with 30dB of gain control for the PCS band and 17dB for the cellular band. The device offers a dedicated GPS LNA/mixer with 37dB of gain. Additionally, a divide-by-2 prescaler to allow the use of either a single- or dual-band VCO is integrated. There is also an integrated TX LO buffer. Off-chip bias current reference resistors are used for the mixer blocks to allow for minimum DC current consumption for a given application. The device is packaged in a plastic, 5mmx5mm QFN.



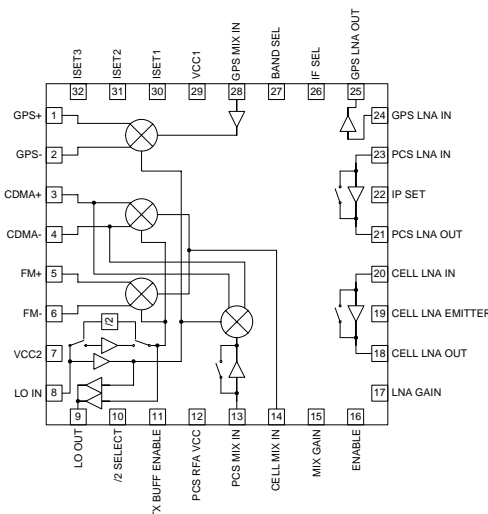
Optimum Technology Matching® Applied

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

Package Style: QFN, 32-Pin, 5x5

Features

- GPS Receive Front-End Gain=37dB
- Meets IMD Tests with Two Gain States/One Logic Control Line
- Adjustable Mixer Bias Current and IIP3
- Selectable Divide-by-2 Prescaler
- Integrated TX LO Buffer Amplifier



Functional Block Diagram

Ordering Information

RF2496 Tri-Band/Quad-Mode CDMA/GPS Low Noise Amplifier/Mixer
 RF2496 PCBA Fully Assembled Evaluation Board

RF Micro Devices, Inc.
 7628 Thorndike Road
 Greensboro, NC 27409, USA

Tel (336) 664 1233
 Fax (336) 664 0454
<http://www.rfmd.com>

RF2496

Absolute Maximum Ratings

Parameter	Rating	Unit
Supply Voltage	-0.5 to +5.0	V _{DC}
Input LO and RF Levels	+6	dBm
Operating Ambient Temperature	-40 to +85	°C
Storage Temperature	-40 to +150	°C



Caution! ESD sensitive device.

RF Micro Devices believes the furnished information is correct and accurate at the time of this printing. However, RF Micro Devices reserves the right to make changes to its products without notice. RF Micro Devices does not assume responsibility for the use of the described product(s).

Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
Overall					T = 25°C, V _{CC} = 2.75V
RF Frequency Range		800 to 900 1500 to 2200 1575.42		MHz MHz MHz	GPS band
IF Frequency Range	0.1		400	MHz	
Power Supply					
Supply Voltage	2.65	2.75	3.15	V	
Logic High	1.8			V	
Logic Low			0.4	V	
Power Down Current			10	µA	ENABLE=0
Cellular Band					Freq=869MHz to 894MHz
JCDMA Band					Freq=832MHz to 870MHz
LNA (On)					LNA 50Ω match
Gain	13.5 13.0	15.0 14.5	16.5 16.0	dB dB	IPSET=1 IPSET=0
Noise Figure		1.1 1.0	1.3 1.2	dB dB	IPSET=1 IPSET=0
Input IP3	+9.0 +5.0	+11.0 +11.0		dBm dBm	IPSET=1 IPSET=0
Current		6.5 4.5		mA mA	IPSET=1 IPSET=0
Isolation		23		dB	
LNA (Off)					
Gain	-4.0	-2.5	-1.8	dB	
Noise Figure		2.5	4.0	dB	
Input IP3	+20.0	+25.0		dBm	
Current		0		mA	
Isolation		2.5		dB	
Mixer - CDMA					LO IN=-4dBm See notes 1 and 2.
Gain	8.5	10.0	13.0	dB	
Noise Figure		9		dB	
Input IP3	+7.0	+8.0		dBm	
Current		16.5		mA	Mixer/LO Input Amps
LO Frequency Range	600		2300	MHz	High and Low Side LO Injection. See note 3 and 4.
IF Frequency Range	0.1	183.6	400	MHz	Typical IF frequencies: 85.38MHz, 109.80MHz, 111.85MHz, 183.6MHz
LO to RF Isolation	36			dB	

NOTE 1. Mixer performance can be changed with external IF load/tuning.

NOTE 2. Specifications apply for conditions of LO Divider enabled or disabled.

Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
Cellular Band/JCDMA Band, cont'd					
Mixer - FM/JCDMA					
Gain	11.5	13.0	15.0	dB	LO IN=-4dBm See notes 1 and 2. Mixer/LO Input Amps High and Low Side LO Injection. See note 3 and 4. Typical IF frequencies: 85.38MHz, 109.80MHz, 111.85MHz, 183.6MHz
Noise Figure		7.5	8.5	dB	
Input IP3	+2.0	+4.0		dBm	
Current		12.5		mA	
LO Frequency Range	600		2300	MHz	
IF Frequency Range	0.1	183.6	400	MHz	
LO to RF Isolation				dB	
Other					
LO-IF Isolation	30			dB	
RF-IF Isolation	40			dB	
LNA Out to Mixer In Isolation	40			dB	
LO-LNA In Isolation, Any State	35			dB	
US PCS Band					
Korean PCS Band					
Freq= 1930MHz to 1990MHz					
Freq= 1840MHz to 1870MHz					
LNA (On)					
Gain	14	16	17.5	dB	LNA 50Ω match IPSET=1 IPSET=0 IPSET=1 IPSET=0 IPSET=1 IPSET=0 IPSET=1 IPSET=0
	13	15	16.5	dB	
Noise Figure		1.5	1.8	dB	
		1.4	1.7	dB	
Input IP3	+6	+8.0		dBm	
	-2	+1.0		dBm	
Current		6.5		mA	
		4.5		mA	
Isolation		20		dB	
LNA (Off)					
Gain	-6	-4		dB	
Noise Figure		4		dB	
Input IP3	+20	+25		dBm	
Current		0		mA	
Isolation		4		dB	
Mixer					
Gain	11	13	15	dB	LO IN=-4dBm See note 1. Mixer Preamp ON Mixer Preamp OFF Mixer Preamp ON Mixer Preamp OFF Mixer Preamp ON Mixer Preamp OFF Mixer Preamp ON Mixer Preamp OFF Mixer Preamp ON/Mixer/LO Input Amps Mixer Preamp OFF/Mixer/LO Input Amps Mixer Preamp ON Mixer Preamp OFF High and Low Side LO Injection. See note 3 and 4. Typical IF frequencies: 85.38MHz, 109.80MHz, 111.85MHz, 183.6MHz
	1.0	3.0	4.5	dB	
Noise Figure		6.5	8.0	dB	
		15	17	dB	
Input IP3	+1.5	+3.5		dBm	
	+11.0	+13.0		dBm	
Current		17.5		mA	
		12.5		mA	
LO to RF Isolation	36			dB	
	30			dB	
LO Frequency Range	1600		2400	MHz	
IF Frequency Range	0.1	183.6	400	MHz	
Other					
LO-IF Isolation	36			dB	
RF-IF Isolation	40			dB	
LNA Out to Mixer In Isolation	30	40		dB	
LO-LNA In Isolation, Any State	35			dB	

RF2496

Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
GPS Band					Freq=1575.42MHz
LNA (On)					
Gain	17.0	18.5		dB	LNA 50Ω match
	16.0	18.0		dB	IPSET=1
Noise Figure		1.5	1.7	dB	IPSET=0
		1.5	1.7	dB	IPSET=1
Input IP3	+1.0	+3.0		dBm	IPSET=0
	-5.0	-2.0		dBm	IPSET=1
Current		6.5		mA	IPSET=0
		4.5		mA	IPSET=1
Isolation		20		dB	IPSET=0
Mixer					
Gain	16.0	18.0	20.5	dB	LO IN=-4dBm See note 1.
Noise Figure		5.5	7.0	dB	Can be reduced with external IF load/tuning.
		7.0	8.5	dB	High side LO injection
Input IP3	-7.5	-3		dBm	Low side LO injection
Current		14.5		mA	Preamp/Mixer/LO Inputs Amps
LO Frequency Range	1350		1800	MHz	High and Low Side LO Injection.
IF Frequency Range	0.1	183.6	400	MHz	See note 3 and 4.
LO to RF Isolation				dB	Typical IF frequencies: 85.38MHz, 109.80MHz, 111.85MHz, 183.6MHz
Other					
LO-IF Isolation	36			dB	
RF-IF Isolation	40			dB	
LNA Out to Mixer In Isolation	30	40		dB	
LO-LNA In Isolation, Any State	35			dB	
CDMA450 Band					Freq=460.00MHz to 493.48MHz
LNA (On)					
Gain		16.5		dB	LNA 50Ω match
Noise Figure		1.4		dB	IPSET=1
Input IP3		+10.0		dBm	IPSET=1
Current		6.5		mA	IPSET=1
Isolation		20		dB	IPSET=1
LNA (Off)					
Gain		-5		dB	
Noise Figure		5		dB	
Input IP3	+20.0	+25.0		dBm	
Current		0		mA	
Isolation		4		dB	
Mixer					
Gain		12		dB	LO IN=-4dBm See note 1.
Noise Figure		8.5		dB	
Input IP3		+5.0		dBm	
Current		17.5		mA	Mixer/LO Input Amps
LO to RF Isolation	36			dB	
	30			dB	
LO Frequency Range	250		700	MHz	High and Low Side LO Injection.
IF Frequency Range	0.1	85.38	400	MHz	Typical IF frequencies: 85.38MHz, 109.80MHz, 111.85MHz, 183.6MHz

Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
CDMA450 Band, cont'd					
Other					
LO-IF Isolation	36			dB	
RF-IF Isolation	40			dB	
LNA Out to Mixer In Isolation	30	40		dB	
LO-LNA In Isolation, Any State	35			dB	
Control Lines					
Input Capacitance			1	pF	BAND SEL, IF SEL, IP SET, LNA GAIN, ENABLE, TX BUFF ENABLE, /2 SELECT
Local Oscillator Input					
Cellular - CDMA/FM/JCDMA					
Input Power	-10	-4	0	dBm	
Input Frequency	600		1078	MHz	See note 3. High and Low side injection.
	1200		2156	MHz	See note 4. High and Low side injection.
PCS					
Input Power	-10	-4	0	dBm	
Input Frequency	1600		2300	MHz	High and Low Side LO Injection.
GPS					
Input Power	-10	-4	0	dBm	
Input Frequency	1350		1800	MHz	High and Low Side LO Injection.
CDMA 450					
Input Power	-10	-4	0	dBm	
Input Frequency	250		700	MHz	High and Low Side LO Injection

RF2496

Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
TX (Local Oscillator) Buffer					
Cellular - CDMA/FM/JCDMA					
Output Power	-10	-8		dBm	Single-ended 50Ω load
Output Frequency	600		1078	MHz	See note 3. High and low side LO injection.
Output Power	-8	-6		dBm	Single-ended 50Ω load
Output Frequency	1200		2156	MHz	See note 4. High and low side LO injection.
Current Consumption			2	mA	
PCS					
Output Power	-9.5	-7.5		dBm	Single-ended 50Ω load
Output Frequency	1600		2300	MHz	High and low side LO injection.
Current Consumption			2	mA	
CDMA 450					
Output Power		-8		dBm	Single-ended 50Ω load
Output Frequency	250		700	MHz	
Current Consumption			2	mA	

NOTE 3. IF=184MHz. LO Divider disabled. LO Divider disabled logic conditions:

A) BAND SELECT=1; /2 SELECT=Immaterial.B) BAND SELECT=0; /2 SELECT=1

NOTE 4. IF=184MHz. LO Divider enabled. LO Divider enabled logic conditions:

A) BAND SELECT=0; /2 SELECT=0

Evaluation Board Current Measurement

	BAND SEL	IF SEL	ENABLE	LNA GAIN	MIX GAIN	IP SET	TX BUFF ENABLE	/2 SELECT	IDC (mA)
CDMA Cellular LNA and Mixer Path									
LNA On, High IIP3 LNA Mode TX Buffer Off, /2 Off	0	1	1	1	X	1	0	1	25.0
LNA Bypassed, TX Buffer Off, /2 Off	0	1	1	0	X	X	0	1	18.5
LNA On, Paging Mode TX Buffer Off, /2 Off	0	1	1	1	X	0	0	1	23

FM/JCDMA LNA and Mixer Path									
LNA On, TX Buffer Off, /2 Off	0	0	1	1	X	0	0	1	19.0
LNA Bypassed, TX Buffer Off, /2 Off	0	0	1	0	X	0	0	1	14.5
LNA On, High IIP3 LNA Mode TX Buffer Off, /2 Off	0	0	1	1	X	1	0	1	21.0

CDMA PCS - High IIP3 LNA Mode LNA and Mixer Path									
LNA On, Mixer Preamp On TX Buffer Off, /2 Off	1	1	1	1	1	1	0	1	26.0
LNA Bypassed, Mixer Preamp On TX Buffer Off, /2 Off	1	1	1	0	1	X	0	1	19.5
LNA On, Mixer Preamp Off TX Buffer Off, /2 Off	1	1	1	1	0	1	0	1	21.0
LNA Bypassed, Mixer Preamp Off TX Buffer Off, /2 Off	1	1	1	0	0	X	0	1	14.5

CDMA PCS - LNA Paging Mode									
LNA On, Mixer Preamp On TX Buffer Off, /2 Off	1	1	1	1	1	0	0	1	24.0
LNA Bypassed, Mixer Preamp On TX Buffer Off, /2 Off	1	1	1	0	1	X	0	1	19.5
LNA On, Mixer Preamp Off TX Buffer Off, /2 Off	1	1	1	1	0	0	0	1	19.0
LNA Bypassed, Mixer Preamp Off TX Buffer Off, /2 Off	1	1	1	0	0	X	0	1	14.5

GPS									
LNA On, Mixer On	1	0	1	X	X	0	0	X	21

CDMA 450									
LNA On, High IIP3 LNA Mode TX Buffer Off, /2 Off	0	1	1	1	X	1	0	1	32.0
LNA Bypassed TX Buffer Off, /2 Off	0	1	1	0	X	X	0	1	25.0

NOTES:

All IDC current numbers include bias circuitry current of 1.5mA to 2.0mA (dependent on mode).

TX Buffer On: Add 2mA to total current.

/2 Select On: Add 2mA to total current.

X: Denotes setting does not impact current.

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Cascaded Performance (Typical Values for $V_{CC}=2.75V$)

NOTE: All total current numbers include bias circuitry current of 1.5mA to 2.0mA (dependent on mode).

Parameter	CELL CDMA	
	LNA ON	LNA OFF
	<i>High IIP3 LNA Mode</i>	
Cascaded:		
Gain (dB)	22.0	4.5
Noise Figure (dB)	2.45	14.5
Input IP3 (dBm)	-4.1	+13.2
LO to IF Isolation (dB)	30	30
IF1 to RF Isolation (dB)	40	40
IF2 to RF Isolation (dB)	40	40
LO to LNA IN Isolation (dB)	45	45
Total Current (mA)	25.0	18.5

NOTE: Assumes 3dB image filter insertion loss. The TX Buffer Enable is off. /2 Circuit is off.
Numbers represent High IIP3 LNA mode IPSET=1.

Parameter	FM and JCDMA	
	LNA ON	LNA OFF
	Cascaded:	
Gain (dB)	24.5	7.5
Noise Figure (dB)	2.1	13
Input IP3 (dBm)	-7.5	+9.4
LO to IF Isolation (dB)	40	40
IF1 to RF Isolation (dB)	40	40
IF2 to RF Isolation (dB)	40	40
LO to LNA IN Isolation (dB)	45	45
Total Current (mA)	19.0	14.5

NOTE: Assumes 3dB image filter insertion loss. The TX Buffer Enable is off. /2 Circuit is off.
Numbers represent low current LNA mode IPSET=0.

Parameter	PCS CDMA					
	LNA ON				LNA OFF	
	<i>High IIP3 LNA Mode, IPSET=1</i>		<i>LNA Paging Mode, IPSET=0</i>			
	Mixer Preamp ON	Mixer Preamp OFF	Mixer Preamp ON	Mixer Preamp OFF	Mixer Preamp ON	Mixer Preamp OFF
Cascaded:						
Gain (dB)	26	16	25	15	6	-4
Noise Figure (dB)	2.1	4.7	2.1	5.2	13.5	22.0
Input IP3 (dBm)	-9.6	-0.6	-9.0	-2.0	+10.3	+18.8
LO to IF Isolation (dB)	40	40	40	40	40	40
IF1 to RF Isolation (dB)	40	40	40	40	40	40
IF2 to RF Isolation (dB)	40	40	40	40	40	40
LO to LNA IN Isolation (dB)	40	40	40	40	40	40
Total Current (mA)	26	21	24	19	19.5	14.5

NOTE: Assumes 3dB image filter insertion loss. The TX Buffer Enable is off. /2 Circuit is off.

Cascaded Performance (Typical Values for $V_{CC}=2.75V$)

NOTE: All total current numbers include bias circuitry current of 1.5mA to 2.0mA (dependent on mode).

Parameter	GPS	
	High IIP3 LNA Mode, IPSET=1	IPSET=0
Cascaded:		
Gain (dB)	35.0	34.5
Noise Figure (dB)	1.6	1.7
Input IP3 (dBm)	-20.0	-19.5
Total Current (mA)	23	21

NOTE: Assumes 1.5dB image filter insertion loss.
The TX Buffer Enable is off. /2 Circuit is off.

Cellular CDMA (Divider on /2 Select=0)

Mode	LNA GAIN	Comments
High Gain	1	Recommended for IMD Test 1 and 2, 3 and 4
Low Gain	0	Recommended for IMD Test 5 and 6

RF2496

Pin	Function	Type	Description	Interface Schematic
1	GPS+	AO	GPS IF output. Open collector.	
2	GPS-	AO	GPS IF output. Open collector.	See pin 1.
3	CDMA+	AO	CDMA IF output. Open collector.	
4	CDMA-	AO	CDMA IF output. Open collector.	See pin 3.
5	FM+	AO	FM IF output. Open collector. "Current combiner" IF interface to SAW filter recommended.	
6	FM-	AO	FM IF output. Open collector. "Current combiner" IF interface to SAW filter recommended.	See pin 5.
7	VCC2	P	VCC connection for internal LO amplifiers. Internal RF bypass capacitor. External bypass capacitor between 1 nF and 47 nF required.	
8	LO IN	AI	LO single-end input. Matched to 50Ω.	
9	LO OUT	AO	LO output. Internal DC block.	
10	/2 SELECT	DI	Logic input. Low enables /2 circuitry in cellular mode. The divider is disabled when BAND SEL (pin 27) is high, regardless of the state of pin 10. The divider can only be enabled when BAND SEL is low and pin 10 is low. Pin 10 can be tied to a low state allowing BAND SEL (pin 27) to control the LO divider function, if using a single LO input source.	
11	TX BUFF ENABLE	DI	Logic input. High enables TX LO output buffer amplifiers.	
12	PCS RFA VCC	P	VCC connection for PCS mixer preamplifier.	
13	PCS MIX IN	AI	PCS mixer RF single-end input.	

Legend:

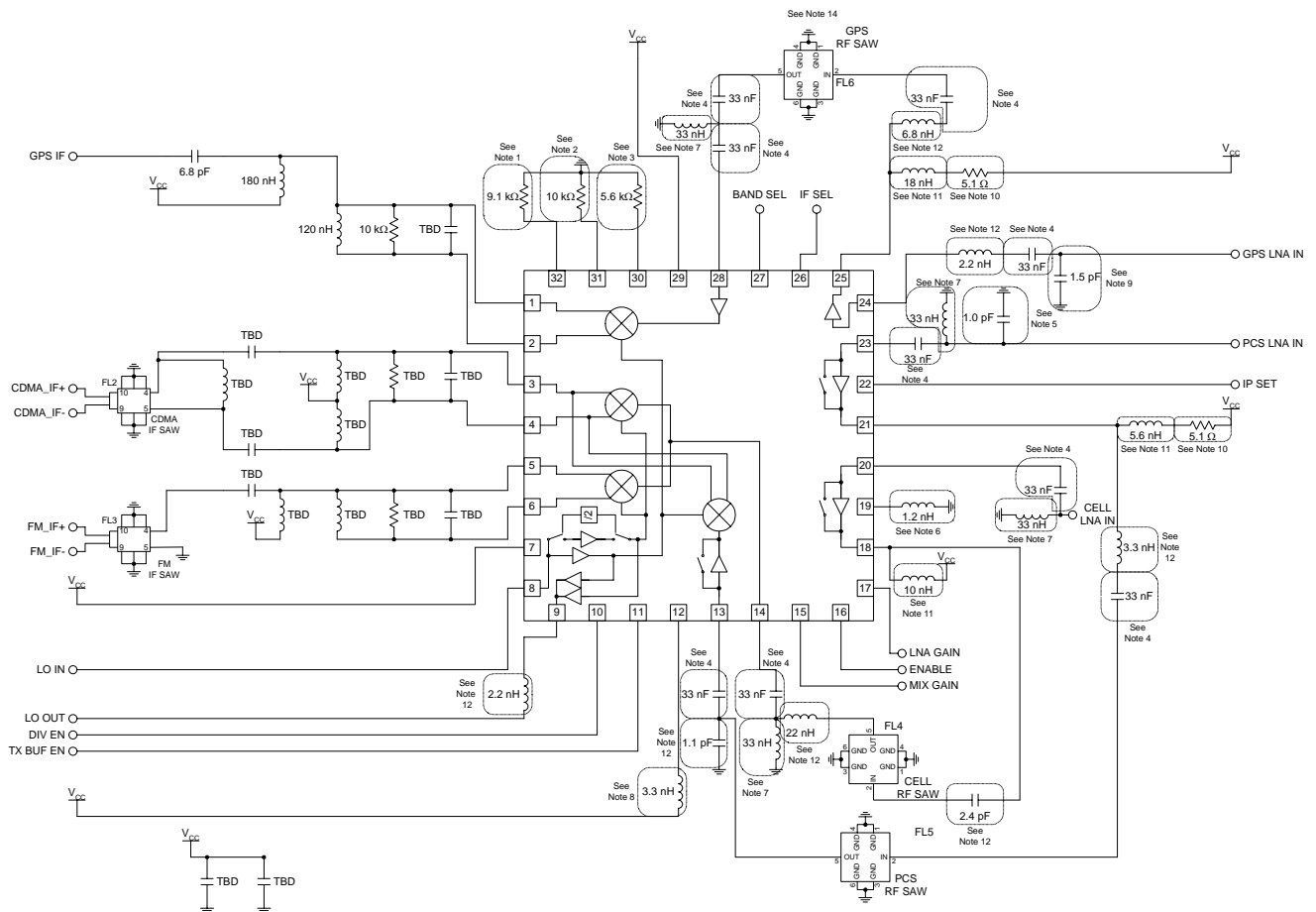
DI=Digital Input from Baseband Chip
 AI=Analog Input
 AO=Analog Output
 P=V_{CC} or GND

Pin	Function	Type	Description	Interface Schematic
14	CELL MIX IN	AI	Cellular mixer RF single-end input. Matched to 50Ω.	
15	MIX GAIN	DI	Logic input. Logic high turns on PCS mixer preamp and provides maximum gain. Logic low will bypass the PCS mixer preamp.	
16	ENABLE	DI	Logic input. Low level powers down the IC.	
17	LNA GAIN	DI	Logic input. High activates cellular or PCS LNAs. Low selects LNA bypass mode for both bands.	
18	CELL LNA OUT	AO	Cellular LNA output. Simple external L-C component required for matching and V _{CC} supply.	See pin 20.
19	CELL LNA EMITTER	AO	Cellular LNA emitter. A small inductor connects this pin to ground. Cellular LNA gain can be adjusted by the inductance.	See pin 20.
20	CELL LNA IN	AI	Cellular LNA input.	
21	PCS LNA OUT	AO	PCS LNA output. Simple external L-C components required for matching and V _{CC} supply.	
22	IP SET	DI	Logic input. High selects high IIP3 LNA "boost" modes for GPS, cellular and PCS CDMA paths. Low selects "normal" LNA IIP3 mode for GPS, cellular and PCS CDMA paths. Bias setting resistors are internal for both modes.	
23	PCS LNA IN	AI	PCS LNA input. For best performance, simple external matching required.	See pin 21.
24	GPS LNA IN	AI	GPS LNA input. For best performance, simple external matching required.	
25	GPS LNA OUT	AO	GPS LNA output. Simple external L-C components required for matching and V _{CC} supply.	See pin 24.
26	IF SEL	DI	Logic input. High selects CDMA outputs; low selects FM or GPS IF outputs.	

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Pin	Function	Type	Description	Interface Schematic
27	BAND SEL	DI	Logic input. High level selects PCS band or GPS band; low level selects cellular band. The LO divider circuitry is disabled when BANDSEL is high, regardless of the state of pin 10 (/2 SELECT). When BAND SEL is low, pin 10 can be selected high or low. If using a single LO input, pin 10 can be tied to a low state allowing BAND SEL to control the LO divider function.	
28	GPS MIX IN	AI	GPS mixer RF single-end input.	
29	VCC1	P	DC supply for internal reference, logic control, cellular mixer preamp, and GPS mixer preamp (PCS mixer preamp has its' own DC supply, PCS_RFA_VCC). External bypass capacitor between 1 nF and 47 nF required.	
30	ISET1	AO	Resistor for internal voltage reference setting. Higher resistance results in higher internal voltage and higher mixer and LNA current. Resistance is required to be within the range of 5.1 kΩ to 7.7 kΩ and precision should not be more than 5%.	
31	ISET2	AO	Resistor to ground sets cellular CDMA mixer current. Higher resistance results in lower current.	
32	ISET3	AO	Resistor to ground sets preamp and mixer currents for all circuits except CDMA cellular. Higher resistance results in lower currents.	
Pkg Base	GND	P	Ground connection. The backside of the package should be soldered to a top side ground pad which is connected to the ground plane with multiple vias.	

Application Schematic - Tri-Band



Note: If any functional blocks are not being used, the unused pins can be left with no connection.

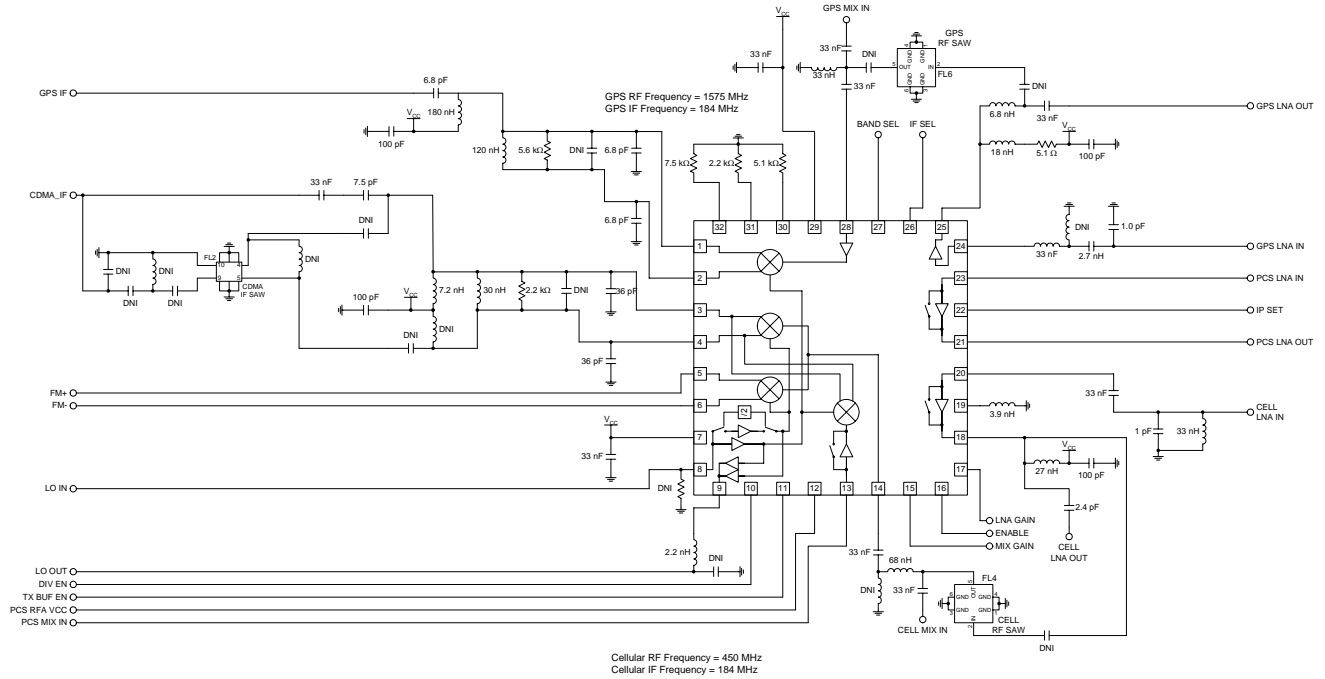
Layout Note: To minimize losses and radiation, the RF signal traces should be as short as possible. The IF+ and IF- outputs traces should be symmetrical. All bypass capacitors and matching capacitors must have a ground via very close to the capacitor. Each capacitor should have its own ground via. All traces should be 50 Ω transmission lines.

Notes:

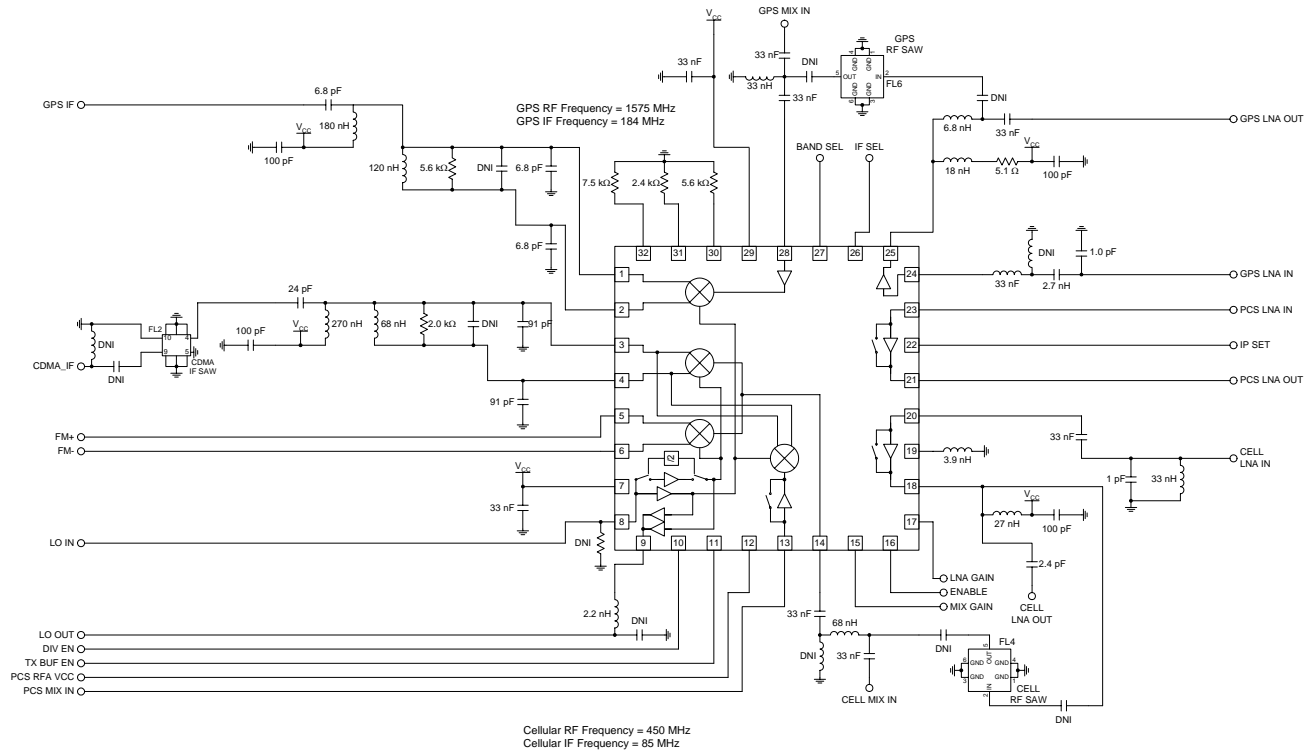
1. This resistor sets preamp and mixer currents for all circuits except CDMA cellular. Lowering the resistance results in higher currents.
2. This resistor sets cellular CDMA mixer current. Increasing the resistor value results in lower currents.
3. Sets internal bias voltage. Recommend 5.1 kΩ.
4. DC blocking capacitor.
5. PCS LNA Input Matching. Optimize for NF. As the value of the capacitance is increased, the NF will be worse.
6. Determines trade off between IIP3 and Gain. Higher value inductor means lower gain and higher IIP3.
7. For optimum IIP3. Low impedance path to ground at low frequency for optimum IIP3.
8. PCS Interstage matching as the value of the inductance is increased, the PCS mixer preamp gain will decrease and the IIP3 will increase vice versa.
9. GPS LNA input matching. Optimize for NF as the value of the capacitance is increased, the NF will be worse.
10. For stability.
11. For output matching and a DC supply bias choke.
12. Input/Output matching.

NOTE: IF output matching component values are dependent on board layout, IF SAW filter and the IF frequency selected. Please contact the RFMD Application Engineering group for assistance with IF output matching.

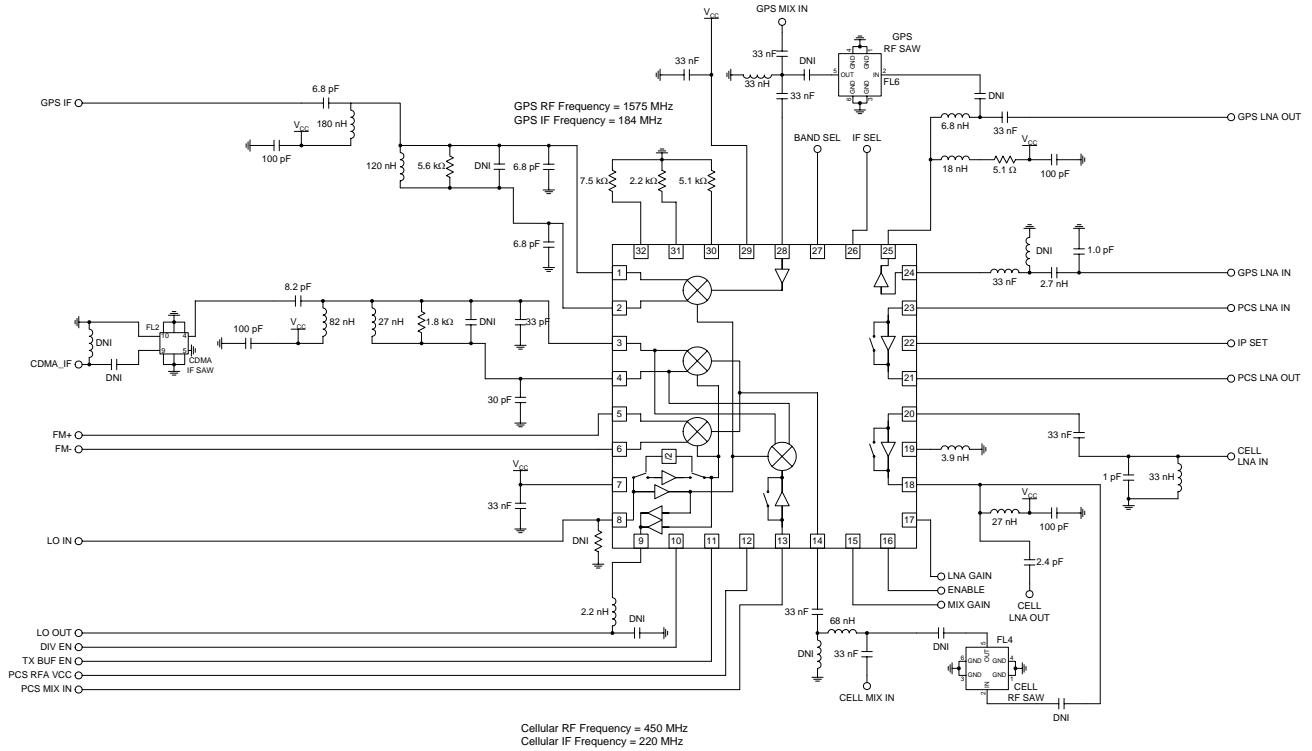
Application Schematic - CDMA 450, IF = 184 MHz GPS 1575, IF = 184 MHz



Application Schematic - CDMA 450, IF=85MHz GPS 1575, IF=184MHz

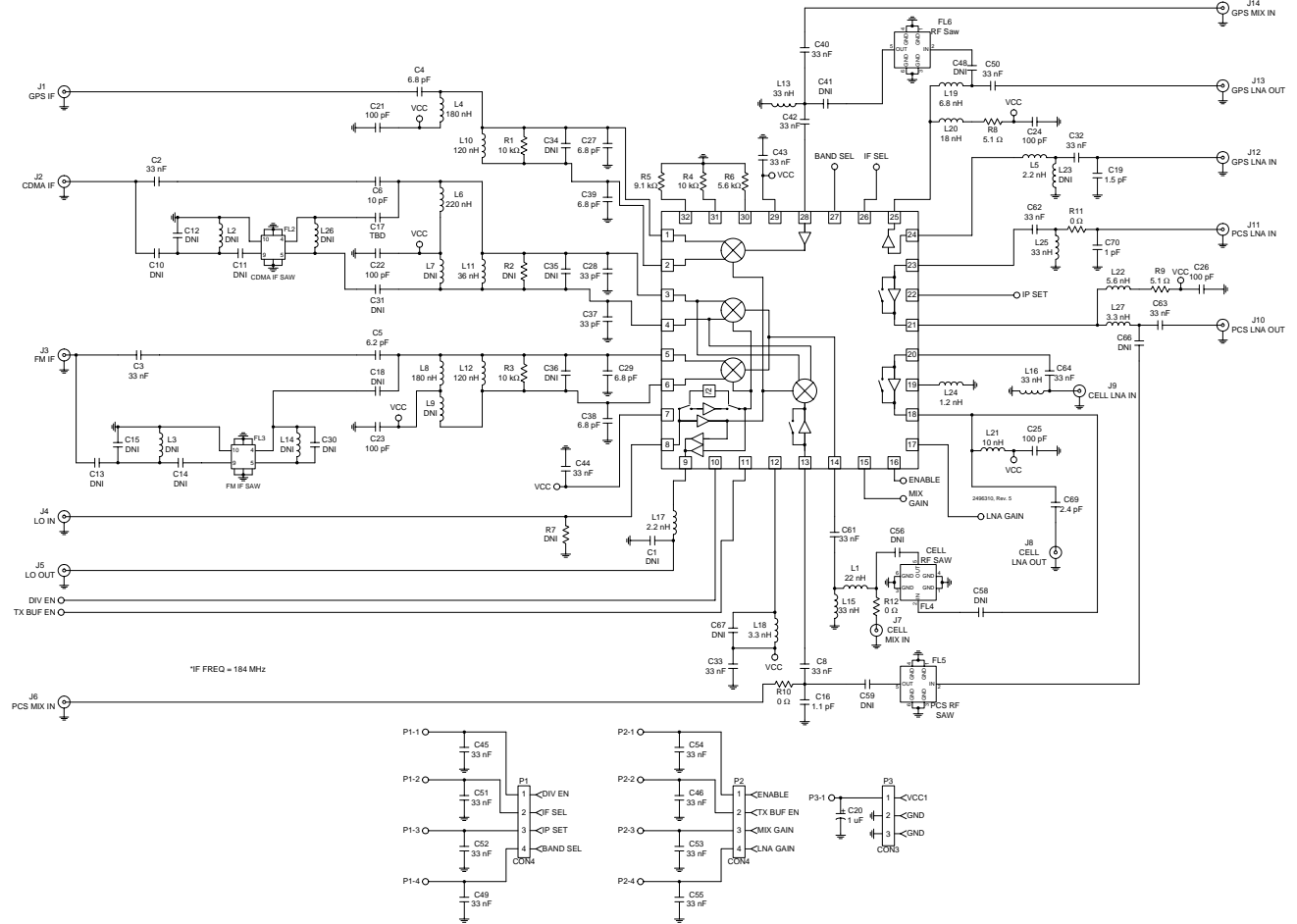


Application Schematic - CDMA 450, IF = 220 MHz GPS 1575, IF = 184 MHz

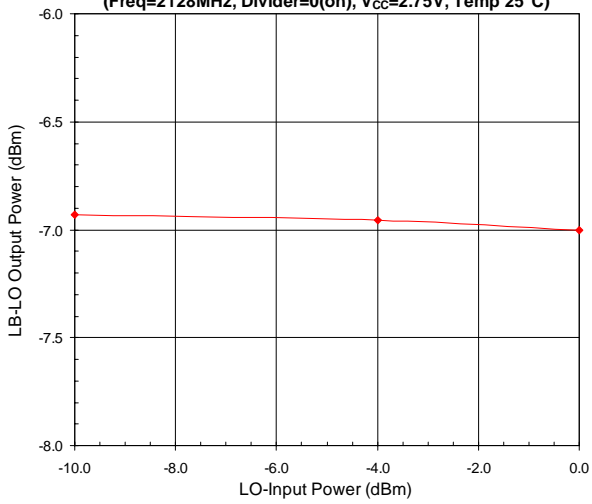


Evaluation Board Schematic - Tri-Band

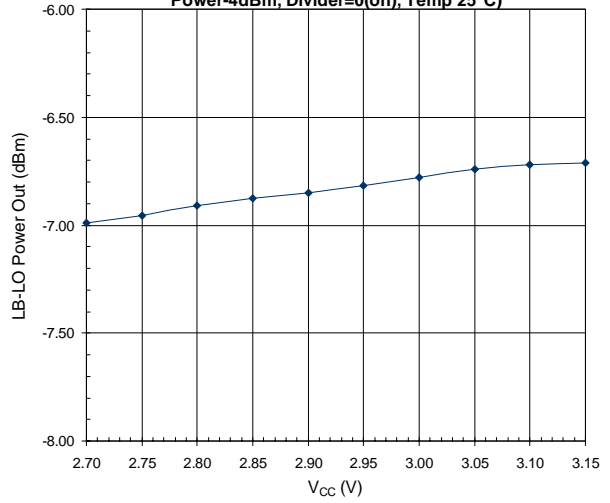
(Download [Bill of Materials](http://www.rfmd.com) from www.rfmd.com.)



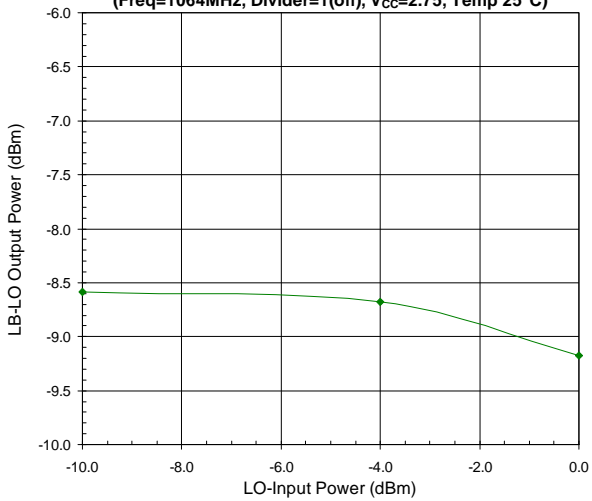
Cellular Band LO Output Power versus LO-Input Power
(Freq=2128MHz, Divider=0(on), V_{CC}=2.75V, Temp 25°C)



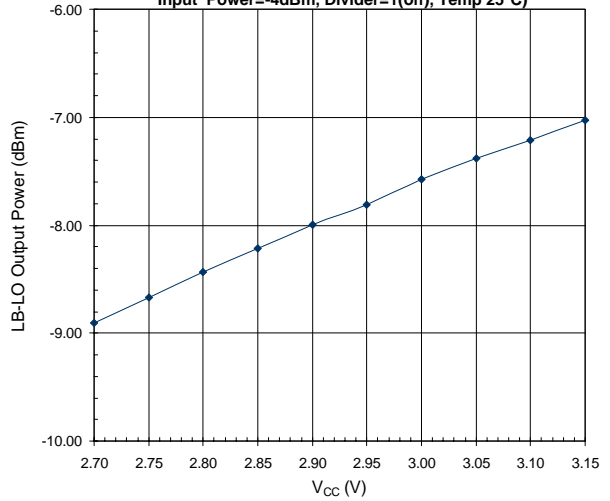
Cellular Band LO POUT versus V_{CC} (Freq=2128MHz, Input Power=-4dBm, Divider=0(on), Temp 25°C)



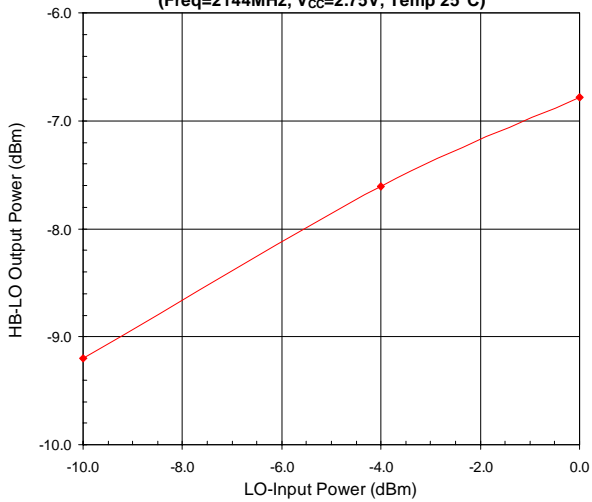
Cellular Band LO Output Power versus LO-Input Power
(Freq=1064MHz, Divider=1(off), V_{CC}=2.75, Temp 25°C)



Cellular Band LO Output Power versus V_{CC} (Freq=1064MHz, Input Power=-4dBm, Divider=1(off), Temp 25°C)



PCS Band LO Output Power versus LO-Input Power
(Freq=2144MHz, V_{CC}=2.75V, Temp 25°C)



PCS Band HB-LO Output Power versus V_{CC}
(Freq=2144MHz, Input Power=-4dBm, Temp 25°C)

