

Package: QFN, 12-Lead, 3x3

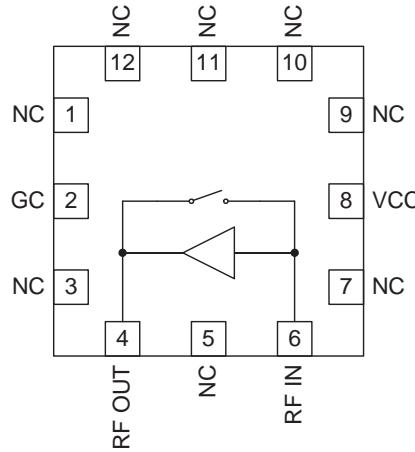


## Features

- Broadband Operation: 45 MHz to 2500 MHz
- ESD Protection: >2kV HBM
- Best-In-Class Linearity

## Applications

- FM Receiver LNA
- UMTS LNA
- Cellular CDMA LNA
- General Purpose Amplification
- Commercial and Consumer Systems



Functional Block Diagram

## Product Description

The RF2884 is a low noise amplifier with a very high dynamic range designed for a broad range of applications. This part is ideal for use as a FM LNA in cellular applications. The device functions as an outstanding front end low noise amplifier, featuring very low noise figure combined with high gain, high IIP3, and low current consumption. The product is packaged in a Pb-free, 3mmx3mm, QFN plastic package.

## Ordering Information

RF2884	Broadband LoW Noise Amplifier
RF2884PCBA-410	Fully Assembled Evaluation Board (LNA)
RF2884PCBA-411	Fully Assembled Evaluation Board, FM LNA

## Optimum Technology Matching® Applied

<input type="checkbox"/> GaAs HBT	<input checked="" 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 +5.0	V <sub>DC</sub>
Input RF Level	+6.0	dBm
Operating Temperature	-40 to +85	°C
Storage Temperature	-40 to +150	°C



Caution! ESD sensitive device.

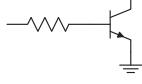
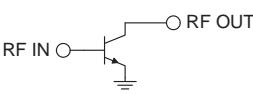
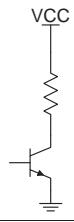
Exceeding any one or a combination of the Absolute Maximum Rating conditions may cause permanent damage to the device. Extended application of Absolute Maximum Rating conditions to the device may reduce device reliability. Specified typical performance or functional operation of the device under Absolute 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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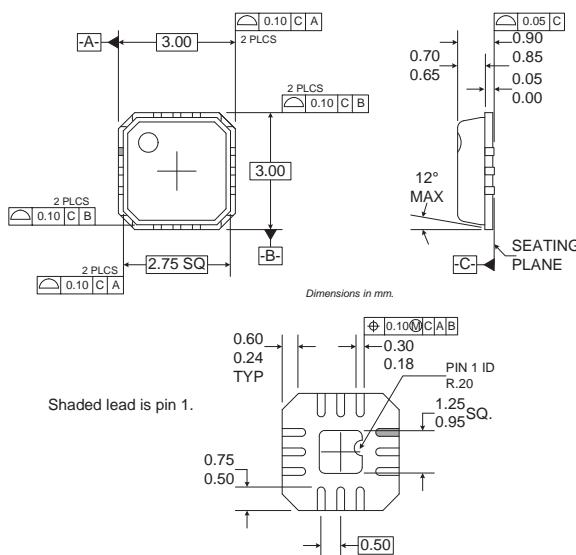
Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
<b>Overall</b>					T <sub>AMB</sub> =-20°C to +85°C, V <sub>CC</sub> =2.65V <sub>DC</sub> to 3.0V <sub>DC</sub> (unless otherwise specified)
Frequency Range	45	869 to 894	2500	MHz	
<b>Cellular Low Noise Amplifier</b>					
Frequency	869		894	MHz	
HIGH GAIN MODE					GC<0.8V
Gain	13.25	15.0	16.25	dB	
Noise Figure		1.2	1.7	dB	1.7dB max, -20°C to +65°C
		1.2	1.85	dB	1.85dB max, -20°C to +85°C
Input IP3	-2.0	+4.0		dBm	
Current		6.0	8.5	mA	
S11		-15.5	-10.5	dB	
S22		-15.5	-9.5	dB	
Input P1dB	-16.0	-10.0		dBm	
Reverse Isolation			-20	dB	
Single Tone IIP2	+7.0	+11.0			F <sub>1</sub> =440MHz, ST IIP2=2*P <sub>IN</sub> -P <sub>OUT</sub> +Gain
Single Tone IIP3	-8.6	-6.5			F <sub>1</sub> =293.3MHz, ST IIP3=P <sub>IN</sub> -(P <sub>OUT</sub> +Gain-P <sub>IN</sub> )/2
Double Tone IIP2	-1.0	+5.0			F <sub>1</sub> =835MHz, F <sub>2</sub> =1715MHz, TT IIP2=P <sub>IN1</sub> +P <sub>IN2</sub> -P <sub>OUT</sub> +Gain
Double Tone IIP3	-6.3	-3.5			F <sub>1</sub> =835MHz, F <sub>2</sub> =2550MHz, TT IIP3=P <sub>IN</sub> -(P <sub>OUT</sub> -Gain-P <sub>IN</sub> )/2
<b>BYPASS MODE</b>					GC>1.8V
Gain	-7.0	-4.0	-2.0	dB	
Input IP3		+20.0		dBm	
Current		0.0	0.003	mA	
S11		-11.5	-10.5	dB	
S22		-10.5	-8.5	dB	
<b>FM LNA</b>					
Frequency Range	70		110	MHz	
HIGH GAIN MODE					
Gain		15.9		dB	
Noise Figure		1.5		dB	
Input IP3		+1		dBm	
S11		-16		dB	

Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
FM LNA, cont.					
S22		-15		dB	
BYPASS MODE					
Gain		-12		dB	
Input IP3		25		dBm	
Current		0		mA	
S11		-3.0		dB	
S22		-2.2		dB	

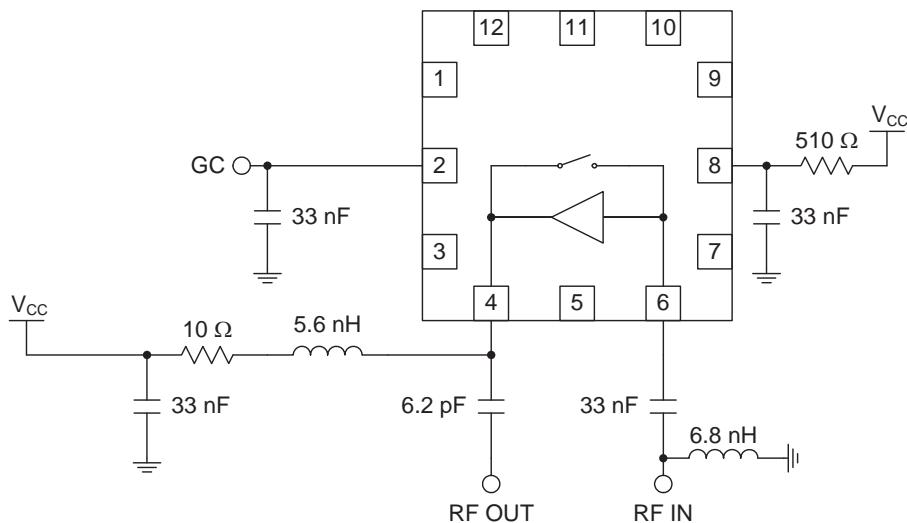
Pin	Function	Description	Interface Schematic
1	NC	No connection. Pin not used.	
2	GC	This pin selects high gain or bypass mode. GC $\leq$ 0.8V, high gain. GC $\geq$ 1.8V, low gain.	
3	NC	No connection. Pin not used.	
4	RF OUT	Amplifier output pin. This pin is an open-collector output. It must be biased to V <sub>CC</sub> 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 6.
5	NC	No connection. Pin not used.	
6	RF IN	RF input pin. A simple matching network is used to match to 50Ω.	
7	NC	No connection. Pin not used.	
8	VCC	Supplies bias to control circuitry. An external bypass capacitor may be used to decouple bias. An external resistor also allows adjustment of the LNA operating current. A 0Ω resistor allows maximum operating current. Increasing series resistance lowers LNA current. The voltage at pin 8 must remain above 2.0V.	
9	NC	No connection. Pin not used.	
10	NC	No connection. Pin not used.	
11	NC	No connection. Pin not used.	
12	NC	No connection. Pin not used.	
Pkg Base	GND	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.	

## Package Drawing

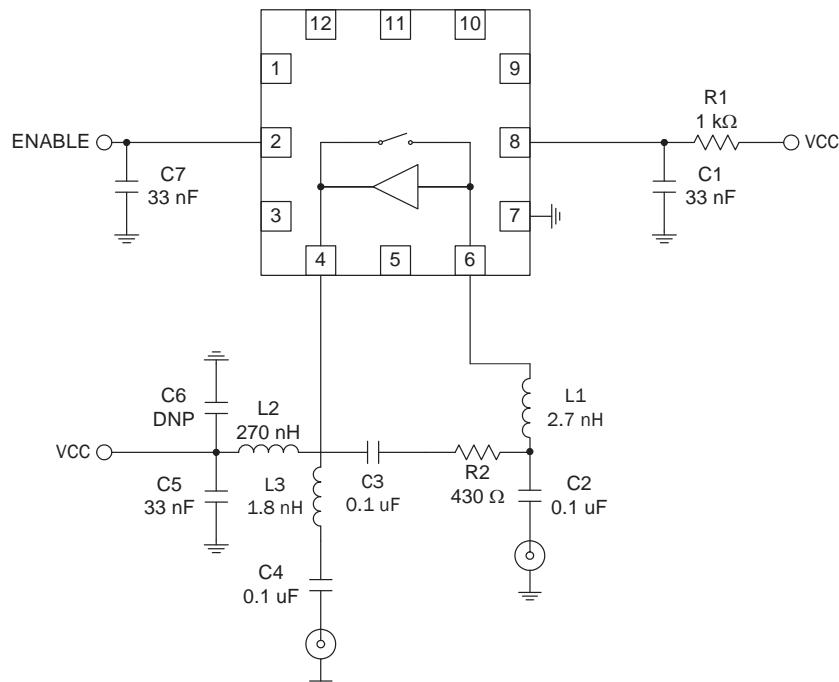
### QFN, 12-Lead, 3x3



**Application Schematic  
(Cellular Low Noise Amplifier ~881MHz)**



## Application Schematic (FM LNA)



A RC feedback network is introduced here to better broad band operation.

## RF2884PCBA-411, Evaluation Board, FM LNA

### Typical Data for FM LNA

Typical Data for PIM-11A		
High Gain	Typical	Unit
Gain	15.9	dB
Input IP3	-1.58	dBm
Noise Figure	1.54	dB
Current	6.3	mA

Low Gain	Typical	Unit
Gain	-12	dB
Input IP3	29	dBm
Current	0.003	uA

Test Condition: EVB 50Ω, V<sub>CC</sub>=2.8V,

### Room Temperature