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RF2374

3V LOW NOISE AMPLIFIER

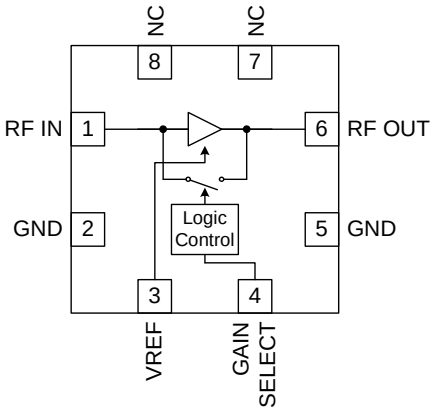
RoHS Compliant & Pb-Free Product
Package Style: QFN, 8-Pin, 2mmx2mmx0.6mm

Features

- Low Noise and High Intercept Point
- Adjustable Bias Current
- Power Down Control
- Low Insertion Loss Bypass Feature
- 1.8V to 4V Operation (See Note: Page 2)
- 800MHz to 3.8GHz Operation
- ESD Class 1B

Applications

- WLAN LNA with Bypass Feature
- CDMA PCS LNA with Bypass Feature
- GPS LNA with Bypass Feature
- General Purpose Amplification
- WiMAX LNA with Bypass Function
- CDMA 800 LNA



Functional Block Diagram

Product Description

The RF2374 is a switchable low noise amplifier with a high dynamic range designed for digital cellular and WLAN applications. The device functions as an outstanding front end low noise amplifier with I_{CC} as low as 3mA. The bias current may be set externally. The IC is featured in a 2mmx2mmx0.6mm module-compatible plastic package.

Ordering Information

RF2374	3V Low Noise Amplifier
RF2374 PCBA-410	Fully Assembled Evaluation Board, 2.3GHz to 3.8GHz with standard tune
RF2374 PCBA-411	Fully Assembled Evaluation Board, 1.5GHz to 2.2GHz with standard tune

Optimum Technology Matching® Applied

☑ GaAs HBT	☐ SiGe BiCMOS	☐ GaAs pHEMT	☐ GaN HEMT
☐ GaAs MESFET	☐ Si BiCMOS	☐ Si CMOS	
☐ InGaP HBT	☐ SiGe HBT	☐ Si BJT	

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Absolute Maximum Ratings

Parameter	Rating	Unit
Supply Voltage	-0.5 to +6.0	V_{DC}
Input RF Level	+5 (see note)	dBm
Current Drain, I_{CC}	32	mA
Operating Ambient Temperature	-40 to +85	°C
Storage Temperature	-40 to +150	°C

NOTE: Exceeding any one or a combination of the above maximum rating limits may cause permanent damage. Input RF transients to +15dBm will not harm the device. For sustained operation at inputs ≥+5dBm, a small dropping resistor is recommended in series with the V_{CC} in order to limit the current due to self-biasing to <32mA.

Caution! ESD sensitive device.

Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
Operating Range					T_{AMB}=+25°C, V_{CC}=3.0V
Frequency Range	800		4000	MHz	
WLAN Low Noise Amplifier					
Frequency		2450		MHz	
HIGH GAIN MODE					Gain Select<0.8V, V_{REF}=3V, T=+25°C
Gain	13.5	14.5		dB	
Noise Figure		1.3	1.5	dB	
Input IP3	+7	+9		dBm	IIP3 will improve if I_{CC} is raised above 7mA.
IP1dB	0			dBm	
Current Drain		7		mA	
BYPASS MODE (Low Gain)					Gain Select>1.8V
Gain	-4.0	-3.0	-2.0	dB	Note: Bypass mode insertion loss will degrade gradually as V_{CC} goes below 2.7V.
Input IP3	+19	+21		dBm	
Current Drain		2.0	3.0	mA	
GPS Low Noise Amplifier					
Frequency		1575		MHz	
Gain		17.5		dB	I_{CC}=7mA
Noise Figure		1.0		dB	
Input IP3		+7.0		dBm	
WiMAX Low Noise Amplifier					
Frequency		3500		MHz	I_{CC}=7mA
Gain		11.0		dB	At 3500MHz
Noise Figure		1.6		dB	At 3500MHz
Input IP3		+10.0		dBm	IIP3 will improve if I_{CC} is raised above 7mA.
CDMA Low Noise Amplifier					
HIGH GAIN MODE					
Frequency	869		894	MHz	
Gain		19		dB	
Noise Figure		1.0		dB	
Input IP3		+2.0		dBm	IIP3 will improve if I_{CC} is raised above 7mA.
Current Drain		7		mA	

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Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
Power Supply					
Voltage (V_{CC})		3		V	
Gain Select Low			0.8	V	High Gain mode. Gain Select < 0.8V, V_{REF} = 3V
Gain Select High	1.8			V	Low Gain mode. Gain Select > 1.8V, V_{REF} = 0V
Power Down	0		5	μA	Gain Select < 0.8V, V_{REF} = 0V, V_{CC} = 3.0V

Bias note: Due to the presence of ESD protection circuitry on the RF2374, the maximum allowable collector bias voltage (pin 6) is 4.0V. Higher supply voltages such as 5V are permissible if a series resistor is used to drop V_{CC} to ≤4.0V for a given I_{CC}.

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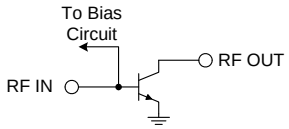
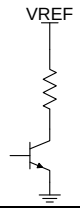
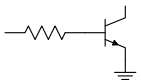
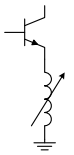
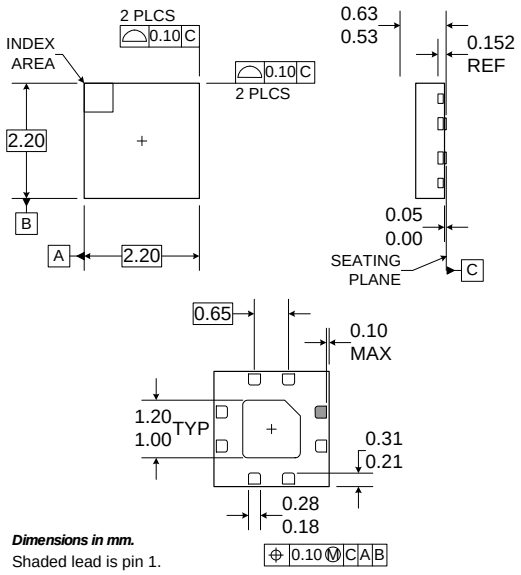
Pin	Function	Description	Interface Schematic
1	RF IN	RF input pin. This part is designed such that 50Ω is the optimal source impedance for best noise figure. Best noise figure is achieved with only a series capacitor on the input.	
2	GND1	Ground connection. For best performance, keep traces physically short and connect immediately to ground plane.	
3	VREF	For low noise amplifier applications, this pin is used to control the bias current. An external resistor can be used to set the bias current for any V_{BIAS} voltage. This device will have good gain and noise figure with I_{CC} as low as 3mA.	
4	GAIN SELECT	This pin selects high gain and bypass modes. Gain Select≤0.8V, high gain. Gain Select≥1.8V, low gain.	
5	GND2	See GND1.	
6	RF OUT	Amplifier output pin. This pin is an open-collector output. It must be biased to V_{CC} through a choke or matching inductor.	
7	NC	Not connected.	
8	NC	Not connected.	
Pkg Gnd	GND	This pad should be connected to the ground plane by vias directly under the device.	

Package Drawing



Dimensions in mm.
Shaded lead is pin 1.

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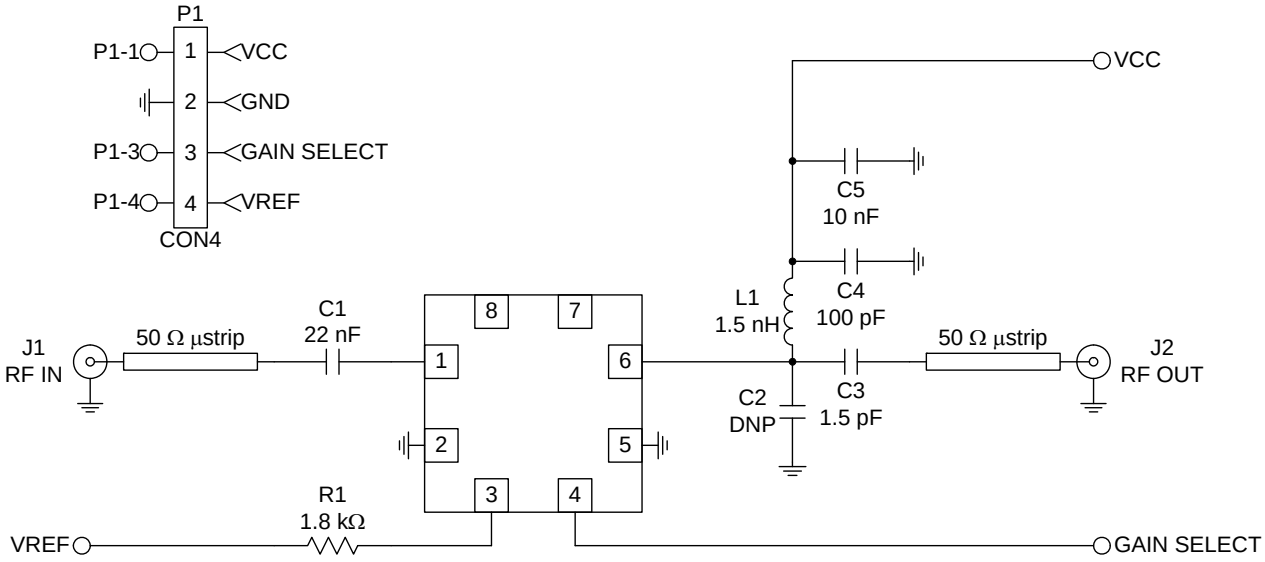
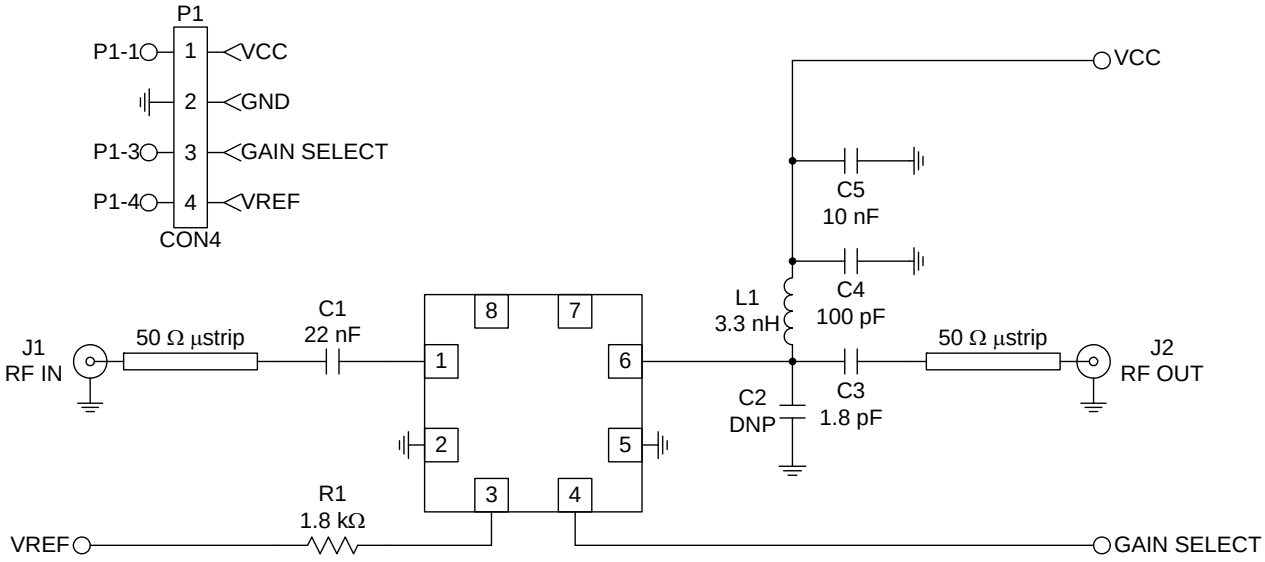
Evaluation Board Schematic
WiBRO/WLAN/WiMAX (2.3GHz to 3.8GHz)



Evaluation Board Schematic
GPS/PCS (1.5GHz to 2.2GHz)



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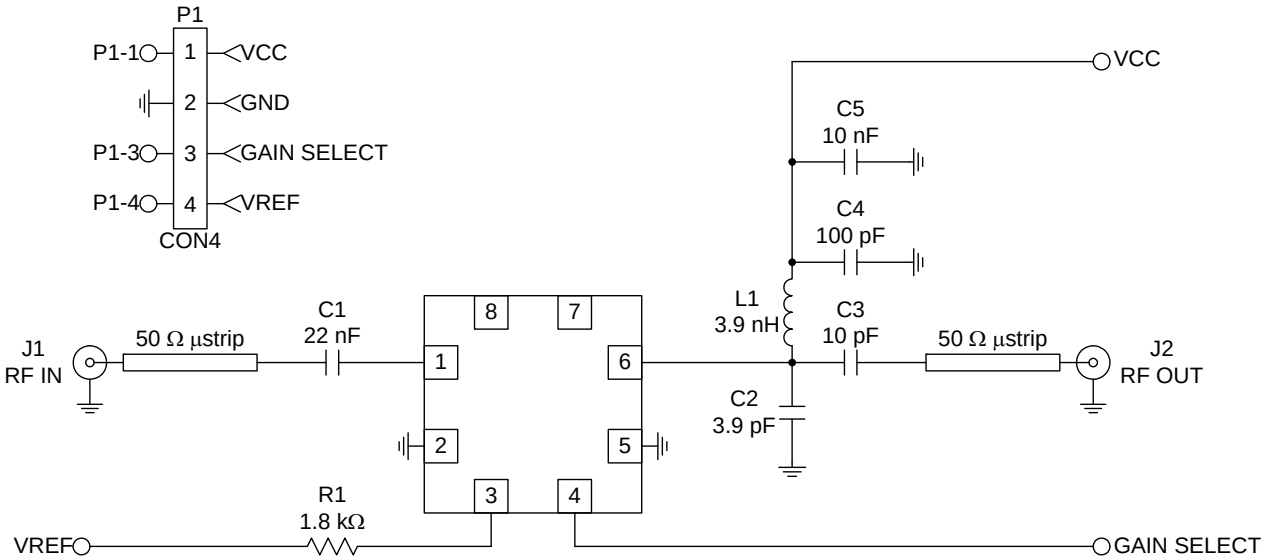
Evaluation Board Schematic - 869 MHz to 894 MHz



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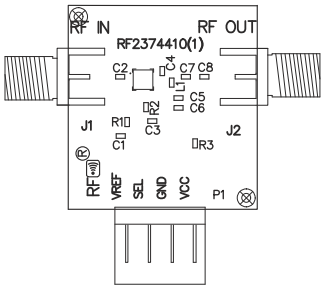
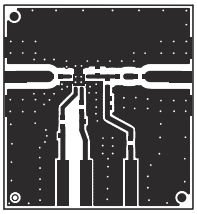
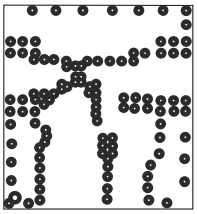
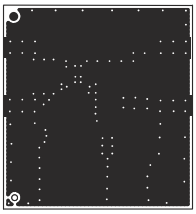
Evaluation Board Layout
Board Size 0.835” x 0.900”
Board Thickness 0.032”, Board Material FR-4









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