

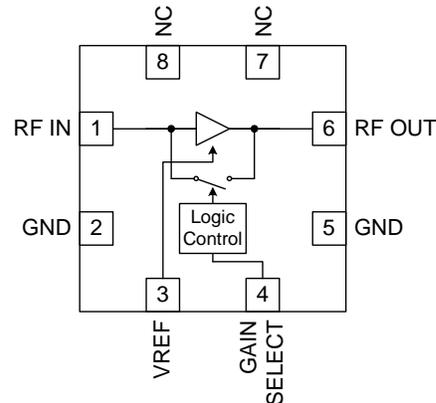
RoHS Compliant & Pb-Free Product  
Package Style: QFN, 8-Pin, 2 mmx2 mmx0.6 mm

### 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 2 mmx2 mmx0.6 mm 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

- |  |                                      |                                     |                                   |
|--|--------------------------------------|-------------------------------------|-----------------------------------|
| <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     |                                   |

## Absolute Maximum Ratings

Parameter	Rating	Unit
Supply Voltage	-0.5 to +6.0	V <sub>DC</sub>
Input RF Level	+5 (see note)	dBm
Current Drain, I <sub>CC</sub>	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  $\geq +5$ dBm, a small dropping resistor is recommended in series with the V<sub>CC</sub> in order to limit the current due to self-biasing to <32mA.



**Caution!** ESD sensitive device.

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RoHS status based on EUDirective2002/95/EC (at time of this document revision).

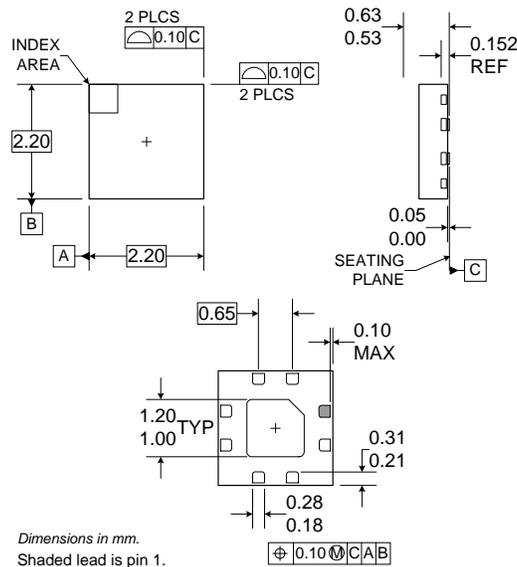
Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
<b>Operating Range</b>					T <sub>AMB</sub> = +25 °C, V <sub>CC</sub> = 3.0V
Frequency Range	800		4000	MHz	
<b>WLAN Low Noise Amplifier</b>					
Frequency		2450		MHz	
<b>HIGH GAIN MODE</b>					Gain Select < 0.8V, V <sub>REF</sub> = 3V, T = +25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

Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
<b>Power Supply</b>					
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	$\mu A$	Gain Select < 0.8V, $V_{REF}=0V$ , $V_{CC}=3.0V$

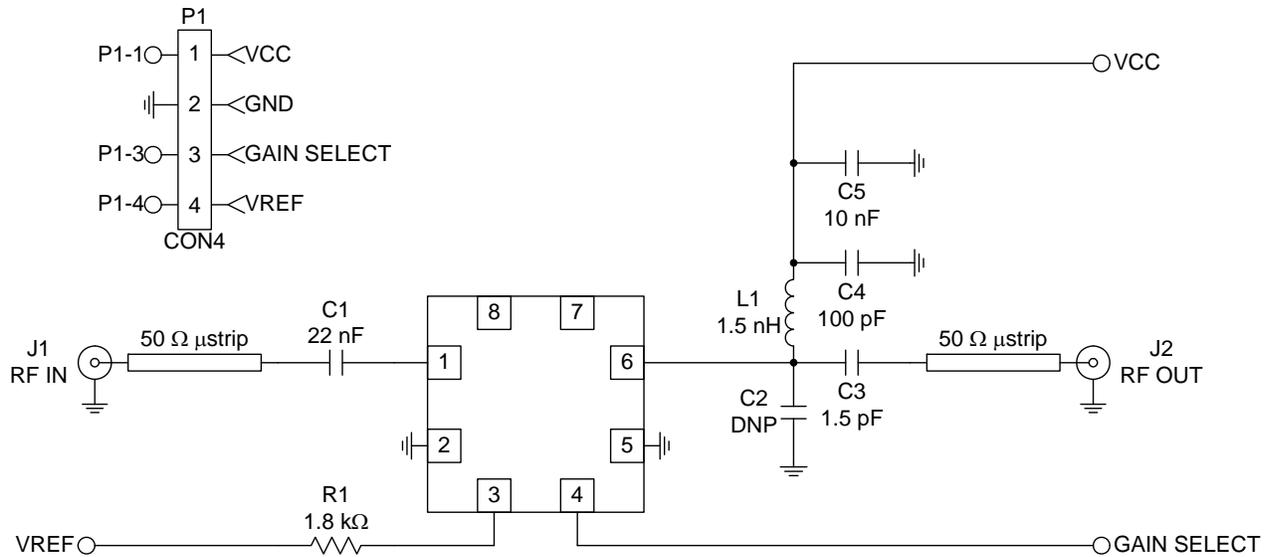
Bias note: Due to the presence of ESD protection circuitry on the RF2374, the maximum allowable collector bias voltage (pin 6) is 4.0V. Higher supply voltages such as 5V are permissible if a series resistor is used to drop  $V_{CC}$  to  $\leq 4.0V$  for a given  $I_{CC}$ .

Pin	Function	Description	Interface Schematic
1	RF IN	RF input pin. This part is designed such that $50\Omega$ 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 $\leq 0.8V$ , high gain. Gain Select $\geq 1.8V$ , 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.	

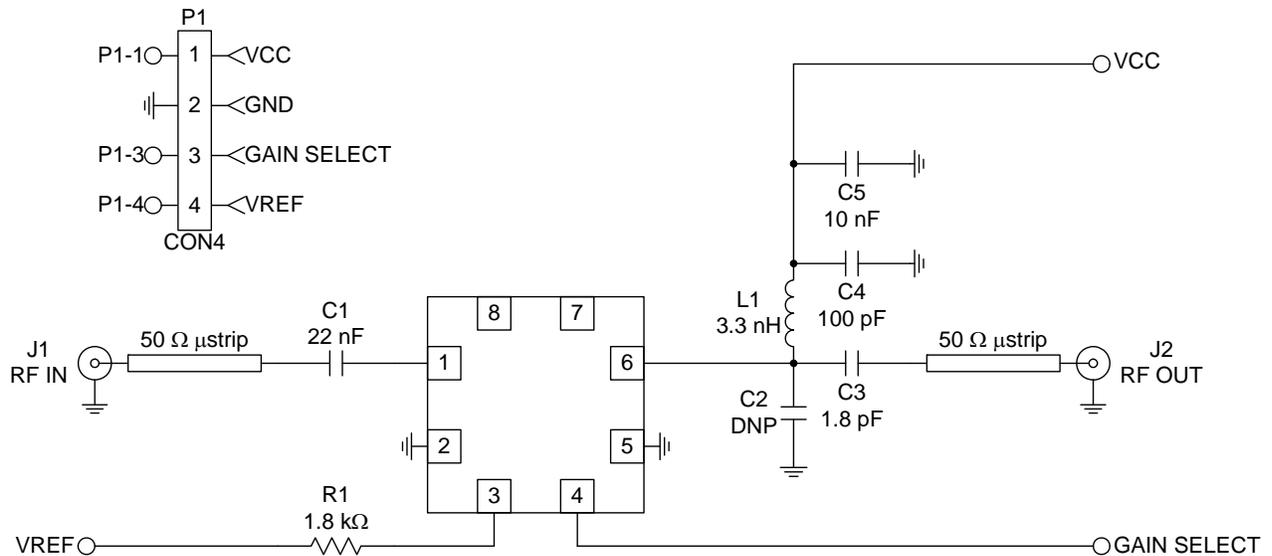
## Package Drawing



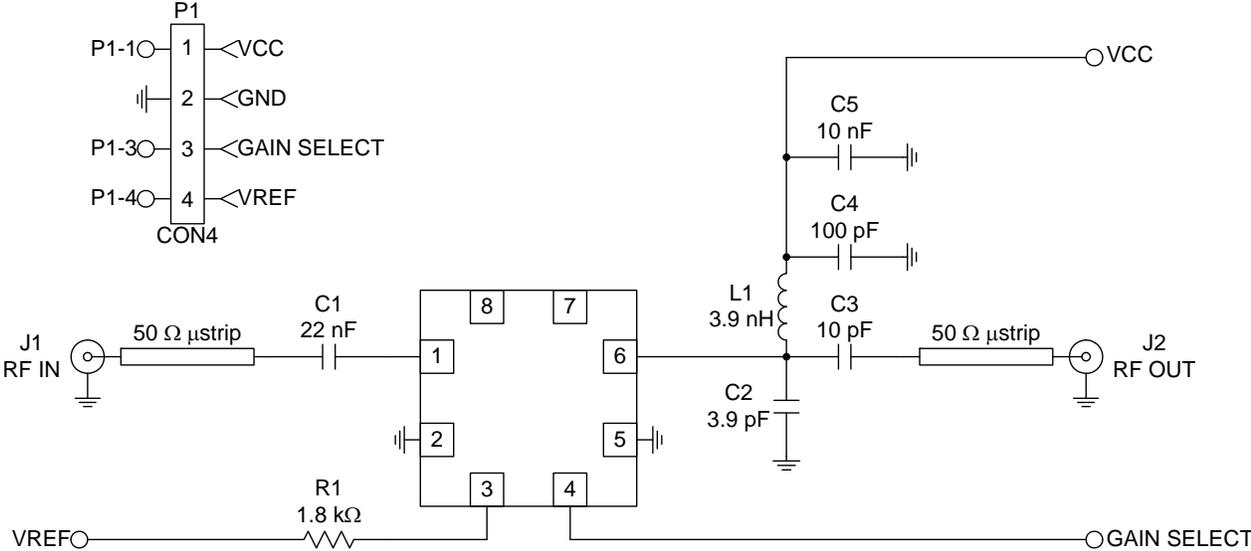
**Evaluation Board Schematic  
WiBRO/WLAN/WiMAX (2.3GHz to 3.8GHz)**



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



## Evaluation Board Schematic - 869MHz to 894MHz



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

