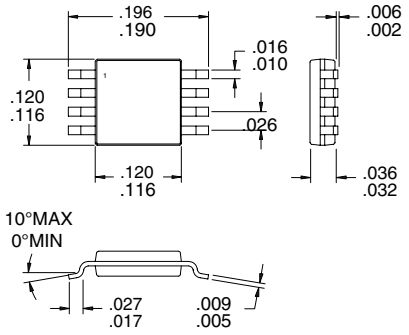
3V LOW NOISE AMPLIFIER/ 3V PA DRIVER AMPLIFIER

Typical Applications

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

Product Description

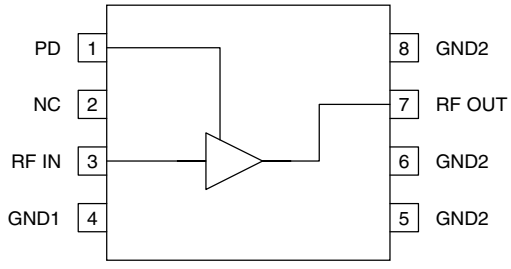
The RF2347 is a low noise amplifier with a very high dynamic range designed for digital cellular applications at 900MHz. The device functions as an outstanding front end low noise amplifier or power amplifier driver amplifier in the transmit chain of digital subscriber units where low transmit noise power is a concern. When used as an LNA, the bias current can be set externally. When used as a PA driver, the IC can operate directly from a single cell Li-ion battery and includes a power down feature that can be used to completely turn off the device. The IC is featured in a standard miniature 8-lead plastic MSOP package.



Optimum Technology Matching® Applied

- ☐ Si BJT
- ☑ GaAs HBT
- ☐ GaAs MESFET
- ☐ Si Bi-CMOS
- ☐ SiGe HBT
- ☐ Si CMOS

Package Style: MSOP-8



Functional Block Diagram

Features

- Low Noise and High Intercept Point
- Power Down Control
- Single 2.5V to 6.0V Power Supply
- 150MHz to 2500MHz Operation
- Extremely Small MSOP-8 Package

Ordering Information

RF2347	3V Low Noise Amplifier/ 3V PA Driver Amplifier
RF2347 PCBA	Fully Assembled Evaluation Board

RF Micro Devices, Inc.
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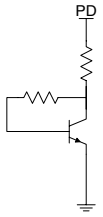
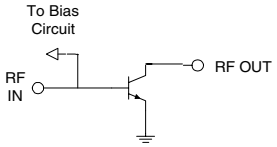
Absolute Maximum Ratings

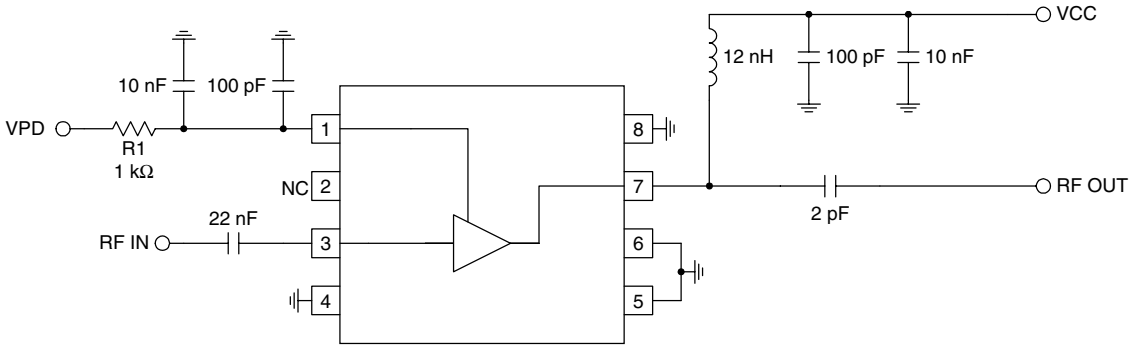
Parameter	Rating	Unit
Supply Voltage	-0.5 to +8.0	V_{DC}
Input RF Level	+10	dBm
Operating Ambient Temperature	-40 to +85	°C
Storage Temperature	-40 to +150	°C

Caution! ESD sensitive device.

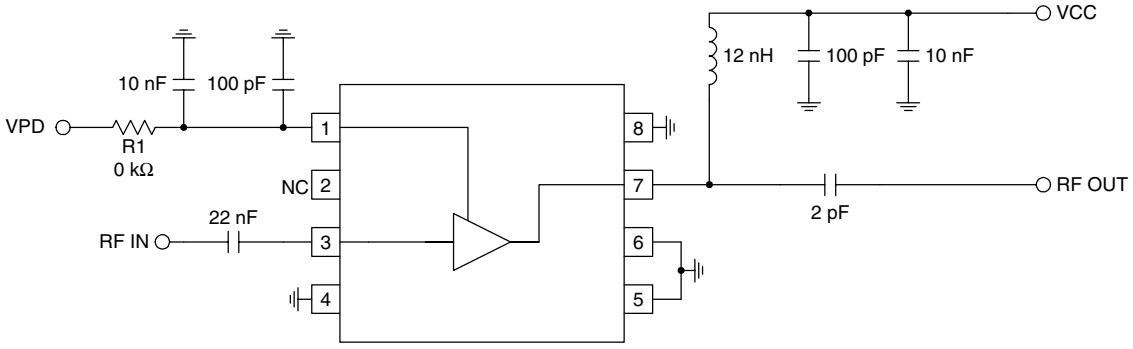
Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
Overall					
RF Frequency Range		150 to 2500		MHz	
Low Noise Amplifier 880MHz Performance					Schematic per LNA Application; T = 25°C, RF=880MHz
Gain	19.5	21.0		dB	V_{CC}=3.0V, I_{CC}=11mA
	19.5	21.0		dB	V_{CC}=2.7V, I_{CC}=11mA
Noise Figure		1.4	1.6	dB	V_{CC}=3.0V, I_{CC}=11mA
		1.4	1.6	dB	V_{CC}=2.7V, I_{CC}=11mA
Input IP3		+6.0		dBm	V_{CC}=3.0V, I_{CC}=11mA
		+5.0		dBm	V_{CC}=2.7V, I_{CC}=11mA
Max Input IP3		+7.5		dBm	V_{CC}=3.0V, I_{CC}=20mA
		+6.0		dBm	V_{CC}=2.7V, I_{CC}=20mA
Driver Amplifier 836MHz Performance					Schematic per Driver Amplifier Application T = 25°C, RF=836MHz, V_{PD}=2.8V
Gain	19.5	20.5	21.5	dB	V_{CC}=3.5V
	19.5	20.5	21.5	dB	V_{CC}=3.0V
	19.5	20.5	21.5	dB	V_{CC}=2.5V
Output IP3	25	+28.5	35	dBm	V_{CC}=3.5V
		+28.5		dBm	V_{CC}=3.0V
		+27		dBm	V_{CC}=2.5V
Noise Figure		1.4	2.0	dB	V_{CC}=3.5V
		1.4	2.0	dB	V_{CC}=3.0V
		1.3	2.0	dB	V_{CC}=2.5V
Reverse Isolation		26		dB	V_{CC}=3.5V
		26		dB	V_{CC}=3.0V
		25		dB	V_{CC}=2.5V
Input VSWR		1.5:1	2.0:1		
Output VSWR		1.25:1	2.0:1		Using External LC network used on Evaluation Board
P_{1dB}	13	15.5		dBm	V_{CC}=3.5V
	12	14.5		dBm	V_{CC}=3.0V
	10.5	13		dBm	V_{CC}=2.5V
Power Supply					T = 25 °C
Voltage (V_{CC})		2.5 to 6.0		V	
Voltage (V_{PD})	2.7	2.8	2.9	V	
Current Consumption	12.5	22	26.5	mA	V_{CC}=3.5V; V_{PD}=2.8V; V_{PD}+ V_{CC} - Current Consumption from V_{PD} is 2.0 mA Typ. @ V_{PD} = 2.8V and 3.0 mA Max @ V_{PD} =2.9V
	18	20	22	mA	V_{CC}=3.5V; V_{PD}=2.7V; V_{PD}+ V_{CC}
	19	24	29	mA	V_{CC}=3.5V; V_{PD}=2.9V; V_{PD}+ V_{CC}
Power Down			10	µA	V_{CC}=3.5V; $V_{PD} \leq$ 0.9V

Pin	Function	Description	Interface Schematic
1	PD	For low noise amplifier applications, this pin is used to control the bias current. See plots for bias current settings. For driver amplifier applications, this is the Power Down pin for the IC. V_{PD} =2.8V +/- 0.1V is required for proper operation. V_{PD}< 0.9V turns off the Part. External RF 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. Nominal current required for V_{PD}=2.8V is 2.0mA typical and 3.0mA Max (@ V_{PD}=2.9V).	
2	NC	No connection. This pin is typically left unconnected or grounded.	
3	RF IN	RF input pin. This pin is DC coupled and matched to 50Ω at 836MHz.	
4	GND1	Ground connection. Keep traces physically short and connect immediately to ground plane for best performance.	
5	NC	See pin 2. This pin is typically grounded.	
6	GND2	Ground connection. Keep traces physically short and connect immediately to ground plane for best performance.	
7	RF OUT	Amplifier Output pin. This pin is an open-collector output. It must be biased to either V_{CC} or pin 7 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.	
8	GND2	See pin 6.	

Application Schematic
Low Noise Amplifier ~880 MHz Operation

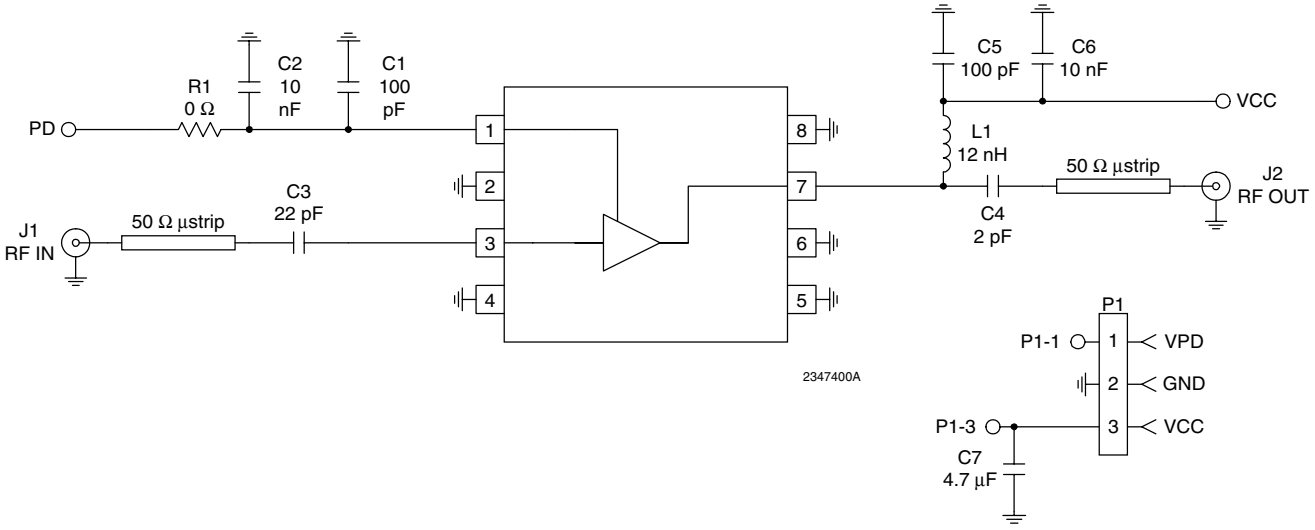


Application Schematic
Driver Amplifier ~836 MHz Operation

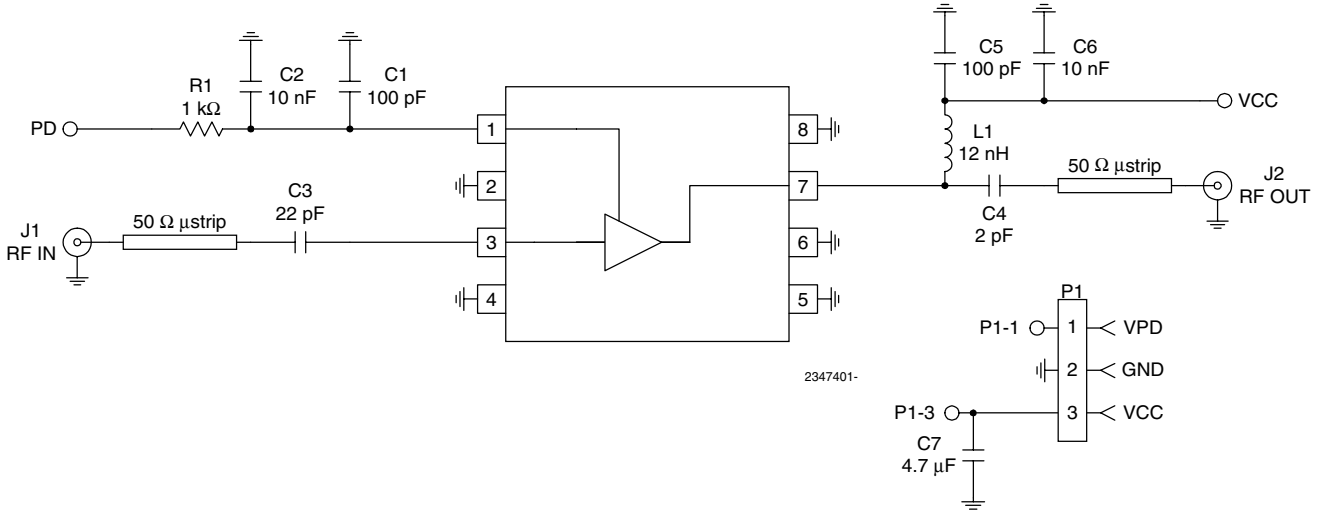


Evaluation Board Schematic
Driver Amplifier Operation

(Download Bill of Materials from www.rfmd.com.)

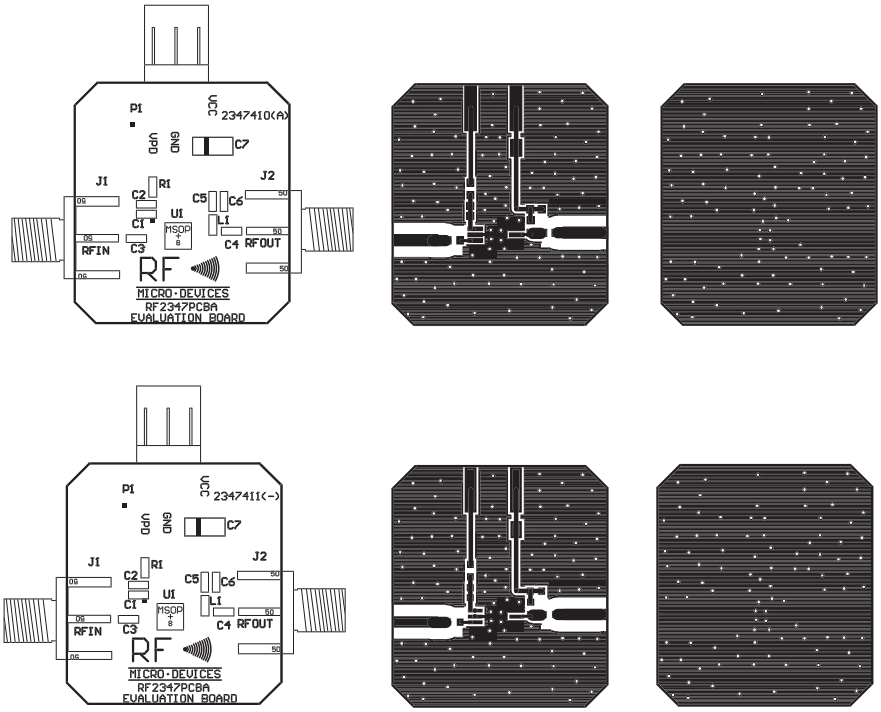


Evaluation Board Schematic
Low Noise Amplifier Operation

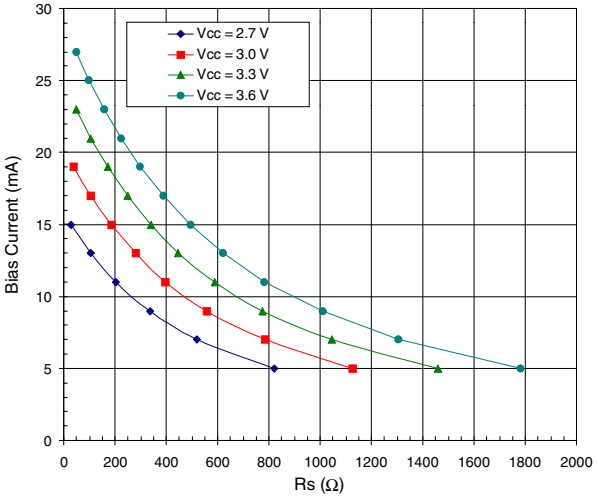


Evaluation Board Layout
Board Size 1.0" x 1.0"

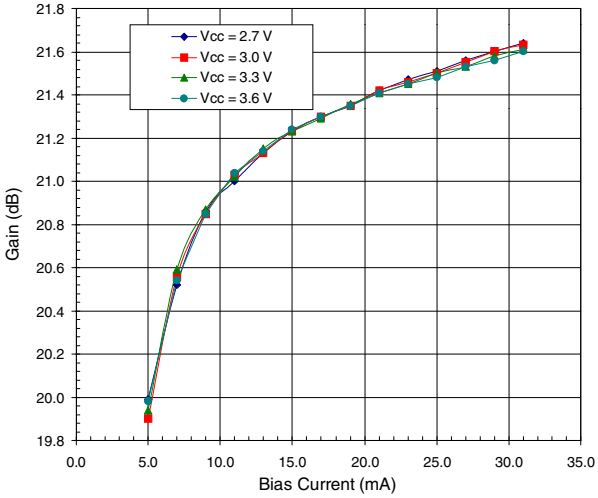
Board Thickness 0.031”; Board Material FR-4



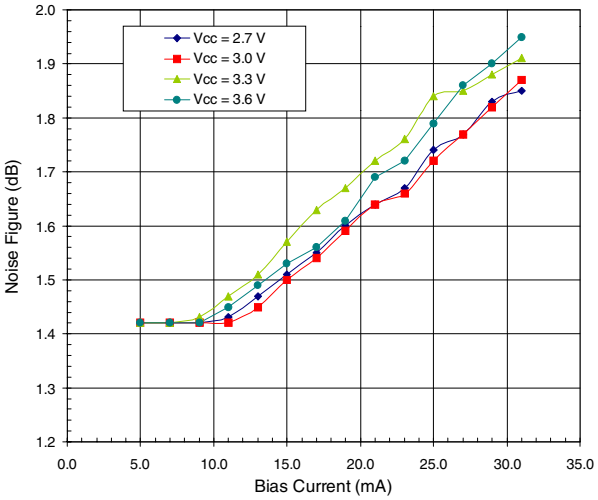
RF2347 Bias Current versus Rc



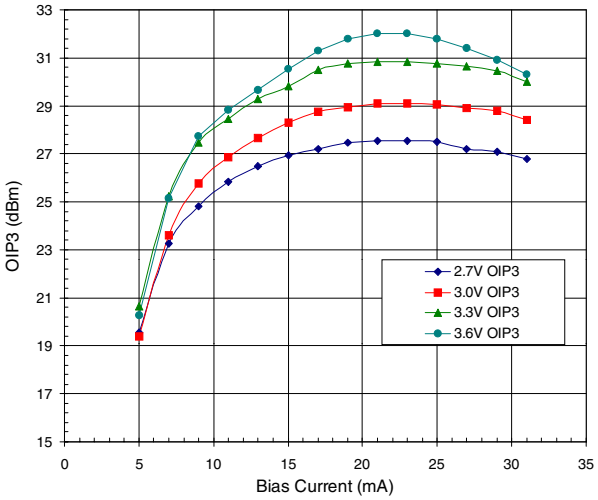
RF2347 Gain versus Bias Current



RF2347 Noise Figure versus Bias Current



RF2347 OIP3 versus Bias Current



RF2347 IIP3 versus Bias Current