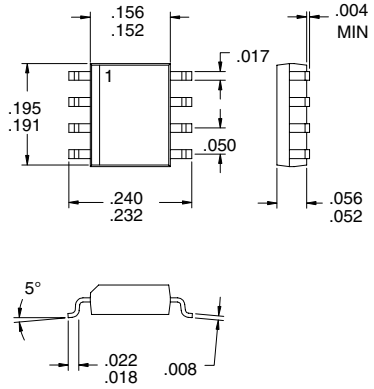
Typical Applications

- Receive or Transmit Low-Noise Amplifiers
- FDD and TDD Communication Systems
- Commercial and Consumer Systems
- Portable Battery Powered Equipment
- Wireless LAN
- ISM Band Applications

Product Description

The RF2304 is a low-noise small-signal amplifier. The device is manufactured on a low-cost Gallium Arsenide MESFET process, and has been designed for use as a gain block in high-end communication systems operating from less than 300MHz to above 2.5GHz. With +6dBm output power, it may also be used as a driver in transmitter applications, or in highly linear receivers. The device is packaged in an 8-lead plastic package and is self-contained, requiring just an inductor and blocking capacitors to operate. The +6dBm output power, combined with the 1.8dB noise figure at 900MHz allows excellent dynamic range for a variety of receive and transmit applications.



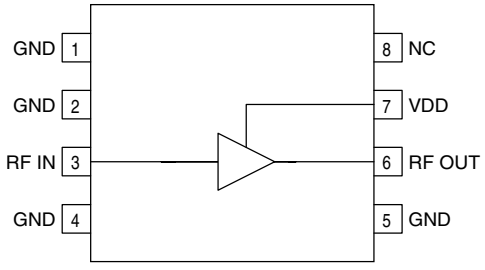
Package Style: SOP-8

Optimum Technology Matching® Applied

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

Features

- Single 2.7V to 6.0V Supply
- 6dBm Output Power
- 8dB Small Signal Gain at 900MHz
- 1.8dB Noise Figure at 900MHz
- Low DC Current Consumption of 5mA
- 300MHz to 2500MHz Operation



Functional Block Diagram

Ordering Information

RF2304	General Purpose Low-Noise Amplifier
RF2304 PCBA	Fully Assembled Evaluation Board

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Absolute Maximum Ratings

Parameter	Rating	Unit
Supply Voltage (V_{DD})	-0.5 to +6.5	V_{DC}
DC Current	40	mA
Input RF Power	+10	dBm
Operating Ambient Temperature	-40 to +85	°C
Storage Temperature	-40 to +150	°C

Caution! ESD sensitive device.

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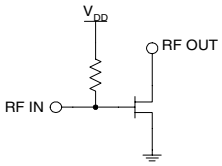
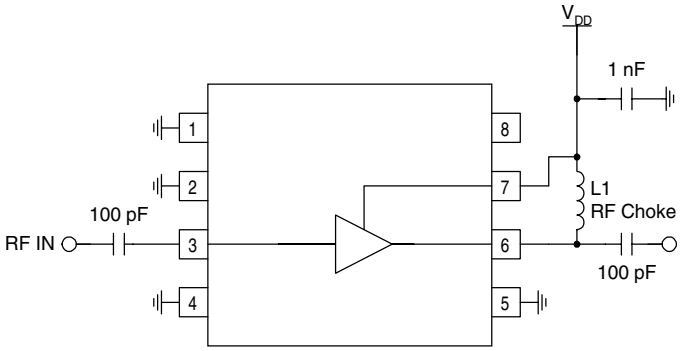
Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
Overall					T=25°C, V_{DD}=5V_{DC}
Nominal Frequency Range		300 to 2500		MHz	
Input IP_3		+8		dBm	
Reverse Isolation		18		dB	
Input VSWR		<2:1			In a 50Ω system
Output VSWR		<2:1			In a 50Ω system
Power Supply Voltage		2.7 to 6.0		V	
Nominal 5V Configuration					V_{DD}=5V_{DC}, Freq=2500MHz, T=25°C
Gain	6	8		dB	
P_{1dB} Output Power		+6		dBm	
Supply Current	7	11	26	mA	
Noise Figure		1.8		dB	900MHz
Noise Figure		2.3		dB	2500MHz
Nominal 3V Configuration					V_{DD}=3V_{DC}, Freq=2500MHz, T=25°C
Gain		7		dB	
P_{1dB} Output Power		+3		dBm	
Supply Current		5.5		mA	
Noise Figure		1.8		dB	900MHz
Noise Figure		2.3		dB	2500MHz

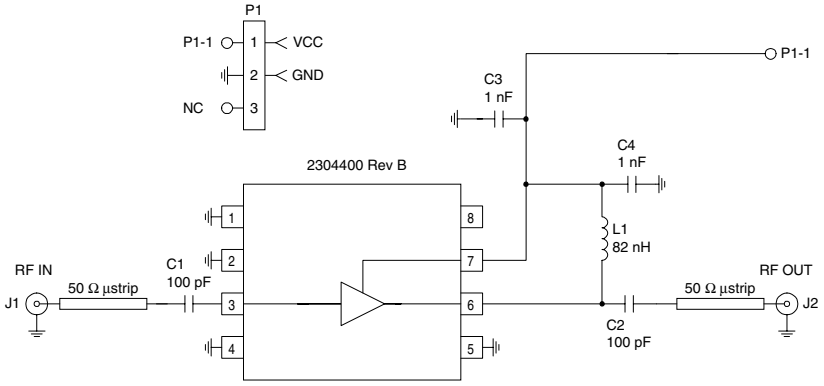
Pin	Function	Description	Interface Schematic
1	GND	Ground connection. Keep traces physically short and connect immediately to ground plane for best performance.	
2	GND	Same as pin 1.	
3	RF IN	DC coupled RF input. A broadband impedance match is produced by internal shunt resistive feedback. The DC level is approximately 200mV. If a DC path exists in the connected circuitry, an external DC blocking capacitor is required to properly maintain the DC operating point.	
4	GND	Same as pin 1.	
5	GND	Same as pin 1.	
6	RF OUT	RF output. A broadband impedance match is produced by internal shunt resistive feedback. The DC connection to the power supply is provided through an external chip inductor having greater than 150Ω reactance at the operating frequency. An external DC blocking capacitor is required if the following circuitry is not DC blocked.	
7	VDD2	Bias control connection. This pin is normally connected to the power supply, but can be used to switch the amplifier on and off by switching between power supply voltage and ground. This pin sinks approximately 600μA when connected to V_{DD}, and sources less than 10μA when grounded.	
8	NC	No connection.	

Application Schematic

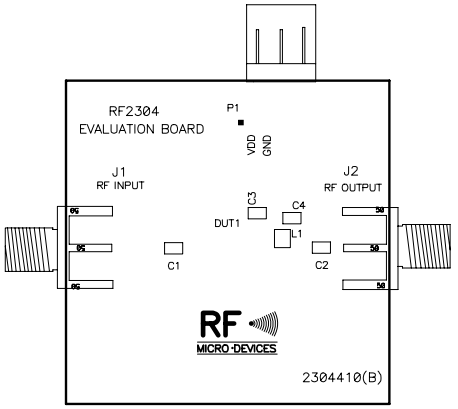


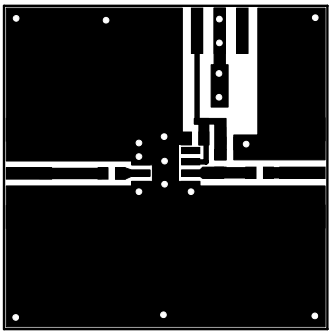
Evaluation Board Schematic

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

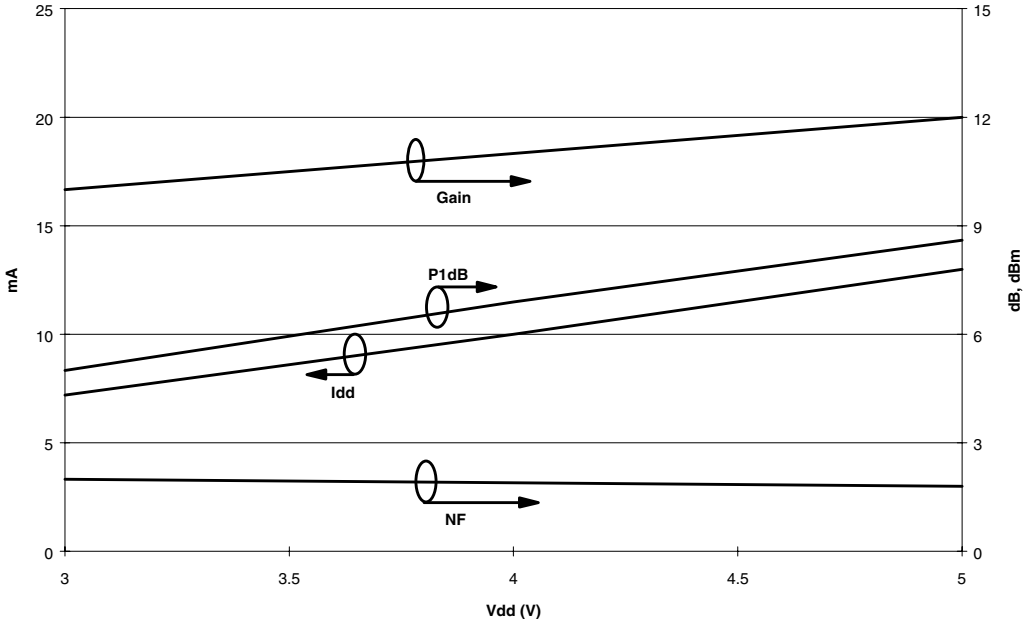


Evaluation Board Layout
1.43” x 1.43”

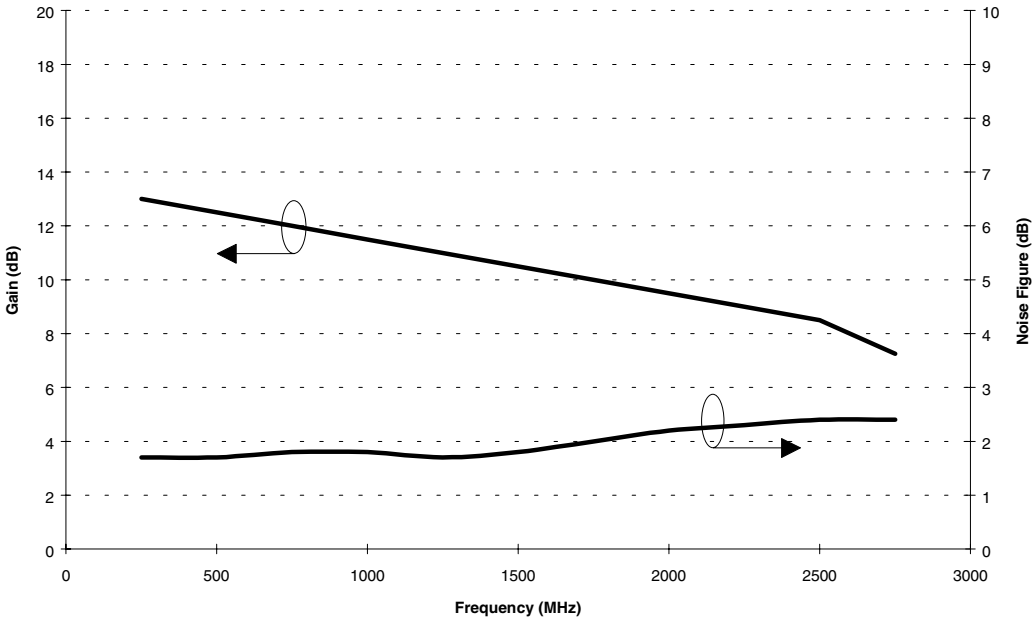




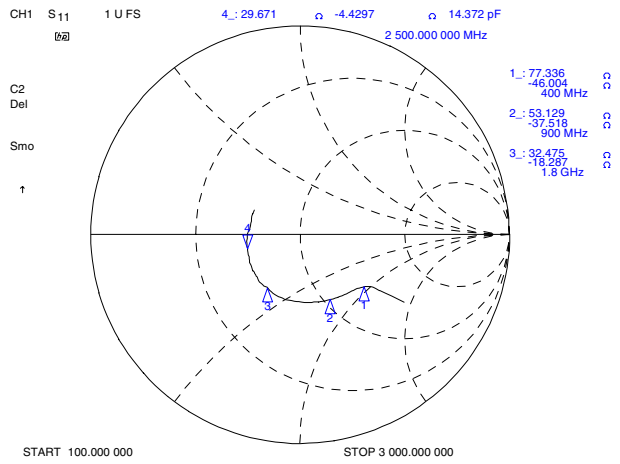
Typical Characteristics
f=900MHz

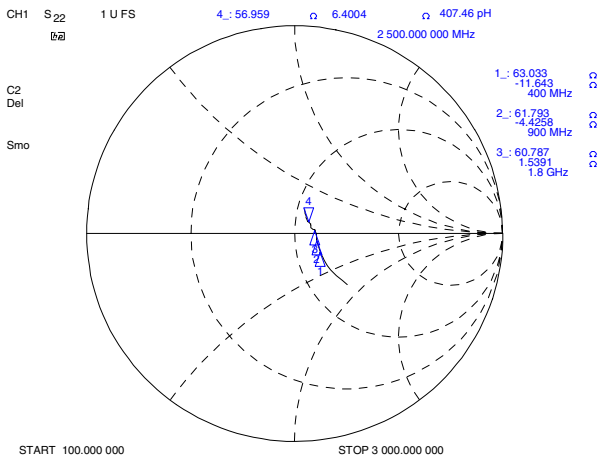


Typical Characteristics
V_{DD}=5.0V



Typical Characteristics with V_{cc}=3.0V Typical Characteristics





Typical Characteristics with V_{cc}=5.0V