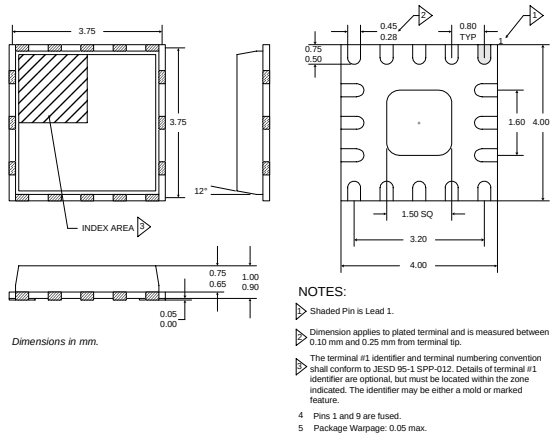
3V, 2.5GHZ LINEAR POWER AMPLIFIER

Typical Applications

- 2.5GHz ISM Band Applications
- PCS Communication Systems
- Wireless LAN Systems
- Commercial and Consumer Systems
- Portable Battery-Powered Equipment
- Broadband Spread-Spectrum Systems

Product Description

The RF2189 is a linear, medium-power, high-efficiency amplifier IC designed specifically for low voltage operation. The device is manufactured on an advanced Gallium Arsenide Heterojunction Bipolar Transistor (HBT) process, and has been designed for use as the final RF amplifier in 2.5GHz spread-spectrum transmitters. The device is provided in a 16-pin leadless chip carrier with a backside ground and is self-contained with the exception of the output matching network and power supply feed line.



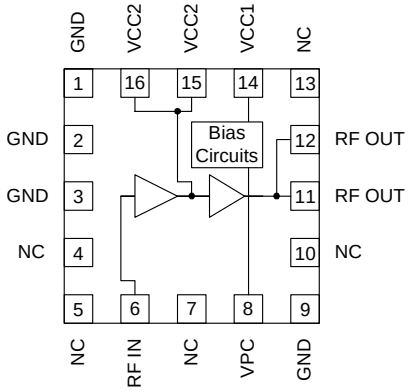
Optimum Technology Matching® Applied

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

Package Style: LCC, 16-Pin, 4x4

Features

- Single 3.3V Power Supply
- +25dBm Saturated Output Power
- 20dB Small Signal Gain
- High Power Added Efficiency
- Power Down Mode
- 1800MHz to 2500MHz Frequency Range



Functional Block Diagram

Ordering Information

RF2189	3V, 2.5GHz Linear Power Amplifier
RF2189 PCBA	Fully Assembled Evaluation Board

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http://www.rfmd.com

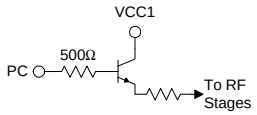
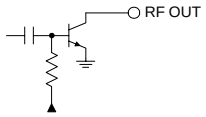
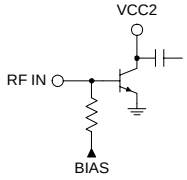
Absolute Maximum Ratings

Parameter	Rating	Unit
Supply Voltage	-0.5 to +6.0	V_{DC}
Power Control Voltage (V_{PC})	-0.5 to 3.3	V
DC Supply Current	350	mA
Input RF Power	+12	dBm
Operating Ambient Temperature	-40 to +85	°C
Storage Temperature	-40 to +150	°C
Moisture sensitivity	JEDEC Level 3	

Refer to "Handling of PSOP and PSSOP Products" on page 16-15 for special handling information.

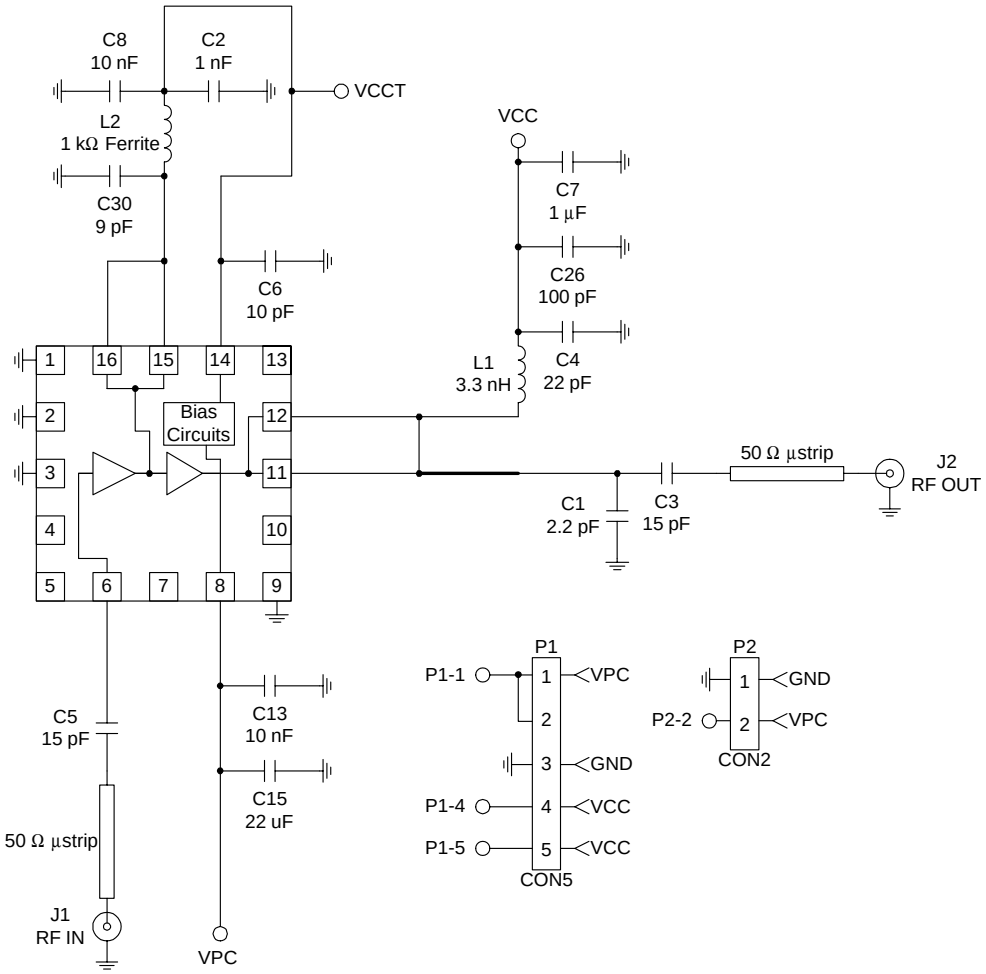
Caution! ESD sensitive device.

Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
Overall					T=25°C, V_{CC}=3.3V, V_{PC}=3.0V, P_{IN}=0dBm, Freq=2450MHz
Frequency Range		1800 to 2500		MHz	
Maximum Saturated Output Power	+23	+24	+26	dBm	P_{IN}=+6dBm
Efficiency at Max Output Power		42		%	
Small Signal Gain	19	20		dB	
Reverse Isolation		30		dB	In "ON" state
		30		dB	In "OFF" state
Second Harmonic		-50		dBc	Including second harmonic trap, see application circuit
IM_3		-30	-23	dBm	P_{OUT}=+17dBm in each tone
IM_5		-35	-30	dBm	P_{OUT}=+17dBm in each tone
IM_7		-48	-35	dBm	P_{OUT}=+17dBm in each tone
Isolation	-20	-30		dBm	In "OFF" state, P_{IN}=0dBm
Input Impedance		50		Ω	
Input VSWR		2:1			
Noise Figure		7		dB	
Power Down					
Power Control "ON"	2.7		3.0	V	Voltage supplied to control input; device is "ON"
Power Control "OFF"		0	0.5	V	Voltage supplied to control input; device is "OFF"
PC Input Impedance	5			kΩ	
Power Supply					
Operating Voltage		3.0 to 5.0		V	
Current Consumption	180	260	320	mA	Power Down "ON", at max output power
	95	150	175	mA	Power Down "ON", two-tone test +20dBm average output power
	50	100	150	mA	Idle current
Current Consumption		<1	10	µA	Power Down "OFF"

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	GND	Same as pin 1.	
4	NC	Not connected.	
5	NC	Not connected.	
6	RF IN	RF input. This input is DC coupled, so an external blocking capacitor is required if this pin is connected to a DC path.	See pin 1.
7	NC	Not connected.	
8	PC	Power control pin. For maximum power this pin should be 3.3V. A higher voltage is not recommended. For less output power and reduced idle current this voltage may be reduced.	
9	GND	Ground connection. Keep traces physically short and connect immediately to ground plane for best performance.	
10	NC	Not internally connected.	
11	RF OUT	RF output and bias for the output stage. The power supply for the output transistor needs to be supplied to this pin. This can be done through a quarter-wave length microstrip line that is RF grounded at the other end, or through an RF inductor that supports the required DC currents.	
12	RF OUT	Same as pin 11.	See pin 11.
13	NC	Not connected.	
14	VCC1	Power supply pin for the bias circuits. External low frequency bypass capacitors should be connected if no other low frequency decoupling is nearby.	See pin 5.
15	VCC2	Bias supply pin for the first stage. A small tuning capacitor is required to set the desired frequency response. External low frequency bypass capacitors should be connected as shown in the application schematic if no other low frequency decoupling is nearby.	
16	VCC2	Connected internally to pin 15.	See pin 15.
Pkg Base	GND	Ground connection. The backside of the package should be connected to the ground plane through a short path, i.e., vias under the device may be required.	See pin 1 and 6.

Evaluation Board Schematic

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



Evaluation Board Layout
Board Size 2.0" x 2.0"
Board Thickness 0.031"; Board Material FR-4