

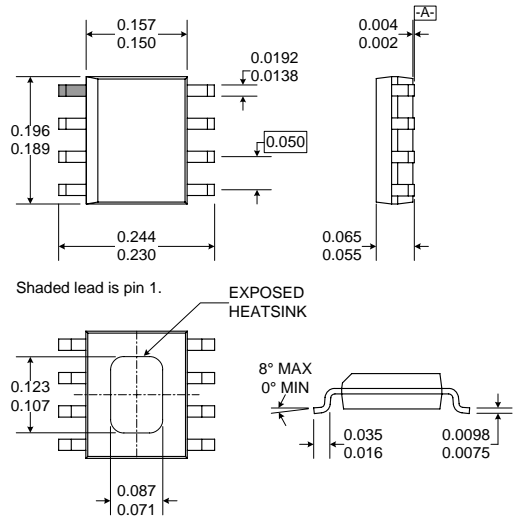
RoHS Compliant & Pb-Free Product

Typical Applications

- 2.14GHz UMTS Systems
- Digital Communication Systems
- PCS Communication Systems
- Commercial and Consumer Systems

Product Description

The RF5187 is a highly-linear, low-power amplifier IC. It has been designed for use as the driver RF amplifier in applications such as W-CDMA basestations. The RF5187 requires an input and output matching network and power supply feed line. The device is manufactured on an advanced Gallium Arsenide HBT process, and is packaged in a 8-pin plastic package with a backside ground.



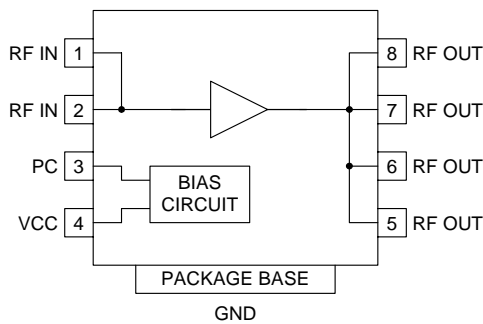
Optimum Technology Matching® Applied

- | | | |
|-------------------------------------|--|---------------------------------------|
| <input type="checkbox"/> Si BJT | <input checked="" type="checkbox"/> GaAs HBT | <input type="checkbox"/> GaAs MESFET |
| <input type="checkbox"/> Si Bi-CMOS | <input type="checkbox"/> SiGe HBT | <input type="checkbox"/> Si CMOS |
| <input type="checkbox"/> InGaP/HBT | <input type="checkbox"/> GaN HEMT | <input type="checkbox"/> SiGe Bi-CMOS |

Package Style: SOIC-8 Slug

Features

- Single 3V to 6V Supply
- 10dBm to 20dBm Ultra Linear Output Power
- 14dB Gain at 2.14GHz
- Power Down Mode
- 800MHz to 2500MHz Operation



Functional Block Diagram

Ordering Information

RF5187 Low Power Linear Amplifier
 RF5187PCBA-41X Fully Assembled Evaluation Board

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RF5187

Absolute Maximum Ratings

| Parameter | Rating | Unit |
|------------------------------------|--------------|-------------|
| Supply Voltage (V_{CC}) | -0.5 to +7.5 | V_{DC} |
| Power Control Voltage (V_{PC}) | -0.5 to +5V | V |
| DC Supply Current | 450 | mA |
| Input RF Power | +20 | dBm |
| Output Load VSWR | 20:1 | |
| Operating Ambient Temperature | -40 to +85 | $^{\circ}C$ |
| Storage Temperature | -40 to +100 | $^{\circ}C$ |



Caution! ESD sensitive device.

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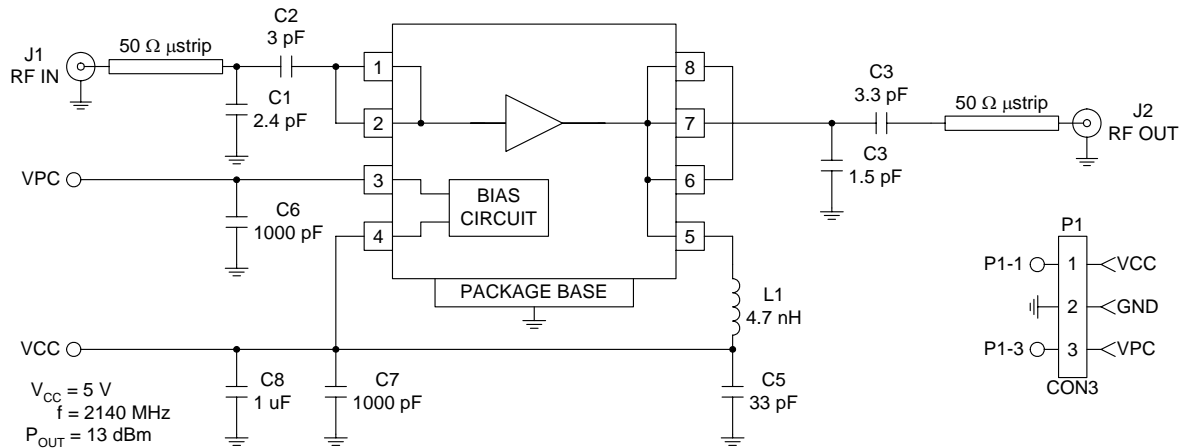
| Parameter | Specification | | | Unit | Condition |
|-------------------------------|---------------|-------|------|---------|---|
| | Min. | Typ. | Max. | | |
| Overall | | | | | $T=25^{\circ}C$, $V_{CC}=5.0V$, $I_{CC}=240mA$, Freq=2140MHz, $P_{OUT}=13dBm$ |
| Frequency Range | 800 | | 2500 | MHz | |
| Output Power | | 13 | | dBm | |
| OP1dB | | 29 | | dBm | |
| Small Signal Gain | 13 | | 15 | dB | |
| Input VSWR | | 1.5:1 | | | With external matching network. |
| Two-Tone Specification | | | | | |
| Output IP3 | 41 | 43 | 45 | dBm | 13dBm per tone. |
| Power Control | | | | | |
| V_{PC} | 2.7 | 3.1 | 3.7 | V | To obtain 240mA idle current. |
| Power Control "OFF" | 0.2 | 0.5 | | V | Threshold voltage at device input. |
| Power Supply | | | | | |
| Power Supply Voltage | 5 | | 6 | V | |
| Supply Current | | | 240 | mA | |
| Power Down Current | | 2 | 10 | μA | $V_{PC}=0.2V$ |

| Pin | Function | Description | Interface Schematic |
|----------|----------|---|---------------------|
| 1 | 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. An optimum match to 50Ω is obtained by providing an external series capacitor of 2.4pF and then a shunt capacitor of 2.4pF. Those values are typical for 2140MHz; other values may be required for other frequencies. | |
| 2 | RF IN | Same as pin 1. | |
| 3 | PC | Power control pin. For obtaining maximum performance, the voltage on this pin can be used to set correct bias level. In a typical application this is implemented by a feedback loop. The feedback can be based on the actual supply current of the device (i.e. maintaining a fixed current level), or it can be based on the RF output power level to maintain a fixed RF power level (Automatic Level Control loop). A voltage of 0.5V or lower brings the part into power down state. | |
| 4 | VCC | Power supply pin for the bias circuits. External low frequency bypass capacitors should be connected if no other low frequency decoupling is nearby. | |
| 5 | 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-wavelength microstrip line that is RF-grounded at the other end, or through an RF inductor that supports the required DC currents. Optimum load impedance is achieved by providing a shunt capacitor of 1.8pF and a series capacitor of 3.3pF. Those values are typical for 2140MHz; other values may be required for other frequencies. Since there are several output pins available (which are internally connected), one pin can be used for connecting the bias, another for connecting a (third) harmonic trap filter, and the other pins for the RF output. | |
| 6 | RF OUT | Same as pin 5. | |
| 7 | RF OUT | Same as pin 5. | |
| 8 | RF OUT | Same as pin 5. | |
| 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). | |

RF5187

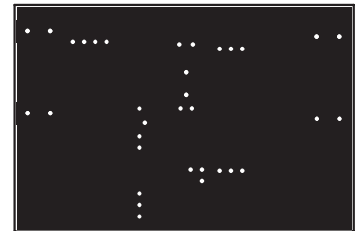
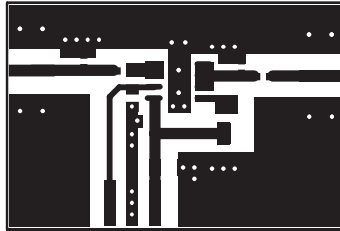
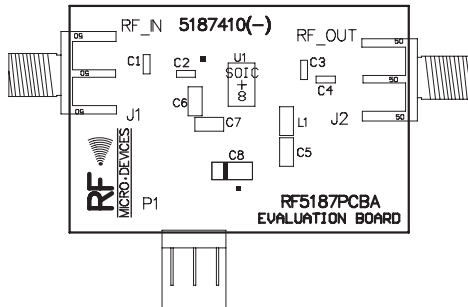
Evaluation Board Schematic 2140MHz Operation

(Download [Bill of Materials](http://www.rfmd.com) from www.rfmd.com.)



Evaluation Board Layout

Board Size 1.5" x 1.0"
Board Thickness 0.031", Board Material FR-4



RF5187