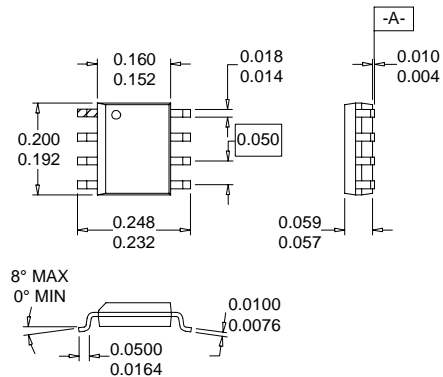


Typical Applications

- DECT Cordless Applications
- PCS Communication Systems
- Commercial and Consumer Systems
- Portable Battery-Powered Equipment

Product Description

The RF2127 is a medium-power, high-efficiency, linear amplifier IC. 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 1800MHz digital PCS phone transmitters requiring linear amplification operating between 1800MHz and 1900MHz, with over 100mW transmitted power. It will also function as the driver stage for the RF2125 high power amplifier. A simple power down function is included for TDD operation.



NOTES:

1. Shaded lead is pin 1.
2. All dimensions are excluding flash, protrusions or burrs.
3. Lead coplanarity: 0.005 with respect to datum "A".
4. Package surface finish: Matte (Charmilles #24-27).

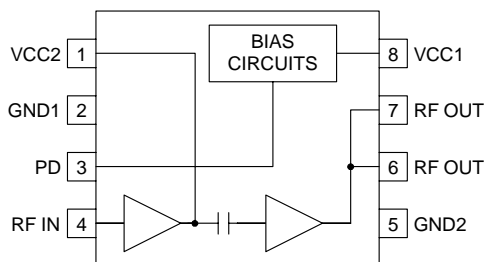
Optimum Technology Matching® Applied

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

Package Style: SOIC-8

Features

- Single 3.0V to 6.5V Supply
- 100mW Linear Output Power
- 25dB Small Signal Gain
- 30% Efficiency
- Digitally Controlled Power Down Mode
- 1500MHz to 1900MHz Operation



Functional Block Diagram

Ordering Information

- RF2127      Medium Power Linear Amplifier  
 RF2127 PCBA      Fully Assembled Evaluation Board

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Fax (336) 664 0454  
<http://www.rfmd.com>

# RF2127

## Absolute Maximum Ratings

| Parameter                       | Rating       | Unit     |
|---------------------------------|--------------|----------|
| Supply Voltage ( $V_{CC}$ )     | -0.5 to +7.5 | $V_{DC}$ |
| Power Down Voltage ( $V_{PD}$ ) | -0.5 to +5.5 | V        |
| DC Supply Current               | 125          | mA       |
| Input RF Power                  | +12          | dBm      |
| Output Load VSWR                | 20:1         |          |
| Operating Ambient Temperature   | -40 to +85   | °C       |
| Storage Temperature             | -40 to +150  | °C       |



**Caution!** ESD sensitive device.

RF Micro Devices believes the furnished information is correct and accurate at the time of this printing. However, RF Micro Devices reserves the right to make changes to its products without notice. RF Micro Devices does not assume responsibility for the use of the described product(s).

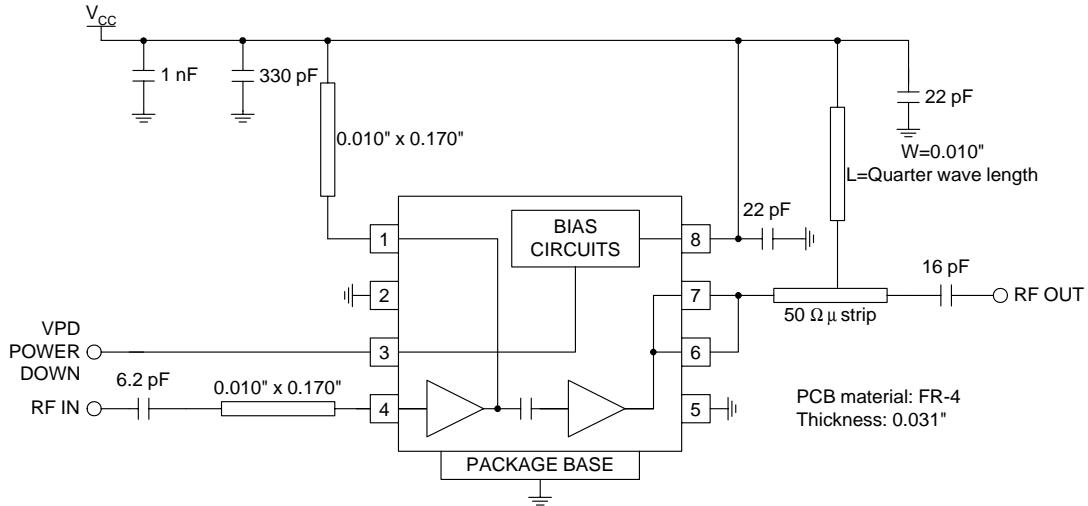
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POWER AMPLIFIERS

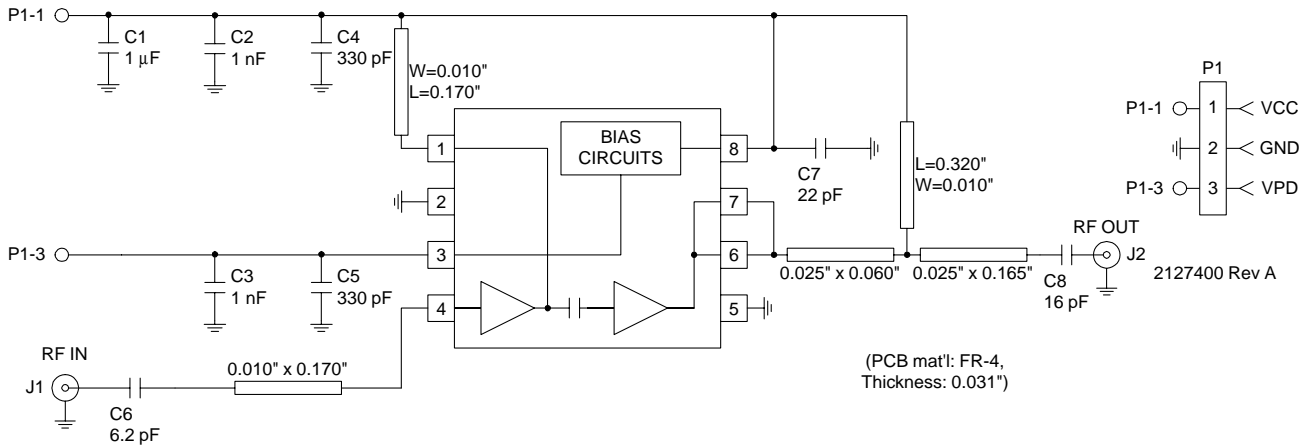
| Parameter                       | Specification |              |      | Unit          | Condition  |
|---------------------------------|---------------|--------------|------|---------------|--|
|                                 | Min.          | Typ.         | Max. |               |  |
| <b>Overall</b>                  |               |              |      |               | $T=25^{\circ}\text{C}$ , $V_{CC}=5\text{V}$ , $V_{PD}=5\text{V}$ , $Z_{LOAD}=106\Omega$ , $P_{IN}=-3\text{dBm}$ , $\text{Freq}=1800\text{MHz}$ |
| Frequency Range                 |               | 1500 to 1900 |      | MHz           |  |
| Maximum Output Power            |               | +20          |      | dBm           | $V_{CC}=5\text{V}$ , $P_{in}=-3\text{dBm}$   |
| Maximum Output Power            |               | +23          |      | dBm           | $V_{CC}=6\text{V}$ , $P_{in}=0\text{dBm}$  |
| Total CW Efficiency             |               | 30           |      | %             | Maximum output, $V_{CC}=V_{PD}=5\text{V}$  |
| Small-signal Gain               | 23            | 25           |      | dB            |  |
| Second Harmonic                 |               | -25          |      | dBc           | $P_{OUT}=20\text{dBm}$   |
| Third Harmonic                  |               | -22          |      | dBc           | $P_{OUT}=20\text{dBm}$   |
| Input VSWR                      |               | 2:1          |      |               |  |
| Input Impedance                 |               | 50           |      | $\Omega$      |  |
| Noise Figure                    |               | 7            |      | dB            |  |
| <b>Two-Tone Specification</b>   |               |              |      |               |  |
| Average Two-Tone Power          |               | +17          |      | dBm           | PEP-3dB  |
| $IM_3$                          |               | -40          |      | dBc           | $P_{OUT}=+14\text{dBm}$ for each tone  |
| $IM_5$                          |               | -45          |      | dBc           | $P_{OUT}=+14\text{dBm}$ for each tone  |
| $IM_7$                          |               | -44          |      | dBc           | $P_{OUT}=+14\text{dBm}$ for each tone  |
| Two-Tone Power-Added Efficiency |               | 36           |      | %             |  |
| <b>Power Control</b>            |               |              |      |               |  |
| Power Down "ON"                 |               | $V_{CC}$     |      | V             | Voltage supplied to the input; Part is "ON"  |
| Power Down "OFF"                | 0             |              | 1.2  | V             | Voltage supplied to the input; Part is "OFF"   |
| <b>Power Supply</b>             |               |              |      |               |  |
| Voltage                         |               | 5            |      | V             | Specifications   |
|                                 |               | 3.0 to 6.5   |      | V             | Operating Limits   |
| Current                         |               | 50           | 65   | mA            | Operating Idle   |
|                                 |               | 80           |      | mA            | Maximum output   |
|                                 |               |              | 10   | $\mu\text{A}$ | Power Down   |

| Pin | Function | Description   | Interface Schematic |
|-----|----------|---|---------------------|
| 1   | VCC2     | Power supply for the driver stage and interstage matching. Matching is typically done by a microstrip line to $V_{CC}$ that is RF grounded at the $V_{CC}$ side. See the application information for details.   |                     |
| 2   | GND1     | Ground connection for the driver stage. Keep traces physically short and connect immediately to the ground plane for best performance. This connection should be separated from the ground connection for the output stage, i.e., using separate traces and vias.   |                     |
| 3   | PD       | Power Down control. When this pin is "low", all circuits are shut off. A "low" is typically 1.2V or less at room temperature. When this pin is "high", all circuits are operating normally. A "high" is $V_{CC}$ . If $V_{PD}$ is below $V_{CC}$ , output power and performance will be degraded. This could be used to obtain some gain control, but results are not guaranteed. |                     |
| 4   | RF IN    | RF Input. This is a $50\ \Omega$ input, but the actual impedance depends on the matching provided on pin 1. An external DC blocking capacitor is required if this port is connected to a DC path to ground.   |                     |
| 5   | GND2     | Ground connection for the output stage. Keep traces physically short and connect immediately to the ground plane for best performance. This connection should be separated from the ground connection for the driver stage, i.e., using separate traces and vias.   |                     |
| 6   | RF OUT   | RF Output and power supply for the output stage. Bias for the output stage needs to be provided on this pin. This can be done through a quarter-wave microstrip that is RF grounded on the other end. For matching to $50\ \Omega$ , an external series microstrip line is required.  |                     |
| 7   | RF OUT   | Same as pin 6.  |                     |
| 8   | VCC1     | Power supply for the bias circuits. An external RF bypass capacitor of 22 pF is required. Keep the traces to the capacitor as short as possible, and connect the capacitor immediately to the ground plane.   |                     |

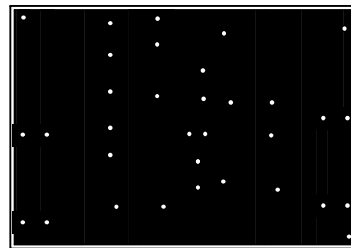
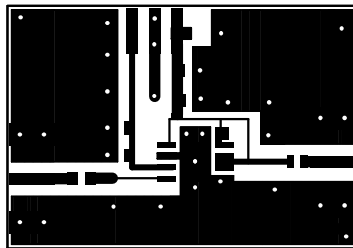
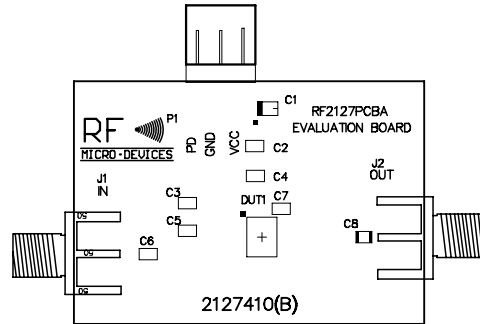
## Application Schematic 1850MHz



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



Evaluation Board Layout  
Board Size 1.55" x 1.07"



**RF2127**

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**POWER AMPLIFIERS**