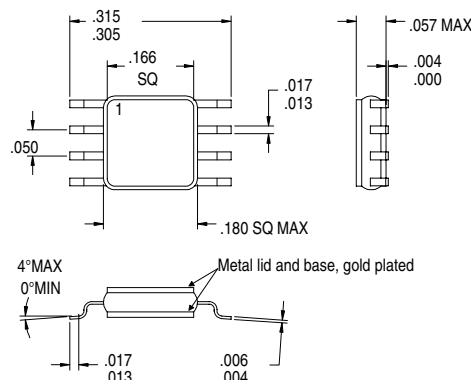


### Typical Applications

- PCS Communication Systems
- 2.5GHz ISM Band Applications
- Wireless LANs
- Commercial and Consumer Systems
- Portable Battery Powered Equipment

### Product Description

The RF2128 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 2.45GHz ISM applications such as WLAN and POS terminals. The part also will function as the final stage in digital PCS phone transmitters requiring linear amplification operating between 1900MHz and 2200MHz, with over 100mW transmitted power, or as the driver stage for the RF2125 high power amplifier. A simple power down function is included for TDD operation.



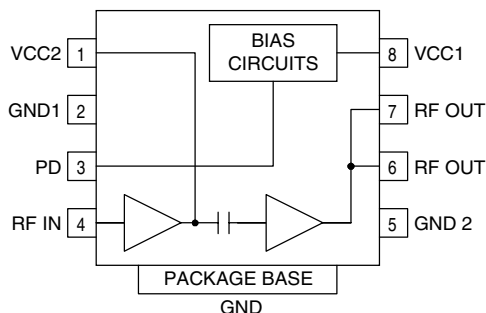
### Optimum Technology Matching® Applied

- |                                     |  |                                      |
|-------------------------------------|--|--------------------------------------|
| <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     |

### Package Style: SOP-8-C

### Features

- Single 3.0V to 6.5V Supply
- 100mW Linear Output Power
- 25dB Small Signal Gain
- 30% Efficiency
- Digitally Controlled Power Down Mode
- 1900MHz to 2500MHz Operation



Functional Block Diagram

### Ordering Information

- |             |                                  |
|-------------|----------------------------------|
| RF2128      | Medium Power Linear Amplifier    |
| RF2128 PCBA | Fully Assembled Evaluation Board |

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Greensboro, NC 27409, USA

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<http://www.rfmd.com>

### Absolute Maximum Ratings

| Parameter                       | Rating      | Unit     |
|---------------------------------|-------------|----------|
| Supply Voltage ( $V_{CC}$ )     | +7.5        | $V_{DC}$ |
| Power Down Voltage ( $V_{PD}$ ) | +5.5        | V        |
| DC Supply Current               | 125         | mA       |
| Input RF Power                  | +12         | dBm      |
| Output Load VSWR                | 20:1        |          |
| Operating Case Temperature      | -40 to +100 | °C       |
| Operating Ambient Temperature   | -40 to +85  | °C       |
| Storage Temperature             | -40 to +150 | °C       |



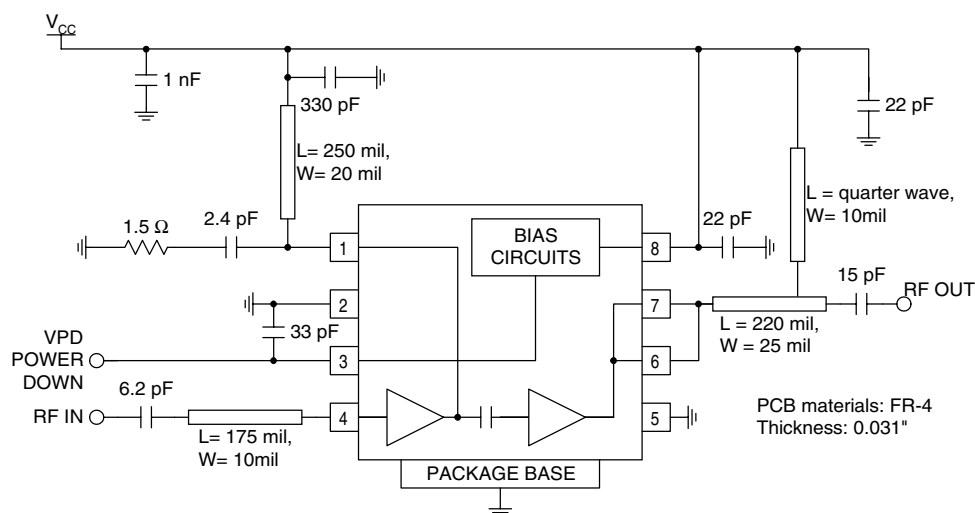
**Caution!** ESD sensitive device.

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| Parameter                       | Specification |                 |      | Unit          | Condition  |
|---------------------------------|---------------|-----------------|------|---------------|--|
|                                 | Min.          | Typ.            | Max. |               |  |
| <b>Overall</b>                  |               |                 |      |               | $T=25^{\circ}\text{C}$ , $V_{CC}=5\text{V}$ , $V_{PD}=5.0\text{V}$ ,<br>Freq=2400MHz |
| Frequency Range                 |               | 1900 to 2500    |      | MHz           |  |
| Maximum Output Power            |               | >+20            |      | dBm           | $V_{CC}=5.0\text{V}$ , $V_{PD}=5.0\text{V}$ , $P_{IN}=-3.0\text{dBm}$                |
| Maximum Output Power            |               | >+23            |      | dBm           | $V_{CC}=6.0\text{V}$ , $V_{PD}=5.5\text{V}$ , $P_{IN}=0\text{dBm}$                   |
| Total CW Efficiency             |               | 30              |      | %             | Maximum output   |
| Small-signal Gain               |               | 25              |      | dB            |  |
| Second Harmonic                 |               | -25             |      | dBc           |  |
| Third Harmonic                  |               | -22             |      | dBc           |  |
| Isolation                       |               | 15              |      | dB            | $V_{PD}=0.2\text{V}$   |
| 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  |
| $IM_3$                          |               | -24             |      | dBc           | $P_{OUT}=+14\text{dBm}$ for each tone  |
| $IM_5$                          |               | -36             |      | 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 Down Control</b>       |               |                 |      |               |  |
| Power Down "ON"                 |               | $V_{CC}$        |      | V             | Voltage supplied to the input; device is "on"  |
| Power Down "OFF"                | 0             |                 | 1.2  | V             | Voltage supplied to the input; device is "off"                                       |
| <b>Power Supply</b>             |               |                 |      |               |  |
| Voltage                         |               | 5<br>3.0 to 6.5 |      | V<br>V        | Specifications<br>Operating  |
| Current                         |               | 50              | 65   | mA            | Operating Idle   |
|                                 |               | 85              |      | mA            | At maximum output power  |
| Current                         |               |                 | 10   | $\mu\text{A}$ | Power Down   |

| Pin      | Function | Description   | Interface Schematic |
|----------|----------|---|---------------------|
| 1        | VCC2     | Power supply for the driver stage and interstage matching. External matching on this pin is required to optimize the gain. The matching on this port also greatly affects the input impedance. A decoupling capacitor of 330pF is required, together with a series RC for tuning for maximum gain at the desired frequency. 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.  |                     |
| 3        | PD       | Power Down control. When this pin is "low", all circuits are shut off. A "low" is typical 1.2V or less at room temperature. When this pin is "high", all circuits are operating normally. A "high" is $V_{CC}$ . If 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.  |                     |
| 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 22pF is required. Keep the traces to the capacitor as short as possible, and connect the capacitor immediately to the ground plane.  |                     |
| 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.   |                     |

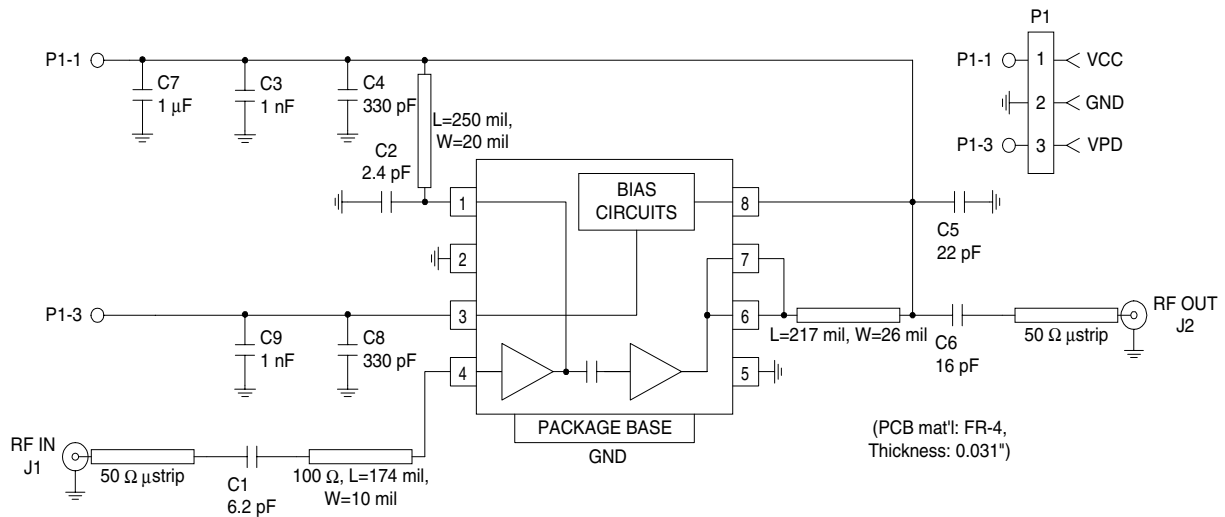
## Application Schematic 2450 MHz



## Evaluation Board Schematic 2450MHz Operation

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

2128400 Rev -



## Evaluation Board Layout 1.547" x 1.068"

