# RF2126

HIGH POWER LINEAR AMPLIFIER

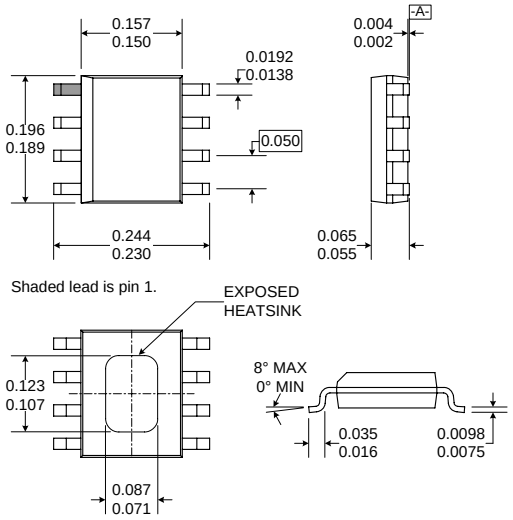
***RoHS Compliant & Pb-Free Product***

## Typical Applications

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

## Product Description

The RF2126 is a high-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 2.45 GHz ISM applications such as WLAN and POS terminals. The part will also function as the final stage in digital PCS phone transmitters requiring linear amplification operating between 1800MHz and 2500MHz. The device is packaged in an 8-lead plastic package with a backside ground. The device is self-contained with the exception of the output matching network and power supply feed line. It produces a typical output power level of 1W.



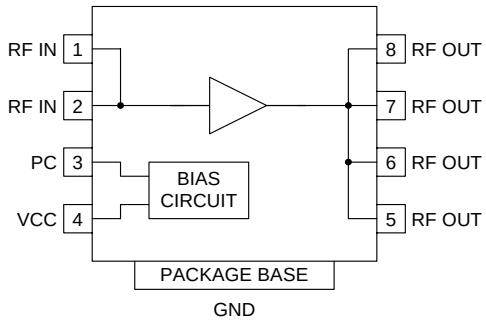

Package Style: SOIC-8 Slug

## Optimum Technology Matching® Applied

- ☐ Si BJT
- ☑ GaAs HBT
- ☐ GaAs MESFET
- ☐ Si Bi-CMOS
- ☐ SiGe HBT
- ☐ Si CMOS
- ☐ InGaP/HBT
- ☐ GaN HEMT
- ☐ SiGe Bi-CMOS

## Features

- Single 3V to 6.5V Supply
- 1.3W Output Power
- 12dB Gain
- 45% Efficiency
- Power Down Mode
- 1800MHz to 2500MHz Operation




Functional Block Diagram

## Ordering Information

| | |
|---|---|
| RF2126 | High Power Linear Amplifier |
| RF2126 PCBA | Fully Assembled Evaluation Board |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## 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 | °C |
| Storage Temperature | -40 to +125 | °C |

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

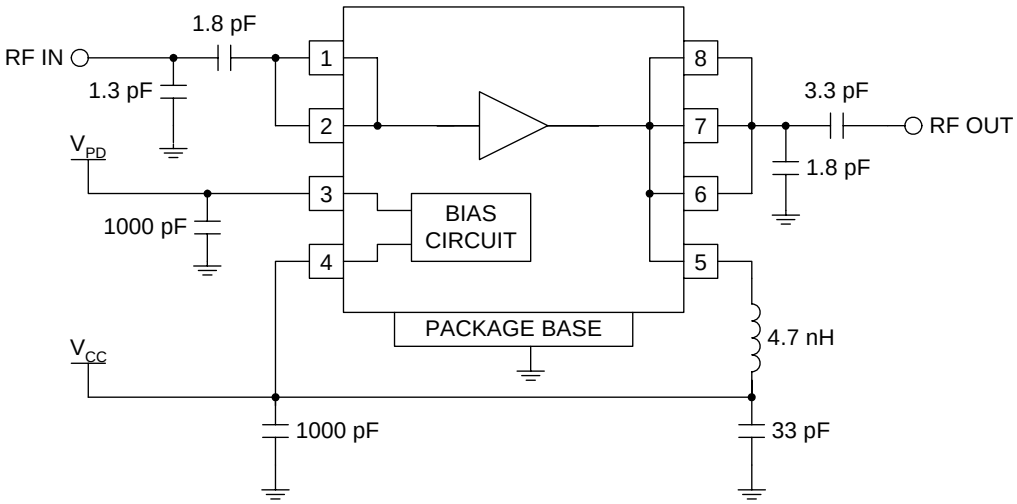
**Caution!** ESD sensitive device.



| Parameter | Specification | | | Unit | Condition |
|---|---|---|---|---|---|
| | Min. | Typ. | Max. | | |
| **Overall** | | | | | T=25°C, $V_{CC}$=6.0V, $V_{PC}$=3.0V, $Z_{LOAD}$=12Ω, $P_{in}$ = 0dBm, Freq=2450MHz, Idle current=180mA |
| Frequency Range | 1800 | | 2500 | MHz | |
| Maximum Output Power | | +27.0 | | dBm | $V_{CC}$=3.6V, $P_{IN}$=+19dBm |
| Maximum Output Power | | +29 | | dBm | $V_{CC}$=4.8V, $P_{IN}$=+19dBm |
| Maximum Output Power | +30.0 | +31.0 | | dBm | $V_{CC}$=6.0V, $P_{IN}$=+19dBm |
| Total Power Added Efficiency | | 45 | | % | Maximum output, $V_{CC}$=3.6V |
| Total Power Added Efficiency | | 45 | | % | Maximum output, $V_{CC}$=4.8V |
| Total Power Added Efficiency | | 45 | | % | Maximum output, $V_{CC}$=6.0V |
| Small-signal Gain | | 12 | | dB | |
| Second Harmonic | | -55 | | dBc | See Application Schematic, $P_{IN}$=+17dBm |
| Third Harmonic | | -60 | | dBc | |
| Input VSWR | | 1.5:1 | | | With external matching network; see application schematic |
| **Two-tone Specification** | | | | | |
| Average Two-Tone Power | | +27 | | dBm | PEP-3dB |
| $IM_3$ | -24 | -25 | | dBc | $P_{OUT}$=+24dBm for each tone |
| $IM_5$ | | -35 | | dBc | $P_{OUT}$=+24dBm for each tone |
| $IM_7$ | | -55 | | dBc | $P_{OUT}$=+24dBm for each tone |
| **Power Control** | | | | | |
| $V_{PC}$ | 1.5 | 3.0 | 3.5 | V | To obtain 180mA idle current |
| Power Control “OFF” | 0.2 | 0.5 | | V | Threshold voltage at device input |
| **Power Supply** | | | | | |
| Power Supply Voltage | 3.0 | | 6.5 | V | |
| Supply Current | 270 | 350 | 410 | mA | $P_{OUT}$=+30dBm, $V_{CC}$=6.0V |
| Power Down Current | | 0.5 | 10 | µA | $V_{PC}$=0.2V |

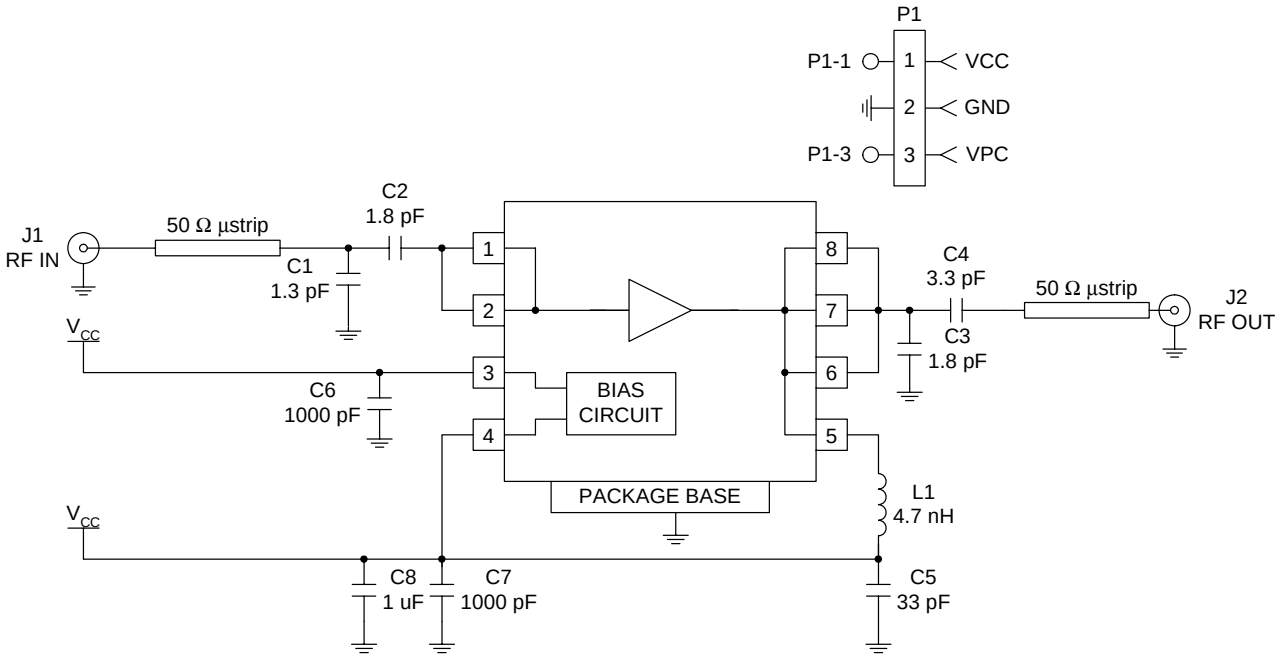
| Pin | Function | Description | Interface Schematic |
|---|---|---|---|
| 1 | RF IN | RF input. This input is DC coupled, so an external blocking capacitor is required if this pin is connected to a DC path. An optimum match to 50Ω is obtained by providing an external series capacitor of 1.8pF and then a shunt capacitor of 1.3pF; see the Application Schematic. Those values are typical for 2450MHz; 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; see the Application Schematic. Those values are typical for 2450MHz; 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. | |

## Application Schematic
## 2450MHz Operation



# Evaluation Board Schematic
# 2450 MHz Operation

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



# Evaluation Board Layout
## 1.5” x 1.0”
Board Thickness 0.031”, Board Material FR-4