# RF2137

## LINEAR POWER AMPLIFIER

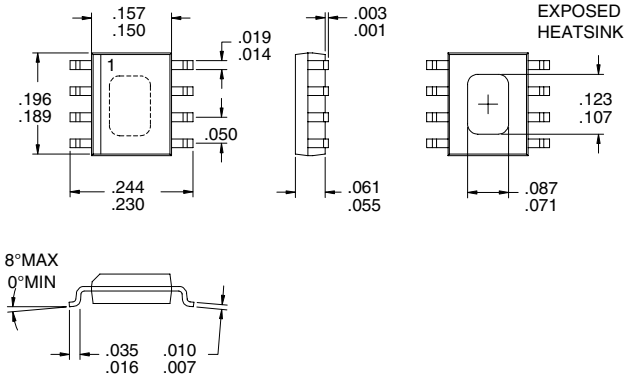


### Typical Applications

- 4.8V AMPS Cellular Handsets
- 4.8V CDMA/AMPS Handsets
- 4.8V JCDMA/TACS Handsets
- Driver Amplifier in Cellular Base Stations
- Portable Battery Powered Equipment

### Product Description

The RF2137 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 dual-mode 4-cell CDMA/AMPS hand-held digital cellular equipment, spread spectrum systems, and other applications in the 800MHz to 950MHz band. The device is self-contained with 50Ω input and the output can be easily matched to obtain optimum power, efficiency, and linearity characteristics at all recommended supply voltages.




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

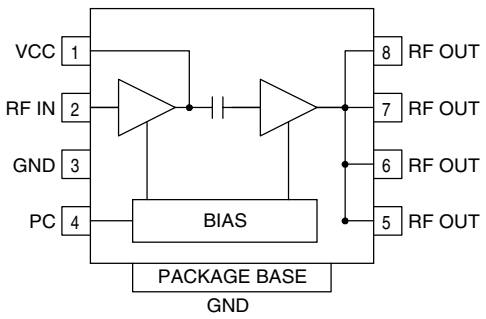
**Package Style: PSOP-8**

### Optimum Technology Matching® Applied

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

### Features

- Single 4.2V to 6.0V Supply
- Up to 29 dBm Linear Output Power
- 27dB Gain With Analog Gain Control
- 45% Linear Efficiency
- On-board Power Down Mode
- 800MHz to 950MHz Operation




**Functional Block Diagram**

### Ordering Information

| | |
|---|---|
| RF2137 | Linear Power Amplifier |
| RF2137 PCBA | Fully Assembled Evaluation Board |

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## Absolute Maximum Ratings

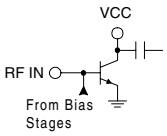
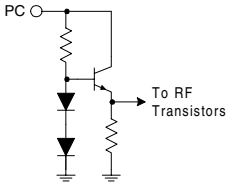
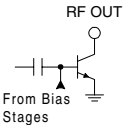
| Parameter | Rating | Unit |
|---|---|---|
| Supply Voltage (No RF) | -0.5 to +8.0 | $V_{DC}$ |
| Supply Voltage ($P_{OUT}$<31 dBm) | -0.5 to +6.0 | $V_{DC}$ |
| Power Control Voltage ($V_{PC}$) | -0.5 to +6.0 or $V_{CC}$ | V |
| DC Supply Current | 800 | mA |
| Input RF Power | +12 | dBm |
| Output Load VSWR | 10:1 | |
| Ambient Operating Temperature | -30 to +90 | °C |
| Storage Temperature | -40 to +150 | °C |

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

**Caution!** ESD sensitive device.



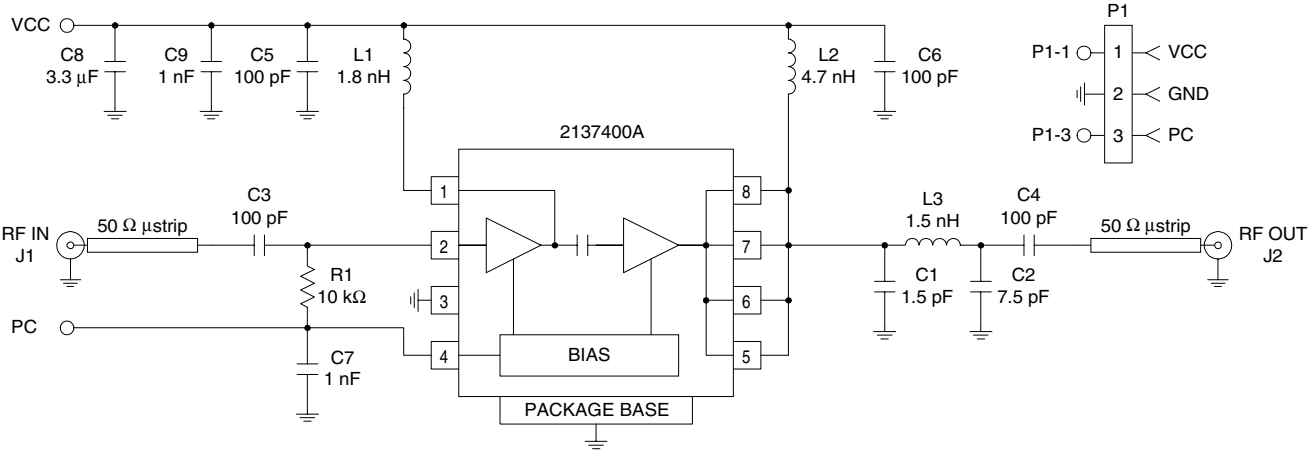
| Parameter | Specification | | | Unit | Condition |
|---|---|---|---|---|---|
| | Min. | Typ. | Max. | | |
| **Overall** | | | | | T=25 °C, $V_{CC}$=5.0 V, $V_{PC}$=3.6 V, Freq=824 MHz to 849 MHz |
| Usable Frequency Range | 800 | 824 to 849 | 950 | MHz | |
| Linear Gain | 25 | 27 | 29 | dB | |
| Total Linear Efficiency | 40 | 45 | | % | |
| Efficiency at Max Output | 50 | 55 | | % | |
| OFF Isolation | | 27 | | dB | $V_{PC}$=0 V, $P_{IN}$=+6 dBm |
| Second Harmonic | | -30 | | dBc | Including Second Harmonic Trap |
| Maximum Linear Output Power | | 28.5 | 29 | dBm | IS-95A CDMA Modulation |
| Adjacent Channel Power @ 885 kHz offset | | -46 | -44 | dBc | Pout = 28 dBm ACPR can be improved by trading off efficiency. |
| Adjacent Channel Power @ 1.98 MHz offset | | -58 | -56 | dBc | Pout = 28 dBm |
| Max CW Output Power | 31.5 | +32.0 | | dBm | |
| Input VSWR | | <2:1 | | | |
| Output Load VSWR | | | 10:1 | | No oscillations |
| **Power Down** | | | | | |
| Turn On/Off Time | | | 100 | ns | |
| Total Current | | | 10 | µA | “OFF” State |
| $V_{PC}$ “OFF” Voltage | 0.2 | | 0.5 | V | Threshold Voltage at Input |
| $V_{PC}$ “ON” Voltage | 3.6 | | Vcc | V | Threshold Voltage at Input |
| **Power Supply** | | | | | |
| Power Supply Voltage | 4.2 | 5.0 | 6.0 | V | Operating voltage |
| Idle Current | | 40 | 100 | mA | $V_{PC}$=4.0 V |
| Current into VPC pin | | 15 | 20 | mA | |

| Pin | Function | Description | Interface Schematic |
|---|---|---|---|
| 1 | VCC | Power supply for the driver stage, and interstage matching. Shunt inductance is required on this pin, which can be achieved by an inductor to $V_{CC}$, with a decoupling capacitor on the $V_{CC}$ side. The value of the inductor is frequency dependent; 3.3nH is required for 830MHz, and 1.2nH for 950MHz. Instead of an inductor, a high impedance microstrip line can be used. |  |
| 2 | RF IN | RF input. This is a 50Ω input, but the actual input impedance depends on the interstage matching network connected to pin 1. An external DC blocking capacitor is required if this port is connected to a DC path to ground or a DC voltage. | See pin 1. |
| 3 | GND | Ground connection. Keep traces physically short and connect immediately to the ground plane for best performance. | |
| 4 | PC | Power Control. When this pin is "low", all circuits are shut off. A "low" is typically 0.5V or less at room temperature. During normal operation this pin is the power control. Control range varies from about 2V for 0dBm to $V_{CC}$ for +31dBm RF output power. The maximum power that can be achieved depends on the actual output matching. PC should never exceed 6.0V or $V_{CC}$, whichever is lowest. |  |
| 5 | RF OUT | RF Output and power supply for the output stage. The three output pins are combined, and bias voltage for the final stage is provided through these pins. The external path must be kept symmetric until combined to ensure stability. An external matching network is required to provide the optimum load impedance; see the application schematics for details. |  |
| 6 | RF OUT | Same as pin 5. | See pin 5. |
| 7 | RF OUT | Same as pin 5. | See pin 5. |
| 8 | RF OUT | Same as pin 5. | See 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. | |

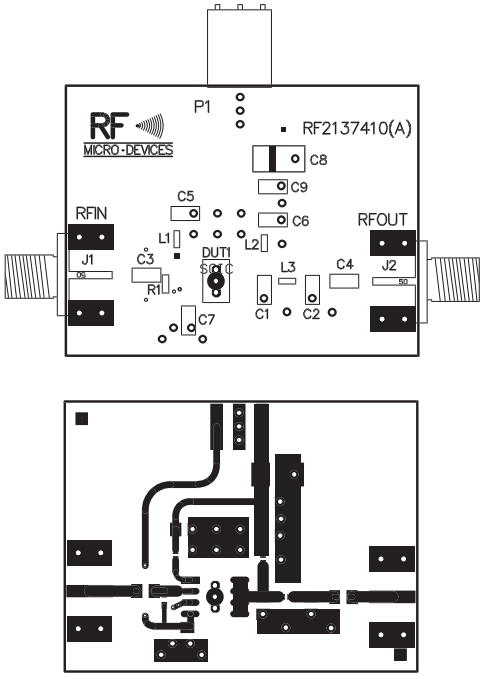


## Evaluation Board Schematic

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



# Evaluation Board Layout
# 1.559" X 1.191"



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