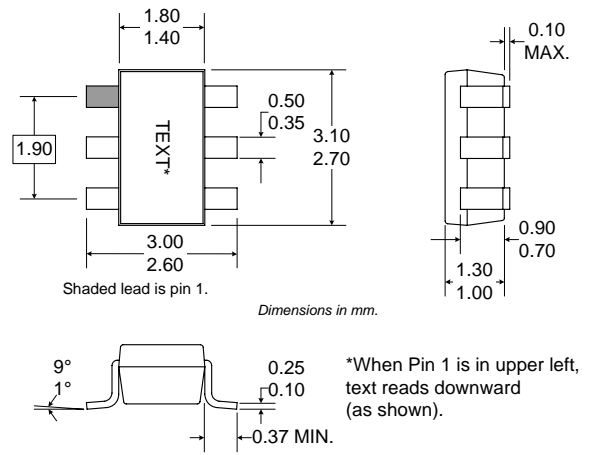


- Typical Applications
- CDMA PCS/Cellular Handsets
  - TDMA PCS/Cellular Handsets
  - W-CDMA Handsets

**Product Description**

The RF2377 is a linear variable gain amplifier suitable for use in TDMA and CDMA systems in the cellular or PCS band and for W-CDMA systems. The features of this device include linear gain control, high gain, and high linearity. The IC is manufactured on an advanced Gallium Arsenide Heterojunction Bipolar Transistor (GaAs HBT) process and is featured in an industry-standard miniature 6-lead plastic SOT package.

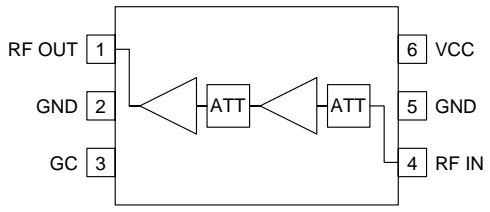


Optimum Technology Matching® Applied

- |                                     |  |                                       |
|-------------------------------------|--|---------------------------------------|
| <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: SOT23-6

- Features**
- 50dB Linear Gain Control Range
  - 24dB Maximum Gain
  - Single 2.7V to 3.3V Supply
  - 45mA Supply Current
  - High Linearity



Functional Block Diagram

**Ordering Information**

RF2377      PCS/Cellular TDMA/CDMA/W-CDMA Linear Variable Gain Amplifier

RF2377-410 PCB Fully Assembled Evaluation Board, PCS

RF2377-411 PCB Fully Assembled Evaluation Board, W-CDMA

RF Micro Devices, Inc.      Tel (336) 664 1233  
7628 Thorndike Road      Fax (336) 664 0454  
Greensboro, NC 27409, USA      <http://www.rfmd.com>

# RF2377

## Absolute Maximum Ratings

| Parameter                     | Rating      | Unit            |
|-------------------------------|-------------|-----------------|
| Supply Voltage                | 0 to +5.0   | V <sub>DC</sub> |
| DC Current                    | 100         | mA              |
| Operating Ambient Temperature | -20 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).

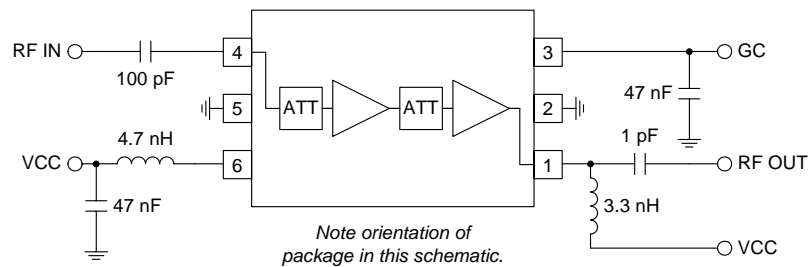
| Parameter                         | Specification |              |       | Unit | Condition  |
|-----------------------------------|---------------|--------------|-------|------|--|
|                                   | Min.          | Typ.         | Max.  |      |  |
| <b>Overall</b>                    |               |              |       |      | V <sub>CC</sub> =2.8V, V <sub>GC</sub> =2.0V, T=25°C   |
| Usable Frequency Range            |               | 800 to 2200  |       | MHz  |  |
| Linear Gain Control Range         | 50            |              |       | dB   |  |
| Gain Control Slope                |               | 70           |       | dB/V |  |
| <b>TDMA</b>                       |               |              |       |      | V <sub>CC</sub> =2.8V, V <sub>GC</sub> =2.0V, T=25°C   |
| Operating Frequency               |               | 1880         |       | MHz  |  |
| Maximum Small Signal Gain         | 22            | 24           | 27    | dB   | Over entire gain control range   |
| Input VSWR                        |               | 1.5:1        | 2.5:1 |      |  |
| Output IP3                        | +23           | +26          |       | dBm  |  |
| Noise Figure                      |               | 7            |       | dB   | Maximum gain   |
| Maximum Average Output Power      |               | +8           |       | dBm  | TDMA modulation  |
| Adjacent Channel Power Rejection  |               | -33          | -32   | dBc  | TDMA modulation; P <sub>OUT</sub> =+8dBm   |
| Alternate Channel Power Rejection |               | -61          | -57   | dBc  | TDMA modulation; P <sub>OUT</sub> =+8dBm   |
| <b>CDMA</b>                       |               |              |       |      | V <sub>CC</sub> =2.8V, V <sub>GC</sub> =2.0V, T=25°C   |
| Operating Frequency               |               | 1880         |       | MHz  |  |
| Maximum Small Signal Gain         | 22            | 24           | 27    | dB   | Over entire gain control range   |
| Input VSWR                        |               | 1.5:1        | 2.5:1 |      |  |
| Output IP3                        | +23           | +26          |       | dBm  |  |
| Noise Figure                      |               | 7            |       | dB   | Maximum gain   |
| Maximum Average Output Power      |               | +11          |       | dBm  | CDMA modulation; V <sub>CC</sub> =3.0V, maximum gain setting, ACPR <sub>≤</sub> -52dBc.  |
| Adjacent Channel Power Rejection  |               | -53          |       | dBc  | CDMA modulation; V <sub>CC</sub> =3.0V. For P <sub>IN</sub> >-16dBm, adjustment of P <sub>IN</sub> is required to maintain ACPR performance over gain control range. For P <sub>IN</sub> ≤-16dBm, ACPR performance is maintained over entire gain control range. |
| <b>W-CDMA</b>                     |               |              |       |      | V <sub>CC</sub> =2.8V, T=25°C  |
| Operating Frequency               |               | 1920 to 1980 |       | MHz  |  |
| Small Signal Gain                 | 20            | 22           | 24    | dB   | V <sub>GC</sub> =2.0V  |
|                                   | -33           | -32          | -31   | dB   | V <sub>GC</sub> =0.3V  |
| Input VSWR                        |               | 1.5:1        | 2.5:1 |      | Over entire gain control range   |
| Output IP3                        | +22           | +24          |       | dBm  |  |
| Noise Figure                      | 4             | 5            | 6     | dB   | Maximum gain   |
|                                   | 32            | 32.5         | 34    | dB   | Minimum gain   |
| Maximum Linear Output Power       | +8            | +9           |       | dBm  | W-CDMA ACPR<-46dBc, V <sub>GC</sub> =2.0V  |
| Adjacent Channel Power Rejection  |               | -48          | -46   | dBc  | W-CDMA modulation; V <sub>GC</sub> =2.0V, P <sub>IN</sub> <-12dBm  |
|                                   |               |              | -43   | dBc  | W-CDMA modulation; Over entire gain control range, P <sub>IN</sub> <-17dBm   |
|                                   |               |              | -43   | dBc  | W-CDMA modulation; V <sub>GC</sub> =1.0V, P <sub>IN</sub> <-14dBm  |

| Parameter            | Specification |            |      | Unit | Condition                  |
|----------------------|---------------|------------|------|------|----------------------------|
|                      | Min.          | Typ.       | Max. |      |                            |
| <b>Power Supply</b>  |               |            |      |      | T = 25°C                   |
| Supply Voltage       |               | 2.8        |      | V    | Specifications             |
| Gain Control Voltage |               | 2.7 to 3.3 |      | V    | Operating range            |
| Supply Current       | 32            | 0 to 2.0   | 65   | mA   | $V_{CC}=2.8V, V_{GC}=2.0V$ |
|                      |               | 45         |      | mA   | $V_{CC}=3.0V, V_{GC}=2.0V$ |
|                      |               | 56         |      | mA   | $V_{CC}=2.8V, V_{GC}=0.4V$ |
| $V_{GC}$ Current     |               |            | 20   | mA   |                            |
|                      |               |            | 1.5  | mA   |                            |

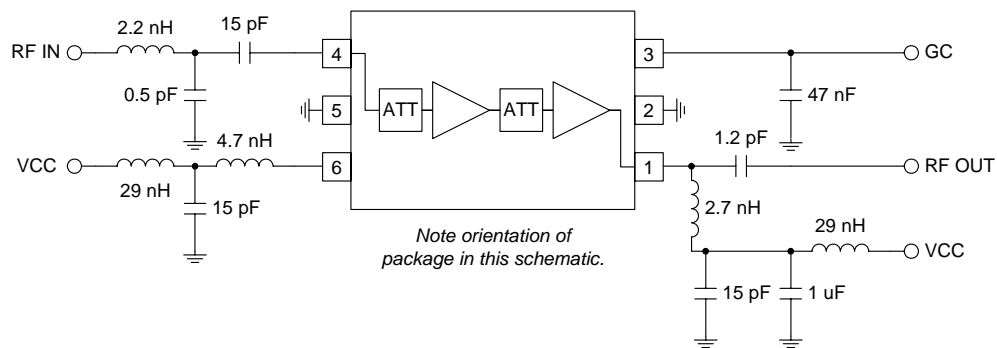
# RF2377

| Pin | Function | Description  | Interface Schematic |
|-----|----------|--|---------------------|
| 1   | RF OUT   | RF output pin. This pin is DC coupled and requires $V_{CC}$ through a bias inductor sized accordingly to provide a high pass transformation with a series capacitor.   |                     |
| 2   | GND      | Ground connection. Keep traces physically short and connect immediately to ground plane for best performance.  |                     |
| 3   | GC       | Analog gain control pin. This pin controls the gain of the IC. Minimum gain occurs at $V_{GC} < 0.4V$ and maximum gain is achieved with $V_{GC} = 2.0V$ . 50dB of linear gain control with little variation of input $P_{1dB}$ is available.                             |                     |
| 4   | RF IN    | RF input pin. This pin is DC coupled.  |                     |
| 5   | GND      | Ground connection. Keep traces physically short and connect immediately to ground plane for best performance.  |                     |
| 6   | VCC      | Power supply. This pin should be connected to a regulated supply and requires a bypass capacitor. Voltage is supplied through this pin to the first stage collector; this voltage also controls the bias. Gain may be tuned by adjusting the value of the feed inductor. |                     |

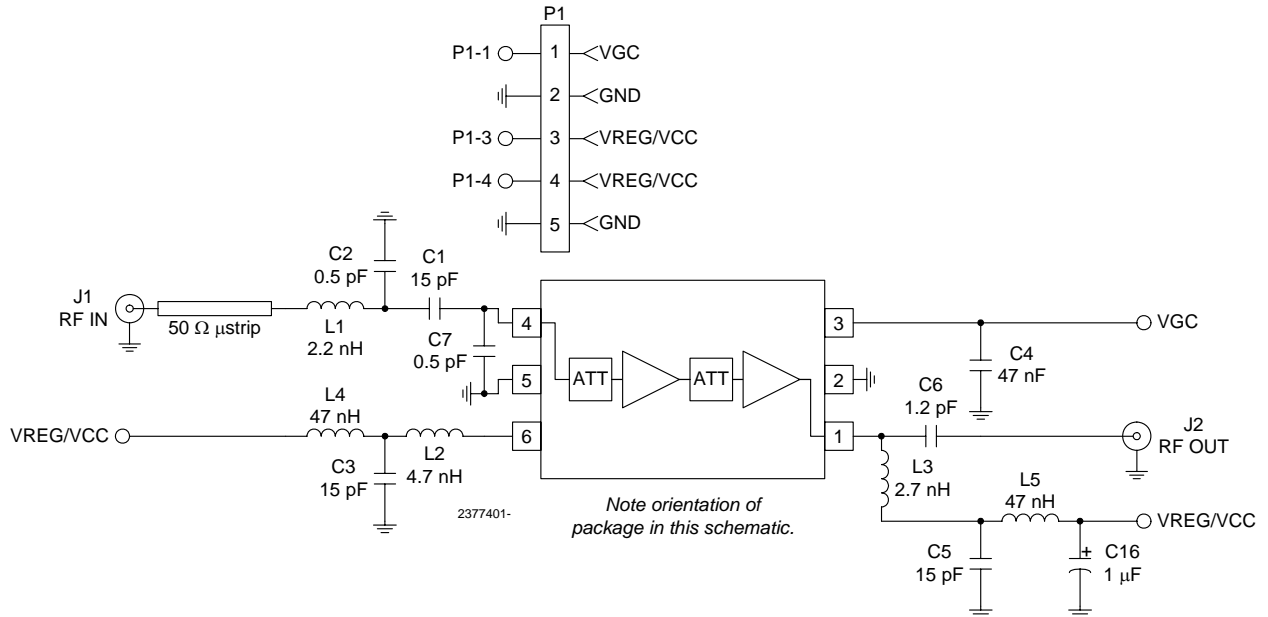
## Application Schematic



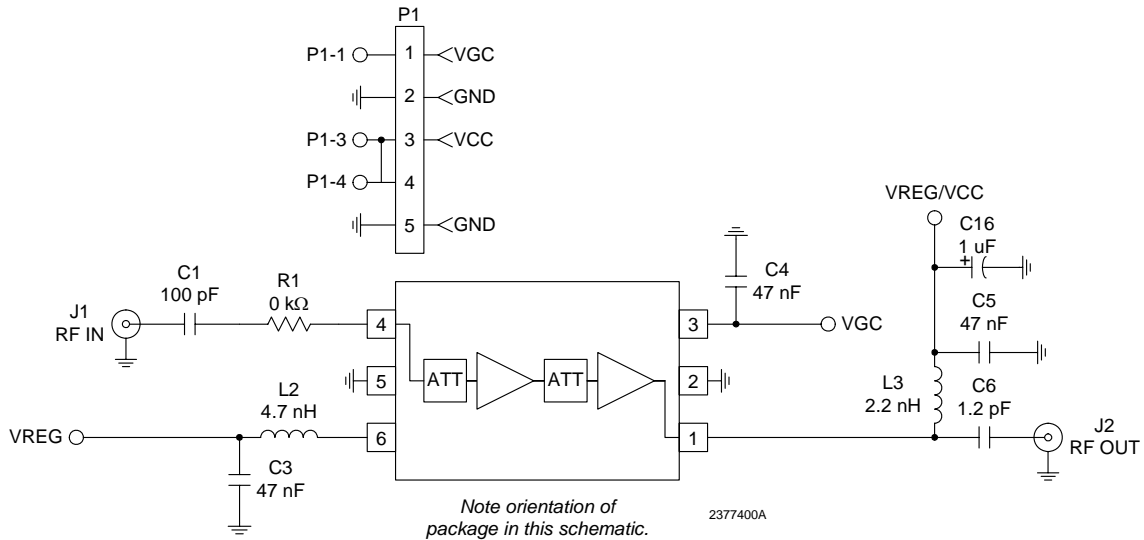
## W-CDMA Application Schematic



## Evaluation Board Schematic (W-CDMA)

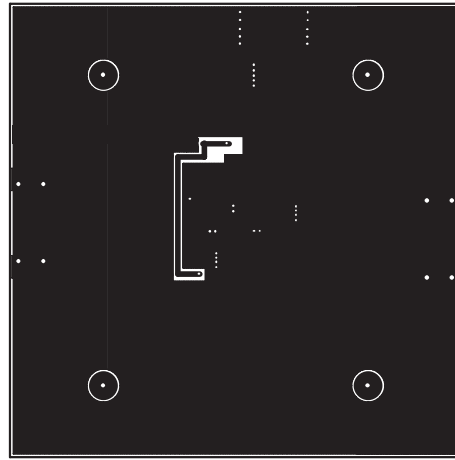
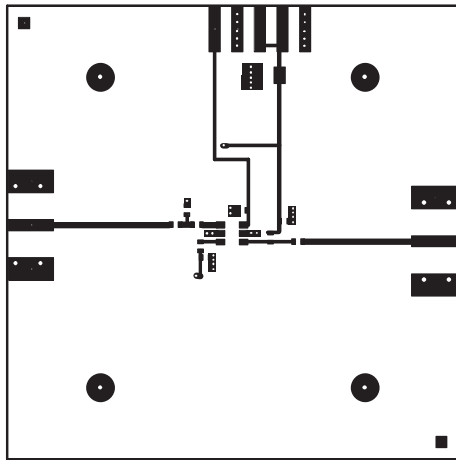
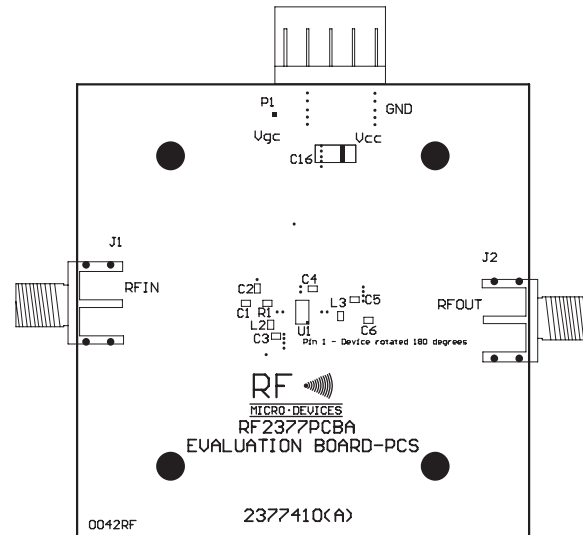


## Evaluation Board Schematic (PCS)

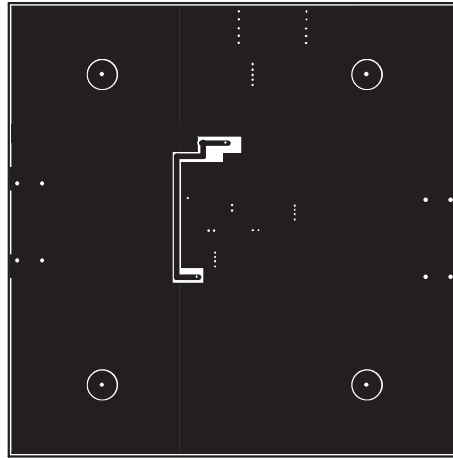
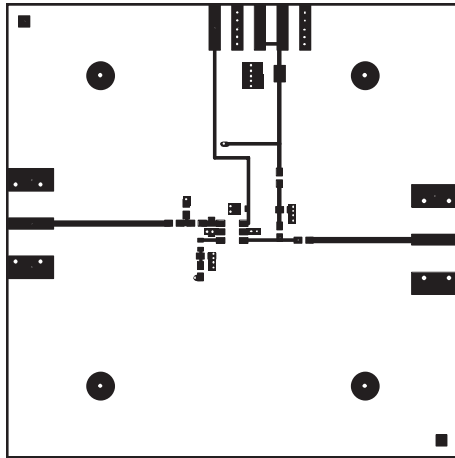
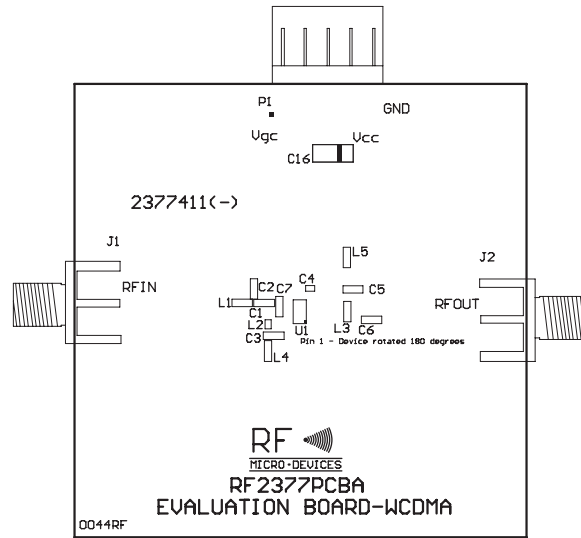


# RF2377

## Evaluation Board Layout (PCS) Board Size 2.0" x 2.0" Board Thickness 0.028", Board Material FR-4



Evaluation Board Layout (W-CDMA)  
Board Size 2.0" x 2.0"  
Board Thickness 0.028", Board Material FR-4



# RF2377

