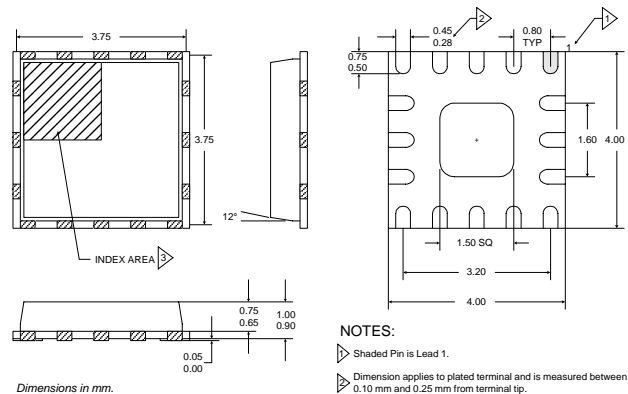


Typical Applications

- CDMA/FM Cellular Systems
- Supports Dual-Mode AMPS/CDMA
- Supports Dual-Mode TACS/CDMA
- General Purpose Downconverter
- Commercial and Consumer Systems
- Portable Battery-Powered Equipment

Product Description

The RF2466 is a receiver dual downconverter designed for the receive section of dual-mode CDMA/FM cellular applications. It is designed to downconvert RF signals while providing 14dB gain in CDMA mode and 7dB gain in FM mode. Also, it features IF output selection and power down mode. Noise Figure, IP3, and other specs are designed to be compatible with the IS-95 Interim Standard for CDMA cellular communications. The IC is manufactured on an advanced Silicon Bipolar process.



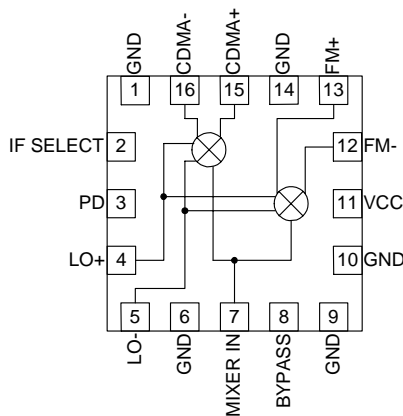
NOTES:

- ▶ Shaded Pin is Lead 1.
- ▶ Dimension applies to plated terminal and is measured between 0.10 mm and 0.25 mm from terminal tip.
- ▶ The terminal #1 identifier and terminal numbering convention shall conform to JEDEC 95-1 SPP-012. Details of terminal #1 identifier are optional, but must be located within the zone indicated. The identifier may be either a mold or marked feature.
- 4 Pins 1 and 9 are fused.
- 5 Package Warpage: 0.05 max.

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Optimum Technology Matching® Applied

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



Functional Block Diagram

Package Style: LCC, 16-Pin, 4 x 4

Features

- Dual Mode CDMA/AMPS
- Dual Mode JCDMA/TACS
- Digitally Selectable IF Outputs
- 500MHz to 1100MHz Operation
- Power Down Mode

Ordering Information

- RF2466 3V CDMA/FM Mixer
- RF2466 PCBA Fully Assembled Evaluation Board

RF Micro Devices, Inc.  
7628 Thorndike Road  
Greensboro, NC 27409, USA

Tel (336) 664 1233  
Fax (336) 664 0454  
<http://www.rfmd.com>

# RF2466

## Absolute Maximum Ratings

| Parameter                     | Rating      | Unit            |
|-------------------------------|-------------|-----------------|
| Supply Voltage                | -0.5 to +5  | V <sub>DC</sub> |
| 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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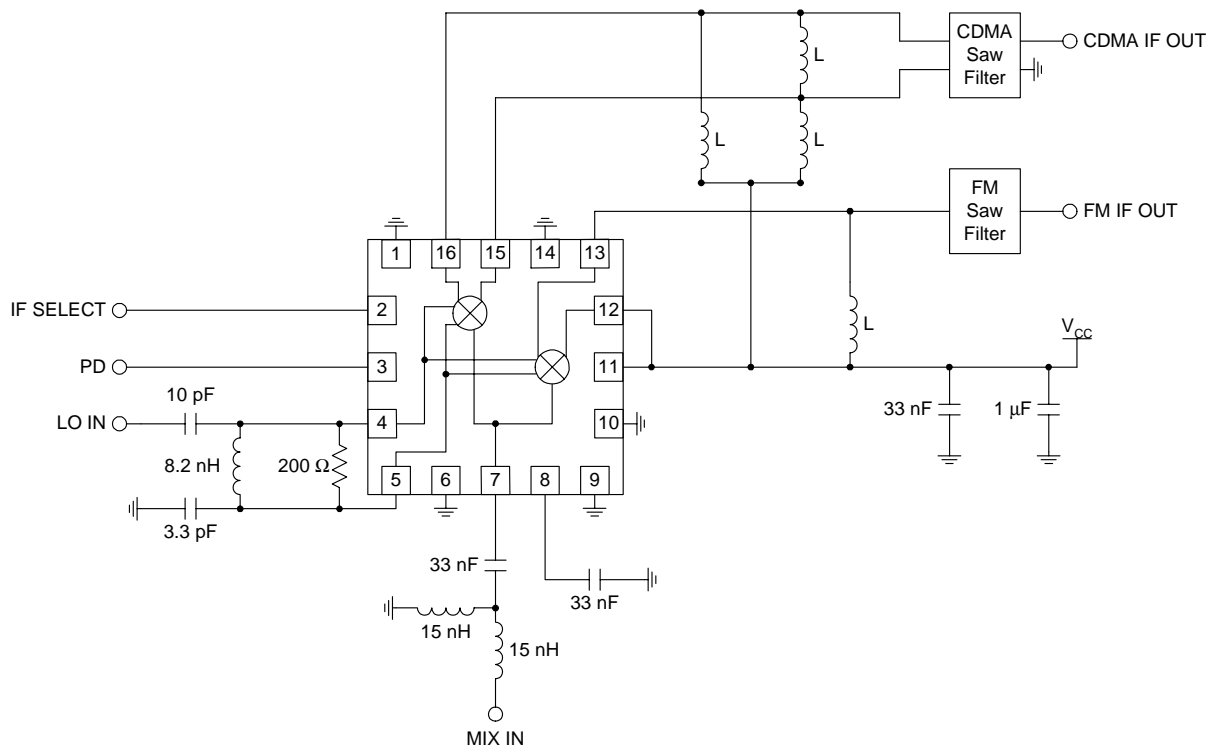
| Parameter                    | Specification |             |      | Unit | Condition                                                                       |
|------------------------------|---------------|-------------|------|------|---------------------------------------------------------------------------------|
|                              | Min.          | Typ.        | Max. |      |                                                                                 |
| <b>Overall</b>               |               |             |      |      | T = 25°C, V <sub>CC</sub> =3.0V, RF=881MHz, LO=966MHz @ 0dBm, IF1= CDMA, IF2=FM |
| RF Frequency Range           |               | 200 to 1000 |      | MHz  |                                                                                 |
| LO Frequency Range           |               | 500 to 1100 |      | MHz  |                                                                                 |
| IF Frequency Range           |               | 0.1 to 250  |      | MHz  |                                                                                 |
| Conversion Gain              | 12.5          | 14          |      | dB   | IF1, 1kΩ balanced load.                                                         |
|                              | 5             | 7           |      | dB   | IF2, 870Ω load.                                                                 |
| Noise Figure                 |               | 9           |      | dB   | IF1 single sideband.                                                            |
|                              |               | 10.5        |      | dB   | IF2 single sideband                                                             |
| Input VSWR                   |               | <1.5:1      |      |      | IF1 with external matching                                                      |
|                              |               | <2:1        |      |      | IF2 with external matching                                                      |
| Input IP3                    | +3            | +7          |      | dBm  | IF1                                                                             |
|                              | +3            | +7          |      | dBm  | IF2                                                                             |
| Input P1dB                   |               | -7          |      | dBm  | IF1                                                                             |
|                              |               | -4          |      | dBm  | IF2                                                                             |
| MIX IN to IF1, IF2 Rejection |               | 35          |      | dB   |                                                                                 |
| IF1, IF2 Output Freq. Range  |               | 70 to 100   |      | MHz  | With external IF interface network                                              |
| Output Impedance             |               | >1          |      | kΩ   | IF1, balanced, open collector                                                   |
|                              |               | 870         |      | Ω    | IF2, single ended, with external inductor.                                      |
| <b>LO Input</b>              |               |             |      |      |                                                                                 |
| LO Input Range               | -10           | -3          | 0    | dBm  |                                                                                 |
| LO IN to RF Input Rejection  |               | 20          |      | dB   |                                                                                 |
| LO IN to IF1, IF2 Rejection  |               | 15          |      | dB   |                                                                                 |
| LO Input VSWR                |               | <2:1        |      |      | IF1 with external matching network                                              |
|                              |               | 2.5         |      |      | IF2 with external matching network                                              |
| <b>Power Supply</b>          |               |             |      |      |                                                                                 |
| Voltage                      | 2.7           | 3.0         | 4.0  | V    |                                                                                 |
| Current Consumption          |               | 16          | 21   | mA   | IF1 selected                                                                    |
|                              |               | 12          | 16   | mA   | IF2 selected                                                                    |
|                              |               |             | 5    | μA   | ENABLE=0                                                                        |

| Pin | Function         | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Interface Schematic |
|-----|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| 1   | <b>GND</b>       | Ground connection. For best performance, keep traces physically short and connect immediately to ground plane.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                     |
| 2   | <b>IF SELECT</b> | Control line for IF out select. A logic "low" enables the FM output. A logic "high" enables the CDMA output. The threshold voltage is 1.6V, and the pin draws less than 50µA when selected.                                                                                                                                                                                                                                                                                                                                                                                                      |                     |
| 3   | <b>PD</b>        | Power down pin. A logic "low" (<1.6V) turns the part off. A logic "high" (>1.6V) turns the part on. In addition, pin 2 (IF SELECT) should also be taken low during power down.                                                                                                                                                                                                                                                                                                                                                                                                                   |                     |
| 4   | <b>LO+</b>       | Mixer LO balanced input pin. For single-ended input operation, this pin is used as an input and pin 5 is bypassed to ground.                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                     |
| 5   | <b>LO-</b>       | Same as pin 4 except complementary input.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | See pin 4.          |
| 6   | <b>GND</b>       | Ground connection for the mixer. For best performance, keep traces physically short and connect immediately to ground plane.                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                     |
| 7   | <b>MIXER IN</b>  | Mixer RF input pin. This pin is internally DC-biased and should be DC blocked if connected to a device with DC present. External matching network sets RF and IF impedance for optimum performance.                                                                                                                                                                                                                                                                                                                                                                                              |                     |
| 8   | <b>BYPASS</b>    | Internal voltage reference. External RF and IF bypassing is required. The trace length between the pin and the bypass capacitors should be minimized. The ground side of the bypass capacitors should connect immediately to ground plane.                                                                                                                                                                                                                                                                                                                                                       |                     |
| 9   | <b>GND</b>       | Same as pin 1.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                     |
| 10  | <b>GND</b>       | Same as pin 1.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                     |
| 11  | <b>VCC</b>       | Supply voltage for the mixers, bias circuits, and control logic. External RF and IF bypassing is required. The trace length between the pin and the bypass capacitors should be minimized. The ground side of the bypass capacitors should connect immediately to ground plane.                                                                                                                                                                                                                                                                                                                  |                     |
| 12  | <b>FM-</b>       | Same as pin 13, except complimentary output. For typical single ended operation, this pin is connected directly to V <sub>CC</sub> .                                                                                                                                                                                                                                                                                                                                                                                                                                                             | See pin 13.         |
| 13  | <b>FM+</b>       | FM IF output pin. This is a balanced output, but is typically used as a single-ended output. The internal circuitry, in conjunction with an external matching/bias inductor to V <sub>CC</sub> , sets the operating impedance. This inductor is typically incorporated in the matching network between the output and IF filter. The net output impedance, including the external inductor, is about 870Ω at 85MHz. Because this pin is biased to V <sub>CC</sub> , a DC blocking capacitor must be used if the IF filter input has a DC path to ground. See Application Schematic.              |                     |
| 14  | <b>GND</b>       | Same as pin 1.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                     |
| 15  | <b>CDMA+</b>     | CDMA IF output pin. This is a balanced output. The internal circuitry, in conjunction with an external matching/bias inductor to V <sub>CC</sub> , sets the operating impedance. This inductor is typically incorporated in the matching network between the output and IF filter. The net output impedance, including the external inductor, at 85MHz is higher than 1kΩ, even though the part is designed to drive a 1kΩ load. Because this pin is biased to V <sub>CC</sub> , a DC blocking capacitor must be used if the IF filter input has a DC path to ground. See Application Schematic. |                     |
| 16  | <b>CDMA-</b>     | Same as pin 15, except complementary output.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | See pin 15.         |

# RF2466

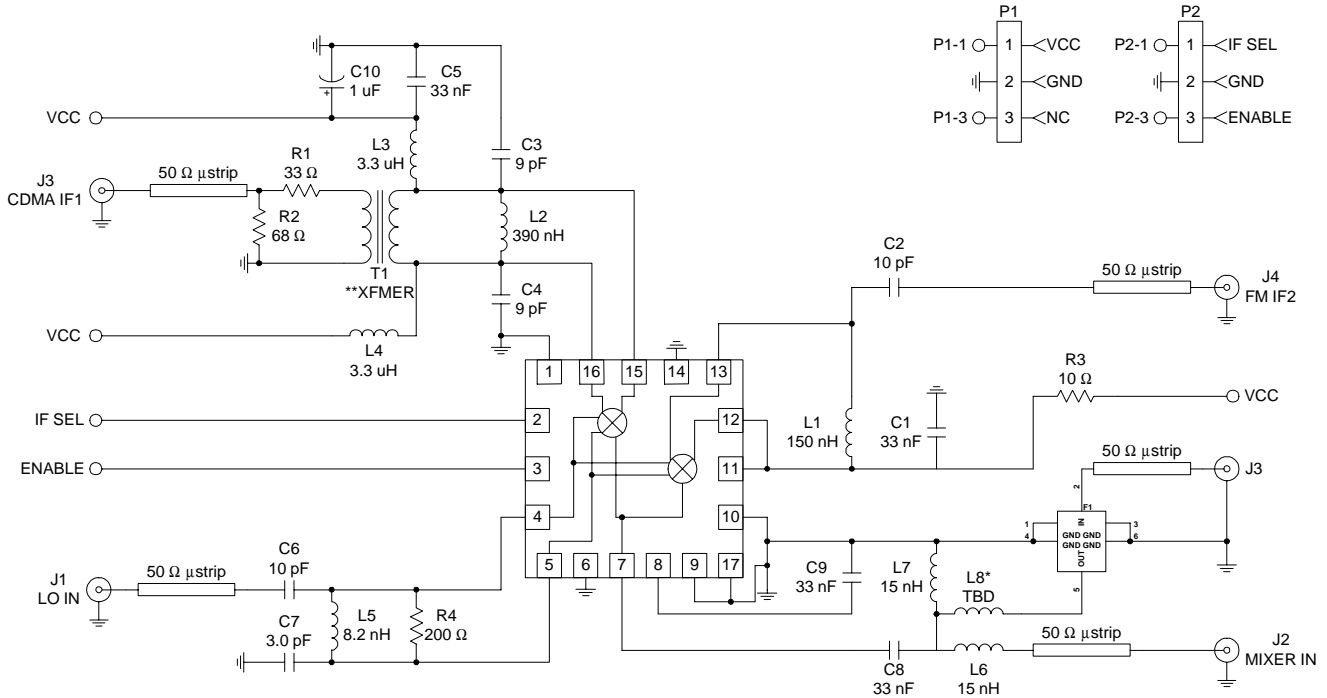
| Pin             | Function   | Description                                                                                                                                           | Interface Schematic |
|-----------------|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| <b>Pkg Base</b> | <b>GND</b> | Ground connection. The backside of the package should be soldered to a top side ground pad which is connected to the ground plane with multiple vias. |                     |

**Application Schematic**



# RF2466

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



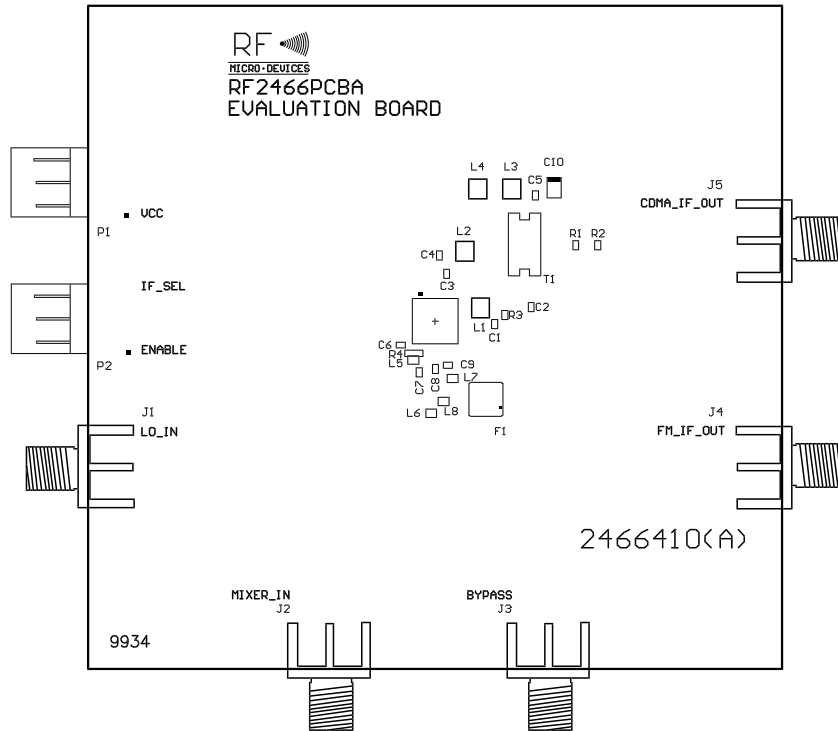
\*\*Core: Fair-Rite Balun #2865002402  
 L12: 3 turns #30 AWG (Green)  
 L34: 12 turns #32 AWG (Red)  
 One turn = one pass through BOTH holes.  
 Winding starts and finishes on same end of core.  
 L12 and L34 exit opposite ends of core.  
 F1: filter

2466400 Rev A

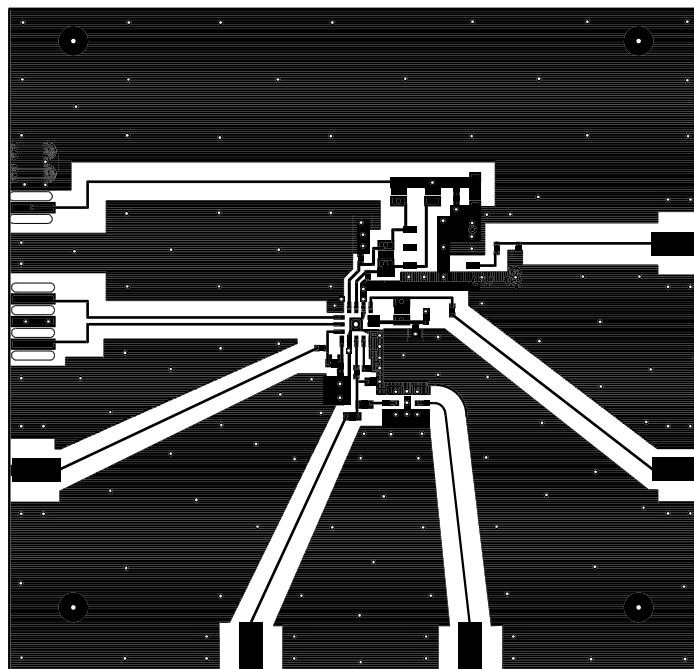
| Enable | IF Select | Stage |
|--------|-----------|-------|
| 0      | 0         | Off   |
| 0      | 1         | Off   |
| 1      | 0         | FM    |
| 1      | 1         | CDMA  |

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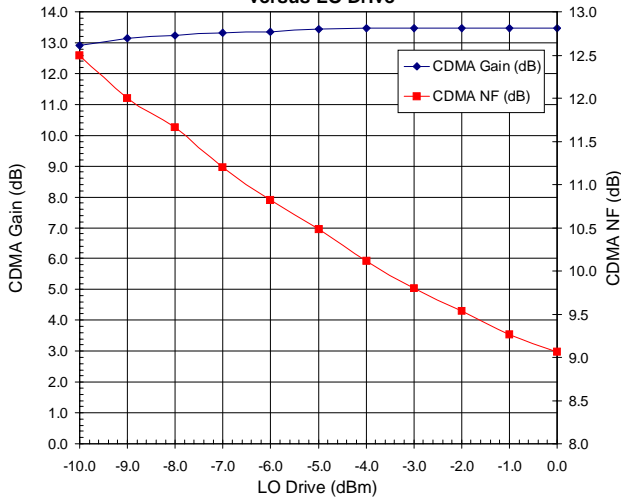
Evaluation Board Layout  
Board Size 3.070" x 2.928"  
Board Thickness 0.056", Board Material FR-4, Multi-Layer



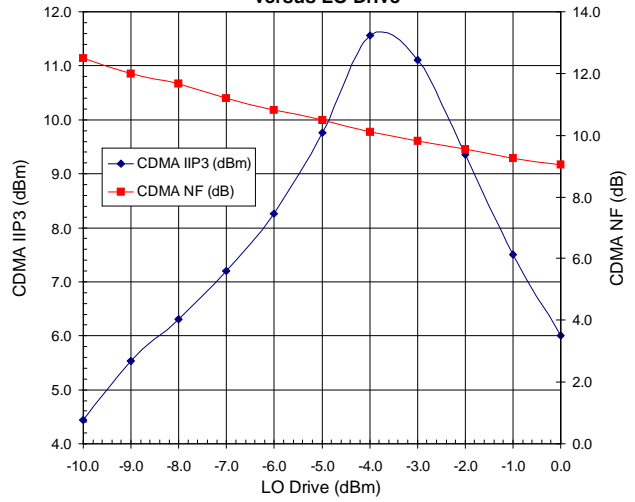
6  
MIXERS



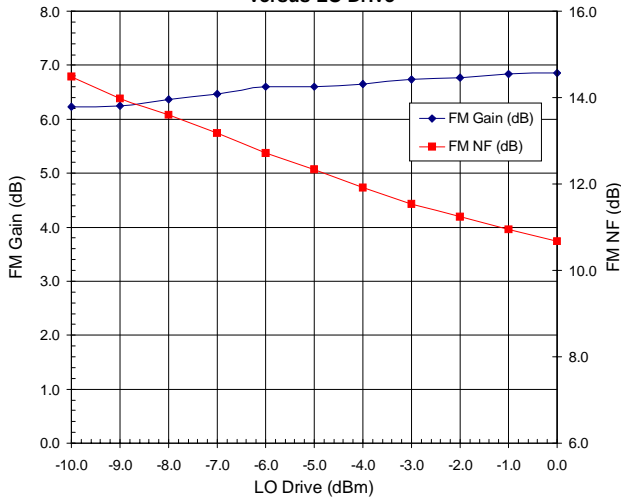
**CDMA Gain and Noise Figure versus LO Drive**



**CDMA IIP3 and Noise Figure versus LO Drive**



**FM Gain and Noise Figure versus LO Drive**



**FM IIP3 and Noise Figure versus LO Drive**

