

## Product Description

The RIF211 is an integrated RF Front End Module designed for ISM band applications at 2.4GHz. The device consists of an integrated Power Amplifier, LNA and Switch. The Device can be used for Class 1 Bluetooth and Cordless Phone Applications. Typically the device operates at 3.3 V DC with an output power of 20 dBm. The FEM is fully matched internally to a 50 ohm input and output impedance.

## Features

- ISM Band @ 3.3V Operation
- Integrated PA/LNA/SPDT switch
- Operation from 2.7V to 3.6V
- Matched to 50 Ohms
- Package: 3.0 x 3.0 x 0.75mm<sup>3</sup> QFN16 Package

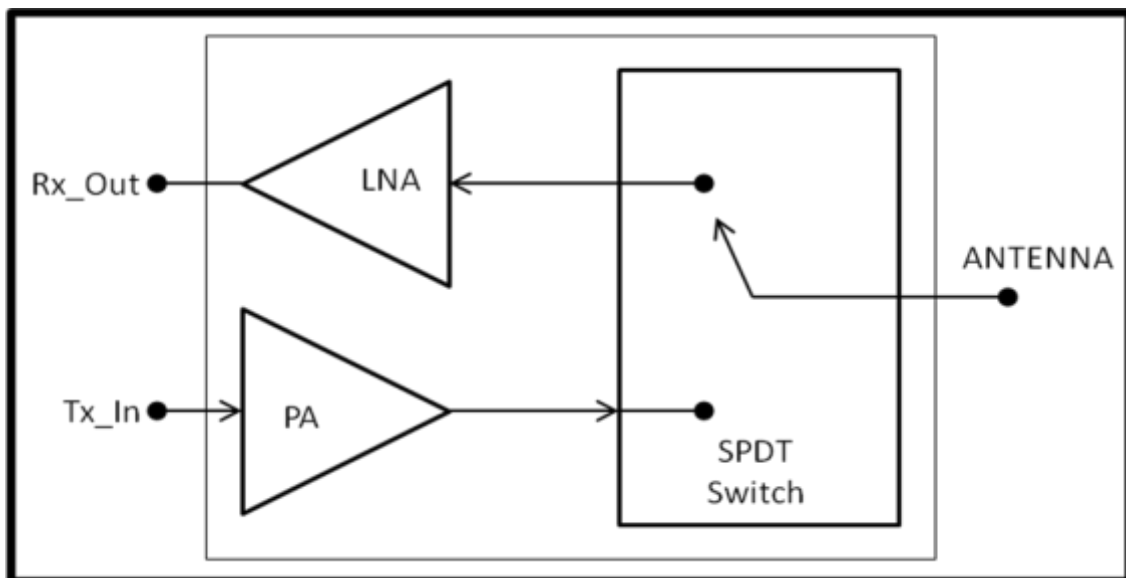
## Application

- IEEE 802.15.4 and ZigBee Systems
- Wireless Audio Systems
- Wireless Consumer Systems
- Wireless Sensor Networks
- All 2.4GHz ISM Band Systems
- Wireless Industrial Systems

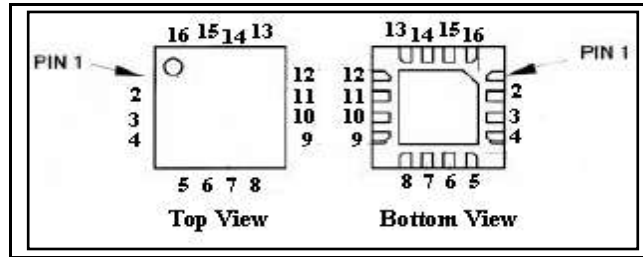
## Advantages

- Integrated Single Chip Solution
- Very Low Current Consumption
- Low Noise Figure
- Miniature Package

## Functional Block Diagram



## Outline Drawing



## Pin Configuration

Pin No.	Name	Description
1	V_CntI2 2.9 – 4.5V / 0.0 – 0.2 V	Enable/ Disable the switch in receive path with logic high 2.9V and logic low 0 – 0.2V
2	LNA_EN 2.2 – 3.0 / 0 V	Low Noise Amplifier Enable pin. A digital control signal with logic high (power up) and logic low (power down) is used to turn the device on and off.
3	LNA_Reg 2.85 – 3.3 V	Supply voltage for bias circuits of Low Noise Amplifier
4	LNA_Vcc 3.3 V	Drain supply voltage for Low Noise Amplifier having 3.3V typical value
5	Rx_Out	RF output power from Low Noise Amplifier
6	GND	RF Ground
7	Tx_In	RF input power for power amplifier
8	GND	RF Ground
9	PA_EN 2.2 – 3.0 / 0 V	Power Amplifier Enable pin. A digital control signal with logic high (power up) and logic low (power down) is used to turn the device on and off.
10	PA_Reg 2.85 – 3.3 V	Supply voltage for bias circuits of Power Amplifier
11	PA_Vcc 3.3 V	Drain supply voltage for Power Amplifier having 3.3V typical value
12	GND	RF Ground
13	NC	No Connection
14	Vt 0.2 V	Control Voltage for switch irrespective of Tx/Rx path on
15	V_CntI1 2.9 – 4.5V / 0.0 – 0.2 V	Enable/ Disable the switch in transmit path with logic high 2.9V and logic low 0 – 0.2V
16	ANTENNA	RF Output/Input for transmit and receive path respectively

## Specifications

### Absolute Maximum Ratings

Name	Description
PA_Vcc, LNA_Vcc	+5 V
VCnt1, VCnt2	+5 V
RF Input Power	+5 dBm
Operating Temperature Range	-40 to +85° C
Storage Temperature Range	-40 to +150° C

### DC Electrical Characteristics

Conditions: PA\_Vcc = LNA\_Vcc = 3.3V, PA\_Reg = LNA\_Reg = 2.85V, V\_Cnt1 = V\_Cnt2 = 2.9V, PA\_EN = LNA\_EN = 2.2V, Vt = 0.2V, TA = 25°C, fc = 2.45GHz, using RF Arrays Evaluation Board.

Name	Descriptions	Unit	Typical
ISTBT	Leakage Current when PA_EN=0V, V_Cnt1=0V	µA	20
ISTBR	Leakage Current when LNA_EN = 0V, VCnt2 = 0V	µA	0.1

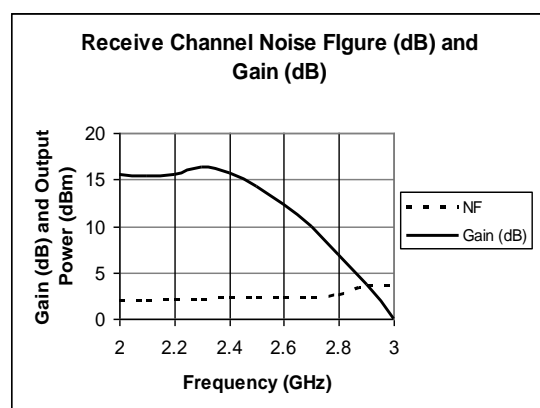
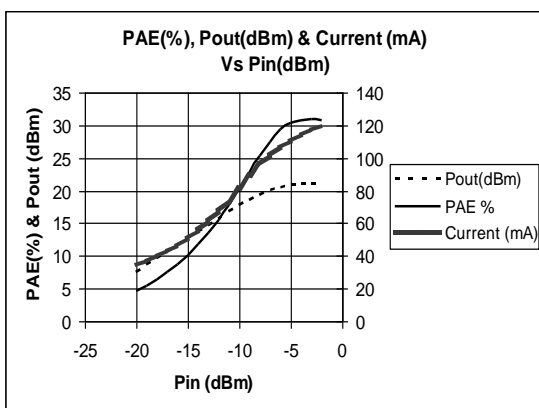
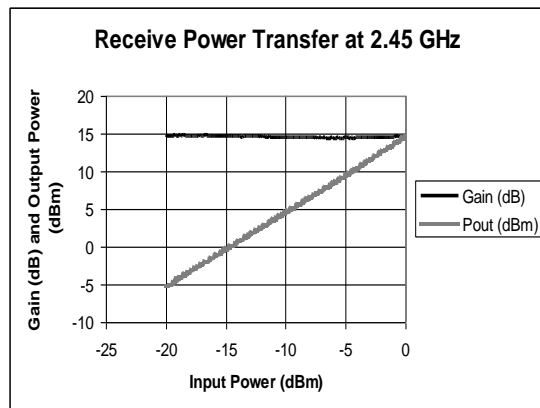
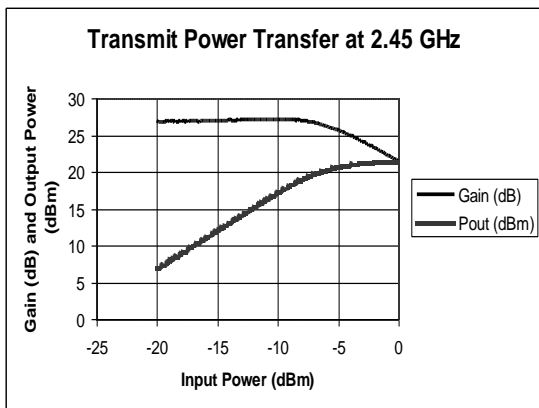
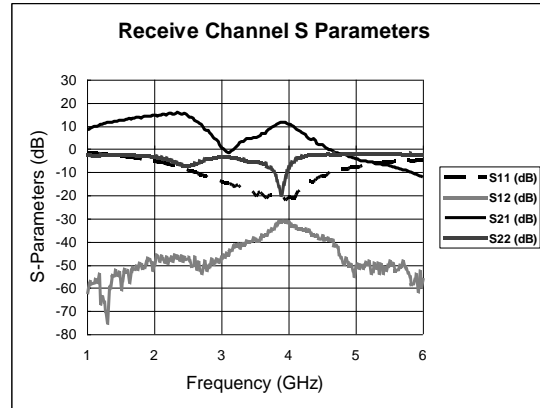
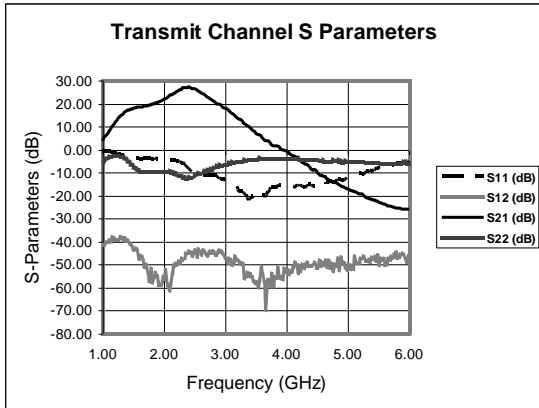
### Transmit Path Electrical Characteristics at 25° C

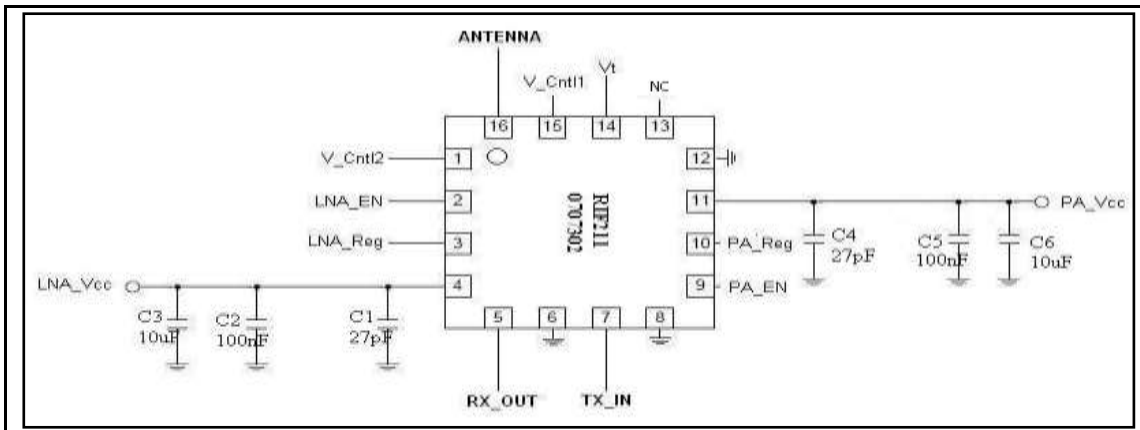
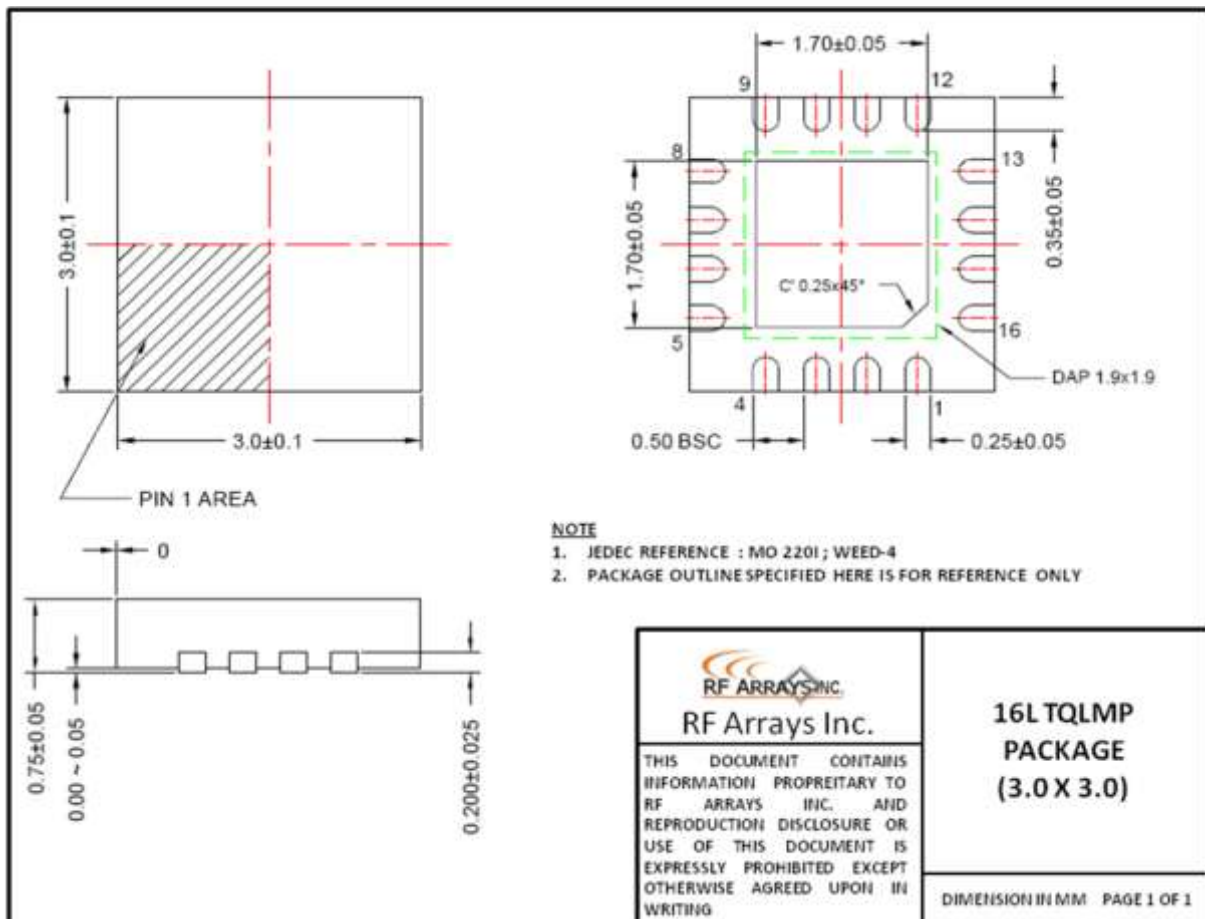
Name	Conditions	Unit	Min.	Typ.	Max.
Frequency		GHz	2.4	2.45	2.5
Small Signal Gain		dB	22.0	26.5	
Output Power	Vcc @ 3.3 V, Pin @ 0 dBm	dBm	18	20.5	
Quiescent Current	Vcc @ 3.3 V	mA	16	25	
Peak Current	Pout @ 20 dBm	mA	100	110	
Input Return Loss		dB	8		
Output Return Loss		dB	10		
Isolation: Tx-Rx Rx-Antenna		dB dB	22 22		
2nd Harmonic	Pout @ 20 dBm	dBm	-14		
3rd Harmonic	Pout @ 20 dBm	dBm	-32		

### Receiver Path Electrical Characteristics at 25° C

Name	Conditions	Unit	Min.	Typ.	Max.
Frequency		GHz	2.4	2.45	2.5
Small Signal Gain		dB	10	15	
Noise Figure		dB		2.2	
Quiescent Current	Vcc @ 3.3 V	mA	5	9	
IIP3		dBm		20	
Input Return Loss		dB	9		
Output Return Loss		dB	7		
Tx-Antenna Isolation		dB	22		

# Measured Data



**PIN Configuration**

**Package Drawings**


<http://www.rfarrays.com>

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### Product Preview

The document contains information from the product concept specification. RF Arrays Inc. reserves the right to change information at any time without notification.

### Preliminary Information

The document contains information from the design target specification. RF Arrays Inc. reserves the right to change information at any time without notification.

### Production testing may not include testing of all parameters.

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