

### 3V 1900MHZ LINEAR AMPLIFIER MODULE

# Typical Applications

- 3V CDMA US-PCS Handsets
- 3V CDMA2000/1X PCS Handsets
- Spread-Spectrum Systems

 Designed for Compatibility with Qualcomm Chipsets

# **Product Description**

The RF3100-3 is a high-power, high-efficiency linear amplifier IC targeting 3V hand-held systems. 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 3V CDMA hand-held digital cellular equipment, spread-spectrum systems, and other applications in the 1850MHz to 1910MHz band. The RF3100-3 has a digital control line for low power application to reduce the current drain. The device is self-contained with  $50\Omega$  input and output that is matched to obtain optimum power, efficiency, and linearity characteristics. The module is an ultra-small 6mmx6mm land grid array with backside ground.

Optimum Technology Matching® Applied

☐ Si BJT

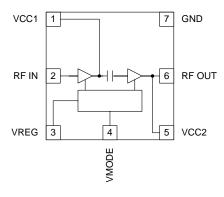
▼ GaAs HBT

☐ GaAs MESFET

Si Bi-CMOS

☐ SiGe HBT

☐ Si CMOS



Functional Block Diagram

# 0.800 sq typ 1.700 4.390 6.0 sq 0.100, 1.7000, 1.700 0.100, 1.700 0.100, 1.700 0.100, 1.700 0.100, 1.700 0.10

Package Style: LGM (6mmx6mm)

## **Features**

- Input/Output Internally Matched @  $50\Omega$
- Single 3V Supply
- 28dBm Linear Output Power
- -141dBm/Hz Noise Power
- 35% Linear Efficiency
- 45mA Idle Current (Low Power Mode)

### Ordering Information

RF3100-3 3V 1900MHz Linear Amplifier Module RF3100-3 PCBA Fully Assembled Evaluation Board

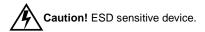
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# RF3100-3

# **Absolute Maximum Ratings**

Parameter	Rating	Unit
Supply Voltage (RF off)	+8.0	$V_{DC}$
Supply Voltage (P <sub>OUT</sub> ≤28dBm)	+5.2	$V_{DC}$
Control Voltage (V <sub>REG</sub> )	+4.2	$V_{DC}$
Mode Voltage (V <sub>MODE</sub> )	+3.5	$V_{DC}$
Input RF Power	+10	dBm
Operating Case Temperature	-30 to +110	℃
Storage Temperature	-30 to +150	$^{\circ}$



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Parameter	Specification		Unit	Condition		
Parameter	Min.	lin. Typ. Max		Unit	Condition	
High Power State (V <sub>MODE</sub> Low)					Typical Performance at V <sub>CC</sub> =3.2V, V <sub>REG</sub> =2.85 V, T <sub>AMB</sub> =25°C, Frequency=1850MHz to 1910MHz (unless otherwise specified)	
Frequency Range Linear Gain Second Harmonic Third Harmonic Maximum Linear Output Power	1850 24 28	26.5 -43 -56	1910	MHz dB dBc dBc dBm	(amoss state mes specimes)	
(CDMA Modulation) Total Linear Efficiency Adjacent Channel Power Rejection		35 -48	-45	% dBc	P <sub>OUT</sub> =28dBm ACPR @ 1.25MHz, V <sub>CC</sub> =3.4V, P <sub>OUT</sub> =28dBm	
		-62	-58	dBc	ACPR @ 2.25MHz, V <sub>CC</sub> =3.4V, P <sub>OUT</sub> =28dBm	
Input VSWR		<2.5:1				
Output VSWR		444	10:1 6:1	alDree /Lle	No damage. No oscillations. >-70dBc	
Noise Power		-141		dBm/Hz	At 80MHz offset.  Typical Performance at V <sub>CC</sub> =3.2V,	
Low Power State (V <sub>MODE</sub> High)					V <sub>REG</sub> =2.85 V, T <sub>AMB</sub> =25°C, Frequency=1850MHz to 1910MHz (unless otherwise specified)	
Frequency Range	1850		1910	MHz	. ,	
Linear Gain Second Harmonic Third Harmonic	14	19 -43 -56		dB dBc dBc		
Maximum Linear Output Power (CDMA Modulation)	16			dBm		
Adjacent Channel Power Rejection		-52	-46	dBc	ACPR@1.25MHz	
Input VSWR		-66 <2.5:1	-59	dBc	ACPR @ 2.25MHz	
Output VSWR			10:1 6:1		No damage. No oscillations. >-70dBc	

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Parameter	Min.	Тур.	Max.	Unit	Condition	
DC Supply					T <sub>AMB</sub> =25°C	
Supply Voltage	3.2	3.7	4.2	V		
Quiescent Current		170	240	mA	V <sub>MODE</sub> =Low, V <sub>REG</sub> =2.85 V	
		50	80	mA	V <sub>MODE</sub> =High, V <sub>REG</sub> =2.85V	
V <sub>REG</sub> Current		6	10	mA		
V <sub>MODE</sub> Current			1.5	mA		
Turn On/Off Time			6	μs		
Total Current (Power Down)		5	10	μΑ	V <sub>REG</sub> =Low, V <sub>MODE</sub> =Low	
V <sub>REG</sub> "Low" Voltage	0		0.5	V		
V <sub>REG</sub> "High" Voltage	2.8	2.85	2.9	V		
V <sub>MODE</sub> "Low" Voltage	0		0.5	V		
V <sub>MODE</sub> "High" Voltage	2.0		3.0	V		

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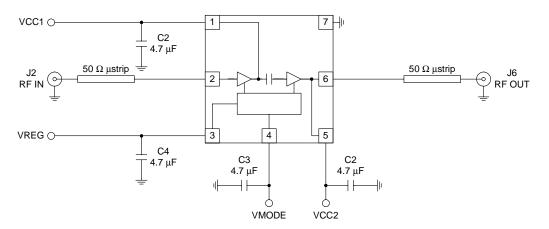
# RF3100-3

Pin	Function	Description	Interface Schematic
1	VCC1	First stage collector supply. A low frequency decoupling capacitor (e.g., $1\mu F$ ) is required.	
2	RF IN	RF input internally matched to $50\Omega$ . This input is internally AC-coupled.	
3	VREG	Regulated voltage supply for amplifier bias. In Power Down mode, both $V_{REG}$ and $V_{MODE}$ need to be LOW (<0.5 V).	
4	VMODE	For nominal operation (High Power Mode), V <sub>MODE</sub> is set LOW. When set HIGH, devices are turned off to improve efficiency.	
5	VCC2	Output stage collector supply. A low frequency decoupling capacitor (e.g., $1\mu F$ ) is required.	
6	RF OUT	RF output internally matched to $50\Omega$ . This output is internally AC-coupled.	
7	GND	Ground connection. Connect to package base ground. For best performance, keep traces physically short and connect immediately to ground plane.	
Pkg Base	GND	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. The pad should have a short thermal path to the ground plane.	

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# **Evaluation Board Schematic**

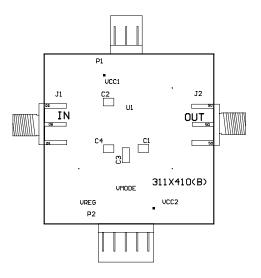
(Download Bill of Materials from www.rfmd.com.)

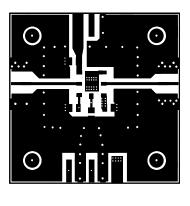


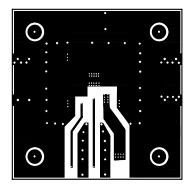
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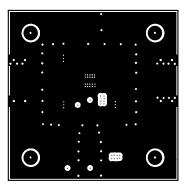
# Evaluation Board Layout Board Size 1.5" x 1.5"

Board Thickness 0.032", Board Material FR-4, Multi-Layer, Ground Plane at 0.014"









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