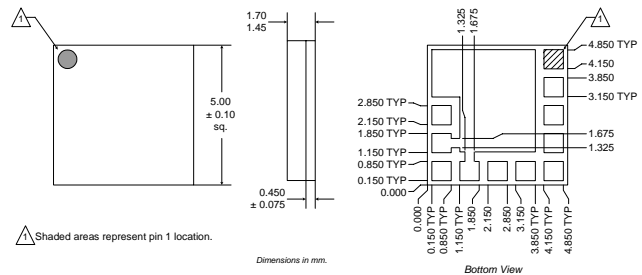


Typical Applications

- 3V CDMA/AMPS Cellular Handsets
- 3V CDMA2000/1X Cellular Handsets
- Spread-Spectrum Systems
- Designed for Compatibility with Qualcomm Chipsets

Product Description

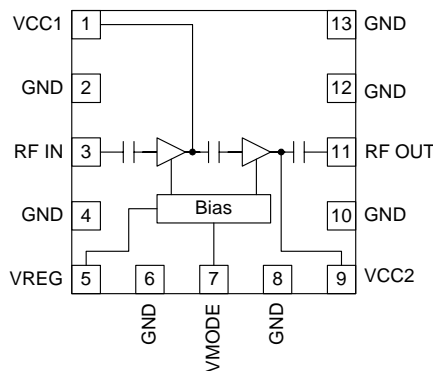
The RF6000-2 is a high-power, high-efficiency linear amplifier module targeting 3V handheld systems. The device is manufactured on a RF Micro Devices' advanced third generation Gallium Arsenide Heterojunction Bipolar Transistor (HBT) process, and has been designed for use as the final RF amplifier in dual-mode 3V CDMA/AMPS handheld digital cellular equipment, spread-spectrum systems, and other applications in the 824MHz to 849MHz band. The RF6000-2 has a digital control line for low power application to reduce the current drain. The device is self-contained with 50Ω input and output that is matched to obtain optimum power, efficiency, and linearity characteristics. The module is an ultra-small 5mmx5mm land grid array with backside ground.



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 |

not to the



Functional Block Diagram

Package Style: LGM (5mmx5mm)

Features

- Advanced 3rd Generation HBT Process
- Input/Output Internally Matched @ 50Ω
- 28.5dBm Linear Output Power
- 29dB Linear Gain
- 45mA Idle Current (Low Power Mode)
- CDMA2000 Compatible

Ordering Information

RF6000-2 3V 900MHz Linear Amplifier Module
RF6000-2 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>

Absolute Maximum Ratings

Parameter	Rating	Unit
Supply Voltage (RF off)	+8.0	V _{DC}
Supply Voltage (P _{OUT} ≤31dBm)	+5.2	V _{DC}
Control Voltage (V _{REG})	+4.2	V _{DC}
Input RF Power	+10	dBm
Mode Voltage (V _{MODE})	+3.5	V _{DC}
Operating Case Temperature	-30 to +110	°C
Storage Temperature	-30 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.		
High Power State (V_{MODE} Low)					Typical Performance at V _{CC} =3.4V, V _{REG} =2.85V, T _{AMB} =25°C, Frequency=836MHz (unless otherwise specified)
Frequency Range	824		849	MHz	
Linear Gain		29		dB	
Second Harmonic		-35		dBc	
Third Harmonic		-35		dBc	
Maximum Linear Output Power	28	28.5		dBm	
Low Voltage Linear Output Power		27		dBm	V _{CC} =3.0V
Total Linear Efficiency		38		%	P _{OUT} =28.5dBm (room temperature)
Total I _{CC}		530		mA	P _{OUT} =28dBm
Adjacent Channel Power Rejection		-50	-46	dBc	ACPR @ 885kHz. P _{OUT} =28dBm (IS-95)
		-61	-58	dBc	ACPR @ 1980kHz. P _{OUT} =28dBm (IS-95)
Input VSWR		2:1			
Output VSWR			10:1		No damage.
			6:1		No oscillations. >-70dBc
Noise Power		-136		dBm/Hz	At 45MHz offset.
Low Power State (V_{MODE} High)					Typical Performance at V _{CC} =3.4V, V _{REG} =2.85V, T _{AMB} =25°C, Frequency=836MHz (unless otherwise specified)
Frequency Range	824		849	MHz	
Linear Gain		20		dB	
Second Harmonic		-35		dBc	
Third Harmonic		-35		dBc	
Maximum Linear Output Power	18	20		dBm	
Total Current, I _{CC}		180		mA	P _{OUT} =18dBm
Adjacent Channel Power Rejection		-50	-46	dBc	ACPR @ 885kHz. P _{OUT} =18dBm (IS-95)
		-70	-58	dBc	ACPR @ 1980kHz. P _{OUT} =18dBm (IS-95)
Input VSWR		2:1			
Output VSWR			10:1		No damage.
			6:1		No oscillations. >-70dBc

Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
FM Mode					Typical Performance at $V_{CC}=3.4V$, $V_{REG}=2.85V$, $T_{AMB}=25^{\circ}C$, Frequency=836MHz (unless otherwise specified)
Frequency Range	824		849	MHz	
Gain		28		dB	
Second Harmonic		-35		dBc	
Third Harmonic		-35		dBc	
Max CW Output Power		31.5		dBm	
Total Efficiency (AMPS mode)		48		%	$V_{CC}=3.4V$, $V_{REG}=2.85V$, $P_{OUT}=31.5dBm$ (room temperature)
Input VSWR		2:1			
Output VSWR			10:1 5:1		No damage. No oscillations. > -70dBc
DC Supply					
Supply Voltage Range	3.2	3.4	4.2	V	
Quiescent Current		150		mA	$V_{MODE}=Low$, $V_{REG}=2.85V$
		45		mA	$V_{MODE}=High$, $V_{REG}=2.85V$
V_{REG} Current		3		mA	
V_{MODE} Current		250		μA	
Turn On/Off Time			<40	μs	V_{REG} switch from Low to High, I_{CC} to within 90% of the final value, P_{OUT} within 1dB of the final value
Total Current (Power Down)		5		μA	$V_{REG}=Low$, $V_{MODE}=Low$
V_{REG} "Low" Voltage	0		0.5	V	
V_{REG} "High" Voltage	2.8	2.85	2.9	V	
V_{MODE} "Low" Voltage	0		0.5	V	
V_{MODE} "High" Voltage	2.0		3.0	V	

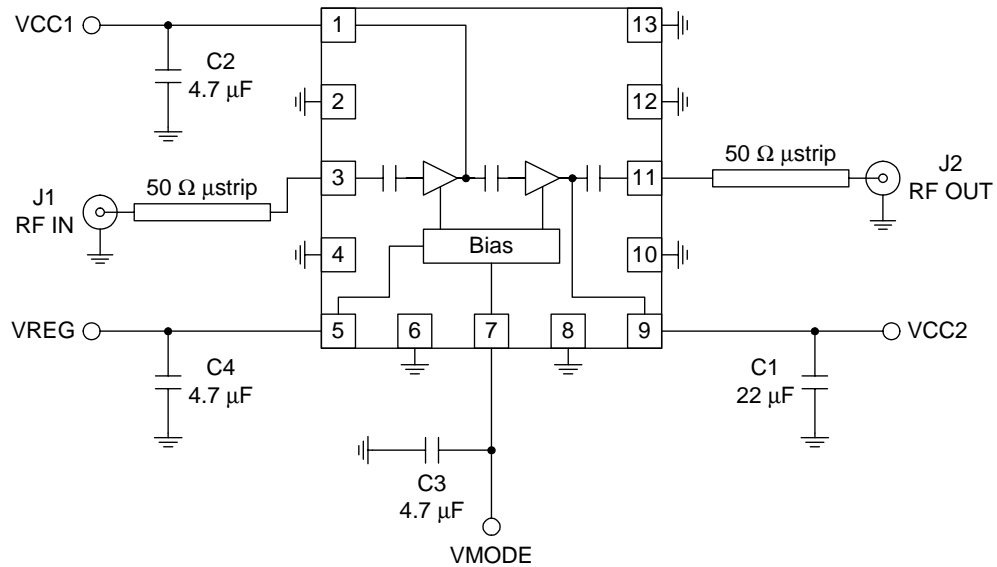
CDMA2000 Configuration Table

No.	Configuration	Peak-to-Average CCDF=1%	Relative Gains				Typical Maximum Output Power (dBm)
			PCH	DCCH	FCH	SCH	
1	DCCH 9600	5.4	-3.75	0			26.5
2	FCH 9600, SCH0 9600	4.5	-3.75		0	0	28.0
3	DCCH 9600, SCH0 9600	4.5	-3.75	0		0	28.0
4	FCH 9600, SCH0 19200	4.5	-6.25		-2.65	0	28.0
5	FCH 9600, SCH0 38400	4.3	-7.5		-5.125	0	28.0
6	DCCH 9600, SCH0 19200	4.1	-6.25	-2.65		0	28.0
7	RC1 (IS-95 Reference)	3.9					28.0
8	FCH 9600, SCH0 76800	3.9	-9.0		-7.875	0	28.0
9	DCCH 9600, SCH0 38400	3.9	-7.5	-5.125		0	28.0
10	DCCH 9600, SCH0 76800	3.6	-9.0	-7.875		0	28.0
11	FCH 9600	3.2	-3.75		0		28.0
12	FCH 1500	3.2	0		-5.875		28.0
13	FCH 2700	3.2	0		-2.75		28.0
14	FCH 4800	3.2	0		-0.25		28.0
15	Pilot Only	3.2	0				28.0

Pin	Function	Description	Interface Schematic
1	VCC1	First stage collector supply. A low frequency decoupling capacitor (e.g., 4.7 μ F) is required.	
2	GND	Ground connection. Connect to package base ground. For best performance, keep traces physically short and connect immediately to ground plane.	
3	RF IN	RF input internally matched to 50 Ω . This input is internally AC-coupled.	
4	GND	Ground connection. Connect to package base ground. For best performance, keep traces physically short and connect immediately to ground plane.	
5	VREG	Regulated voltage supply for amplifier bias. In Power Down mode, both V _{REG} and V _{MODE} need to be LOW (<0.5V).	
6	GND	Ground connection. Connect to package base ground. For best performance, keep traces physically short and connect immediately to ground plane.	
7	VMODE	For nominal operation (High Power Mode), V _{MODE} is set LOW. When set HIGH, devices are turned off to improve efficiency.	
8	GND	Ground connection. Connect to package base ground. For best performance, keep traces physically short and connect immediately to ground plane.	
9	VCC2	Output stage collector supply. A low frequency decoupling capacitor (e.g., 22 μ F) is required.	
10	GND	Ground connection. Connect to package base ground. For best performance, keep traces physically short and connect immediately to ground plane.	
11	RF OUT	RF output internally matched to 50 Ω . This output is internally AC-coupled.	
12	GND	Ground connection. Connect to package base ground. For best performance, keep traces physically short and connect immediately to ground plane.	
13	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.	

Evaluation Board Schematic

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



Evaluation Board Layout
Board Size 1.0" x 1.5"

Board Thickness 0.042", Board Material RO4003, Ground plane at 0.020", Multi-layer

