



Preliminary

RF3118

3V 1900MHZ LINEAR AMPLIFIER MODULE

Typical Applications

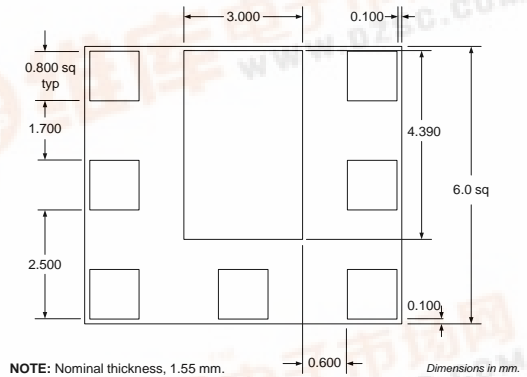
- 3V CDMA US-PCS Handsets
- 3V CDMA2000/1X PCS Handsets
- Compatible with Qualcomm Chipset
- Spread-Spectrum Systems

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Product Description

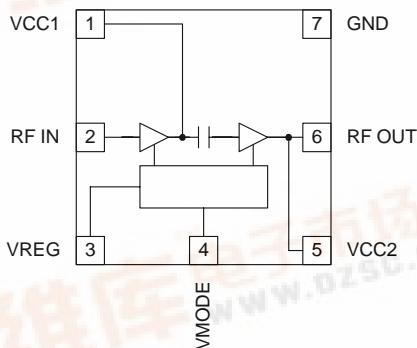
The RF3118 is a high-power, high-efficiency linear amplifier IC targeting 3V handheld systems. The device is manufactured on an advanced Gallium Arsenide Hetero-junction Bipolar Transistor (HBT) process, and has been designed for use as the final RF amplifier in dual-mode 3V CDMA hand-held digital cellular equipment, spread-spectrum systems, and other applications in the 1850MHz to 1910MHz band. The RF3118 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 6mmx6mm land grid array with backside ground.



Optimum Technology Matching® Applied

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

Package Style: LGM (6mmx6mm)



Features

- Input/Output Internally Matched @ 50Ω
- Single 3V Supply
- 29dBm Linear Output Power
- 27dB Linear Gain
- 34% Linear Efficiency
- 50mA Idle Current

Ordering Information

- RF3118 3V 1900MHz Linear Amplifier Module
- RF3118 PCBA Fully Assembled Evaluation Board

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Functional Block Diagram



Absolute Maximum Ratings

Parameter	Rating	Unit
Supply Voltage (RF off)	+8.0	V _{DC}
Supply Voltage (P _{OUT} ≤29dBm)	+5.2	V _{DC}
Control Voltage (V _{REG})	+4.2	V _{DC}
Mode Voltage (V _{MODE})	+3.5	V _{DC}
Input RF Power	+10	dBm
Operating Case Temperature	-30 to +110	°C
Storage Temperature	-30 to +150	°C



Caution! ESD sensitive device.

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Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
High Power State (V_{MODE} Low)					Typical Performance at V _{CC} =3.2V, V _{REG} =3.0V T _{AMB} =25°C, Frequency=1850MHz to 1910MHz (unless otherwise specified)
Frequency Range	1850		1910	MHz	
Linear Gain	25	27		dB	
Second Harmonic		-40		dBc	
Third Harmonic		-50		dBc	
Maximum Linear Output Power (CDMA Modulation)	28	29		dBm	
Total Linear Efficiency		34		%	P _{OUT} =28dBm
Adjacent Channel Power Rejection		-48	-46	dBc	ACPR @ 1.25MHz, P _{OUT} =28dBm
		-60	-57	dBc	ACPR @ 2.25MHz, P _{OUT} =28dBm
Input VSWR		2:1			
Output VSWR			10:1		No damage.
			6:1		No oscillations. >-70dBc
Noise Power		-141		dBm/Hz	At 80MHz offset.
Low Power State (V_{MODE} High)					Typical Performance at V _{CC} =3.2V, V _{REG} =3.0V T _{AMB} =25°C, Frequency=1850MHz to 1910MHz (unless otherwise specified)
Frequency Range	1850		1910	MHz	
Linear Gain	15	19		dB	
Second Harmonic		-40		dBc	
Third Harmonic		-50		dBc	
Maximum Linear Output Power (CDMA Modulation)	16	20		dBm	
Adjacent Channel Power Rejection		-55	-46	dBc	ACPR @ 1.25MHz, P _{OUT} =16dBm
		-72	-60	dBc	ACPR @ 1.25MHz, P _{OUT} =16dBm
Input VSWR		2:1			
Output VSWR			10:1		No damage.
			6:1		No oscillations. >-70dBc

Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
DC Supply					$T_{AMB}=25^{\circ}C$
Supply Voltage	3.2	3.7	4.2	V	
Quiescent Current		160	200	mA	$V_{MODE}=Low, V_{REG}=3.0V, V_{CC}=3.2V$
		50	60	mA	$V_{MODE}=High, V_{REG}=3.0V, V_{CC}=3.2V$
V_{REG} Current			8	mA	
V_{MODE} Current			1	mA	
Turn On/Off Time (RF)			6	μs	
Total Current (Power Down)			10	μA	$V_{REG}=Low, V_{MODE}=Low$
			5	μA	
V_{REG} "Low" Voltage	0		0.5	V	
V_{REG} "High" Voltage	2.9	3.0	3.1	V	
V_{MODE} "Low" Voltage	0		0.5	V	
V_{MODE} "High" Voltage	2.0		3.0	V	

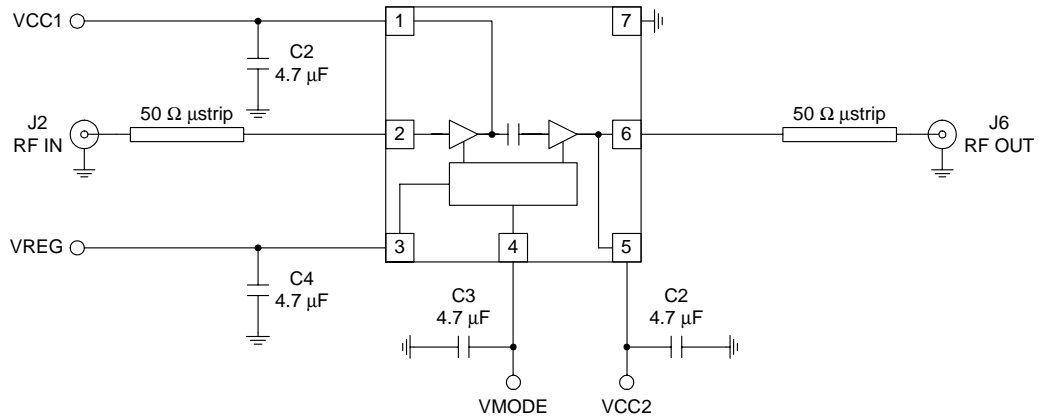
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Pin	Function	Description	Interface Schematic
1	VCC1	First stage collector supply. A low frequency decoupling capacitor (e.g., 1 μ F) is required.	
2	RF IN	RF input internally matched to 50 Ω . This input is internally AC-coupled.	
3	VREG	Regulated voltage supply for amplifier bias. In Power Down mode, both V _{REG} and V _{MODE} need to be LOW (<0.5V).	
4	VMODE	For nominal operation (High Power Mode), V _{MODE} 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 μ F) is required.	
6	RF OUT	RF output internally matched to 50 Ω . 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.	

Evaluation Board Schematic

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



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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