

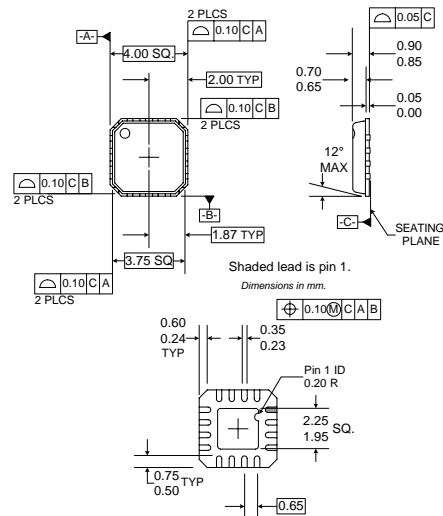
RoHS Compliant & Pb-Free Product

Typical Applications

- UMTS Base Stations
- CDMA Base Stations
- GSM-EDGE/EGSM Base Stations
- WLAN and WLL Systems
- GMSK, QPSK, DQPSK, QAM Modulation

Product Description

The RF2850 is a direct quadrature modulator for use in base stations and other communications systems. RF2850 supports PCS, GSM, EDGE, CDMA2000, and UMTS standards. This device features a narrow-band operation at 1700MHz to 2500MHz with excellent carrier and sideband suppression and ultra low noise floor. The device is manufactured on an advanced GaAs HBT process. The RF2850 operates from a single 5V supply and is packaged in a low cost 4mmx4mm 16-pin leadless package.



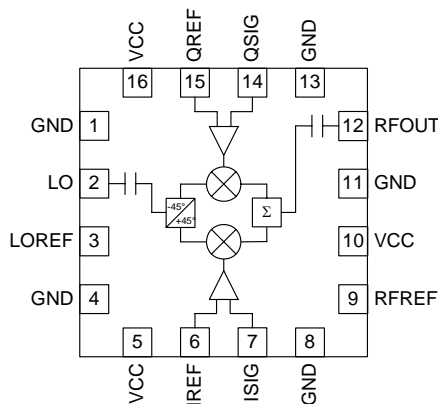
Package Style: QFN, 16-Pin, 4 x 4

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 |

Features

- Typical Carrier Suppression >40dBc
- Typical Sideband Suppression >40dBc
- Noise Floor better than -158dBm/Hz
- Single 5V Power Supply



Functional Block Diagram

Ordering Information

- | | |
|-------------|----------------------------------|
| RF2850 | Direct Quadrature Modulator |
| RF2850 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>

RF2850

Absolute Maximum Ratings

Parameter	Rating	Unit
Supply Voltage	-0.5 to +5.3	V
LO Input	+10	dBm
Operating Temperature	-40 to +85	°C
Storage Temperature	-65 to +150	°C



Caution! ESD sensitive device.

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Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
High Band Performance (1900MHz) with CW Baseband Inputs					
LO Input Port					
LO Drive Level		-5		dBm	
LO Input Impedance		50		Ω	
LO Port Return Loss		13		dB	
Modulation Input					
Frequency Range	DC		250	MHz	Baseband common mode voltage 0.25V _{P-P} per pin, 500mV V _{P-P} differential, I/Q in quadrature CW baseband signal Measured at DC 500mV V _{P-P} differential, I/Q at 2.05V DC
Reference Voltage		2.05		V	
Baseband Input Level		0.25		V _{P-P}	
I/Q Signal		200		kHz	
Input Impedance		40		k Ω	
Bandwidth (-1dB)		130		MHz	
Input Bias Current			40	μ A	
I/Q Modulator Output					
RF Frequency Range	1700		2500	MHz	T=25°C, V _{CC} =5V
RF Output Power		-6		dBm	
RF Output Return Loss		15		dB	
RF Output P1dB	4	5		dBm	
Carrier Suppression	20	25		dBc	Unadjusted (see note)
Carrier Suppression	35	55		dBc	Adjusted. T=-40°C to +85°C
Sideband Suppression	30	45		dBc	Unadjusted
IM3 Suppression		52		dBc	Two tone baseband input @ 500mV _{P-P} dif-ferential per tone
Output IP3	15	20		dBm	
Broadband Noise Floor		-158	-156	dBm/Hz	20MHz offset from LO, all IQ input at bias of 2.05V
DC Parameters					
Supply Voltage		5.0		V	Specification
Supply Current	4.75	60	5.25	mA	Operating limits

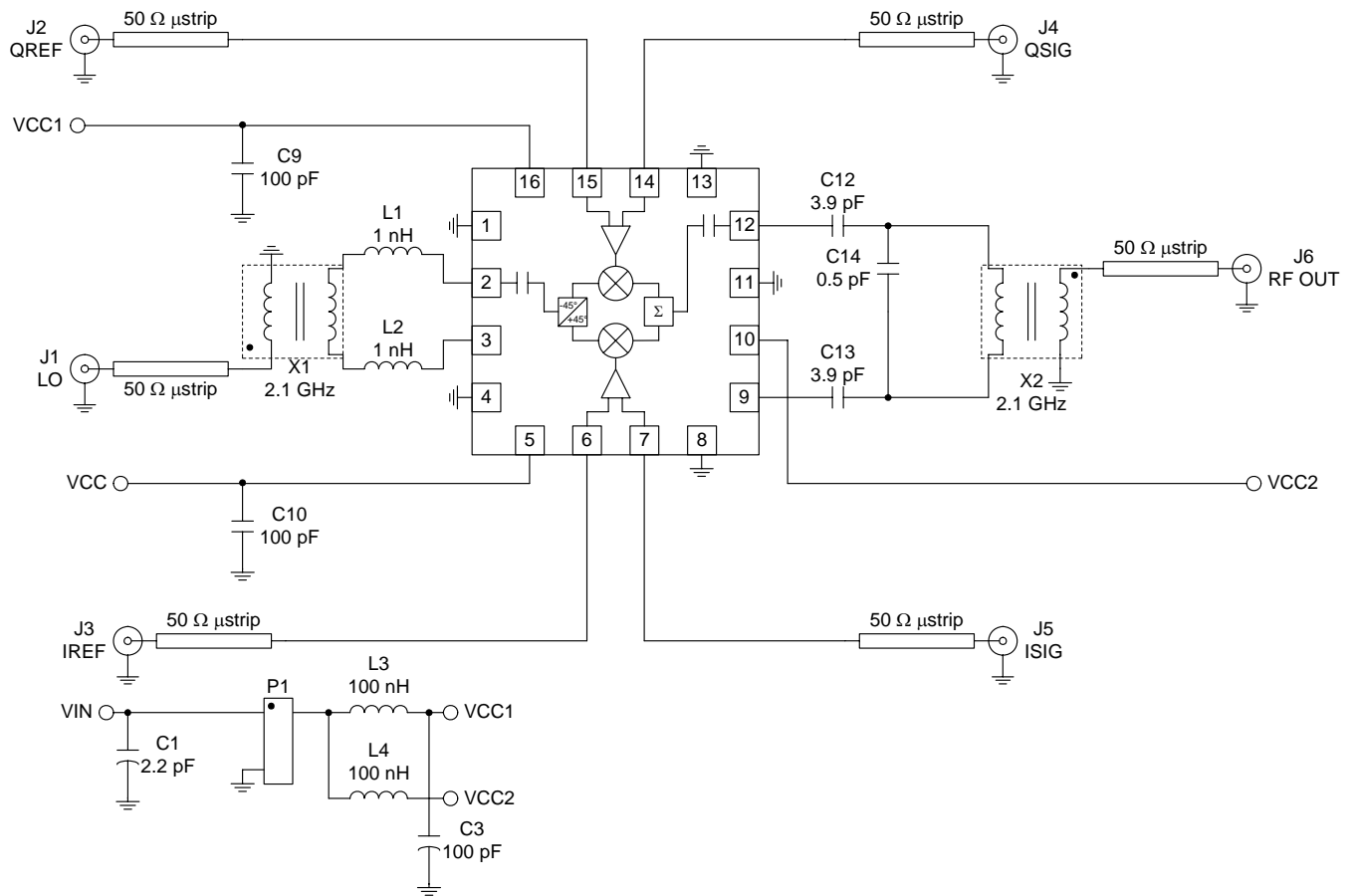
Note: 20dBc limit for unadjusted carrier suppression is applicable for differential I and Q inputs only.

Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
High Band Performance with PCS CDMA and W-CDMA Baseband Inputs					
W-CDMA 3GPP					
Channel Power		-13		dBm	3.84MHz integrated bandwidth, ESG-D with LPF
ACPR @ 1960MHz		-68	-62	dBc	
SNR @ 1960MHz		-74	-70	dBc	
ACPR @ 2140MHz		-65	-62	dBc	
SNR @ 2140MHz		-74	-70	dBc	
Noise Floor @ 20MHz Offset		-156	-155	dBm/Hz	20MHz offset from LO
PCS CDMA					
Channel Power		-13		dBm	1.2288MHz integrated bandwidth 30kHz integrated bandwidth
ACPR @ 1960MHz		-72	-70	dBc	
W-CDMA 1 MHz BW					
Channel Power		-14		dBm	1 MHz integrated bandwidth at adjacent channel
ACPR @ 2140MHz		-74	-71	dBc	
SNR @ 2140MHz		-85	-82	dBc	
Noise Floor @ 20MHz Offset		-157	-156	dBm/Hz	

RF2850

Pin	Function	Description	Interface Schematic
1	GND	Ground connection.	
2	LO	LO input signal. This pin has an internal DC-blocking capacitor. This port is voltage-driven so matching at different frequencies is generally not required.	
3	LOREF	The reference end of local oscillator.	
4	GND	Ground connection.	
5	VCC	Power supply. An external capacitor is required.	
6	I REF	Reference voltage for the I mixer. The DC voltage should be the same as the DC supplied to I SIG (pin 7). See pin 7 for more information. The SIG and REF inputs are inputs of a differential amplifier. Therefore, the REF and SIG inputs are interchangeable. If swapping the I SIG and I REF pins, the Q SIG and Q REF also need to be swapped to maintain the correct phase. It is also possible to drive the SIG and REF inputs in a differential mode which will increase gain.	
7	I SIG	Baseband input to the I mixer. This pin is DC-coupled. The input drive level determines output power and linearity performance. For better carrier/sideband suppression and dynamic range, the drive level should be as high as possible to meet the required linearity performance. The recommended DC level for this pin is 2.05V.	
8	GND	Ground connection.	
9	RFREF	The reference end of RF input.	
10	VCC	Power supply. An external capacitor is required.	
11	GND	Ground connection.	
12	RF OUT	RF Output. This pin has an internal DC-blocking capacitor. At some frequencies, external matching may be needed to optimize output power.	
13	GND	Ground connection.	
14	Q SIG	Baseband input to the Q mixer. This pin is DC-coupled. The input drive level determines the output power and linearity performance. For better carrier/sideband suppression and dynamic range, the drive level should be as high as possible to meet the required linearity performance. The recommended DC level for this pin is 2.05V.	
15	Q REF	Reference voltage for the Q mixer. See pin 14 for more information.	
16	VCC	Power supply. An external capacitor is required.	
Pkg Base	GND	Ground connection.	

Evaluation Board Schematic 1700MHz to 2500MHz (Differential Drive)



RF2850

Evaluation Board Layout

Board Size 2.00" x 2.00"

Board Thickness 0.042" ($\pm 10\%$), Board Material FR-4

