DIRECT QUADRATURE MODULATOR

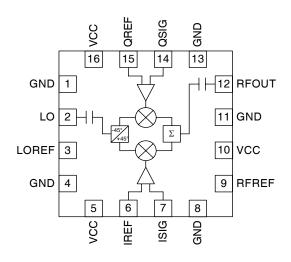
RoHS Compliant & Pb-Free Product Package Style: QFN, 16-Pin, 4x4

Features

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

Applications

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



Functional Block Diagram

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 4 mmx4 mm 16-pin leadless package.

Ordering Information

RF2850 Direct Quadrature Modulator
RF2850PCBA-41X Fully Assembled Evaluation Board

Optimum Technology Matching® Applied

☑ GaAs HBT	☐ SiGe BiCMOS	☐ GaAs pHEMT	☐ GaN HEMT
☐ GaAs MESFET	☐ Si BiCMOS	Si CMOS	
☐ InGaP HBT	☐ SiGe HBT	☐ Si BJT	



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.

Exceeding any one or a combination of the Absolute Maximum Rating conditions may cause permanent damage to the device. Extended application of Absolute Maximum Rating conditions to the device may reduce device reliability. Specified typical performance or functional operation of the device under Absolute Maximum Rating conditions is not implied.

RoHS status based on EU Directive 2002/95/EC (at time of this document revision).

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Parameter		Specification		11:4	On a dikina
	Min.	Тур.	Max.	Unit	Condition
High Band Performan	се (1900МН	z) with CW	Baseban	d 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	
Reference Voltage		2.05		V	Baseband common mode voltage
Baseband Input Level		0.25		V _{P-P}	$0.25V_{P,P}$ per pin, $500\text{mV}V_{P,P}$ differential, I/Q in quadrature
I/Q Signal		200		kHz	CW baseband signal
Input Impedance		40		kΩ	Measured at DC
Bandwidth (-1dB)		130		MHz	500 mV V _{P-P} differential, I/Q at 2.05 V DC
Input Bias Current			40	μА	
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 @ 500 mV _{P-P} differential 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
	4.75		5.25	V	Operating limits
Supply Current		60		mA	

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





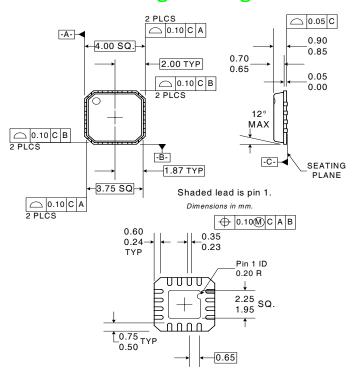
Parameter		Specification			Oan dition
	Min.	Тур.	Max.	Unit	Condition
High Band Performanc	e with PCS	6 CDMA and	W-CDMA	Baseban	nd Inputs
W-CDMA 3GPP					
Channel Power		-13		dBm	3.84 MHz integrated bandwidth, ESG-D with LPF
ACPR @ 1960MHz		-68	-62	dBc	
SNR @ 1960MHz		-74	-70	dBc	
ACPR @ 2140 MHz		-65	-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
ACPR @ 1960MHz		-72	-70	dBc	30 kHz integrated bandwidth
W-CDMA 1MHz BW					
Channel Power		-14		dBm	1MHz integrated bandwidth at adjacent channel
ACPR @ 2140 MHz		-74	-71	dBc	
SNR @ 2140 MHz		-85	-82	dBc	
Noise Floor @ 20MHz Offset		-157	-156	dBm/Hz	20MHz offset from LO



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.	LO 0W -
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	V cc
7	I SIG	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. Baseband input to the I mixer. This pin is DC-coupled. The input drive level	<u> </u>
,	1310	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 2.05 V.	2 pF
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.	→ RF OUT
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 2.05 V.	2 pF
15	Q REF	Reference voltage for the Q mixer. See pin 14 for more information.	2 pF =
16	VCC	Power supply. An external capacitor is required.	
Pkg Base	GND	Ground connection.	

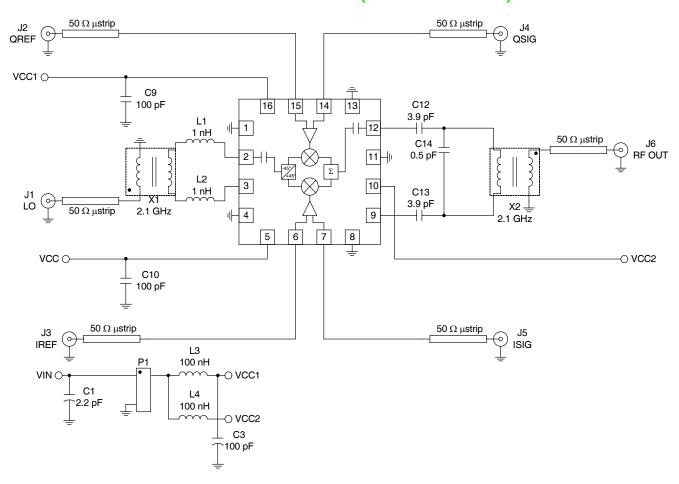


Package Drawing





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





Evaluation Board Layout Board Size 2.00" x 2.00"

Board Thickness 0.042" (±10%), Board Material FR-4

