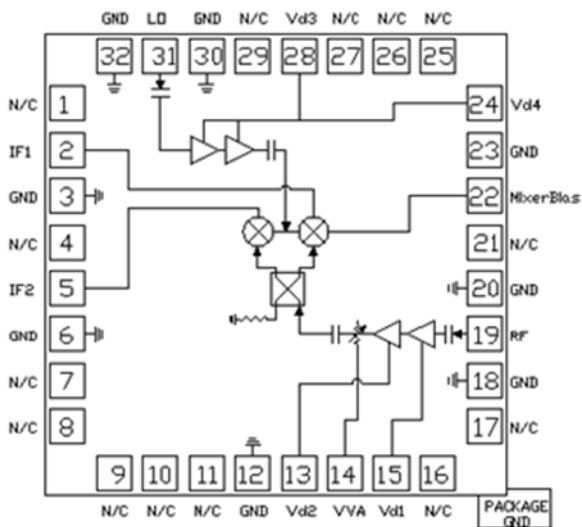


# RFRX1002

GaAs MMIC IQ Downconverter  
9GHz to 14GHz

RFMD's RFRX1002 is a 9GHz to 14GHz GaAs pHEMT Downconverter, incorporating an integrated LNA, image rejection mixer, LO buffer amplifier, and DC decoupling capacitors. The combination of high performance and low cost packaging makes the RFRX1002 a cost effective solution, ideally suited to both current and next generation Point-to-Point and VSAT applications. RFRX1002 is packaged in a 5mm x 5mm QFN to simplify both system level board design and volume assembly.



Functional Block Diagram

## Ordering Information

RFRX1002S2	Sample bag with 2 pieces
RFRX1002SB	Bag with 5 pieces
RFRX1002SQ	Bag with 25 pieces
RFRX1002SR	7" Reel with 100 pieces
RFRX1002TR7	7" Reel with 750 pieces
RFRX1002TR13	13" Reel with 2500 pieces
RFRX1002PCK-410	Evaluation board



Package: QFN, 32-pin,  
5mm x 5mm x 0.95mm

## Features

- RF Frequency: 9GHz to 14GHz
- LO Frequency: 5GHz to 18GHz
- IF Frequency: DC to 4GHz
- LO Input Drive: +5dBm
- Conversion Gain: 14dB
- Noise Figure: 1.7dB
- IIP3: 4dBm
- OIP3: 18dBm
- Image Rejection: 15dBc

## Applications

- Point-to-Point
- VSAT

## Absolute Maximum Ratings

Parameter	Rating	Unit
LNA Drain Voltage ( $V_D$ )	7	V
LOA Drain Voltage ( $V_D$ )	7	V
RF Input Power	0	dBm
LO Input Power	15	dBm
$T_{OPER}$	-40 to +85	°C
$T_{STOR}$	-65 to +150	°C
ESD Human Body Model	Class 1A	



**Caution!** ESD sensitive device.



RFMD Green: RoHS compliant per EU Directive 2011/65/EU, halogen free per IEC 61249-2-21, <1000ppm each of antimony trioxide in polymeric materials and red phosphorus as a flame retardant, and <2% antimony solder.

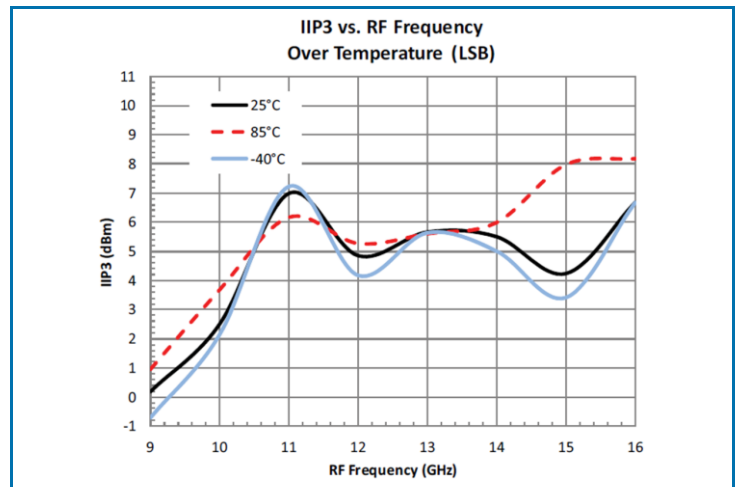
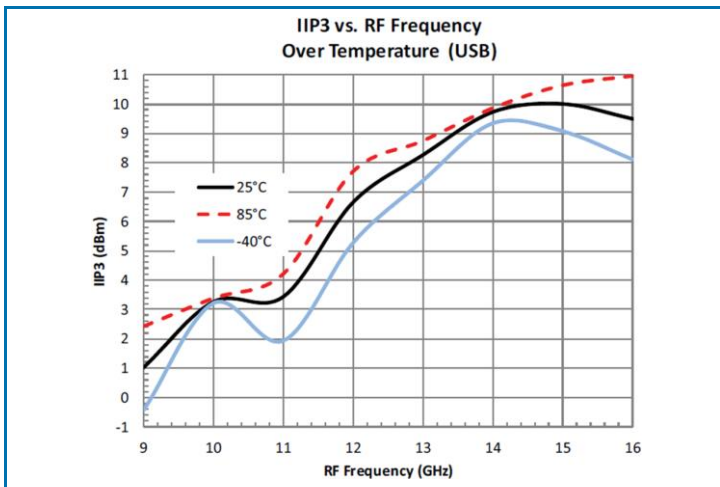
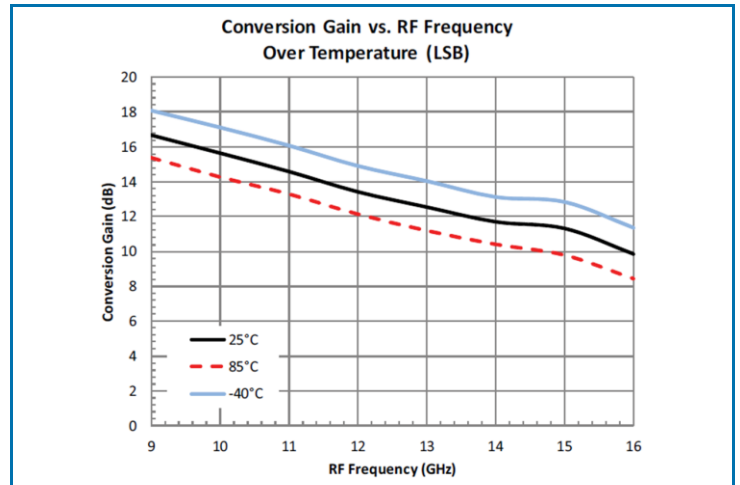
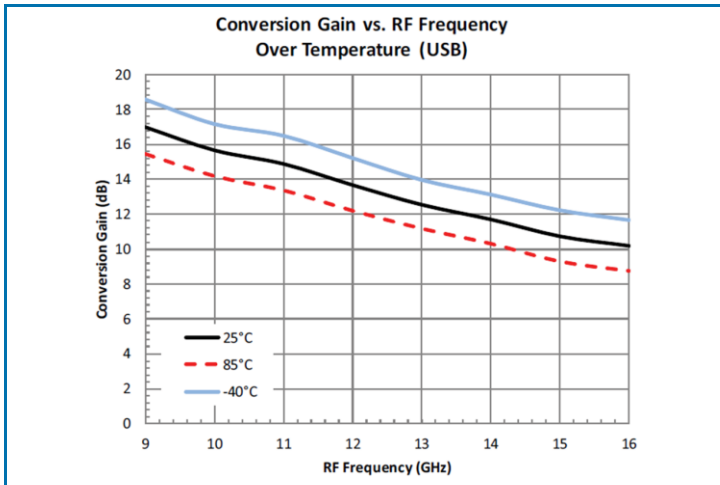
Exceeding any one or a combination of the Absolute Maximum Rating conditions may cause permanent damage to the device. Extended application of Absolute Maximum Rating conditions to the device may reduce device reliability. Specified typical performance or functional operation of the device under Absolute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

## Nominal Operating Parameters

Parameter	Specification			Unit	Condition
	Min	Typ	Max		
<b>General Performance</b>					
RF Frequency	9		14	GHz	
LO Frequency	5		18	GHz	
IF Frequency	DC		4.0	GHz	
LO Input Drive	0	+5		dBm	
Conversion Gain	10	+14		dB	
Noise Figure		1.7	2.4	dB	
IIP3		+4		dBm	
OIP3		+18		dBm	
Image Rejection	12	15		dBc	
LO-RF Isolation		30		dB	
LO-IF Isolation		20		dB	
LO Return Loss	8	12		dB	
RF Return Loss	10	12		dB	
$V_D$		4		V	
$I_D$		210	220	mA	
VVA	-2		0	V	
Mixer Bias		-0.8		V	

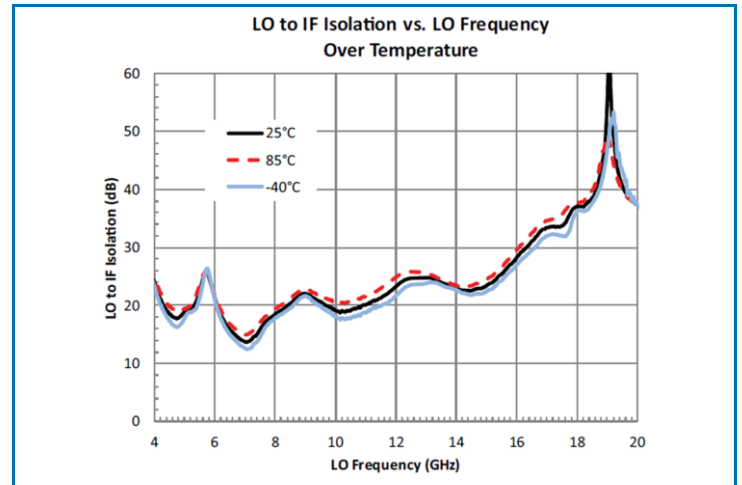
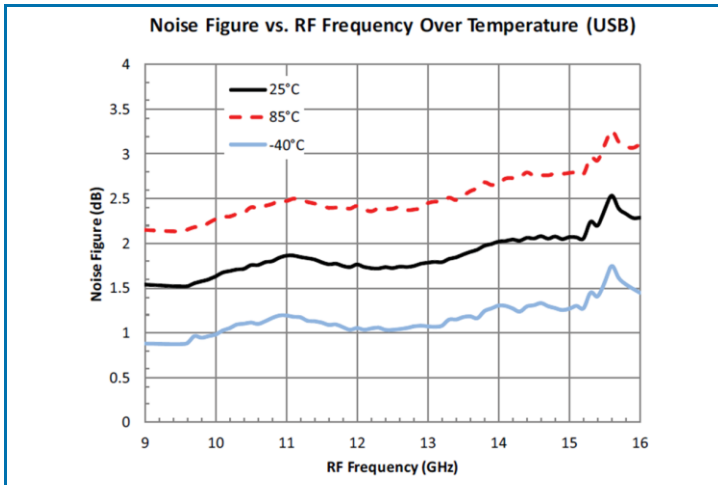
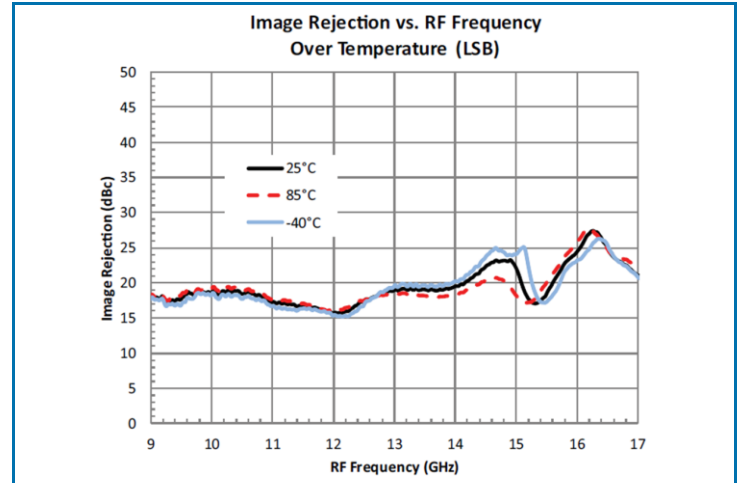
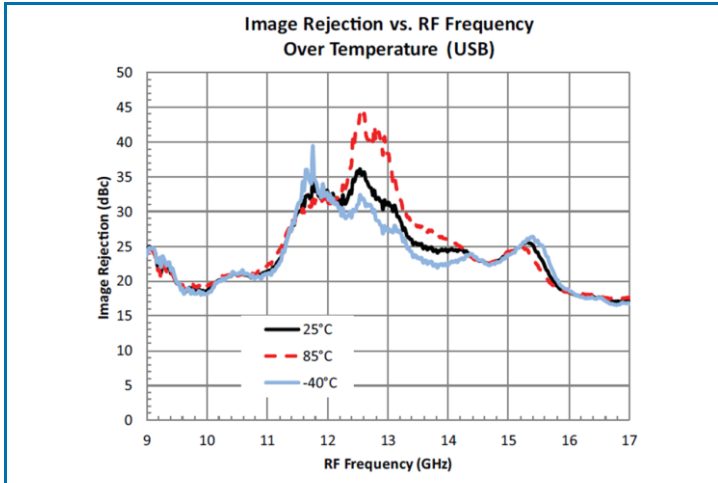
### Typical Electrical Performance

Measurements performed with I and Q ports connected to an external 90° Hybrid Combiner and Bias Voltage of +4V, and LO Power of +5dBm, unless otherwise stated



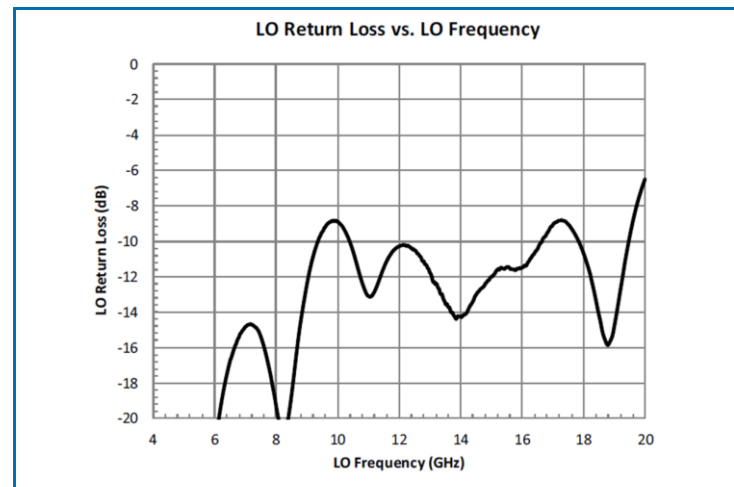
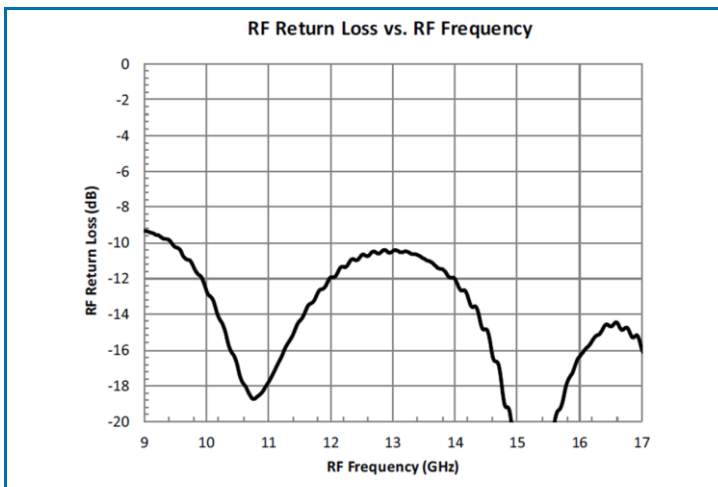
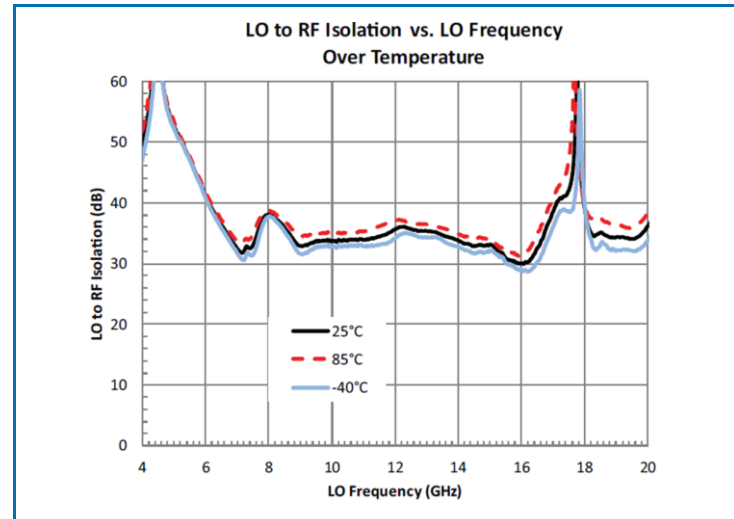
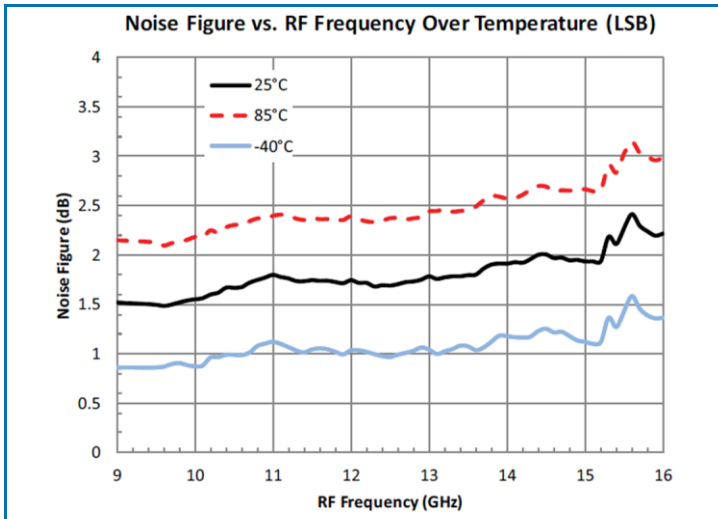
**Typical Electrical Performance (continued)**

Measurements performed with I and Q ports connected to an external 90° Hybrid Combiner and Bias Voltage of +4V, and LO Power of +5dBm, unless otherwise stated



**Typical Electrical Performance (continued)**

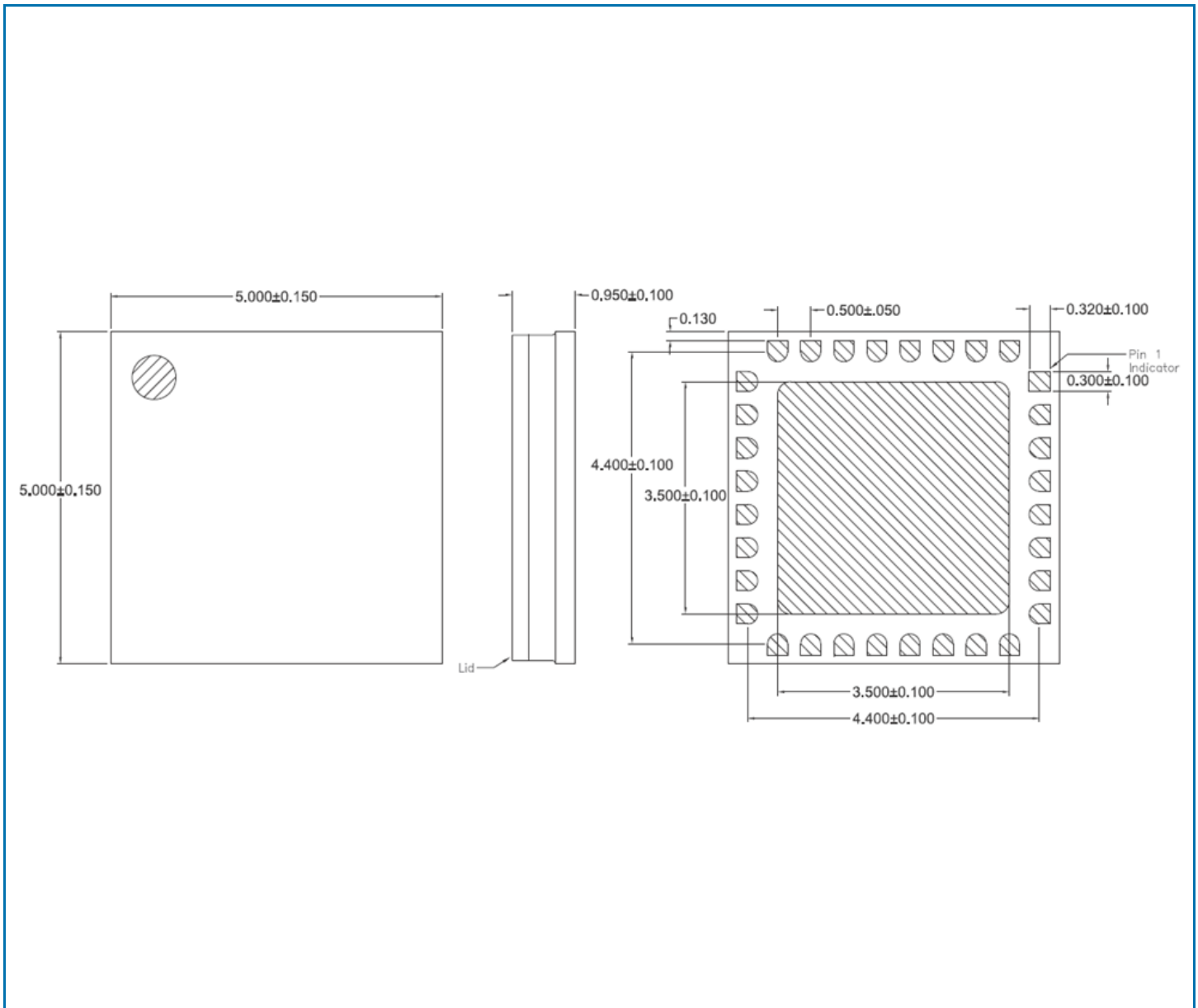
Measurements performed with I and Q ports connected to an external 90° Hybrid Combiner and Bias Voltage of +4V, and LO Power of +5dBm, unless otherwise stated



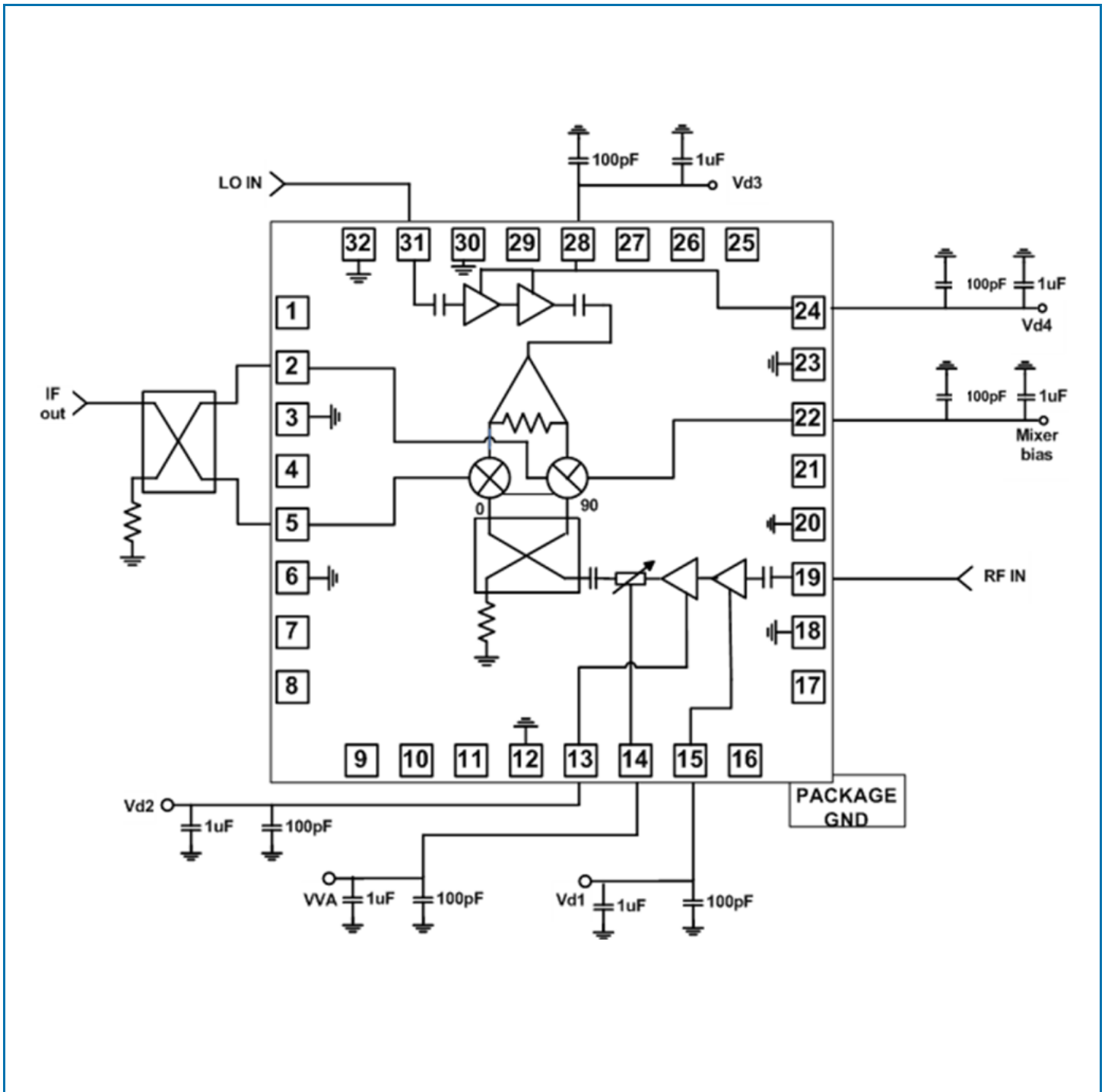
## Pin Names and Descriptions

Pin	Name	Description
1	N/C	Not Connected
2	IF1	IF1 Output
3	GND	Ground
4	N/C	Not Connected
5	IF2	IF2 Output
6	GND	Ground
7-11	N/C	Not Connected
12	GND	Ground
13	Vd2	LNA stage 2 bias = 4V
14	VVA	VVA bias = -2V to 0V
15	Vd1	LNA stage 1 bias = 4V
16-17	N/C	Not Connected
18	GND	Ground
19	RF Input	RF Input AC couples and matched to 50Ω
20	GND	Ground
21	N/C	Not Connected
22	Mixer Bias	Mixer Bias = -0.8V
23	GND	Ground
24	Vd4	LOA Bias = 4V
25-27	N/C	Not Connected
28	Vd3	LOA Bias = 4V (internally connected to Vd4)
29	N/C	Not Connected
30	GND	Ground
31	LO Input	Local oscillator input. AC couples and matched to 50Ω
32	GND	Ground

### Package Outline Drawing (Dimensions in millimeters)

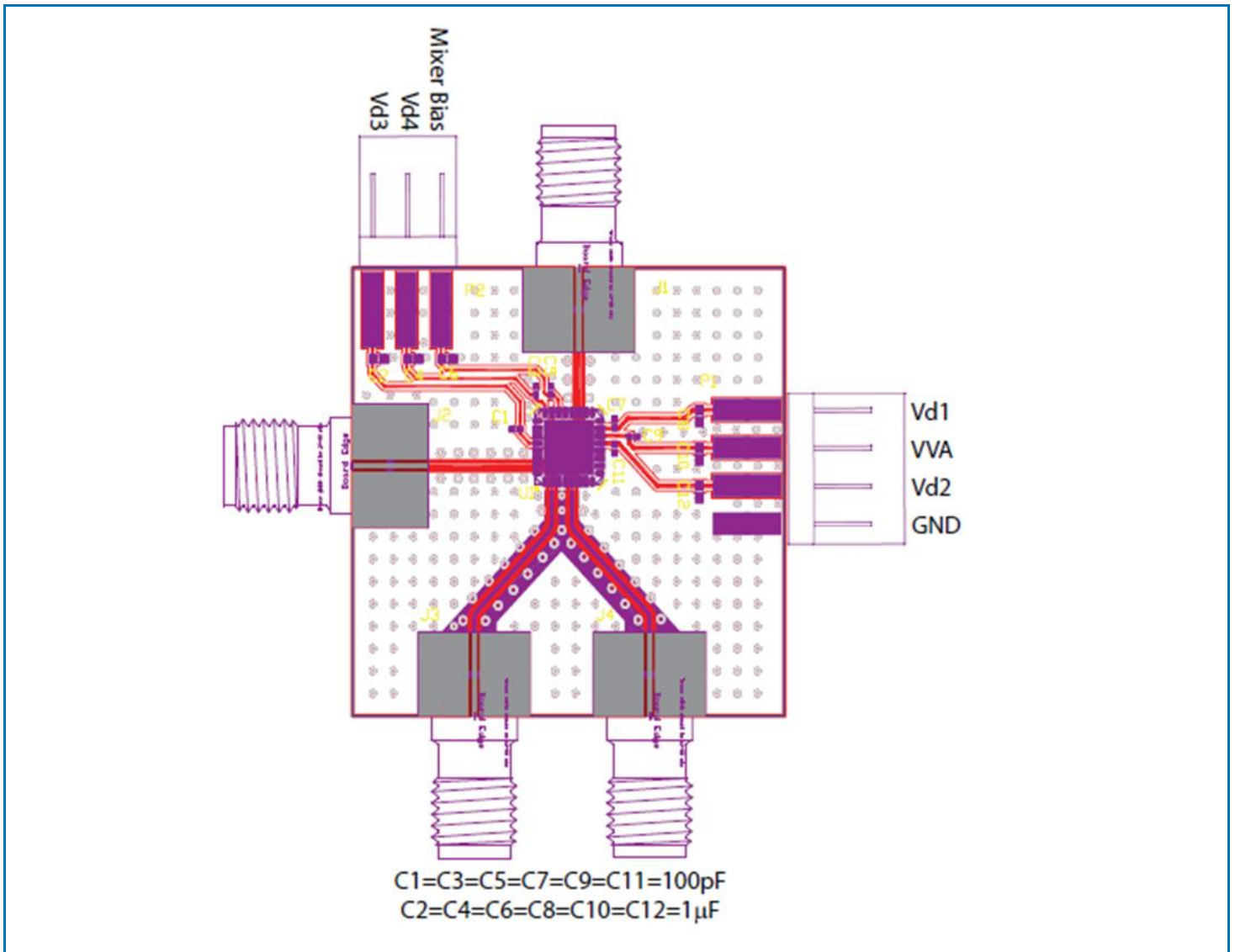


Application Circuit Block Diagram





## Evaluation Board Layout



## Test Conditions

LO Power	+5dBm
RF Power	-20dBm
Vd1, Vd2	4V
Vd3, Vd4	4V
VVA	-2V
Mixer Bias	-0.8V