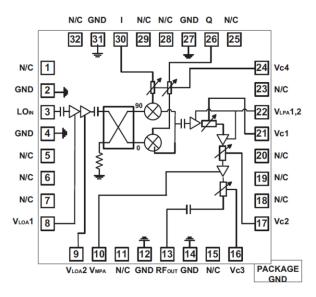


RFUV1003

GaAs MMIC IQ UpConverter 12GHz to 16GHz

RFMD's RFUV1003 is a 12GHz to 16GHz GaAs pHEMT upconverter, incorporating an integrated LO buffer amplifier, a balanced single-side band (image rejection) mixer followed by a variable gain amplifier and DC decoupling capacitors. The combination of high performance part and low cost packaging makes the RFUV1003 a cost effective solution, ideally suited to both current and next generation Point-to-Point and VSAT applications. RFUV1003 is packaged in a 5mm x 5mm QFN to simplify both system level board design and volume assembly.



Functional Block Diagram

Ordering Information

RFUV1003S2	Sample bag with 2 pieces	
RFUV1003SB	Bag with 5 pieces	
RFUV1003SQ	Bag with 25 pieces	
RFUV1003SR	7" Reel with 100 pieces	
RFUV1003TR7	7" Reel with 750 pieces	
RFUV1003TR13	13" Reel with 2500 pieces	
RFUV1003PCK-410 Evaluation Board with 2-piece sample bag		



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

Features

- RF Frequency: 12GHz to 16GHz
- LO Frequency: 8GHz to 20GHz
- IF Frequency: DC to 4GHz
- Maximum Conversion Gain: 23dB
- Minimum Conversion Gain: -10dB
- Noise Figure (Maximum Gain): 11dB
- Noise Figure (Minimum Gain): 17dB
- OIP3 (Maximum Gain): +28dBm
- OIP3 (Minimum Gain): +12dBm
- Image Rejection: 20dBc

Applications

- Point-to-Point
- VSAT

RF Micro Devices Inc. 7628 Thorndike Road, Greensboro, NC 27409-9421

For sales or technical support, contact RFMD at +1.336.678.5570 or customerservice@rfmd.com.

RF MICRO DEVICES[®] and RFMD[®] are trademarks of RFMD, LLC. BLUETOOTH is a trademark owned by Bluetooth SIG, Inc., U.S.A. and licensed for use by RFMD. All other trade names, trademarks, and registered trademarks are the property of their respective owners. ©2013, RF Micro Devices, Inc.

DS140213



Absolute Maximum Ratings

Parameter	Rating	Unit
LPA Drain Voltage Vd	6	V
LOA Drain Voltage	6	V
RF Input Power	15	dBm
LO Input Power	15	dBm
T _{OPER}	-40 to +85	°C
T _{STOR}	-65 to +150	°C
ESD Human Body Model	Class 1A	





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.

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.

Nominal Operating Parameters

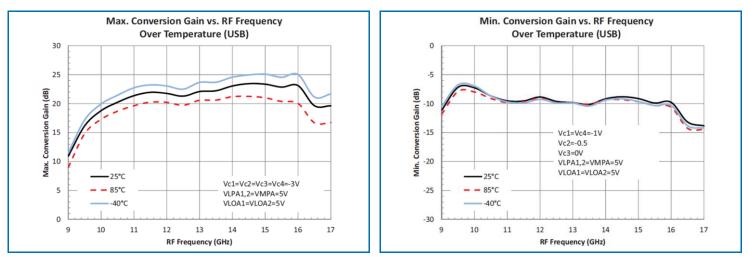
Devenuetor	Specification			Unit	Condition				
Parameter	Min	Тур	Max	Unit					
General Performance									
RF Frequency	12		16	GHZ					
LO Frequency	8		20	GHZ					
IF Frequency	DC		4	GHZ					
LO input Drive	-1	0	+5	dBm					
Conversion Gain (Max.)	20	23	24	dB					
Conversion Gain (Min.)	-9	-10	-11	dB					
NF (max. Gain)		11	13	dB					
NF (min. Gain)		17	21	dB					
OIP3 (max. Gain)	25	28		dBm					
OIP3 (min. Gain)	9	12		dBm					
Image Rejection	15	20		dBc					
LO Leakage at RF-Port (Maximum Gain)		-5	5	dBm	With IQ bias				
LO Return Loss		10		dB					
RF Return Loss		10		dB					
V _D		5		V					
ID		380	500	mA					
VVA	-4		0	V					

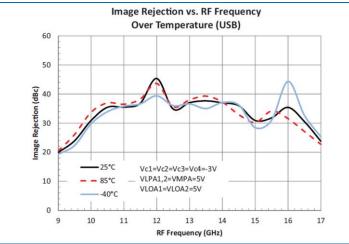
RF Micro Devices Inc. 7628 Thorndike Road, Greensboro, NC 27409-9421 For sales or technical support, contact RFMD at +1.336.678.5570 or customerservice@rfmd.com. DS140213



Typical Electrical Performance

Measurements performed with I and Q (IF) ports connected to an external 90° Hybrid, LO Power = 0dBm and IF = 2.5GHz, -10dBm unless otherwise stated

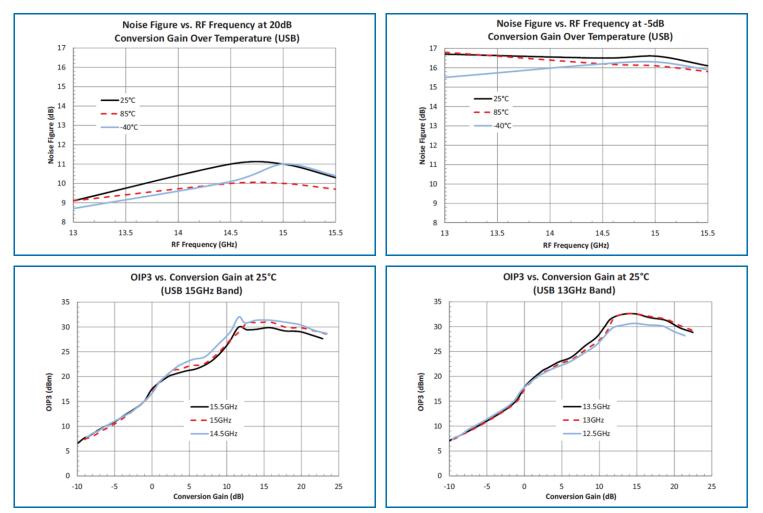




RFUV1003



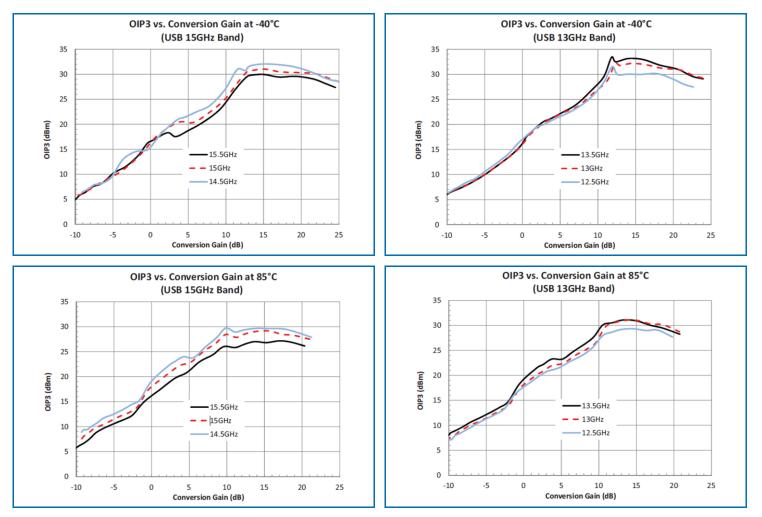
Typical Electrical Performance (continued)



RF Micro Devices Inc. 7628 Thorndike Road, Greensboro, NC 27409-9421 For sales or technical support, contact RFMD at +1.336.678.5570 or customerservice@rfmd.com. DS140213



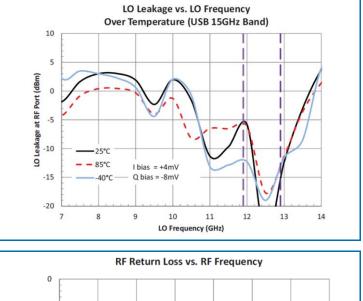
Typical Electrical Performance (continued)

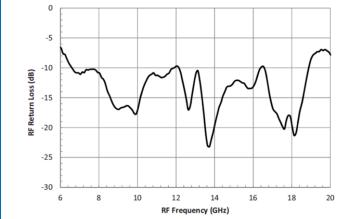


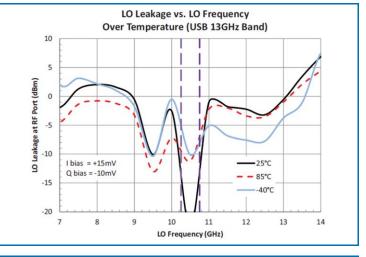
DS140213

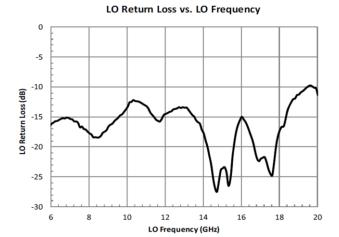


Typical Electrical Performance (continued)











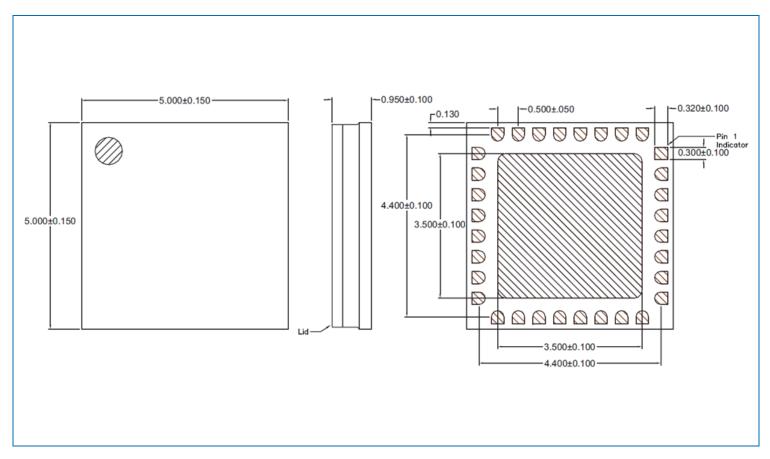
Typical Bias Sequence and Gain Control

Optimum linearity versus gain is achieved using sequential bias. At maximum gain (V_c1, V_c4), V_c2 and V_c3 are set at -4V. (V_c1, V_c4), V_c2 and V_c3 are biased in sequence. The first dynamic range is achieved by setting V_c2 and V_c3 at -4V and varying (V_c1, V_c4) over the (-4V to -1.25V) range as shown in the table below. Similarly second dynamic range is achieved by setting (V_c1, V_c4) at -1V, setting V_c3 to -4V and varying V_c2 over the (-2.5V to -1.25V) range. Finally third dynamic range is achieved by setting (V_c1, V_c4) and V_c2 at -1V, and varying V_c3 over the (-2.5V to -1V) range.

Bias Sequence 1 (Typical)

	Gmax																		Gmin
VC1, VC4	-4	-2.5	-2.25	-2	-1.75	-1.5	-1.25	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
VC2	-4	-4	-4	-4	-4	-4	-4	-2.5	-2.25	-2	-1.75	-1.5	-1.25	-1	-1	-1	-1	-1	-1
VC3	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-2.5	-2.25	-2	-1.75	-1.5	-1

Package Outline Drawing (Dimensions in millimeters)



RF Micro Devices Inc. 7628 Thorndike Road, Greensboro, NC 27409-9421

DS140213



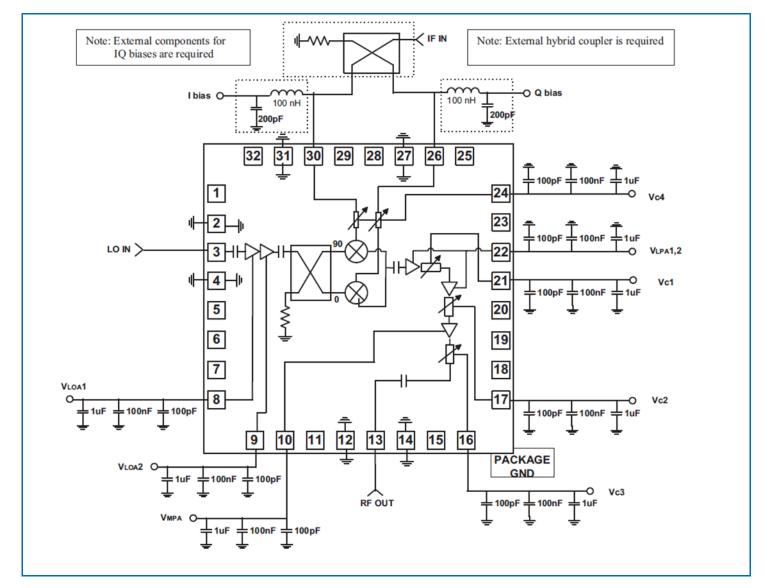
Pin Names and Descriptions

Pin	Name	Description
1	N/C	
2	GND	Ground
3	LO	Local oscillator input. AC coupled and matched to 50Ω
4	GND	Ground
5-7	N/C	
8	VLOA1	LOA stage 1 drain bias
9	VLOA2	LOA stage 2 drain bias
10	VMPA	MPA drain bias
11	N/C	
12	GND	Ground
13	RFOUT	RF output. AC coupled and matched to 50W
14	GND	Ground
15	N/C	
16	VC3	Control line number 3 (See bias sequence description)
17	VC2	Control line number 2 (See bias sequence description)
18-20	N/C	
21	VC1	Control line number 1 (See bias sequence description)
22	VLPA1, VLPA2	LPA stage 1,2 drain bias
23	N/C	
24	VC4	Control line number 4 (See bias sequence description)
25	N/C	
26	Q	IF Q input
27	GND	Ground
28-29	N/C	
30	1	If I input
31	GND	Ground
32	N/C	

DS140213



Application Circuit Block Diagram

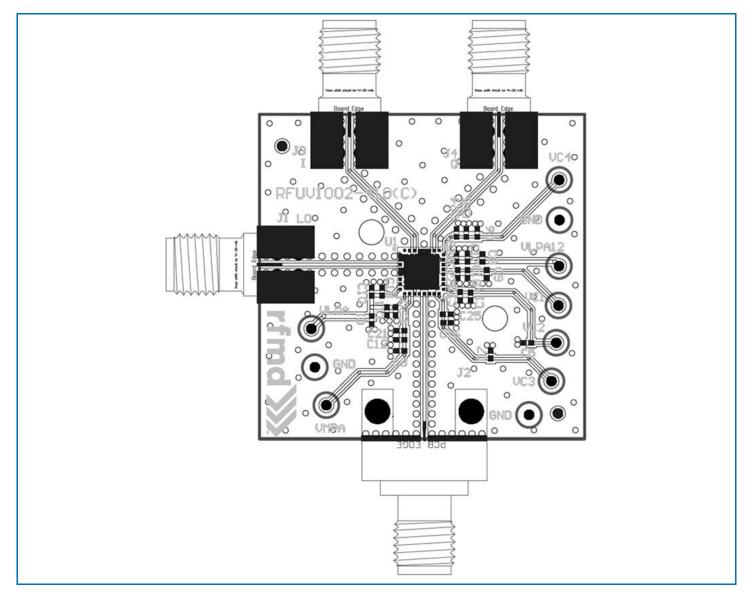


RF Micro Devices Inc. 7628 Thorndike Road, Greensboro, NC 27409-9421

DS140213



Evaluation Board Layout



Test Cone		
LO Power	0dBm	В
IF Power	-10dBm	10
VLOA1, VLOA2	5V	1'
VLPA1, VLPA2, VMPA	5V	13
(V _c 1, V _c 4), V _c 2, V _c 3	-4V to 0V	15

Sub-Band Frequency Ranges						
Band Frequency Range						
10GHz	10GHz to 10.5GHz					
11GHz	10.7GHz to 11.7GHz					
13GHz	12.75GHz to 13.25GHz					
15GHz	14.4GHz to 15.4GHz					

RF Micro Devices Inc. 7628 Thorndike Road, Greensboro, NC 27409-9421

For sales or technical support, contact RFMD at +1.336.678.5570 or customerservice@rfmd.com.

The information in this publication is believed to be accurate. However, no responsibility is assumed by RF Micro Devices, Inc. ("RFMD") for its use, nor for any infringement of patents or other rights of third parties resulting from its use. No license is granted by implication or otherwise under any patent or patent rights of RFMD. RFMD reserves the right to change component circuitry, recommended application circuitry and specifications at any time without prior notice.

DS140213