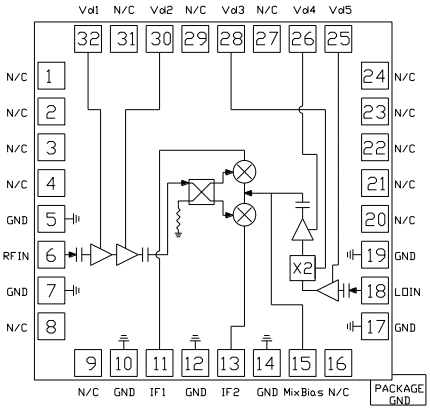
RFMD + TriQuint = Qorvo

RFRX1702

GaAs MMIC IQ Downconverter 17.7GHz to 19.7GHz

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

RFMD's RFRX1702 is a 17.7GHz to 19.7GHz GaAs pHEMT Downconverter, incorporating a low-noise amplifier, an integrated X2 LO frequency multiplier and buffer amplifier, and an image rejection mixer. The combination of high performance part and low cost packaging makes the RFRX1702 a cost effective solution, ideally suited to both current and next generation Point-to-Point Microwave Radio and Satellite Applications. RFRX1702 is packaged in a 5mm x 5mm QFN to simplify both system level board design and volume assembly.



Functional Block Diagram

Features

- RF Frequency: 17.7GHz to 19.7GHz
- LO Frequency: 6.85GHz to 11.85GHz
- IF Frequency: DC to 4GHz
- Conversion Gain: 12dB
- Noise Figure: 2dB
- IIP3: 6dBm
- Image Rejection: 15dBc
- Low Cost 5mm x 5mm QFN Package

Applications

- Point-to-Point Radio
- Point-Multipoint Radio
- Satellite Communications
- Radar
- Electronic Warfare

Ordering Information

RFRX1702S2	Sample bag with 2 pieces
RFRX1702SB	Bag with 5 pieces
RFRX1702SQ	Bag with 25 pieces
RFRX1702SR	100 Pieces
RFRX1702TR7	7" Reel with 750 pieces
RFRX1702PCBA-410	Evaluation board

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Absolute Maximum Ratings

Parameter	Rating	Unit
LNA Drain Voltage	+6.0	V
LOA Voltage	+6.0	V
RF Input Power	+10	dBm
LO Input Power	+15	dBm
Operating Temperature Range	-40 to +85	°C
Storage Temperature Range	-40 to +150	°C
ESD Rating - Human Body Model (HBM)	Class 1A	V

Caution! ESD sensitive device.

RFMD Green: RoHS status based on EU Directive 2011/65/EU (at time of this document revision), 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 in 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.

Electrical Specifications

Parameter	Specification			Unit	Condition
	Min	Typ	Max		
Test conditions unless otherwise noted: IF = 2.5GHz, RF Power = -20dBm, IIP3 is measured with a 2-tone input of -23dBm power for each tone and Δf = 10MHz, Vd1 = 2.8V, Vd2 = 4V, Vd3 through Vd5 = 4.5V, MixerBias = 0V, 50 Ω system					
RF Frequency Range	17.7		19.7	GHz	
LO Frequency Range	6.85		11.85	GHz	
IF Frequency Range	DC		4.0	GHz	
LO Input Power		+5		dBm	
Conversion Gain		13		dB	
NF (17.7 – 19.7 GHz)		2		dB	
IIP3		6		dBm	
Image Rejection		15		dB	
LO-to-RF Isolation		40		dB	
LO-to-IF Isolation		15		dB	
LO Return Loss		12		dB	
RF Return Loss		12		dB	
V_D		2.8 to 4.5		V	
I_D		350		mA	

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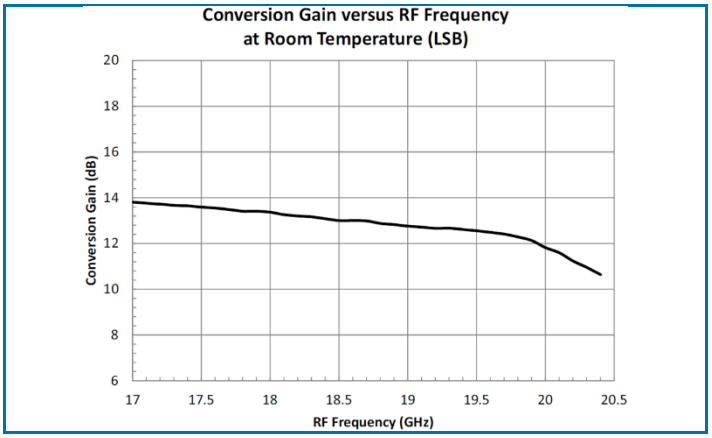
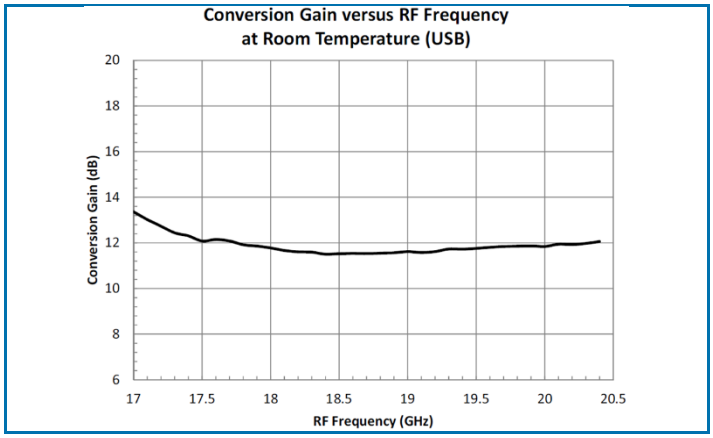
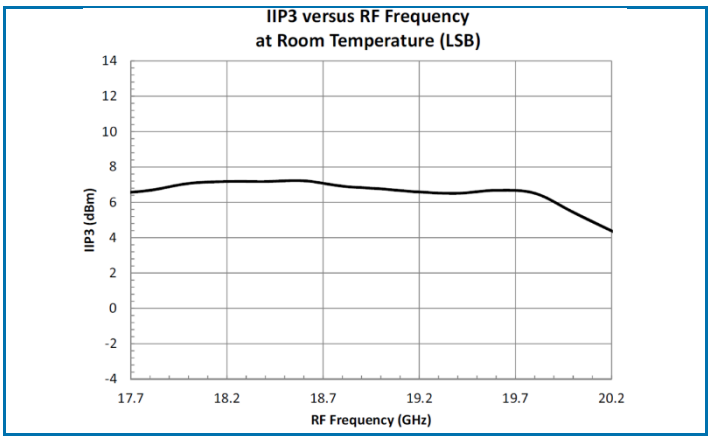
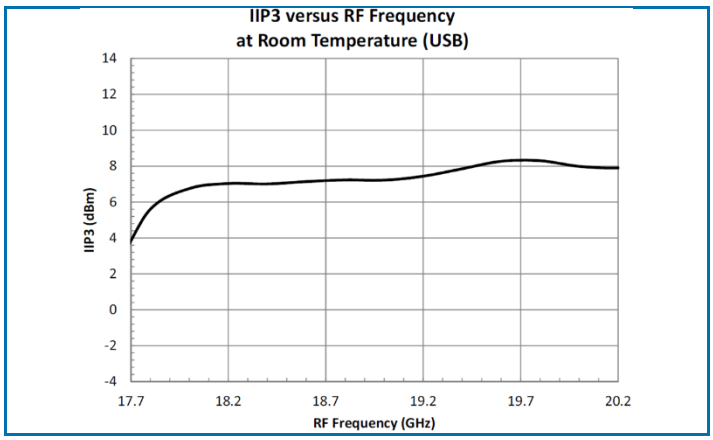
Typical Performance

Measurements performed on part soldered on evaluation board with SMA connectors and IF ports connected to an external 90° Hybrid Combiner and LO Power of +5dBm and at 25°C, unless otherwise noted.
IF = 2.5GHz, RF Power = -20dBm, IIP3 is measured with a 2-tone input of -23dBm power for each tone and Δf = 10MHz, Vd1 = 2.8V, Vd2 = 4V, Vd3 through Vd5 = 4.5V, MixerBias = 0V.









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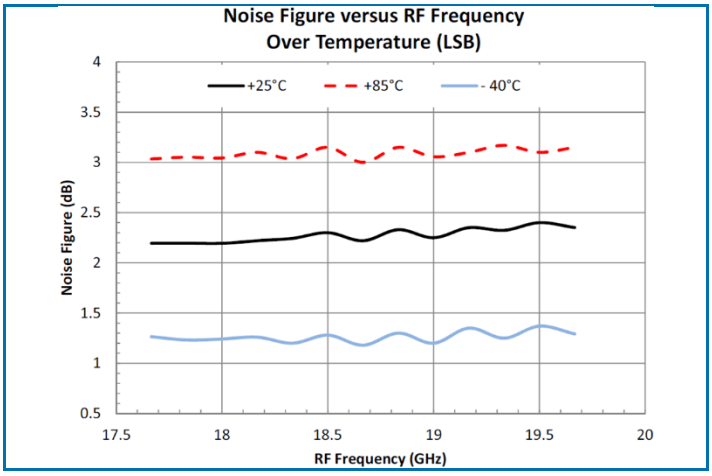
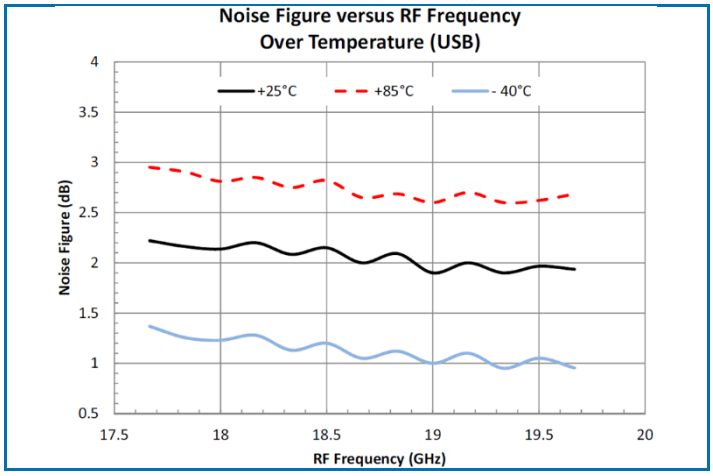
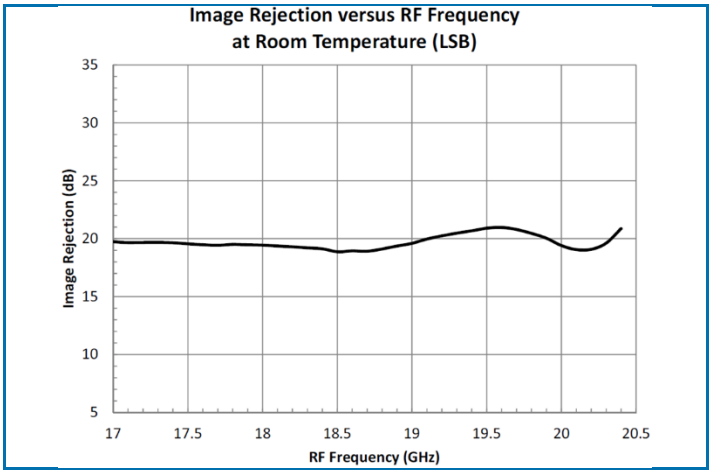
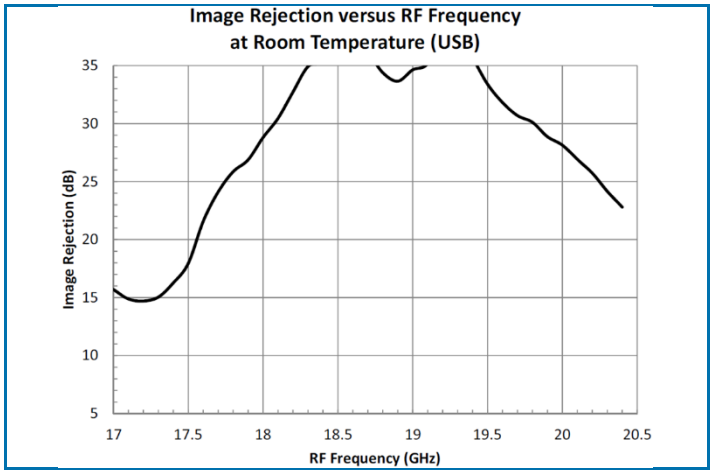
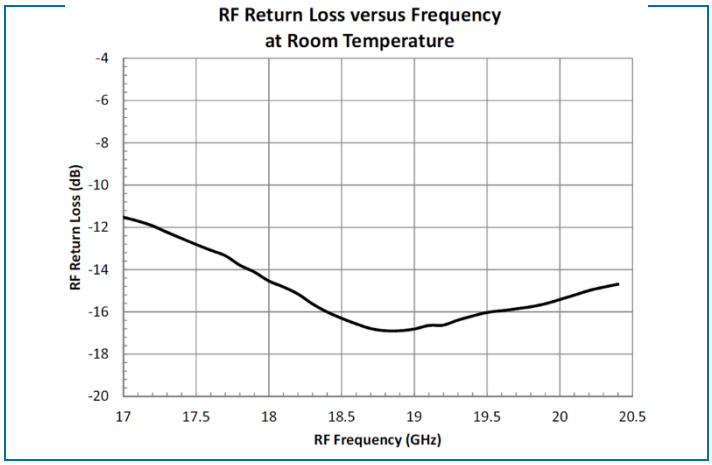
Typical Performance (continued)











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Typical Performance (continued)

Spur tables are $|M \times f_{LO} + N \times f_{RF}|$ mixer spurious products for -20 dBm RF input power.
All values in dBc below the IF output power level.

M x N Spurious Outputs for LSB,
IF = 1.5 GHz, IF = 2LO – RF

N \ M	1	2	3	4	5
-2	69	70	61	36	72
-1	37	0	56	71	62
0	29	27	34	31	--
1	67	56	55	--	--
2	57	--	--	--	--

M x N Spurious Outputs for USB,
IF = 1.5 GHz, IF = RF – 2LO

N \ M	1	2	3	4	5
-2	69	71	75	47	54
-1	55	0	29	41	66
0	21	26	67	40	59
1	69	49	56	--	--
2	54	--	--	--	--

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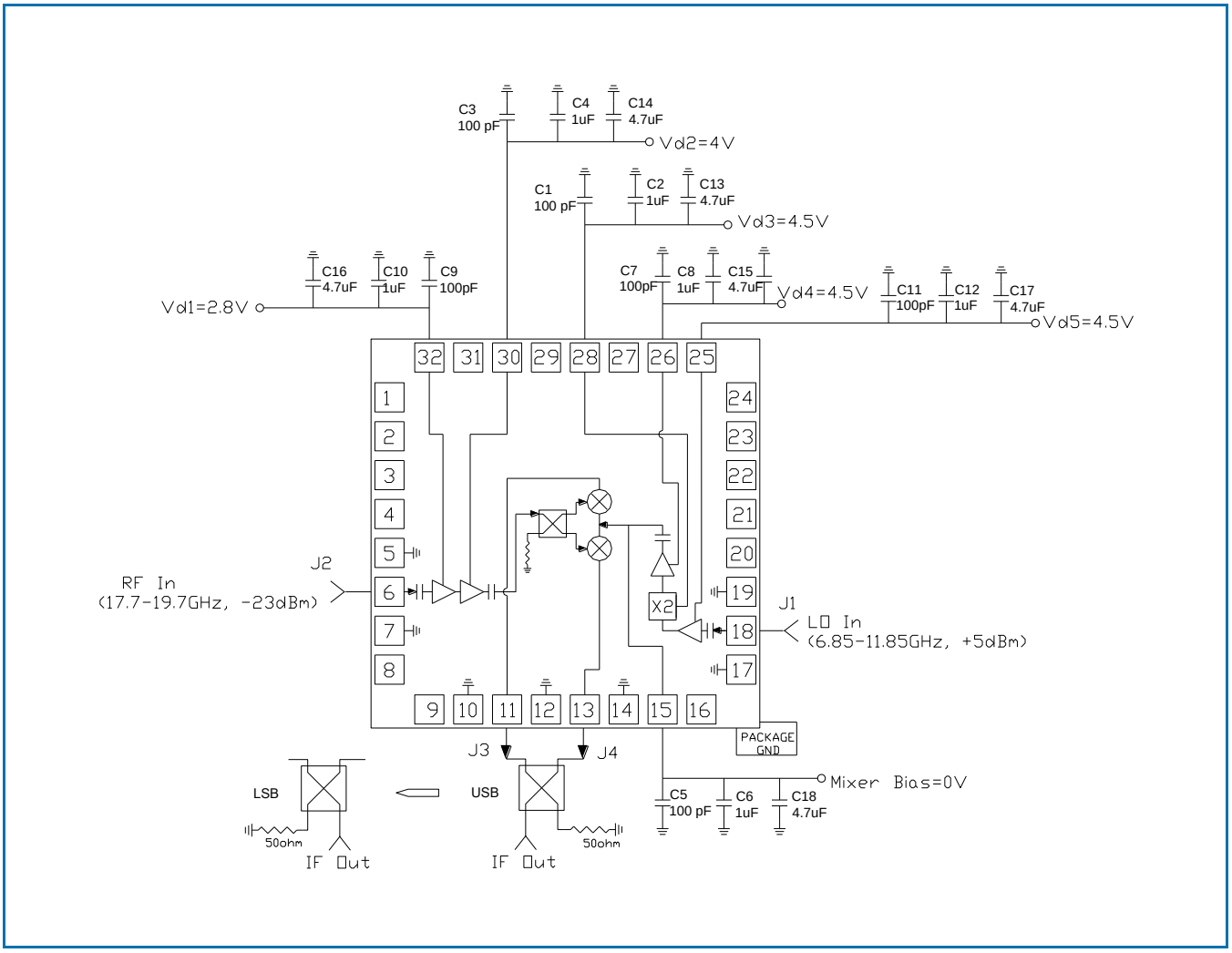
Evaluation Board Schematic



Evaluation Board Bill of Materials (BOM)

Description	Reference Designator	Manufacturer	Manufacturer's P/N
CAP, 100pF, 5%, 25V, C0G, 0201	C1, C3, C5, C7, C9, C11	Taiyo Yuden (USA), Inc.	RM TMK063 CG101JT-F
CAP, 1uF, 10%, 6.3V, X5R, 0402	C2, C4, C6, C8, C10,C12	Taiyo Yuden (USA), Inc.	RM JMK105BJ105KVLF
CAP, 4.7uF, 10%, 6.3V, X5R, 0603	C13 thru C18	Murata Electronics	GRM188R60J475KE19D
CONN, SMA, HI-FREQ END LNCH, SQ 4-HOLE	J1,J3,J4	Emerson Network Power	142-0761-811
CONN, 2.92MM, END LAUNCH, 40GHz, SQ FLG	J2	Southwest Microwave, Inc	1092-01A-5

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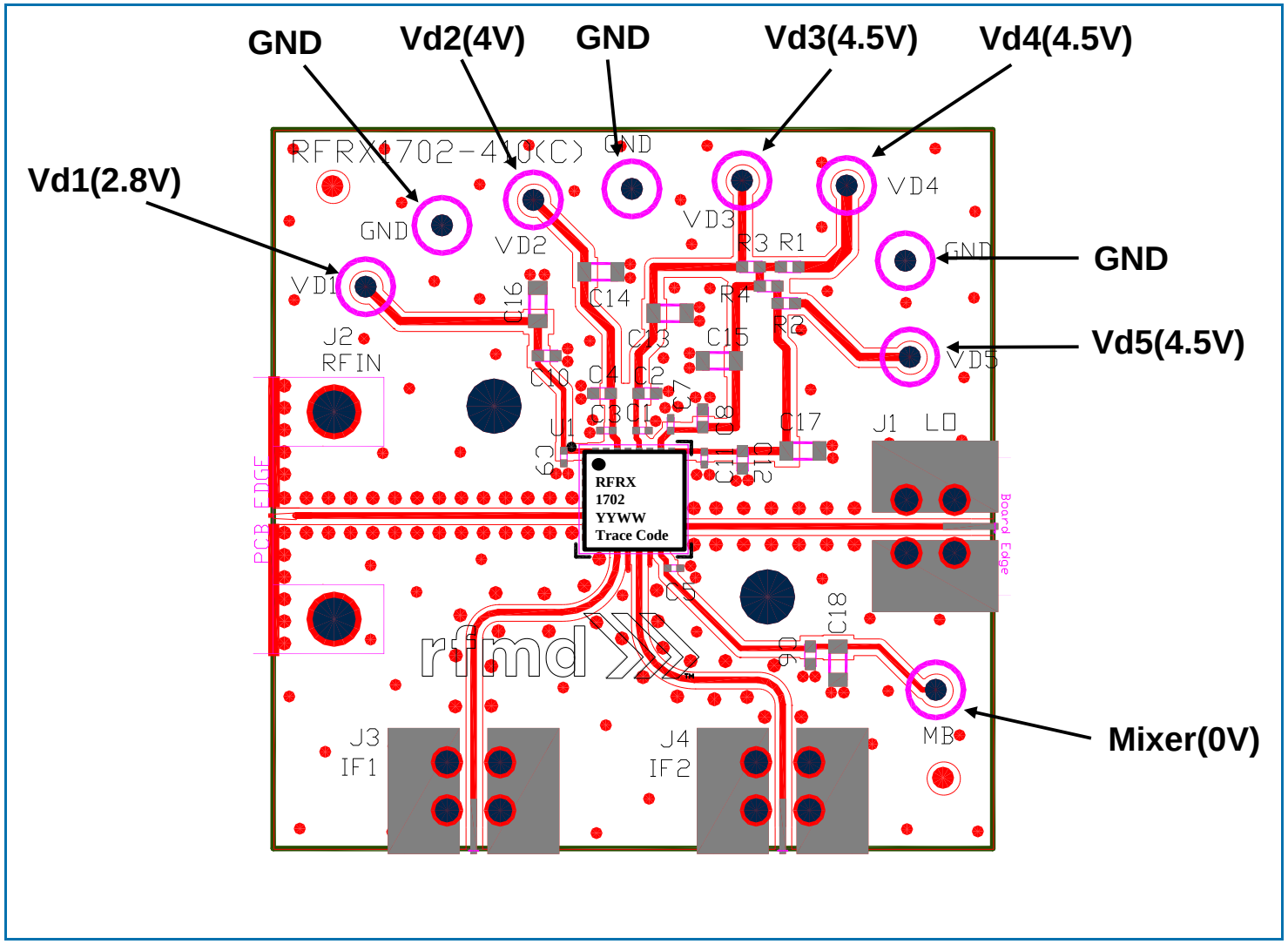
Evaluation Board Assembly Drawing



Test Conditions

LO Power	+5dBm
RF Power	-20dBm
Vd1	2.8V
Vd2	4.0V
Vd3, Vd4, Vd5	4.5V
Mixer Bias	0V

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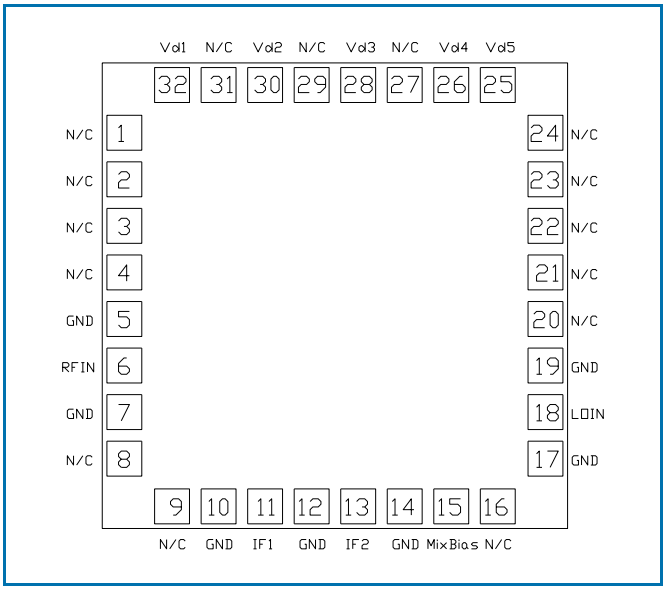
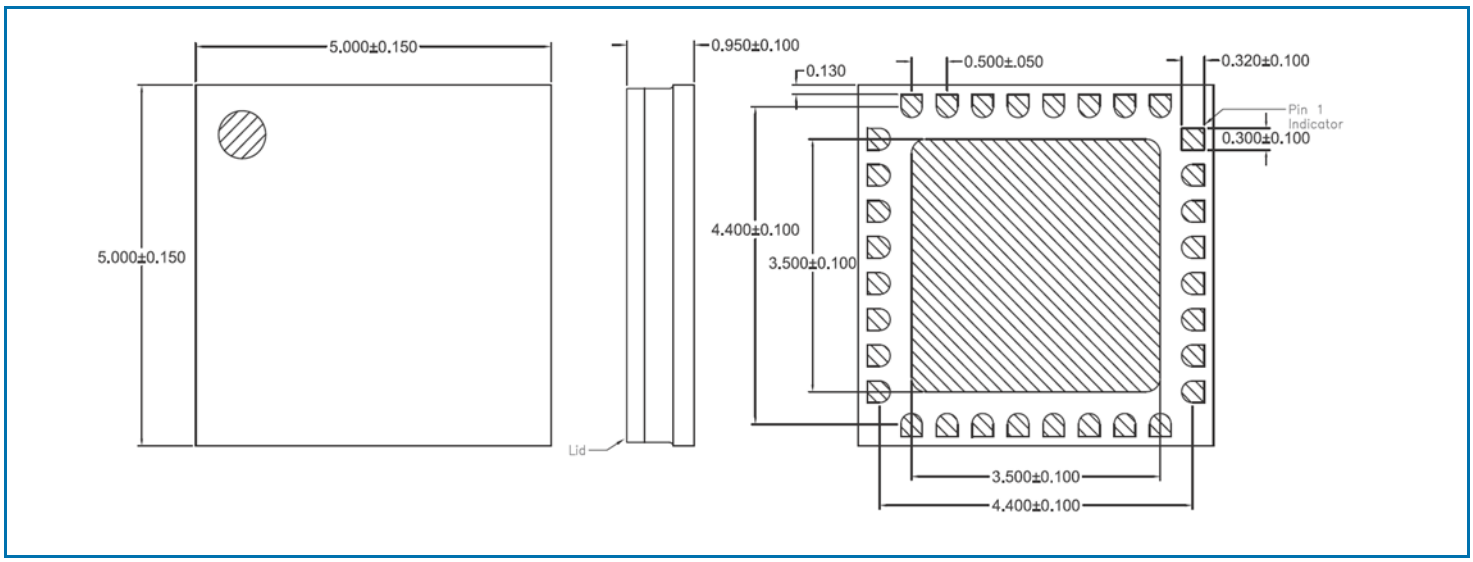
Pin Out



Package Outline and Branding Drawing (Dimensions in millimeters)



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Pin Names and Descriptions

Pin	Name	Description
1-4	N/C	Not Connected
5	GND	Ground
6	RF	RF Input, AC coupled and matched to 50Ω
7	GND	Ground
8-9	N/C	Not Connected
10	GND	Ground
11	IF1	IF1 Output
12	GND	Ground
13	IF2	IF2 Output
14	GND	Ground
15	Mixer Bias	Mixer Bias = 0V
16	N/C	Not Connected
17	GND	Ground
18	LO	LO Input, AC coupled and matched to 50Ω
19	GND	Ground
20-24	N/C	Not Connected
25	Vd5	Vd5 (LOA bias) = 4.5V
26	Vd4	Vd5 (LOA bias) = 4.5V
27	N/C	Not Connected
28	Vd3	Vd5 (LOA bias) = 4.5V
29	N/C	Not Connected
30	Vd2	LNA drain bias2 = 4V
31	N/C	Not Connected
32	Vd1	LNA drain bias2 = 2.8V

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Contact Information

For the latest specifications, additional product information, worldwide sales and distribution locations:

Web: www.rfmd.com **Tel: 1-844-890-8163**
Email: customer.support@qorvo.com

For information about the merger of RFMD and TriQuint as Qorvo:

Web: www.qorvo.com

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