



GaAs MMIC I/Q DOWNCONVERTER
21 - 25 GHz

Data Taken As IRM With External IF Hybrid

Conversion Gain vs. Temperature

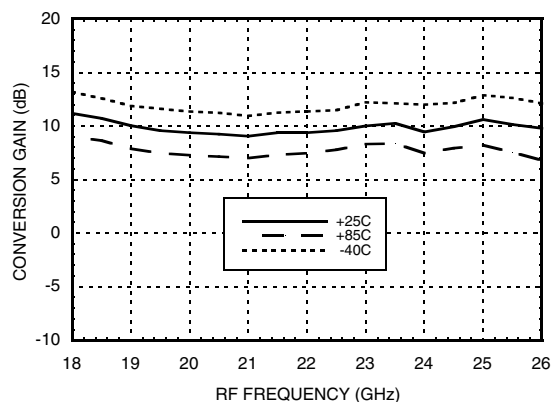
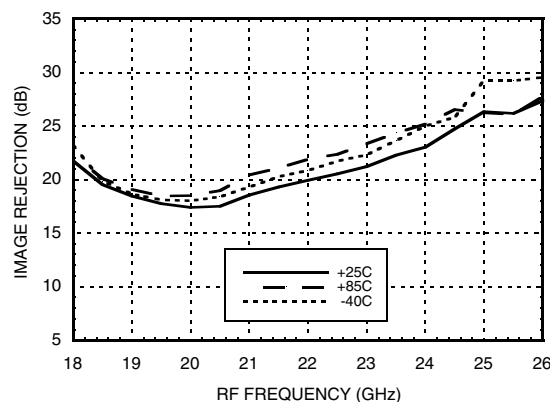
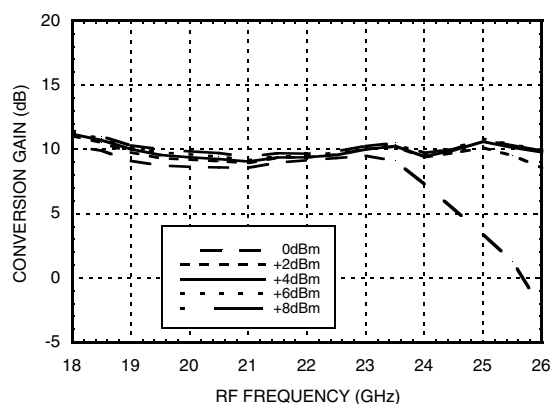


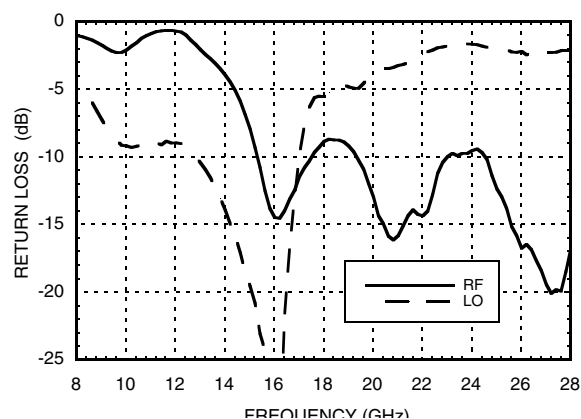
Image Rejection vs. Temperature



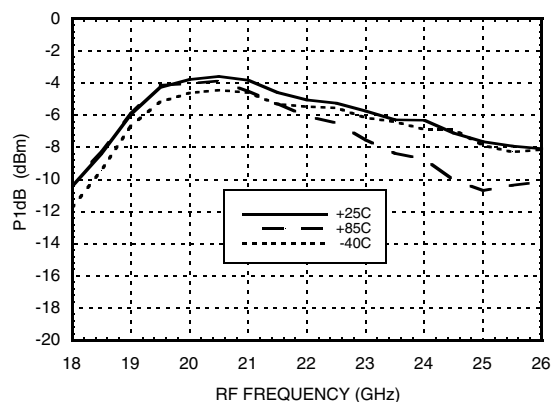
Conversion Gain vs. LO Drive



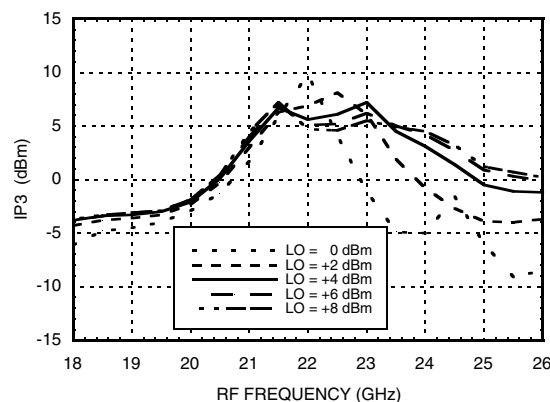
Return Loss



Input P1dB vs. Temperature



Input IP3 vs. LO Drive

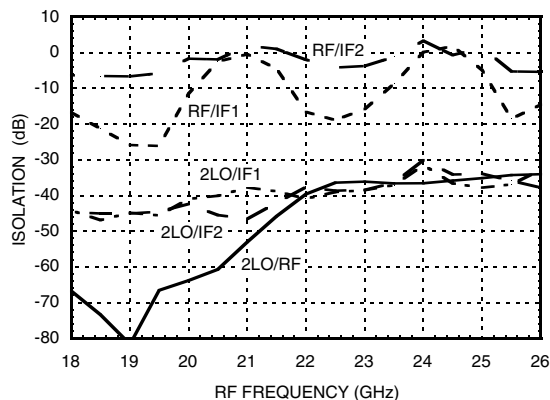




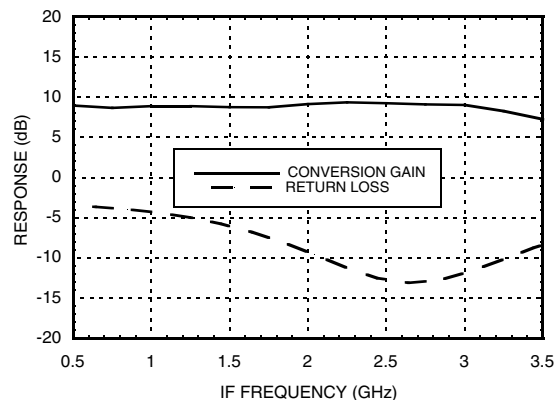
GaAs MMIC I/Q DOWNCONVERTER 21 - 25 GHz

Quadrature Channel Data Taken Without IF Hybrid

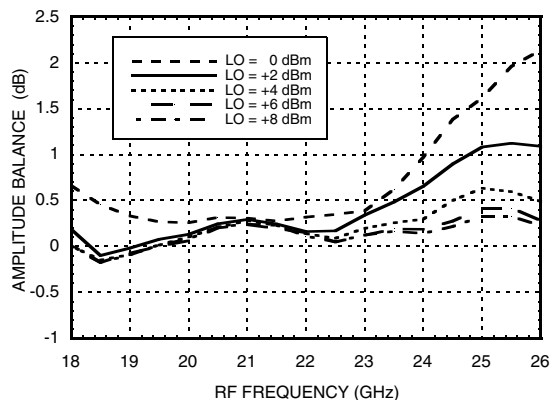
Isolations



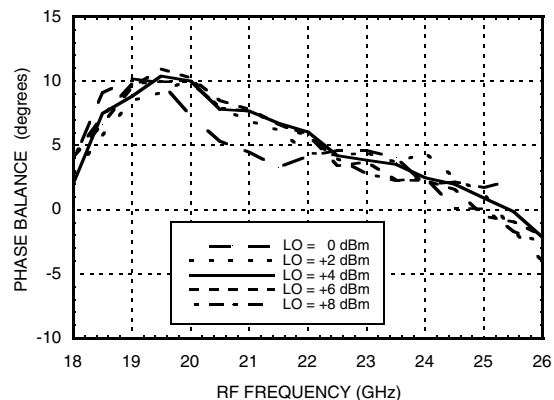
IF Bandwidth*



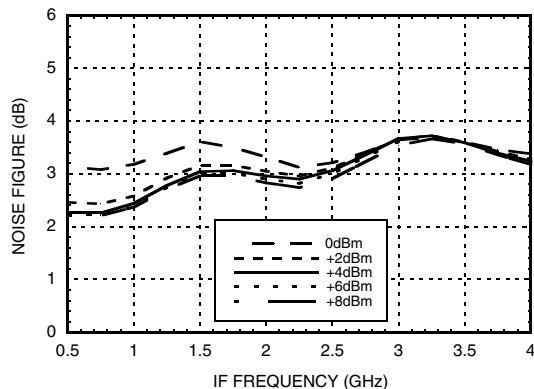
Amplitude Balance vs. LO Drive



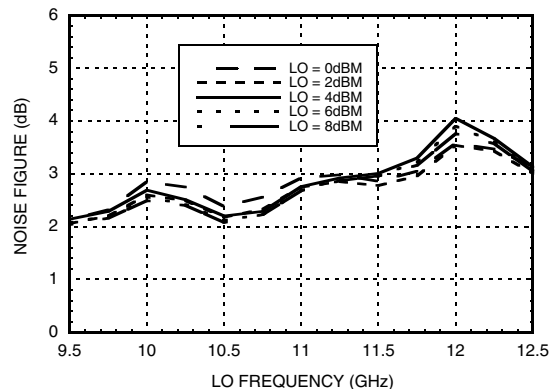
Phase Balance vs. LO Drive



Noise Figure vs. LO Drive, LO Frequency = 10.3 GHz



Noise Figure vs. LO Drive, IF Frequency = 100 MHz



* Conversion gain data taken with external IF hybrid, LO frequency fixed at 10.3 GHz and RF varied

Information furnished by Analog Devices is believed to be accurate and reliable. However, no responsibility is assumed by Analog Devices for its use, nor for any infringements of patents or other rights of third parties that may result from its use. Specifications subject to change without notice. No license is granted by implication or otherwise under any patent or patent rights of Analog Devices. Trademarks and registered trademarks are the property of their respective owners.

For price, delivery, and to place orders: Analog Devices, Inc., One Technology Way, P.O. Box 9106, Norwood, MA 02062-9106 Phone: 781-329-4700 • Order online at www.analog.com Application Support: Phone: 1-800-ANALOG-D



GaAs MMIC I/Q DOWNCONVERTER

21 - 25 GHz

MxN Spurious Outputs

mRF	nLO				
	0	1	2	3	4
0	xx	31	19	25	38
1	20	32	0	31	48
2	xx	xx	72	62	43
3	xx	xx	xx	xx	81
4	xx	xx	xx	xx	xx

RF = 18 GHz @ -20 dBm
LO = 8.5 GHz @ +4 dBm
Data taken without IF hybrid
All values in dBc below IF power level (1RF -2LO = 1 GHz)

Absolute Maximum Ratings

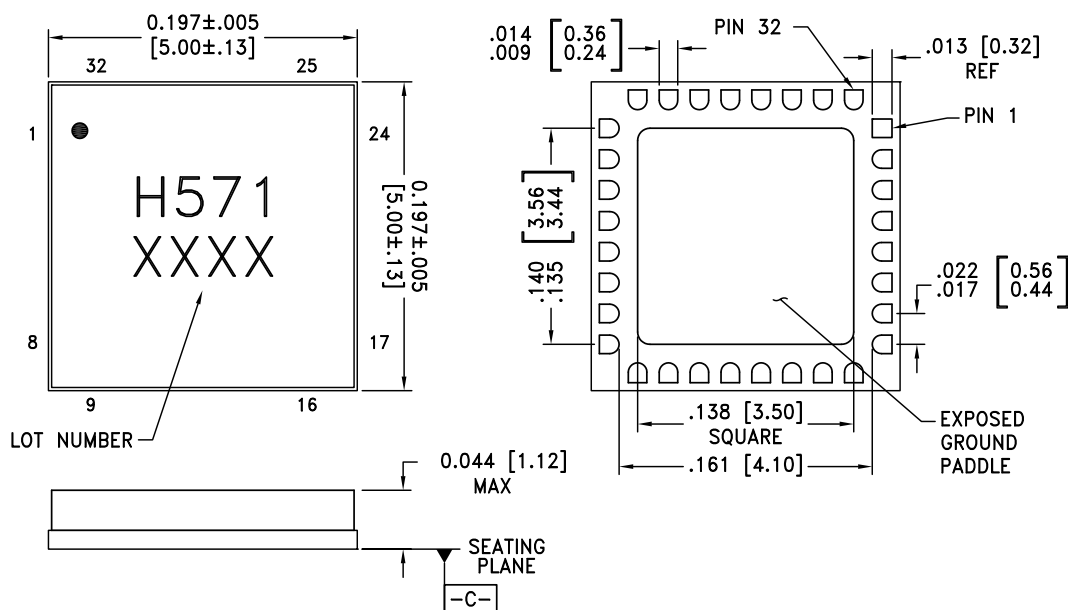
RF	+2 dBm
LO Drive	+ 13 dBm
Vdd	5.5V
Channel Temperature	175°C
Continuous P _{diss} (T=85°C) (derate 9.56 mW/°C above 85°C)	860 mW
Thermal Resistance (R _{TH}) (channel to package bottom)	104.6 °C/W
Storage Temperature	-65 to +150 °C
Operating Temperature	-55 to +85 °C
ESD Sensitivity (HBM)	Class 1B



ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS



BOTTOM VIEW



1. PACKAGE BODY MATERIAL: ALUMINA
2. LEAD AND GROUND PADDLE PLATING: 30 - 80 MICROINCHES GOLD OVER 50 MICROINCHES MINIMUM NICKLE
3. DIMENSIONS ARE IN INCHES [MILLIMETERS]
4. LEAD SPACING TOLERANCE IS NON-CUMULATIVE
5. PACKAGE WARP SHALL NOT EXCEED 0.05mm DATUM
6. ALL GROUND LEADS AND GROUND PADDLE MUST BE SOLDERED TO PCB RF GROUND

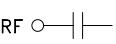
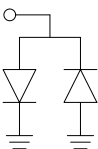
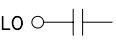
Part Number	Package Body Material	Lead Finish	MSL Rating	Package Marking ^[2]
HMC571LC5	Alumina, White	Gold over Nickel	MSL3 ^[1]	H571 XXXX

[2] 4-Digit lot number XXXX

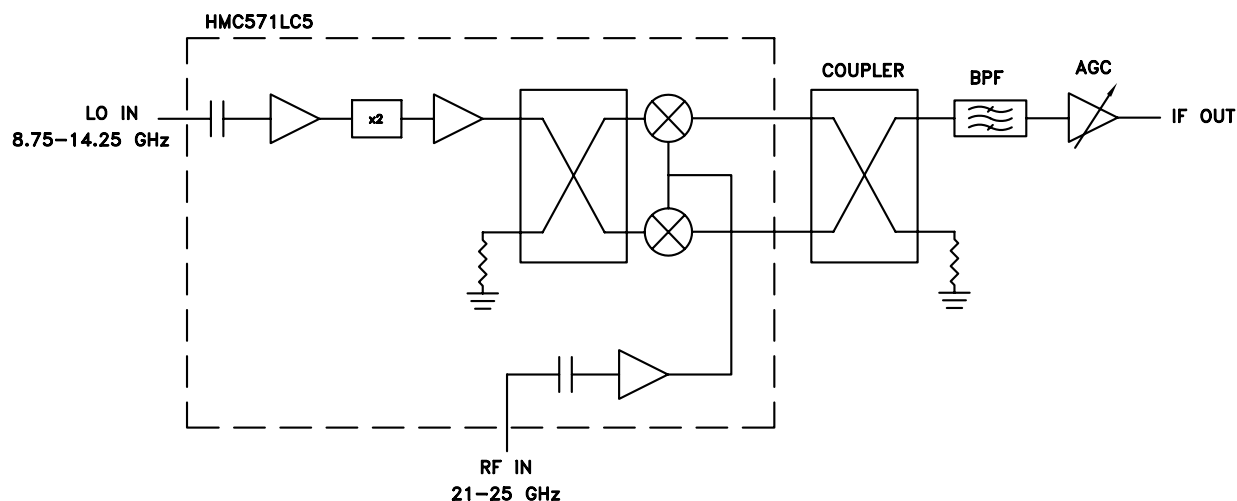


GaAs MMIC I/Q DOWNCONVERTER 21 - 25 GHz

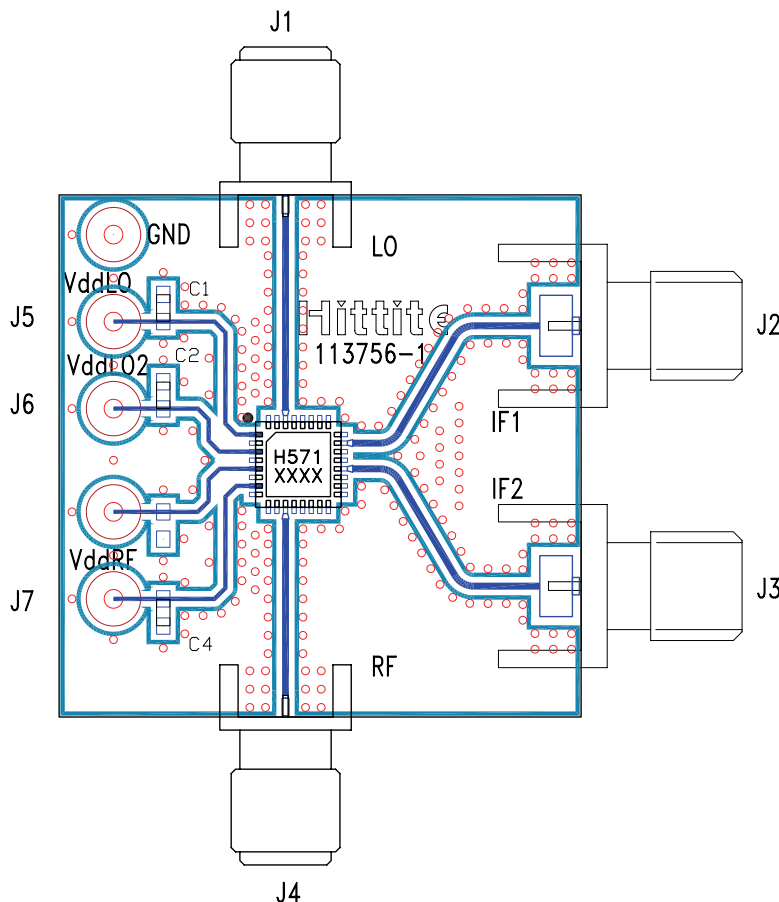
Pin Descriptions

Pin Number	Function	Description	Interface Schematic
1	VddLO	Power supply for first stage of LO amplifier.	VddLO 
2, 4 - 6, 8, 9, 12 - 18, 21, 22, 25 - 28, 31, 32	N/C	No connection required. These pins may be connected to RF/DC ground without affecting performance.	
3	VddLO2	Power supply for second stage of LO amplifier.	VddLO2 
7	VddRF	Power supply for RF LNA.	VddRF 
10, 19, 24, 29	GND	These pins and ground paddle must be connected to RF/DC ground.	GND 
11	RF	This pin is AC coupled and matched to 50 Ohms.	RF 
20	IF2	This pin is DC coupled for applications not requiring operation to DC. This port should be DC blocked externally using a series capacitor whose value has been chosen to pass the necessary frequency range. For operation to DC, this pin must not sink / source more than 3 mA of current or part non-function and possible failure will result.	IF1, IF2 
23	IF1		
30	LO	This pin is AC coupled and matched to 50 Ohms.	LO 

Typical Application



Evaluation PCB



List of Materials for Evaluation PCB 113758 ^[1]

Item	Description
C1 - C4	Capacitor 0603, 0.01 μ F
J1, J4	PCB Mount SMA RF Connector, SRI
J2, J3	PCB Mount SMA Connector, Johnson
J5 - J7	DC Pin
U1	HMC571LC5
PCB ^[2]	113756 Evaluation Board

[1] Reference this number when ordering complete evaluation PCB

[2] Circuit Board Material: Rogers 4350

The circuit board used in the application should use RF circuit design techniques. Signal lines should have 50 Ohm impedance while the package ground leads and exposed paddle should be connected directly to the ground plane similar to that shown. A sufficient number of via holes should be used to connect the top and bottom ground planes. The evaluation circuit board shown is available from Hittite upon request.

