



**GaAs MMIC I/Q MIXER
15 - 23 GHz**

Data Taken As IRM With External IF Hybrid

Conversion Gain vs. Temperature

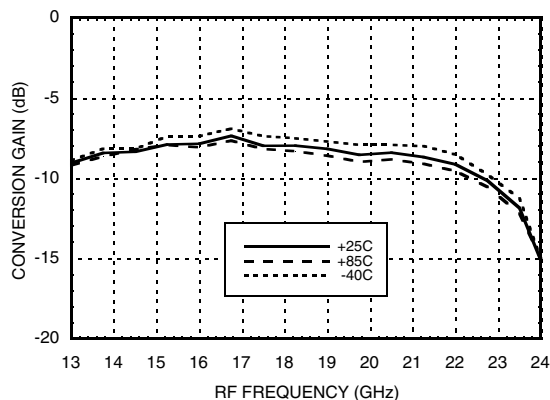
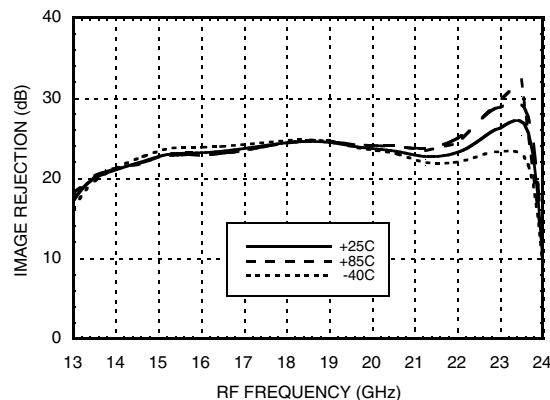
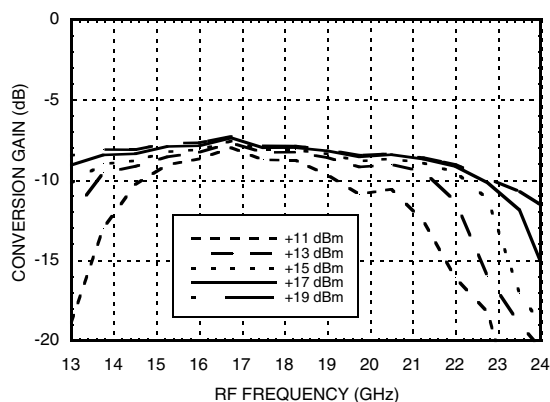


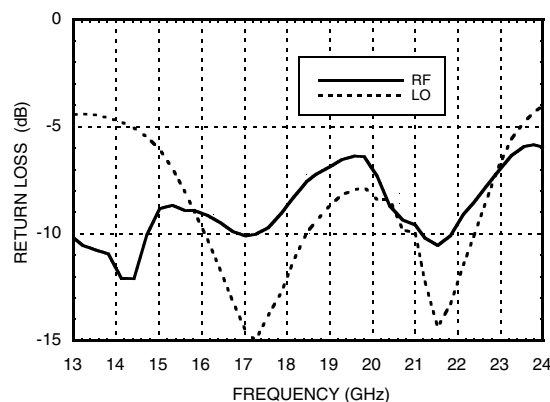
Image Rejection vs. Temperature



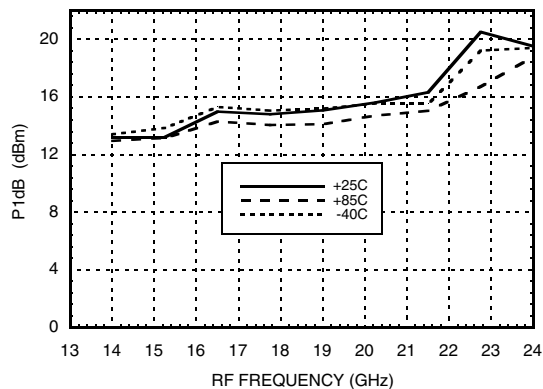
Conversion Gain vs. LO Drive



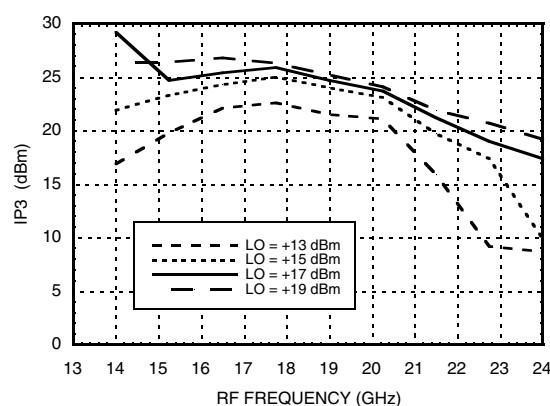
Return Loss



Input P1dB vs. Temperature



Input IP3 vs. LO Drive

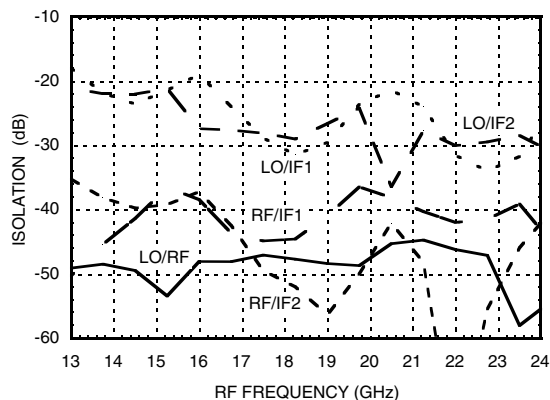




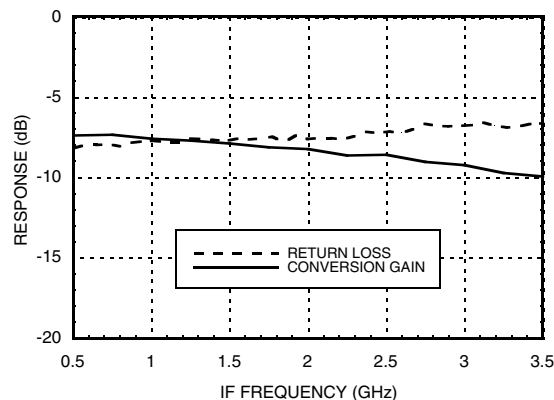
**GaAs MMIC I/Q MIXER
15 - 23 GHz**

Quadrature Channel Data Taken Without IF Hybrid

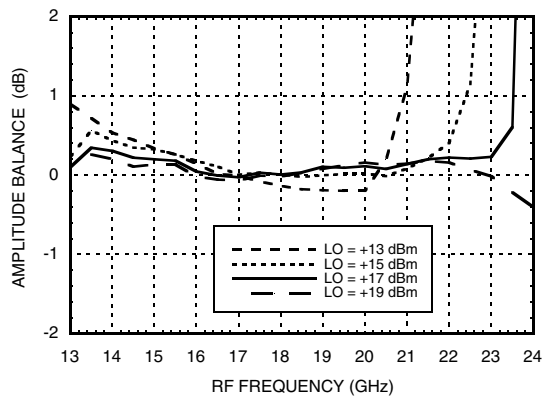
Isolations



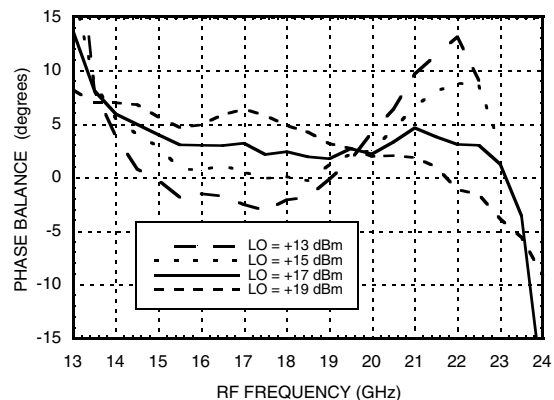
IF Bandwidth



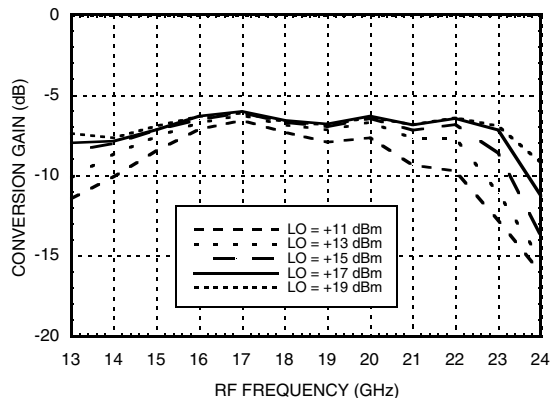
Amplitude Balance vs. LO Drive



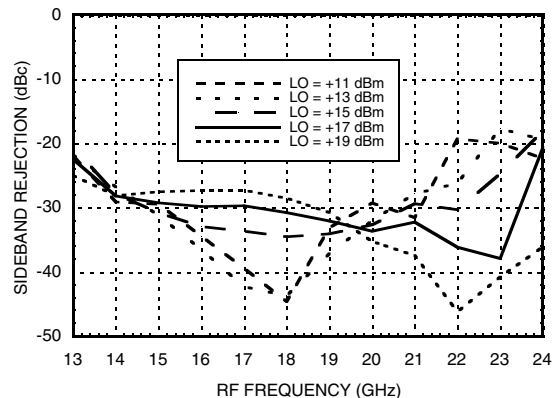
Phase Balance vs. LO Drive



**Upconverter Performance
Conversion Gain vs. LO Drive**



**Upconverter Performance
Sideband Rejection vs. LO Drive**





GaAs MMIC I/Q MIXER 15 - 23 GHz

Harmonics of LO

LO Freq. (GHz)	nLO Spur at RF Port	
	1	2
15.5	47	51
17	49	56
18.5	50	63
20	47	73
21.5	50	72
23	53	71

LO = + 15 dBm
Values in dBc below input LO level measured at RF Port.

MxN Spurious Outputs

mRF	nLO				
	0	1	2	3	4
0	xx	-9	29	xx	xx
1	34	0	46	61	xx
2	87	65	82	62	87
3	xx	87	92	86	90
4	xx	xx	84	92	92

RF = 17.6 GHz @ -10 dBm
LO = 17.5 GHz @ +15 dBm
Data taken without IF hybrid
All values in dBc below IF power level

Absolute Maximum Ratings

RF / IF Input	+20 dBm
LO Drive	+ 27 dBm
Channel Temperature	150°C
Continuous P _{diss} (T=85°C) (derate 5.22 mW/°C above 85°C)	340 mW
Thermal Resistance (R _{TH}) (junction to package bottom)	191.5 °C/W
Storage Temperature	-65 to +150 °C
Operating Temperature	-55 to +85 °C
ESD Sensitivity (HBM)	Class 1A

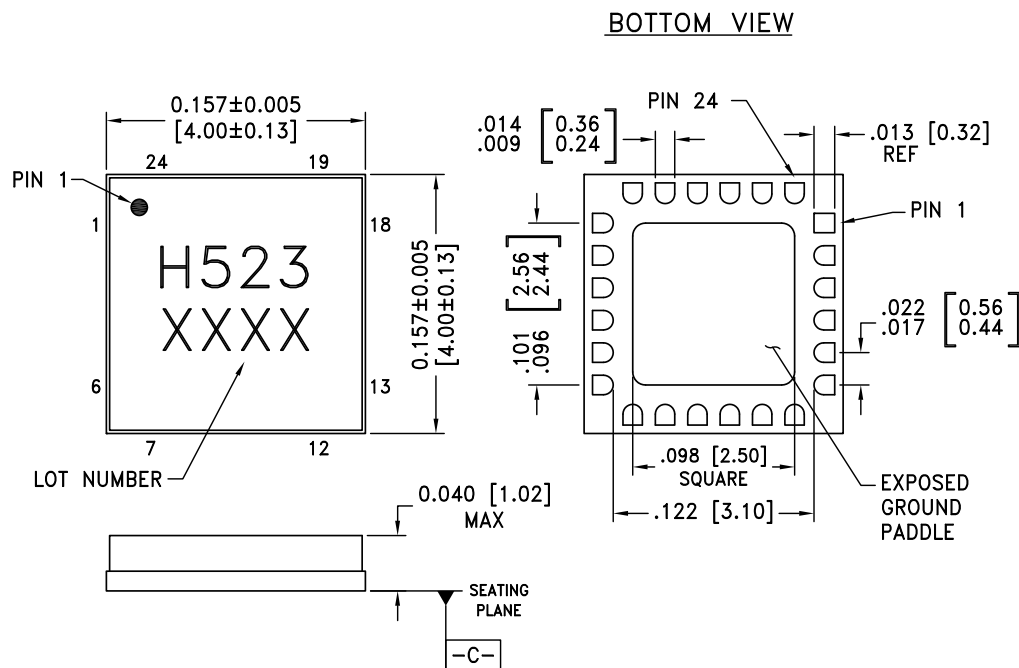


ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS



GaAs MMIC I/Q MIXER
15 - 23 GHz

Outline Drawing



NOTES:

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

Package Information


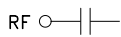
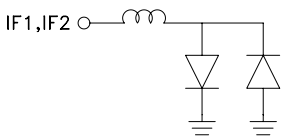
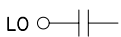
Part Number	Package Body Material	Lead Finish	MSL Rating	Package Marking ^[2]
HMC523LC4	Alumina, White	Gold over Nickel	MSL3 ^[1]	H523 XXXX

[1] Max peak reflow temperature of 260 °C

[2] 4-Digit lot number XXXX



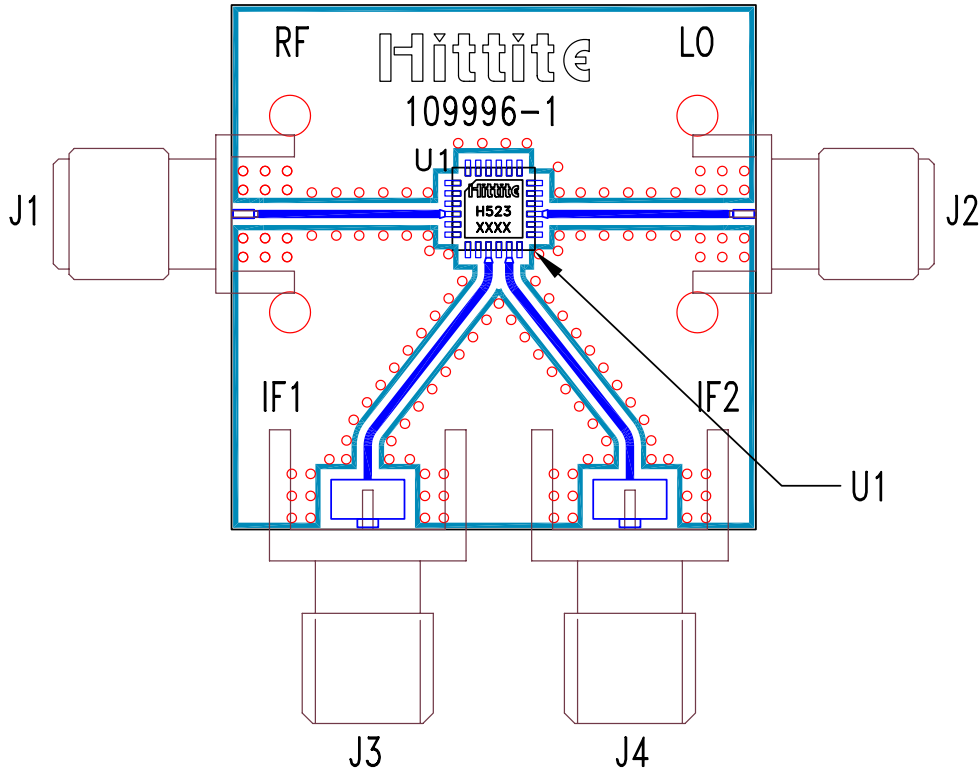
Pin Descriptions

Pin Number	Function	Description	Interface Schematic
1, 2, 6 - 8, 10, 13, 17 - 24	N/C	No connection required. These pins may be connected to RF/DC ground without affecting performance.	
3, 5, 12, 14, 16	GND	These pins and package bottom must be connected to RF/DC ground.	
4	RF	This pin is AC coupled and matched to 50 Ohms from 15 to 23 GHz.	
9	IF1	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 IF frequency range. For operation to DC, this pin must not source/sink more than 3mA of current or part non-function and possible part failure will result.	
11	IF2		
15	LO	This pin is AC coupled and matched to 50 Ohms from 15 to 23 GHz.	



**GaAs MMIC I/Q MIXER
15 - 23 GHz**

Evaluation PCB



List of Materials for Evaluation PCB 109998 ^[1]

Item	Description
J1, J2	PCB Mount K RF Connector, SRI
J3 - J4	PCB Mount SMA Connector, Johnson
U1	HMC523LC4
PCB [2]	109996 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.

