HMC422MS8

GaAs MMIC MIXER w/ INTEGRATED LO AMPLIFIER, 1.2 - 2.5 GHz

Typical Applications

The HMC422MS8 is ideal for:

- MMDS & ISM
- Wireless Local Loop
- WirelessLAN
- Cellular Infrastructure

Features

Integrated LO Amplifier w/ Pdiss <100 mW

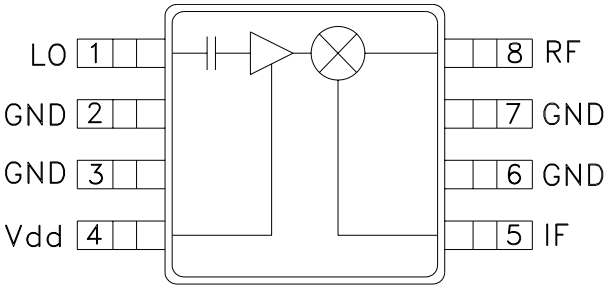
Conversion Loss / Noise Figure: 8.0 dB

Low LO Drive: 0 dBm

Input IP3: +15 dBm

Single Positive Supply: 3V, 30 mA

Functional Diagram



General Description

The HMC422MS8 is a double balanced mixer IC with an integrated LO amplifier. This mixer can operate as an upconverter or downconverter between 1.2 GHz and 2.5 GHz. With the integrated LO amplifier, the mixer requires an LO drive level of only 0 dBm, and requires only 30mA from a single positive +3V rail. The mixer has 8 dB of conversion loss, an input P1dB of +8 dBm and an input third order intercept point of +15 dBm at 2 GHz.

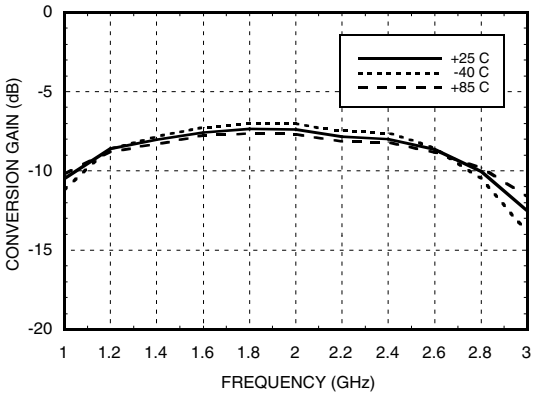
Electrical Specifications, T_A = +25° C

Parameter	IF = 100 MHz LO = 0 dBm & Vdd = 3V			Units
	Min.	Typ.	Max.	
Frequency Range, RF & LO		1.2 - 2.5		GHz
Frequency Range, IF		DC - 1.0		GHz
Conversion Loss		8	10.5	dB
Noise Figure (SSB)		8	10.5	dB
LO to RF Isolation	23	30		dB
LO to IF Isolation	9	15 - 20		dB
RF to IF Isolation	9	15 - 20		dB
IP3 (Input)	12	15		dBm
1 dB Compression (Input)	5	8		dBm
Supply Current (Idd)		30		mA

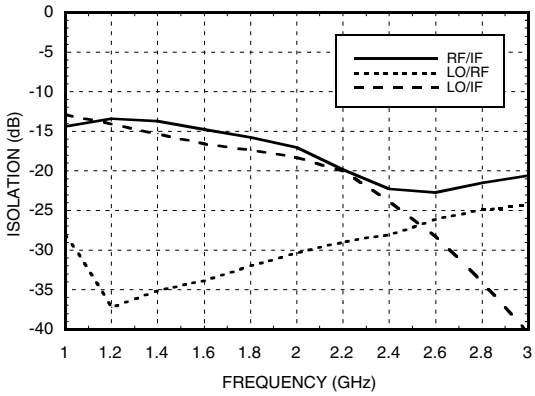
** Unless otherwise noted, all measurements performed as downconverter, IF= 100 MHz.*

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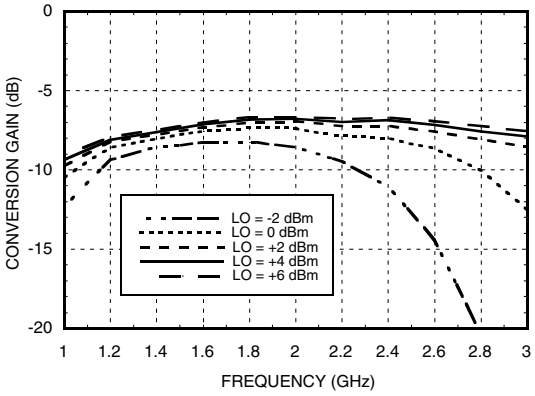
Conversion Gain vs. Temperature @ LO = 0 dBm



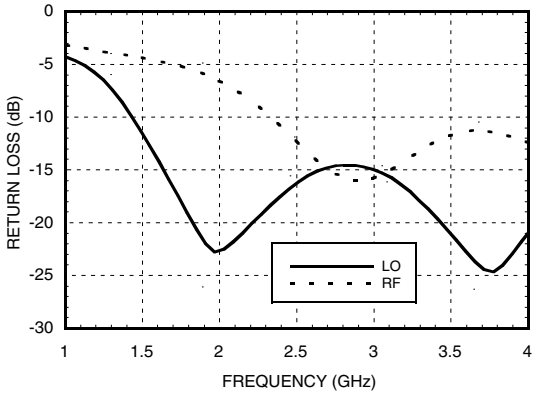
Isolation @ LO = 0 dBm



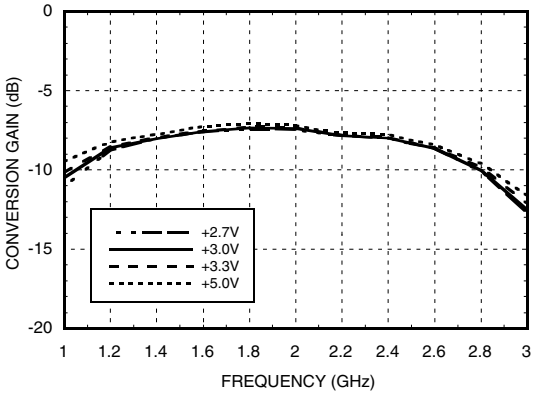
Conversion Gain vs. LO Drive



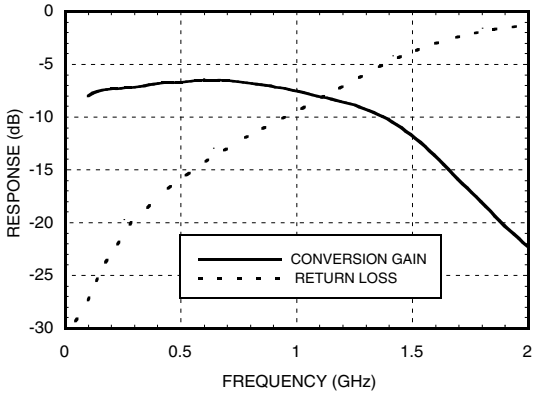
Return Loss @ LO = 0 dBm



Conversion Gain vs. Vdd @ LO = 0 dBm



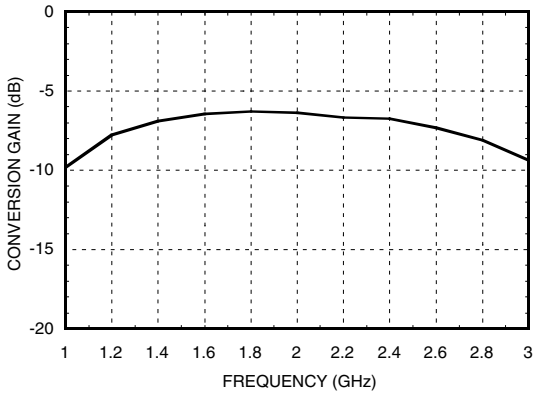
IF Bandwidth @ LO = 0 dBm



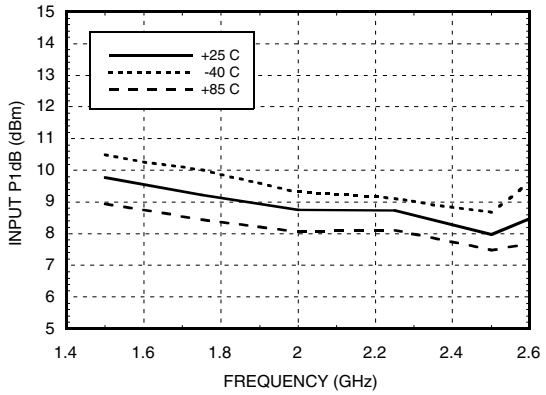
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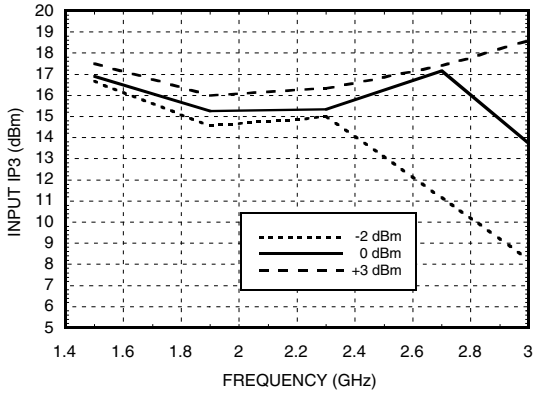
Upconverter Performance Conversion Gain @ LO = 0 dBm



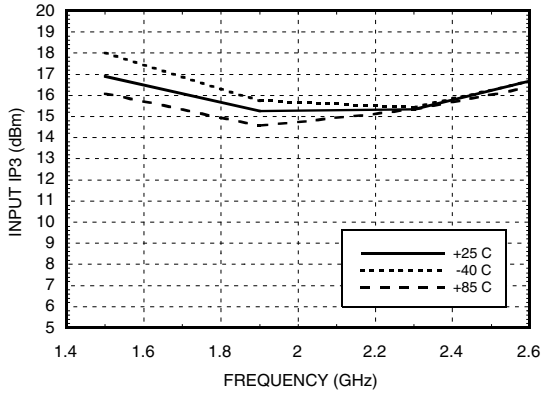
Input P1dB vs. Temperature @ LO = 0 dBm



Input IP3 vs. LO Drive*



Input IP3 vs. Temperature @ LO = 0 dBm*



MxN Spurious @ IF Port

	nLO				
mRF	0	1	2	3	4
0	XX	2	22	26	41
1	10	0	27	48	57
2	66	60	64	53	73
3	>85	>85	83	69	80
4	>85	>85	>85	>85	>85

RF = 2.1 GHz @ -10 dBm
LO = 2 GHz @ 0 dBm
All values in dBc relative to the IF power level.

Harmonics of LO

	nLO Spur @ RF Port			
LO Freq. (GHz)	1	2	3	4
1.5	33	14	38	35
1.75	30	16	39	44
2	29	17	45	47
2.25	27	20	50	52
2.5	25	26	49	61
3	22	37	69	72

LO = 0 dBm
All values in dBc below input LO level @ RF port.

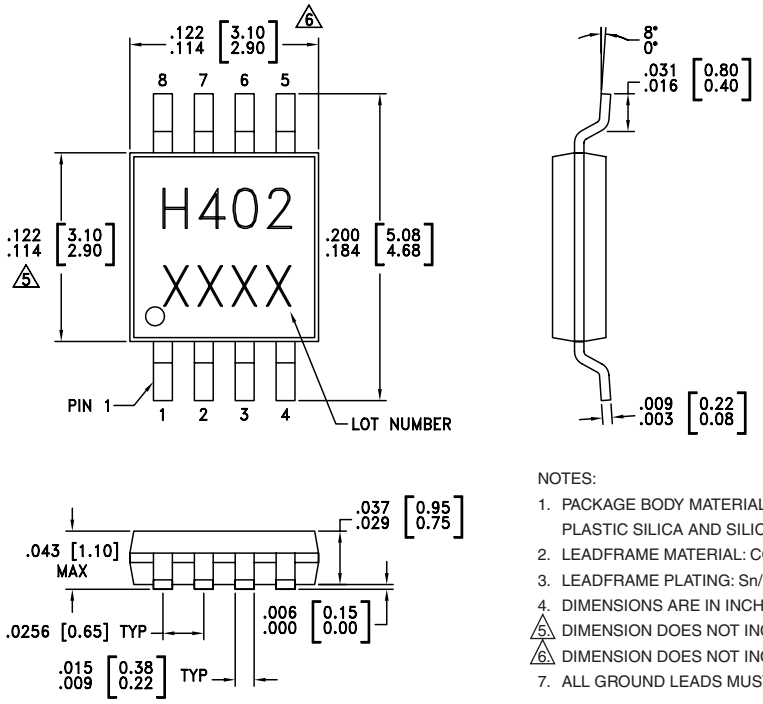
** Two-tone input power= 0 dBm each tone, 1 MHz spacing.*

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Absolute Maximum Ratings

RF / IF Input (Vdd = +3V)	+13 dBm
LO Drive (Vdd = +3V)	+13 dBm
Vdd	+7 Vdc
IF DC Current	±10 mA
Channel Temperature (Tc)	150 °C
Continuous Pdiss (T = 85°C) (Derate 5.8 mW/°C above 85 C)	0.38 W
Storage Temperature	-65 to +150 °C
Operating Temperature	-40 to +85 °C

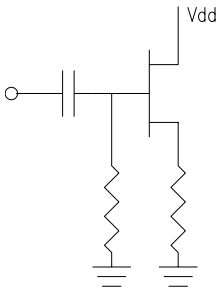
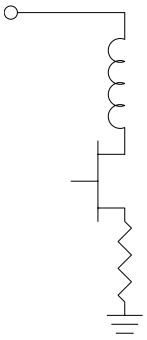
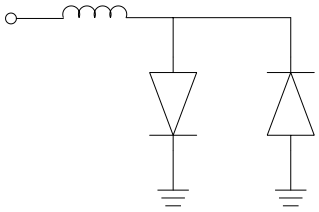
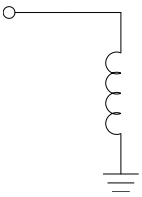
Outline Drawing



NOTES:

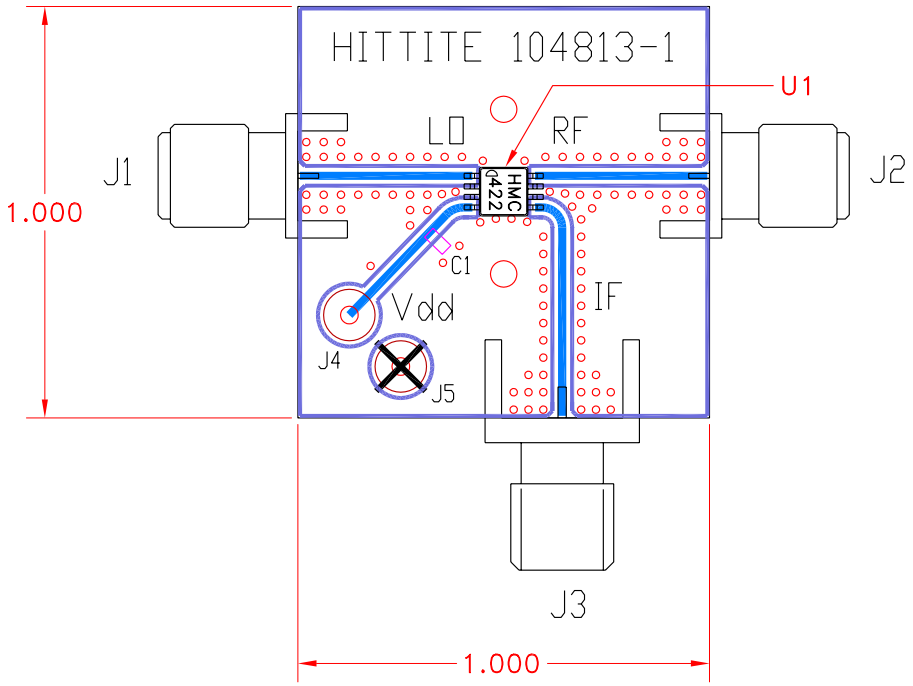
1. PACKAGE BODY MATERIAL: LOW STRESS INJECTION MOLDED PLASTIC SILICA AND SILICON IMPREGNATED.
2. LEADFRAME MATERIAL: COPPER ALLOY
3. LEADFRAME PLATING: Sn/Pb SOLDER
4. DIMENSIONS ARE IN INCHES [MILLIMETERS].
5. DIMENSION DOES NOT INCLUDE MOLDFLASH OF 0.15mm PER SIDE.
6. DIMENSION DOES NOT INCLUDE MOLDFLASH OF 0.25mm PER SIDE.
7. ALL GROUND LEADS MUST BE SOLDERED TO PCB RF GROUND.

Pin Descriptions

Pin Number	Function	Description	Interface Schematic
1	LO Port	This pin is AC coupled and matched to 50 Ohm from 1.2 - 2.5 GHz.	
2, 3, 6, 7	GND	Pins must connect to RF ground.	
4	Vdd	Power supply for the LO Amplifier. One external RF bypass capacitor (10,000 pF) is required.	
5	IF Port	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 10 mA of current or die non-function and possible die failure will result.	
8	RF Port	This pin is DC coupled and matched to 50 Ohm from 1.2 - 2.5 GHz.	

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Evaluation PCB



List of Material

Item	Description
J1 - J3	PC Mount SMA RF Connector
J4 - J5	DC Pin
C1	10k pF Chip Capacitor, 0603 Pkg.
U1	HMC422MS8 Mixer
PCB*	104813 Evaluation PCB, 1.0" x 1.0"
* Circuit Board Material: Rogers 4350	

The circuit board used in the final application should use RF circuit design techniques. Signal lines should have 50 ohm impedance while the package ground leads 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.