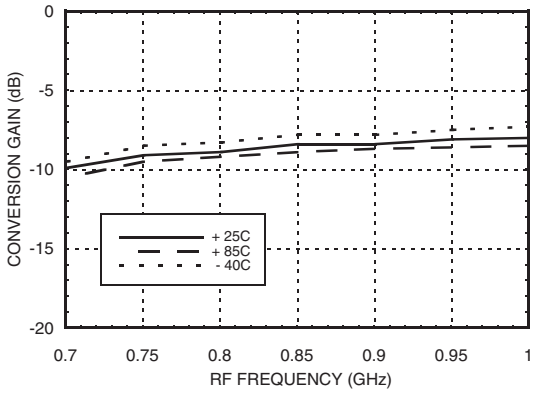
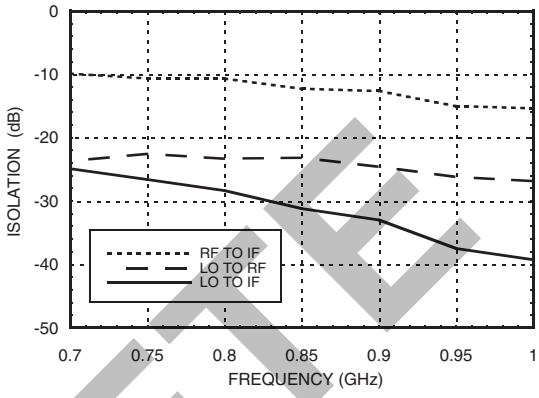
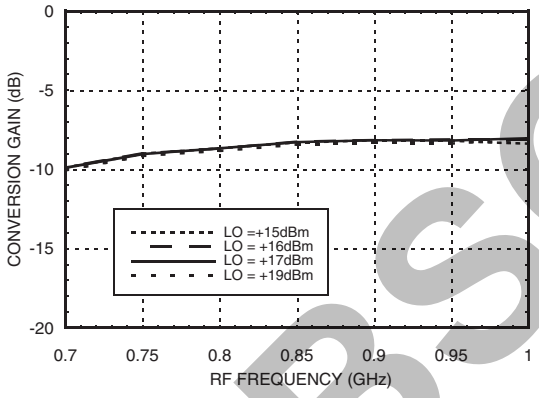
Conversion Gain vs. Temperature @ LO = +17 dBm



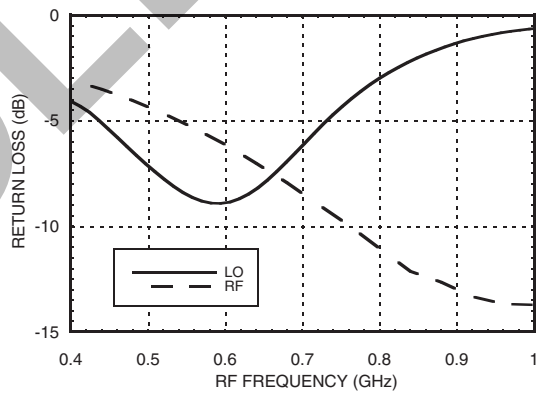
Isolation @ LO = +17 dBm



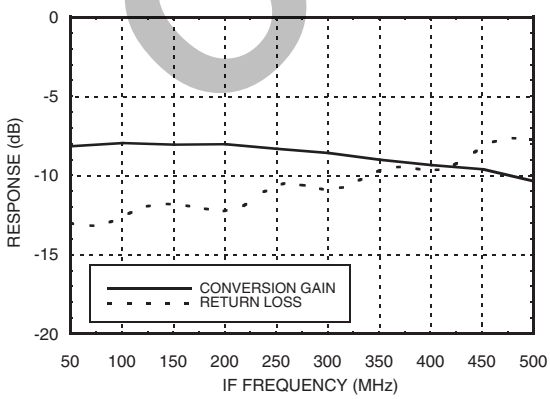
Conversion Gain vs. LO Drive



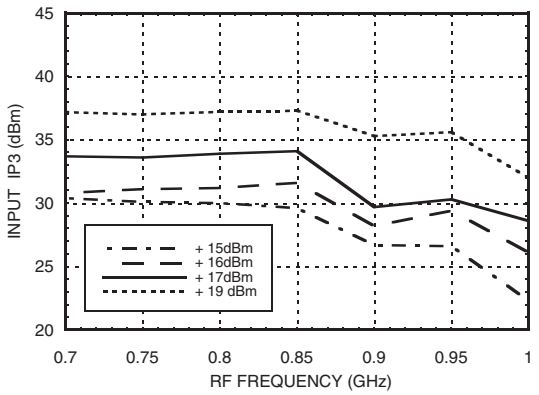
Return Loss @ LO = +17 dBm*



If Bandwidth @ LO = +17 dBm



Upconverter Conversion Gain @ LO = +17 dBm



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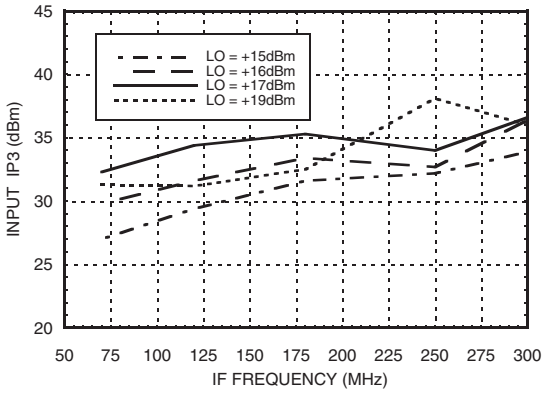
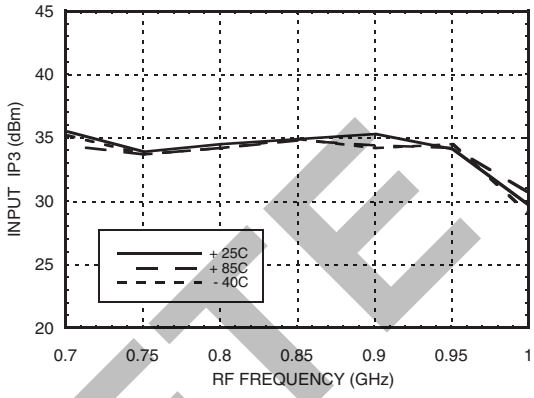
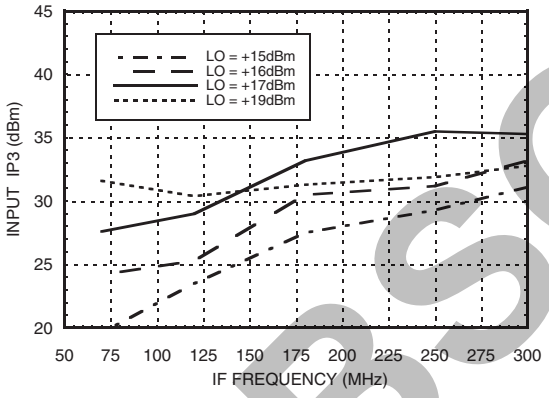
Input IP3 vs. IF Frequency, RF = 850 MHz



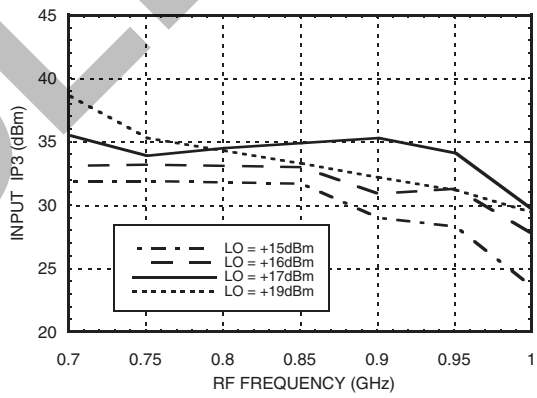
Input IP3 vs. Temperature @ LO = +17 dBm



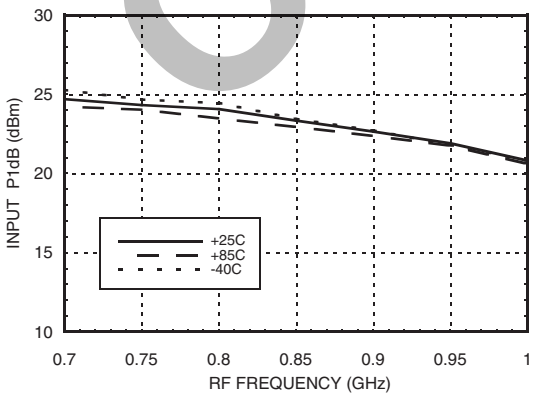
Input IP3 vs. IF Frequency, RF = 950 MHz



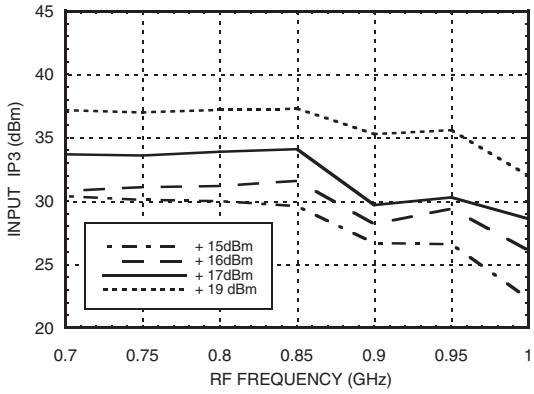
Input IP3 vs. LO Drive



Input P1dB vs. Temperature @ LO = +17 dBm



Upconverter Input IP3 vs. LO Drive



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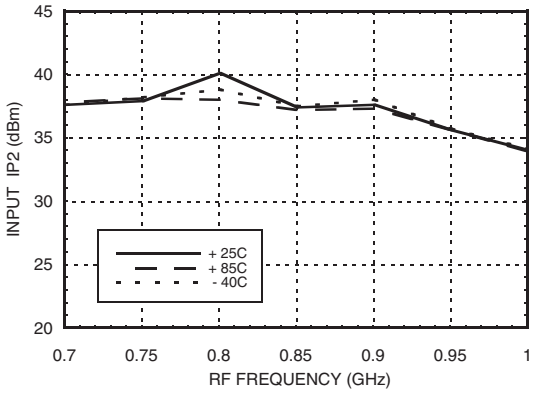
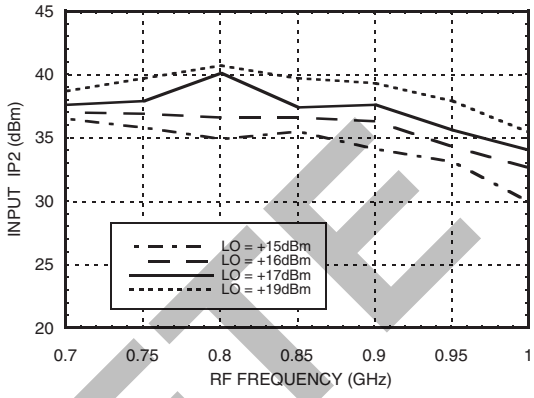
Input IP2 vs. Temperature @ LO = +17 dBm



Input IP2 vs. LO Drive



MxN Spurious Outputs

	nLO				
mRF	0	1	2	3	4
0	xx	-9	17	2	23
1	3	0	17	28	26
2	69	75	57	62	65
3	80	71	82	69	80
4	81	81	81	80	80

RF Freq = 0.801 GHz @ -10 dBm
LO Freq = 0.601 GHz @ +17 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
0.4	34	54	38	45
0.5	30	39	35	47
0.6	26	35	33	54
0.7	24	37	36	47
0.8	23	33	42	50
0.9	25	31	46	43

LO = +17 dBm
All values are in dBc below input LO level @ RF port.

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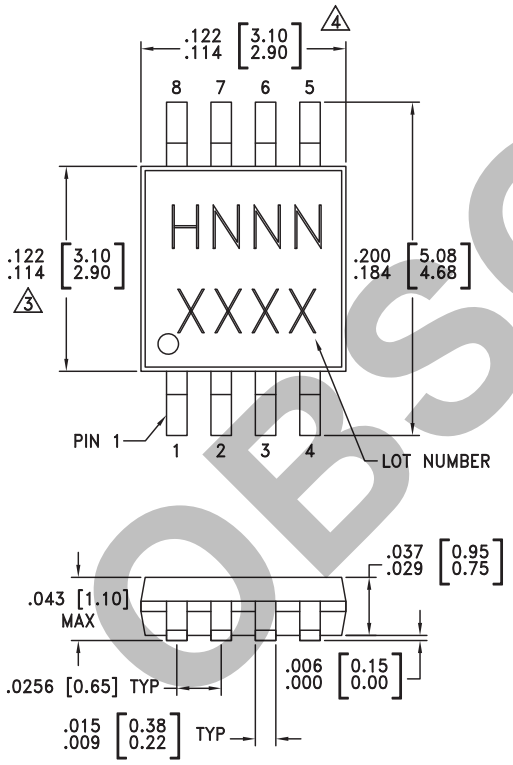
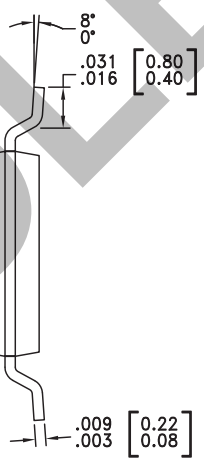
Absolute Maximum Ratings

RF/IF Input	+25 dBm
LO Drive	+27 dBm
Storage Temperature	-65 to +150 °C
Operating Temperature	-40 to +85 °C
IF DC Current	±40 mA

ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS

Outline Drawing





NOTES:

1. LEADFRAME MATERIAL: COPPER ALLOY
2. DIMENSIONS ARE IN INCHES [MILLIMETERS]
3. DIMENSION DOES NOT INCLUDE MOLDFLASH OF 0.15mm PER SIDE.
4. DIMENSION DOES NOT INCLUDE MOLDFLASH OF 0.25mm PER SIDE.
5. ALL GROUND LEADS MUST BE SOLDERED TO PCB RF GROUND.

Package Information

Part Number	Package Body Material	Lead Finish	MSL Rating	Package Marking [3]
HMC399MS8	Low Stress Injection Molded Plastic	Sn/Pb Solder	MSL1 [1]	H399 XXXX
HMC399MS8E	RoHS-compliant Low Stress Injection Molded Plastic	100% matte Sn	MSL1 [2]	H399 XXXX

[1] Max peak reflow temperature of 235 °C
[2] Max peak reflow temperature of 260 °C
[3] 4-Digit lot number XXXX

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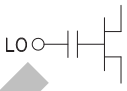
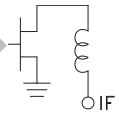
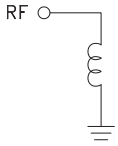
Pin Descriptions

Pin Number	Function	Description	Interface Schematic
1	LO	This pin is AC coupled & matched to 50 Ohms when an external inductor (L1) is connected in series with the LO. Choose value of L1 to optimize LO frequency response.	
2, 4	N/C	Not connected.	
3, 6, 7	GND	This pin must be connected to RF ground.	
5	IF	This pin is DC coupled. For applications not requiring operation to DC this port should be DC blocked externally using a series capacitor. Choose value of C1 to pass IF frequency desired. For operation to DC, this pin must not sink/source more than 40 mA of current or failure may result.	
8	RF	This pin is DC coupled & matched to 50 Ohms from 700 - 1000 MHz	

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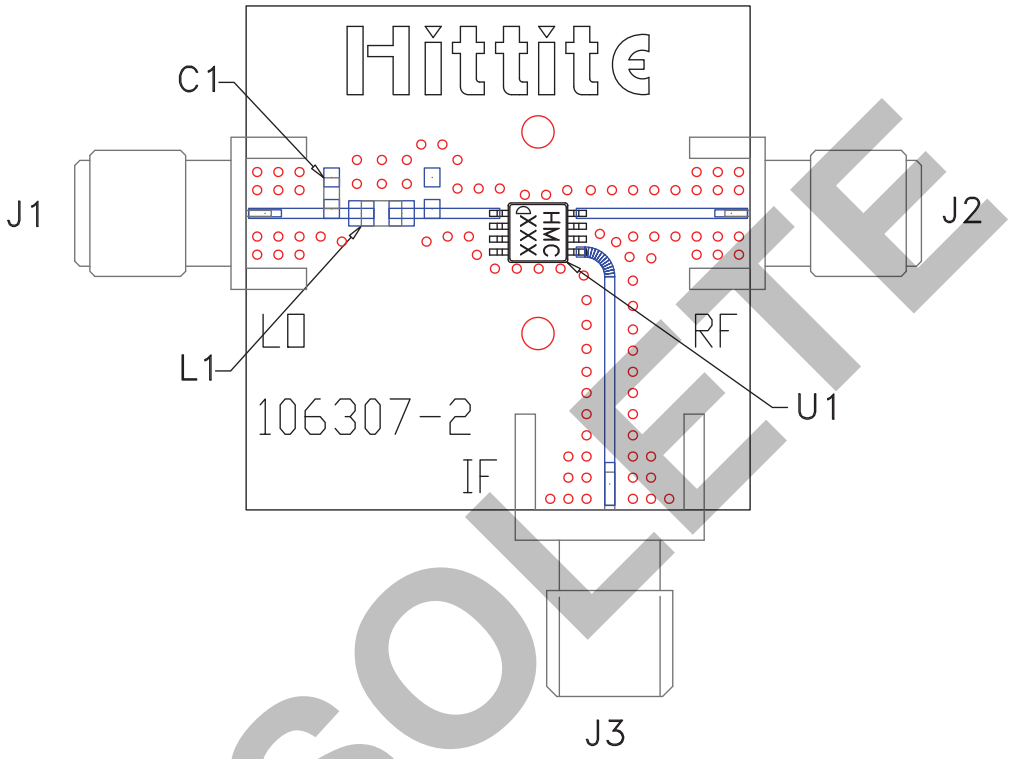
Evaluation PCB



List of Materials for Evaluation PCB 106334 [1]

Item	Description
J1 - J3	PCB Mount SMA RF Connector
C1	4 pF Capacitor, 0603 Pkg.
L1	24 nH Chip Inductor, 0805 Pkg
U1	HMC399MS8 / HMC399MS8E Mixer
PCB [2]	106307 Eval Board

[1] Reference this number when ordering complete evaluation PCB

[2] 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.

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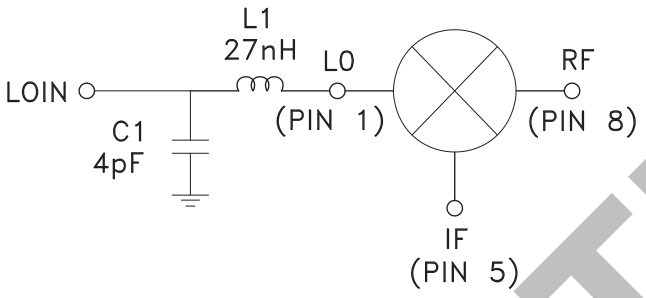
Application Circuit



Selection of L1 for Optimal LO Frequency ±10%

Choose value of L1 to optimize LO Frequency response. For best results use an 0805 size RF inductor or smaller.

IF (MHz)	LO Frequency (MHz)	L1 (nH)	C1 pF
250	600	27	4
170	700	22	4
100	800	18	5
70	850	15	5

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