HMC439* PRODUCT PAGE QUICK LINKS

Last Content Update: 02/23/2017

COMPARABLE PARTS

View a parametric search of comparable parts.

EVALUATION KITS

- HMC439QS16G Evaluation Board.

DOCUMENTATION

Data Sheet

- HMC439 Data Sheet

TOOLS AND SIMULATIONS

- Using the HMC Design Tool for Synthesizers with a PFD Output

REFERENCE MATERIALS

Quality Documentation

- HMC Legacy PCN: QS##, QS##E and QS##G,QS##GE packages - Relocation of pre-existing production equipment to new building
- Package/Assembly Qualification Test Report: Plastic Encapsulated QSOP (QTR: 02015 REV: 11)
- PCN: MS, QS, SOT, SOIC packages - Sn/Pb plating vendor change
- Semiconductor Qualification Test Report: GaAs HBT-A (QTR: 2013-00228)

DESIGN RESOURCES

- HMC439 Material Declaration
- PCN-PDN Information
- Quality And Reliability
- Symbols and Footprints

DISCUSSIONS

View all HMC439 EngineerZone Discussions.

SAMPLE AND BUY

Visit the product page to see pricing options.

TECHNICAL SUPPORT

Submit a technical question or find your regional support number.

DOCUMENT FEEDBACK

Submit feedback for this data sheet.

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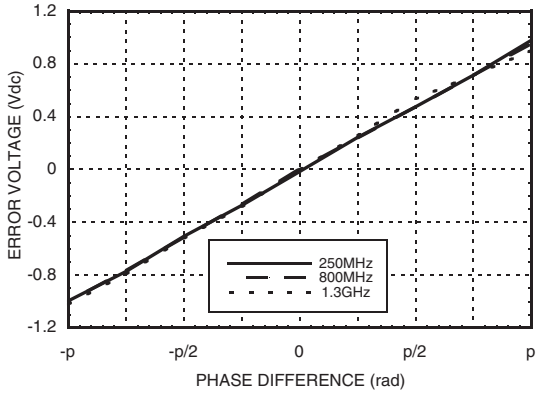
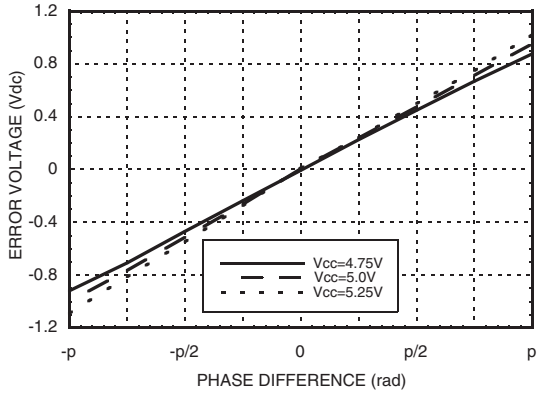
HBT DIGITAL PHASE-FREQUENCY DETECTOR, 10 - 1300 MHz

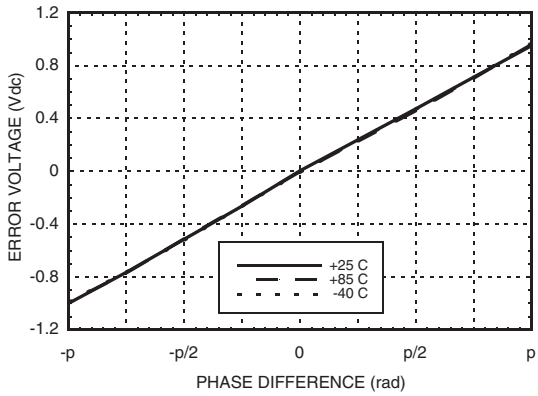
Error Voltage vs. Frequency, Pin= 0 dBm*



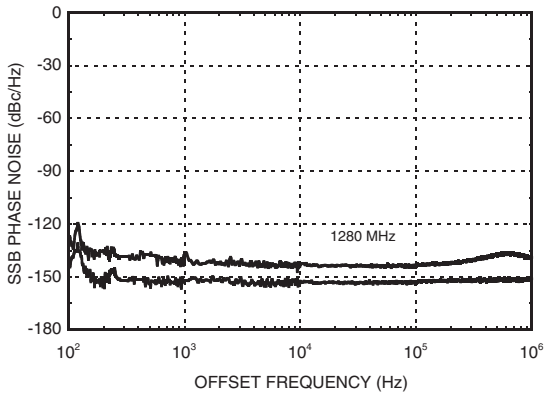
Error Voltage vs. Supply Voltage, Pin= 0 dBm, Fin= 250 MHz*



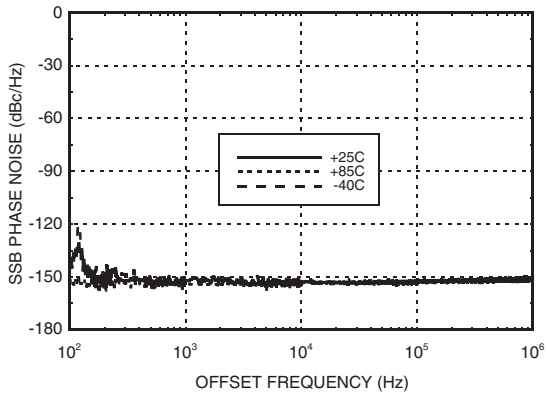
Error Voltage vs. Temperature, Pin= 0 dBm, Fin= 250 MHz*



SSB Phase Noise Performance, Pin= 0 dBm, T= 25 °C



SSB Phase Noise Performance, Pin= 0 dBm, Fin= 100 MHz



** See Gain & Error Voltage Test Circuit herein.*

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HMC439QS16G / 439QS16GE

v02.0705

HBT DIGITAL PHASE-FREQUENCY DETECTOR, 10 - 1300 MHz

Absolute Maximum Ratings

RF Input (Vcc= +5V)	+13 dBm
Supply Voltage (Vcc)	+5.5V
Channel Temperature (Tc)	135 °C
Continuous Pdiss (T = 85 °C) (derate 47.2 mW/° C above 85 °C)	4.25 W
Storage Temperature	-65 to +150 °C
Operating Temperature	-40 to +85 °C

ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS

Typical Supply Current vs. Vcc

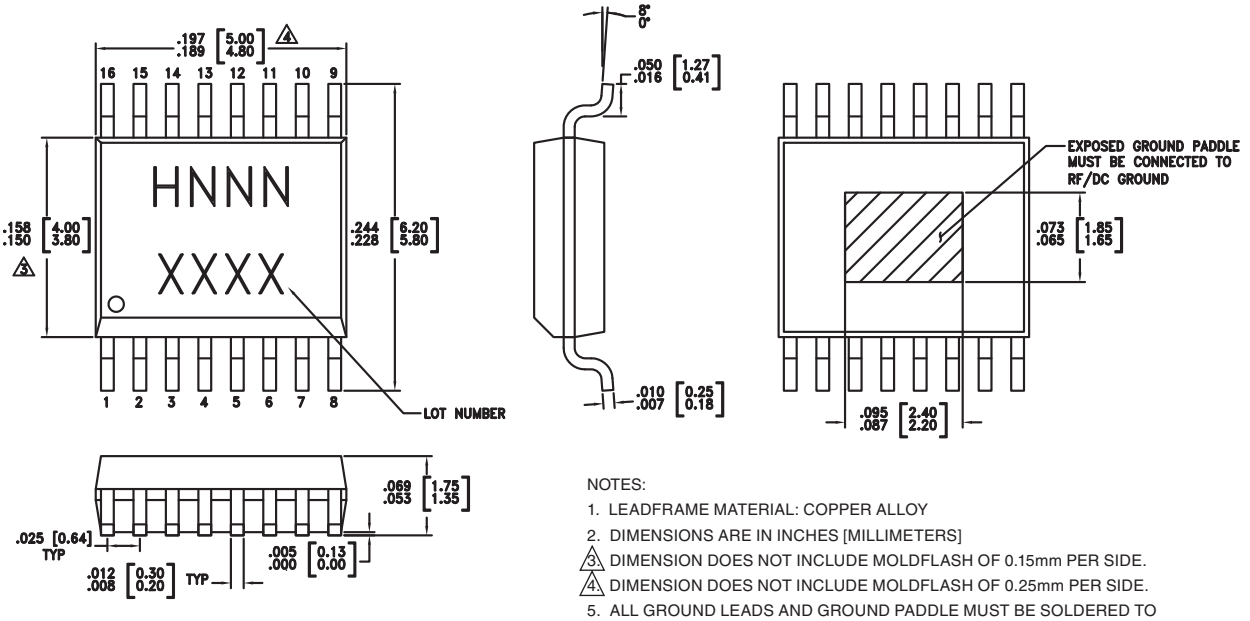
Vcc (Vdc)	Icc (mA)
4.8	90
5.0	96
5.2	102

Note: Detector will work over full voltage range above.

Typical DC Characteristics @ Vcc = +5V

Symbol	Characteristics	+25C			Units
		Min.	Typ.	Max.	
Icc	Power Supply Current	90	96	102	mA
Voh	Output High Voltage	5.0	5.0	5.0	V
Vol	Output Low Voltage	2.9	3	3.1	V

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 AND GROUND PADDLE MUST BE SOLDERED TO PCB RF GROUND.

Package Information

Part Number	Package Body Material	Lead Finish	MSL Rating	Package Marking [3]
HMC439QS16G	Low Stress Injection Molded Plastic	Sn/Pb Solder	MSL1 [1]	H439 XXXX
HMC439QS16GE	RoHS-compliant Low Stress Injection Molded Plastic	100% matte Sn	MSL1 [2]	H439 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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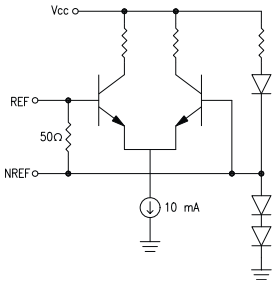
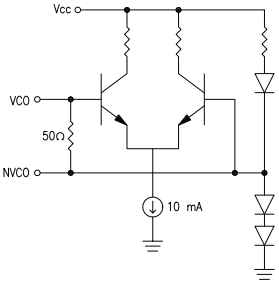
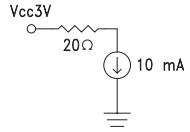
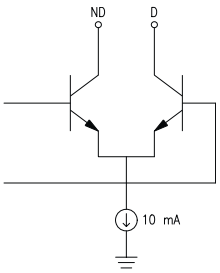
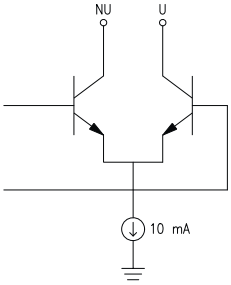
Pin Description

Pin Number	Function	Description	Interface Schematic
1	Vcc	Supply voltage 5V ± 0.2V	
2, 8, 9, 11, 16	GND	All ground leads and ground paddle must be connected to PCB RF/DC ground.	
		(These pins are AC coupled and must be DC blocked externally.)	
3	REF	Reference Input	
4	NREF	Reference Input Compliment	
5	N/C	Not Connected	
		(These pins are AC coupled and must be DC blocked externally.)	
6	VCO	VCO Input	
7	NVCO	VCO Input Compliment	
10	Vcc3V	3.0 Volt Reference Voltage for Internal 10mA Current Source	
12	ND	Down Output Compliment	
13	D	Down Output	
14	NU	Up Output Compliment	
15	U	Up Output	

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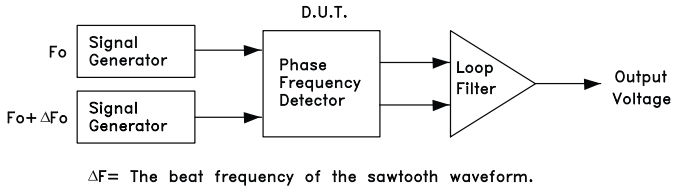
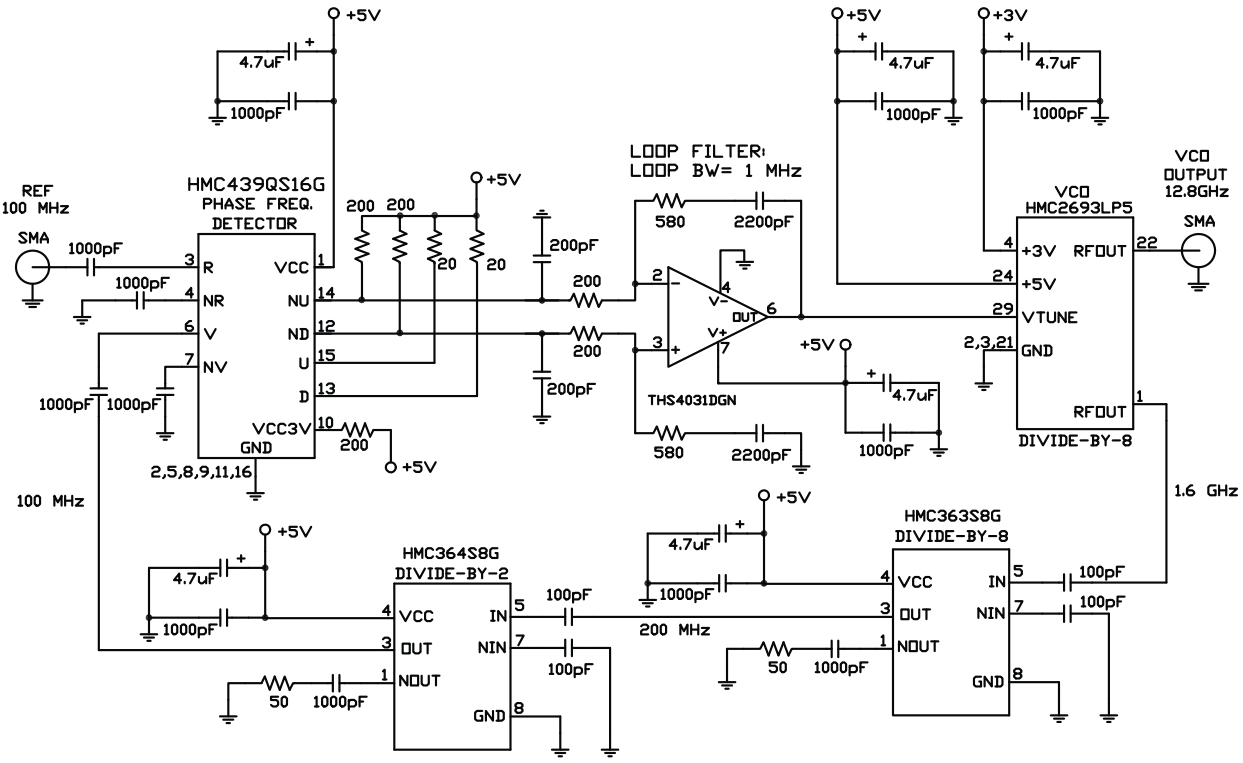
Gain & Error Voltage Test Circuit:

Gain & Error Voltage data taken using test circuit below. Loop filter gain has been subtracted from the result.



Typical PLL Application Circuit using HMC439QS16G

PLL application shown for a 12.8 GHz Fout. Contact HMC to discuss your specific application.



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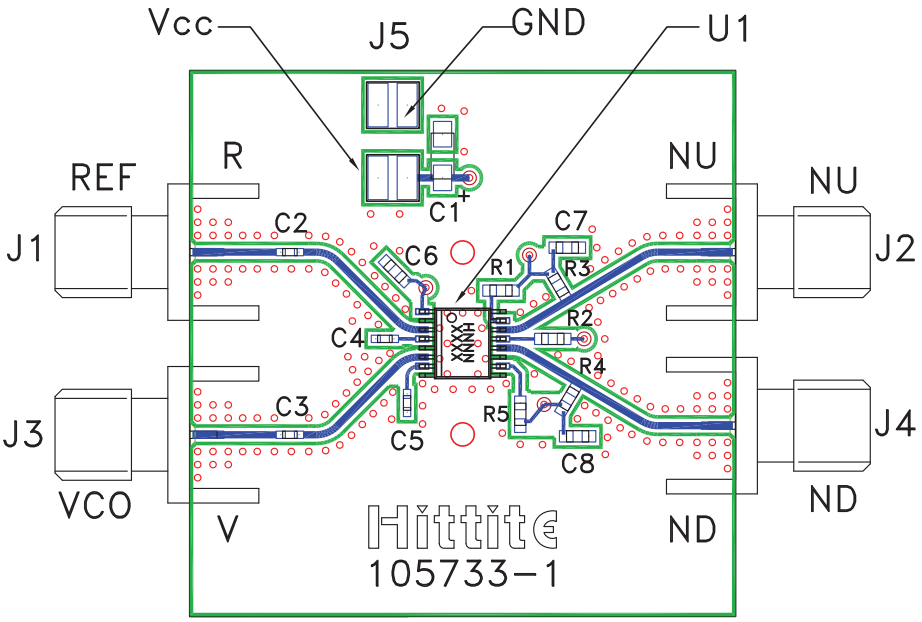
Evaluation PCB



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 and backside ground slug 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.

List of Materials for Evaluation PCB 105809 [1]

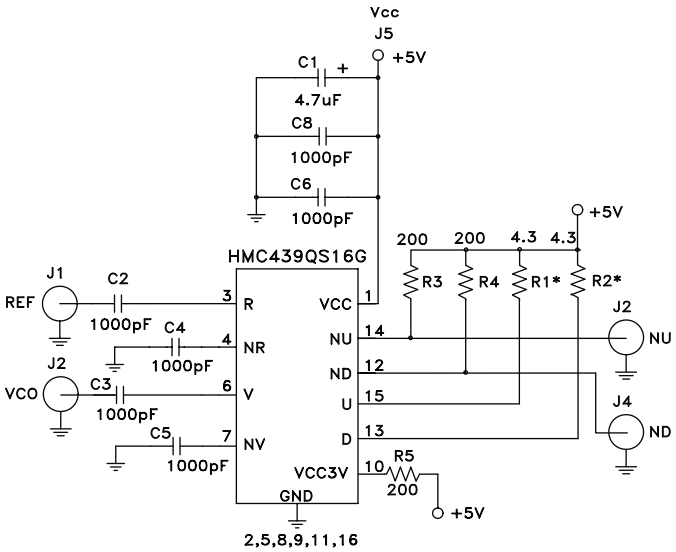
Item	Description
J1 - J4	PCB Mount SMA RF Connector
J5	2 mm DC Header
C1	4.7 µF Capacitor
C2, C5 - C7	100 pF Capacitor, 0402 Pkg.
C3, C4, C8	1000 pF Capacitor, 0603 Pkg.
R1[3], R2 [3]	4.3 Ohm Resistor, 0603 Pkg.
R3, R4, R5	200 Ohm Resistor, 0603 Pkg.
U1	HMC439QS16G / HMC439QS16GE
PCB [2]	105733 Eval Board

[1] Reference this number when ordering complete evaluation PCB

[2] Circuit Board Material: Rogers 4350

[3] Choose values of R1 & R2 between 4.3 and 20 Ohms for best noise performance

Evaluation PCB Circuit



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