

# Analog Devices Welcomes Hittite Microwave Corporation

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### Typical Applications

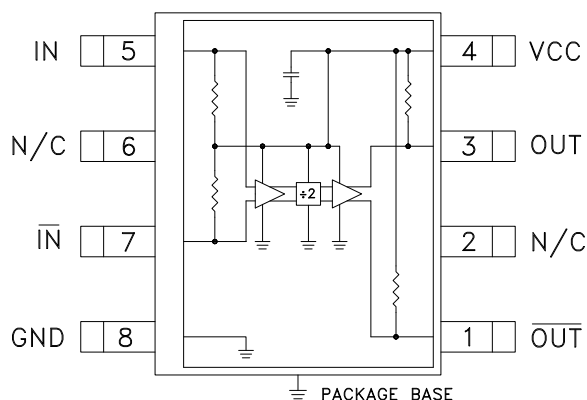
Prescaler for DC to X Band PLL Applications:

- Satellite Communication Systems
- Fiber Optic
- Point-to-Point and Point-to-Multi-Point Radios
- VSAT

### Features

- Ultra Low SSB Phase Noise: -145 dBc/Hz
- Wide Bandwidth
- Output Power: 4 dBm
- Single DC Supply: +5V
- S8G SMT Package

### Functional Diagram



### General Description

The HMC364S8G & HMC364S8GE are low noise Divide-by-2 Static Dividers with InGaP GaAs HBT technology in 8 lead surface mount plastic packages. This device operates from DC (with a square wave input) to 12.5 GHz input frequency with a single +5V DC supply. The low additive SSB phase noise of -145 dBc/Hz at 100 kHz offset helps the user maintain good system noise performance.

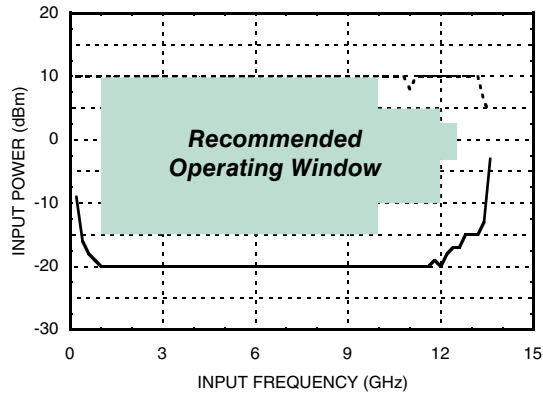
### Electrical Specifications, $T_A = +25^\circ\text{C}$ , 50 Ohm System, $V_{CC} = 5V$

Parameter	Conditions	Min.	Typ.	Max.	Units
Maximum Input Frequency		12.5	13.5		GHz
Minimum Input Frequency	Sine Wave Input. [1]		0.2	0.5	GHz
Input Power Range	$F_{in} = 1$ to 10 GHz	-15	>-20	+10	dBm
	$F_{in} = 10$ to 12 GHz	-10	>-15	+5	dBm
	$F_{in} = 12$ to 12.5 GHz	-4	>-8	+2	dBm
Output Power	$F_{in} = 6$ GHz	2	5		dBm
	$F_{in} = 9$ GHz	-2			dBm
	$F_{in} = 11$ GHz	-5			dBm
	$F_{in} = 12.5$ GHz	-8			dBm
Reverse Leakage	Both RF Outputs Terminated		40		dB
SSB Phase Noise (100 kHz offset)	$P_{in} = 0$ dBm, $F_{in} = 6$ GHz		-145		dBc/Hz
Output Transition Time	$P_{in} = 0$ dBm, $F_{out} = 882$ MHz		100		ps
Supply Current ( $I_{CC}$ )			105		mA

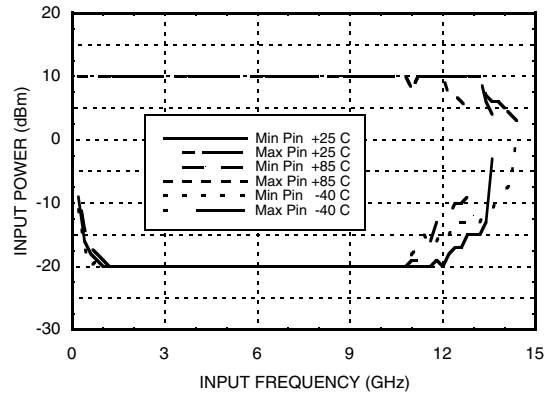
1. Divider will operate down to DC for square-wave input signal.



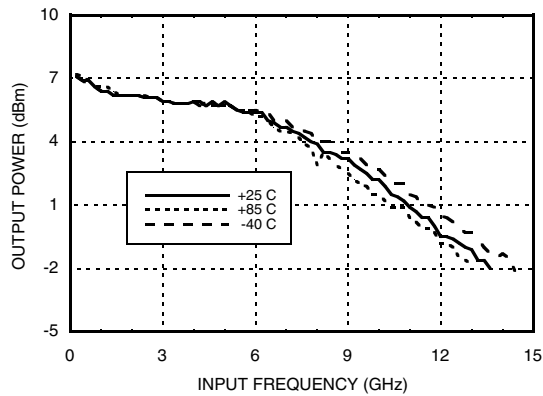
**Input Sensitivity Window,  $T = 25\text{ }^{\circ}\text{C}$**



**Input Sensitivity Window vs. Temperature**

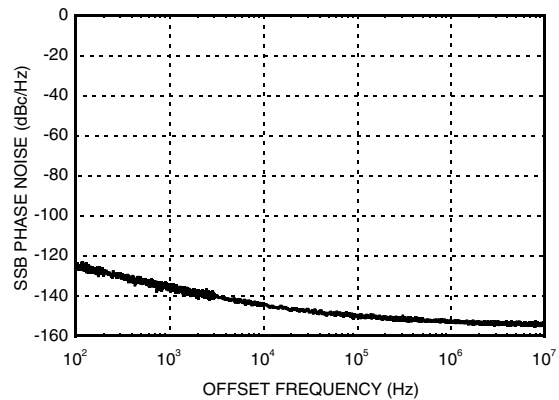


**Output Power vs. Temperature**



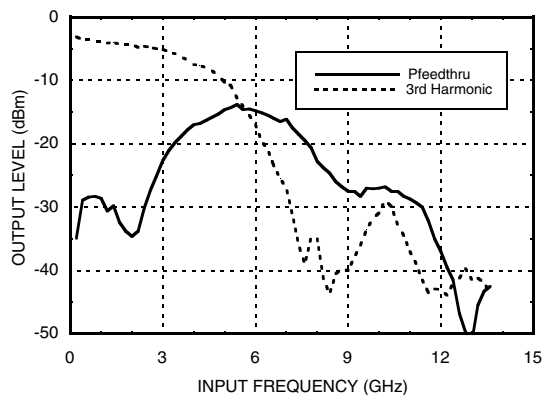
**SSB Phase Noise**

**Performance,  $P_{in} = 0\text{ dBm}$ ,  $T = 25\text{ }^{\circ}\text{C}$**

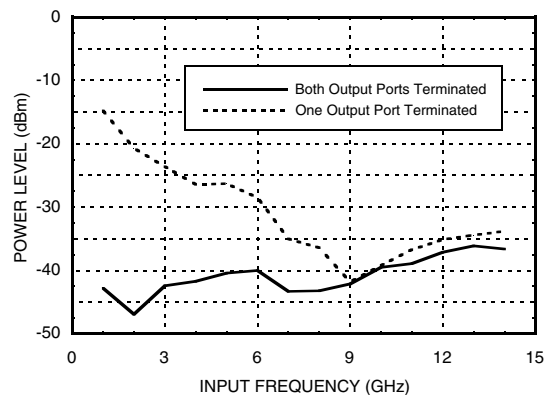


**Output Harmonic**

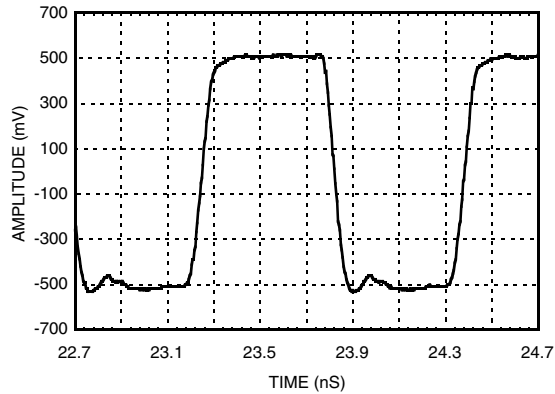
**Content,  $P_{in} = 0\text{ dBm}$ ,  $T = 25\text{ }^{\circ}\text{C}$**



**Reverse Leakage,  $P_{in} = 0\text{ dBm}$ ,  $T = 25\text{ }^{\circ}\text{C}$**



**Output Voltage Waveform,**  
**Pin= 0 dBm, Fout= 882 MHz, T= 25 °C**



**Absolute Maximum Ratings**

RF Input (Vcc = +5V)	-13 dBm
Vcc	+5.5V
VLogic	Vcc -1.6V to Vcc -1.2V
Thermal Resistance (RTH) (junction to ground paddle)	69.3 °C/W
Storage Temperature	-65 to -150 °C
Operating Temperature	-40 to +85 °C

**Typical Supply Current vs. Vcc**

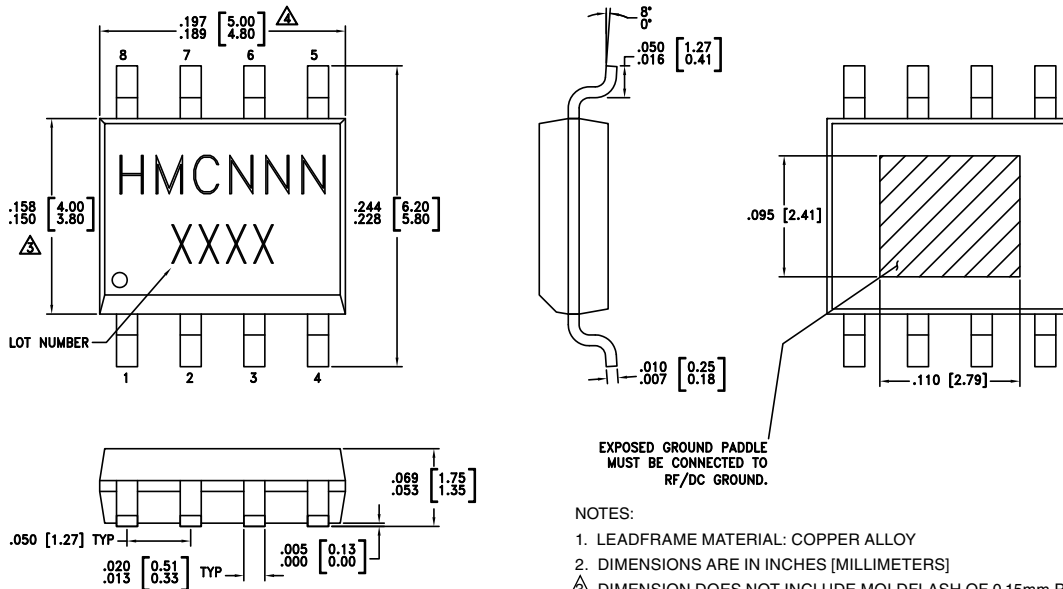
Vcc (V)	Icc (mA)
4.75	93
5.00	105
5.25	115

Note: Divider will operate over full voltage range shown above



**ELECTROSTATIC SENSITIVE DEVICE**  
**OBSERVE HANDLING PRECAUTIONS**

**Outline Drawing**



EXPOSED GROUND PADDLE  
MUST BE CONNECTED TO  
RF/DC GROUND.

NOTES:

1. LEADFRAME MATERIAL: COPPER ALLOY
2. DIMENSIONS ARE IN INCHES [MILLIMETERS]
- △ DIMENSION DOES NOT INCLUDE MOLDFLASH OF 0.15mm PER SIDE.
- ▲ 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 <sup>[3]</sup>
HMC364S8G	Low Stress Injection Molded Plastic	Sn/Pb Solder	MSL1 <sup>[1]</sup>	HMC364 XXXX
HMC364S8GE	RoHS-compliant Low Stress Injection Molded Plastic	100% matte Sn	MSL1 <sup>[2]</sup>	HMC364 XXXX

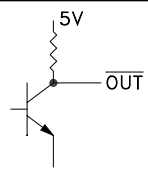
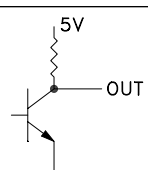
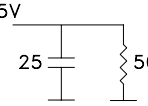
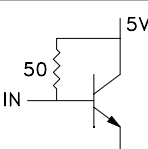
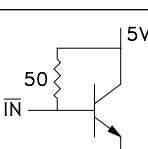

[1] Max peak reflow temperature of 235 °C

[2] Max peak reflow temperature of 260 °C

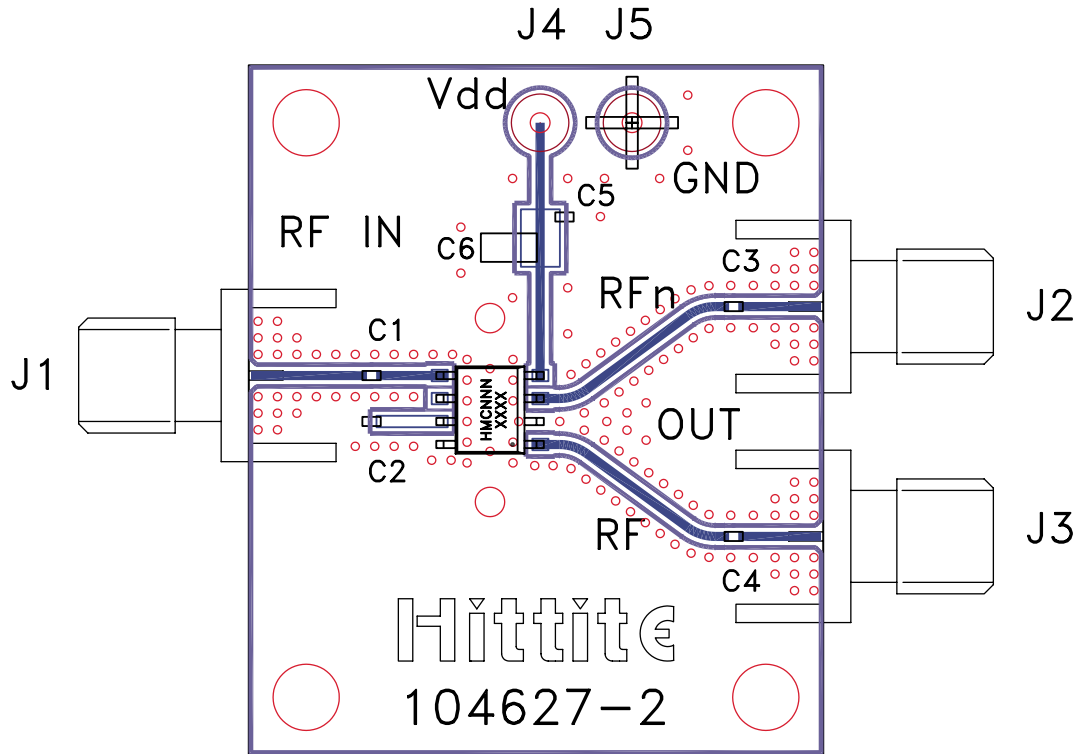
[3] 4-Digit lot number XXXX



### Pin Description

Pin Number	Function	Description	Interface Schematic
1	$\overline{\text{OUT}}$	Divided output 180° out of phase with pin 3.	
2, 6	N/C	No Connection	
3	OUT	Divided Output.	
4	VCC	Supply voltage 5V ± 0.25V.	
5	IN	RF Input must be DC blocked.	
7	$\overline{\text{IN}}$	RF Input 180° out of phase with pin 5 for differential operation. A/C ground for single ended operation	
8	GND	Exposed paddle must be connected to RF/DC ground.	

**Evaluation PCB**



**List of Materials for Evaluation PCB 104631 [1]**

Item	Description
J1 - J3	PCB Mount SMA RF Connector
C1 - C4	100 pF Capacitor, 0402 Pkg.
C5	1000 pF Capacitor, 0603 Pkg.
C6	10 µF Tantalum Capacitor
U1	HMC364S8G / HMC364S8GE Divide-by-2
PCB [2]	104627 Eval 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 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. This evaluation board is designed for single ended input testing. J2 and J3 provide differential output signals.


**Application Circuit**
