

# Analog Devices Welcomes Hittite Microwave Corporation

NO CONTENT ON THE ATTACHED DOCUMENT HAS CHANGED



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### Typical Applications

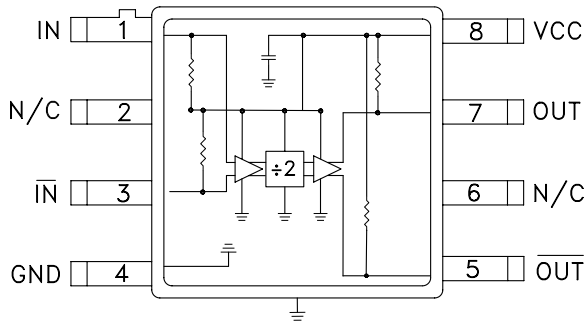
Prescaler for DC to X Band PLL Applications:

- Point-to-Point / Multi-Point Radios
- VSAT Radios
- Fiber Optic
- Test Equipment
- Space & Military

### Features

- Ultra Low SSB Phase Noise: -145 dBc/Hz
- Wide Bandwidth
- Output Power: 7 dBm
- Single DC Supply: +5V
- 8 Lead Hermetic SMT Package

### Functional Diagram



### General Description

The HMC364G8 is a low noise Divide-by-2 Static Divider with InGaP GaAs HBT technology in an 8 lead glass/metal surface mount (hermetic) package. This device operates from DC (with a square wave input) to 13 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, $V_{CC} = 5V$

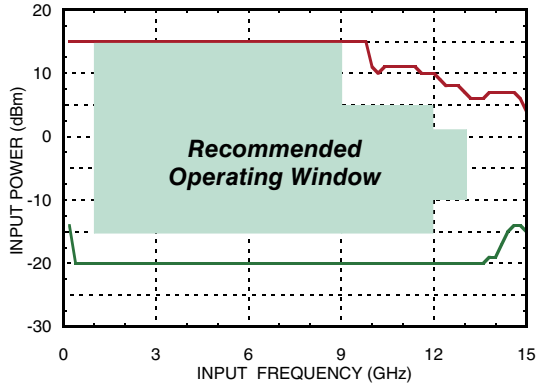
Parameter	Conditions	Min.	Typ.	Max.	Units
Maximum Input Frequency		13	13.5		GHz
Minimum Input Frequency	Sine Wave Input. {1}		0.2	0.5	GHz
Input Power Range	$F_{in} = 1$ to 9 GHz	-15	>-20	+10	dBm
	$F_{in} = 9$ to 12 GHz	-15	>-20	+5	dBm
	$F_{in} = 12$ to 13 GHz	-10	>-15	+2	dBm
Output Power	$F_{in} = 6$ GHz	3	7		dBm
	$F_{in} = 9$ GHz	1	5		dBm
	$F_{in} = 12$ GHz	-2	2		dBm
	$F_{in} = 13$ GHz	-3	1		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 ( $I_{CC}$ )			110		mA

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

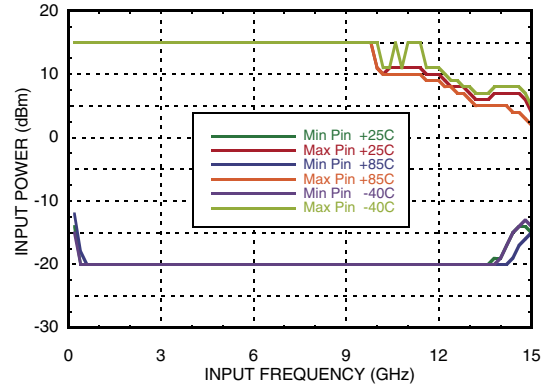


**SMT GaAs HBT MMIC  
DIVIDE-BY-2, DC - 13 GHz**

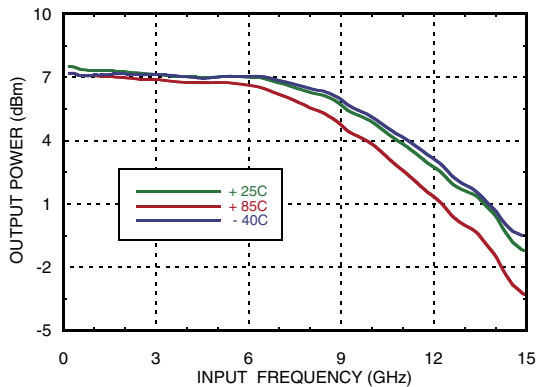
**Input Sensitivity Window,  $T = 25\text{ }^{\circ}\text{C}$**



**Input Sensitivity Window vs. Temperature**

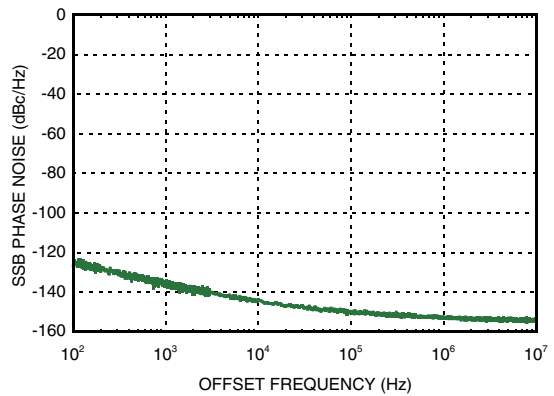


**Output Power vs. Temperature**



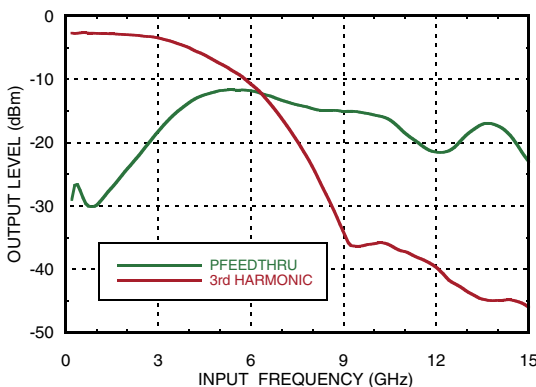
**SSB Phase Noise**

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

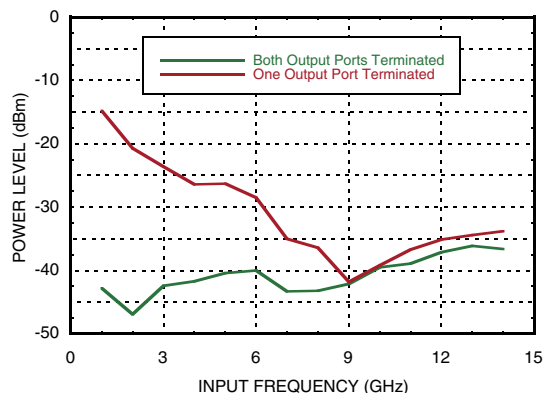


**Output Harmonic**

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

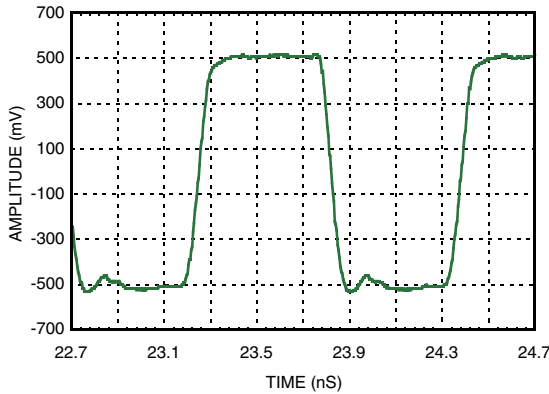


**Reverse Leakage,  $P_{in} = 0\text{ dBm}$ ,  $T = 25\text{ }^{\circ}\text{C}$**





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



**Absolute Maximum Ratings**

RF Input (Vcc = +5V)	+13 dBm
Vcc	+5.5V
Channel Temperature (Tc)	135 °C
Continuous Pdiss (T = 85 °C) (derate 11.9 mW/° C above 85 °C)	593 mW
Storage Temperature	-65 to +150 °C
Operating Temperature	0 to +85 °C



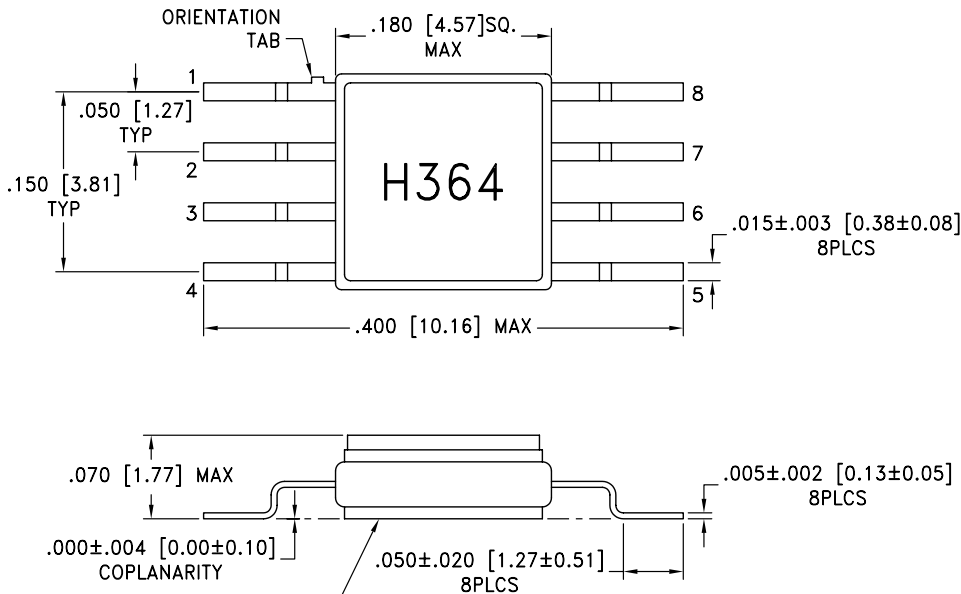
**ELECTROSTATIC SENSITIVE DEVICE  
OBSERVE HANDLING PRECAUTIONS**

**Typical Supply Current vs. Vcc**

Vcc (V)	Icc (mA)
4.75	100
5.0	110
5.25	120

Note: Divider will operate over full voltage range shown above

**Outline Drawing**

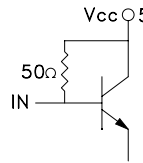
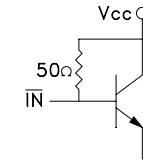

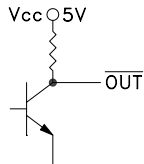
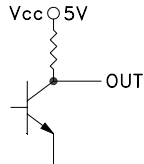


**NOTES:**

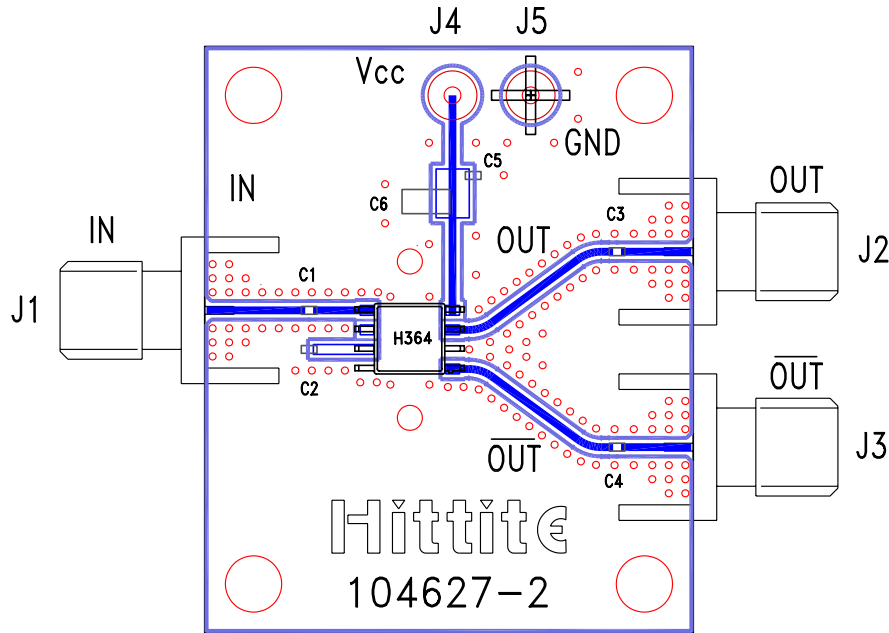
1. PACKAGE MATERIAL: ALUMINA LOADED BOROSILICATE GLASS.
2. LEAD, BASE, COVER MATERIAL: KOVAR™ (#7052 CORNING).
3. PLATING: ELECTROLYTIC GOLD 50 MICROINCHES MIN., OVER ELECTROLYTIC NICKEL 50 MICROINCHES MIN.
4. DIMENSIONS ARE IN INCHES [MILLIMETERS].
5. TOLERANCES: ±.005 [0.13] UNLESS OTHERWISE SPECIFIED.
6. ALL GROUND LEADS AND GROUND PADDLE MUST BE SOLDERED TO PCB RF GROUND.



**Pin Description**

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

**Evaluation PCB**



**List of Materials for Evaluation PCB 106582 [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 uF Tantalum Capacitor
U1	HMC364G8 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**
