HMC365

v05.0109

GaAs HBT MMIC DIVIDE-BY-4, DC - 13 GHz

Typical Applications

Prescaler for DC to Ku Band PLL Applications:

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

Features

Ultra Low SSB Phase Noise: -151 dBc/Hz

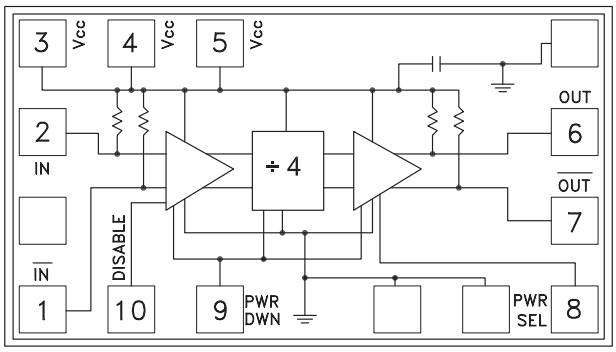
Wide Bandwidth

Output Power: 5 dBm

Single DC Supply: +5V

Small Size: 1.30 x 0.69 x 0.1 mm

Functional Diagram



General Description

The HMC365 is a low noise Divide-by-4 Static Divider with InGaP GaAs HBT technology that has a small size of 1.30 x 0.69 mm. 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 -151 dBc/Hz at 100 kHz offset helps the user maintain good system noise performance.

Electrical Specifications, T_A = +25° C, 50 Ohm System, Vcc = 5V

Parameter	Conditions	Min.	Typ.	Max.	Units
Maximum Input Frequency		13	14		GHz
Minimum Input Frequency	Sine Wave Input. [1]		0.2	0.5	GHz
Input Power Range	Fin = 1 to 10 GHz	-15	>-20	+10	dBm
	Fin = 10 to 12 GHz	-10	>-15	+3	dBm
	Fin = 12 to 13 GHz	-5	>-8	+3	dBm
Output Power [2]	Fin = 13 GHz	2	5		dBm
Reverse Leakage	Both RF Outputs Terminated		45		dB
SSB Phase Noise (100 kHz offset)	Pin = 0 dBm, Fin = 6 GHz		-151		dBc/Hz
Output Transition Time	Pin = 0 dBm, Fout = 882 MHz		100		ps
Supply Current (Icc) [2]			110		mA

[1] Divider will operate down to DC for square-wave input signal.
[2] When operated in high power mode (pin 8 connected to ground).

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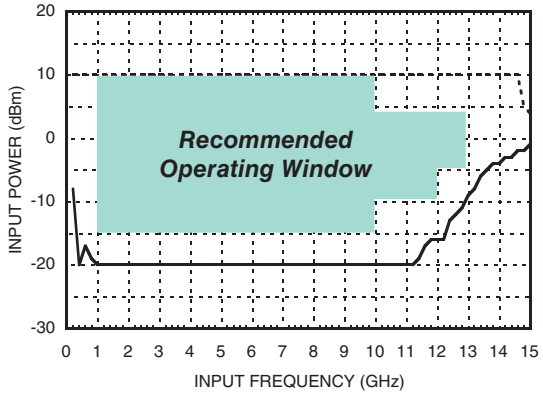
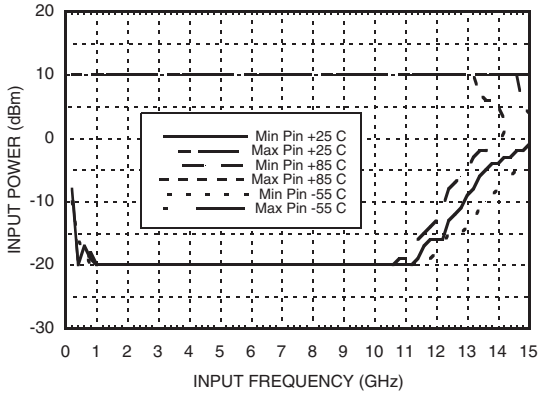
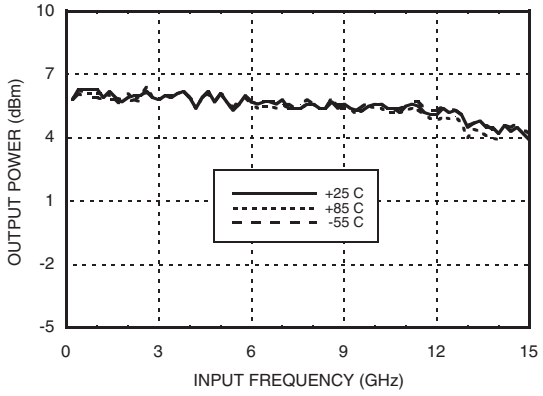
Input Sensitivity Window, T= 25 °C



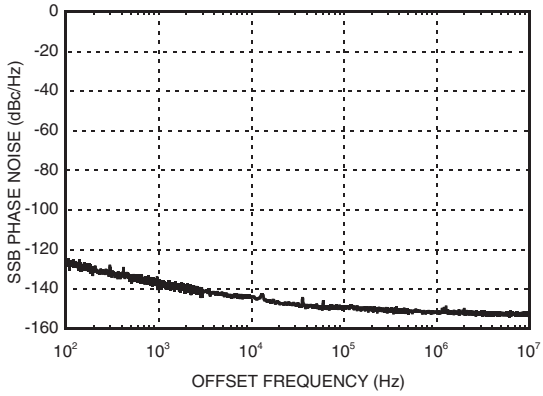
Input Sensitivity Window vs. Temperature



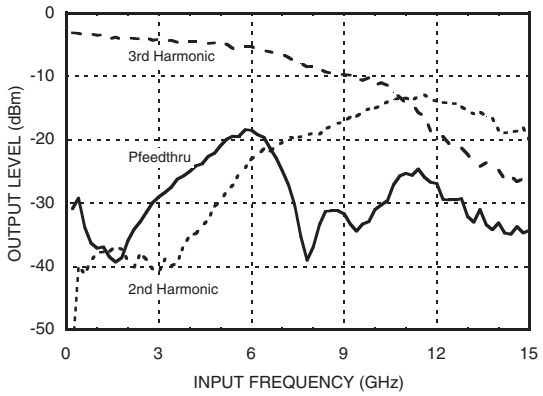
Output Power vs. Temperature



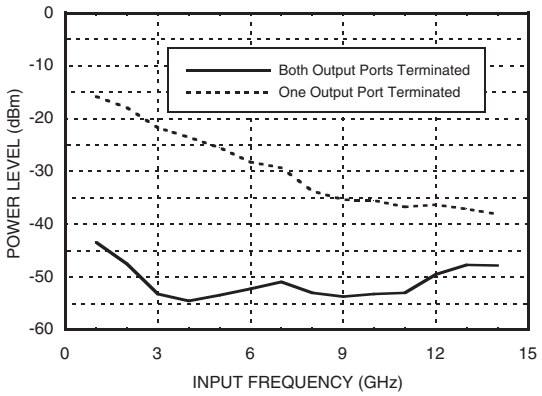
SSB Phase Noise Performance, Pin= 0 dBm, T= 25 °C



Output Harmonic Content, Pin= 0 dBm, T= 25 °C



Reverse Leakage, Pin= 0 dBm, T= 25 °C



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ANALOG DEVICES

HMC365

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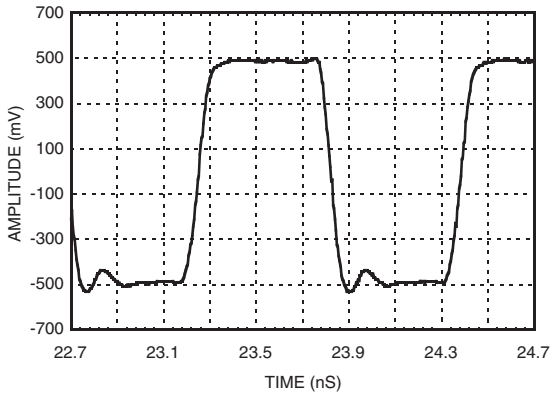
Output Voltage Waveform, Pin= 0 dBm, Fout= 882 MHz, T= 25 °C



Absolute Maximum Ratings

RF Input (Vcc = +5V)	+13 dBm
Vcc	+5.5V
VLogic	Vcc -1.6V to Vcc -1.2V
Storage Temperature	-65 to +150 °C
Operating Temperature	-55 to +85 °C

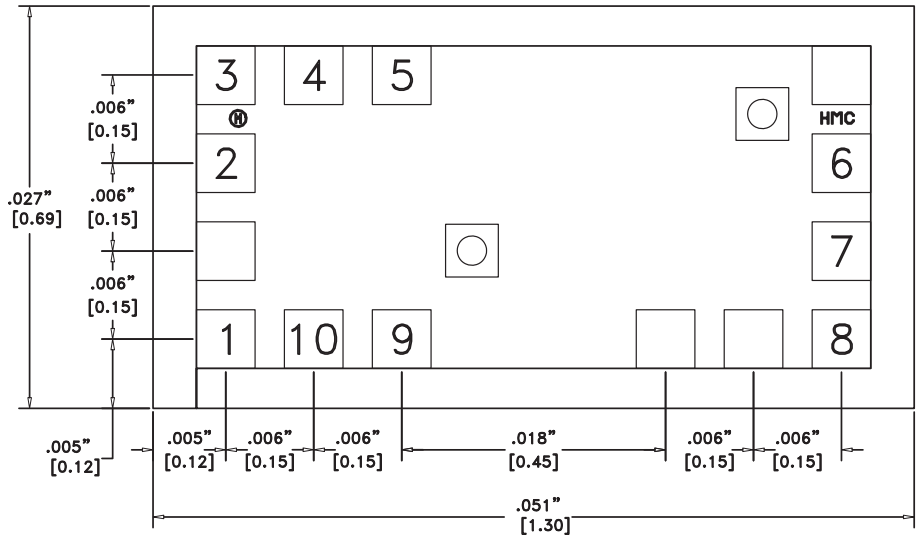
ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS

Typical Supply Current vs. Vcc

Vcc (V)	Icc (mA)
4.75	94
5.0	110
5.25	118

Note: Divider will operate over full voltage range shown above

Outline Drawing



Die Packaging Information [1]

Standard	Alternate
WP-8 (Waffle Pack)	[2]

[1] Refer to the "Packaging Information" section for die packaging dimensions.
[2] For alternate packaging information contact Hittite Microwave Corporation.

NOTES:
1. ALL DIMENSIONS IN INCHES (MILLIMETERS)
2. ALL TOLERANCES ARE ±0.001 (0.025)
3. DIE THICKNESS IS 0.004 (0.100) BACKSIDE IS GROUND
4. BOND PADS ARE 0.004 (0.100) SQUARE
5. BOND PAD SPACING, CTR-CTR: 0.006 (0.150)
6. BACKSIDE METALLIZATION: GOLD
7. BOND PAD METALLIZATION: GOLD

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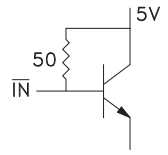
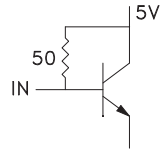
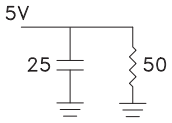
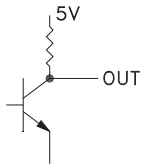
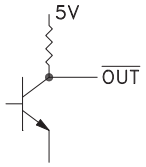
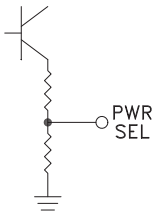
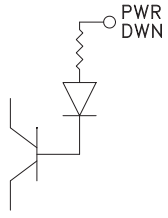
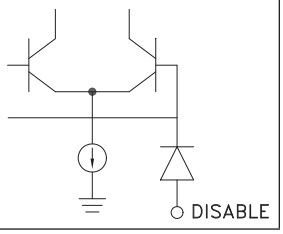
Pad Description

Pad Number	Function	Description	Interface Schematic
1	$\overline{IN}$	RF Input 180° out of phase with pad 3 for differential operation. AC ground for single ended operation.	
2	IN	RF Input must be DC blocked.	
3, 4, 5	Vcc	Supply Voltage 5V ±0.25V can be applied to pad 3, 4, or 5.	
6	OUT	Divided Output	
7	$\overline{OUT}$	Divided output 180° out of phase with OUT.	
8	PWR SEL	In the low power mode, the power select pin is left floating. By grounding this pin, the output power is increased by approximately 10 dB.	
9	PWR DWN	The power down pin is grounded for normal operation. Applying 5 volts to this pin will power down this device.	
10	DISABLE	The disable pin is grounded for normal operation. Applying 5 volts to this pin will disable the input buffer amplifier.	

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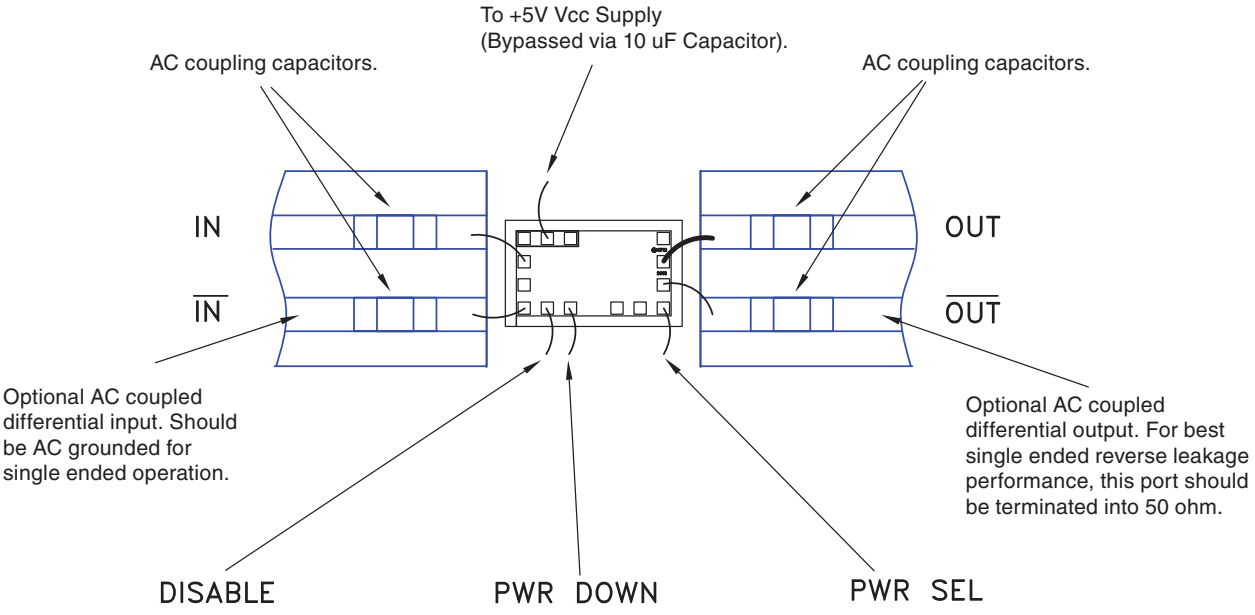
Truth Table

Function	Pin	5V	GND	Float
DISABLE	10	Output Off	Output On	X
PWR DWN	9	Power Down	Power Up	X
PWR SEL	8	X	High Power Output	Low Power Output
X = State not permitted.				

Assembly Diagrams



This port should be grounded for normal operation. Applying +5V to this port will disable the input buffer amplifier.

This port should be grounded for normal operation. Applying +5V to this port will power down the device.

For high power output, this port should be bonded to ground. For low power output, this port should be floating.

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