

## GaAs HBT MMIC DIVIDE-BY-4, DC - 11 GHz

### Typical Applications

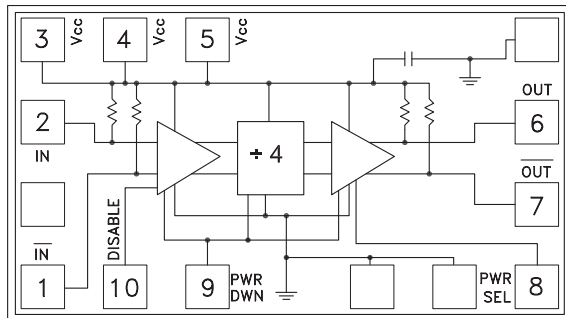
Prescaler for DC to X Band PLL Applications:

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

### Features

- Ultra Low SSB Phase Noise: -149 dBc/Hz
- Wide Bandwidth
- Output Power: -6 dBm
- Single DC Supply: +5V
- Small Size: 1.30 x 0.69 x 0.1 mm

### Functional Diagram



### General Description

The HMC362 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 11 GHz input frequency with a single +5V DC supply. The low additive SSB phase noise of -149 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, $V_{CC} = 5V$

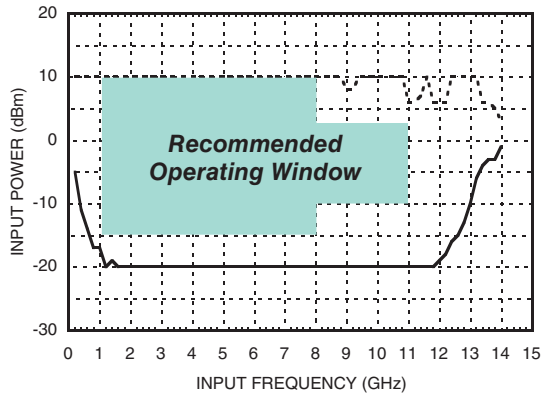
Parameter	Conditions	Min.	Typ.	Max.	Units
Maximum Input Frequency		11	12		GHz
Minimum Input Frequency	Sine Wave Input. [1]		0.2	0.5	GHz
Input Power Range	$F_{in} = 1$ to 8 GHz	-15	>-20	+10	dBm
	$F_{in} = 8$ to 11 GHz	-10	>-15	+2	dBm
Output Power [2]	$F_{in} = 11$ GHz	-9	-6		dBm
Reverse Leakage	Both RF Outputs Terminated		40		dB
SSB Phase Noise (100 kHz offset)	$P_{in} = 0$ dBm, $F_{in} = 6$ GHz		-149		dBc/Hz
Output Transition Time	$P_{in} = 0$ dBm, $F_{out} = 882$ MHz		100		ps
Supply Current ( $I_{CC}$ ) [2]			68		mA

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

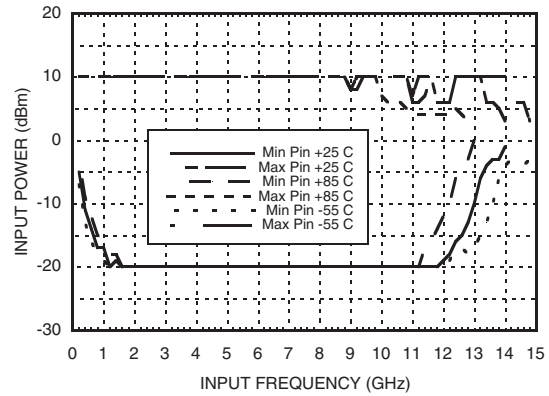
[2] When operated in low power mode (pin 8 floating).

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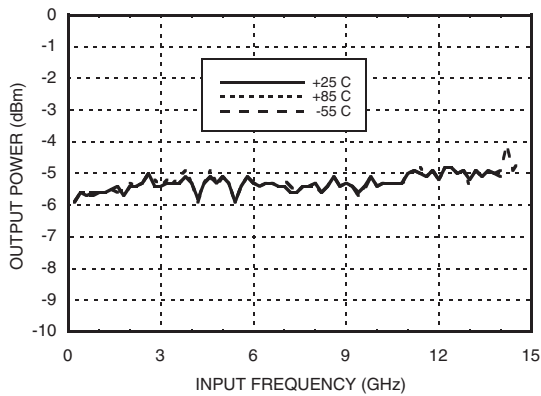
**Input Sensitivity Window,  $T = 25\text{ }^{\circ}\text{C}$**



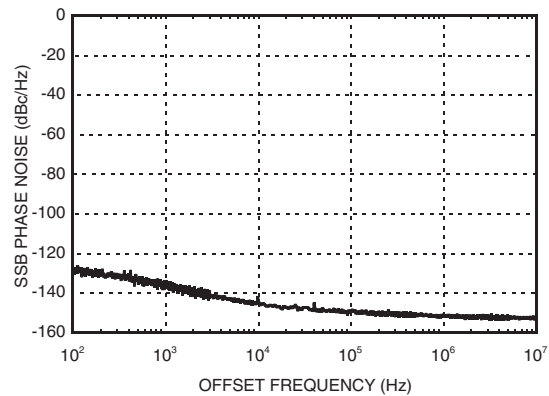
**Input Sensitivity Window vs. Temperature**



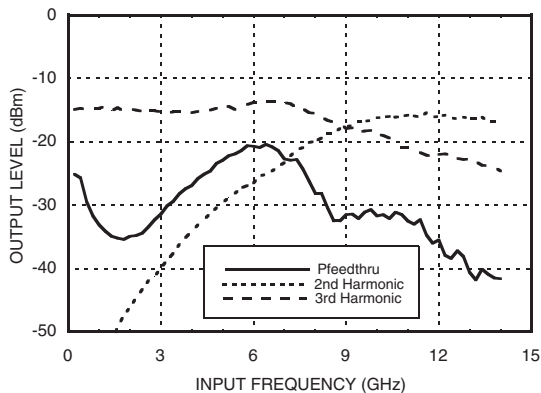
**Output Power vs. Temperature**



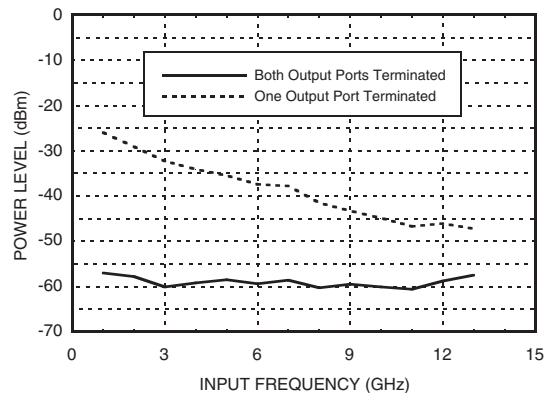
**SSB Phase Noise Performance,  $P_{in} = 0\text{ dBm}$ ,  $T = 25\text{ }^{\circ}\text{C}$**



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



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

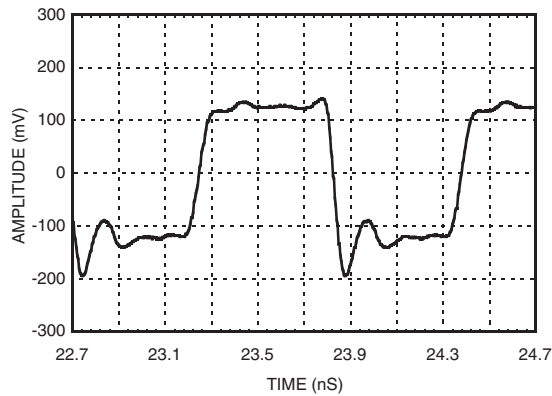


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**Output Voltage Waveform,  
Pin= 0 dBm, Fout= 882 MHz, T= 25 °C**



**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



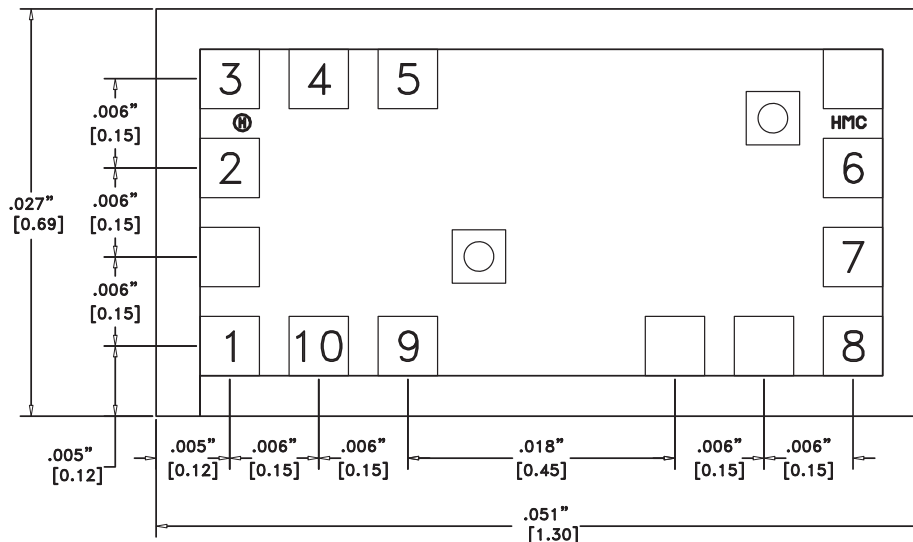
**ELECTROSTATIC SENSITIVE DEVICE  
OBSERVE HANDLING PRECAUTIONS**

**Typical Supply Current vs. Vcc**

Vcc (V)	Icc (mA)
4.75	61
5.0	68
5.25	74

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:**

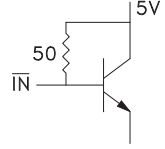
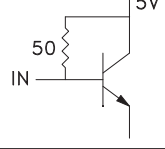
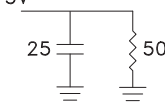
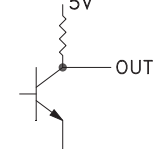
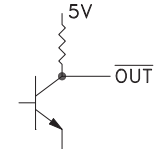
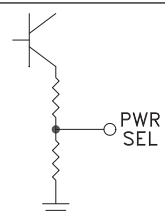
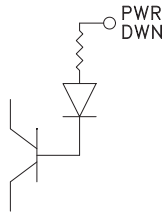
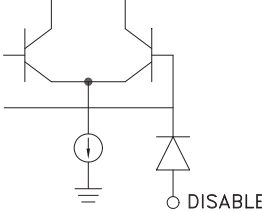
- ALL DIMENSIONS IN INCHES (MILLIMETERS)
- ALL TOLERANCES ARE ±0.001 (0.025)
- DIE THICKNESS IS 0.004 (0.100) BACKSIDE IS GROUND
- BOND PADS ARE 0.004 (0.100) SQUARE
- BOND PAD SPACING, CTR-CTR: 0.006 (0.150)
- BACKSIDE METALLIZATION: GOLD
- BOND PAD METALLIZATION: GOLD

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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.	

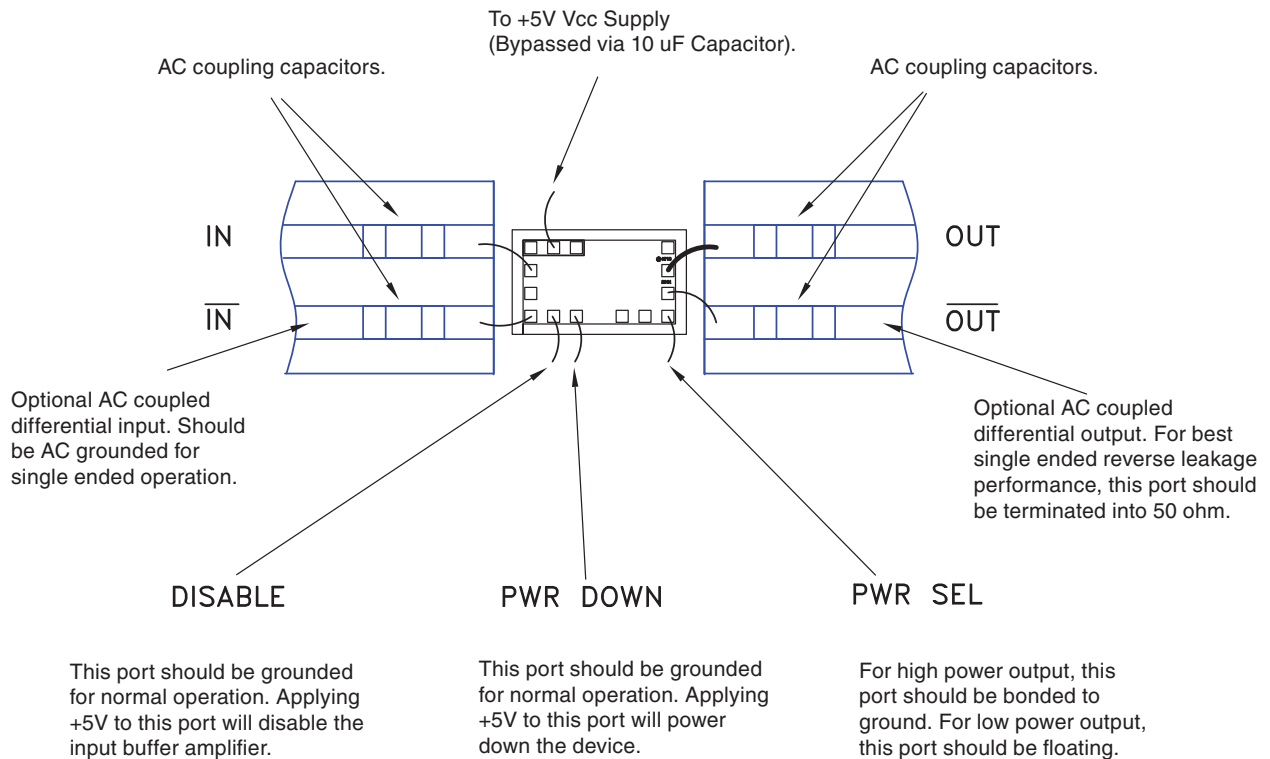
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**Truth Table**

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 Diagram**



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