

## InGaP HBT GAIN BLOCK MMIC AMPLIFIER, DC - 4 GHz

### Typical Applications

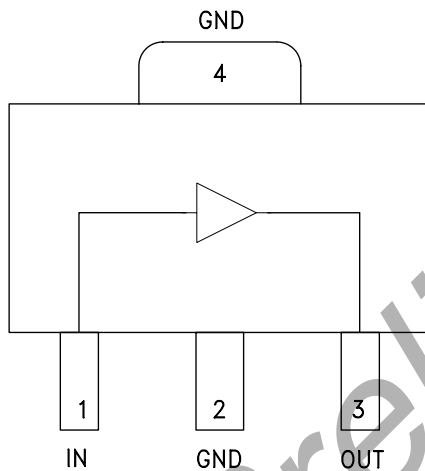
The HMC589AST89E is ideal for:

- Cellular / PCS / 3G
- Fixed Wireless & WLAN
- CATV, Cable Modem & DBS
- Microwave Radio & Test Equipment
- IF & RF Applications

### Features

- P1dB Output Power: +21 dBm
- Gain: 21 dB
- Output IP3: +33 dBm
- Single Supply: +5V
- Industry Standard SOT89 Package

### Functional Diagram



### General Description

The HMC589AST89E is an InGaP HBT Gain Block MMIC SMT amplifiers covering DC to 4 GHz and packaged in an industry standard SOT89. The amplifier can be used as a cascadable 50 Ohm RF or IF gain stage as well as a LO or PA driver with up to +19 dBm P1dB output power for cellular/3G, FWA, CATV, microwave radio and test equipment applications. The HMC589ST89E offers 20 dB gain and +33 dBm output IP3 at 1 GHz while requiring only 82 mA from a single positive supply. The HMC589AST89E InGaP HBT gain block offers excellent output power and gain stability over temperature.

### Electrical Specifications, $V_s = 5V$ , $R_{bias} = 1.8 \text{ Ohm}$ , $T_A = +25^\circ \text{ C}$

Parameter		Min.	Typ.	Max.	Units
Gain	DC - 1.0 GHz	19	21	25	dB
	1.0 - 2.0 GHz	16	19	23	dB
	2.0 - 3.0 GHz	14	17	22	dB
	3.0 - 4.0 GHz	13	15	20	dB
Gain Variation Over Temperature	DC - 5 GHz		0.008		dB/ °C
Input Return Loss	DC - 1.0 GHz	13	17		dB
	1.0 - 4.0 GHz	8	11		dB
Output Return Loss	DC - 1.0 GHz	8	12		dB
	1.0 - 4.0 GHz	7	10		dB
Reverse Isolation	DC - 4 GHz		23		dB
Output Power for 1 dB Compression (P1dB)	0.5 - 1.0 GHz	17.5	21		dBm
	1.0 - 2.0 GHz	16	19		dBm
	2.0 - 3.0 GHz	16	19		dBm
	3.0 - 4.0 GHz	14.5	17.5		dBm
Output Third Order Intercept (IP3) (Pout= 0 dBm per tone, 1 MHz spacing)	0.5 - 1.0 GHz		33		dBm
	1.0 - 2.0 GHz		32		dBm
	2.0 - 3.0 GHz		30.5		dBm
	3.0 - 4.0 GHz		29		dBm
Noise Figure	DC - 2.0 GHz		4.0		dB
	2.0 - 4.0 GHz		4.5		dB
Supply Current (Icq)			82	102	mA

Note: Data taken with broadband bias tee on device output.

For price, delivery and to place orders: Analog Devices, Inc., 1 Technology Way, P.O. Box 9106, Norwood, MA 02062-9106

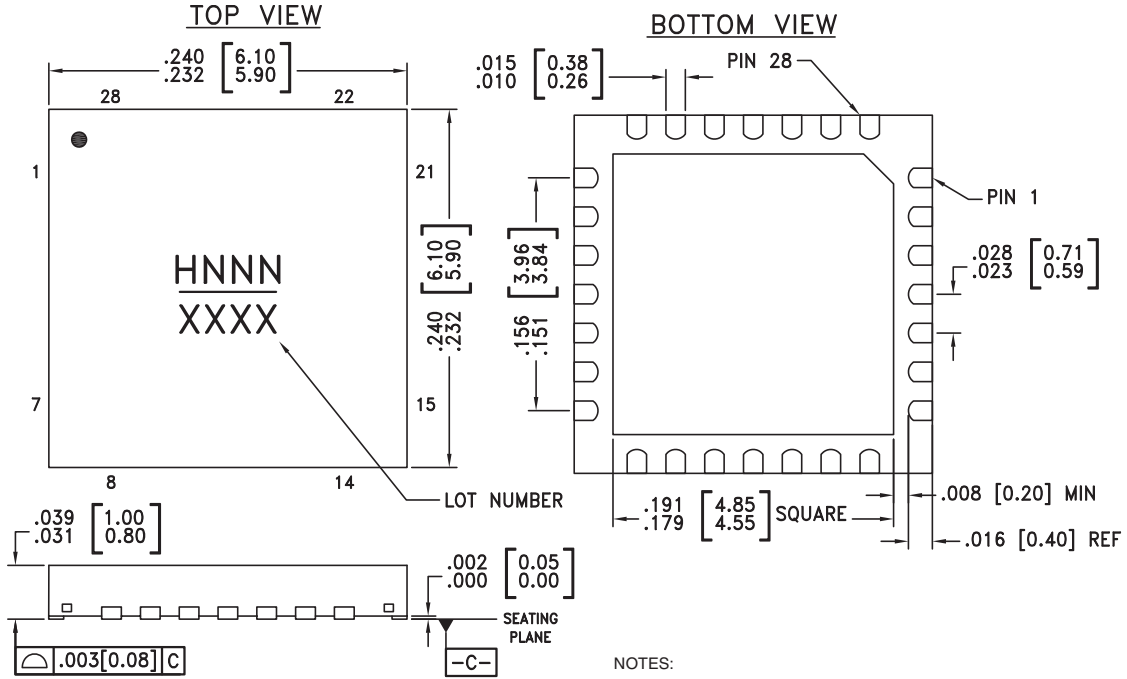
Phone: 781-329-4700 • Order On-line at [www.analog.com](http://www.analog.com)

Application Support: Phone: 1-800-ANALOG-D



**GaAs MMIC 6-BIT DIGITAL  
PHASE SHIFTER, 2.9 - 3.9 GHz**

**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 MUST BE SOLDERED TO PCB RF GROUND.
6. CLASSIFIED AS MOISTURE SENSITIVITY LEVEL (MSL) 1.

**Package Information**

Part Number	Package Body Material	Lead Finish	MSL Rating	Package Marking <sup>[3]</sup>
HMC648LP6	Low Stress Injection Molded Plastic	Sn/Pb Solder	MSL1 <sup>[1]</sup>	H648 XXXX
HMC648LP6E	RoHS-compliant Low Stress Injection Molded Plastic	100% matte Sn	MSL1 <sup>[2]</sup>	H648 XXXX

[1] Max peak reflow temperature of 235 °C  
 [2] Max peak reflow temperature of 260 °C  
 [3] 4-Digit lot number XXXX