

GaAs PHEMT HIGH LINEARITY Gain Block, 0.2 - 4.0 GHz



Typical Applications

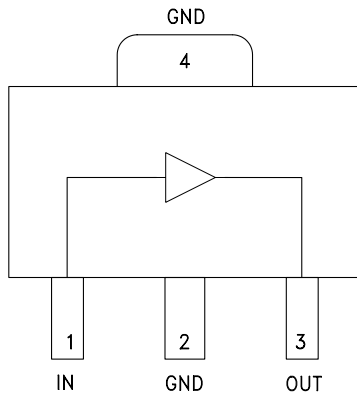
The HMC636ST89(E) is ideal for:

- Cellular / PCS / 3G
- WiMAX, WiBro, & Fixed Wireless
- CATV & Cable Modem
- Microwave Radio

Features

- Low Noise Figure: 2.2 dB
- High P1dB Output Power: +22 dBm
- High Output IP3: +40 dBm
- Gain: 13 dB
- 50 Ohm I/O's - No External Matching
- Industry Standard SOT89 Package

Functional Diagram



General Description

The HMC636ST89(E) is a GaAs pHEMT, High Linearity, Low Noise, Wideband Gain Block Amplifier covering 0.2 to 4.0 GHz. Packaged in an industry standard SOT89, the amplifier can be used as either a cascadable 50 Ohm gain stage, a PA Pre-Driver, a Low Noise Amplifier, or a Gain Block with up to +23 dBm output power. This versatile Gain Block Amplifier is powered from a single +5V supply and requires no external matching components. The internally matched topology makes this amplifier compatible with virtually any PCB material or thickness.

Electrical Specifications, $V_s = 5.0\text{ V}$, $T_A = +25^\circ\text{ C}$

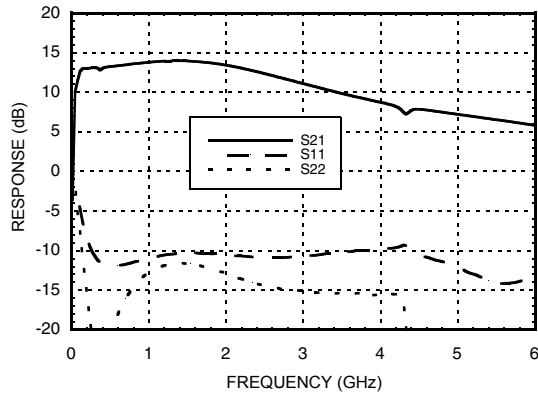
Parameter	Min	Typ.	Max	Min.	Typ.	Max.	Units
Frequency Range	0.2 - 2.0			2.0 - 4.0			GHz
Gain	10	13		5	10		dB
Gain Variation Over Temperature		0.01	0.02		0.01	0.02	dB/ °C
Input Return Loss		10			10		dB
Output Return Loss		13			15		dB
Reverse Isolation		22			20		dB
Output Power for 1 dB Compression (P1dB)	19	22		20	23		dBm
Output Third Order Intercept (IP3)	36	39		36	39		dBm
Noise Figure		2.5			2		dB
Supply Current (Icq)		155			155	175	mA

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

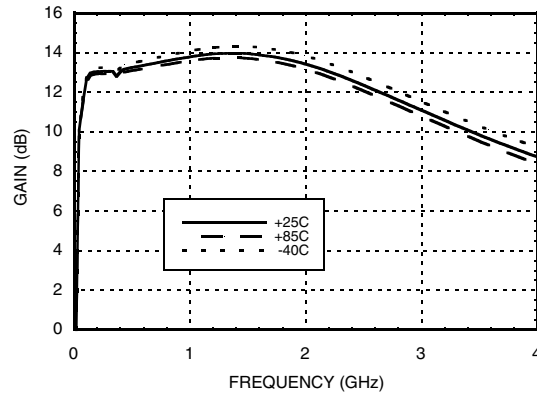


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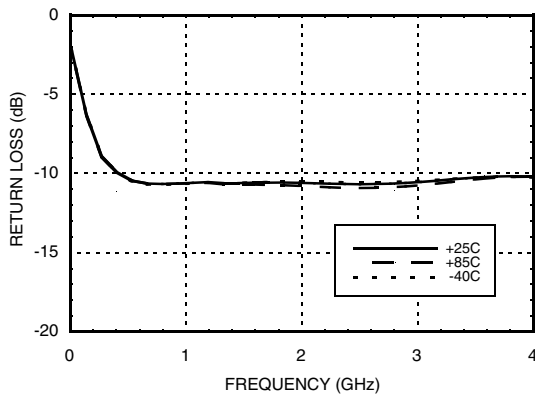
Broadband Gain & Return Loss



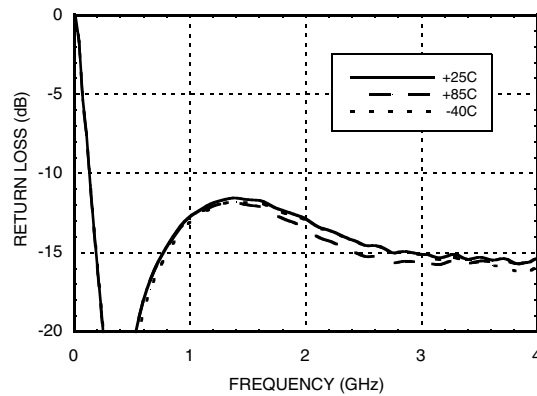
Gain vs. Temperature



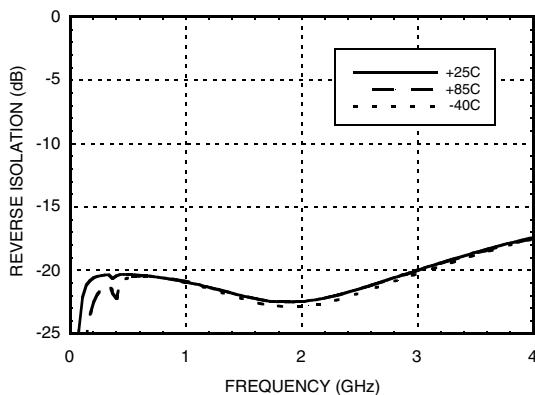
Input Return Loss vs. Temperature



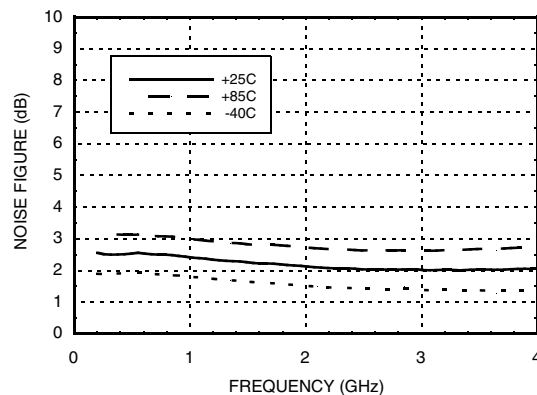
Output Return Loss vs. Temperature



Reverse Isolation vs. Temperature



Noise Figure vs. Temperature



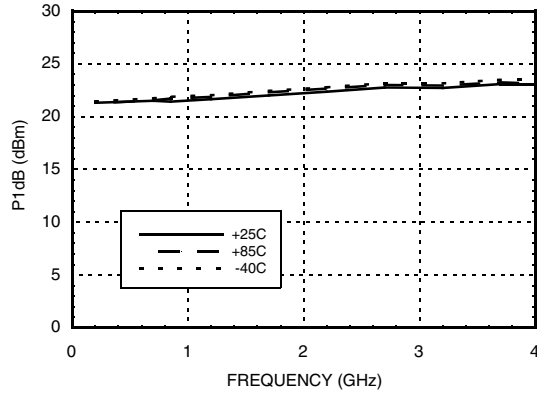
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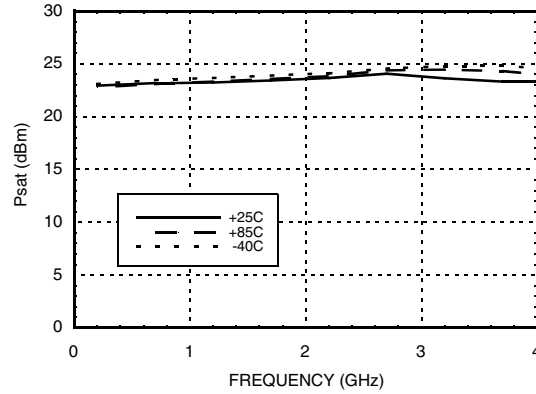


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Gain Block, 0.2 - 4.0 GHz**

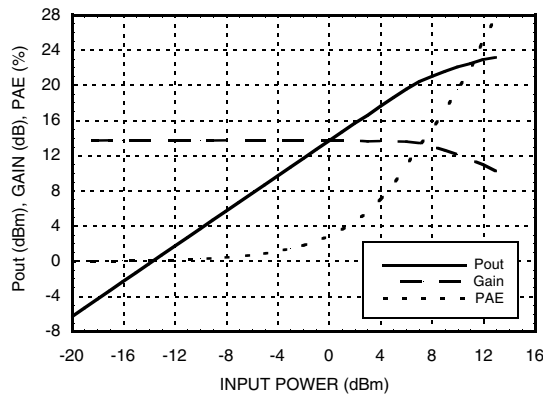
P1dB vs. Temperature



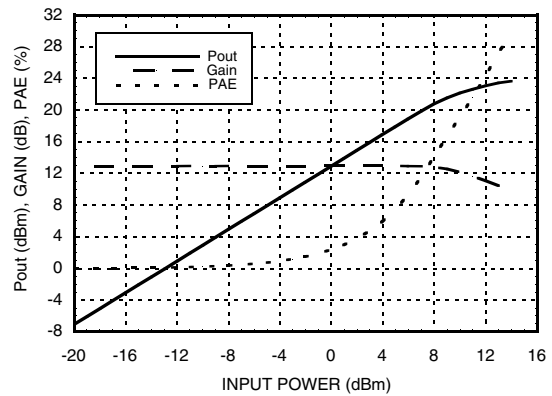
Psat vs. Temperature



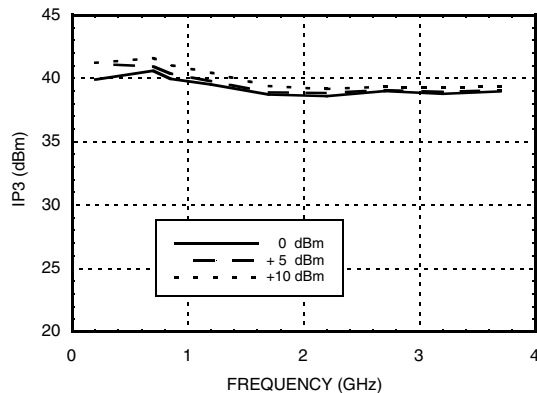
Power Compression @ 850 MHz



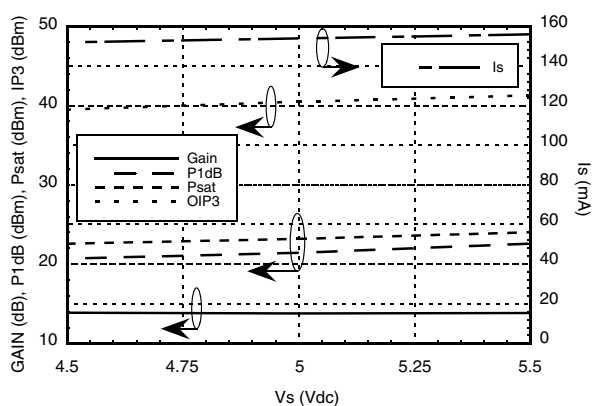
Power Compression @ 2200 MHz



Output IP3 vs. Input Tone Power



Gain, Power, Output IP3 & Supply Current vs. Supply Voltage @ 850 MHz



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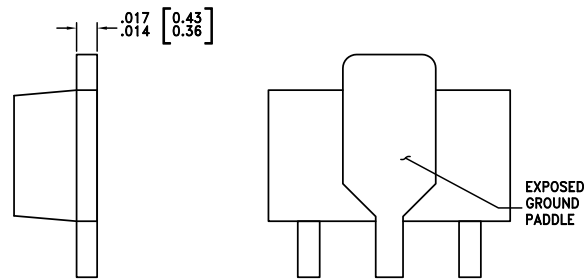
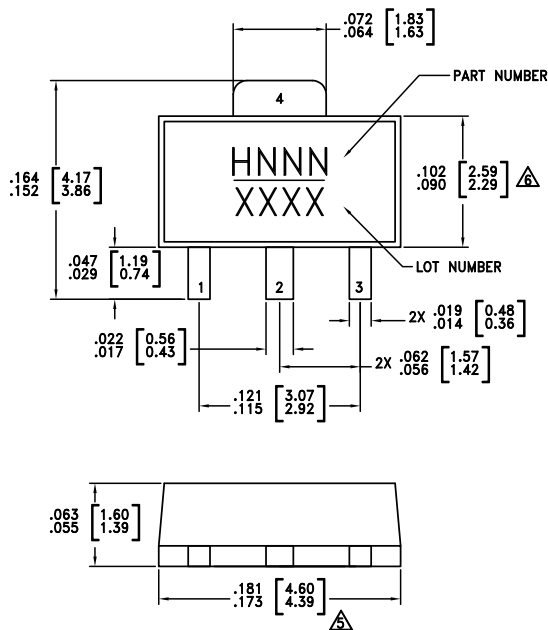
Absolute Maximum Ratings

Collector Bias Voltage (Vcc)	+5.5 Volts
RF Input Power (RFIN)(Vcc = +5 Vdc)	+16 dBm
Channel Temperature	150 °C
Continuous Pdiss (T = 85 °C) (derate 13.3 mW/°C above 85 °C)	0.86 W
Thermal Resistance (Channel to lead)	75.6 °C/W
Storage Temperature	-65 to +150 °C
Operating Temperature	-40 to +85 °C
ESD Sensitivity (HBM)	Class 1A



ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS

Outline Drawing



NOTES:

- PACKAGE BODY MATERIAL:
MOLDING COMPOUND MP-180S OR EQUIVALENT.
- LEAD MATERIAL: Cu w/ Ag SPOT PLATING.
- LEAD PLATING: 100% MATTE TIN.
- DIMENSIONS ARE IN INCHES [MILLIMETERS]
- Δ DIMENSION DOES NOT INCLUDE MOLDFLASH OF 0.15mm PER SIDE.
- Δ DIMENSION DOES NOT INCLUDE MOLDFLASH OF 0.25mm PER SIDE.
- ALL GROUND LEADS MUST BE SOLDERED TO PCB RF GROUND.

Package Information

Part Number	Package Body Material	Lead Finish	MSL Rating	Package Marking ^[3]
HMC636ST89	Low Stress Injection Molded Plastic	Sn/Pb Solder	MSL1 ^[1]	H636 XXXX
HMC636ST89E	RoHS-compliant Low Stress Injection Molded Plastic	100% matte Sn	MSL1 ^[2]	<u>H636</u> XXXX

[1] Max peak reflow temperature of 235 °C

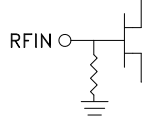
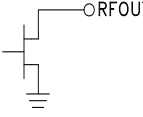

[2] Max peak reflow temperature of 260 °C

[3] 4-Digit lot number XXXX

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Pin Descriptions

Pin Number	Function	Description	Interface Schematic
1	RFIN	This pin is DC coupled. An off-chip DC blocking capacitor is required.	
3	RFOUT	RF Output and DC BIAS for the amplifier. See Application Circuit for off-chip components.	
2, 4	GND	These pins and package bottom must be connected to RF/DC ground.	

Application Circuit
