



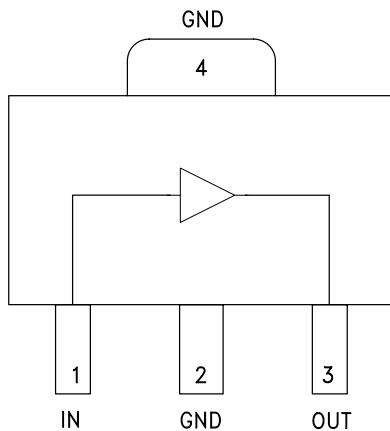
SiGe HBT GAIN BLOCK MMIC AMPLIFIER, DC - 5 GHz

Typical Applications

The HMC479ST89 / HMC479ST89E is an ideal RF/IF gain block & LO or PA driver:

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

Functional Diagram



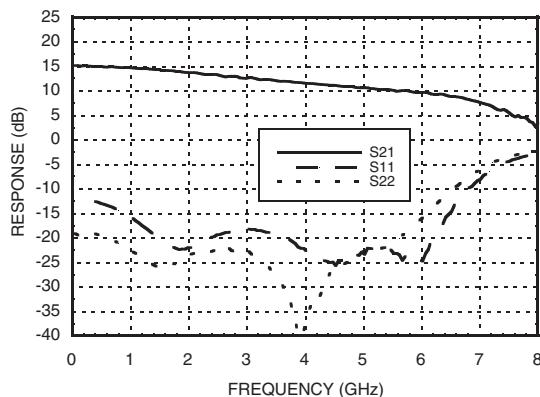
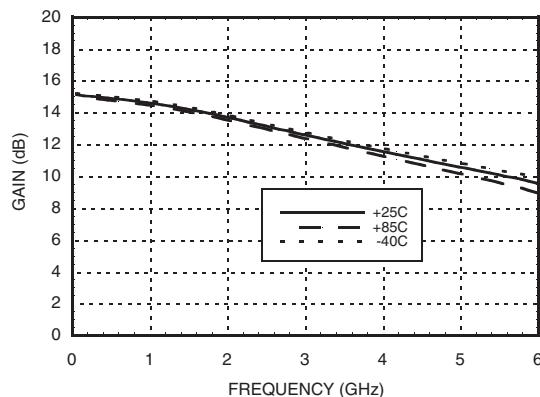
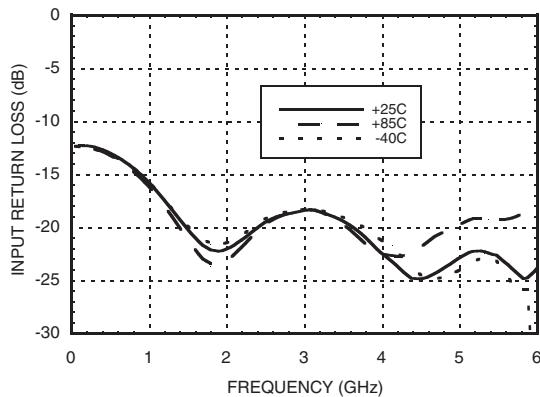
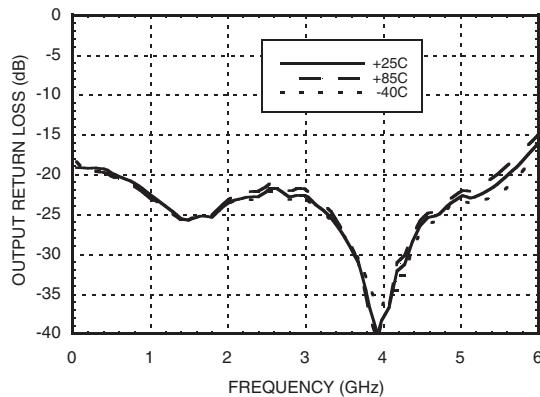
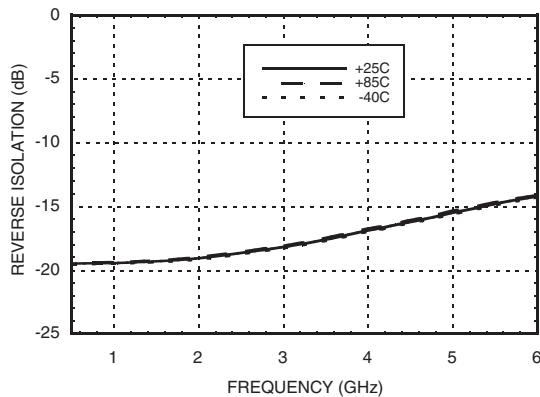
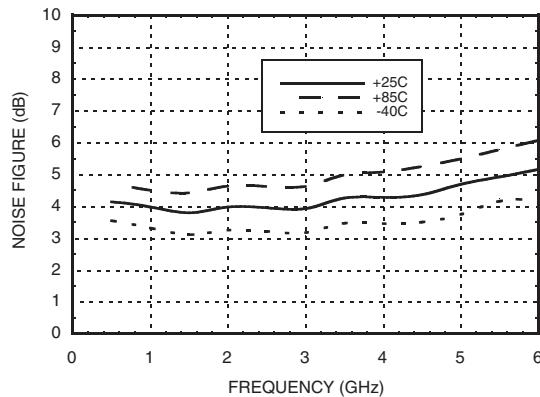
Electrical Specifications, Vs= 8.0 V, Rbias= 51 Ohm, TA = +25° C

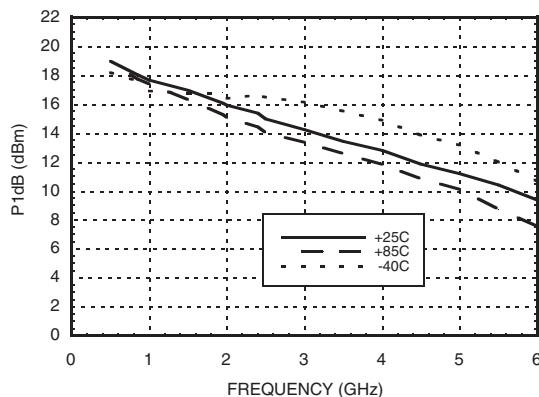
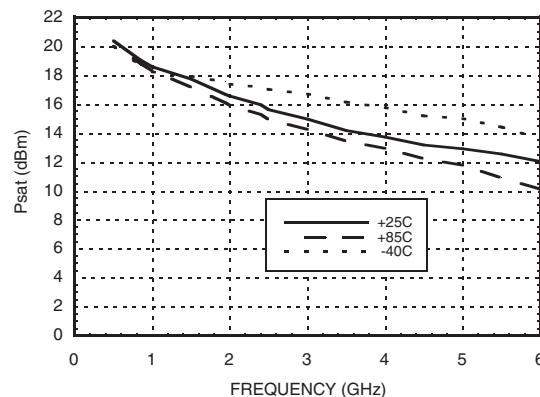
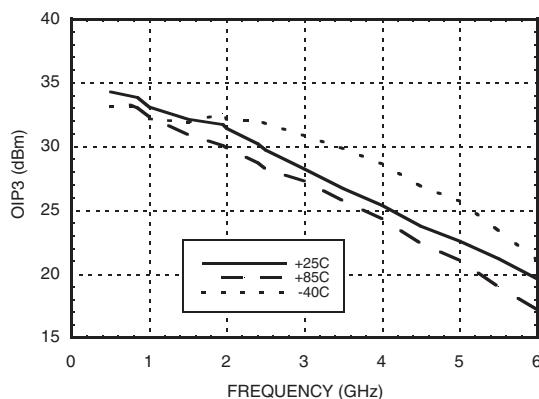
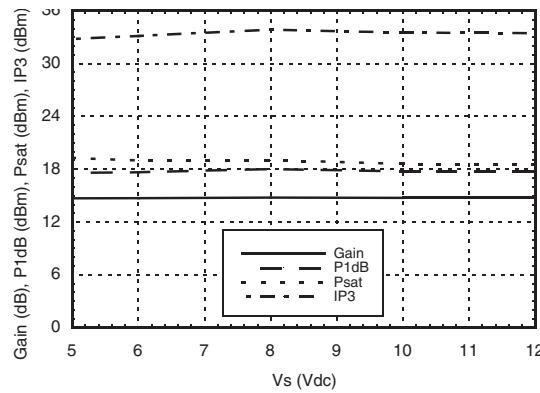
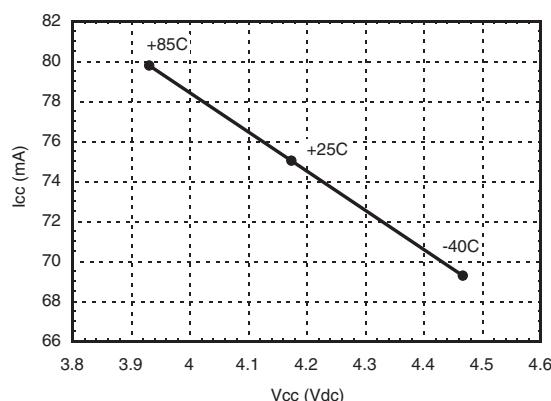
Parameter	Min.	Typ.	Max.	Units	
Gain	DC - 1.0 GHz 1.0 - 2.0 GHz 2.0 - 3.0 GHz 3.0 - 4.0 GHz 4.0 - 5.0 GHz	12.5 11.5 10.5 9.5 8.5	15 13.5 12.5 11.5 10.5		dB
Gain Variation Over Temperature	DC - 5 GHz		0.008	0.012	dB/ °C
Input Return Loss	DC - 1.0 GHz 1.0 - 2.0 GHz 2.0 - 4.0 GHz 4.0 - 5.0 GHz		12 16 18 22		dB
Output Return Loss	DC - 1.0 GHz 1.0 - 5.0 GHz		20 22		dB
Reverse Isolation	DC - 5 GHz		18		dB
Output Power for 1 dB Compression (P1dB)	0.5 - 1.0 GHz 1.0 - 2.0 GHz 2.0 - 3.0 GHz 3.0 - 4.0 GHz 4.0 - 5.0 GHz	15 13 11 10 8	18 16 14 13 11		dBm
Output Third Order Intercept (IP3) (Pout= 0 dBm per tone, 1 MHz spacing)	0.5 - 1.0 GHz 1.0 - 2.5 GHz 2.5 - 4.0 GHz 4.0 - 5.0 GHz		33 30 25 23		dBm
Noise Figure	DC - 3.0 GHz 3.0 - 5.0 GHz		4.0 4.5		dB
Supply Current (Icq)			75		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



**SiGe HBT GAIN BLOCK
MMIC AMPLIFIER, DC - 5 GHz**
8
AMPLIFIERS - DRIVER & GAIN BLOCK - SMT
P1dB vs. Temperature

Psat vs. Temperature

Output IP3 vs. Temperature

**Gain, Power & OIP3 vs. Supply Voltage
for Constant Icc = 72 mA @ 850 MHz**

**Vcc vs. Icc Over Temperature for
Fixed Vs = 8V, Rbias = 51 Ohms**


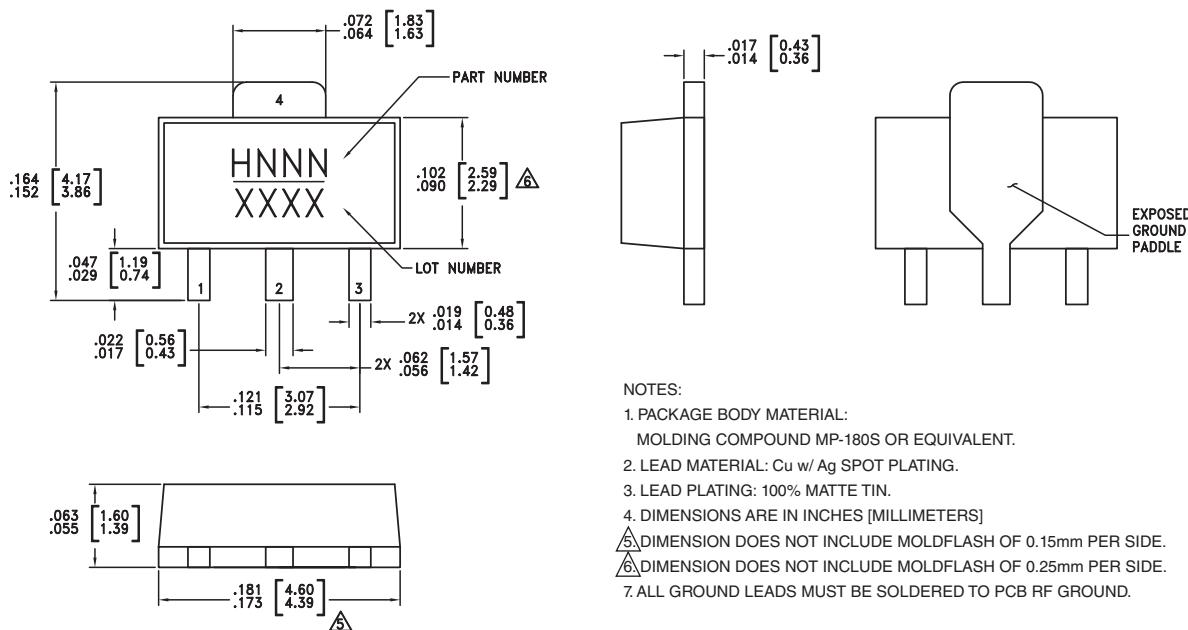


Absolute Maximum Ratings

Collector Bias Voltage (Vcc)	+6.0 Vdc
RF Input Power (RFIN)(Vcc = +4.2 Vdc)	+17 dBm
Junction Temperature	150 °C
Continuous Pdiss (T = 85 °C) (derate 14.76 mW/°C above 85 °C)	0.960 W
Thermal Resistance (junction to lead)	67.6 °C/W
Storage Temperature	-65 to +150 °C
Operating Temperature	-40 to +85 °C


**ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS**

Outline Drawing



Package Information

Part Number	Package Body Material	Lead Finish	MSL Rating	Package Marking ^[3]
HMC479ST89	Low Stress Injection Molded Plastic	Sn/Pb Solder	MSL1 ^[1]	H479 XXXX
HMC479ST89E	RoHS-compliant Low Stress Injection Molded Plastic	100% matte Sn	MSL1 ^[2]	H479 XXXX

[1] Max peak reflow temperature of 235 °C

[2] Max peak reflow temperature of 260 °C

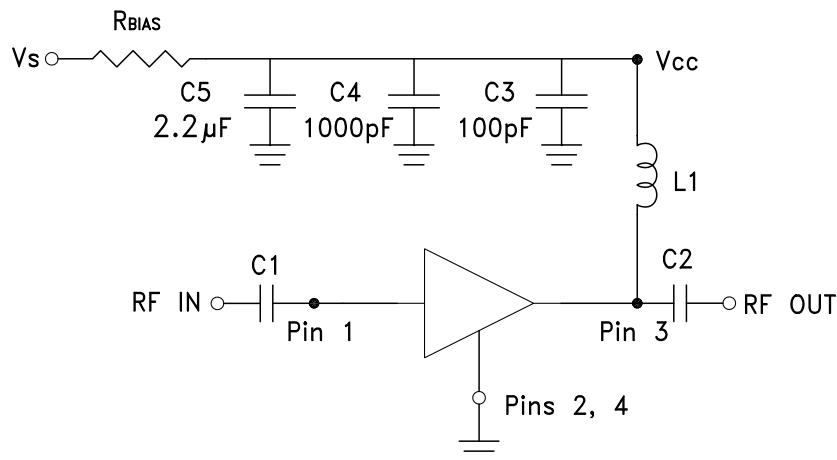
[3] 4-Digit lot number XXXX



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 (Vcc) for the output stage.	
2, 4	GND	These pins and package bottom must be connected to RF/DC ground.	

Application Circuit



Recommended Bias Resistor Values for $I_{cc} = 75 \text{ mA}$, $R_{bias} = (V_s - V_{cc}) / I_{cc}$

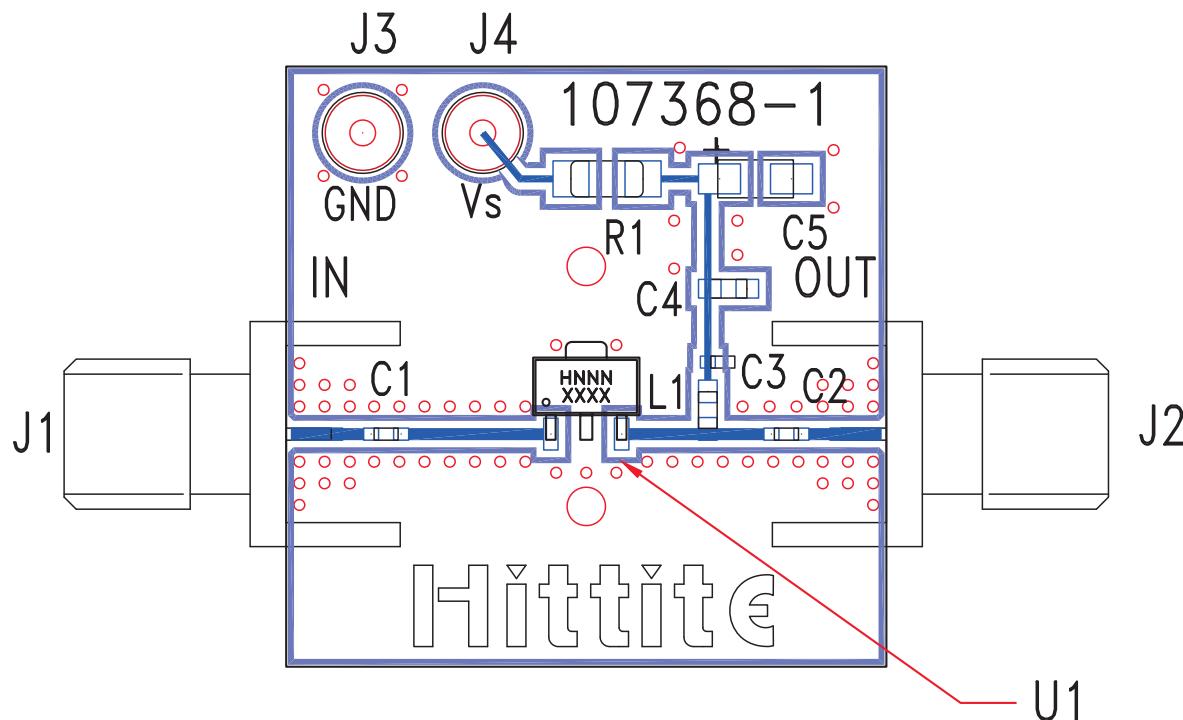
Supply Voltage (Vs)	5V	6V	8V	10V	12V
R _{bias} VALUE	13 Ω	27 Ω	51 Ω	82 Ω	110 Ω
R _{bias} POWER RATING	1/8 W	1/4 W	1/2 W	1/2 W	1 W

Note:

1. External blocking capacitors are required on RFIN and RFOUT.
2. R_{bias} provides DC bias stability over temperature.

Recommended Component Values for Key Application Frequencies

Component	Frequency (MHz)						
	50	900	1900	2200	2400	3500	5000
L1	270 nH	56 nH	18 nH	18 nH	15 nH	8.2 nH	6.8 nH
C1, C2	0.01 μF	100 pF					


Evaluation PCB

List of Materials for Evaluation PCB 108323 ^[1]

Item	Description
J1 - J2	PCB Mount SMA Connector
J3 - J4	DC Pin
C1, C2	Capacitor, 0402 Pkg.
C3	100 pF Capacitor, 0402 Pkg.
C4	1000 pF Capacitor, 0603 Pkg.
C5	2.2 μ F Capacitor, Tantalum
R1	Resistor, 1210 Pkg.
L1	Inductor, 0603 Pkg.
U1	HMC479ST89 / HMC479ST89E
PCB [2]	107368 Evaluation PCB

[1] Reference this number when ordering complete evaluation PCB

[2] Circuit Board Material: Rogers 4350

The circuit board used in the final application should use RF circuit design techniques. Signal lines should have 50 Ohm impedance while the package ground leads and package bottom 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 board should be mounted to an appropriate heat sink. The evaluation circuit board shown is available from Hittite upon request.

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