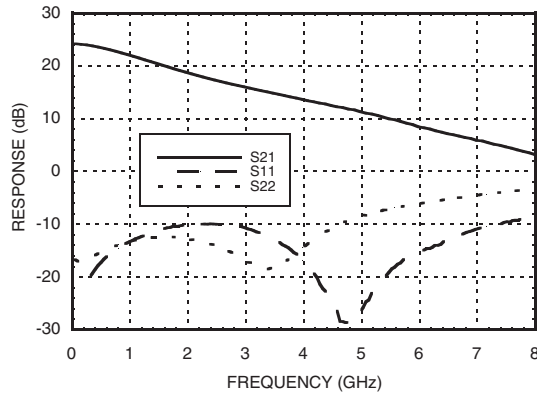
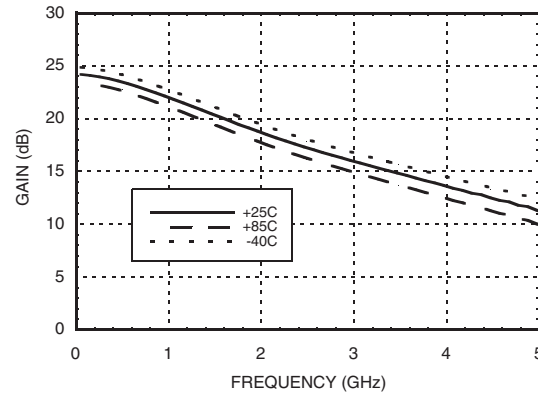


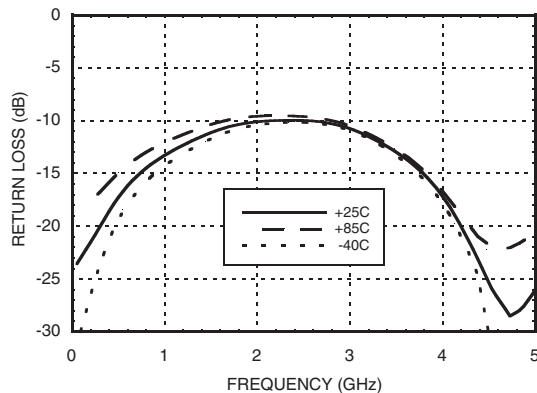
Broadband Gain & Return Loss



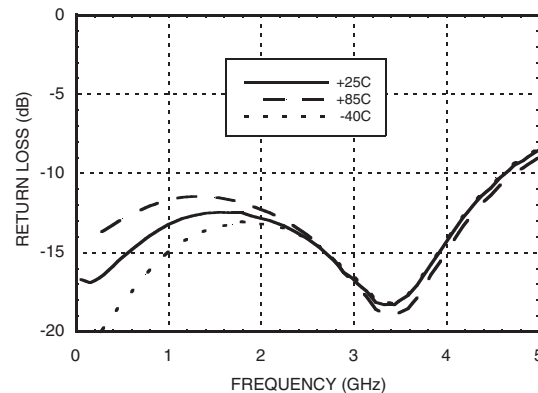
Gain vs. Temperature



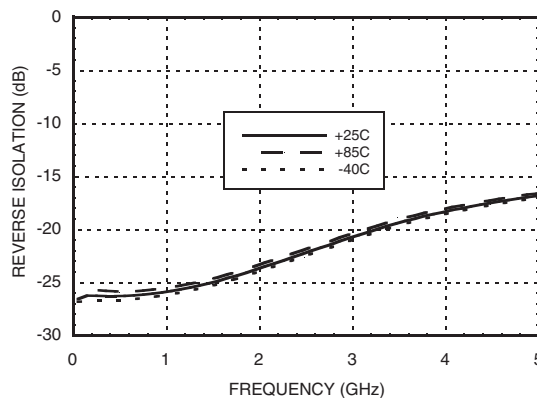
Input Return Loss vs. Temperature



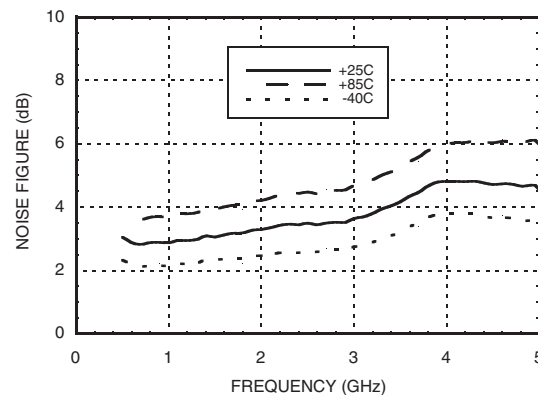
Output Return Loss vs. Temperature

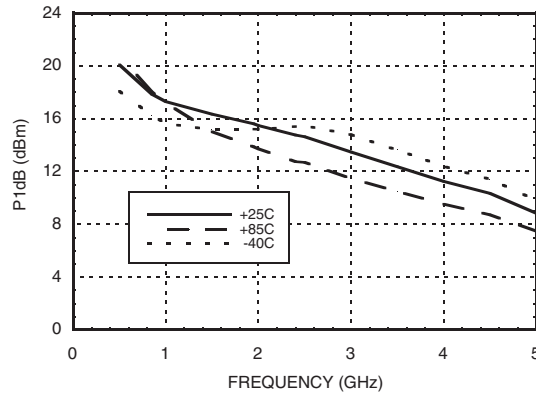
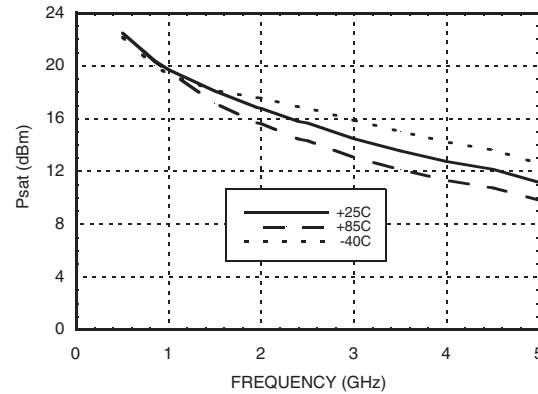
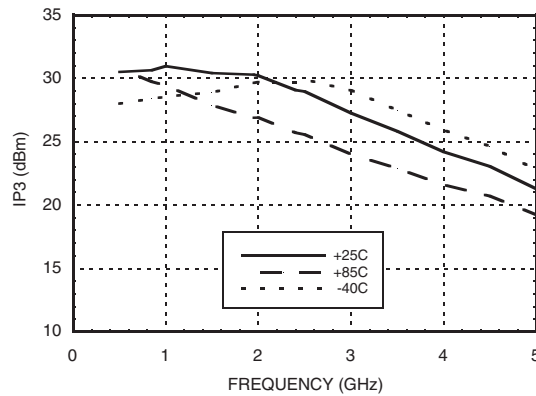
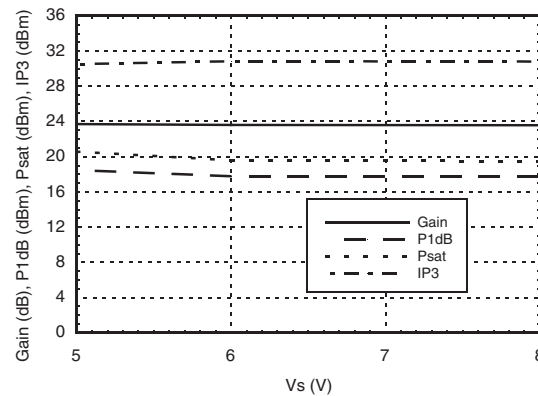
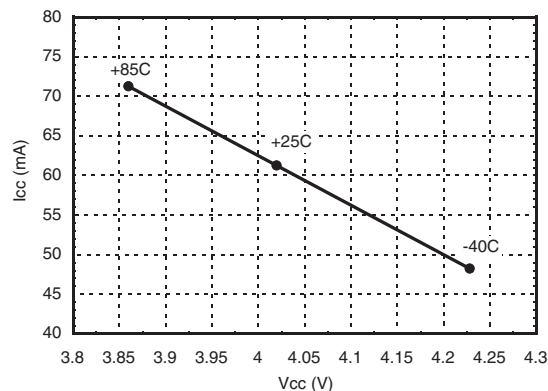
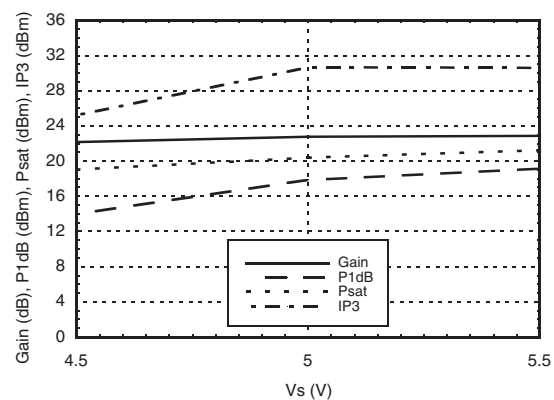


Reverse Isolation vs. Temperature



Noise Figure vs. Temperature



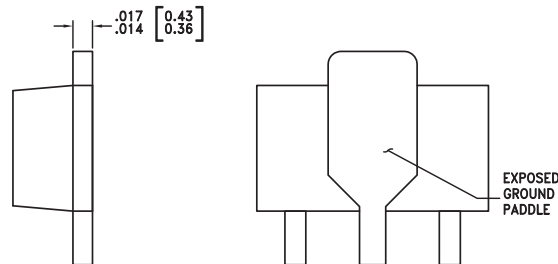
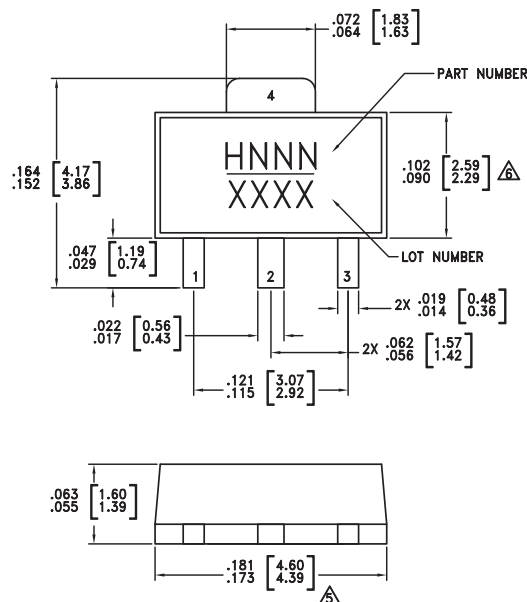
P1dB vs. Temperature

Psat vs. Temperature

Output IP3 vs. Temperature

Gain, Power & Output IP3 vs. Supply Voltage for Constant Icc= 62 mA @ 850 MHz

Vcc vs. Icc Over Temperature for Fixed Vs= 5V, RBIAS= 18 Ohms

Gain, Power & Output IP3 vs. Supply Voltage for Rs = 18 Ohms @ 850 MHz



**SiGe HBT GAIN BLOCK
MMIC AMPLIFIER, DC - 4 GHz**
Absolute Maximum Ratings

Collector Bias Voltage (Vcc)	+6 Vdc
RF Input Power (RFIN)(Vcc = +4.2 Vdc)	+5 dBm
Junction Temperature	150 °C
Continuous P _{diss} (T = 85 °C) (derate 9.5 mW/°C above 85 °C)	0.615 W
Thermal Resistance (junction to lead)	105.6 °C/W
Storage Temperature	-65 to +150 °C
Operating Temperature	-40 to +85 °C
ESD Sensitivity (HBM)	Class 1C



**ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS**

Outline Drawing

NOTES:

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

Package Information

Part Number	Package Body Material	Lead Finish	MSL Rating	Package Marking ^[3]
HMC478ST89	Low Stress Injection Molded Plastic	Sn/Pb Solder	MSL1 ^[1]	H478 XXXX
HMC478ST89E	RoHS-compliant Low Stress Injection Molded Plastic	100% matte Sn	MSL1 ^[2]	H478 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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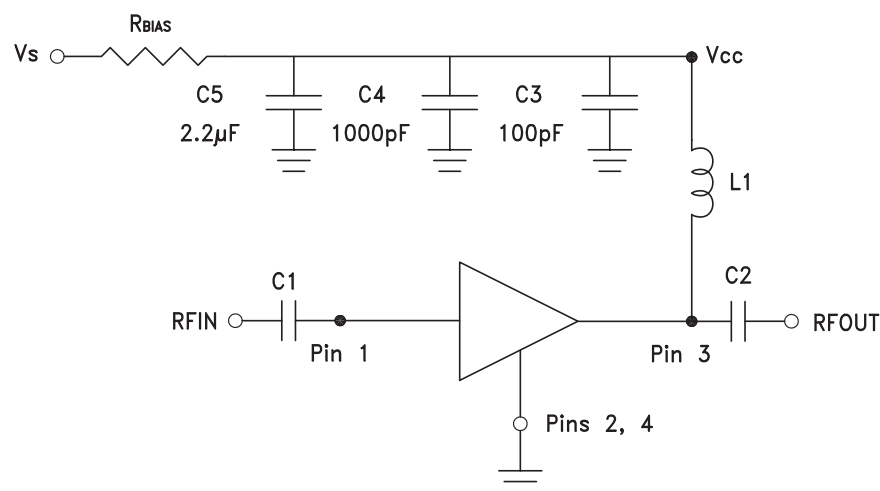


**SiGe HBT GAIN BLOCK
MMIC AMPLIFIER, DC - 4 GHz**

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 $I_{cc} = 62 \text{ mA}$, $R_{bias} = (V_s - V_{cc}) / I_{cc}$**

Supply Voltage (Vs)	5V	6V	8V
RBIAS VALUE	18 Ω	35 Ω	67 Ω
RBIAS POWER RATING	1/8 W	1/4 W	1/2 W

Note:

1. External blocking capacitors are required on *RFIN* and *RFOUT*.
2. *RBIAS* provides DC bias stability over temperature.

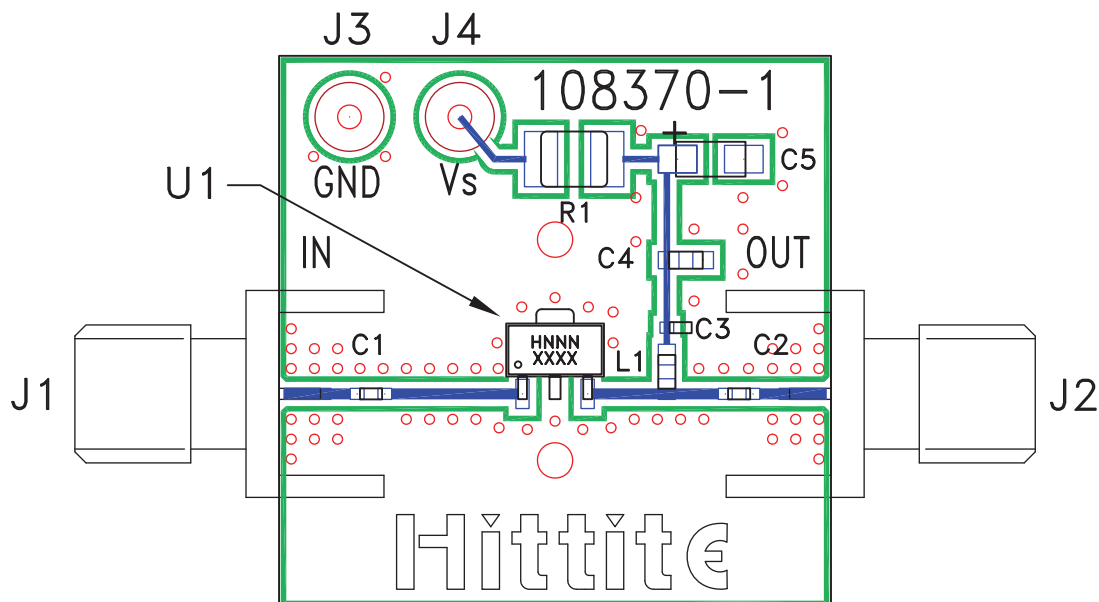
Recommended Component Values for Key Application Frequencies

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

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Evaluation PCB



List of Materials for Evaluation PCB 110161 [1]

Item	Description
J1 - J2	PC Mount SMA Connector
J3 - J4	DC Pin
C1 - C3	100 pF Capacitor, 0402 Pkg.
C4	1000 pF Capacitor, 0603 Pkg.
C5	2.2 μ F Capacitor, Tantalum
R1	Resistor, 1210 Pkg.
L1	18 nH Inductor, 0603 Pkg.
U1	HMC478ST89 / HMC478ST89E
PCB [2]	108370 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.