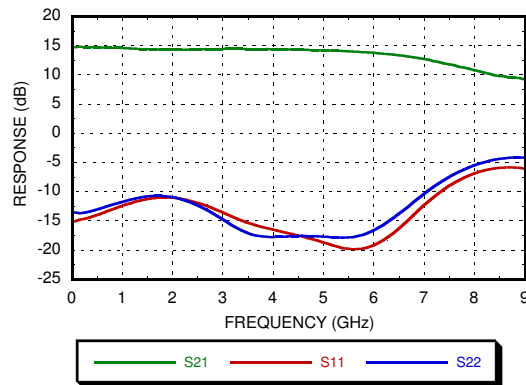
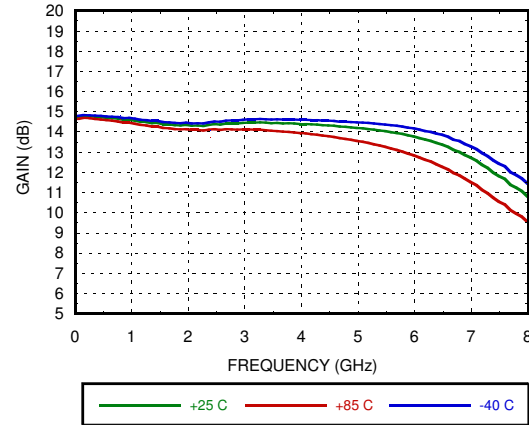


**InGaP HBT GAIN BLOCK
MMIC AMPLIFIER, DC - 6 GHz**

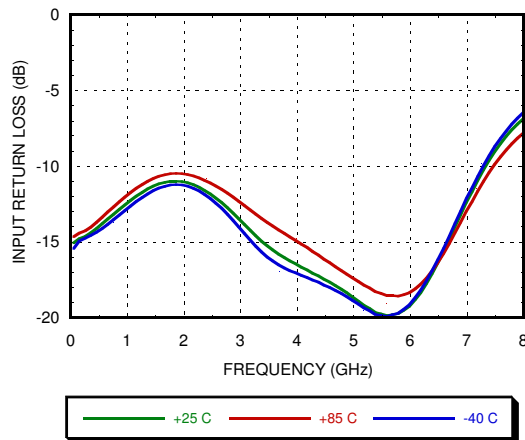
Gain & Return Loss



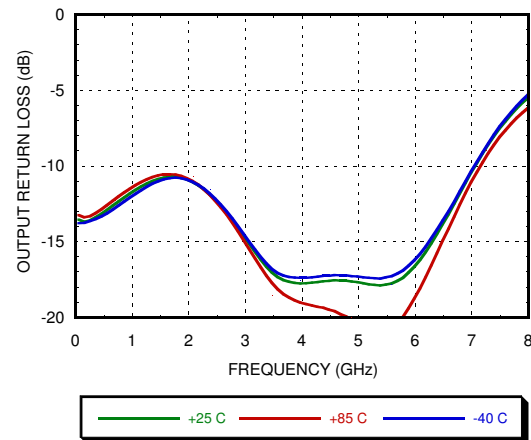
Gain vs. Temperature



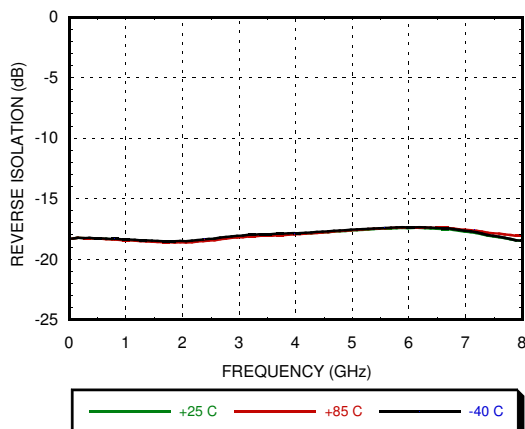
Input Return Loss vs. Temperature



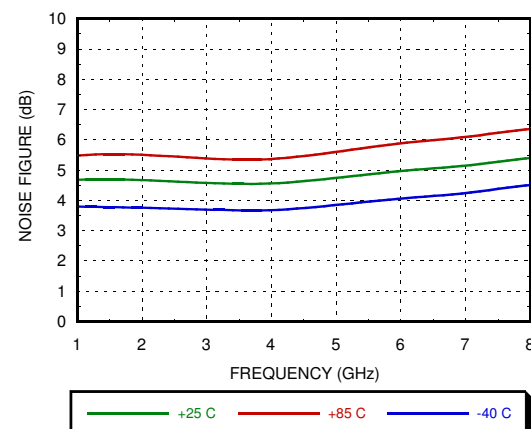
Output Return Loss vs. Temperature

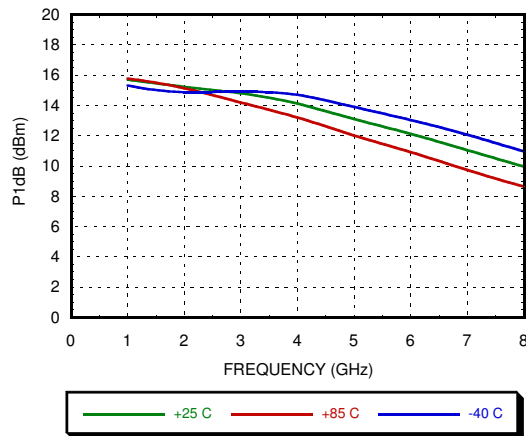
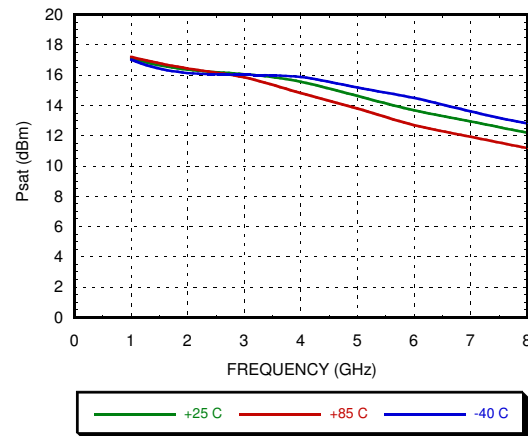
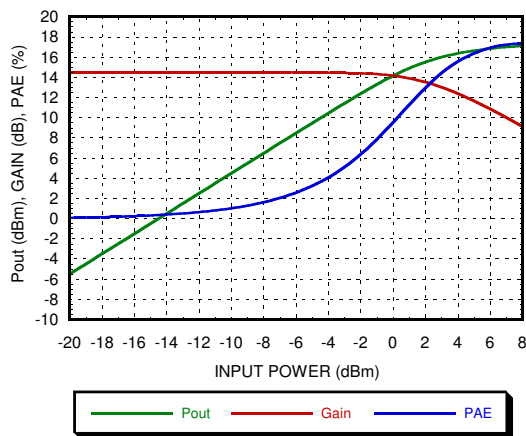
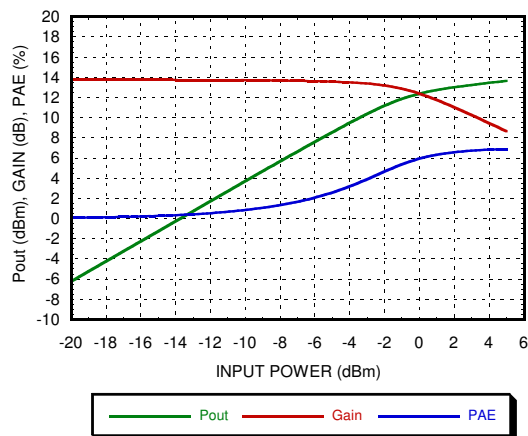
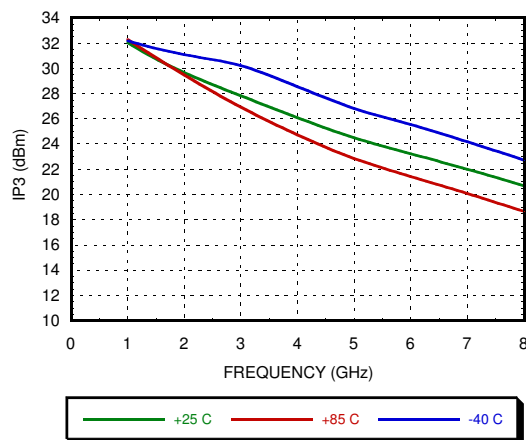
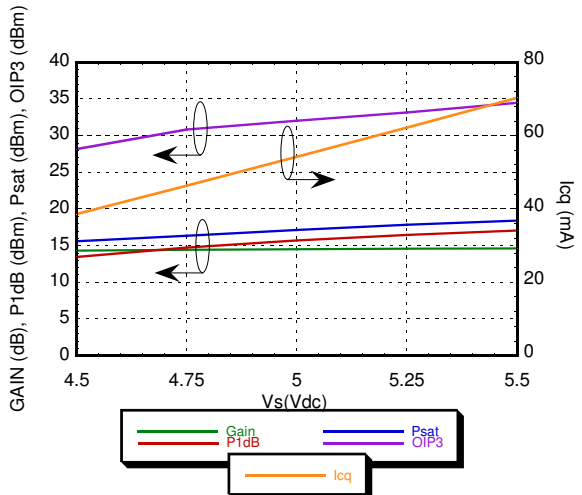


Reverse Isolation vs. Temperature



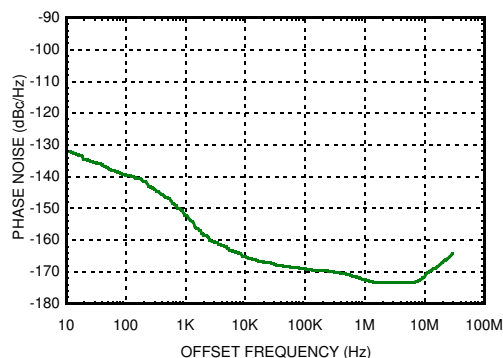
Noise Figure vs. Temperature



**InGaP HBT GAIN BLOCK
MMIC AMPLIFIER, DC - 6 GHz**
P1dB vs. Temperature

Psat vs. Temperature

Power Compression @ 1 GHz

Power Compression @ 6 GHz

Output IP3 vs. Temperature

**Gain, Power, Output IP3 & Supply Current
vs. Supply Voltage @ 1 GHz**


**InGaP HBT GAIN BLOCK
MMIC AMPLIFIER, DC - 6 GHz**

**Additive Phase Noise Vs Offset Frequency,
RF Frequency = 2 GHz,
RF Input Power = 1 dBm (P1dB)**



InGaP HBT GAIN BLOCK MMIC AMPLIFIER, DC - 6 GHz

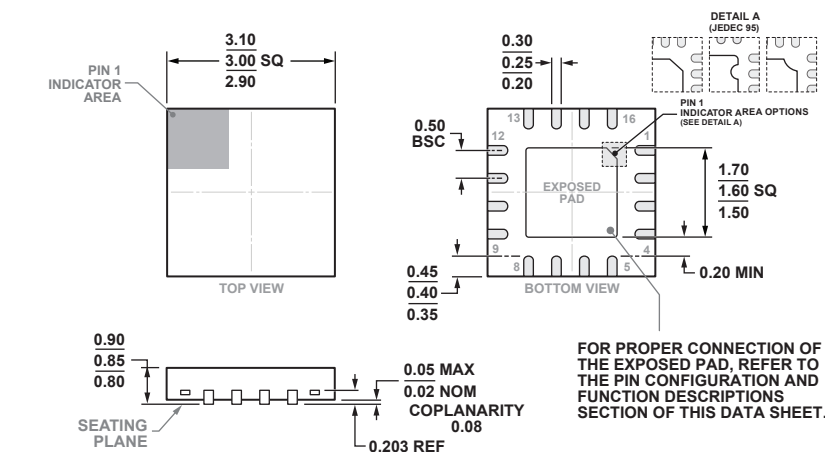
Absolute Maximum Ratings

Collector Bias Voltage (Vcc)	+7V
RF Input Power (RFIN)(Vs = +5V)	+10 dBm
Junction Temperature	150 °C
Continuous P _{diss} (T = 85 °C) (derate 5.21 mW/°C above 85 °C)	0.339 W
Thermal Resistance (junction to ground paddle)	192 °C/W
Storage Temperature	-65 to +150 °C
Operating Temperature	-40 to +85 °C
ESD Sensitivity (HBM)	Class 1A, Passed 250V



**ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS**

Outline Drawing



COMPLIANT TO JEDEC STANDARDS MO-220-VEED-4

16-Lead Lead Frame Chip Scale Package [LFCSP]
3 mm x 3 mm Body and 0.85 mm Package Height
(CP-16-50)

Dimensions shown in millimeters

Package Information

Part Number	Package Body Material	Lead Finish	MSL Rating	Package Marking ^[3]
HMC311LP3	Low Stress Injection Molded Plastic	Sn/Pb Solder	MSL1 ^[1]	311 XXXX
HMC311LP3E	RoHS-compliant Low Stress Injection Molded Plastic	100% matte Sn	MSL1 ^[2]	311 XXXX

[1] Max peak reflow temperature of 235 °C

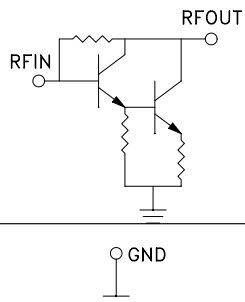
[2] Max peak reflow temperature of 260 °C

[3] 4-Digit lot number XXXX

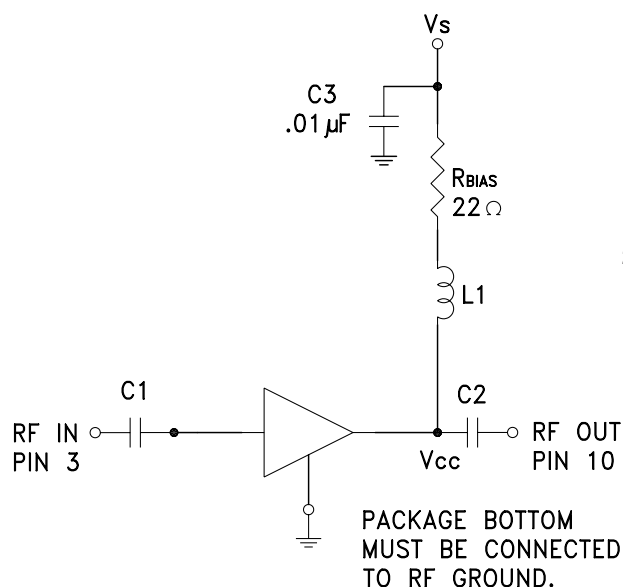
For price, delivery, and to place orders: Analog Devices, Inc., One Technology Way, P.O. Box 9106, Norwood, MA 02062-9106
Phone: 781-329-4700 • Order online at www.analog.com
Application Support: Phone: 1-800-ANALOG-D

InGaP HBT GAIN BLOCK MMIC AMPLIFIER, DC - 6 GHz

Pin Descriptions

Pin Number	Function	Description	Interface Schematic
1, 2, 4 - 9, 11 - 16	N/C	This pin may be connected to RF ground.	
3	RFIN	This pin is DC coupled. An off chip DC blocking capacitor is required.	
10	RFOUT	RF output and DC Bias for the output stage.	
	GND	Package bottom must be connected to RF/DC ground.	

Application Circuit



Note:

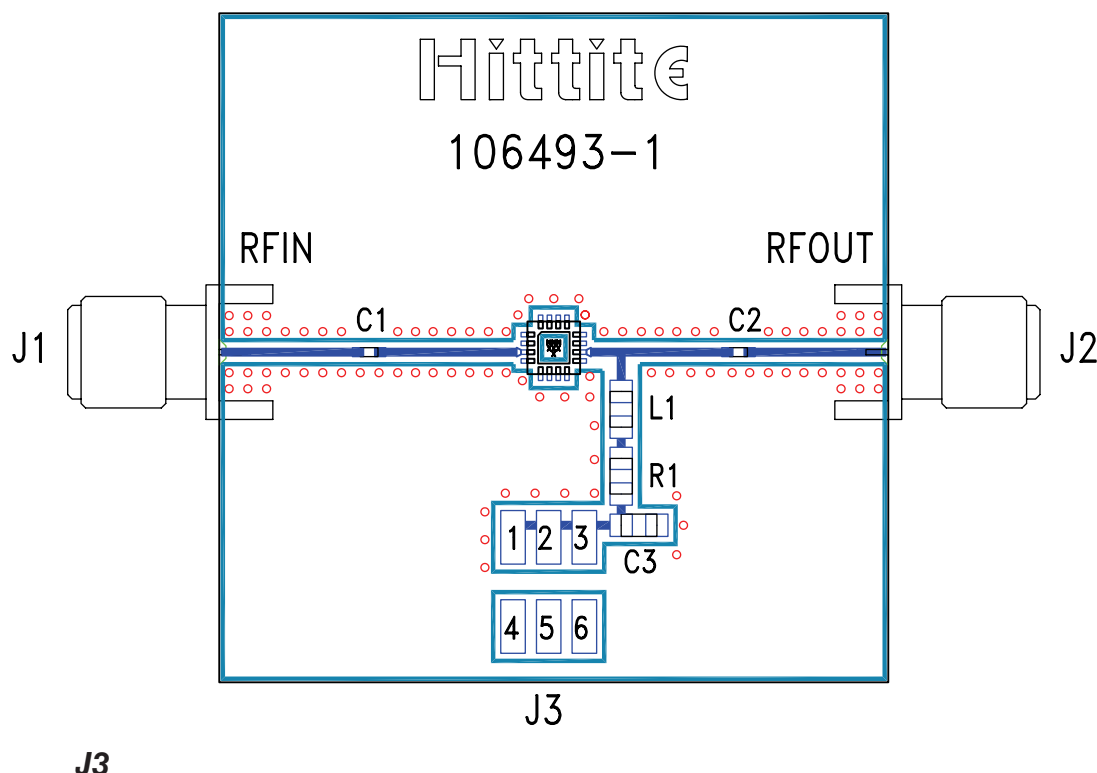
1. Select Rbias to achieve Icq using equation below,
Rbias $\geq$ 22 Ohm.
2. External blocking capacitors are required on
RFIN and RFOUT.

$$I_{cq} = \frac{V_s - 3.8}{R_{bias}}$$

Recommended Component Values

Component	Frequency (MHz)							
	50	900	1900	2200	2400	3500	5200	5800
L1	270 nH	56 nH	18 nH	18 nH	15 nH	8.2 nH	3.3 nH	3.3 nH
C1, C2	0.01 μ F	100 pF	100 pF	100 pF	100 pF	100 pF	100 pF	100 pF

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**InGaP HBT GAIN BLOCK
MMIC AMPLIFIER, DC - 6 GHz**
Evaluation PCB


Pin Number	Description
1, 2, 3	Vs
4, 5, 6	GND

List of Materials for Evaluation PCB 106789 ^[1]

Item	Description
J1 - J2	PC Mount SMA Connector
J3	2 mm DC Header
C1, C2	Capacitor, 0402 Pkg.
C3	10,000 pF Capacitor, 0805 Pkg.
R1	22 Ohm Resistor, 0805 Pkg.
L1	Inductor, 22 nH 0805 Pkg.
U1	HMC311LP3 / HMC311LP3E
PCB ^[2]	106493 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 exposed paddle 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 Analog Devices upon request.

***InGaP HBT GAIN BLOCK
MMIC AMPLIFIER, DC - 6 GHz*****Notes**