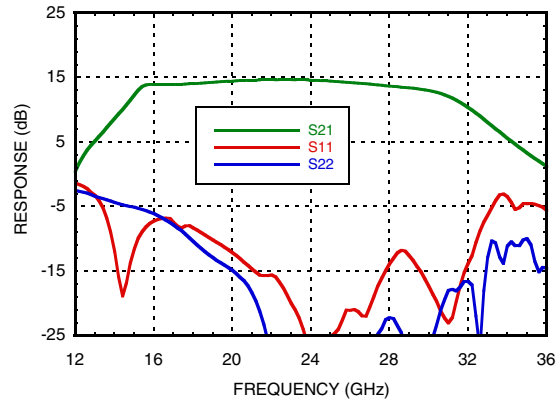


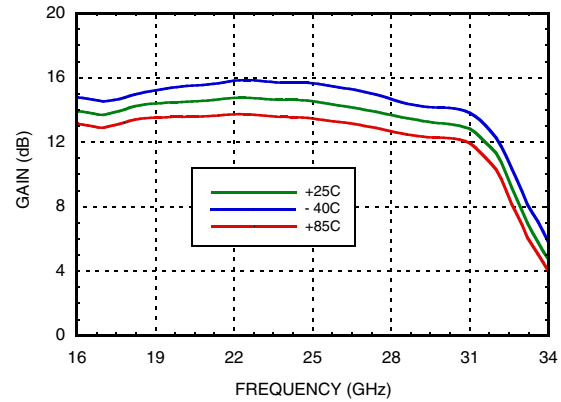
For price, delivery, and to place orders: Analog Devices, Inc.,  
One Technology Way, P.O. Box 9106, Norwood, MA 02062-9106  
Phone: 781-329-4700 • Order online at [www.analog.com](http://www.analog.com)  
Application Support: Phone: 1-800-ANALOG-D

**GAAS PHEMT MMIC LOW NOISE  
AMPLIFIER, 18 - 31 GHz**

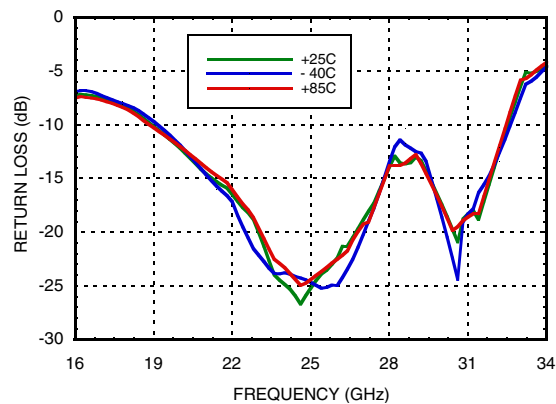
**Broadband Gain & Return Loss**



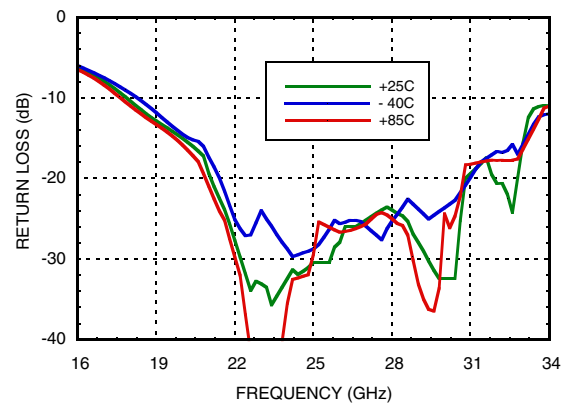
**Gain vs. Temperature**



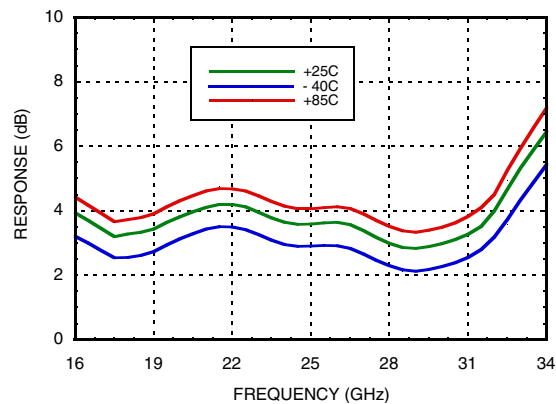
**Input Return Loss vs. Temperature**



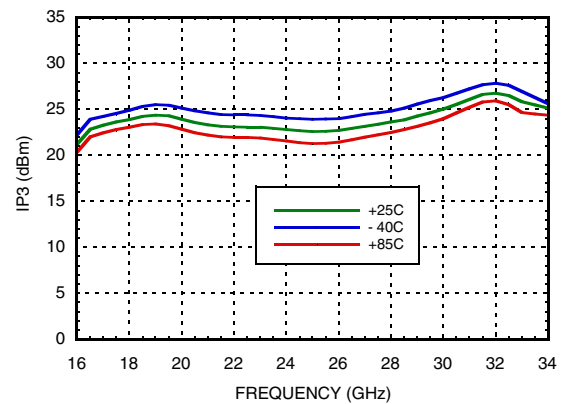
**Output Return Loss vs. Temperature**



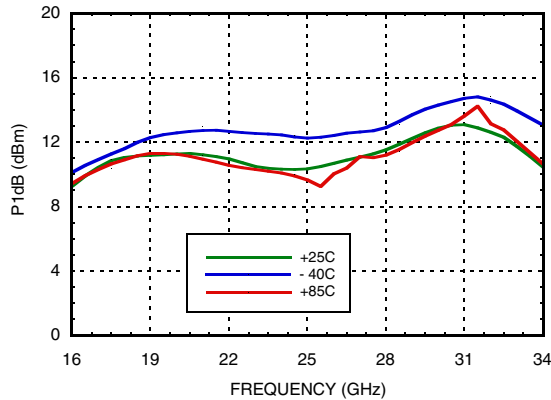
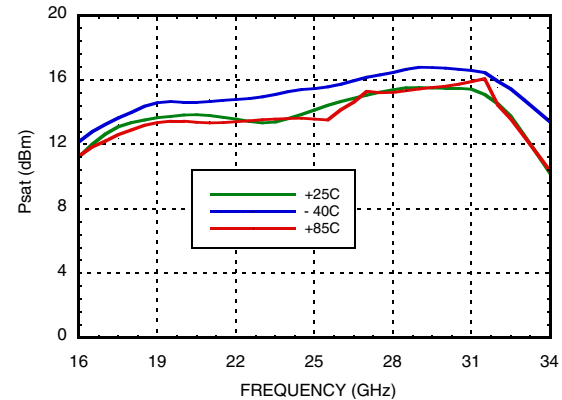
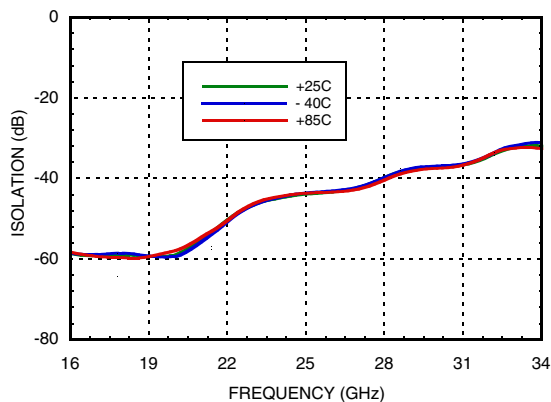
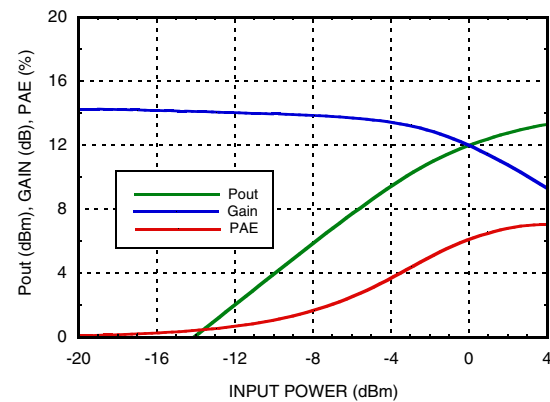
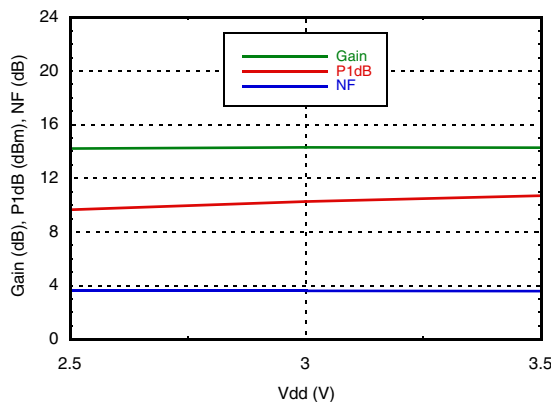
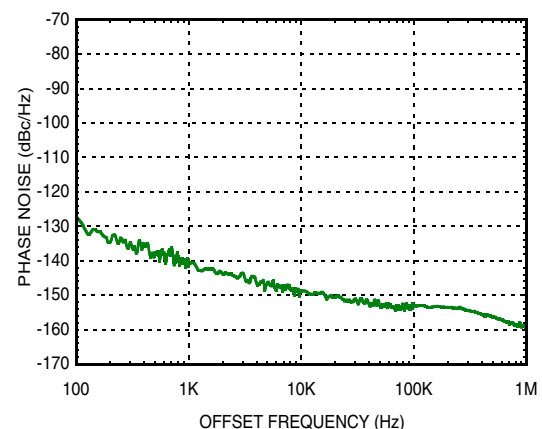
**Noise Figure vs. Temperature**



**Output IP3 vs. Temperature**



# GAAS PHEMT MMIC LOW NOISE AMPLIFIER, 18 - 31 GHz

**P1dB vs. Temperature**

**Psat vs. Temperature**

**Reverse Isolation vs. Temperature**

**Power Compression @ 24 GHz**

**Gain, Noise Figure & Power vs.  
Supply Voltage @ 24 GHz**

**Additive Phase Noise Vs Offset Frequency,  
RF Frequency = 26.5 GHz,  
RF Input Power = 5 dBm (Psat)**


## GAAS PHEMT MMIC LOW NOISE AMPLIFIER, 18 - 31 GHz

### Absolute Maximum Ratings

Drain Bias Voltage (Vdd1, Vdd2, Vdd3)	+3.5 Vdc
RF Input Power (RFIN)(Vdd = +3.0 Vdc)	+20 dBm
Channel Temperature	175 °C
Continuous P <sub>diss</sub> (T= 85 °C) (derate 13 mW/°C above 85 °C)	1.2 W
Thermal Resistance (channel to package bottom)	76.9 °C/W
Storage Temperature	-65 to 150 °C
Operating Temperature	-40 to 85 °C
ESD Sensitivity (HBM)	Class 1B

### Typical Supply Current vs. Vdd

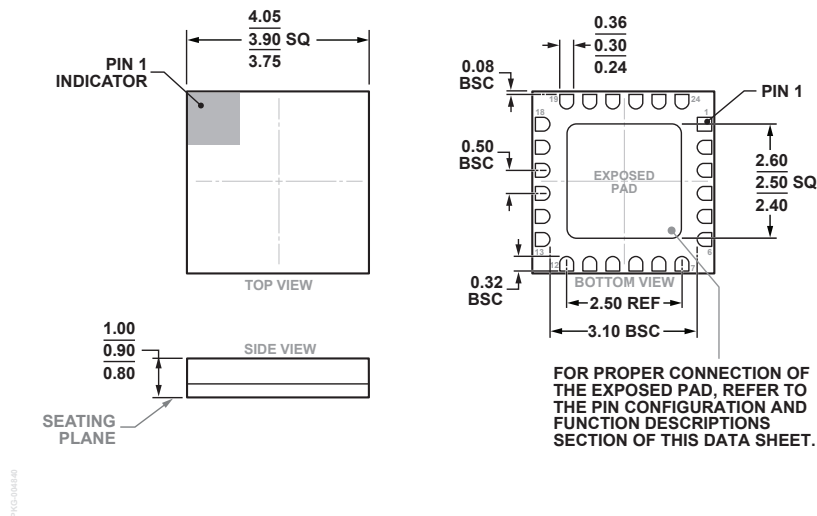
Vdd (V)	I <sub>dd</sub> (mA)
2.5	72
3.0	75
3.5	78

Note: Amplifier will operate over full voltage ranges shown above.



**ELECTROSTATIC SENSITIVE DEVICE  
OBSERVE HANDLING PRECAUTIONS**

### Outline Drawing



24-Terminal Ceramic Leadless Chip Carrier [LCC]  
(E-24-1)

Dimensions shown in millimeters.

### Package Information


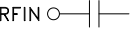
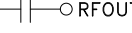
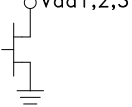
Part Number	Package Body Material	Lead Finish	MSL Rating	Package Marking <sup>[2]</sup>
HMC519LC4	Alumina, White	Gold over Nickel	MSL3 <sup>[1]</sup>	H519 XXXX

[1] Max peak reflow temperature of 260 °C

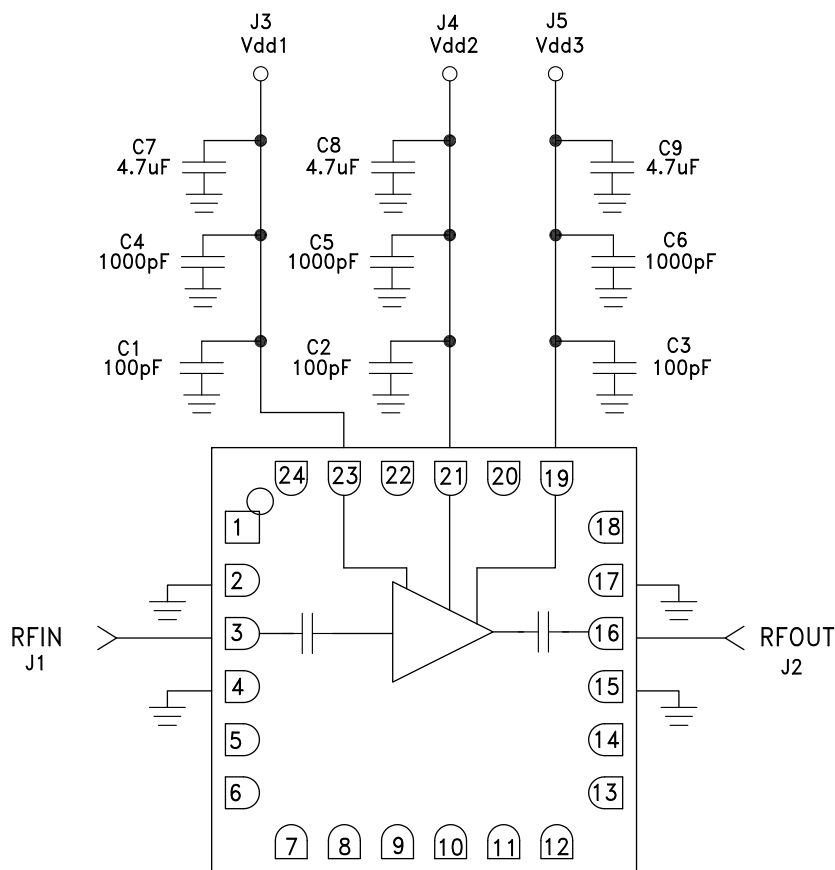
[2] 4-Digit lot number XXXX

# GAAS PHEMT MMIC LOW NOISE AMPLIFIER, 18 - 31 GHz

## Pad Descriptions

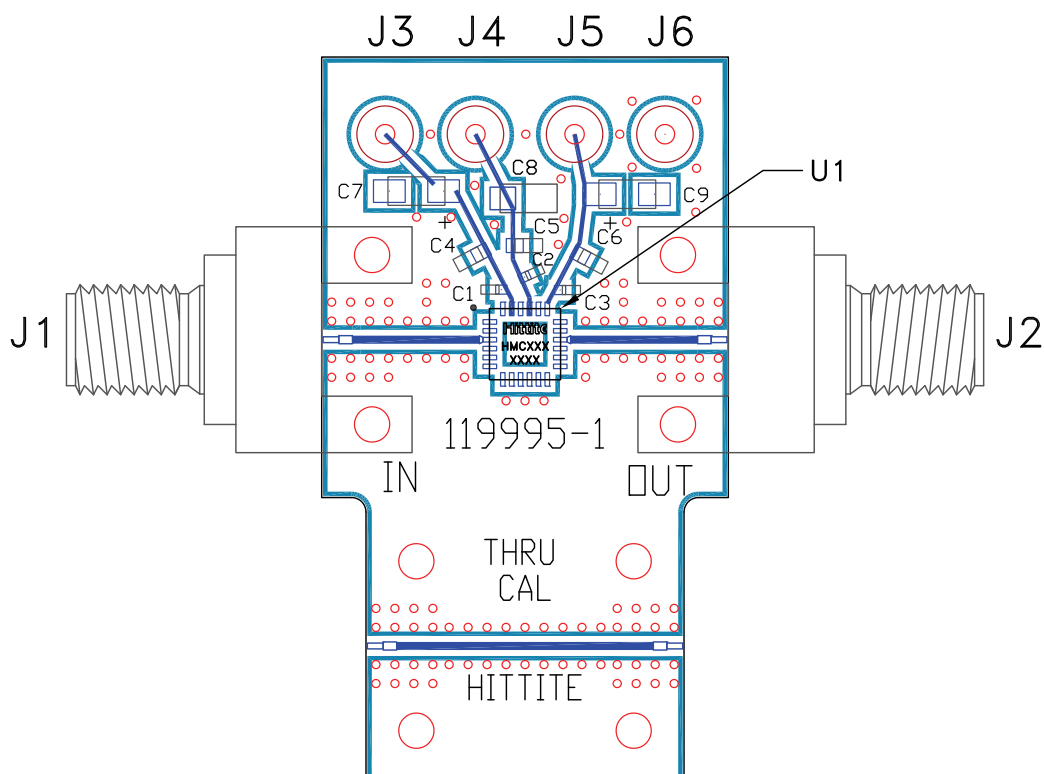
Pad Number	Function	Description	Interface Schematic
1, 5 - 14, 18, 20, 22, 24	N/C	Not Connected	
2, 4, 15, 17	GND	Package bottom has exposed metal paddle that must be connected to RF/DC ground.	
3	RFIN	This pad is AC coupled and matched to 50 Ohms	
16	RFOUT	This pad is AC coupled and matched to 50 Ohms	
19, 21, 23	Vdd3, Vdd2, Vdd1	Power Supply Voltage for the amplifier. See application circuit for required external components.	

## Application Circuit



**GAAS PHEMT MMIC LOW NOISE  
AMPLIFIER, 18 - 31 GHz**

**Evaluation PCB**



**List of Material for Evaluation PCB 119667 <sup>[1]</sup>**

Item	Description
J1, J2	2.92mm PCB mount K-Connector
J3 - J6	DC Pin
C1, C2, C3	100pF Capacitor, 0402 Pkg.
C4, C5, C6	1000pF Capacitor, 0603 Pkg.
C7, C8, C9	4.7 $\mu$ F Capacitor, Tantalum
U1	HMC519LC4 Amplifier
PCB <sup>[2]</sup>	11995 Evaluation PCB

[1] Reference this number when ordering complete evaluation PCB

[2] Circuit Board Material: Rogers 4350.

The circuit board used in this 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.

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