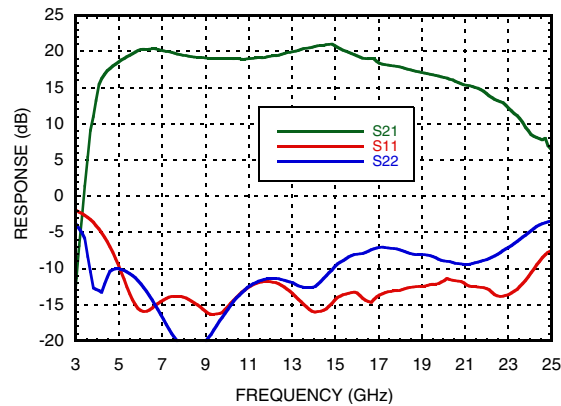
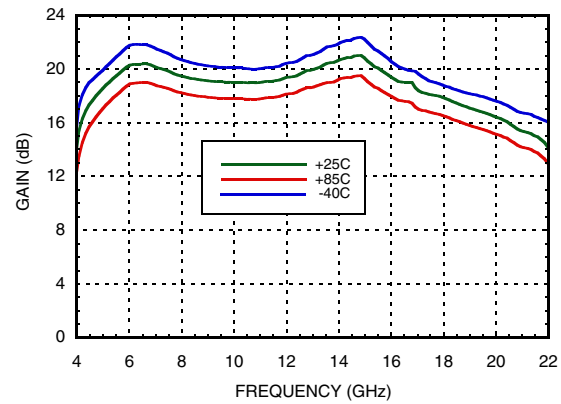


**GAAS PHEMT MMIC MEDIUM
POWER AMPLIFIER, 5 - 20 GHz**

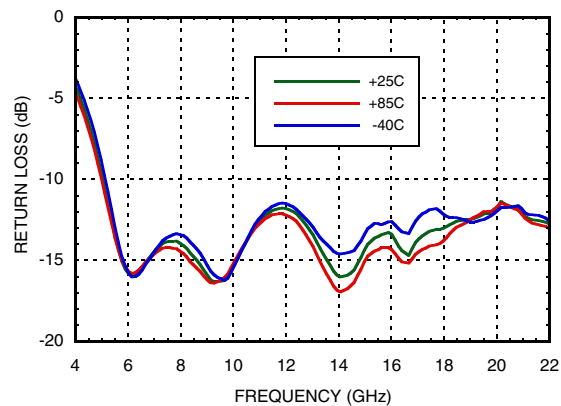
Broadband Gain & Return Loss



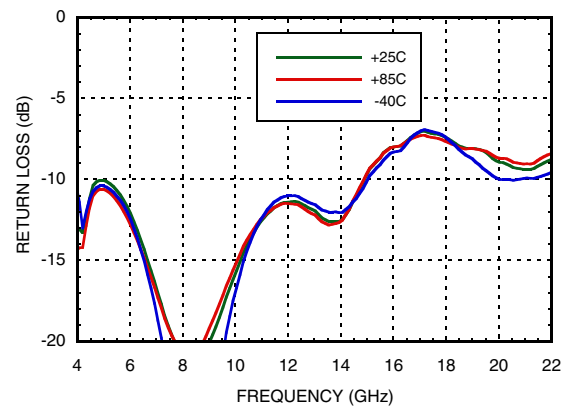
Gain vs. Temperature



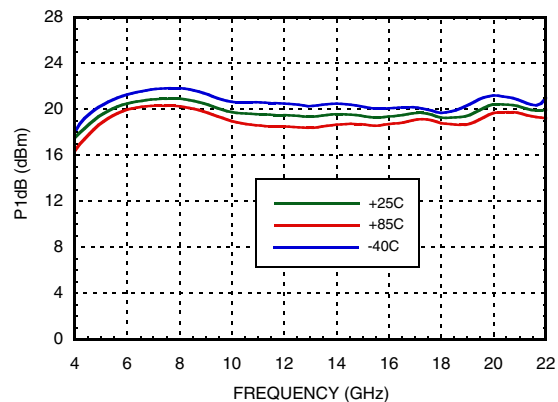
Input Return Loss vs. Temperature



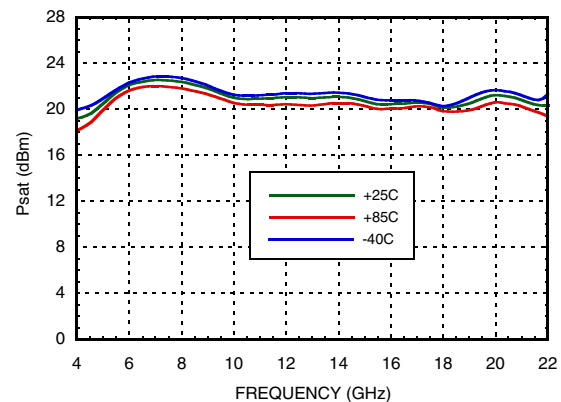
Output Return Loss vs. Temperature



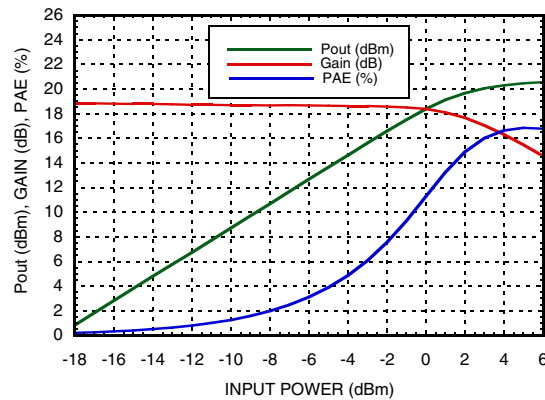
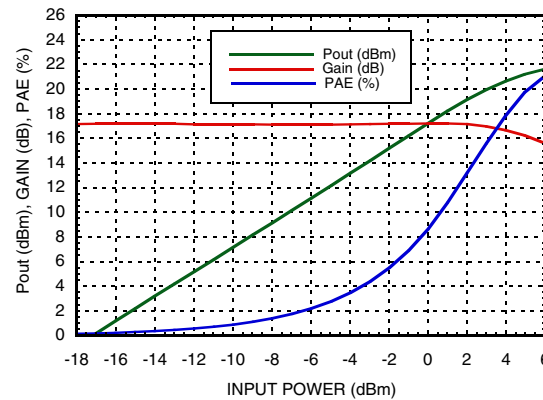
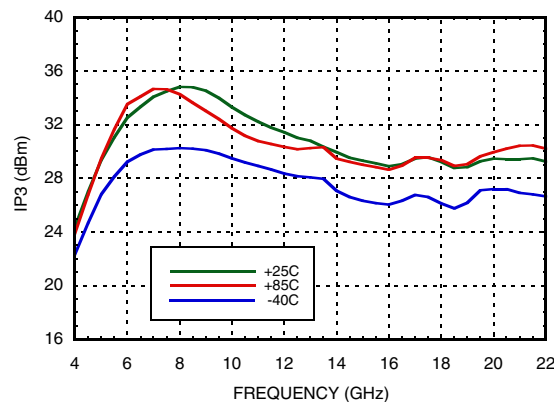
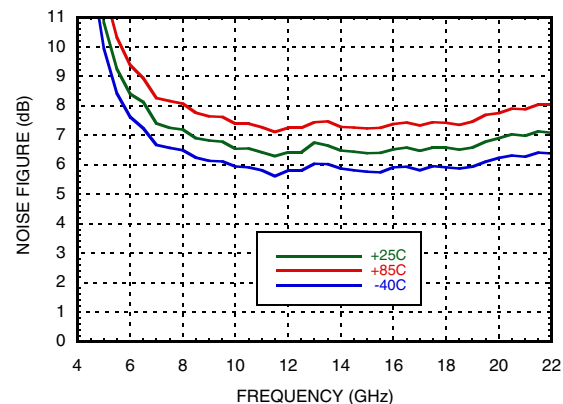
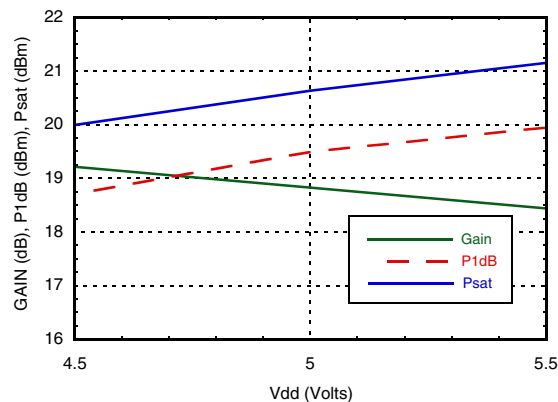
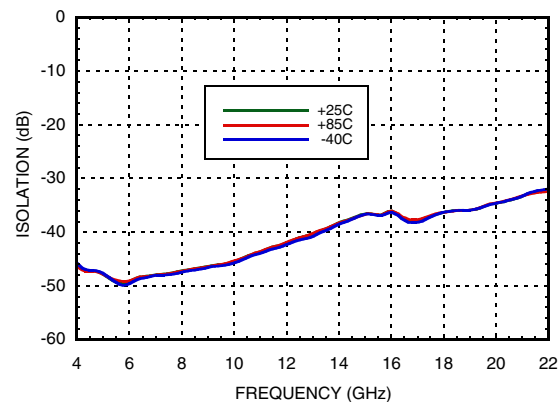
P1dB vs. Temperature



Psat vs. Temperature



GAAS PHEMT MMIC MEDIUM POWER AMPLIFIER, 5 - 20 GHz

Power Compression @ 10 GHz

Power Compression @ 20 GHz

Output IP3 vs. Temperature

Noise Figure vs. Temperature

**Gain, P1dB & PSAT
vs. Supply Voltage @ 11 GHz**

Reverse Isolation vs. Temperature


GAAS PHEMT MMIC MEDIUM POWER AMPLIFIER, 5 - 20 GHz

Absolute Maximum Ratings

Drain Bias Voltage ($V_{dd1} = V_{dd2}$)	+5.5 Vdc
RF Input Power (RFIN)($V_{dd} = +5V_{dc}$)	+10 dBm
Channel Temperature	175 °C
Continuous Pdiss (T = 85 °C) (derate 12.4 mW/°C above 85 °C)	1.1 W
Thermal Resistance (channel to ground paddle)	80 °C/W
Storage Temperature	-65 to +150 °C
Operating Temperature	-40 to +85 °C
ESD Sensitivity (HBM)	Class 1A, passed 250V

Typical Supply Current vs. $V_{dd1} = V_{dd2}$

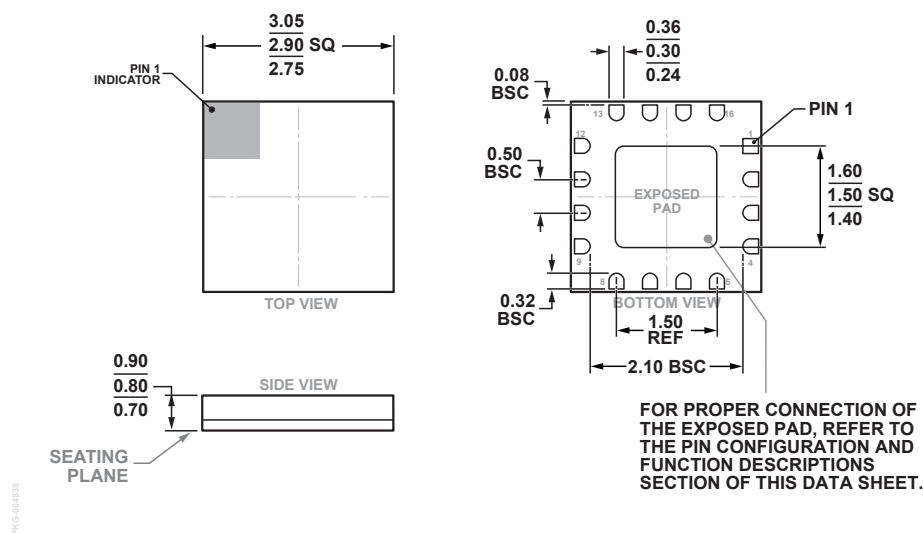
$V_{dd1} = V_{dd2}$ (V)	$I_{dd1} = I_{dd2}$ (mA)
+4.5	111
+5.0	114
+5.5	116

Note: Amplifier will operate over full voltage range shown above



ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS

Outline Drawing



16-Terminal Ceramic Leadless Chip Carrier [LCC]
(E-16-1)
Dimensions shown in millimeters.

Package Information

Part Number	Package Body Material	Lead Finish	MSL Rating	Package Marking ^[2]
HMC451LC3	Alumina, White	Gold over Nickel	MSL3 ^[1]	H451 XXXX

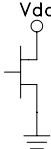
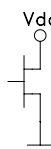
[1] Max peak reflow temperature of 260 °C

[2] 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

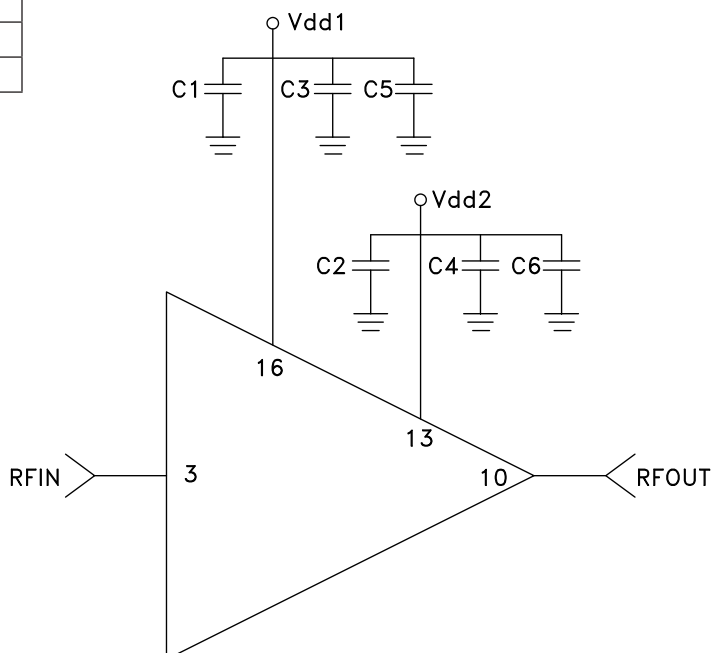
GAAS PHEMT MMIC MEDIUM POWER AMPLIFIER, 5 - 20 GHz

Pin Descriptions

Pin Number	Function	Description	Interface Schematic
1, 2, 4 - 9, 11, 12, 14, 15	N/C	This pin may be connected to RF/DC ground. Performance will not be affected.	
3	RFIN	This pin is AC coupled and matched to 50 Ohms from 5 - 20 GHz.	RFIN 
10	RFOUT	This pin is AC coupled and matched to 50 Ohms from 5 - 20 GHz.	 RFOUT
13	Vdd2	Power Supply Voltage for the amplifier. External bypass capacitors of 100 pF, 1,000 pF and 2.2 μ F are required.	
16	Vdd1	Power Supply Voltage for the amplifier. External bypass capacitors of 100 pF, 1,000 pF and 2.2 μ F are required.	
	GND	Package bottom must be connected to RF/DC ground.	

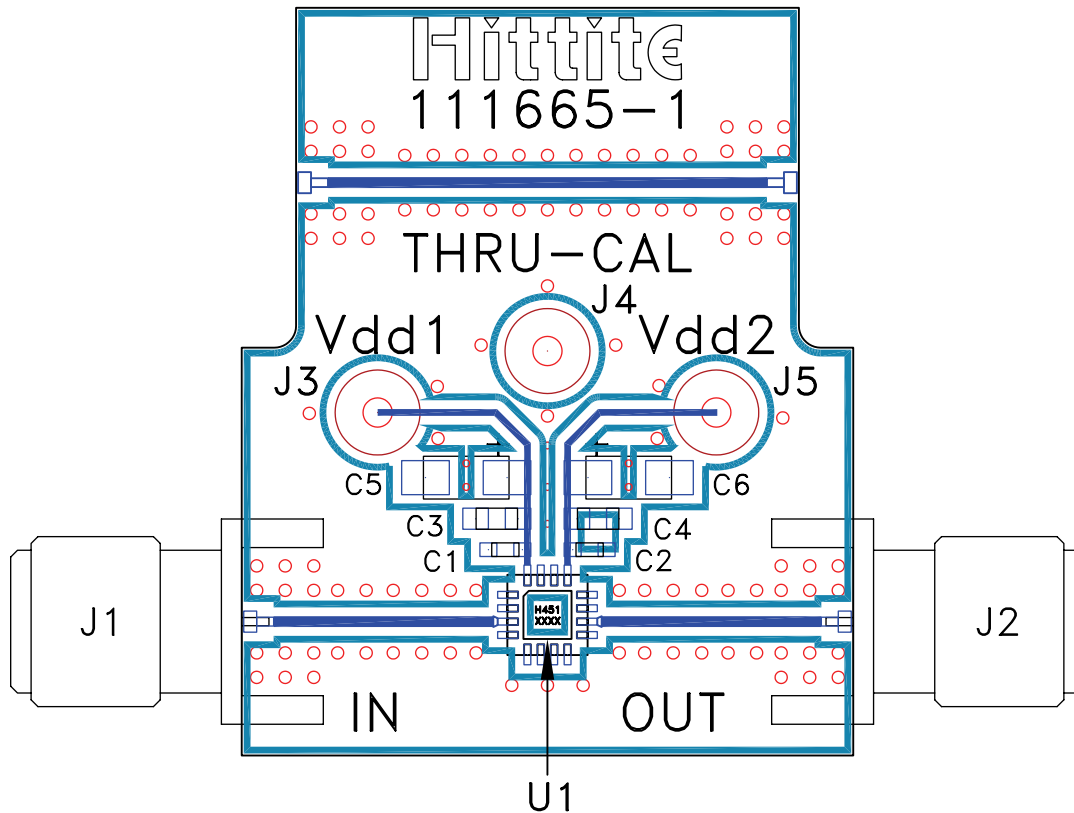
Application Circuit

Component	Value
C1, C2	100 pF
C3, C4	1,000 pF
C5, C6	2.2 μ F



**GAAS PHEMT MMIC MEDIUM
POWER AMPLIFIER, 5 - 20 GHz**

Evaluation PCB



List of Materials for Evaluation PCB 111667 [1]

Item	Description
J1 - J2	PCB Mount SMA Connector
J3 - J5	DC Pin
C1, C2	100 pF Capacitor, 0402 Pkg.
C3, C4	1000 pF Capacitor, 0603 Pkg.
C5, C6	2.2 μ F Capacitor, Tantalum
U1	HMC451LC3 Amplifier
PCB [2]	111665 Evaluation PCB, 10 mils

[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.