

SURFACE MOUNT PHEMT 2 WATT POWER AMPLIFIER, 9 - 12 GHz

Typical Applications

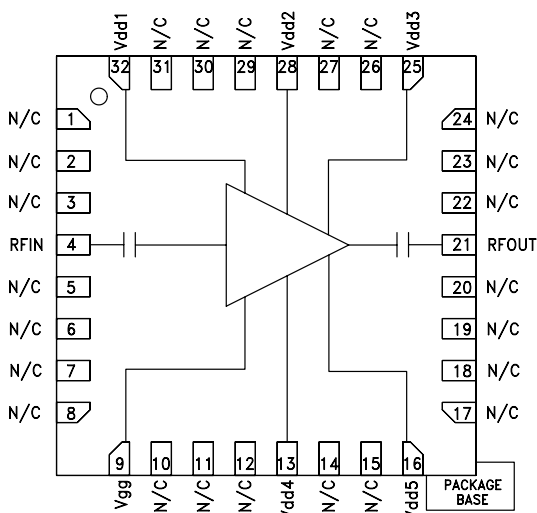
The HMC487LP5E is ideal for use as a power amplifier for:

- Point-to-Point Radios
- Point-to-Multi-Point Radios
- Test Equipment and Sensors
- Military End-Use

Features

- Saturated Power: +33 dBm @ 20% PAE
- Output IP3: +36 dBm
- Gain: 20 dB
- +7V @ 1300 mA Supply
- 50 Ohm Matched Input/Output
- 25 mm² Leadless SMT Package

Functional Diagram



General Description

The HMC487LP5E is a high dynamic range GaAs PHEMT MMIC 2 Watt Power Amplifiers housed in leadless 5 x 5 mm surface mount packages. Operating from 9 to 12 GHz, the amplifier provides 20 dB of gain, +33 dBm of saturated power and 20% PAE from a +7V supply voltage. Output IP3 is +36 dBm typical. The RF I/Os are DC blocked and matched to 50 Ohms for ease of use. The HMC487LP5E eliminates the need for wire bonding, allowing use of surface mount manufacturing techniques.

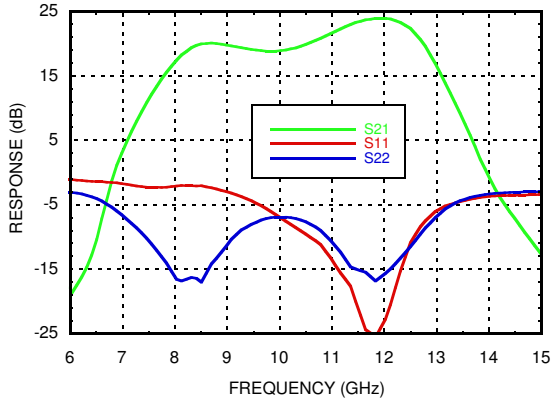
Electrical Specifications, $T_A = +25^\circ\text{C}$, $V_{dd1, 2, 3, 4, 5} = +7\text{V}$, $I_{dd} = 1300\text{ mA}^*$

Parameter	Min.	Typ.	Max.	Min.	Typ.	Max.	Units
Frequency Range	9 - 11		11 - 12				GHz
Gain	17	20		19	22		dB
Gain Variation Over Temperature		0.05	0.07		0.05	0.07	dB/°C
Input Return Loss		7			15		dB
Output Return Loss		7			15		dB
Output Power for 1 dB Compression (P1dB)	29	32		28	31		dBm
Saturated Output Power (Psat)		33			32		dBm
Output Third Order Intercept (IP3)		36			35		dBm
Noise Figure		9			8		dB
Supply Current (I _{dd})(V _{dd} = +7V, V _{gg} = -0.3V Typ.)		1300			1300		mA

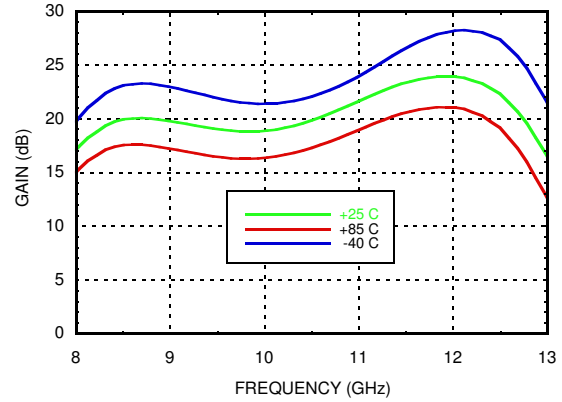
* Adjust V_{gg} between -2 to 0V to achieve I_{dd} = 1300 mA typical.

SURFACE MOUNT PHEMT 2 WATT POWER AMPLIFIER, 9 - 12 GHz

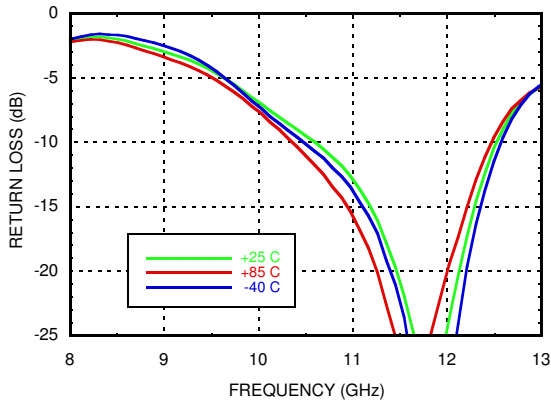
Broadband Gain and Return Loss



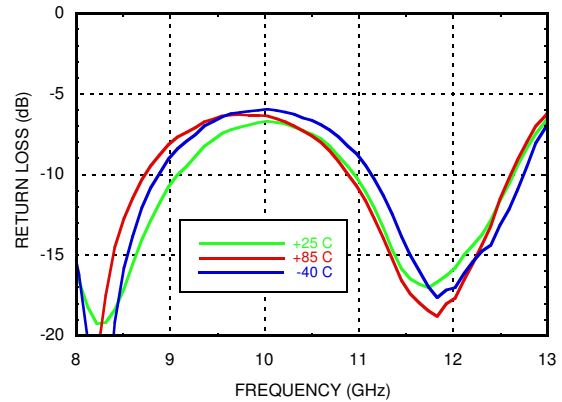
Gain vs. Temperature



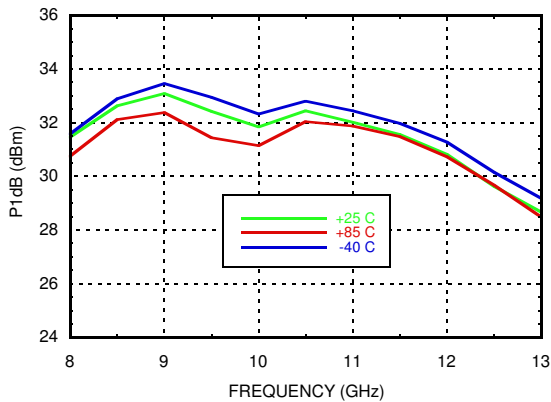
Input Return Loss vs. Temperature



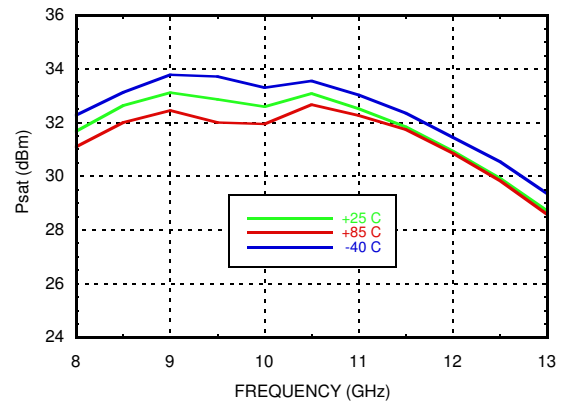
Output Return Loss vs. Temperature



P1dB vs. Temperature

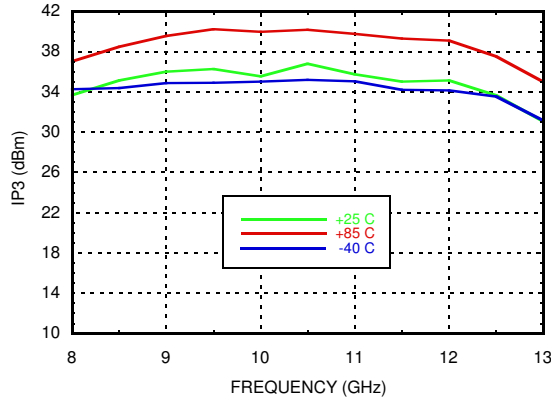


Psat vs. Temperature

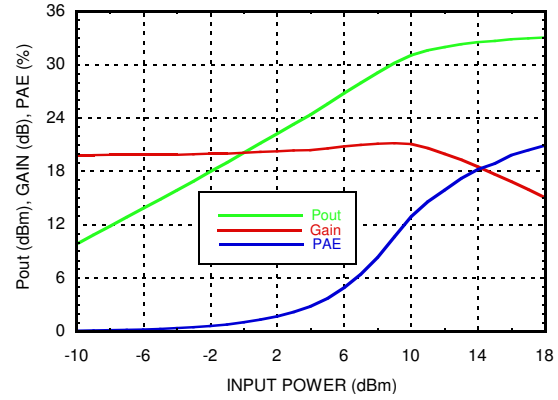


SURFACE MOUNT PHEMT 2 WATT POWER AMPLIFIER, 9 - 12 GHz

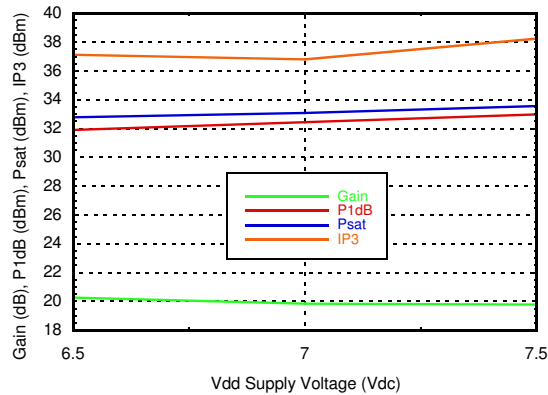
Output IP3 vs. Temperature



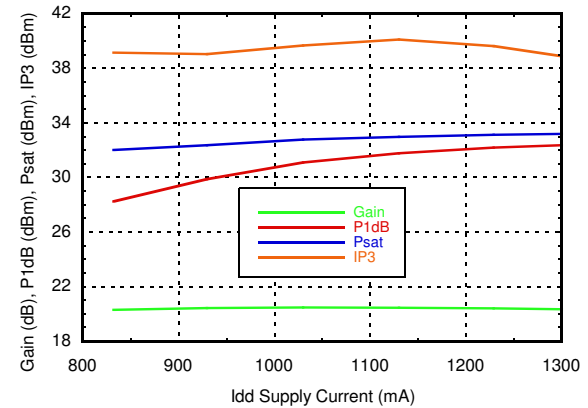
Power Compression @ 10.5 GHz



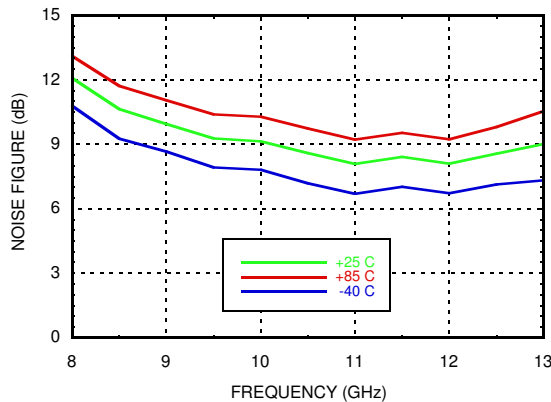
Gain Power and OIP3 vs. Supply Voltage @10.5 GHz



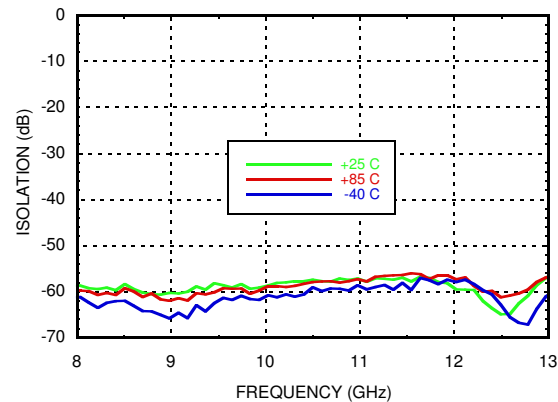
Gain, Power and OIP3 vs. Supply Current @ 10.5 GHz



Noise Figure vs. Temperature

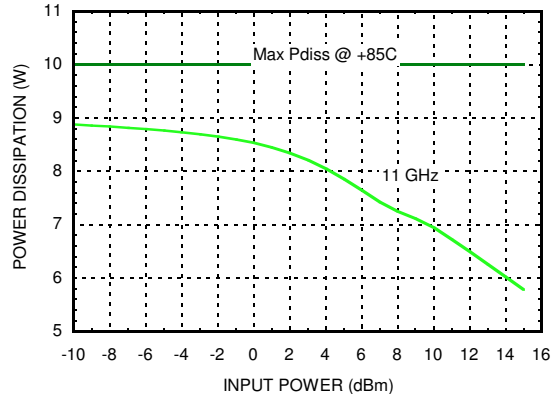


Reverse Isolation vs. Temperature



SURFACE MOUNT PHEMT 2 WATT POWER AMPLIFIER, 9 - 12 GHz

Power Dissipation*

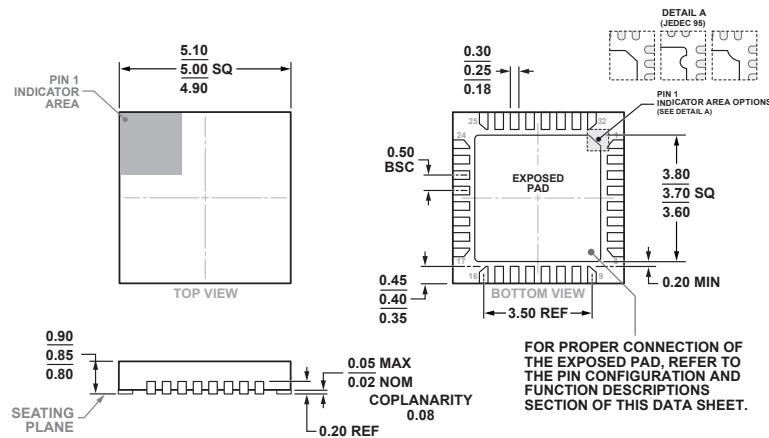


* Refer to "Thermal Management for Surface Mount Components" application note herein.



**ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS**

Outline Drawing



COMPLIANT TO JEDEC STANDARDS MO-220-VHHD-4

32-Lead Lead Frame Chip Scale Package [LFCSP]
5 mm x 5 mm Body and 0.85 mm Package Height
(HCP-32-1)

Dimensions shown in millimeters

Package Information

Part Number	Package Body Material	Lead Finish	MSL Rating	Package Marking ^[2]
HMC487LP5ETR	RoHS-compliant Low Stress Injection Molded Plastic	100% matte Sn	MSL3 ^[1]	H487 XXXX
HMC487LP5E	RoHS-compliant Low Stress Injection Molded Plastic	100% matte Sn	MSL3 ^[1]	<u>H487</u> XXXX

[1] Max peak reflow temperature of 260 °C

[2] 4-Digit lot number XXXX

Typical Supply Current vs. Vdd

Vdd (Vdc)	Idd (mA)
+6.5	1330
+7.0	1300
+7.5	1285

Note: Amplifier will operate over full voltage ranges shown above. Vgg adjusted to achieve Idd= 1300 mA at +7.0V.

Absolute Maximum Ratings

Drain Bias Voltage (Vdd1, 2, 3, 4, 5)	+8 Vdc
Gate Bias Voltage (Vgg)	-2.0 to 0 Vdc
RF Input Power (RFIN)(Vdd = +7.0 Vdc)	+20 dBm
Channel Temperature	150 °C
Continuous Pdis (T= 85 °C) (derate 154 mW/°C above 85 °C)	10 W
Thermal Resistance (channel to ground paddle)	6.5 °C/W
Storage Temperature	-65 to +150 °C
Operating Temperature	-40 to +85 °C

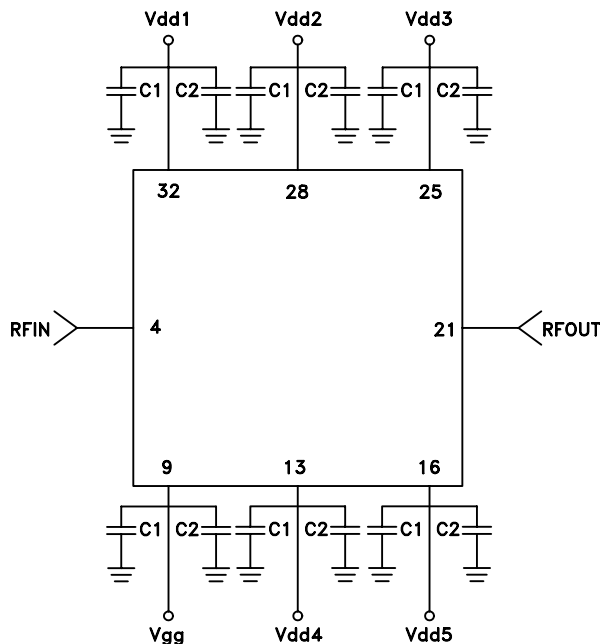
SURFACE MOUNT PHEMT 2 WATT POWER AMPLIFIER, 9 - 12 GHz

Pin Descriptions

Pin Number	Function	Description	Interface Schematic
1 - 3, 5 - 8, 10 - 12, 14, 15, 17 - 20, 22 - 24, 26, 27, 29 - 31	N/C	No connection required. These pins may be connected to RF/DC ground without affecting performance.	
4	RFIN	This pin is AC coupled and matched to 50 Ohms.	
9	Vgg	Gate control for amplifier. Adjust to achieve I _{dd} of 1300 mA. Please follow "MMIC Amplifier Biasing Procedure" Application Note. External bypass capacitors of 100 pF and 2.2 μF are required.	
21	RFOUT	This pin is AC coupled and matched to 50 Ohms.	
32, 28, 25, 13, 16	Vdd1, Vdd2, Vdd3, Vdd4, Vdd5	Power Supply Voltage for the amplifier. External bypass capacitors of 100 pF and 2.2 μF are required.	
	GND	Ground: Backside of package has exposed metal ground slug that must be connected to ground through a short path. Vias under the device are required	

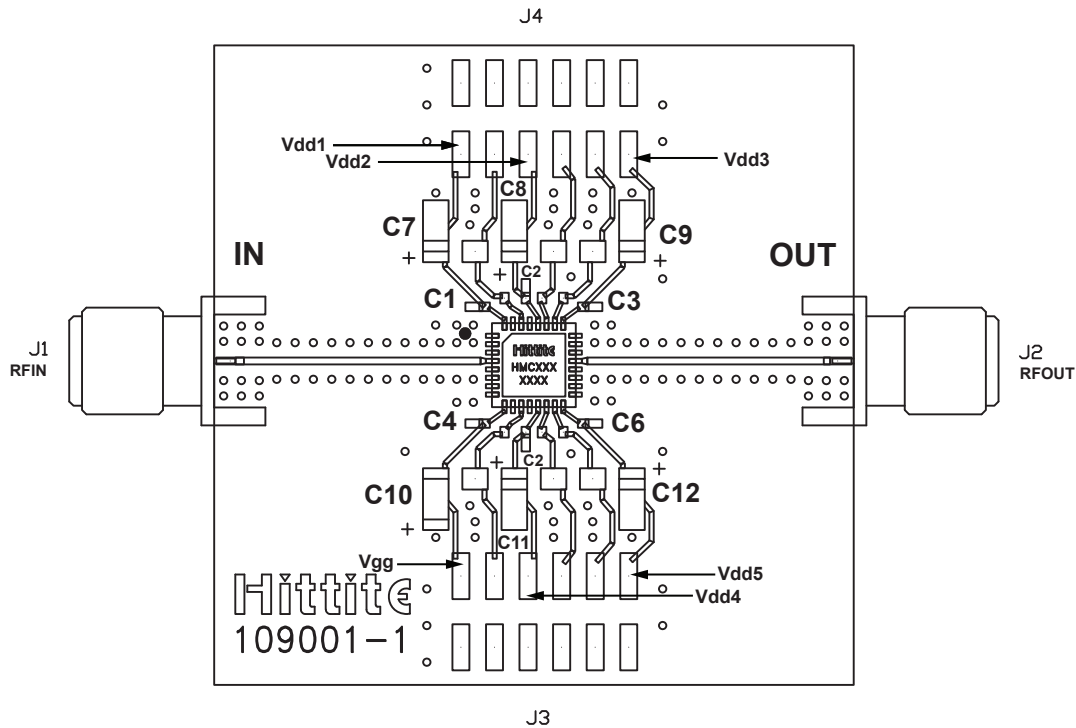
Application Circuit

Component	Value
C1	100 pF
C2	2.2 μF



SURFACE MOUNT PHEMT 2 WATT POWER AMPLIFIER, 9 - 12 GHz

Evaluation PCB



List of Materials for Evaluation PCB 108190 [1]

Item	Description
J1, J2	SRI PC Mount SMA Connector
J3, J4	2mm DC Header
C1 - C6	100 pF capacitor, 0402 pkg.
C7 - C12	2.2μF Capacitor, Tantalum
U1	HMC487LP5E Amplifier
PCB [2]	109001 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. Copper filled vias under the device are recommended. The evaluation board should be mounted to an appropriate heat sink. The evaluation circuit board shown is available from Analog Devices upon request.

Компания «Life Electronics» занимается поставками электронных компонентов импортного и отечественного производства от производителей и со складов крупных дистрибьюторов Европы, Америки и Азии.

С конца 2013 года компания активно расширяет линейку поставок компонентов по направлению коаксиальный кабель, кварцевые генераторы и конденсаторы (керамические, пленочные, электролитические), за счёт заключения дистрибьюторских договоров

Мы предлагаем:

- Конкурентоспособные цены и скидки постоянным клиентам.
- Специальные условия для постоянных клиентов.
- Подбор аналогов.
- Поставку компонентов в любых объемах, удовлетворяющих вашим потребностям.
- Приемлемые сроки поставки, возможна ускоренная поставка.
- Доставку товара в любую точку России и стран СНГ.
- Комплексную поставку.
- Работу по проектам и поставку образцов.
- Формирование склада под заказчика.
- Сертификаты соответствия на поставляемую продукцию (по желанию клиента).
- Тестирование поставляемой продукции.
- Поставку компонентов, требующих военную и космическую приемку.
- Входной контроль качества.
- Наличие сертификата ISO.

В составе нашей компании организован Конструкторский отдел, призванный помогать разработчикам, и инженерам.

Конструкторский отдел помогает осуществить:

- Регистрацию проекта у производителя компонентов.
- Техническую поддержку проекта.
- Защиту от снятия компонента с производства.
- Оценку стоимости проекта по компонентам.
- Изготовление тестовой платы монтаж и пусконаладочные работы.



Тел: +7 (812) 336 43 04 (многоканальный)

Email: org@lifeelectronics.ru