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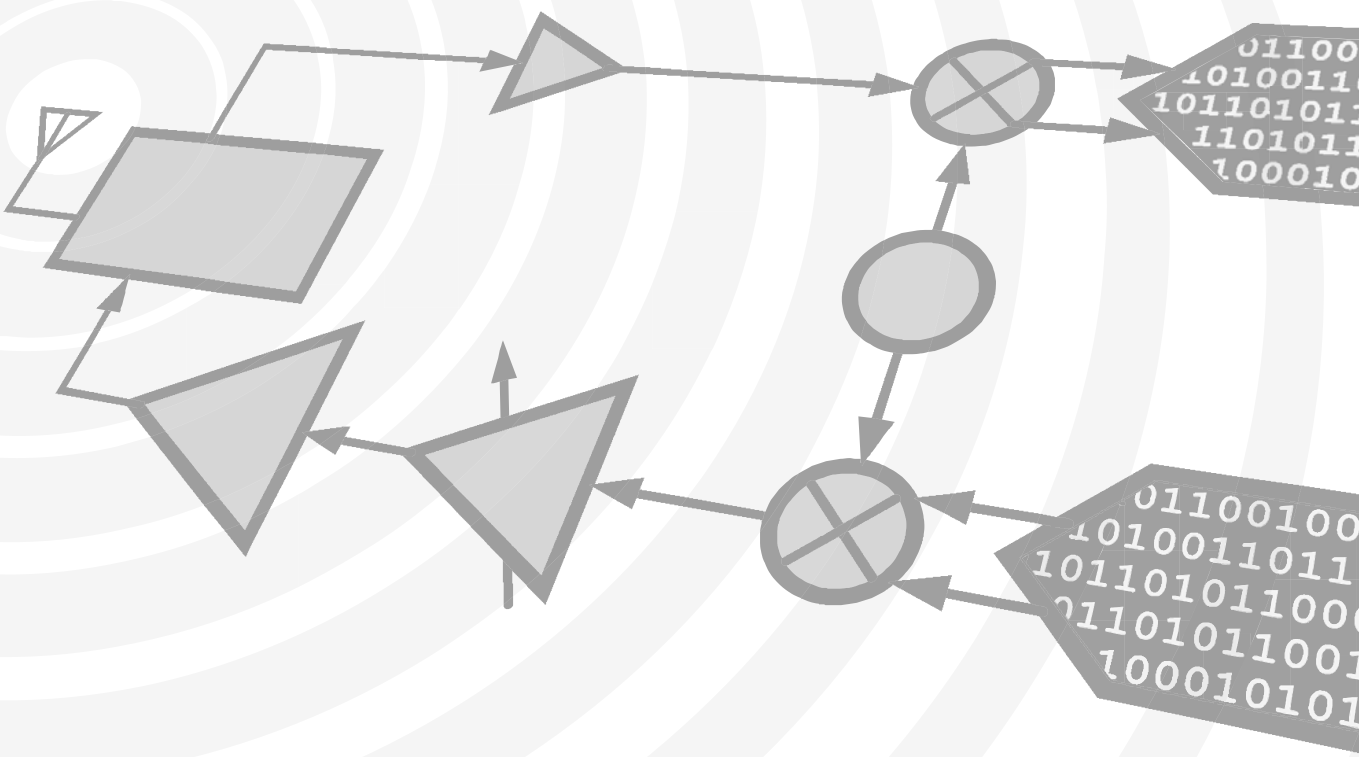
NO CONTENT ON THE ATTACHED DOCUMENT HAS CHANGED



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Hittite MICROWAVE CORPORATION

HMC952LP5GE

v01.1012

RoHS✓ EARTH FRIENDLY

GaAs pHEMT MMIC 2 Watt POWER AMPLIFIER SMT WITH POWER DETECTOR , 9 - 14 GHz

Typical Applications

The HMC952LP5GE is ideal for:

- Point-to-Point Radios
- Point-to-Multi-Point Radios
- SATCOM

Features

+35 dBm Pout @ 27% PAE

High P1dB Output Power: +34 dBm

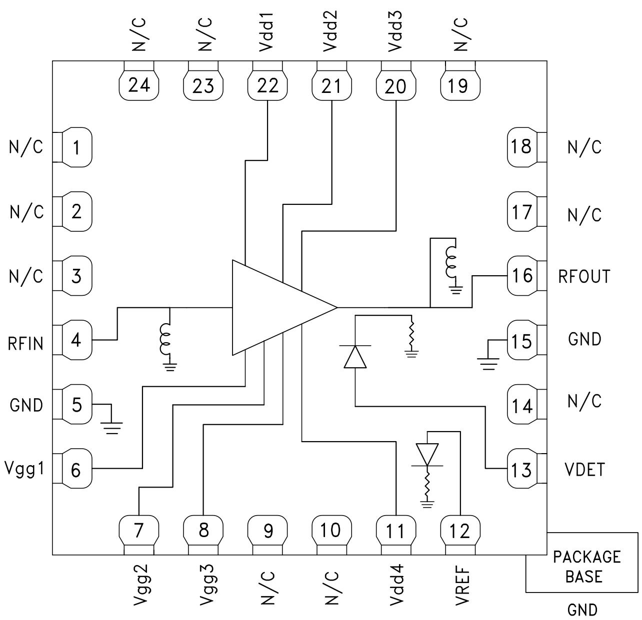
High Gain: 33 dB

High Output IP3: +43 dBm

Supply Voltage: Vdd = +6V @ 1400 mA

50 Ohm Matched Input/Output

Functional Diagram



General Description

The HMC952LP5GE is a four-stage GaAs pHEMT MMIC Medium Power Amplifier with a temperature compensated on-chip power detector which operates between 9 and 14 GHz. The amplifier provides 33 dB of gain and +35 dBm of saturated output power at 27% PAE from a +6V supply. With up to +43 dBm IP3 the HMC952LP5GE is ideal for linear applications such as point-to-point and point-to-multi-point radios or SATCOM applications demanding +35 dBm of efficient saturated output power. The RF I/Os are internally matched to 50 Ohms.

Electrical Specifications, T_A = +25° C, Vdd1, Vdd2, Vdd3, Vdd4 = +6V, Idd = 1400 mA [1]

Parameter	Min.	Typ.	Max.	Min.	Typ.	Max.	Units
Frequency Range		9 - 10			10 - 14		GHz
Gain [2]	30	33		30	33		dB
Gain Variation Over Temperature		0.05			0.05		dB/ °C
Input Return Loss		12			15		dB
Output Return Loss		9			12		dB
Output Power for 1 dB Compression (P1dB) [2]	30.5	33		31.5	34		dBm
Saturated Output Power (Psat) [2]		34.5			35		dBm
Output Third Order Intercept (IP3) [2] [3]		42			43		dBm
Total Supply Current		1400			1400		mA

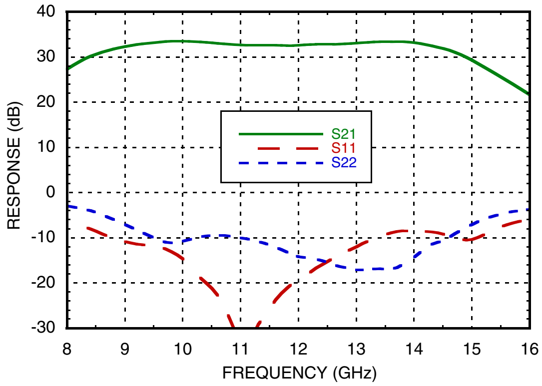
[1] Adjust Vgg between -2 to 0V to achieve Idd = 1400 mA typical.

[2] Board loss subtracted out.

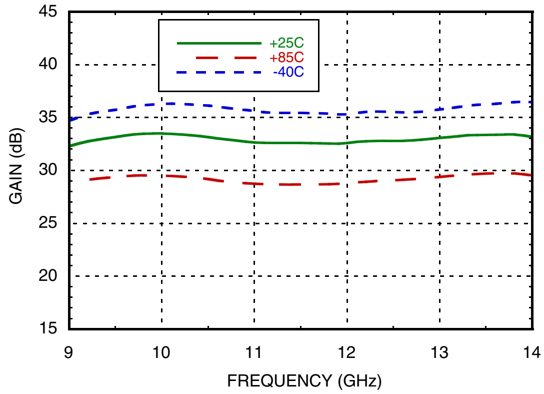
[3] Measurement taken at Pout / tone = +20 dBm.

GaAs pHEMPT MMIC 2 Watt POWER AMPLIFIER SMT WITH POWER DETECTOR, 9 - 14 GHz

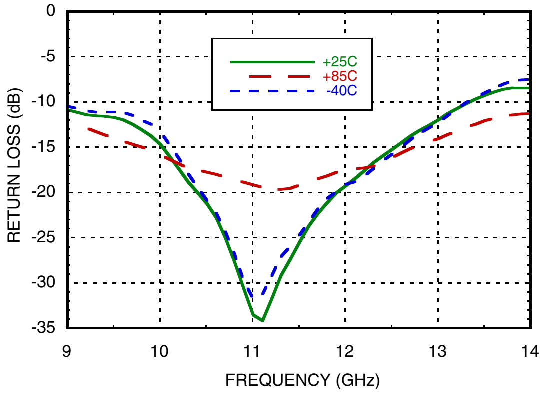
Gain & Return Loss



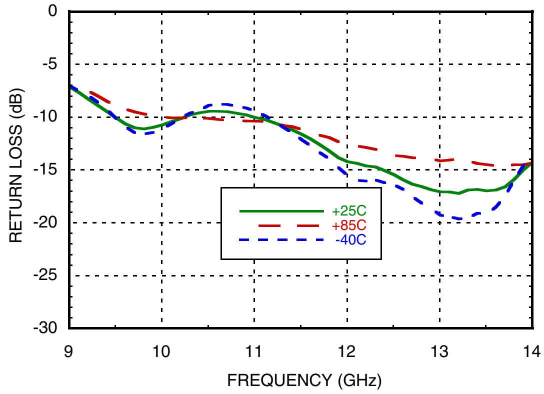
Gain vs. Temperature



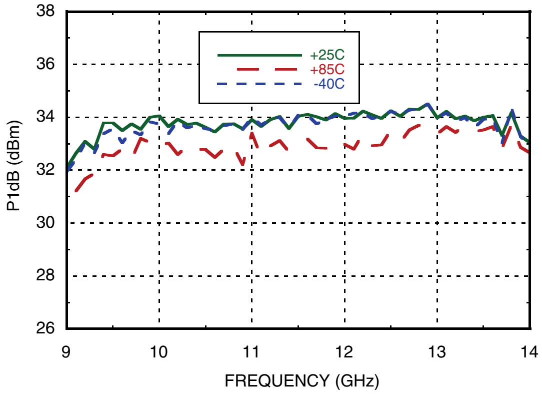
Input Return Loss vs. Temperature



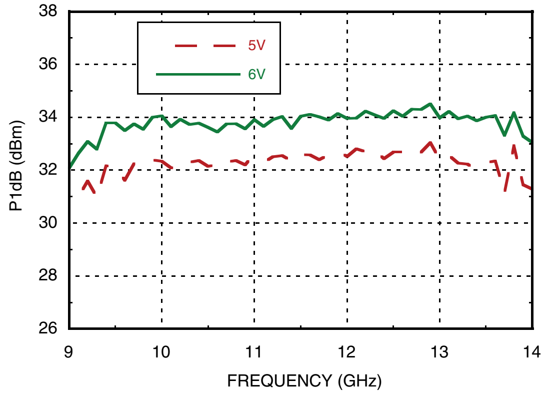
Output Return Loss vs. Temperature



P1dB vs. Temperature

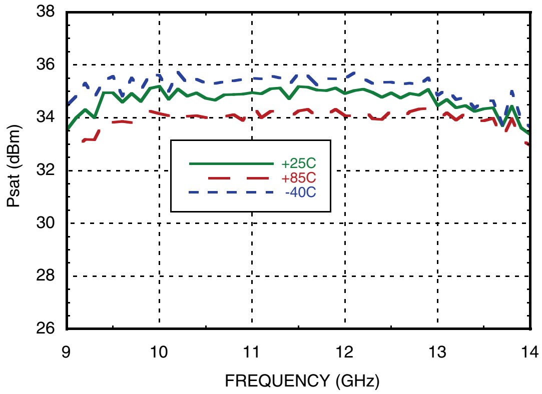


P1dB vs Supply Voltage

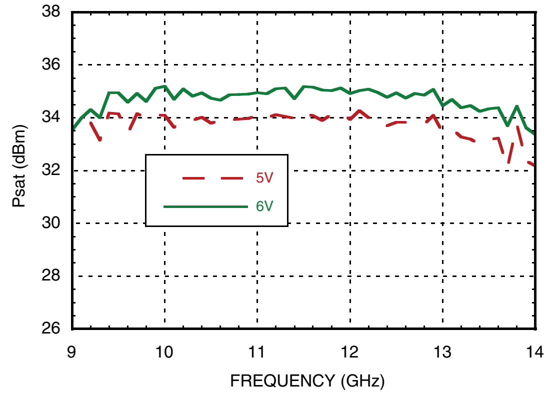


GaAs pHEMPT MMIC 2 Watt POWER AMPLIFIER SMT WITH POWER DETECTOR, 9 - 14 GHz

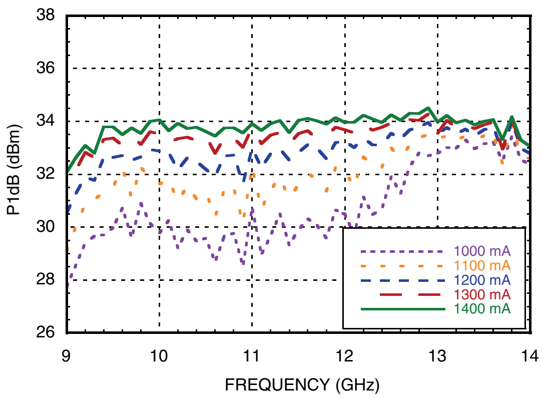
Psat vs. Temperature



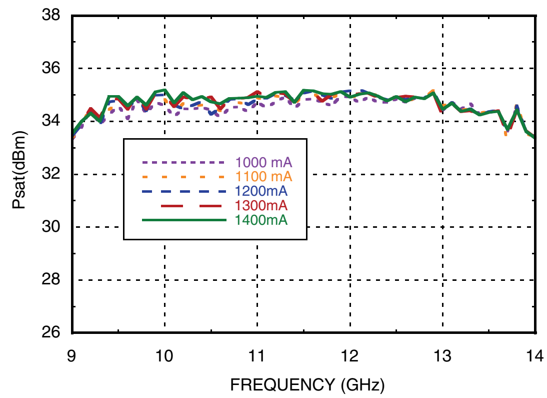
Psat vs. Supply Voltage



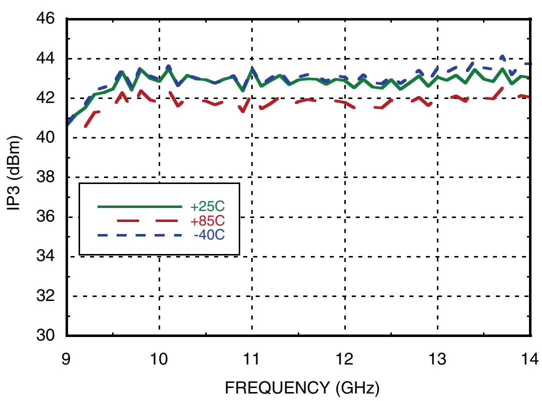
P1dB vs. Supply Current



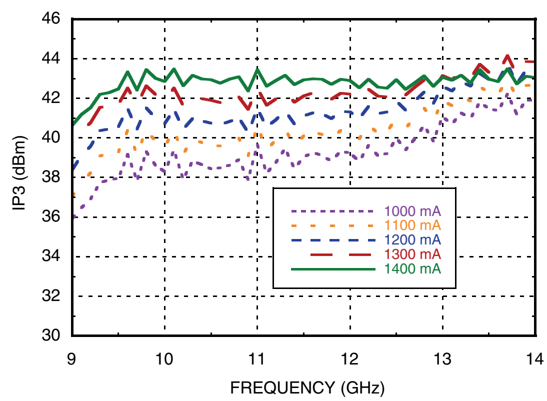
Psat vs. Supply Current



Output IP3 vs. Temperature, Pout/tone = +20 dBm

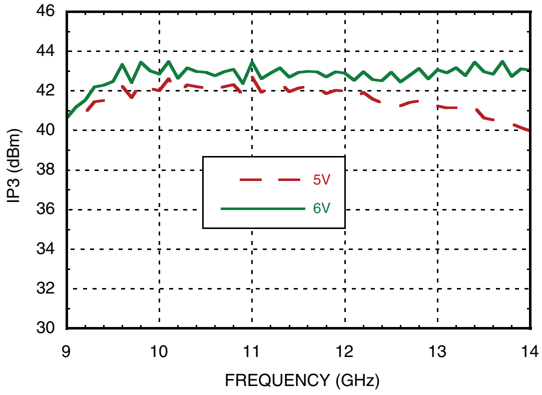


Output IP3 vs. Supply Current, Pout/tone = +20 dBm

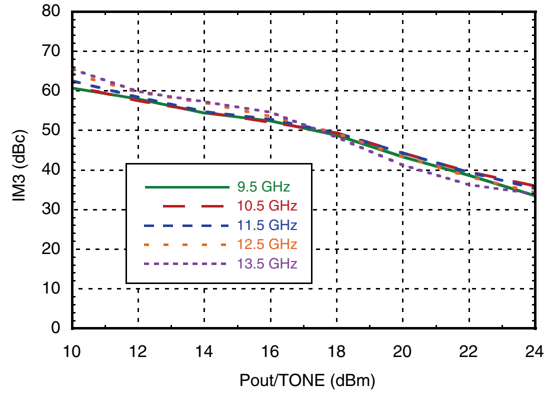


GaAs pHEMPT MMIC 2 Watt POWER AMPLIFIER SMT WITH POWER DETECTOR, 9 - 14 GHz

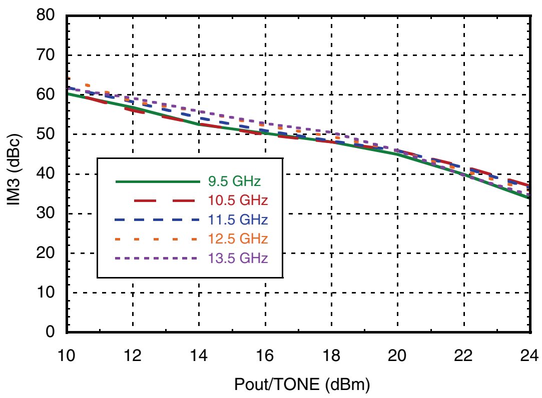
Output IP3 vs. Supply Voltage, Pout/tone = +20 dBm



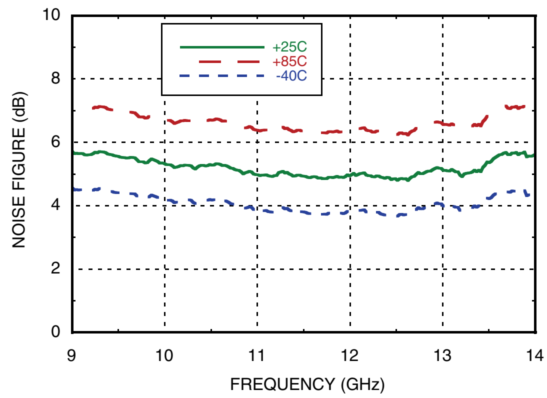
Output IM3 @ Vdd = +5V



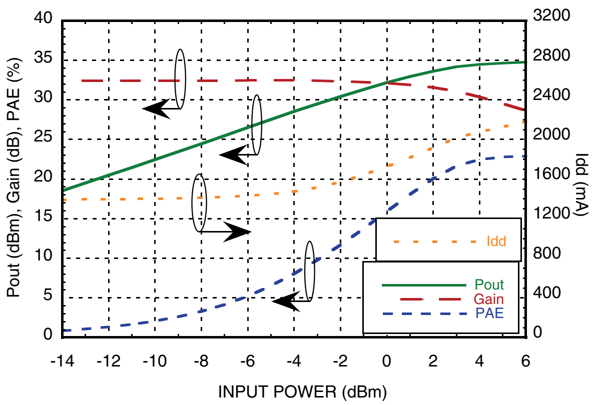
Output IM3 @ Vdd = +6V



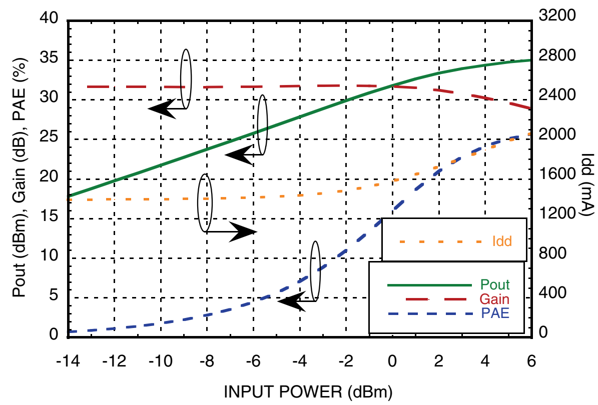
Noise Figure vs. Temperature



Power Compression @ 9.5 GHz

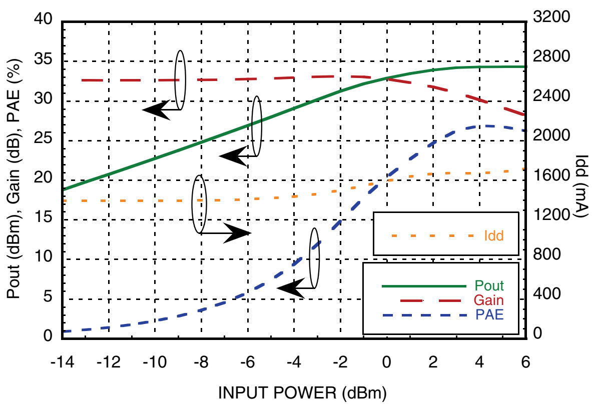


Power Compression @ 11.5 GHz

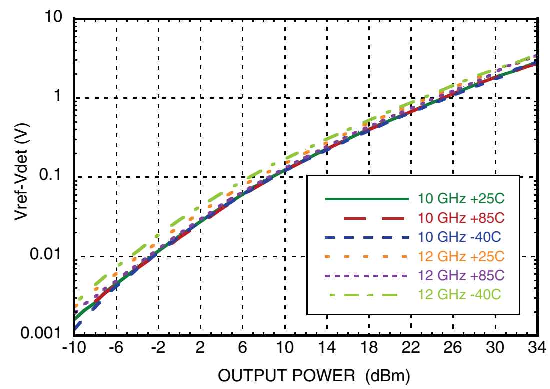


GaAs pHEMPT MMIC 2 Watt POWER AMPLIFIER SMT WITH POWER DETECTOR, 9 - 14 GHz

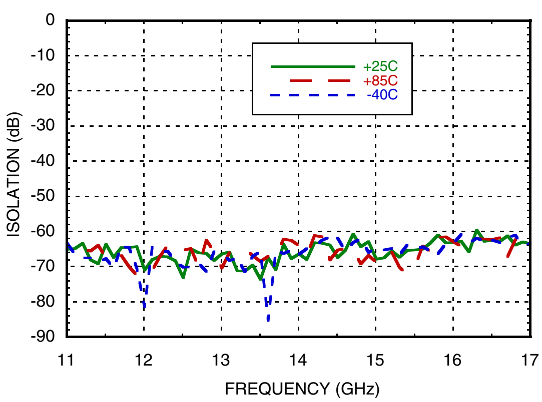
Power Compression @ 13.5 GHz



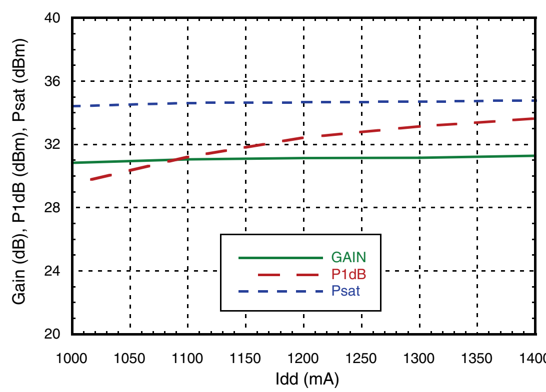
Detector Voltage vs. Frequency & Temperature



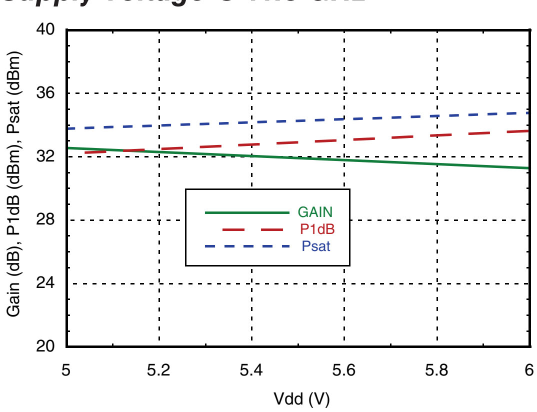
Reverse Isolation vs. Temperature



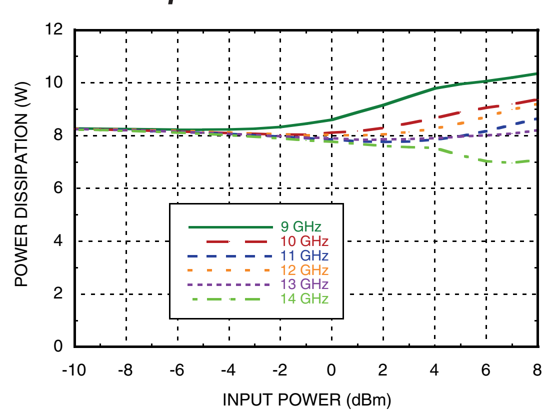
Gain & Power vs. Supply Current @ 11.5 GHz



Gain & Power vs. Supply Voltage @ 11.5 GHz



Power Dissipation



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Absolute Maximum Ratings

Drain Bias Voltage (Vdd)	+8 Vdc
Gate Bias Voltage (Vgg)	-3 - 0 Vdc
RF Input Power (RFIN)	+24 dBm
Channel Temperature	150 °C
Continuous Pdiss (T= 85 °C) (derate 137 mW/°C above 85 °C)	8.9 W
Thermal Resistance (channel to die bottom)	7.3 °C/W
Storage Temperature	-65 to 150°C
Operating Temperature	-55 to 85 °C
ESD Sensitivity (HBM)	Class 0, Passed 150V

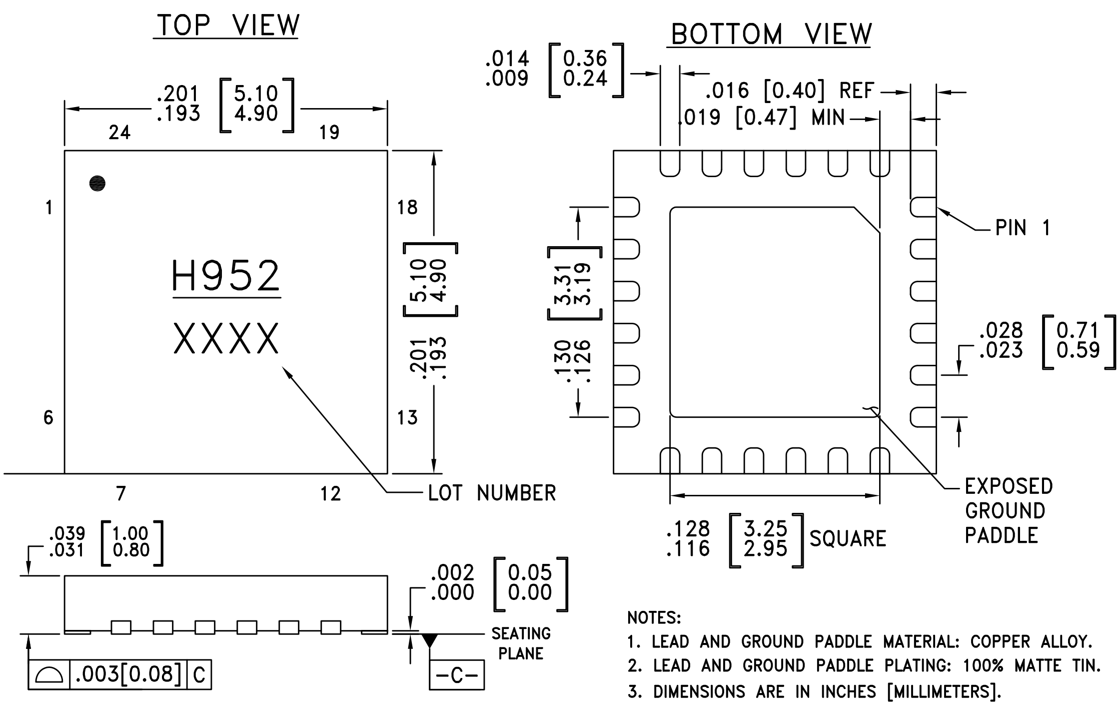
Typical Supply Current vs. Vdd

Vdd (V)	Idd (mA)
+5	1400
+6	1400

Adjust Vgg1 to achieve Idd = 1400 mA

ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS

Outline Drawing



NOTES:
1. LEAD AND GROUND PADDLE MATERIAL: COPPER ALLOY.
2. LEAD AND GROUND PADDLE PLATING: 100% MATTE TIN.
3. DIMENSIONS ARE IN INCHES [MILLIMETERS].
4. LEAD SPACING TOLERANCE IS NON-CUMULATIVE.
5. PAD BURR LENGTH SHALL BE 0.15mm MAX. PAD BURR HEIGHT SHALL BE 0.25mm MAX.
6. PACKAGE WARP SHALL NOT EXCEED 0.05mm
7. ALL GROUND LEADS AND GROUND PADDLE MUST BE SOLDERED TO PCB RF GROUND.

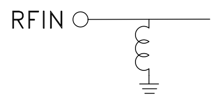
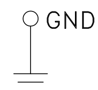
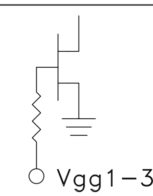
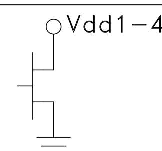
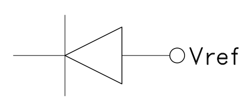
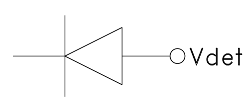
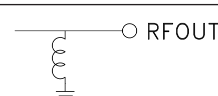
Package Information

Part Number	Package Body Material	Lead Finish	MSL Rating [2]	Package Marking [1]
HMC952LP5GE	RoHS-compliant Low Stress Injection Molded Plastic	100% matte Sn	MSL3	H952 XXXX

[1] 4-Digit lot number XXXX
[2] Max peak reflow temperature of 260 °C

GaAs pHEMPT MMIC 2 Watt POWER AMPLIFIER SMT WITH POWER DETECTOR, 9 - 14 GHz

Pin Descriptions

Pin Number	Function	Description	Interface Schematic
1-3, 9, 10, 14, 17-19, 23, 24	N/C	These pins are not connected internally, however all data shown herein was measured with these pins connected to RF/DC ground externally.	
4	RFIN	This pin is DC coupled and matched to 50 Ohms.	
5, 15	GND	These pins and package bottom must be connected to RF/DC ground.	
6-8	Vgg1, Vgg2, Vgg3	Gate control for amplifier External bypass capacitors of 100pF, 10nF and 4.7uF are required.	
11, 20-22	Vdd4, Vdd3, Vdd2, Vdd1	Drain bias voltage for amplifier. external bypass capacitors of 100pF, 10nF and 4.7uF are required.	
12	Vref	DC bias of diode biased through external resistor , used for temperature compensation of Vdet. See application circuit.	
13	Vdet	DC voltage representing RF output power rectified by diode which is biased through an external resistor. See application circut.	
16	RFOUT	This pin is DC coupled and matched to 50 Ohms	

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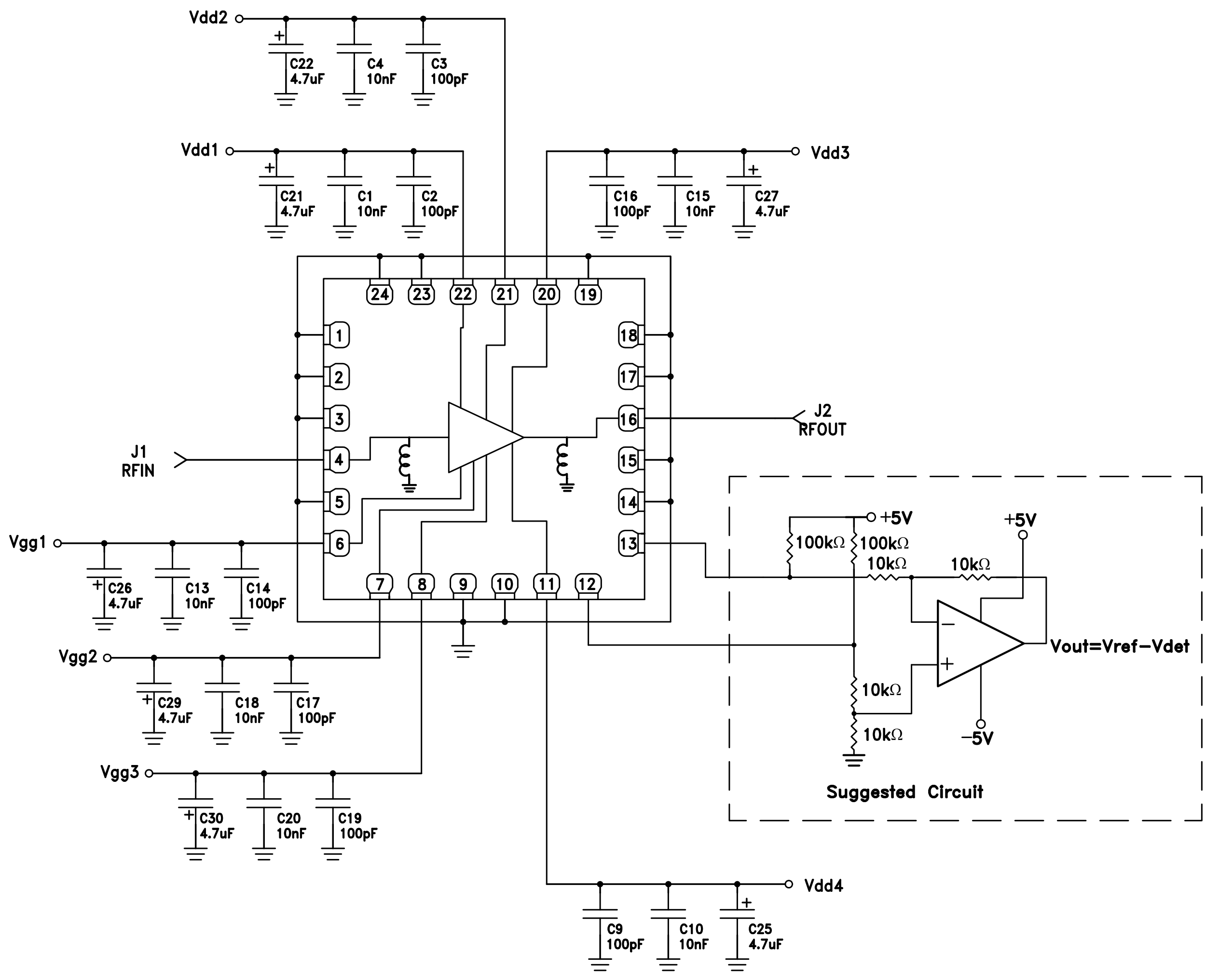
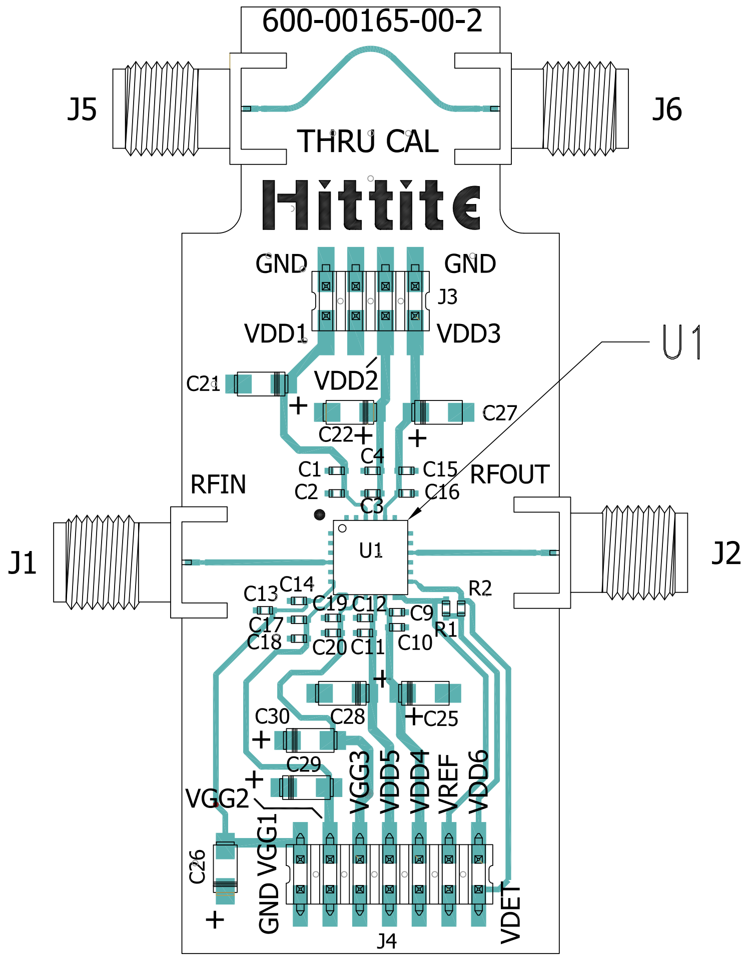
Application Circuit



For price, delivery and to place orders: Hittite Microwave Corporation, 2 Elizabeth Drive, Chelmsford, MA 01824
Phone: 978-250-3343 Fax: 978-250-3373 Order On-line at www.hittite.com
Application Support: Phone: 978-250-3343 or apps@hittite.com

Evaluation PCB



List of Materials for Evaluation PCB EVAL01-HMC952LP5GE [1]

Item	Description
J1, J2, J5, J6	K Connector SRI
J3, J4	DC Pin
C2, C3, C9, C12, C14, C16, C17, C19	100 pF Capacitor, 0402 Pkg.
C1, C4, C10, C11, C13, C15, C18, C20	10 nF Capacitor, 0402 Pkg.
C21, C22, C25 - C30	4.7uF Capacitor, Case A.
U1	HMC952LP5GE Power Amplifier
PCB	600-00163-00 Evaluation PCB

[1] Reference this number when ordering complete evaluation PCB

[2] Circuit Board Material: Rogers 4350 or Arlon FR4

The circuit board used in the 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 circuit board shown is available from Hittite upon request.

GaAs pHEMPT MMIC 2 Watt POWER AMPLIFIER SMT WITH POWER DETECTOR, 9 - 14 GHz

Notes: