GaAs MMIC Wide Voltage Power Amplifier Chip, 13.5-14.5GHz

Performance characteristics

Frequency range: 13.5-14.5 GHz
Wide voltage operation: +5V~+7V
Small signal gain : 22 dB@+5V , 21dB@+6V, 20dB@+7V
Gain flatness: ± 0.5 dB
P-1dB: 30 dB m @+5V , 31 dB m @+6V, 32 dB m @+7V
Psat : 31 dB m @+5V , 32 dB m @+6V, 33 dB m @+7V
Power added efficiency: ⩾45%@ Psat
Power supply: + 5V/ 430mA , +6V/ 450mA, +7V/480mA
50Ohm input/output
100% on-chip testing
Chip size : 1.85 x 1.15 x 0.1mm

Product Introduction

GPA-1314-1B is a wide voltage high added efficiency power amplifier chip based on GaAs process , covering the frequency range of 13.5 ~ 14.5GHz, small signal gain of 20 ~ 22dB, P-1 output power of 30~32 dBm. The chip is powered by +5V~+7V power supply. The chip through-hole metallization process ensures good grounding, and the back side is metallized, which is suitable for eutectic sintering or conductive adhesive bonding process.

Use restriction parameter [1]	
Maximum drain voltage	+8 V
Maximum input power	+2 0 dBm
Operating temperature	-55 ~ + 85 °C
Storage temperature	-65 ~ +150°C

【1】 Exceeding any of these maximum limits may cause permanent damage.

Electrical performance parameters (TA = +25°C , Vd = +5V, +6V, +7V)				
index	Minimum	Typical Value	Maximum	unit
Frequency Range	13.5~14.5			GHz
Small Signal Gain	20~22@+5V~+7V			dB
Gain Flatness		± 0.5		dB
P -1 dB	30~32@+5V~+7V			dBm
Psat	31~33@+5V~+7V			dBm
Input return loss	10.5	12~13		dB
Output return loss		15~18		dB
Quiescent Current	+5V~+7V@ 430~480			mA
*By tuning the Vg terminal voltage from -2V to 0V, make Ids reach the recommended value. The recommended				

Vg terminal voltage is -0.9 V.

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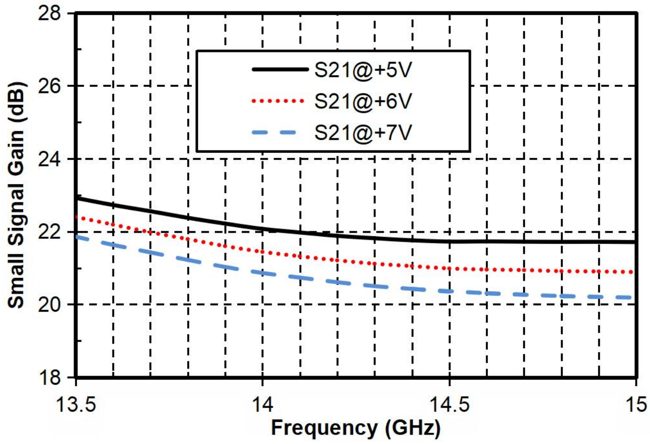
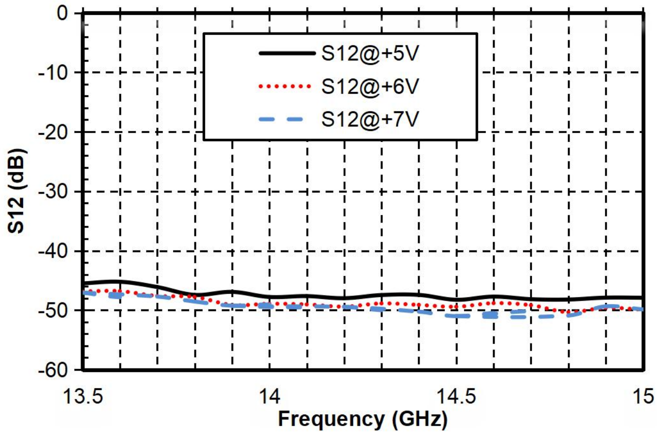
Main index test curve

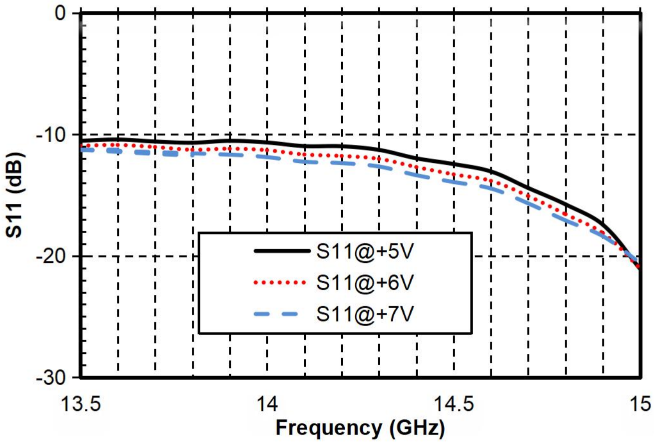
Gain vs. Frequency



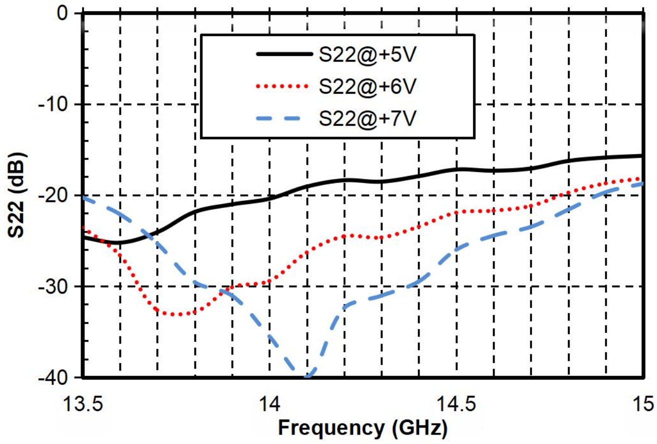
Reverse Isolation vs. Frequency



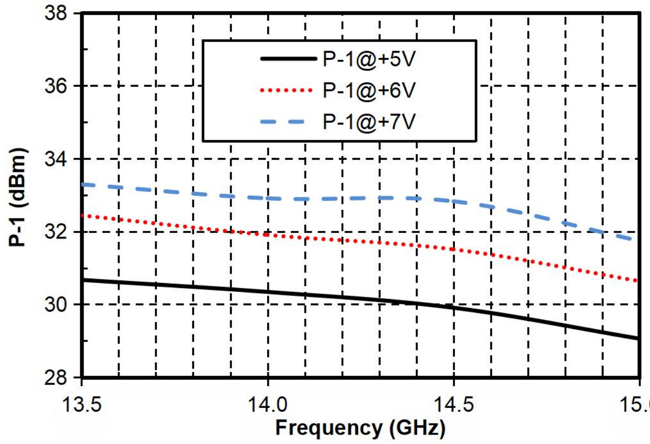
Input Return Loss vs. Frequency



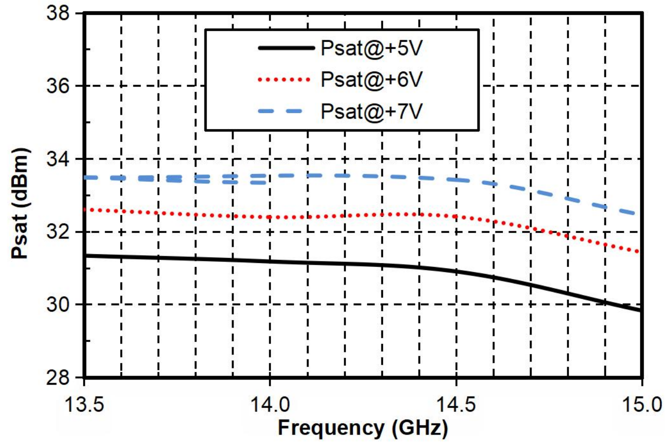
Output Return Loss vs. Frequency



P-1dB vs. Frequency



Psat vs. Frequency



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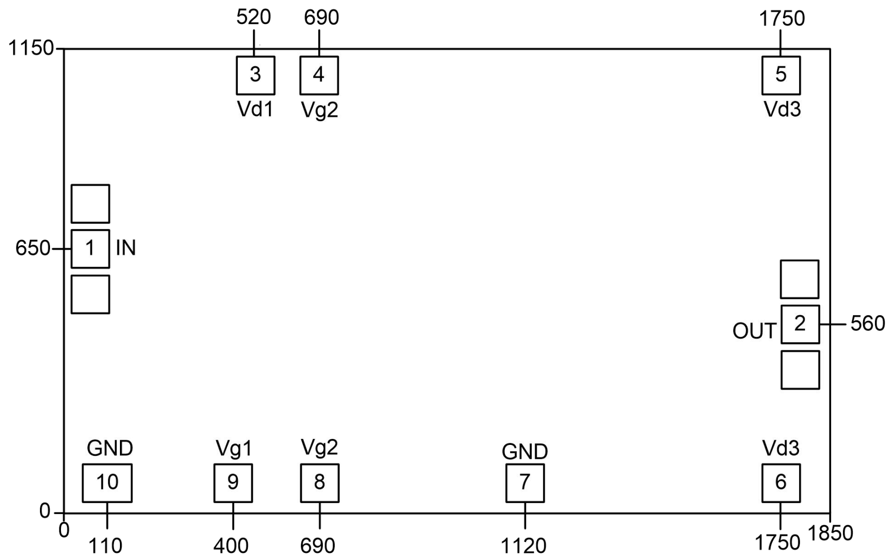
Appearance structure [2]



【 2 】All units in the figure are micrometers

Bonding point definition		
Bonding point number	Function Symbol	Functional Description
1	RF IN	RF signal input terminal, no DC blocking capacitor required.
2	RF OUT	RF signal output terminal, no DC blocking capacitor required.
3	Vd 1	Amplifier drain bias, external 100pF , 1000pF , 4.7uF bypass capacitors are required.
4, 8	Vg2	Dangling.
5	Vd3	Amplifier drain bias, external 10pF , 1000pF , 4.7uF bypass capacitors are required.
6	Vd3	Amplifier drain bias, external 10pF , 1000pF , 4.7uF bypass capacitors are required.
7, 10	GND	Dangling.
9	Vg1	Amplifier gate bias, external 10pF , 1000pF , 4.7uF bypass capacitors are required.
Chip bottom	GND	The bottom of the chip needs to be in good contact with the RF and DC grounds.

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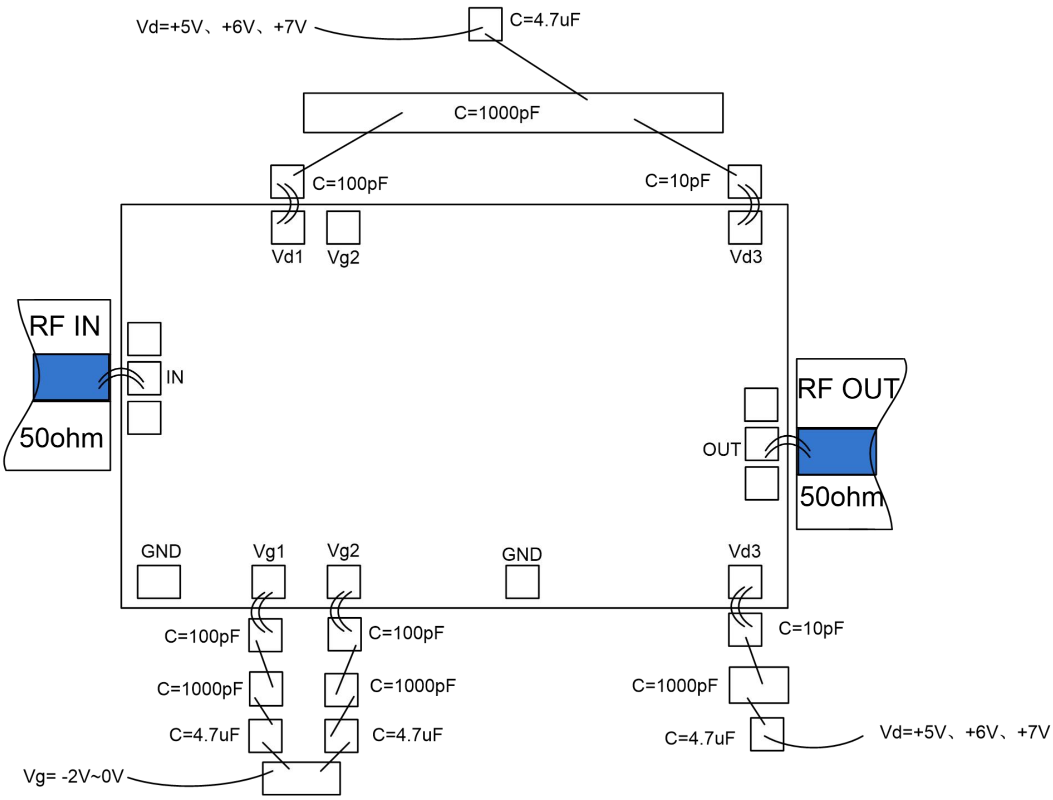
Recommended assembly diagram



Notice

- The chip must be stored in an anti-static container and kept in a nitrogen environment.
- Do not attempt to clean the bare die surface using wet chemical methods.
- Please strictly follow the ESD protection requirements to avoid static damage to the bare chip.
- General operation: Please use precision pointed tweezers to pick up bare chips. Avoid touching the chip surface with tools or fingers during operation.
- Rack mounting operation suggestions: Bare chip mounting can be done by AuSn solder eutectic sintering or conductive adhesive bonding. The mounting surface must be clean and flat.
- Sintering process: It is recommended to use AuSn solder sheets with a gold-tin ratio of 80/20. The working surface temperature reaches 255 ℃ and the tool (vacuum chuck) temperature reaches 265 ℃ . When the high-temperature mixed gas (nitrogen-hydrogen ratio of 90/10) is blown to the chip, the temperature at the top of the tool should be raised to 290 ℃ . Do not let the chip exceed 320 ℃ for more than 20 seconds. The friction time should not exceed 3 seconds.
- Bonding process: The amount of conductive glue dispensed should be as small as possible. After the chip is placed in the installation position, the conductive glue can be vaguely seen around it. For curing

conditions, please follow the information provided by the conductive glue manufacturer.

- Bonding operation suggestions: Use Φ0.025mm (1mil) gold wire for both ball and wedge bonding. Thermosonic bonding temperature is 150 ℃ . The pressure of the wedge bonding knife is 40~50gf for ball bonding and 18~22gf for wedge bonding. Use the smallest possible ultrasonic energy. The bonding starts at the pressure point on the chip and ends at the package (or substrate).