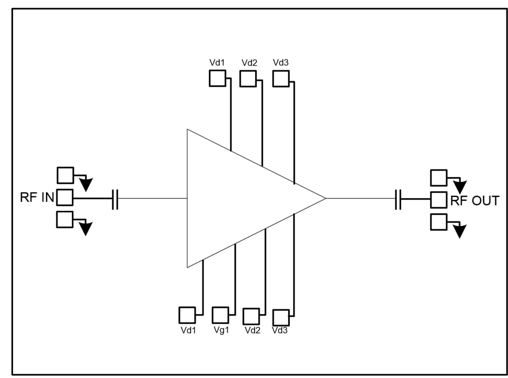
GaAs MMIC Power Amplifier Chip, 13-15GHz

Performance characteristics

Frequency range: 13-15GHz
Small Signal Gain: 26 dB
P -1dB: 37 dBm
Psat: 37.5 dBm
OIP3: 42dBm@14GHz
Power supply: 7 V/ 1300 mA
50Ohm input/output
Chip size: 3.24 x 3.12 x 0.1mm

Functional Block Diagram



Product Introduction

GPA -1315B is a high-gain, high- power amplifier chip based on GaAs technology , covering a frequency range of 13~15GHz, a small signal gain of 26dB , a P-1dB output power of 37dBm, and an additional efficiency of 33% . The chip via metallization process ensures good grounding, and the back side is metallized for eutectic sintering process.

Use restriction parameter [1]	
Maximum drain voltage	+8 V
Maximum gate bias	- 3 V
Maximum input power	+18 dBm
Operating temperature	-55 ~ +85°C
Storage temperature	-65 ~ +150°C

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

Electrical parameters (Ta=+25°C, Vd= 7 V, Ids= 1300 mA)

index	Minimum	Typical Value	Maximum	unit
Frequency Range		13 - 15		GHz
Small Signal Gain	26	26	27	dB
Gain Flatness		± 0.5		dB
P-1dB	-	37	-	dBm
Psat	37	37.5	-	dBm
Input return loss	-	25	-	dB
Output return loss	-	25	-	dB
* By tuning the Vg terminal voltage -2V~0V , make Ids reach 1300mA; the recommended gate voltage is -1.0V.				

GaAs MMIC Power Amplifier Chip, 13-15GHz

Main index test curve

Gain vs. Frequency

Small Signal Gain (dB)
36
34
32
30
28
26
24
22
20
18
16
14
12
10
12 13 14 15 16
Frequency (GHz)
S21@+25C
S21@+85C
S21@ -55C

Reverse Isolation vs. Frequency

S12 (dB)
0
-10
-20
-30
-40
-50
-60
-70
-80
12 13 14 15 16
Frequency (GHz)
S12@+25C

Input Return Loss vs. Frequency

S11 (dB)
0
-10
-20
-30
-40
12 13 14 15 16
Frequency (GHz)
S11@+25C

Output Return Loss vs. Frequency

S22 (dB)
0
-10
-20
-30
-40
12 13 14 15 16
Frequency (GHz)
S22@+25C

P-1dB vs. Frequency

P-1dB (dBm)
40
38
36
34
32
30
28
26
24
22
20
12 13 14 15 16
Frequency (GHz)
P-1@+25C
P-1@+85C
P-1@-55C

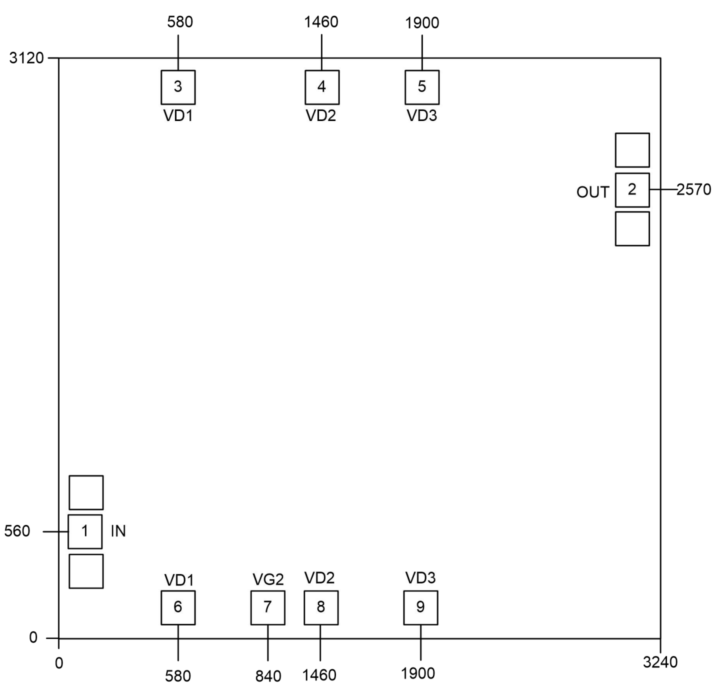
Psat vs. Frequency

Psat (dBm)
40
38
36
34
32
30
28
26
24
22
20
12 13 14 15 16
Frequency (GHz)
Psat@+25C
Psat@+85C
Psat@ -55C

Add: 101 cecil street #14-10, tong eng building singapore 069533
Email: info@standardcircuit.com
Web: www.standardcircuit.com
Tel: +65 82613258

GaAs MMIC Power Amplifier Chip, 13-15GHz

Appearance structure [2]

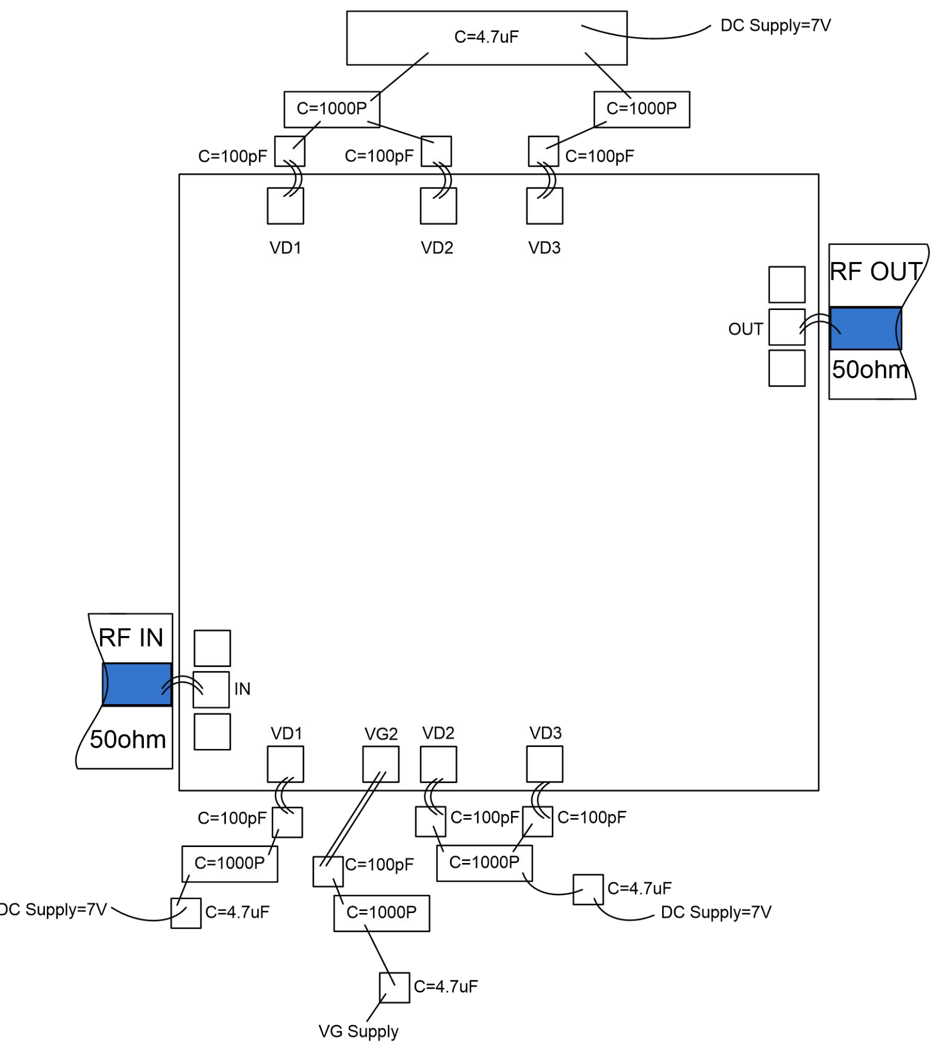


【 2 】All units in the figure are micrometers

Bonding point definition			
Bonding point number	Function Symbol	Functional Description	Equivalent Circuit
1	RF IN	The signal input terminal is connected to a 50 ohm circuit, and no DC blocking capacitor is required.	RF IN
2	RF OUT	The signal output terminal is connected to a 50 ohm circuit, and no DC blocking capacitor is required.	RF OUT
3, 4, 5, 6, 8, 9	V D1~3	Amplifier drain bias, external 100pF , 1000pF , 4.7uF bypass capacitors are required.	Vdd
7	VG	Amplifier gate bias, external 100pF , 1000pF , 4.7uF bypass capacitors are required.	Vg
Chip bottom	GND	The bottom of the chip needs to be in good contact with the RF and DC grounds	GND

GaAs MMIC Power Amplifier Chip, 13-15GHz

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: AuSn solder eutectic sintering process can be used for bare chip mounting. 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 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).