Standard Circuit

# GPA -0812B

## GaAs MMIC Power Amplifier Chip, 8-12GHz

### Performance characteristics

Frequency range: 8-12GHz
Small Signal Gain: 16.5 dB
P-1dB: 31.5 dBm
Psat: 32 dBm
PAE : 42%
Power supply: +8V / 200mA
50Ohm input/output
100% on-chip testing
Chip size: 2.05 x 1.5 x 0.1mm

### Product Introduction

GPA-0812B is a broadband high-gain, high-efficiency, high- power amplifier chip based on GaAs technology , covering a frequency range of 8~12GHz, a small signal gain of 16.5dB, a P-1 output power of 31.5dBm , and a saturation efficiency of 40% . 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 | +10 V |
| Maximum gate bias | -3 V |
| Maximum input power | +20 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 =+ 8 V, Ids= 200 mA) | | | | |
|---|---|---|---|---|
| Index | Minimum | Typical Value | Maximum | Unit |
| Frequency Range | | 8 - 12 | | GHz |
| Small Signal Gain | 16 | 16.5 | 17 | dB |
| Gain Flatness | | ± 0.5 | | dB |
| Reverse Isolation | | 51 | | dB |
| P-1dB | 31 | 31.5 | - | dBm |
| Psat | 31.5 | 32 | - | dBm |
| PAE | 37 | 42 | - | % |
| Noise | - | 6.5 | - | |
| Input return loss | 14 | 15 | - | dB |
| Output return loss | 9.5 | 11 | - | dB |
| * By tuning the Vg terminal voltage -2V~0V , the recommended gate voltage is -0.85V. | | | | |

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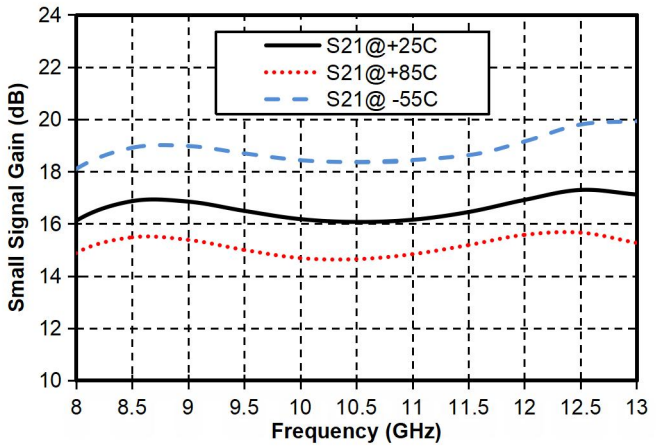
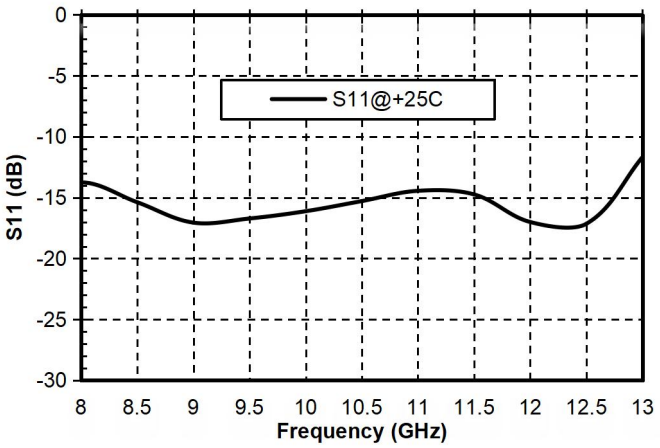
### Main index test curve

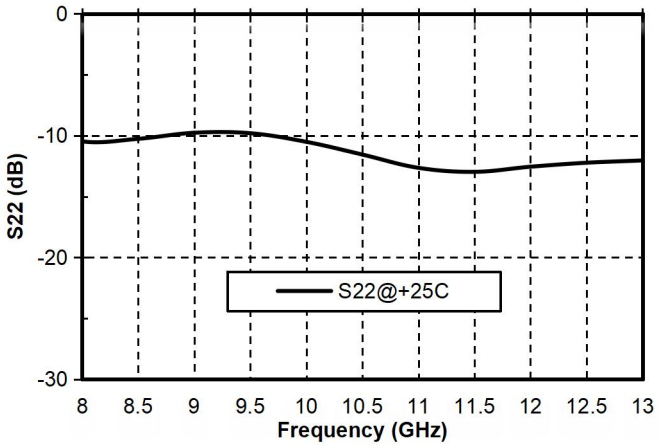
Gain vs. Frequency



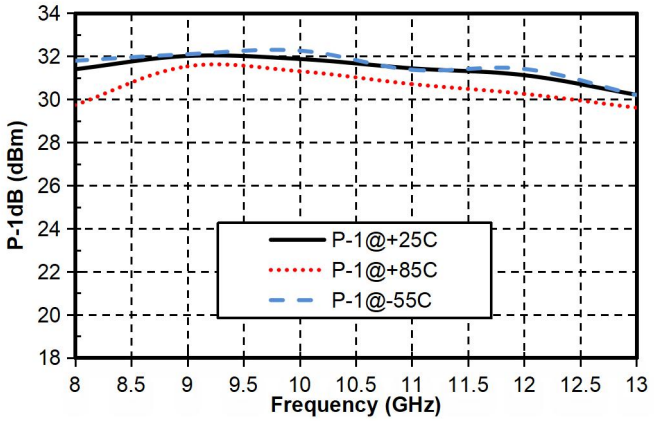

Input Return Loss vs. Frequency



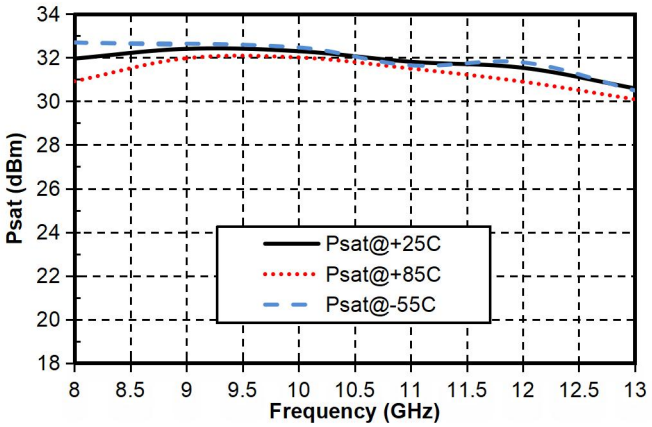

Output Return Loss vs. Frequency



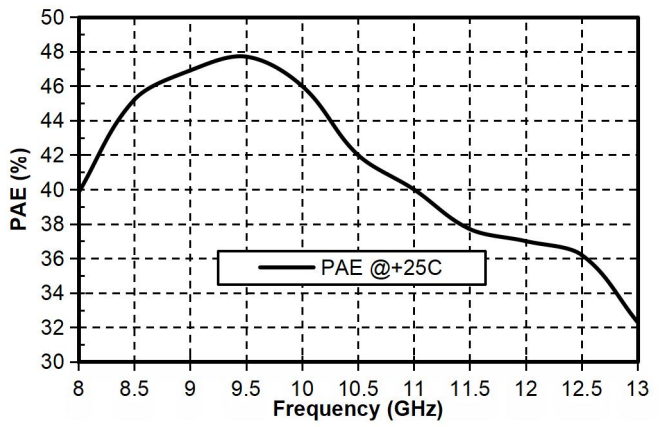

P-1dB vs. Frequency




Psat vs. Frequency




P AE vs. Frequency

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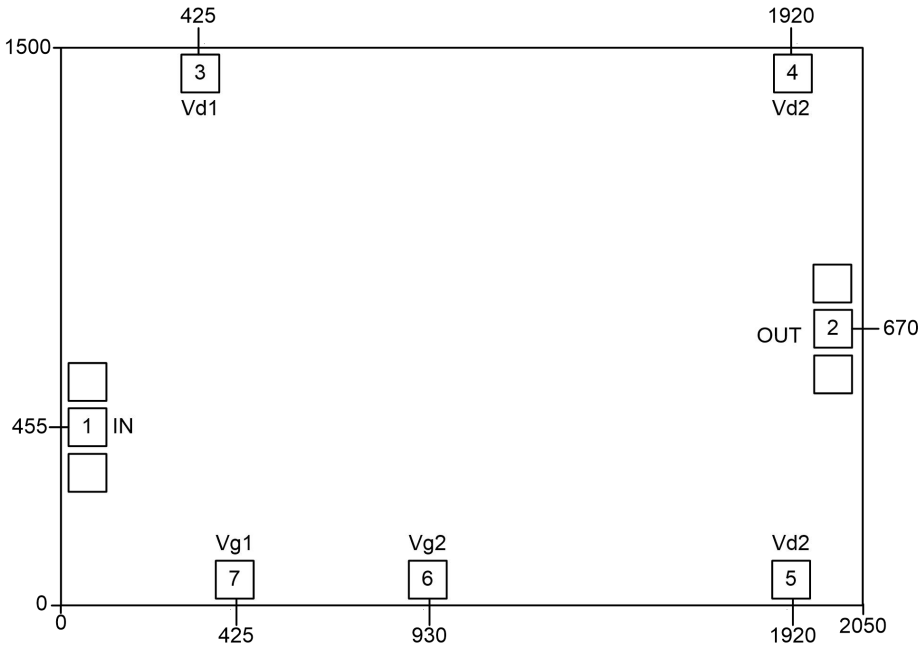
### Appearance structure [2]

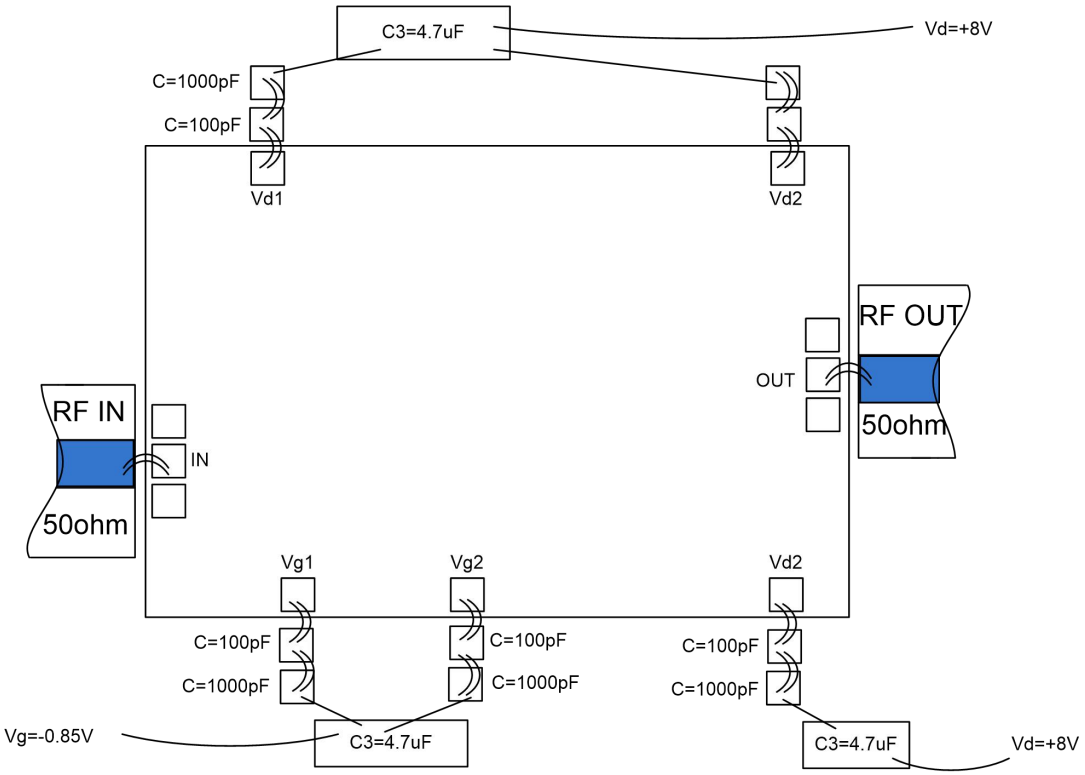



【 2 】All units in the figure are micrometers

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

## GaAs MMIC Power Amplifier Chip, 8-12GHz

### Recommended assembly diagram




### Notice

- The chip must be stored in an anti-static container and kept in a nitrogen environment.
- 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).