

BSTGPA92-0812

8-12GHz GaN Power Amplifier

Data Sheet

I. Product Introduction

BSTGPA92-0812 is a high-performance GaN power amplifier chip with a frequency range of 8 to 12 GHz and can operate in both pulsed and continuous wave modes. In pulsed mode, it achieves a small signal gain of 31.5 dB, a saturated output power of 46.5 dBm, and a power-added efficiency of 44%. This chip utilizes on-chip through-hole metallization to ensure good grounding, eliminating the need for additional grounding measures and making it easy to use. The back side is metallized and suitable for eutectic sintering process.

II. Key Technical Indicators

- Frequency range: 8-12GHz
- Small signal gain (Pulse): 31.5dB
- Saturated output power (Pulse): 46.5dBm
- Power added efficiency (Pulse): 44%
- Power gain (Pulse): 22dB
- Input return loss: -14dB
- Quiescent operating current (Pulse): 1.64A @+28V
- Chip size: 4.00mm × 4.00mm × 0.075mm

II. Functional Block Diagram

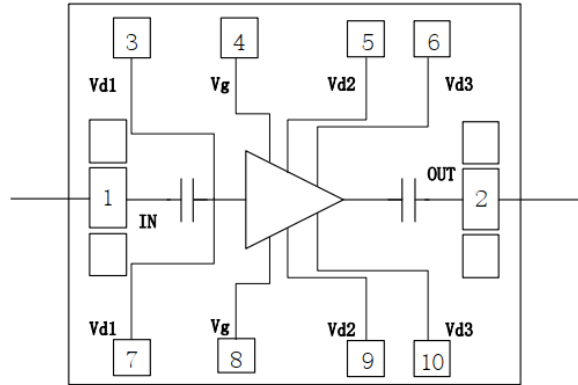


Figure 1.

III. Electrical Performance

Table 1. ($T_A = +25^{\circ}\text{C}$, $V_{d1} = V_{d2} = V_{d3} = +28\text{V}$, $V_g = -2.6\text{V}$, Pulse Mode)

PARAMETER NAME	SYMBOL	MINIMUM	TYPICAL VALUES	MAXIMUM	UNIT
Frequency range	Freq	8	—	12	GHz
Small signal gain	Gain	30	31.5	33.8	dB
Saturated output power	Psat	45.7	46.5	47	dBm
Power added efficiency	PAE	40	44	50	%
Power gain	Gp	21.5	22	23	dB
Input return loss	RL_IN	—	-14	-7	dB
Dynamic current	IDD	—	3.4	4	A
Quiescent operating current *	IDQ	—	1.64	1.88	A
* Adjust V_g within the -3V to -2.4V range to achieve a pulse quiescent current of 1.64A. Reference V_g values: -2.6V for pulse, -2.6V for CW.					

IV. Absolute Maximum Ratings

Table 2.

PARAMETER	VALUE
Maximum drain operating voltage	+40V
Maximum gate operating voltage	-5V
Maximum input power	+30dBm
Storage temperature	$-65^{\circ}\text{C} \sim +150^{\circ}\text{C}$
Operating temperature	$-55^{\circ}\text{C} \sim +125^{\circ}\text{C}$

V. Test curve ($V_g=-2.6V$, $V_{d1}=V_{d2}=V_{d3}=+28V$, pulse test conditions: pulse width 1ms, duty cycle 10%)

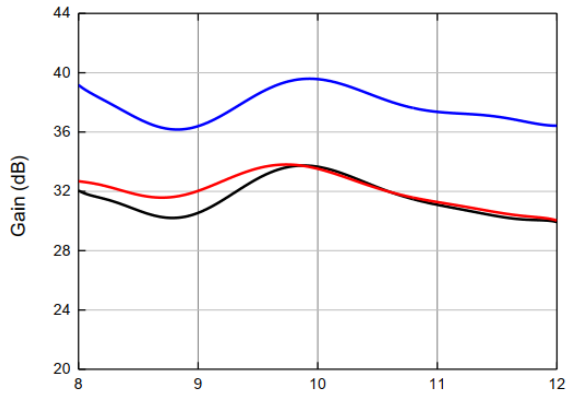


Figure 2. Small signal gain (Pulse)

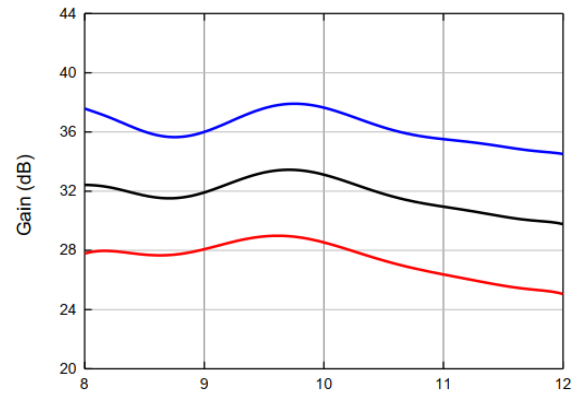


Figure 3. Small Signal Gain (CW)

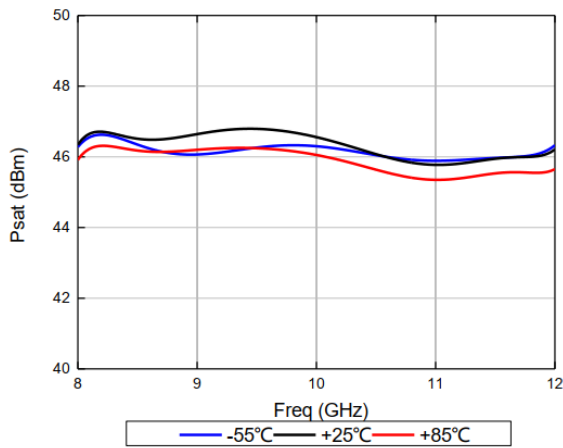


Figure 4. Saturated output power (Pulse)

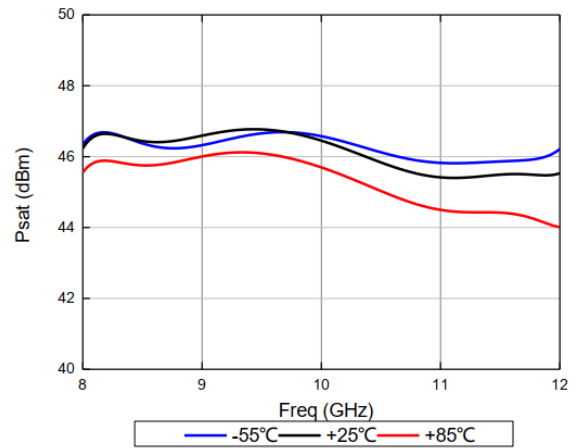


Figure 5. Saturated output power (CW)

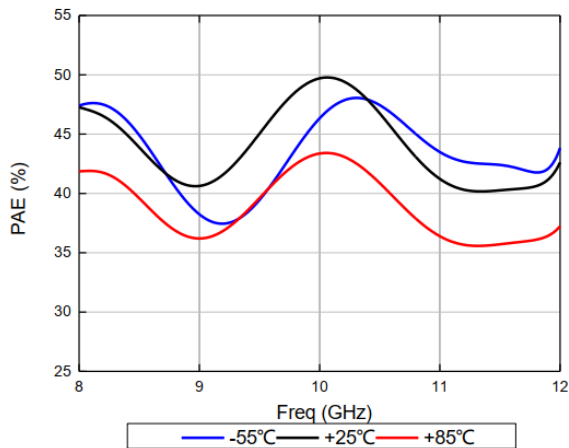


Figure 6. Power added efficiency (Pulse)

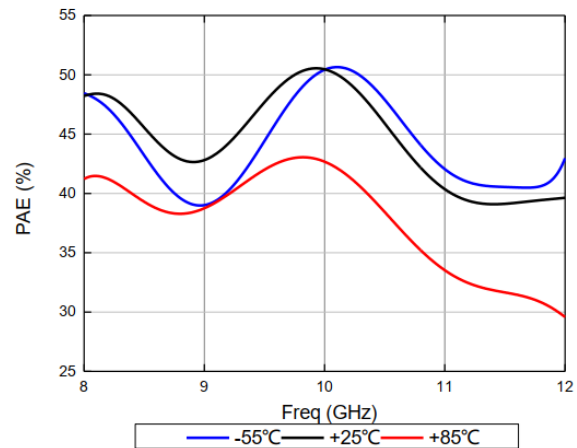


Figure 7. Power added efficiency (CW)

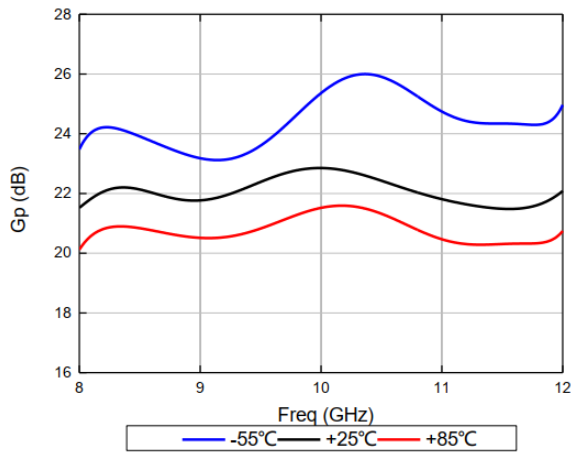


Figure 8. Power gain (Pulse)

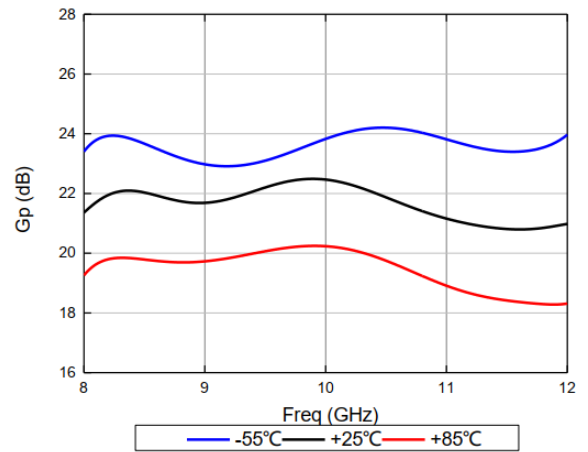


Figure 9. Power gain (CW)

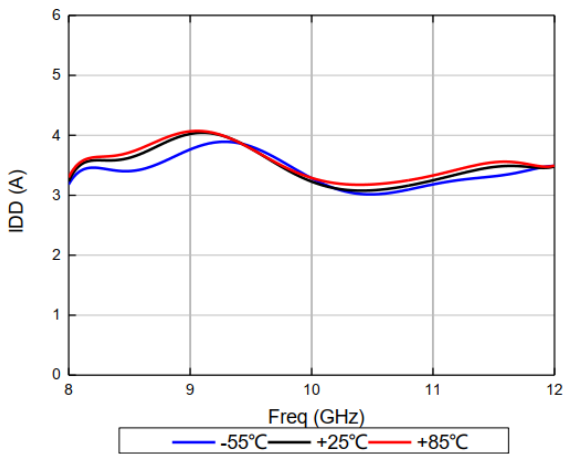


Figure 10. Dynamic current (Pulse)

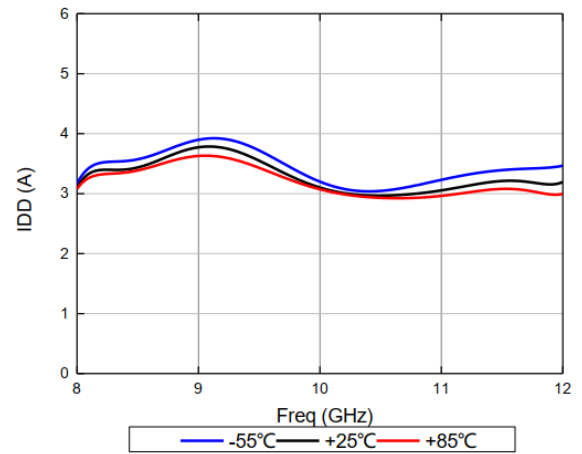


Figure 11. Dynamic current (CW)

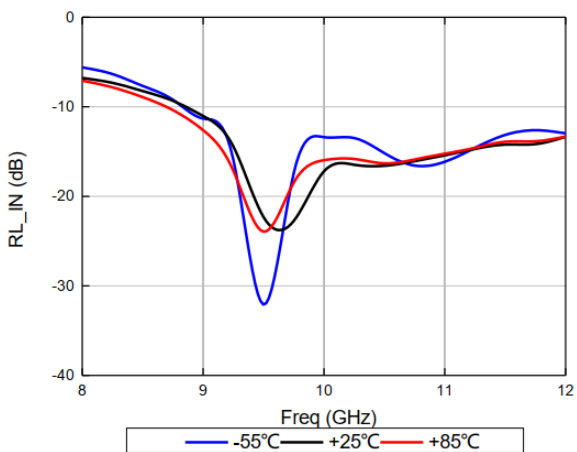


Figure 12. Input return loss (Pulse)

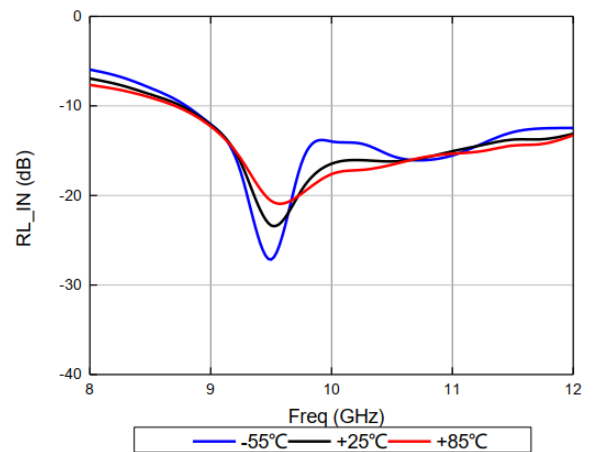


Figure 13. Input return loss (CW)

VI. Chip Port Diagram (unit: μm)

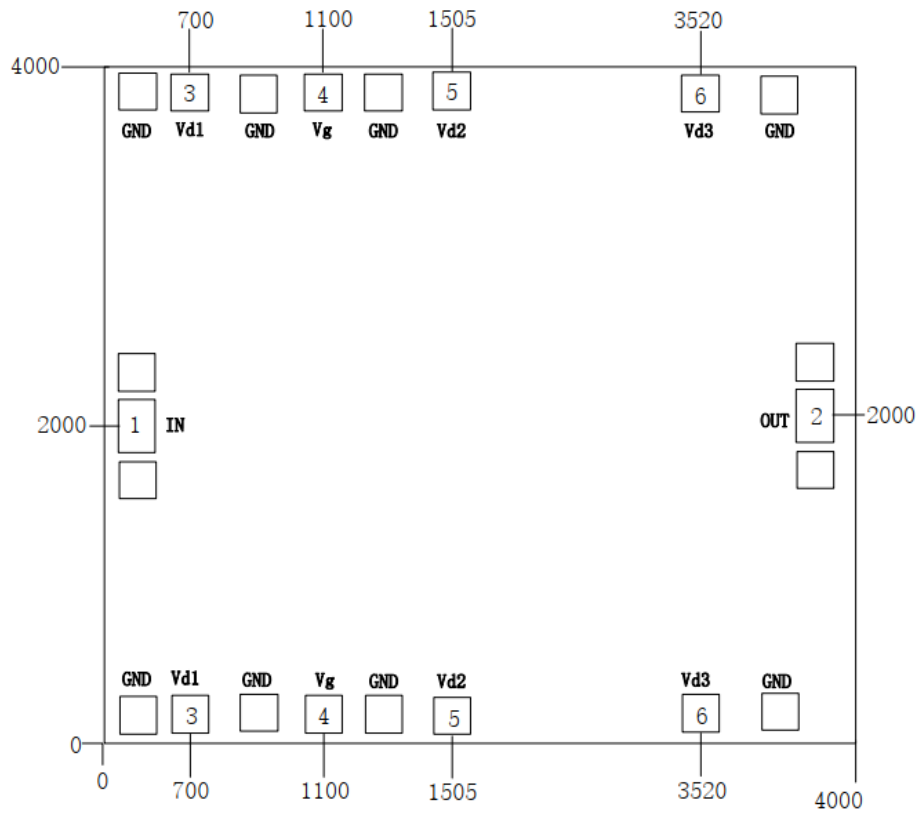


Figure 14.

6.1. Port Definition

SERIAL NUMBER	PORT NAME	DEFINITION	SIGNAL OR VOLTAGE
4	Vg	Negative power supply, it is recommended to add a 100pF capacitor	-2.6V
3/5/6	Vd1/2/3	Positive power supply, it is recommended to add a 100pF capacitor	28V
1	IN	RF signal input terminal	RF
2	OUT	RF signal output terminal	RF

VII. Recommended Assembly Drawing

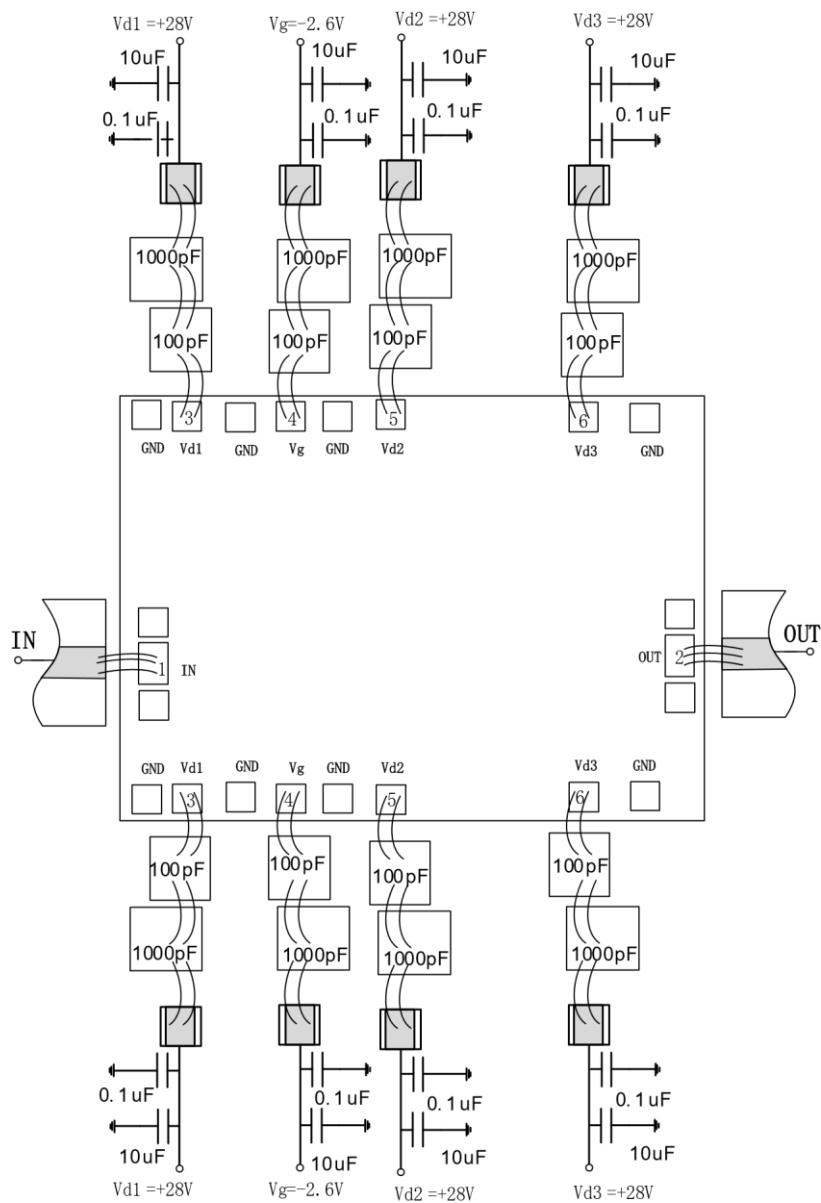


Figure 15.

VIII. Notes

- Assemble and use in a clean environment.
- GaN material is very brittle and the chip surface is easily damaged (do not touch the surface), so you must be careful when using it.
- Use three bonding wires (25μm diameter gold wire) for input and output. Keep the bonding wires as short as possible and no longer than 300μm.

- The sintering temperature should not exceed 300°C and the sintering time should be as short as possible, not exceeding 30 seconds.
- This product is an electrostatic sensitive device, please be careful to prevent static electricity during storage and use.
- Store in a dry, nitrogen environment.
- Do not attempt to clean the chip surface with dry or wet chemical methods.