

BSTPA40-0812

8-12GHz Power Amplifier

Data Sheet

I. Product Introduction

BSTPA40-0812 is a high-performance GaAs 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 offers a small signal gain of 23.5 dB, a saturated output power of 40.5 dBm, and a power-added efficiency of 45%. 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 or conductive adhesive bonding.

II. Key Technical Indicators

- | | |
|-------------------------------------|----------------------|
| • Frequency range: | 8-12GHz |
| • Small signal gain (Pulse): | 23.5dB |
| • Saturated output power (Pulse): | 40.5dBm |
| • Power added efficiency (Pulse): | 45% |
| • Input return loss: | -15dB |
| • Output return loss: | -16dB |
| • Static operating current (Pulse): | 2A@+8V |
| • Chip size: | 3.65mm×4.00mm×0.10mm |

III. Functional Block Diagram

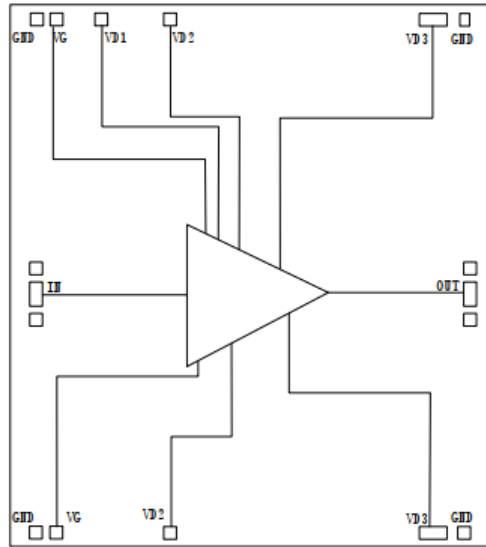


Figure 1. Functional Block Diagram

IV. Electrical Performance Table

$T_A = +25^\circ\text{C}$, $VD1 = VD2 = VD3 = +8\text{V}$, $VG = -0.8\text{V}^*$, Pulse Mode

Table 1.

PARAMETER NAME	SYMBOL	MINIMUM	TYPICAL VALUES	MAXIMUM	UNIT
Frequency range	Freq	8	—	12	GHz
Small signal gain	Gain	22	23.5	24	dB
Saturated output power	Psat	40	40.5	41	dBm
Power added efficiency	PAE	40	45	47	%
Input return loss	RL_in	—	-15	-11	dB
Output return loss	RL_out	—	-16	-10	dB
Dynamic current	IDD	—	2.6	3.1	A
Quiescent operating current *	IDQ	—	2	—	A
* VG reference value: -0.8V for Pulse, -0.8V for CW.					

V. Absolute Maximum Ratings

Table 2.

PARAMETER	LIMIT VALUE
Maximum drain operating voltage	+9V
Maximum gate operating voltage	-0.5V
Maximum input power	+25dBm
Storage temperature	-65°C~+150°C
Operating temperature	-55°C~+125°C

VI. Test Curve

VG=-0.8V, VD1=VD2=VD3=+8V, pulse test conditions: pulse width 1ms, duty cycle 10%

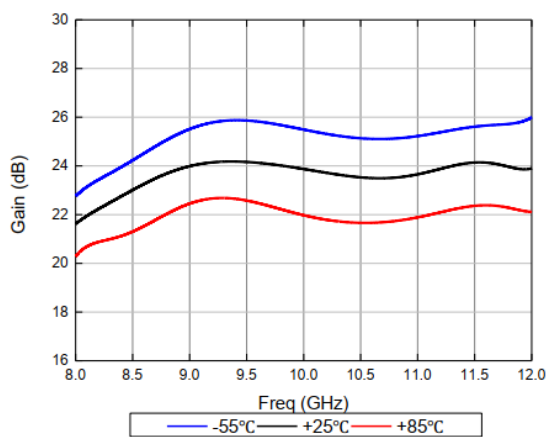


Figure 2. Small signal gain (Pulse)

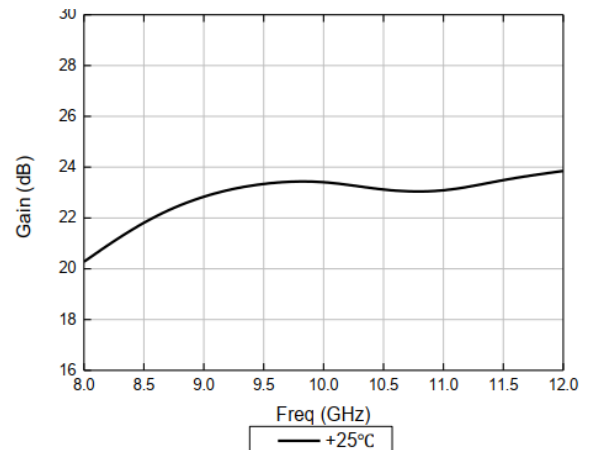


Figure 3. Small Signal Gain (CW)

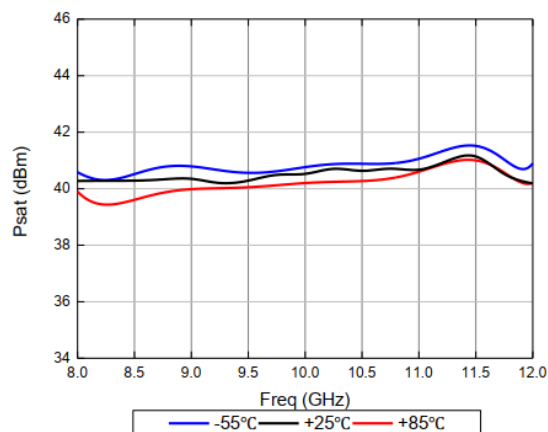


Figure 4. Saturated output power (Pulse)

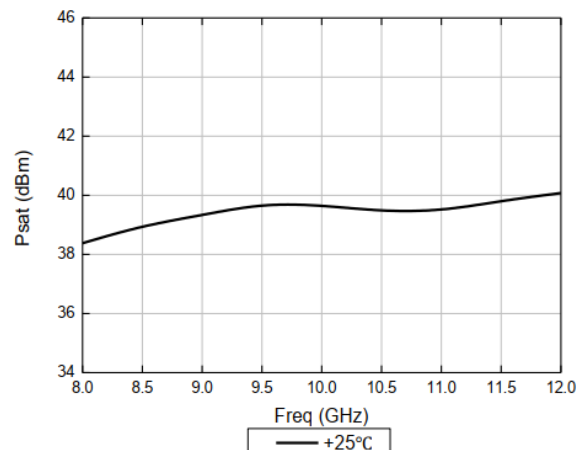


Figure 5. Saturated output power (CW)

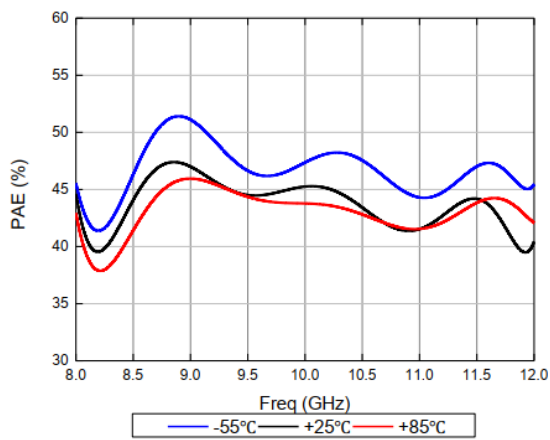


Figure 6. Power added efficiency (Pulse)

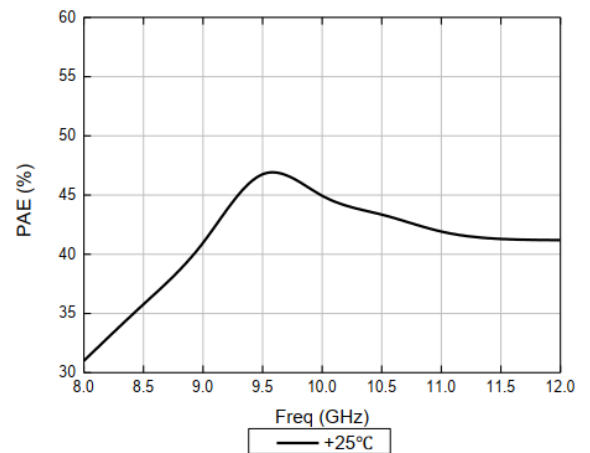


Figure 7. Power added efficiency (CW)

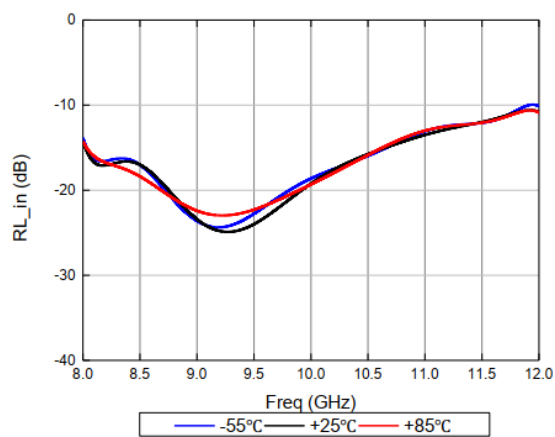


Figure 8. Input return loss (Pulse)

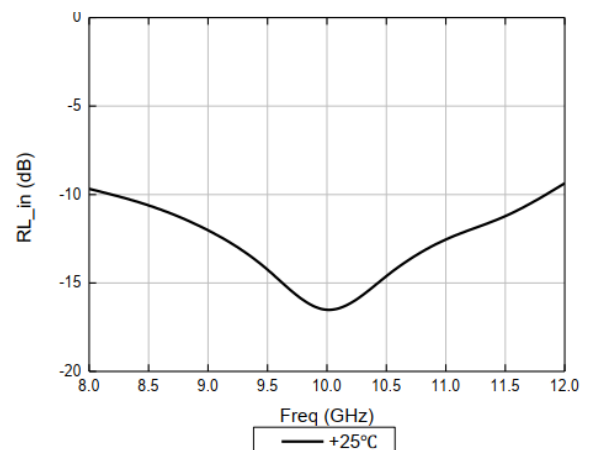


Figure 9. Input return loss (CW)

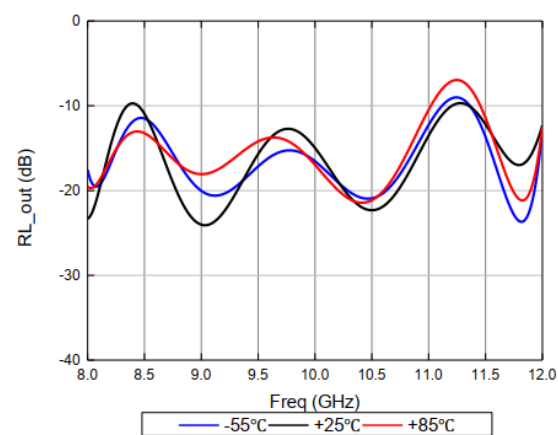


Figure 10. Output return loss (Pulse)

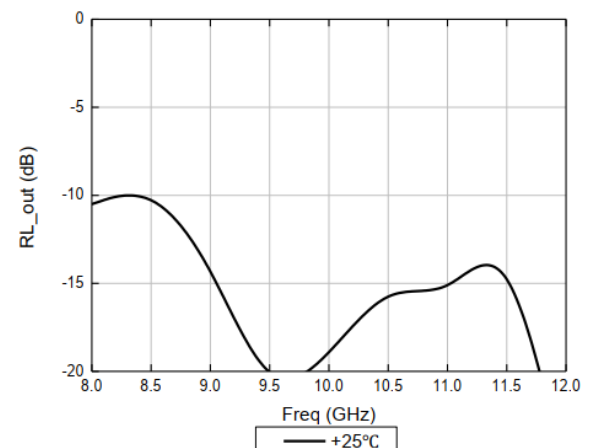


Figure 11. Output return loss (CW)

VII. Chip Port Diagram (Unit: μm)

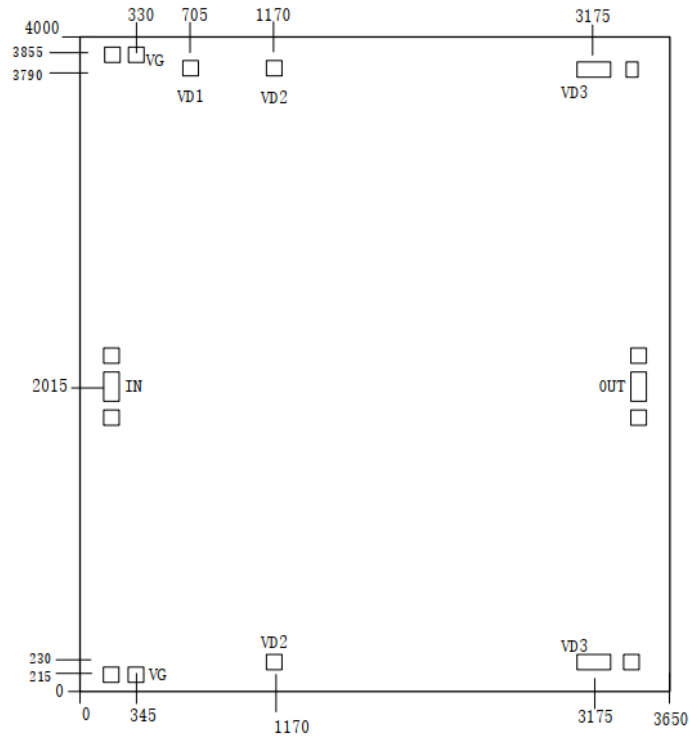


Figure 12.

VIII. Port Definition

Table 3.

PORT NAME	DEFINITION	SIGNAL OR VOLTAGE
IN	RF signal input terminal	RF
OUT	RF signal output terminal	RF
VG	Gate voltage, it is recommended to add a 100pF capacitor	-0.8V
VD ₁	First drain voltage, it is recommended to add a 100pF capacitor	+8V
VD ₂	Second drain voltage, it is recommended to add a 100pF capacitor	+8V
VD ₃	The third drain voltage, it is recommended to add a 100pF capacitor	+8V
/	Ground pressure point for probe testing	/

IX. Recommended Assembly Drawing

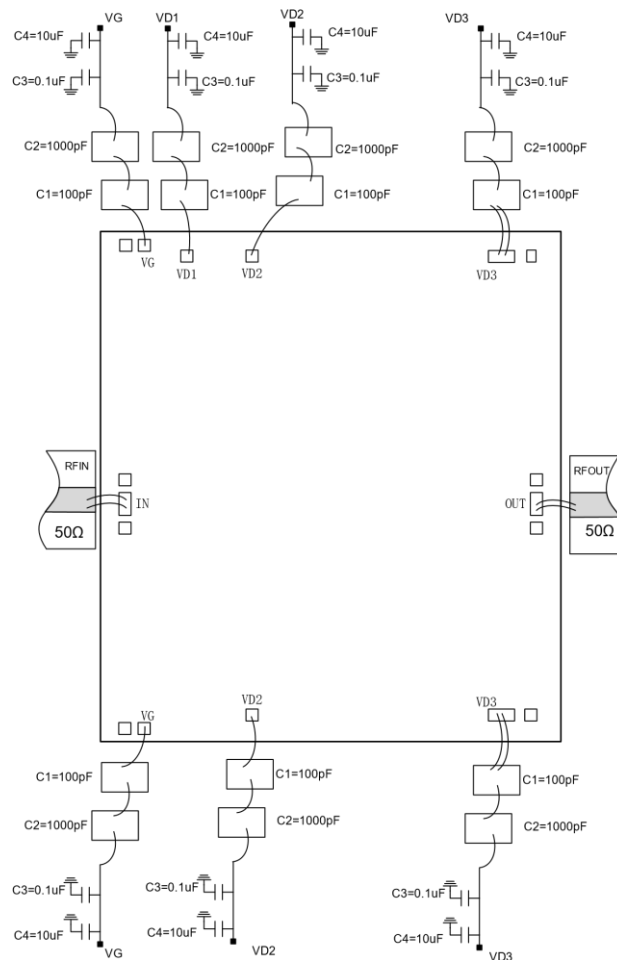


Figure 13.

X. Precautions

- Assemble and use in a clean environment;
- GaAs 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 two 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.