

BSTGPA12- 0713

7-13 GHz GaN Power Amplifier Data Sheet

Product Introduction

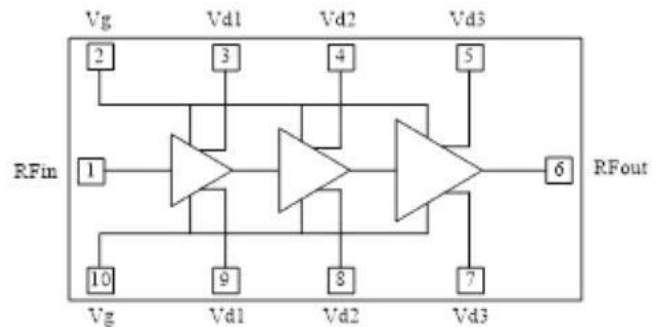
BSTGPA12-0713 Is a 0.25 μ m GaN amplifier chip made with HEM T technology. The operating frequency range covers 7.0 GHz to 13.0 GHz, the power gain is greater than 21.5 dB, the typical saturated output power is 45.5 dB m, the typical power added efficiency is 40 %, and it can operate in pulse /continuous wave mode. The chip is grounded through a back-side via, and the typical operating voltage is $V_D = + 28$ V, $V_G = - 2.5$ V.

Key technical indicators

- Frequency range: 7GHz~13GHz
- Power Gain: 23.5dB
- Saturated output power: 45.5dBm
- Power added efficiency: 40%
- Power supply: +28V
- Chip size: 3.50 mm×3.20 mm×0.10 mm

Application Areas

- Microwave transceiver components
- Solid-state transmitter



BSTGPA12-0713 Functional Block Diagram

DC parameters (TA = +25 °C)

Index	Symbol	Minimum	Typical Value	Maximum	Unit
Gate operating voltage	V _g	- 3.0	- 2.5	- 2.4	V
Drain operating voltage	V _d	-	28	-	V
Quiescent Drain Current	I _d	-	1.7	2	A
Dynamic drain current	I _{dd}	-	2.5	3.0	A
Dynamic gate current	I _{gg}	-	3.0	10.0	mA

Microwave electrical parameters (TA = +25 °C , V_d = +28V , V_g = -2.5V)

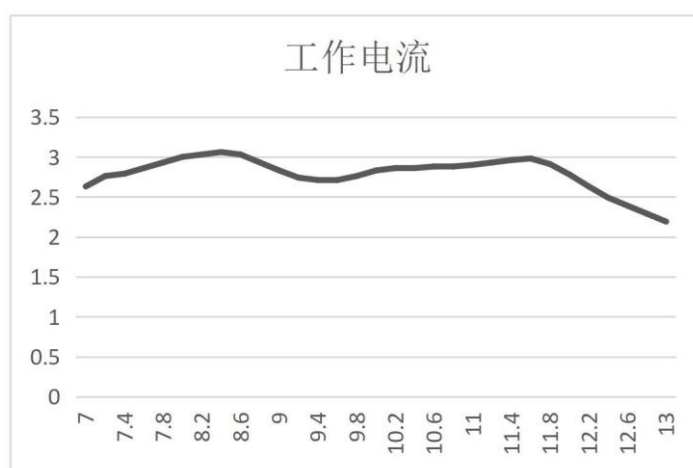
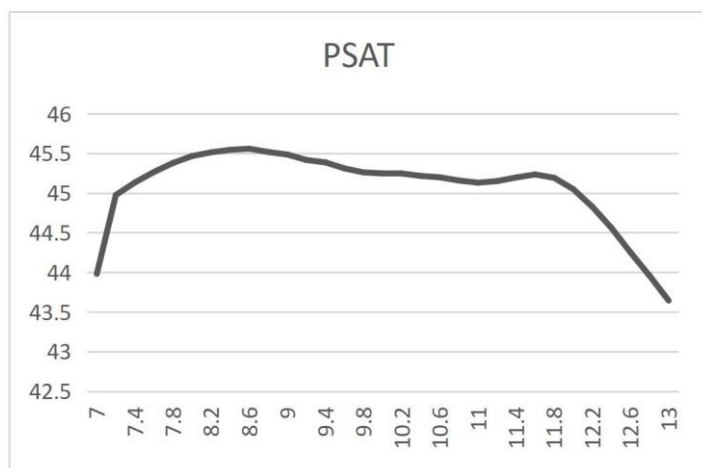
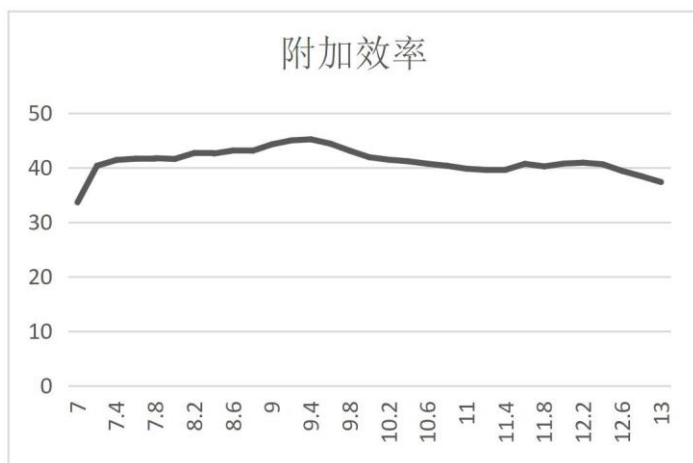
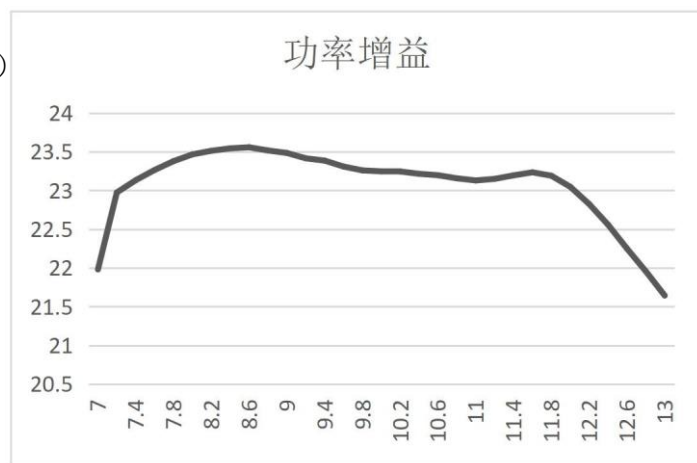
index	Symbol	Minimum	Typical Value	Maximum	Unit
Frequency range	f	7.0 ~ 13.0			GHz
Saturated output power	P _{SAT}	43.5	45.2	-	dBm
Power Gain	G _P	21.5	-	23.5	dB
Power gain flatness	Δ G _P	-	-	±1	dB
Power Added Efficiency	PAE	36	-	47	%
Linear gain	S ₂₁	-	33	-	dB
Linear gain flatness	Δ S ₂₁	-	-	±3	dB
Input standing wave	VSWR (in)	-	1.6	2.0	-

Note: All chips have been 100 % DC tested and 100 % RF tested on-chip;

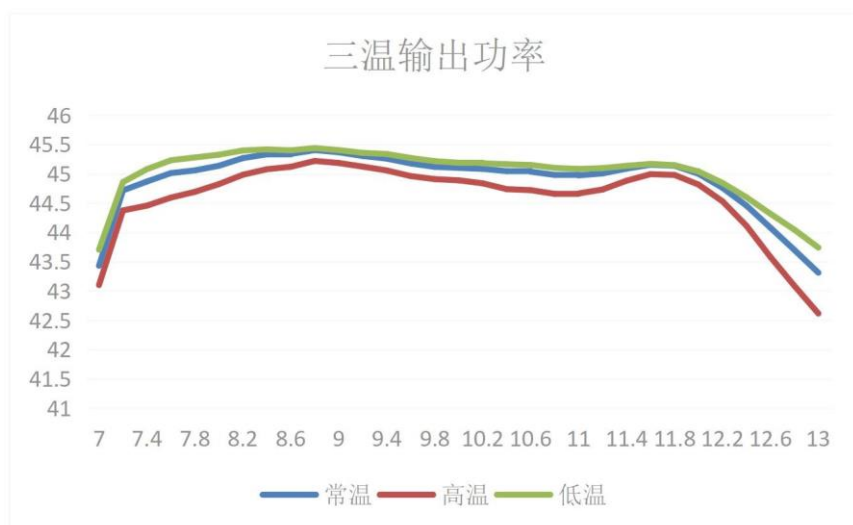
Limited use parameters

parameter	Symbol	Limit value
Maximum drain-source forward bias voltage	V _D	+32V
Minimum gate negative bias	V _G	- 5V
Maximum input power	P _{IN}	+28dBm
Storage temperature	T _{STG}	-65 °C ~ +150 °C
Maximum operating channel temperature	T _{OP}	+225 °C

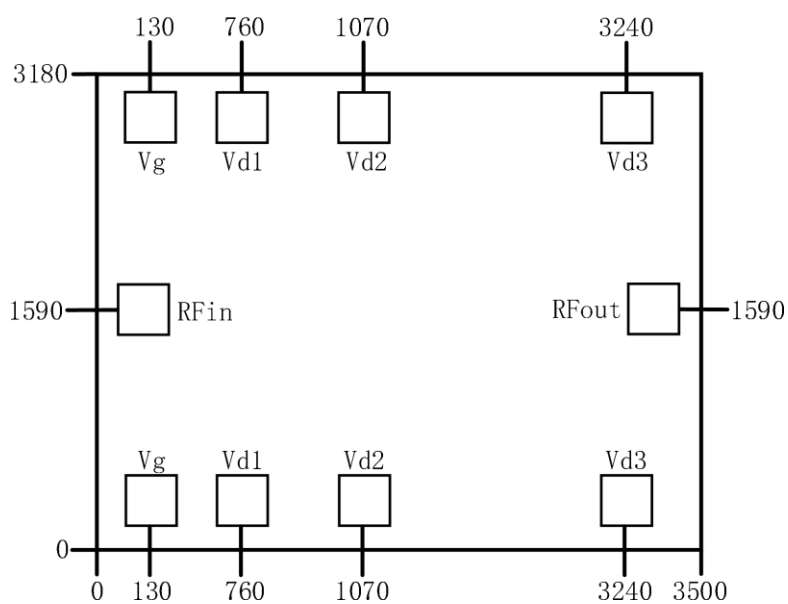
Typical curve ($V_d=+28V$, $V_g= -2.5V$, $P_{IN}=22dBm$)



Three-temperature test: $V_D=28V$, $V_G=-2.5V$, $P_{in}=22dBm$, 10% duty cycle.



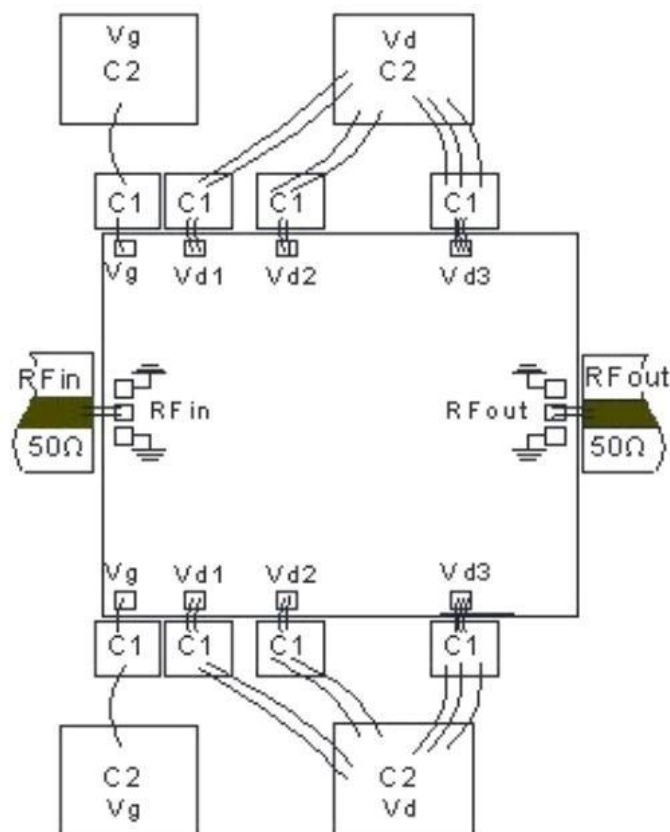
Chip port diagram



Port Definition

Port Name	Definition	Signal or voltage
Vg	Gate voltage	- 2.5V
Vd1/Vd2/Vd3	Amplifier Power Supply	28V
RFin	RF Input	RF
RFout	RF Output	RF

Recommended assembly drawing



Note:

1. The capacitance of the external capacitor is $C1=100\text{pF}$, $C2=1000\text{pF}$
It is recommended to use a single-layer ceramic capacitor, where $C1$ It should be as close to the chip as possible, not exceeding $750\mu\text{m}$.
2. Consider $125\mu\text{m} \sim 250\mu\text{m}$
The low-loss and low-dielectric constant microstrip line is bonded / sintered on the carrier to reduce transmission loss. The input and output bonding wire length is controlled at $350\mu\text{m} \pm 150\mu\text{m}$
3. Close to chip gate V_g a $10\mu\text{f}$ tantalum capacitor or electrolytic capacitor should be added.