

BSTGPA51-0203P

GaN Internally Matched Power Amplifier

Data Sheet

I. Product Introduction:

BSTGPA51-0203P is a gallium nitride high electron mobility transistor (GaN HEMT). It is a high-efficiency, high-power internally matched pulsed power transistor that can operate in pulsed mode at saturated power. It is designed for standard communications and radar frequency bands and provides optimal power and gain performance in 50Ω systems.

II. Performance Characteristics

- Covered operating frequency band range: 2.7GHz ~3.5GHz
- Good 50Ω impedance matching, easy to cascade
- Metal ceramic tube sealed package
- Adopt screw-fixed flange package or welded pill package.

III. Electrical Performance Table:

Operating conditions: 50Ω test system, $T_A = +25^{\circ}\text{C}$, $V_{DS} = +28\text{V}$, $I_{DS} = 80\text{mA}$, 10% duty cycle, 200us pulse width.

Table 1

PARAMETER NAME	TEST CONDITIONS		MINIMUM	TYPICAL	MAXIMUM	UNIT
P_{sat}	Freq.=2.7GHz~3.5GHz $V_{DS}=28\text{V}$ $V_{GS}=-2.8\sim-4\text{V}$ $I_{DSq}=80\text{mA}$ Pulse test: 200us pulse width, 10% duty cycle compare		51	-	-	dBm
Power gain			12	-	-	dB
Power added efficiency			50			
Power flatness			-	-	1	dB
pinch-off voltage	$V_{DS}=6\text{V}$	$I_{DS}\leq 100\text{mA}$	-8	-	-4	V
Gate-source reverse current	$V_{DS}=0\text{V}$	$V_{GS}=-10\text{V}$	-	-	5	uA

Note: Final technical indicators and dimensions are subject to the technical agreement. Products with similar power specifications, higher efficiency, and wider bandwidth can be customized.

IV. Absolute Maximum Ratings

Table 2

PARAMETER	LIMIT VALUE
Source-drain voltage V_{DS}	+100V
Gate-source voltage V_{GS}	-10V
Operating temperature	-40°C~+75°C
Power dissipation ($T_c=25^\circ\text{C}$, $V_{DS}=+28\text{V}$)	110W
Storage temperature	-55°C~+125°C

V. Main Indicator Tests

1. Test conditions: $T_A = +25^\circ\text{C}$, $V_{DS} = +28\text{V}$, $I_{DS} = 80\text{mA}$, duty cycle $D = 10\%$, pulse width $\tau = 200\mu\text{s}$.

Table 3

FREQUENCY (GHZ)	INPUT POWER (DBM)	OUTPUT POWER (DBM)	GAIN (DB)	EFFICIENCY(%)	SECOND HARMONIC
2.7	39.0	51.2	12.2	52.4	-29
2.8	38.5	51.25	12.75	60.7	-29
2.9	38.5	51.1	12.6	62.5	-33
3.0	38.5	51.05	12.55	62.7	-35
3.1	38.5	50.7	12.2	58.4	-35
3.2	38.5	50.8	12.3	58.4	-30
3.3	38.5	50.8	12.3	54.3	-27
3.4	38.5	50.7	12.2	56	-26
3.5	38.5	50.9	12.4	57.8	-26

2. Test conditions: $T_A = +25^\circ\text{C}$, $V_{DS} = +32\text{V}$, $I_{DS} = 80\text{mA}$, duty cycle $D = 10\%$, pulse width $\tau = 200\mu\text{s}$.

Table 4

FREQUENCY (GHZ)	INPUT POWER (DBM)	OUTPUT POWER (DBM)	GAIN (DB)	EFFICIENCY(%)	SECOND HARMONIC
2.7	39.0	51.6	12.6	57.7	-27
2.8	38.5	51.6	13.1	55.1	-29
2.9	38.5	51.7	13.2	59.6	-32
3.0	38.5	51.8	13.3	60.7	-34

3.1	38.5	51.4	12.9	56.5	-35
3.2	38.5	51.6	13.1	56.8	-32
3.3	38.5	51.6	13.1	52.8	-28
3.4	38.5	51.5	13.0	55.2	-26
3.5	38.5	51.6	13.1	55.6	-26

3. Test conditions: $T_A = +25^\circ$, $V_{DS} = +28V$, $I_{DS} = 80mA$, duty cycle $D = 50\%$, pulse width $\tau = 200\mu s$.

Table 5

FREQUENCY (GHZ)	INPUT POWER (DBM)	OUTPUT POWER (DBM)	GAIN (DB)	EFFICIENCY(%)	SECOND HARMONIC
2.7	39.0	50.8	11.8	51.8	-27
2.8	38.5	50.9	12.4	59.3	-29
2.9	38.5	50.7	12.2	60.1	-32
3.0	38.5	50.7	12.2	59.9	-34
3.1	38.5	50.3	11.8	54.6	-35
3.2	38.5	50.5	12	55.5	-32
3.3	38.5	50.5	12	52	-28
3.4	38.5	50.3	11.8	53.8	-26
3.5	38.5	50.4	11.9	54.8	-26

VI. Dimensions, Recommended Circuit Diagram

6.1. Shell and Tube

Note: The unit in the figure is millimeter (mm), polarity: cut-angle end – gate; flat-angle end – drain.

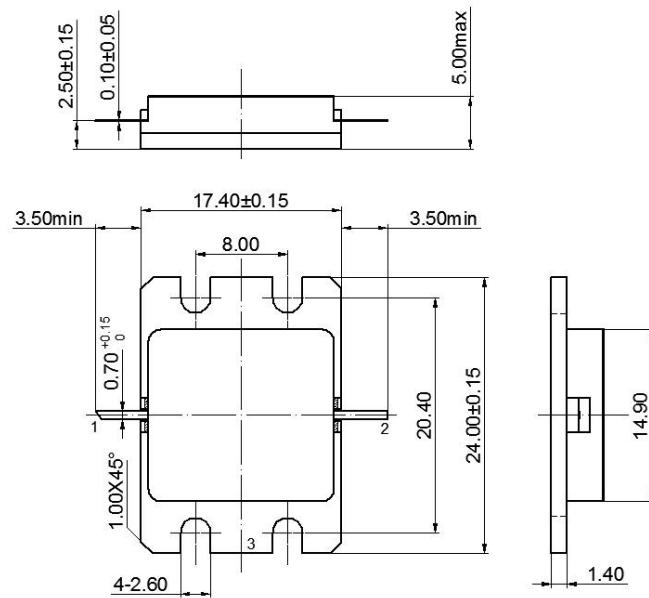


Figure 1

6.2. Recommended Application Circuit Schematic

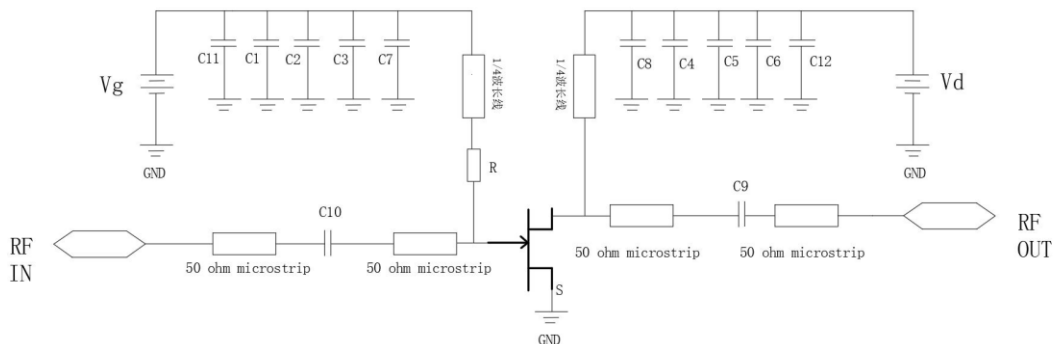


Figure 2

Table 6

COMPONENTS	SPECIFICATION	REMARK
C7, C8, C9, C10	8.2pF	0805
C3, C4	1000pF	0805
C2, C5	10nF	0805
C1, C6	4.7μF	0805
C11	47μF	
C12	470μF	
R	20Ω	0805
Plate	4350B	Rogers
Plate thickness	0.762mm	
Dielectric constant	3.48	

6.3. Recommended nstallation

- After the screws are tightened on the shell, the height between the shell pin and the printed circuit board should be $\geq 0.1\text{mm}$, the shell should be installed in the center, the slot width should be $\geq 17.65\text{mm}$, and the clearance between the input and output ends should be $> 0.1\text{mm}$, otherwise the pins may fall off. It can also be soldered.
- It is recommended to use M2.0 screws, assemble with a torque of $0.6\text{ N}\cdot\text{m}$, and take anti-loosening measures such as spring washers, thread fasteners, or glue on the nail caps.
- When the device is working, the case temperature does not exceed 75°C .

Notes:

- This device is an internally matched device with an input and output impedance of 50Ω .
- When applying power, please strictly follow the order of negative voltage first and then positive voltage; when powering on, increase the grid voltage first and then the drain voltage; when removing power, reduce the drain voltage first and then the grid voltage.
- Pay attention to heat dissipation during use. The lower the shell temperature, the longer the service life of the device.
- During use, instruments and equipment should be well grounded. This product is an electrostatic sensitive device, so please be careful to prevent static electricity during storage and use. Please select the power supply reasonably according to the specific modulation method and corresponding requirements.