Product Features

Operating Frequency:7GHz～13.5GHz

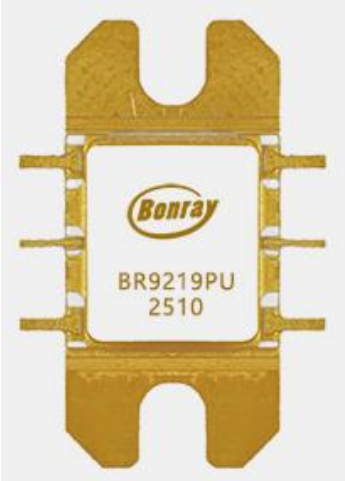
Gain:23.2dB@10GHz

Psat: 32.8dBm@10GHz

PAE: 27.1%@10GHz

Operation Voltage: 6V, static current 1000mA

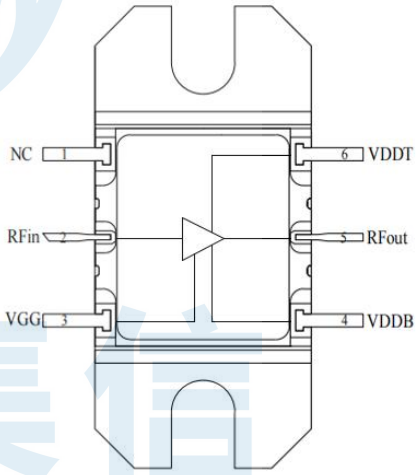
Package: PU



General Description

The BR9219PUG is an MMIC driver amplifier that covers a frequency range of 7 GHz to 13.5 GHz. Powered by a +6V drain power supply and featuring a quiescent current of 1000 mA, it boasts high gain and high output power, and can be widely applied in transmitter systems such as communications and data links.

Functional Block Diagram



Application

Communication

Data Link

Ordering Information

Part Number	Package	Description
BR9219PUG	PU	7GHz～13.5GHz Drive Amplifier

Technical Specifications（EVB test results+6V, 7GHz~13.5GHz）

Parameters	Test conditions	Min	Typ	Max	Units
Small Signal Gain	7GHz	—	22.3	—	dB
	10GHz	—	23.2	—	dB
	13.5GHz	—	22.9	—	dB
Input Return Loss	7GHz	—	-7.0	—	dB
	10GHz	—	-16.1	—	dB
	13.5GHz	—	-8.6	—	dB
Output Return Loss	7GHz	—	-10.2	—	dB
	10GHz	—	-22.4	—	dB
	13.5GHz	—	-16.1	—	dB
Reverse Isolation	7GHz	—	-55.4	—	dB
	10GHz	—	-47.1	—	dB
	13.5GHz	—	-45.8	—	dB
Output Power for 1dB Compression	7GHz	—	32.5	—	dBm
	10GHz	—	32.4	—	dBm
	13.5GHz	—	31.7	—	dBm
Saturated Output Power	7GHz	—	32.5	—	dBm
	10GHz	—	32.8	—	dBm
	13.5GHz	—	31.7	—	dBm
Operating Voltage	—	—	6	8	V
Quiescent Current	—	—	1000	—	mA
Test conditions:Vdd=+6V，TA=+25℃					

Absolute Maximum Ratings

Maximum Supply Voltage: +8V

Maximum RF input Power:+24dBm

Recommended Operating Conditions

Drain Voltage（V_{DD}）：+6V（Typ）

Drain Static Current（I_{DQ}）：1000mA（Typ）

Storage Temperature：-65℃～+150℃

Operating Temperature：-55℃～+85℃

Note: Operation of the device outside the parameter ranges given absolute-maximum-ratings conditions may cause permanent damage, and. exposure to absolute-maximum-ratings conditions for extended periods will affect the reliability.

ESD WARNING

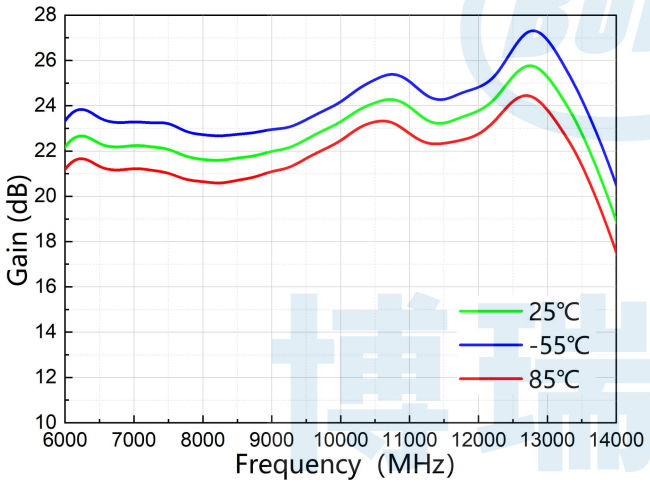
ELECTROSTATIC SENSITIVE DEVICE

OBSERVE HANDLING PRECAUTIONS

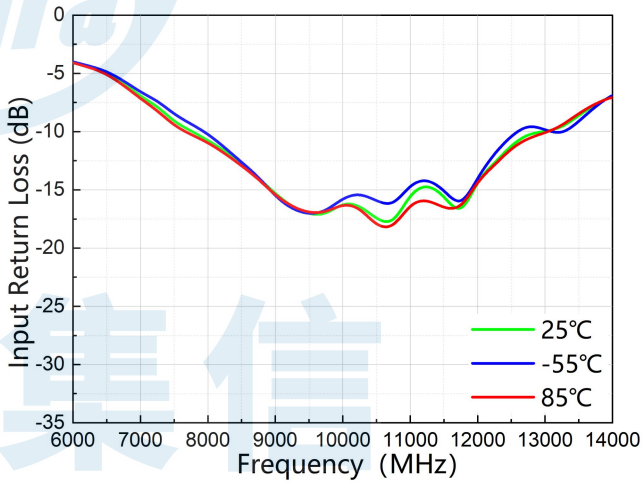
Typical Performance （EVB test results+6V, 7GHz~13.5GHz）

Parameters	Typ.								Units
Frequency	7000	8000	9000	10000	11000	12000	13000	13500	MHz
Small Signal Gain	22.3	21.6	22.0	23.2	24.0	23.7	25.4	22.9	dB
Input Return Loss	-7.0	-10.7	-15.3	-16.1	-15.2	-14.0	-9.9	-8.5	dB
Output Power for 1dB Compression	32.5	32.0	33.3	32.4	33.2	32.1	31.3	31.7	dBm
Drain Current@P_{sat}	1054	1306	1347	1161	1270	1230	1240	1186	mA
Saturated Output Power	32.5	32	33.3	32.8	33.2	32.1	31.9	31.7	dBm
PAE@P_{sat}	27.9	22.9	26.3	27.1	27.2	22.3	20.7	20.6	%
Power Gain@P_{sat}	20.9	21.1	21.6	20.8	21.9	21.2	21.9	21.4	dB
Test conditions: Temp=+25℃，V_{DD}=6V，I_{DQ}=1000mA									

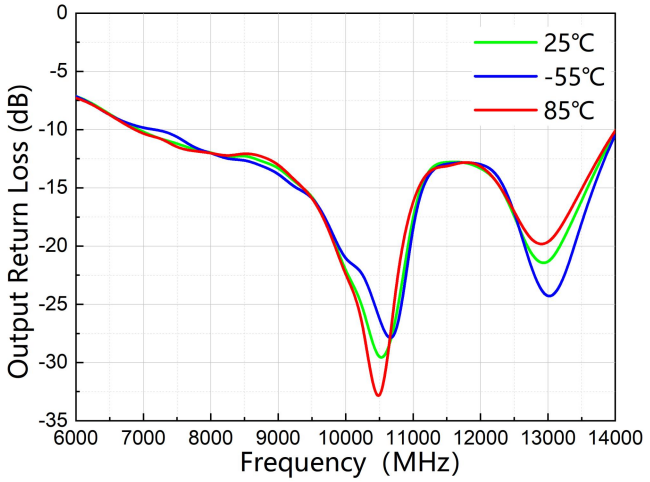
Typical Performanc (EVB test results)



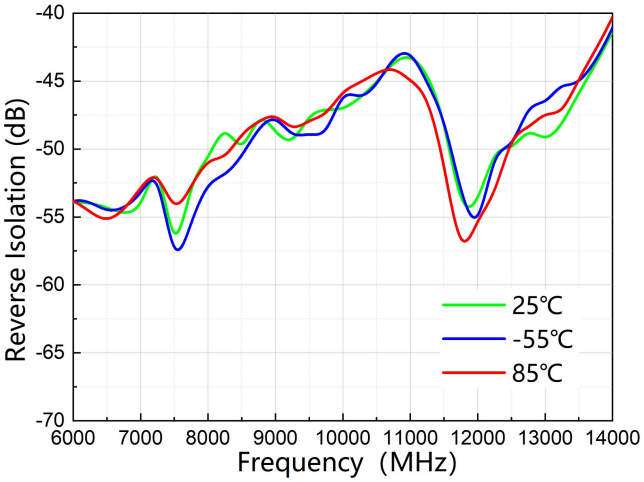
Small Signal Gain vs. Freq



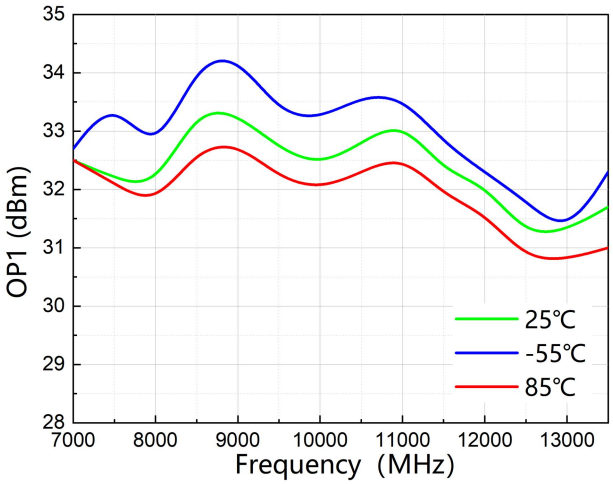
Input Return Loss vs. Freq



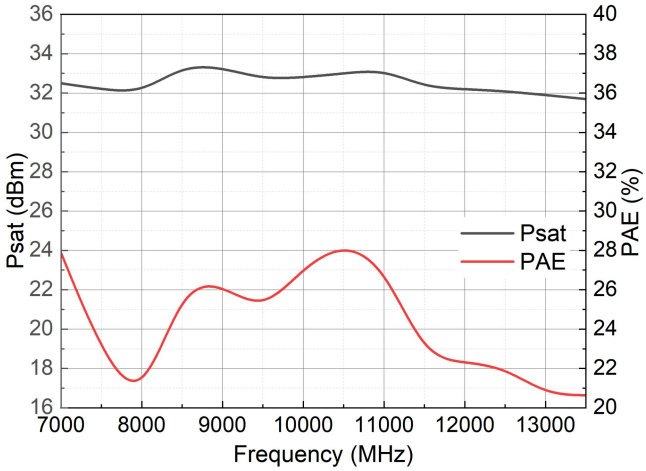
Output Return Loss vs. Freq



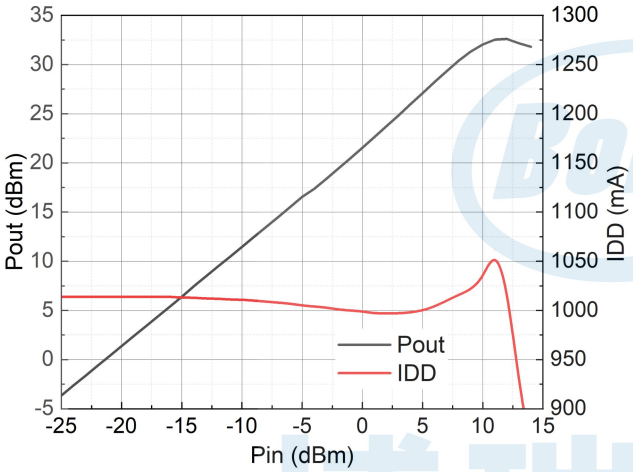
Reverse Isolation vs. Freq



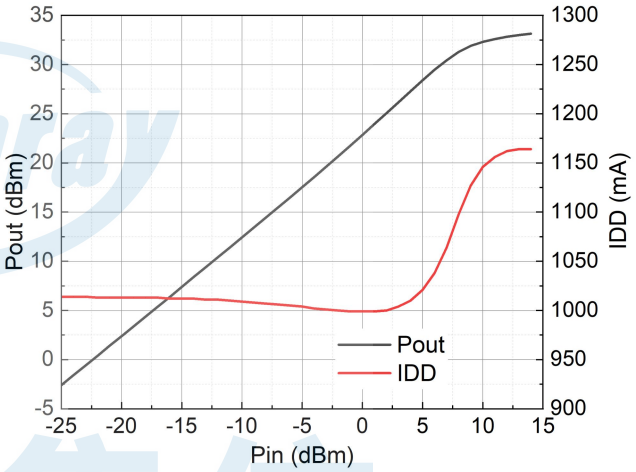
Output Power for 1dB Compression vs. Freq



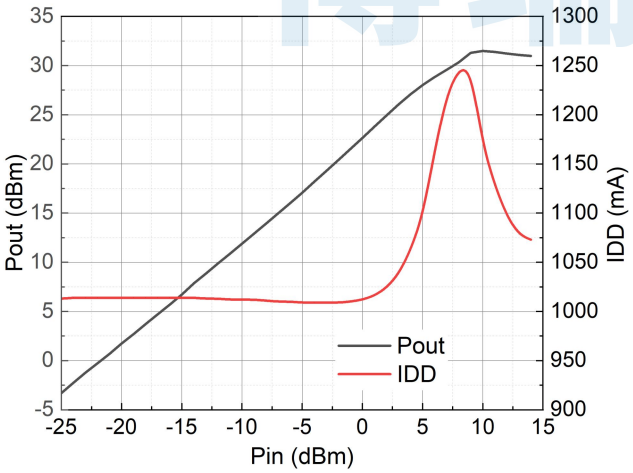
Saturated Output Power, Power Added Efficiency vs.Freq



P_{out}、Idd vs. P_{in} @7GHz

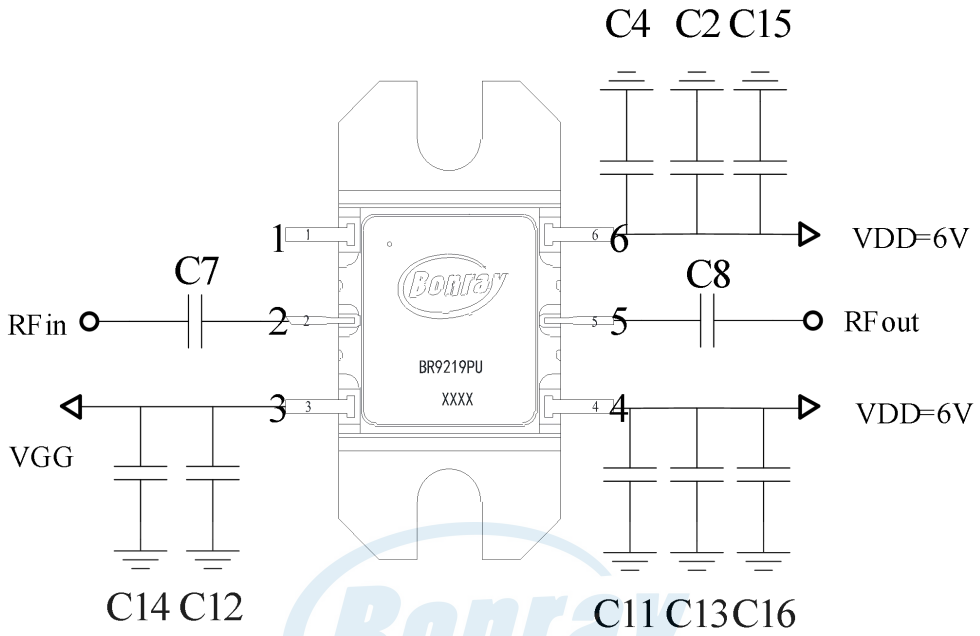


P_{out}、Idd vs. P_{in} @10GHz



P_{out}、Idd vs. P_{in} @13.5GHz

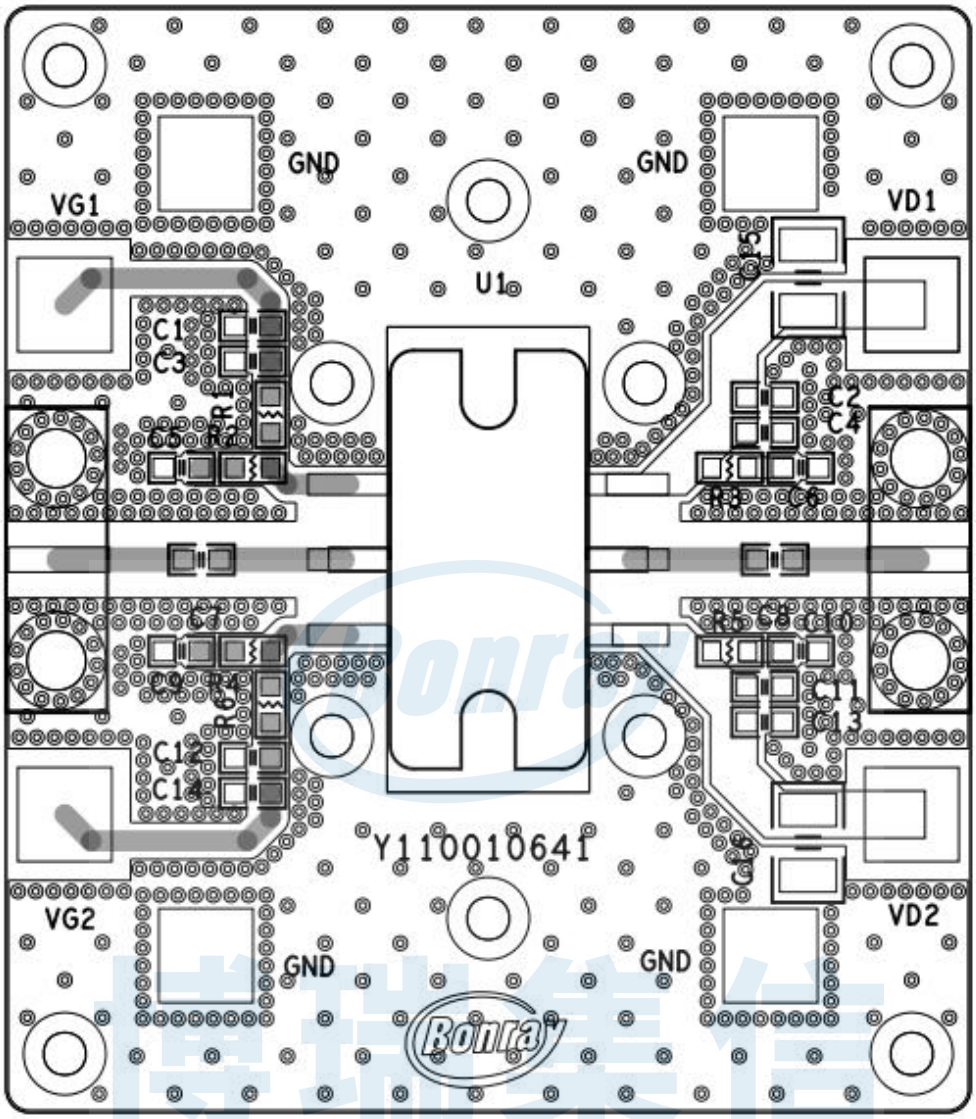
Typical Application Schematic



Bill of Material

Designator	Package	Description	Part Number
U1	PU	drive amplifier	BR9219PUG
C2、C13、C14	C0603	4.7uF	GRM188C71C475KE21D
C4、C11、C12	C0603	1000pF	GRM155R71C102KA88
C15、C16	C1206	10uF	GRM32ER71H106KA12L
C7、C8	/	Short	/

PCB Evaluation Board（20mil Rogers 4350B，double-layer board）



PCB Design Specification

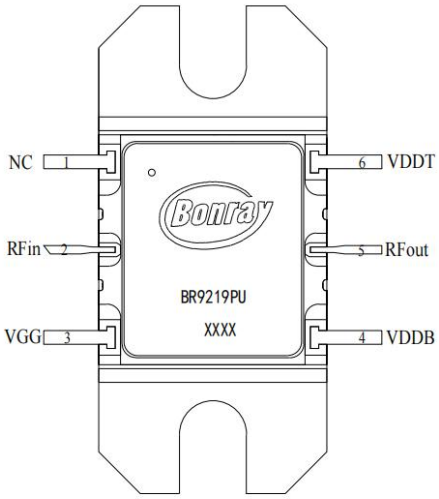
1.To ensure good heat dissipation and grounding performance, it is recommended to solder and fix the bottom of the device to the external heat dissipation structure.

2.If bottom soldering is not feasible, the device shall be installed via screw fastening with anti-loosening measures implemented. Meanwhile, indium foil shall be padded at the bottom of the device to guarantee favorable grounding and heat dissipation effects.

3.The slotting design of the Printed Circuit Board (PCB) and metal structural components shall be optimized, ensuring that the device leads are 0.1 mm higher than the PCB surface.

4.The device shall be centrally installed inside the slot. The distance between its input/output end face and the edge of the PCB slot shall be controlled within the range of 0.1 - 0.15 mm.

Pin Configuration and Description



Pin Number	Pin Name	Description
1	NC	No connection inside the pin
2	RFin	Rf input, already matched to 50Ω
3	VGG	Gate voltage
4、6	VDDB、VDDT	Drain voltage
5	RFout	Rf output, already matched to 50Ω
/	Backside	Backside for the back pad, RF ground and heat dissipation

Power-on Sequence

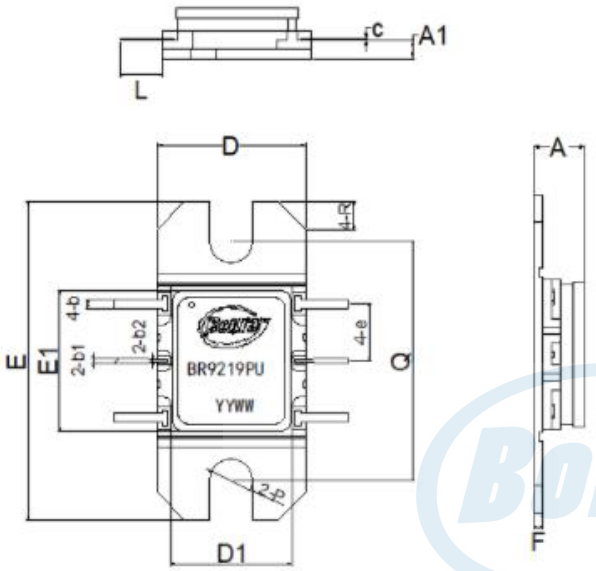
1. Set the gate voltage (V_{GG}) to -3V
2. Set drain voltage (V_{DD}) to +6V with 2.0A current limit
3. Turn on the gate voltage;
4. Turn on drain voltage
5. Increase the gate voltage (V_{GG}) so that the drain current is 1000mA
6. Input RF signal

Power-off Sequence

1. Turn off the RF signal
2. Reduce the gate voltage (V_{GG}) to -3V
3. Turn off the drain Supply Voltage voltage
4. Turn off the gate Supply Voltage voltage

Note: In circuit design, bias voltage under-voltage protection is needed with timing protection circuits to ensure that V_{GG} is fully powered up before V_{DD} is applied, and that V_{DD} is lowered to below 5V before V_{GG} is powered down, especially in T_{DD} applications. The gate driving decoupling capacitor needs to be carefully evaluated to meet the switching speed requirements.

Package Dimensions (mm)



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	2.4	2.8	3.2
A1	0.7	1	1.3
b	0.35	0.5	0.65
b1	0.15	0.3	0.45
b2	0.15	0.2	0.25
c	0.08	0.1	0.15
D	8.2	8.33	8.46
D1	6.6	6.73	6.86
E	17.65	17.78	17.91
E1	7.75	7.88	8.01
e	3.05	3.2	3.35
F	0.38	0.51	0.64
L	1.9	2.4	2.9
P	-	2.44	-
Q	13.33	13.46	13.59
R	-	1.52	-

Recommended Soldering Temperature Profile