Product Features

Frequency：DC～3.2GHz

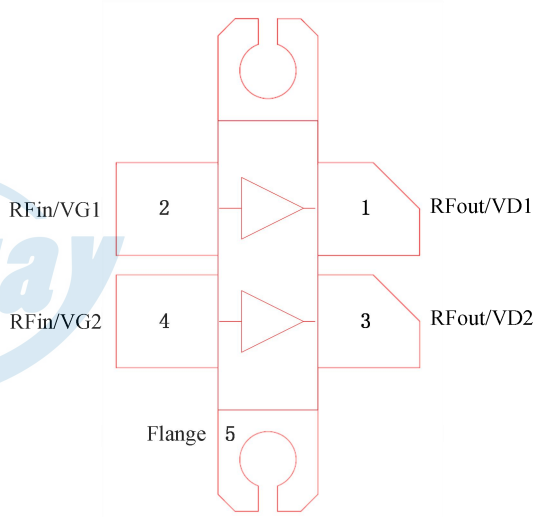
Psat：51.2dBm@1.2GHz

PAE：54%（1.2GHz,Pout=51.2dBm）

Operation Voltage: 28V, static current 800mA

Package：PF（ceramic seal）

Functional Diagram



General Description

The BRGM032120PF is a gallium nitride (GaN) pre-matched pair transistor with a +28V drain supply ， that delivers 120W(50.8dBm) of transistor output in a DC to 3.2GHz bandwidth with a power added efficiency (PAE) up to 54%.The product uses GaN process and has the characteristics of high efficiency, high gain and wide bandwidth, which makes the product has strong application capabilities in both linear and compressed amplifier circuits, while also simplifying link design and related heat consumption management.

Ordering Information

Part Number	Package	Description
BRGM032120PF	PF	DC～3.2GHz 120W dual path transistor

Applications

Wide Band Communications

Radar

Test instrumentation

Wideband or narrowband amplifiers

Jammers

Absolute Maximum Ratings

Parameters	values
Gate drain breakdown voltage（BV_{DG}）	100V
Gate Voltage Range（V_{GG}）	-6～0V
Drain current（I_D）	17.2A
Gate current（I_G）	28mA
Mounting temperature（30seconds）	245℃
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. Under high temperature operation, please pay attention to good Dissipate heat.

Impedance Mismatch

Symbol	Parameters	values
VSWR	Impedance Mismatch Ruggedness	5:1

Test Condition: DEMO board test, TA=25℃, VDD=+28V,

Freq=1.2GHz, CW wave, Pout=120W test;

Recommended Operating Conditions

Parameters	values
Drain voltage（V_{DD}）	+28V（Typ）
Drain static current（I_{DQ}）	800mA（Typ）
Gate voltage（V_{GG}）	-2.59V（Typ）
Channel temperature（T_{CH}）	225℃（Max）
Continuous dissipated power（P_D）	93W（Max）

Note: The power amplifier transistor electrical specifications are tested under the specified Test Condition. Electrical performance is not guaranteed when the test specifications are exceeded.

Thermal Parameters

Parameters	Test Condition	value	Units
Thermal resistance（θ_{JC}）	Dc bias Test at 70 ° C	1.5	℃/W
Channel temperature（T_{ch}）		225	℃

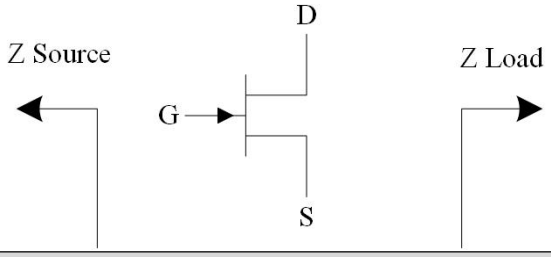
Note: θ JC to measure the thermal resistance to the bottom of the tube housing;

ESD WRANING

ELECTROSTATIC SENSITIVE DEVICE

OBSERVE HANDLING PRECAUTIONS

Load Pull performance（sigle path）



Load Pull performance for Psat				
Symbol	**value**			**Units**
Freq	1000	2000	3000	MHz
Z_{source}	2.24-j*2.58	1.85-j*4.04	1.96-j*9.51	Ω
Z_{load}	4.25-j*0.68	3.89-j*3.02	4.58-j*4.54	Ω
I_D@P_{sat}	4.03	4.4	4.1	A
P_{sat}	48.43	48.5	48.4	dBm
PAE@P_{sat}	60.9	60	63	%
Gain@P_{sat}	19.01	17.09	16	dB
Test Condition： Temp=+25℃， V_{DD}=+28V， I_{DQ}=800mA， CW test；				

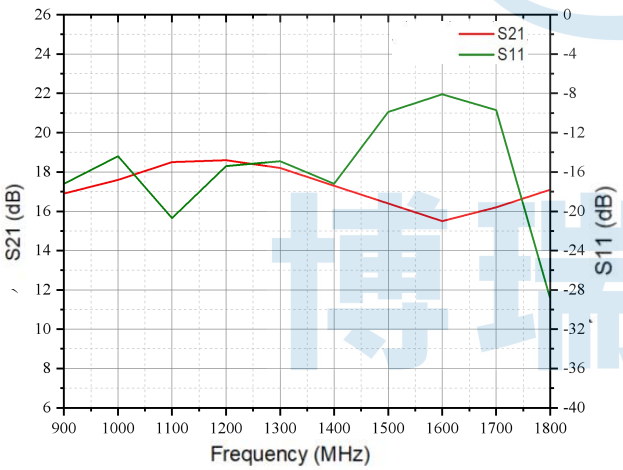
Load Pull performance for PAE				
Symbol	**value**			**Units**
Freq	1000	2000	3000	MHz
Z_{source}	2.24-j*2.58	1.85-j*4.04	1.96-j*9.51	Ω
Z_{load}	7.12-j*3.01	3.6+j*0.69	2.69-j*2.6	Ω
I_D@P_{sat}	3.71	2.16	3.0	A
P_{sat}	48.36	46.16	48	dBm
PAE@P_{sat}	64.66	65.86	72.7	%
Gain @P_{sat}	17.47	17.5	16	dB
Test Condition： Temp =+25℃， V_{DD}=+28V， I_{DQ}=800mA， CW test；				

Typical Performance (EVB test data)

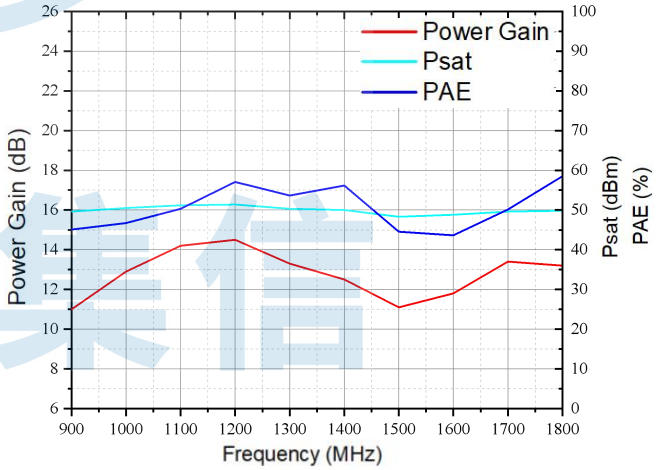
Parameters	Typ.										Units
Frequency	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	MHz
S21	16.9	17.6	18.5	18.6	18.2	17.3	16.4	15.5	16.2	17.1	dB
S11	-17.2	-14.4	-20.7	-15.4	-14.9	-17.2	-9.9	-8.1	-9.7	-28.9	dB
Drain Current @P_{sat}	6.6	8.1	9.0	8.3	6.8	6.0	5.0	5.8	6.2	5.6	A
Pout @P_{sat}	49.6	50.5	51.2	51.4	50.3	50	48.3	48.8	49.6	49.8	dBm
PAE@P_{sat}	45.1	46.7	50.3	57.1	53.6	56.2	44.5	43.6	50.1	58.5	%
Gain@P_{sat}	11	12.9	14.2	14.5	13.3	12.5	11.1	11.8	13.4	13.2	dB
Test condition：Temp =+25℃，V_{DD}=+28V，I_{DQ}=800mA；											

Note:P_{sat} defined as the saturation power output of the evaluation board.

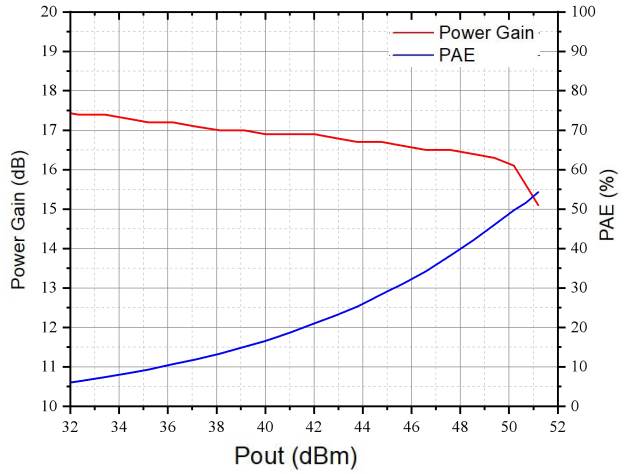
Typical Performance（test on EVB 0.9GHz-1.8GHz，Temp =+25℃，V_{DD}=+28V，I_{DQ}=800mA）



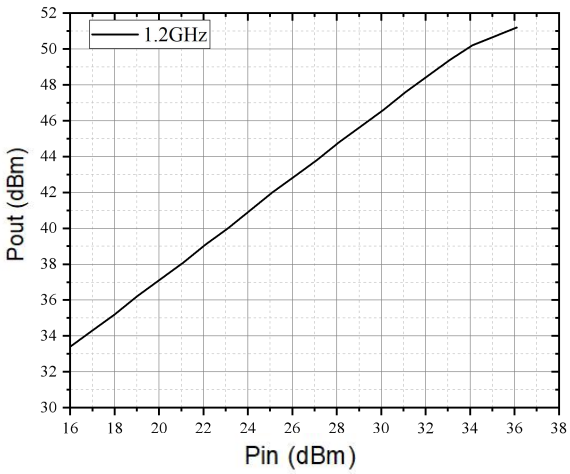
S21、S11 vs. Freq



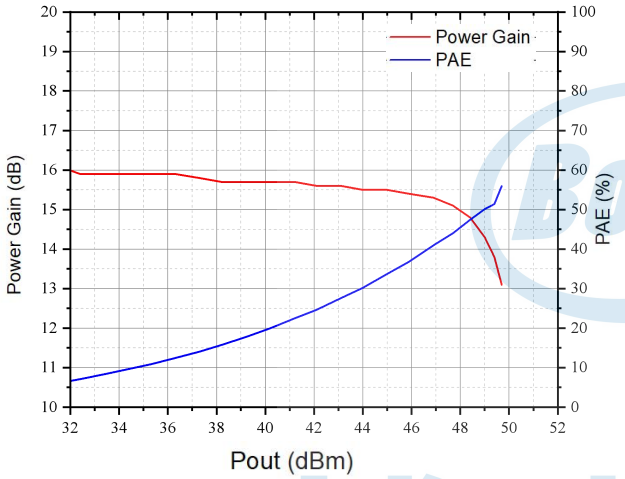
Gain、Psat、PAE vs.Freq



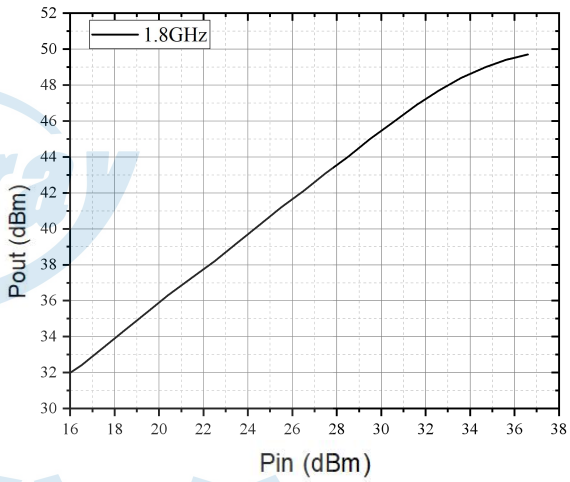
Gain、PAE vs.Pout（1.2GHz）



Pout vs.Pin（1.2GHz）

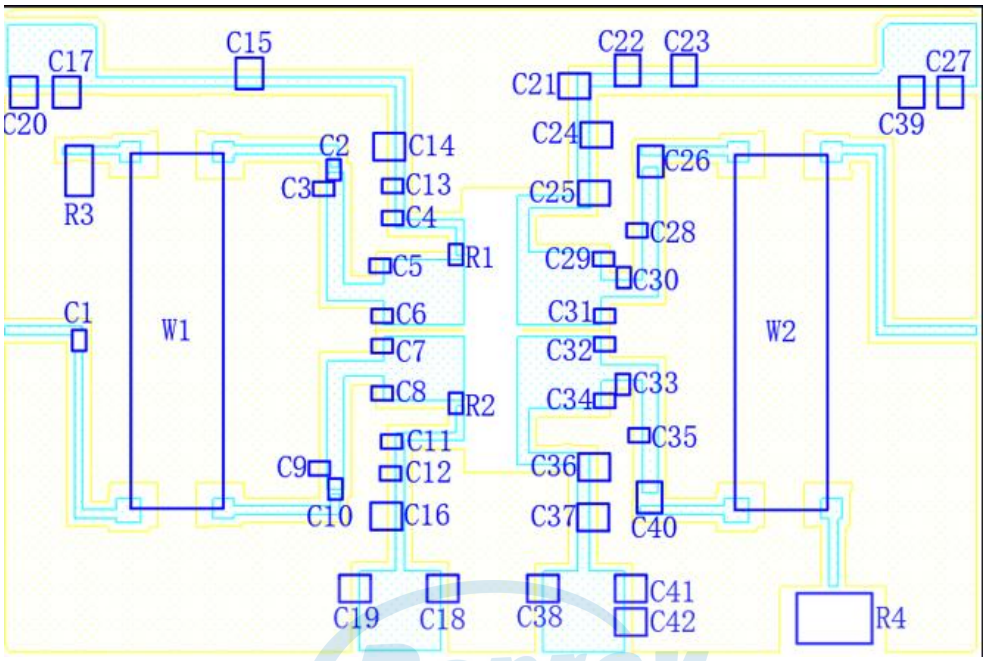


Gain、PAE vs.Pout（1.8GHz）



Pout vs.Pin（1.8GHz）

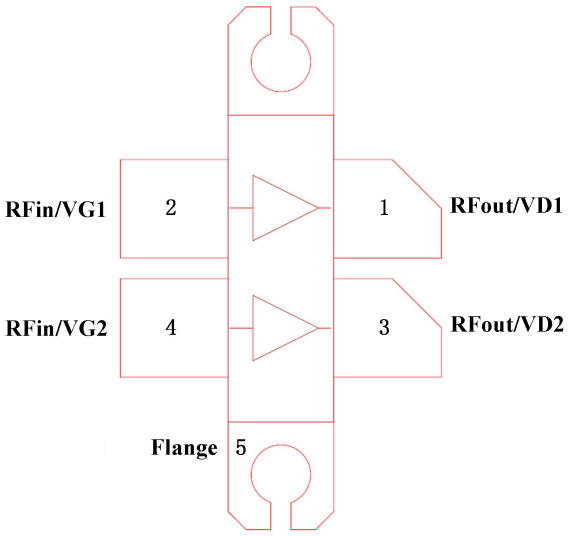
PCB Evaluation Board



Bill of Material

Designator	Description	Package	Qty
C1,C2,C4,C10,C11	CAP,39pF,50VDC	C0603	5
C3,C9	CAP,1pF,50VDC	C0603	2
C30,C33	CAP,1pF,250VDC	C0603	2
C5~C8	CAP,1.8pF,50VDC	C0603	4
C29,C31,C32,C34	CAP,1.8pF,250VDC	C0603	4
C28,C35	CAP,1.5pF,250VDC	C0603	2
C25,C26,C36,C40	CAP,39pF, 250VDC	C1111	4
C12,C13	CAP,1000pF,50VDC	C0603	2
C14~C20	CAP,10uF,50VDC	C1210	7
C21~C24,C27, C37~C39,C41,C42	CAP,10uF,250VDC	C1210	10
R1,R2	RES,49.9Ohm	R0603	2
R3	RES,50Ohm,20W	/	1
R4	RES,50Ohm,150W	/	1
W1,W2	3dB combiner,150W	/	2

Pin Configuration and Description



Pin Number	Pin Name	Description
1/3	RFout/V_{DD}	Drain voltage / RF Output matched to 50 ohms;
2/4	RFin/V_{GG}	Gate voltage / RF Input matched to 50 ohms;
-	Package Base	Source connected to ground;

Power-on Sequence

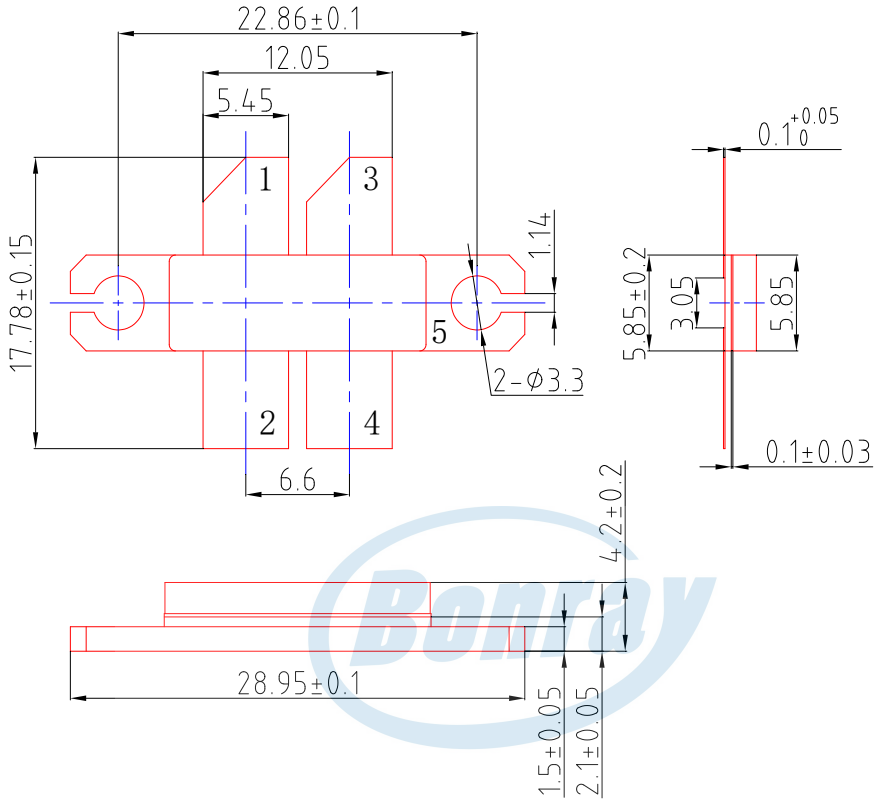
1. Set the grid voltage (V_{GG}) to -5V；
2. Set drain voltage (V_{DD}) to +28V；
3. Turn on the gate voltage ；
4. Open drain voltage；
5. Slowly increase VG until quiescent ID is 800 mA.

Power-off Sequence

1. Turn off the RF signal;
2. Reduce the gate voltage (V_{GG}) to -5V；
3. Turn off drain supply voltage；
4. Turn off the grid supply voltage；

Note: When the circuit is designed, a timing protection circuit is required to power off the V_{GG}. Ensure that the V_{DD} is added after the V_{GG} is fully powered on. Ensure that the V_{DD} is lower than 5V before powering off the V_{GG}. Especially in T_{DD} applications, grid-supplied decoupling capacitors need to be rigorously evaluated to meet switching speed requirements.

Package Dimensions (Units:mm)



Recommended Soldering Temperature Profile