

Product Features

Frequency: 2.7GHz ~ 3.5GHz

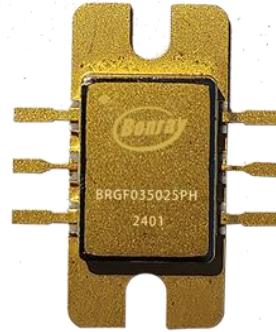
Gain : 17.3dB@3.1GHz

Psat: 45.7dBm@3.1GHz

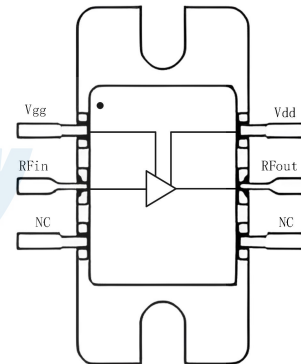
PAE: 59.2%@3.1GHz

Operation Voltage: 28V, I_{DQ} 175mA

Package: PH (metal package)


Functional Block Diagram
General Description

BRGF035025PHG is a gallium nitride (GaN) internal matching power amplifier, covering the frequency range of 2.7GHz ~ 3.5GHz, using +28V drains power supply, with I_{DQ} 175mA, and thanks to the product's internal matching design, users can only through a small number of periphery component can be used in the system design. The product has the characteristics of high efficiency and high reliability, and can be widely used in data link, universal transmitter and other systems.


Ordering Information

Part Number	Package	Description
BRGF035025PHG	PH	2.7 GHz to 3.5 GHz 25W Internal Power Amplifier

Absolute Maximum Ratings

Parameters	Values
Gate Drain Breakdown Voltage (BV_{DG})	100V
Gate Voltage Range (V_{GG})	-6 to 0V
Drain Current (I_D)	5A
Gate Current (I_G)	9mA
Continuous Dissipated Power (P_D)	50W
Channel Temperature (T_{CH})	275 °C
Mounting Temperature (30 seconds)	245 °C

Note: Operation of this device outside the parameter ranges given above may cause permanent damage. These are stress ratings only, and functional operation of the device at these conditions is not implied. Please pay attention to good heat dissipation under high temperature operation.

Recommended Operating Conditions

Parameters	Values
Drain Voltage (V_{DD})	+28V (Typ)
Drain Static Current (I_{DQ})	175mA (Typ)
Gate Voltage (V_{GG})	-2.48V (Typ)
Channel Temperature (T_{CH})	225 °C (25 °C)
Storage Temperature	-65°C to +150°C
Operating Temperature	-55°C ~ +85°C

Note: The electrical specifications of power amplifier tubes are tested under specified test conditions. Electrical performance is not guaranteed when the test specifications are exceeded.

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Impedance Mismatch

Markers	Parameters	Typ.
VSWR	Impedance Mismatch Ruggedness	10:1

Test Conditions: DEMO board test, $T_A=25^{\circ}\text{C}$,
 $V_{DD}=+28\text{V}$, $I_{DQ}=175\text{mA}$, Freq=3.5GHz, CW
wave, $P_{out}=25\text{W}$ test;

Thermal Parameter

Parameters	Test Condition	Value	Units
Thermal Resistance (θ_{JC})	DC at 85°C case	5	$^{\circ}\text{C}/\text{W}$

Note: θ_{JC} to measure the thermal resistance to the
bottom of the package;

ESD WARNING

**ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS**

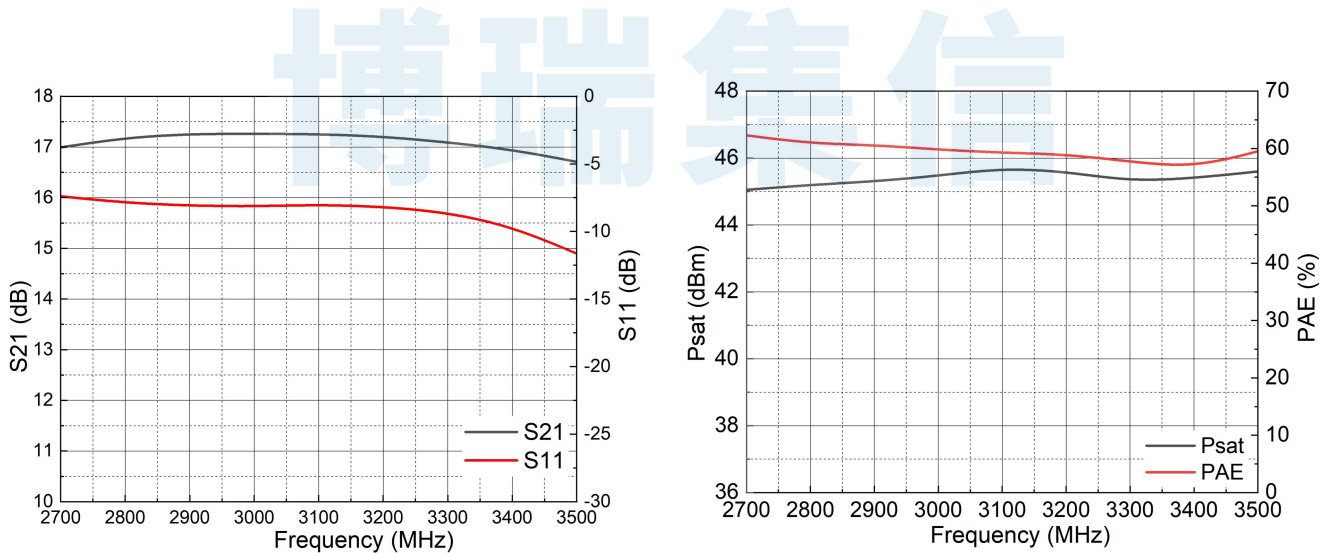
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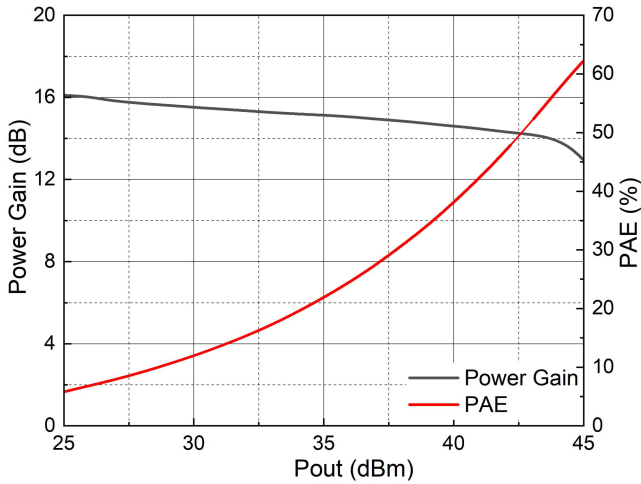
Typical Performance, EVB test data (2.7GHz ~ 3.5GHz)

Parameters	Typ.									Units
	2700	2800	2900	3000	3100	3200	3300	3400	3500	
Frequency	2700	2800	2900	3000	3100	3200	3300	3400	3500	MHz
Gain	17.0	17.2	17.3	17.3	17.3	17.2	17.1	17.0	16.7	dB
Input Return Loss	-7.4	-7.9	-8.1	-8.2	-8.0	-8.2	-8.6	-9.6	-11.6	dB
Output Return Loss	-15.6	-13.1	-11.1	-10.1	-9.4	-9.0	-9.4	-10.1	-12.0	dB
Drain Current @P _{sat}	1740	1854	1914	2018	2135	2110	2015	2089	2072	mA
Pout (dBm) @P _{sat}	45.1	45.2	45.3	45.5	45.7	45.6	45.3	45.4	45.6	dBm
PAE@P _{sat}	62.3	60.9	60.6	59.8	59.2	59.0	57.7	56.6	59.5	%
Power Gain@P _{sat}	12.9	13.4	13.9	13.9	13.3	14.0	14.1	13.5	13.1	dB

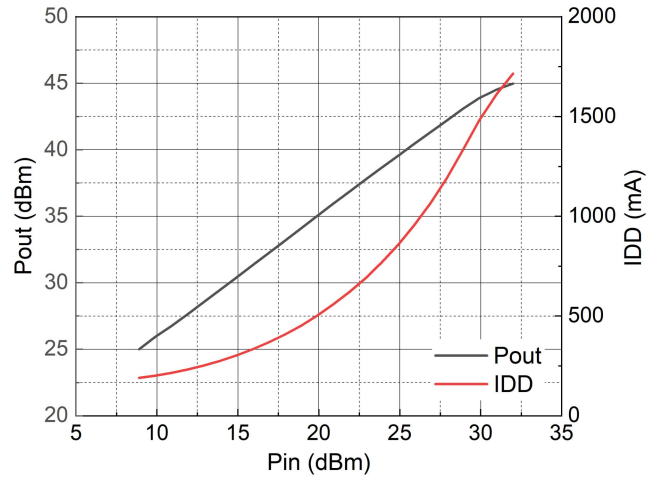
Test Condition: Temp =+25 ° C, V_{DD}=+28V, I_{DQ}=175mA

Note: P_{sat} defined as the Psat output by the evaluation board;

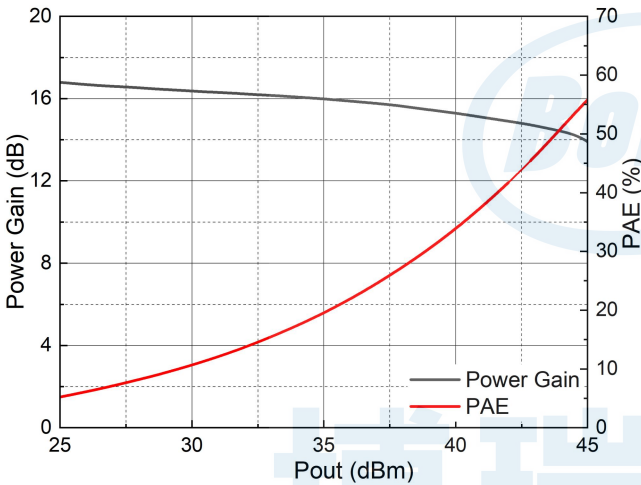
Typical Performance (EVB: 2.7GHz~3.5GHz, Temp=+25°C, V_{DD}=+28V, I_{DQ}=175mA, CW wave test)

Gain , Input Return Loss vs. Freq
Psat, PEA vs. Freq



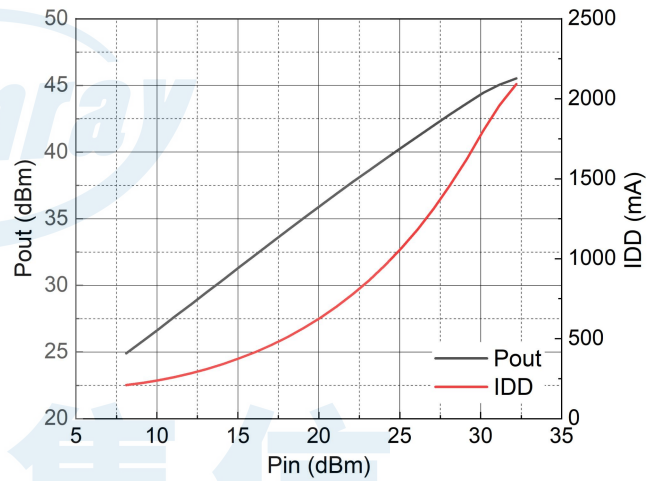
Gain , PEA vs. P_{out} @2.7GHz



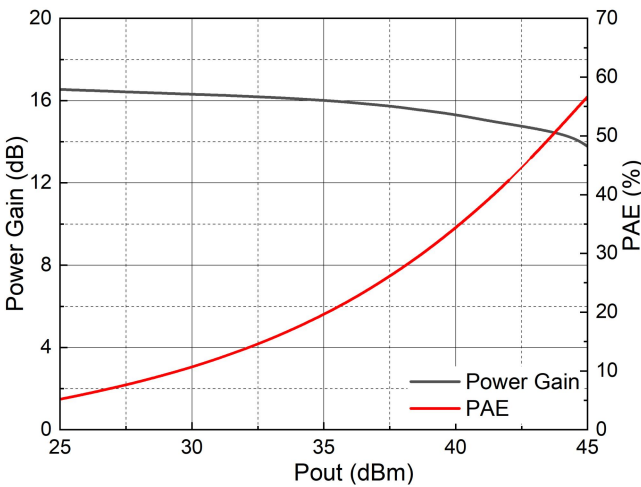
P_{out}, IDD vs P_{in} @2.7GHz



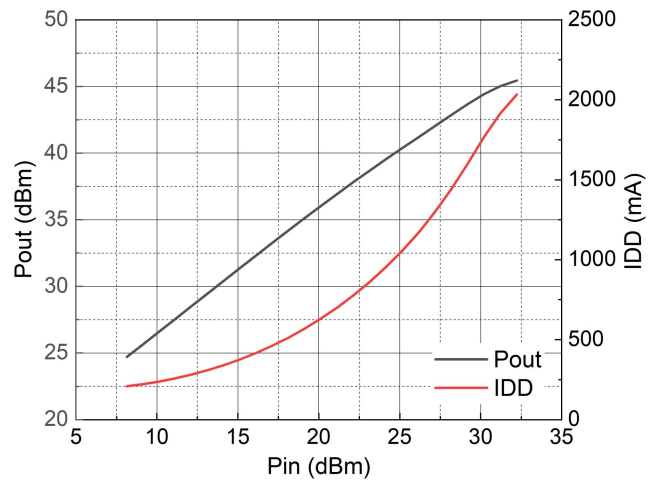
Gain , PEA vs. P_{out} @3.1GHz



P_{out}, IDD vs P_{in} @3.1GHz

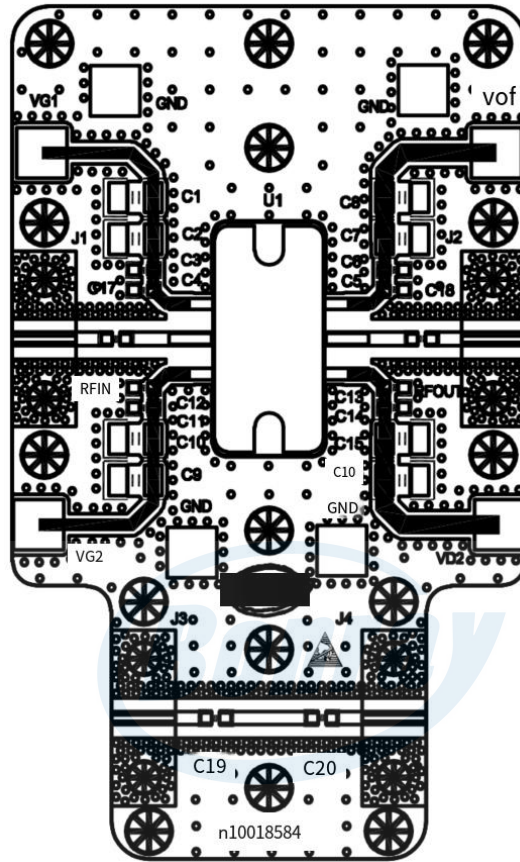


Gain , PEA vs. P_{out} @3.5GHz



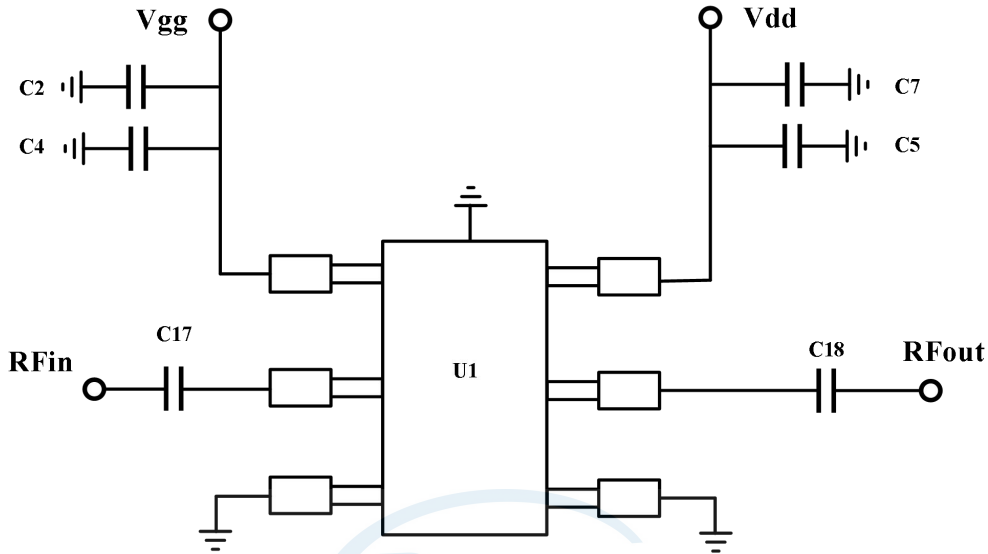
P_{out}, IDD vs P_{in} @3.5GHz

PCB Evaluation Board



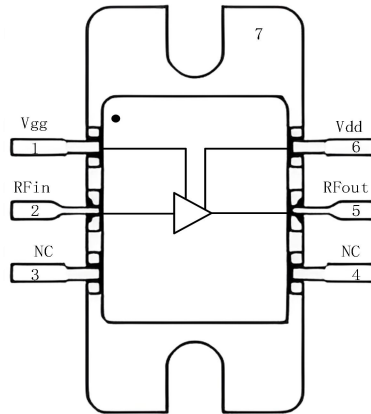
Note: C1, C3, C6, C8, C9, C10, C11, C12, C13, C14, C15, C16 are reserved to tune.

Typical Application Schematic



Bill of Material

Designator	Package	Description	Part Number
U1	Metal package	25W matched power amplifier inside	BRGF035025PHG
C17, C18	0603	10pF 250V 0603	GQM1875C2E100FB12#
C2 ,C7	1210	10uF 100V	GRM32EC72A106KE05#
C4 ,C5	0603	50V 0.1uF ±10%	GRM188R71H104KA93D
-	-	0.3mm fine-needle SMA connector	SMA-KFD1162G
-	-	Structural parts of metal	BRJX-9680-JG-05

Pin Configuration and Description


Pin Number	Pin Name	Description
1	Vgg	Gate voltage;
2	RFIn	RF Input matched to 50 ohms;
3, 4	NC	No connection;
5	RFout	RF Output matched to 50 ohms;
6	Vdd	Drain voltage;
7	Metal housing	Amplifier source level, grounded, cooling

Power-on Sequence

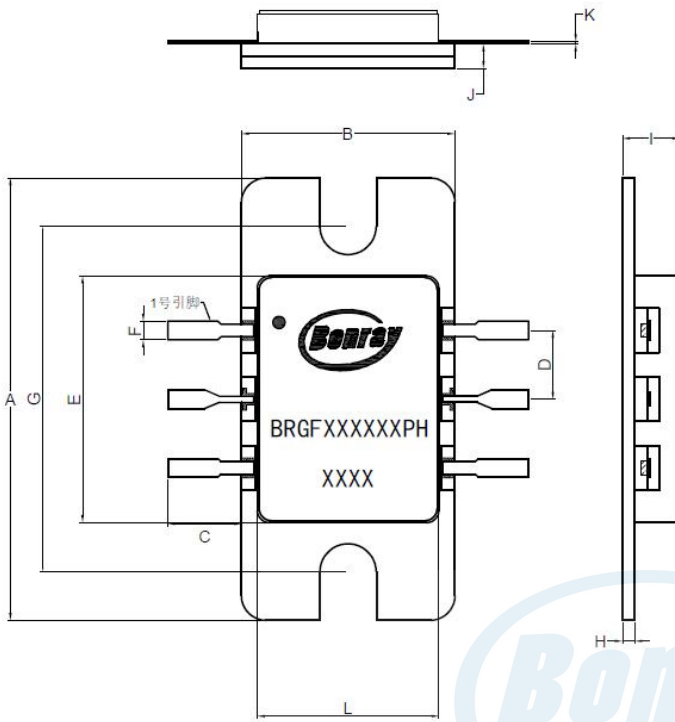
1. Set the gate voltage (V_{GG}) to -5V
2. Set drain voltage (V_{DD}) to +28V and current limit to 2.7A
3. Turn on the gate voltage
4. Turn on drain voltage
5. Increase the gate voltage (V_{GG}) so that the drain current is 175mA
6. Input RF signal

Power-off Sequence

1. Turn off the RF signal
2. Reduce the gate voltage (V_{GG}) to -5V
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)



尺寸项	单位: mm		
	最小	中值	最大
A	17.83	18.03	18.23
B	8.55	8.7	8.85
C	2.5	3	3.5
D	2.67	2.8	2.93
E	9.9	10.05	10.2
F	0.63	0.76	0.9
G	13.88	14.08	14.28
H	0.37	0.5	0.63
I	2.25	2.4	2.55
J	0.8	1	1.2
K	0.07	0.1	0.13
L	7.25	7.4	7.55

Recommended Soldering Temperature Profile

