Product Features

Frequency: DC ~ 3.5GHz

Gain: 15dB@2.3GHz

Psat: 50.6dBm@2.3GHz

Operation Voltage: 28V, static current 500mA

Package: PC (ceramic seal)

Applications

Power Amplification Stage for Wireless Infrastructure

Test and Measurement Equipment

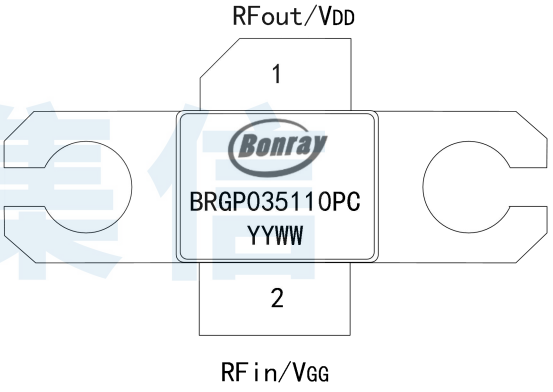
Commercial and Military Radars

Universal Transmitters and Jammers Ultrashort Wave Communication Equipment

General Description

The BRGP035110PC is a pre-matched transistor designed using the GaN HEMT process, using a +28V drain supply to achieves 110W (50.4dBm) of output in a DC ~ 3.5GHz with a power added efficiency (PAE) > 55%. This device has the characteristics of high efficiency, high gain and wide bandwidth. Its input terminal adopts pre-matching design, has good high frequency characteristics, reduces the sensitivity of external matching circuit, and is convenient for users to realize high frequency and ultra-wide band schemes through external matching design. The package form is a metal ceramic package with flange, excellent thermal conductivity, and the user can choose a variety of ways to install. This product is suitable for microwave communication, radar and other fields.

Functional Block Diagram



Ordering Information

Part Number	Package	Description
BRGP035110PC	PC	DC ~ 3.5GHz 110W GaN Transistor

Absolute Maximum Ratings

Parameters	Values
Gate Drain Breakdown Voltage (BV_{DG})	100V
Gate Voltage Range (V_{GG})	-6 to 0V
Drain Current (I_D)	10.5 A
Gate Current (I_G)	28mA
Continuous Dissipated Power (P_D)	130W
Channel Temperature (T_{CH})	275 ℃
Mounting Temperature (30 seconds)	245 ℃

Note: The Absolute Maximum Ratings indicates the limit value that the Reference Designator can withstand, exceeding the Absolute Maximum Ratings may result in permanent damage to the Reference Designator. Long-term operation under Absolute Maximum Ratings conditions will affect the reliability of Reference Designator. 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})	500mA (Typ)
Gate Voltage (V_{GG})	-2.76V (Typ)
Channel Temperature (T_{CH})	225 ° C (Max)
Continuous Dissipated Power CW (P_D)	110W (Max)
Storage Temperature	-65℃ to +150℃
Operating Temperature	-55℃ ~ +85℃

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.

Impedance Mismatch

Markers	Parameters	Typ.
VSWR	Impedance Mismatch Ruggedness	5:1

Test Condition: DEMO board test, T_A =25℃, V_{DD} =+28V, I_{DQ} =500mA, Fre=1GHz, CW wave, P_{out}=110W ;

Thermal Parameters

Parameters	Test Condition	Value	Units
Thermal resistance (θ_{JC})	CW wave is tested at 70 ° C	1.5	℃/W
Channel temperature (T_{ch})		225	℃

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

ESD WARNING

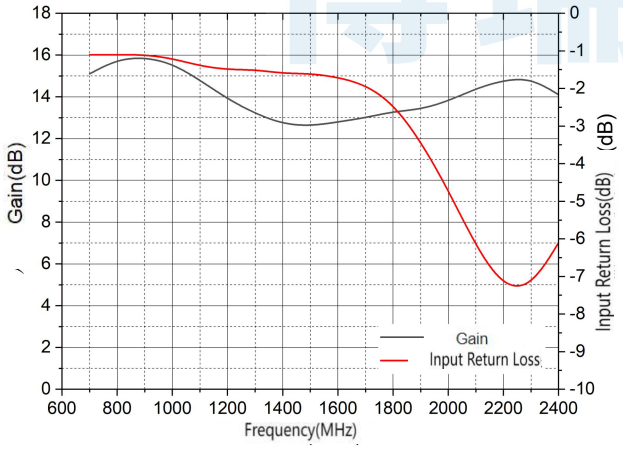
ELECTROSTATIC SENSITIVE DEVICE

OBSERVE HANDLING PRECAUTIONS

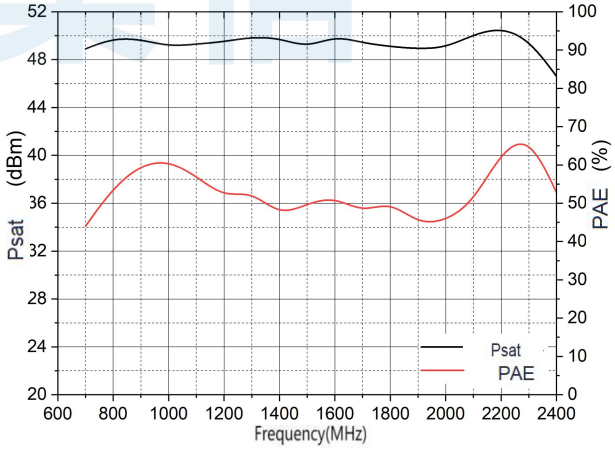
Typical Performance (Evaluation board test data)

Evaluation Board (0.7GHz ~ 2.4GHz) Test Data							
Parameters	**Typ.**						**Units**
Frequency	700	900	1000	1500	2000	2400	MHz
Gain	15.1	16.2	15.8	12.8	13.8	14.1	dB
Small Signal Input Return Loss	-1.1	-1.0	-1.2	-1.8	-6.1	-5.1	dB
Drain Current @P_{sat}	5.7	5.3	5.1	5.7	5.9	5.56	A
Pout (dBm) @P_{sat}	48.9	50.0	49.8	49.3	49.3	50.1	dBm
Pout (dBm) @P_{sat}	77.6	100	95.5	85.1	85.3	102.3	W
PAE@P_{sat}	40.7	61.1	63.0	40.7	45.3	58.8	%
Gain @P_{sat}	10.8	10.6	12.4	9.9	10.7	9.6	dB
Test Conditions: Temp =+25℃, V_{DD}=+28V, I_{DQ}=500mA, CW ; Note: P_{sat} indicates the saturation output power of the device;							

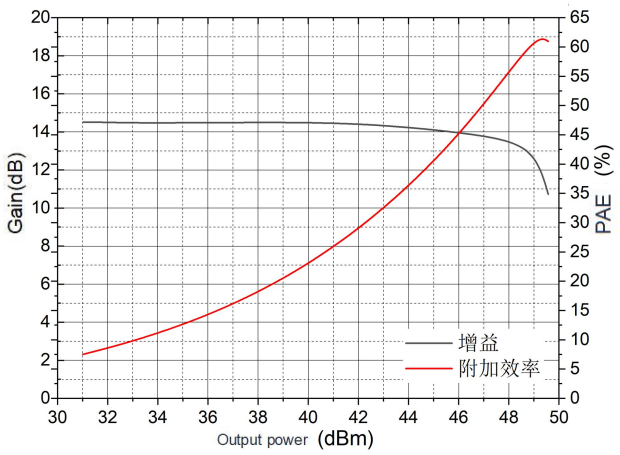
Typical Performance (Evaluation board:0.7GHz-2.4GHz, Temp =+25℃, V_{DD}=+28V, I_{DQ}=500mA, CW wave test)



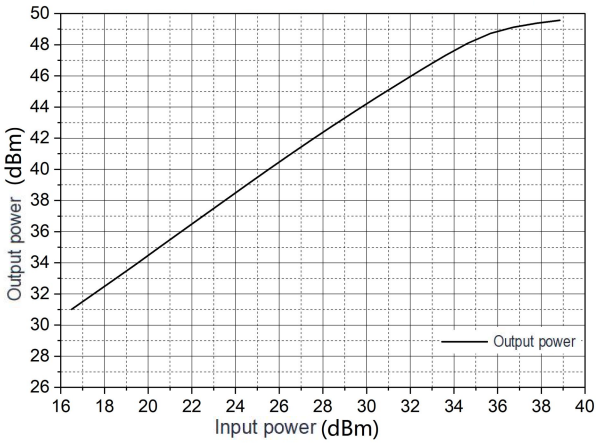
Standing Wave, Gain vs. Freq@25℃



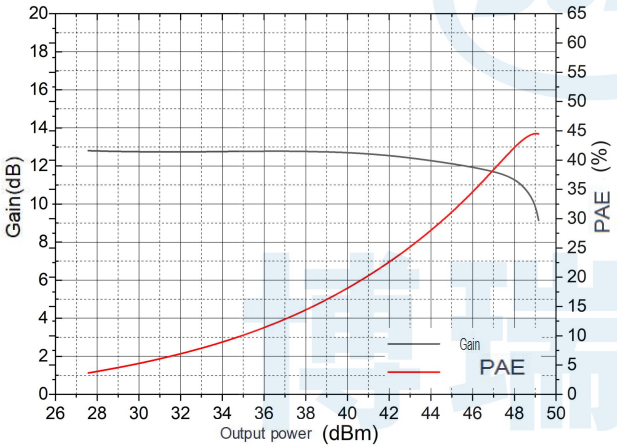
Psat,PEA vs. Freq@25℃



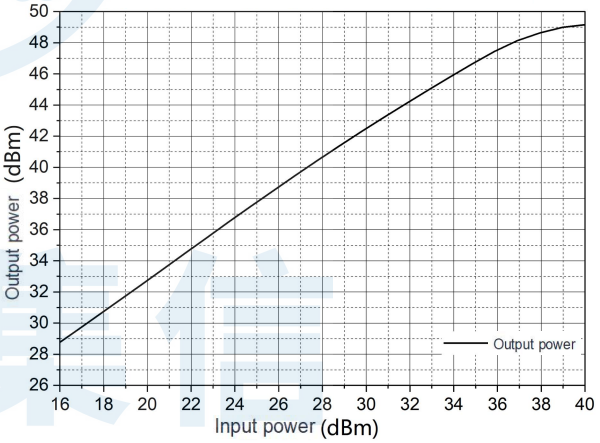
Gain, PEA vs. P_{out} @1GHz



P_{out} vs. P_{in}@1GHz

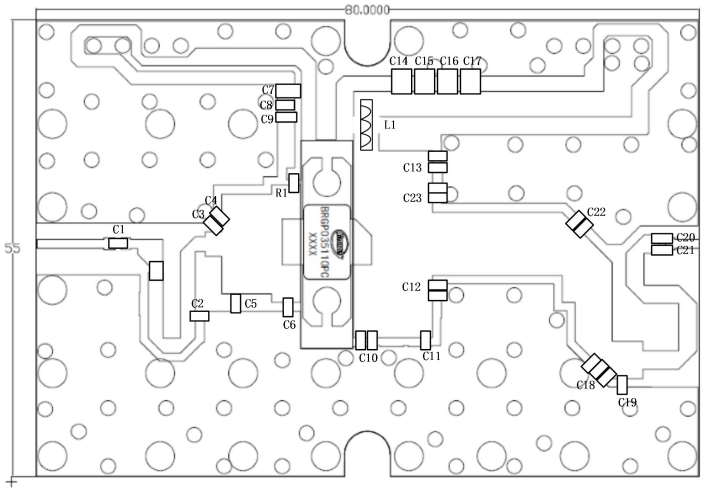


Gain, PEA vs. P_{out} @2GHz



P_{out} vs. P_{in}@2GHz

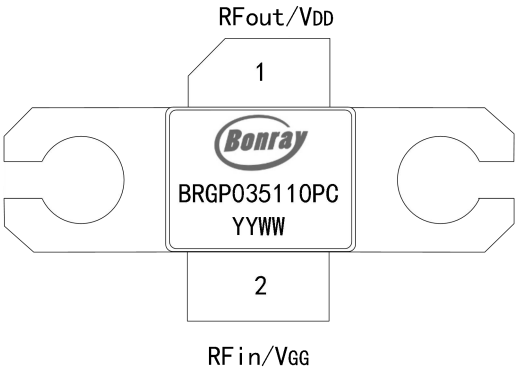
PCB Evaluation Board



Bill of Material

Designator	Package	Description	Part Number
U1	PC	Power amplifier	BRGP035110PC
C1	0603	15pF	GRM1885C2A150JA01
C2	0603	1.5pF ±0.1pF	GRM1885C1H1R5BA01D
C3, C5	0603	1pF	GQM1875C2E1R0BB12D
C4, C6, C19	0603	0.5 PF	GQM1875G2ER50BB12#
L1	/	3mm inner diameter, 1 turn, 0.8mm wire diameter	/
C13,C10,C11,C12,C22,C23	0603	0.1 pF	GQM1875G2ER10BB12#
C20,C21	1111	30pF	VJ1111D300FXRQJ
C18	0603	0.1 pF	GQM1875G2ER10BB12#
R1	0603	51 Ω	RC0603FR-0751R1L
C7	1206	1uF	GRM31C5C1H104JA01L
C8	0603	0.47 uF	UMK107BJ474KAHT
C9	0805	100pF	0805CG101J251NT
C14,C15,C16, C17	1210	10uF	GRM32EC72A106KE05

Pin Configuration and Description



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

Power-on Sequence

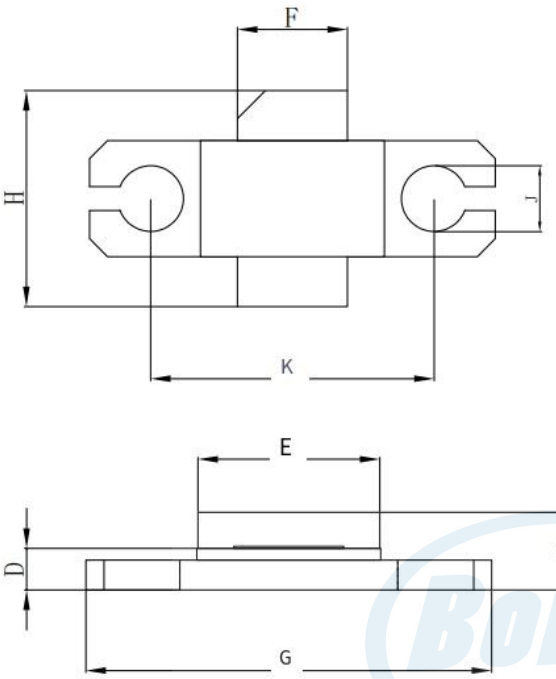
1. Set the gate voltage (V_{GG}) to -5V;
2. Set drain voltage (V_{DD}) to +28V, current limit 10A;
3. Turn on the gate voltage;
4. Turn on drain voltage;
5. Increase the gate voltage (V_{GG}) so that the drain current is 500mA;
6. Input RF signal;

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)



DIM	Units: mm	
	MIN	MAX
A	5.67	5.93
B	0.05	0.15
C	3.18	4.19
D	1.93	2.23
E	9	9.2
F	5.37	5.63
G	20.17	20.43
H	10.3	11.3
J	3.3±0.13	
K	14.2±0.13	

Recommended Soldering Temperature Profile