

GaAs monolithic integrated power amplifier

8.5GHz~11GHz 40dBm

### Key indicator

- Frequency range: 8.5GHz~11GHz
- Gain: 25dB
- Output P<sub>-3dB</sub> : 40.5dBm
- Supply voltage: +8V
- PAE: 40% typical
- Chip size: 4.17mm×4.17mm×0.1mm
- Package form: bare chip

### Typical application

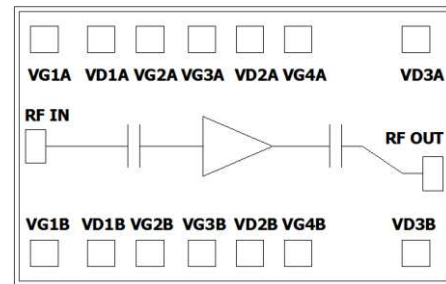
- Weather radar
- Point-to-point communication
- Test Equipment

### Product Introduction

AY1991 It is an X-band GaAs MMIC power amplifier, operating frequency 8.5GHz~11GHz, small signal gain 25dB, output P<sub>-3dB</sub> 40.5dBm typical PAE 40%, power supply voltage +8V.

The surface is covered with a dielectric layer protection layer, which has good environmental adaptation At the same time, the chip adopts an on-chip metallization process to ensure good grounding, and the back of the chip is metallized, which is suitable for eutectic sintering or conductive adhesive bonding process.

### Functional block diagram



### Electrical properties

T<sub>A</sub>=25°C, V<sub>D</sub>=+8V, I<sub>b</sub>=3A, Z<sub>0</sub>=50 Ω, pulse width=100uS, 10% duty cycle

Index	Minimum	Typical value	Max	Unit
Frequency	8.5~11			GHz
Small signal gain	22	25	—	dB
Small signal gain flatness	—	±2	—	dB
Reverse isolation	—	-50	—	dB
Input return loss	—	-12	—	dB
PAE	—	37	—	%
Output P <sub>-3dB</sub>	39.5	40.5	—	dBm
Drain voltage (V <sub>D</sub> )	—	8	8.5	V
Grid current	—	20	100	mA
Supply current(I <sub>b</sub> )	—	3.8	4.5	A
Thermal resistance	—	4	—	°C/W

※Test conditions: P / T =+28dBm

### Absolute maximum ratings

Maximum input power	+22dBm	Operating temperature	-40°C~+70°C
Channel temperature	150°C	Storage temperature	-65°C~+150°C
Max V <sub>D</sub>	+9V	Max V <sub>G</sub>	-1.2V

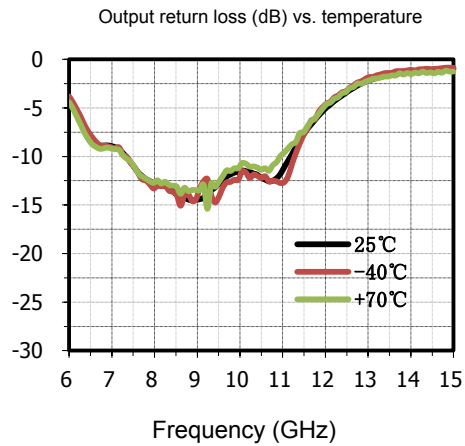
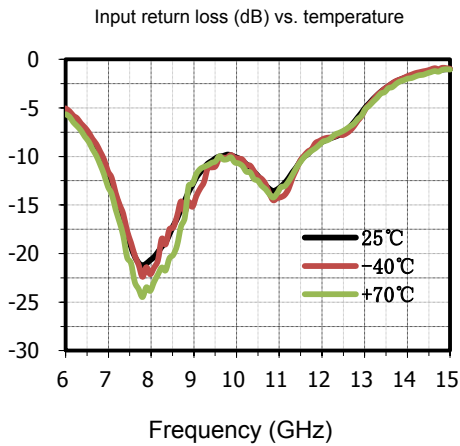
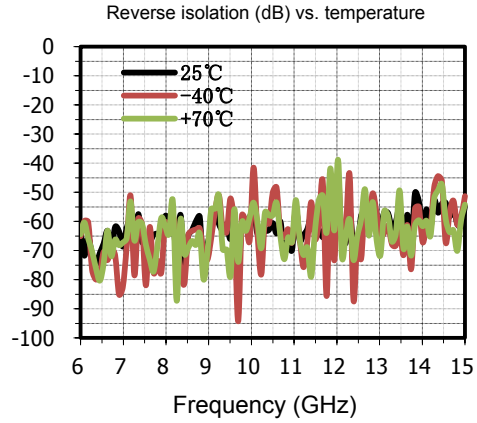
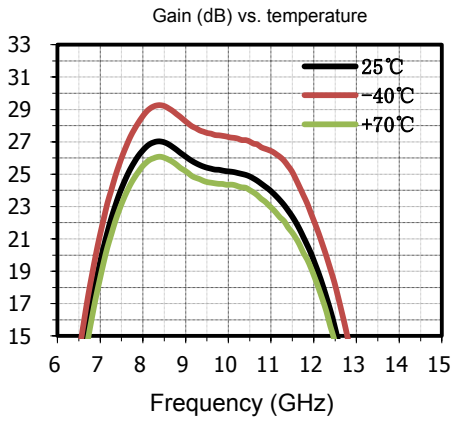
The output power of XT3113 is limited by the thermal resistance of the chip itself. It is recommended to work in pulse mode; XT3113 can work at a maximum duty cycle of 60%

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Typical small signal parameter test curve

$V_D = +8V$   $I_D = 3A$



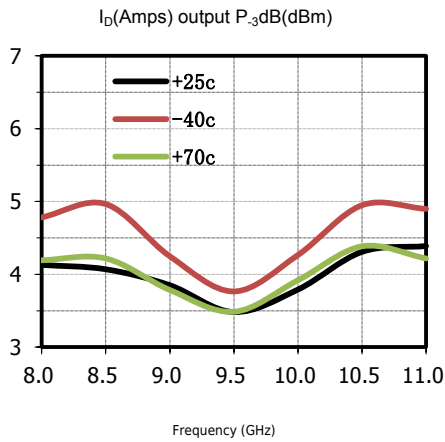
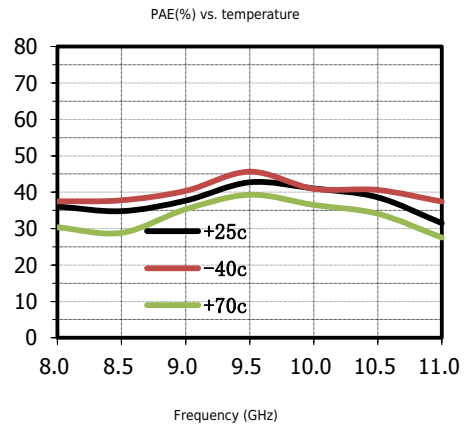
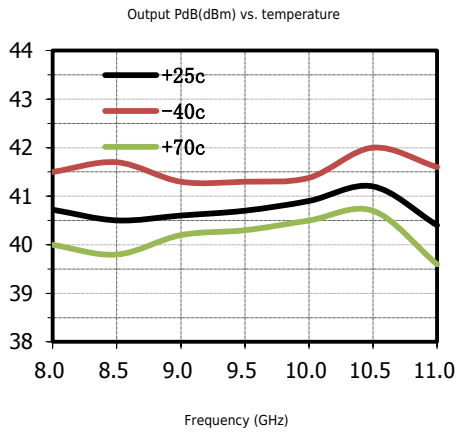
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**Output power and PAE test curve**

The following data is the result of using AY1991 fixture test and then de-embedding fixture parameters

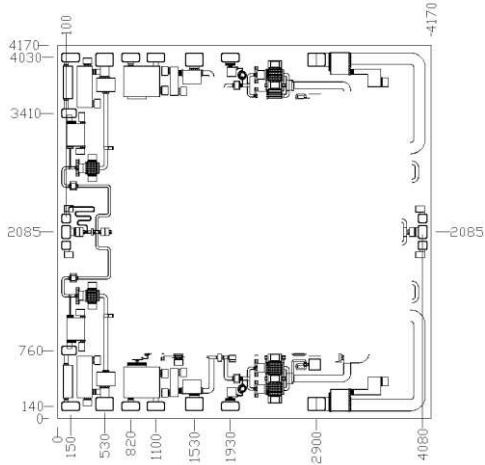
**$V_D=+8V$   $I_D=3A$  Pulse width = 600uS 60% duty cycle**



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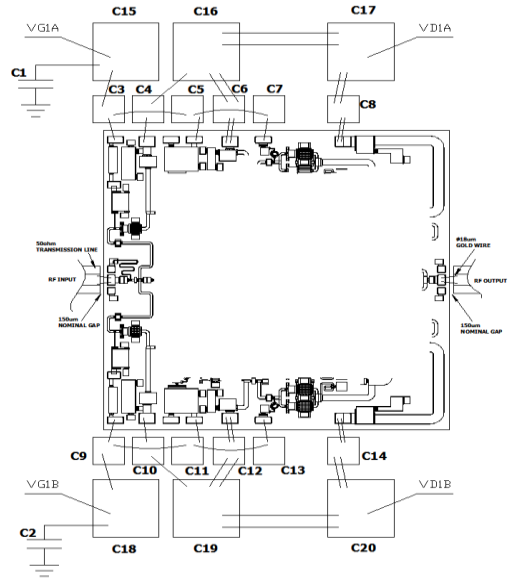
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### Shape and port size (μm)



Pad size:: 130x80um VG 、 RF IN 、 RFOUT pads  
180x130um VD pads

### Recommended assembly drawing



### Component list

serial number	Numerical value	Model	Manufacturer	Encapsulation
C1~C2	1uF	GRM155R61A105KE15D	Murata	0402
C3~C14	300pF	-	ANY	SLC
C15~C20	1000pF	-	ANY	SLC

Note intended to do items

1. AY1991 requires a positive drain voltage and a negative gate voltage bias. The recommended gate voltage setting is -0.75~-0.9V;
2. The length of the RF input/output gold wire should be as short as possible. It is recommended to use 18um gold wire for bonding;
3. AuSn eutectic welding is recommended, and high thermal conductivity conductive adhesive such as EK2000 can also be used for bonding;
4. The bypass capacitor C1~C2 should not exceed 1.5mm from the chip.