

GaAs monolithic integrated digital phase shifter

2.7~3.5GHz

### Key indicator

- Frequency range: 2.7~3.5GHz
- Root mean square root of precision of phase shifting phase precision: 2°
- Low insertion loss: 5.5dB
- Positive voltage control
- Chip size: 3.8mm×1.25mm×0.1mm

### Typical application

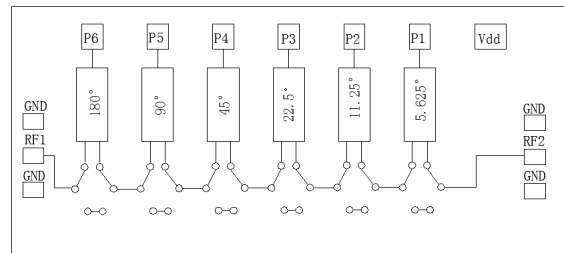
- Electronic Warfare
- Weather & Military and Military Affairs Reredada Satellite
- Communications
- Wave control module
- Phase modulation

### Product Introduction

AY1168 is an S-band six-digit digitally controlled phase shifter chip, made with GaAs 0.5μm-pHEMT process, phase shift step 5.625°, insertion loss less than 5.5dB, standing wave ratio less than 1.5, using -5V single power supply, 0/+5V logic level control phase shift.

The chip adopts an on-chip metallization process to ensure good grounding. It is easy to use and metallized on the back of the chip, and is suitable for eutectic sintering or conductive adhesive bonding processes.

### Functional block diagram



Electrical performance (T<sub>A</sub>=25°C, V<sub>D</sub>=-5V, control level=0/+5V, 50 Ω system)

Index	Minimum	Typical value	Max	Unit
Frequency	2.7~3.5			GHz
Input standing wave ratio	—	1.55	—	:1
Output standing wave ratio	—	1.4	—	:1
Insertion loss	—	-5.2	—	dB
Amplitude fluctuation	-0.5	—	0.5	dB
Phase shift accuracy	-2	—	4.5	°
Phase shift accuracy root mean square	—	2	—	°

Truth table (0:0V, 1:+5V)

Phase shift	P1	P2	P3	P4	P5	P6
Zero state	0	0	0	0	0	0
-5.625°	1	0	0	0	0	0
-11.25°	0	1	0	0	0	0
-22.5°	0	0	1	0	0	0
-45°	0	0	0	1	0	0
-90°	0	0	0	0	1	0
-180°	0	0	0	0	0	1
-354.375°	1	1	1	1	1	1

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**Absolute maximum rating**

Maximum input power	+23dBm	Operating temperature	-55°C~+85°C
Maximum input voltage	-8V	Storage temperature	-65°C~+150°C

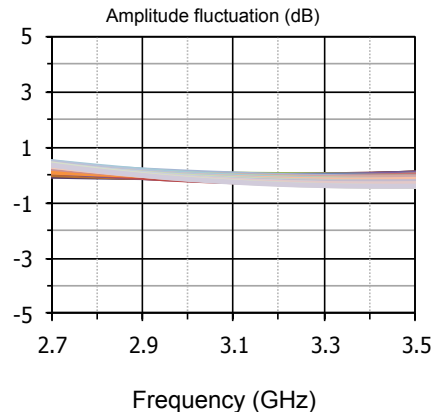
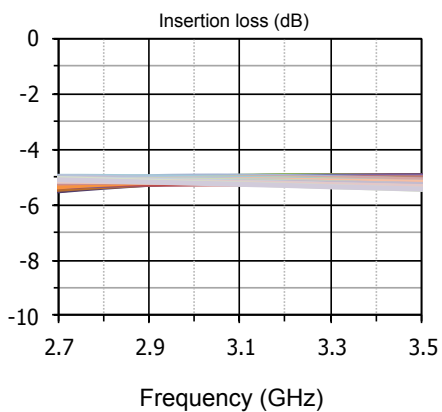
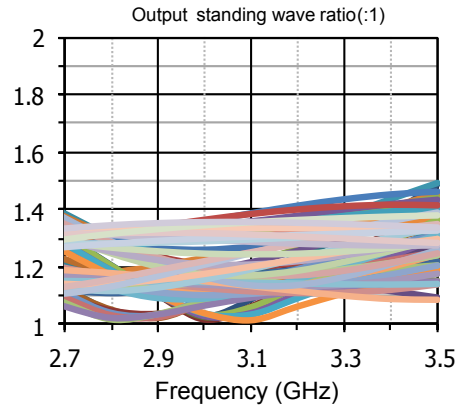
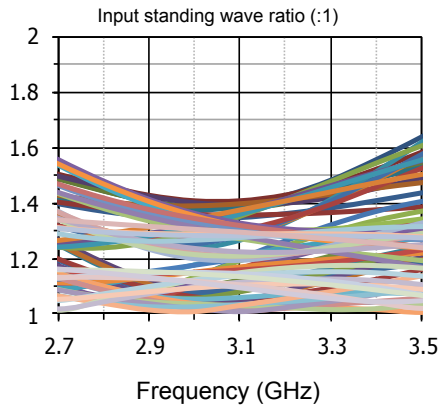
**Control voltage**

State	Bias condition
Low	0~0.2V
High	4.5~5.5V

**Bias voltage & current**

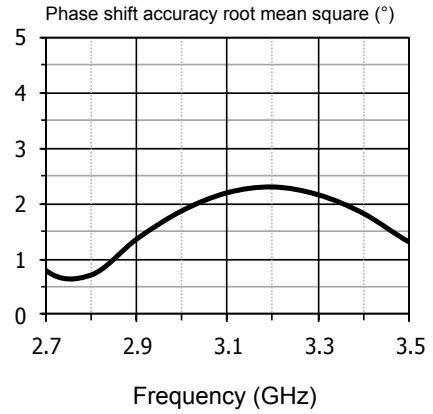
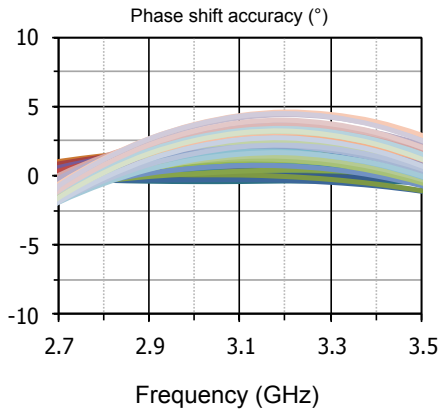
$V_D$	$I_D$
-5V	8mA

**Typical test curve (bare chip test)**

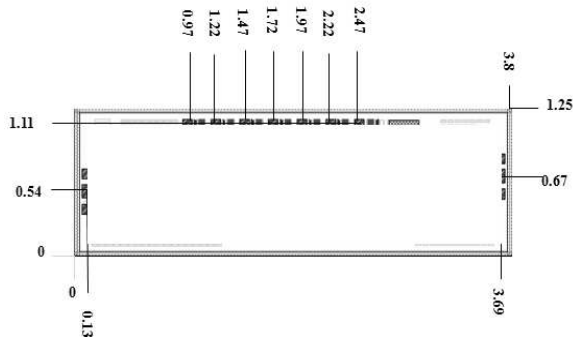


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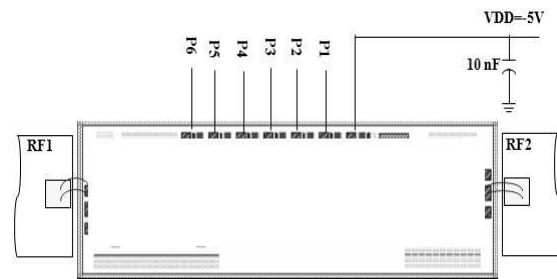
2.7~3.5GHz



Shape and port size (mm)



Recommended assembly drawing



**Precautions**

1. The chip is stored in a dry, nitrogen environment and used in an ultra-clean environment;
2. GaAs material is brittle and cannot touch the surface of the chip, so you must be careful when using it;
3. Chips are sintered with conductive glue or alloy (the alloy temperature cannot exceed 300°C, and the time cannot exceed 30 seconds) to make it fully grounded;
4. The gap between the microwave port of the chip and the substrate should not exceed 0.05mm. Use  $\Phi 25\mu\text{m}$  double gold wire for bonding. The recommended length of gold wire is 250~400 $\mu\text{m}$ ;
5. The chip is sensitive to static electricity, so pay attention to anti-static during storage and use.