

GaAs monolithic integrated 5-bit digital phase shifter

32~38GHz

Key indicator

- Frequency range: 32~38GHz
- Low insertion loss: 9dB
- Chip size: 2.1mmx1.25mmx0.1mm

Typical application

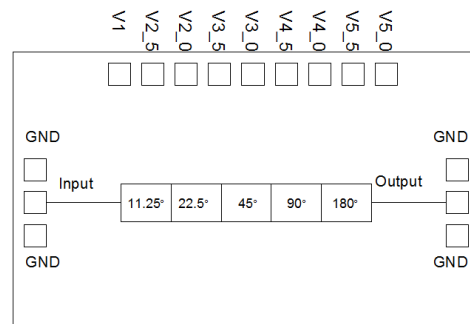
- Electronic Warfare
- Satellite Communications
- Wave control module
- Phase modulation

Product Introduction

AY1171 is a five-digit digitally controlled phase shifter chip, made with GaAs 0.5μm-pHEMT process, with a phase shift step of 5.625°, an insertion loss of about 9dB, and a 0/-5V logic level to control the phase shift.

The chip uses on-chip metal chemical technology to ensure good grounding. It is easy to use and metallized on the back of the chip. It is suitable for eutectic sintering or conductive adhesive bonding processes.

Functional block diagram



Electrical performance (T_A=25°C, V_b=-5V, control level=0/-5V, 50 Ω system)

Index	Minimum	Typical value	Max	Unit
Frequency	32~38			GHz
RF1 standing wave ratio	—	1.8	—	:1
RF2 standing wave ratio	—	2	—	:1
Insertion loss	—	-9	—	dB
Insertion loss change	—	2	—	dB

Truth table

Phase shift	V1	V2_5	V2_0	V3_5	V3_0	V4_5	V4_0	V5_5	V5_0
Zero state	1	1	0	1	0	1	0	1	0
-11.25°	0	1	0	1	0	1	0	1	0
-22.5°	1	0	1	1	0	1	0	1	0
-45°	1	1	0	0	1	1	0	1	0
-90°	1	1	0	1	0	0	1	1	0
-180°	1	1	0	1	0	1	0	0	1
-354.375°	0	0	1	0	1	0	1	0	1

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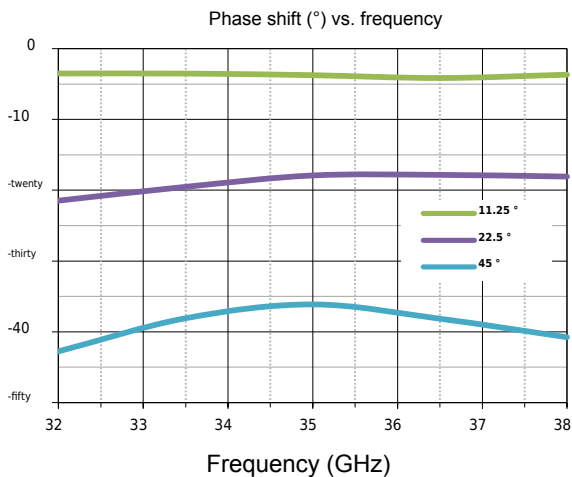
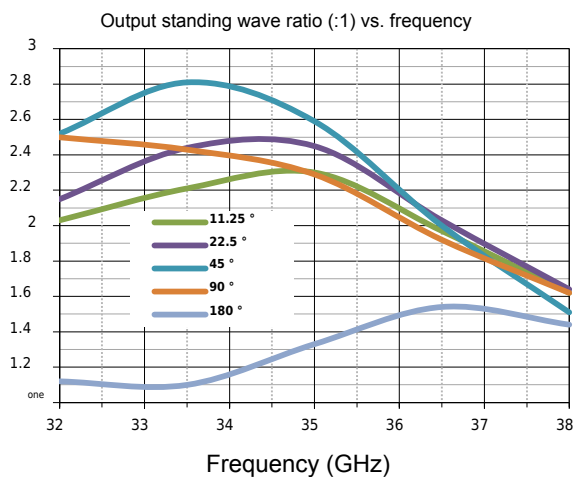
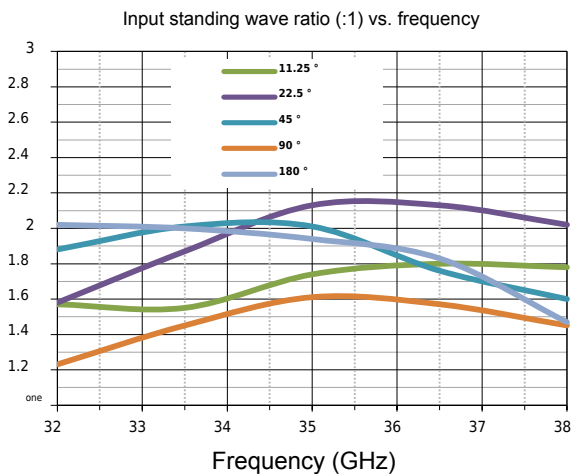
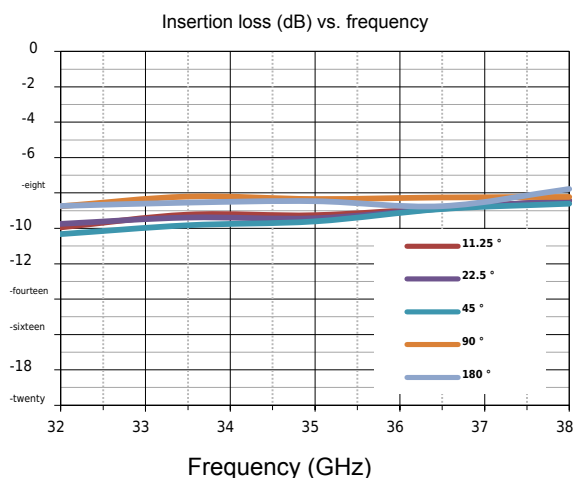
Absolute maximum rating

Maximum input power	+15dBm	Operating temperature	-55°C~+85°C
Maximum input voltage	-8V	Storage temperature	-65°C~+150°C

Control voltage

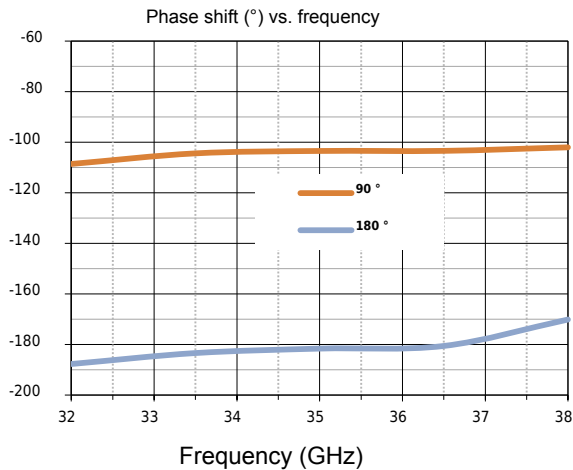
State	Bias condition
0	-0.8V~0V
1	-5V~-4.5V

Typical test curve

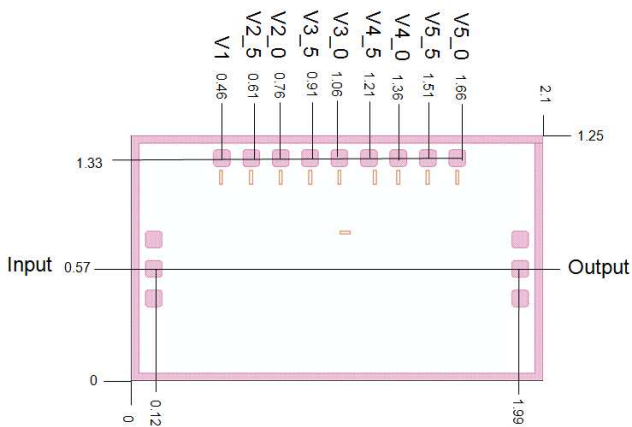


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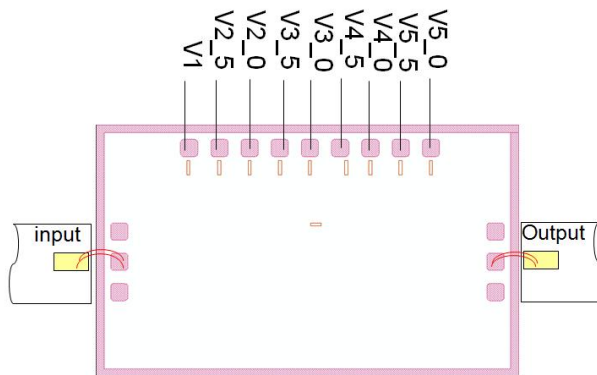
32~38GHz



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 part 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 μm ;
5. The chip is sensitive to static electricity, so pay attention to anti-static during storage and use.