

GaAs monolithic integrated digital phase shifter 8∼12GHz

Key indicator

➤ Frequency Range: 8~12GHz

Phaseshiftaccuracyrootmeansquare:2°

Low insertion loss: 8dBPositive voltage control

Chip size: 3.8mm×1.25mm×0.1mm

Product Introduction

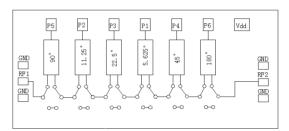
AY1160 is an X-band six-bit digitally controlled phase shifter chip, made with GaAs 0.5µm-pHEMT process, phase shift step 5.625°, insertion loss less than 8dB, 0/+5V logic level control phase shift.

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.

Typical application

- Electronic Warfare
- Weather & Military Radar
- > Satellite Communications
- > Wave control module
- Phase modulation

Functional block diagram



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

Index	Minimum	Typical value	Max	Unit
Frequency	8~12		GHz	
Input standing wave ratio	-	1.9	-	:1
Output standing wave ratio	ı	1.8	-	:1
Insertion loss	-	-8	-	dB
Amplitude fluctuation	-0.6	-	0.6	dB
Phase shift accuracy	-4	-	5	0
Phase shift accuracy root mean square	-	2	-	۰

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	+18dBm	Operating temperature	-55℃~+85℃
Maximum input voltage	-8V	Storage temperature	-65℃~+150℃

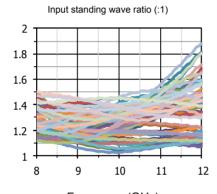
Control voltage

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

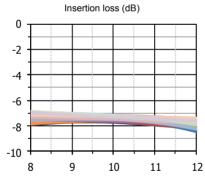
Bias voltage & current

V_{D}	l _D
-5V	8mA

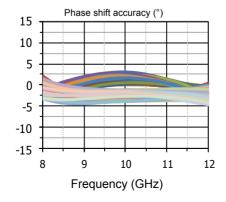
Typical test curve (bare chip test)



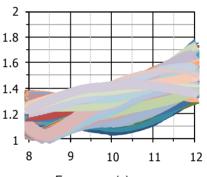
Frequency (GHz)



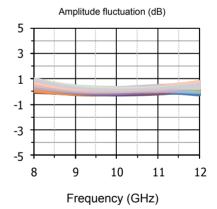
Frequency (GHz)



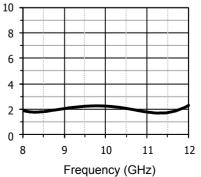
Output standin wave ratio(:1)



Frequency (z)



Phase shift accuracy root mean square (°)



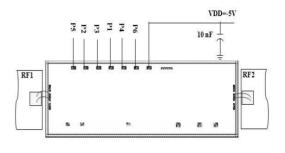


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Shape and port size (mm)

1.11 0.65

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 Φ 25µm double gold wire for bonding. The recommended length of gold wire is $250\sim400\mu m$;5. The chip is sensitive to static electricity, so pay attention to anti-static during storage and use.