

(Integrated phase shift, attenuator function) X-band receiving multi-function chip

8~12GHz

Key indicator

- Frequency range: 8~12GHz
- Phase shift accuracy root mean square: 2.5°
- Root mean square attenuation accuracy: 1dB
- Transmitting/receiving state gain: 1.5dB
- Chip size: 5mm×3.5mm×0.1mm

Typical application

- Radar and electronic countermeasures
- Military and aerospace
- Satellite communications
- Beam
- Phase shift

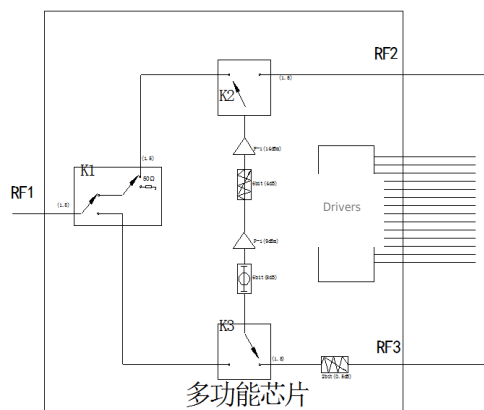
Product Introduction

AY1491 integrated numerical control phase shift, numerical control attenuation and other power.

The attenuation accuracy is 1dB, and the phase shift accuracy is 2.5°.

The chip uses an on-chip metallization process to ensure good grounding, and is suitable for eutectic sintering or conductive adhesive bonding processes.

Functional block diagram



Electrical properties

($T_A=+25^{\circ}\text{C}$, $V_{d1}=5\text{V}$, $V_S=-5\text{V}$, control voltage = 0/+5V, $Z_O=50\Omega$)

Index	Minimum	Typical value	Max	Unit
Frequency Range	8~12			GHz
Transmit state gain	—	1.5	—	dB
Attenuation range	0.5	—	31.5	dB
Root mean square attenuation accuracy	—	1.0	—	dB
Decay state phase fluctuation	-6	—	4	°
Phase shift range	5.625	—	354.375	°
Phase shift accuracy root mean square	—	2.5	—	°
Phase-shifted amplitude fluctuation	—	± 1.0	—	dB
Input standing wave ratio	—	1.6	—	:1
Output standing wave ratio	—	1.7	—	:1
TTL control voltage	—	0(0V)	1(+5V)	V
Amplifier working current	—	90	100	mA
Driver operating current	—	10	20	mA
storage temperature	-55	—	75	°C

Absolute maximum ratings

Maximum input power	+23dBm	Operating temperature	-55~+75°C
Maximum input voltage	8V	Storage temperature	-65~+150°C

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Switch truth table (0: 0V, 1: +5V)

SW1	SW2	COM-TX	RX-COM	COM-Load
0	0	OFF	OFF	ON
0	1	OFF	ON	OFF
1	0	ON	OFF	OFF
1	1	ON	OFF	OFF

Phase-shifting truth table (0:0V, 1:-5V)

Phase shift	PC1	PC2	PC3	PC4	PC5	PC6
Reference 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

Attenuation truth table (0: 0V, 1: +5V)

Attenuation	AC1	AC2	AC3	AC4	AC5	AC6
Reference state	0	0	0	0	0	0
0.5dB	1	0	0	0	0	0
1dB	0	1	0	0	0	0
2dB	0	0	1	0	0	0
4dB	0	0	0	1	0	0
8dB	0	0	0	0	1	0
16dB	0	0	0	0	0	1
31.5dB	1	1	1	1	1	1

Control voltage

State	Bias condition
0	0~0.2V
1	4.5~5.5V

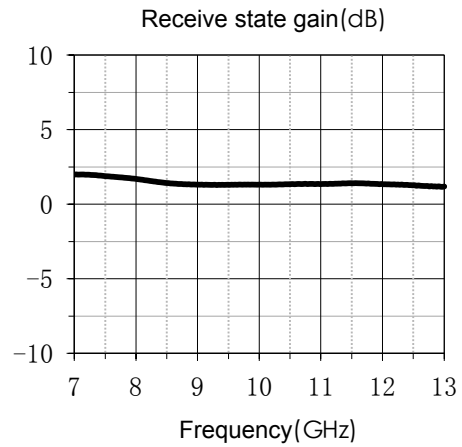
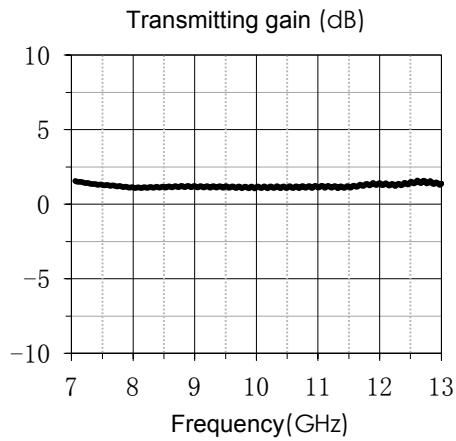
Bias voltage vs current

V _{d1}	I _{dd}	V _s	I _{ss}
5V	90mA	-5V	18mA

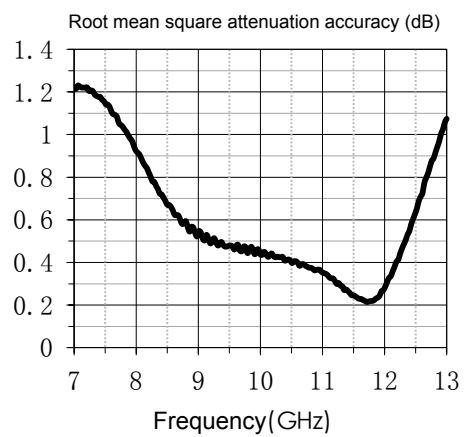
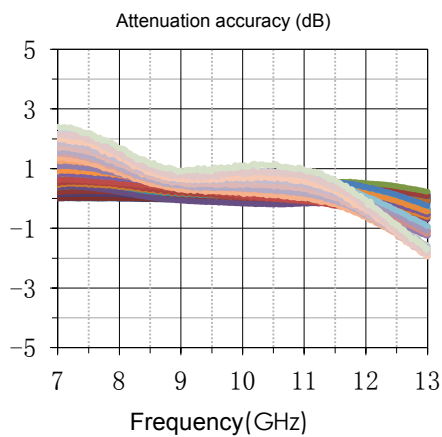
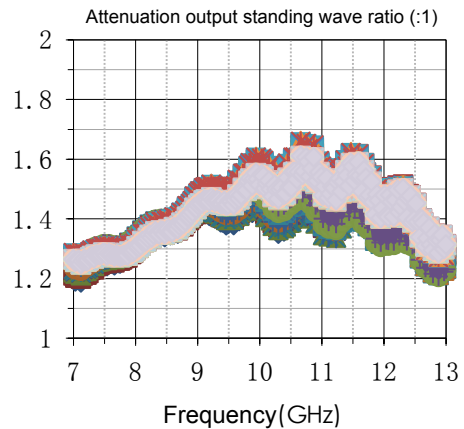
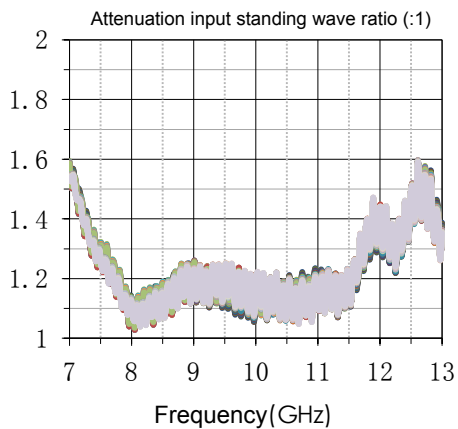
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Typical test curve (bare chip test)

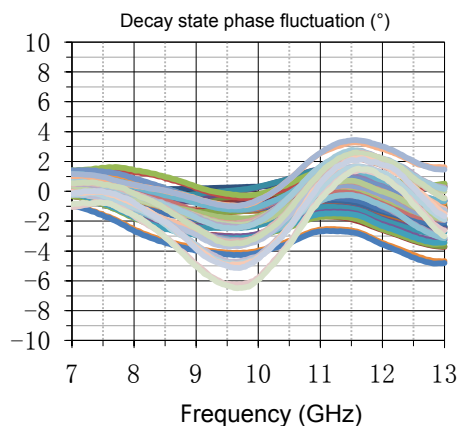


(1) Attenuation

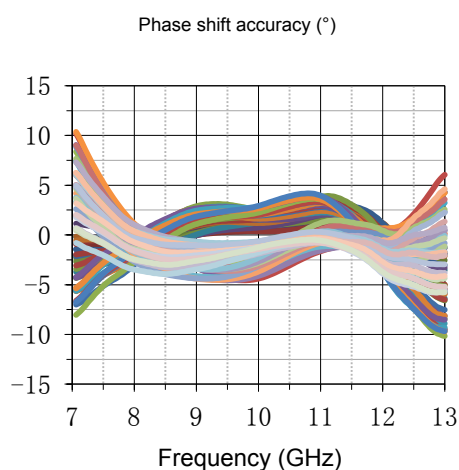
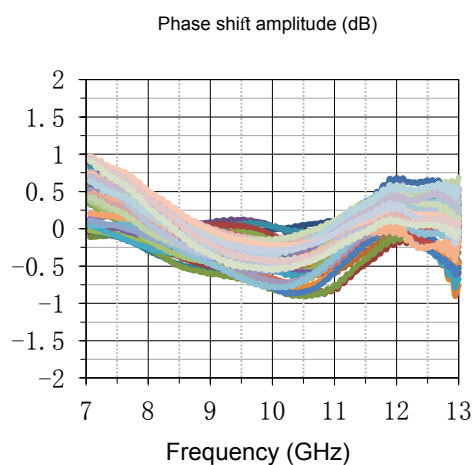
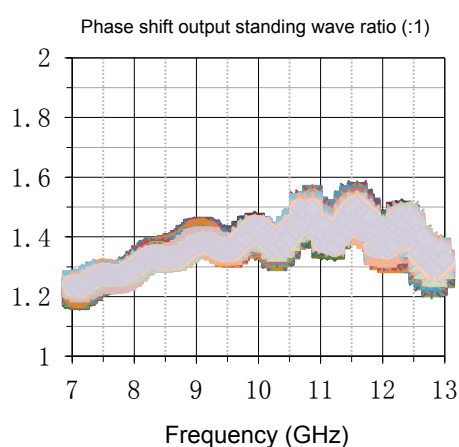
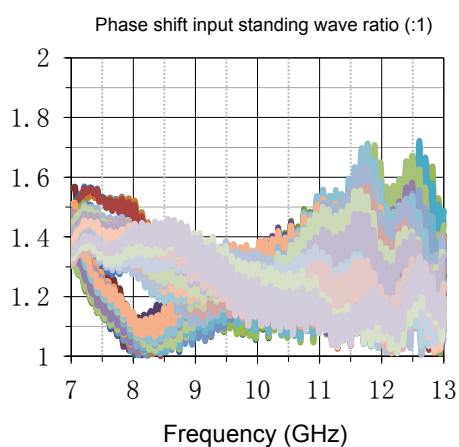


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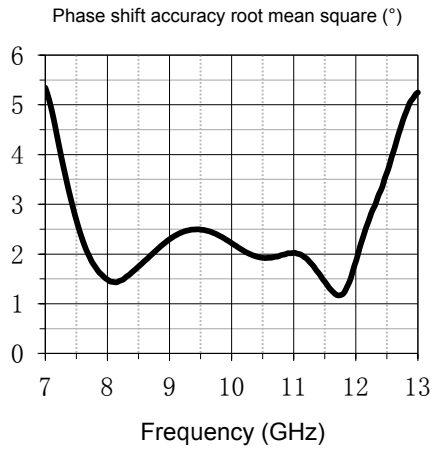


(2) Phase shift

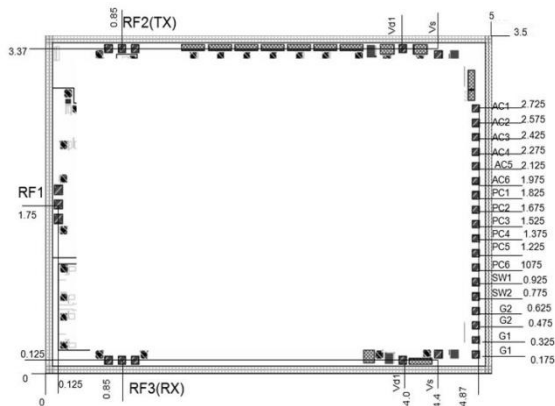


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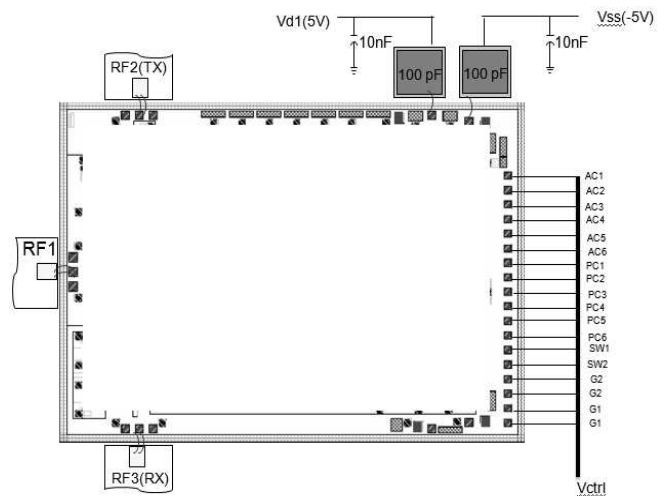
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Shape and port size (mm)



Recommended assembly drawing



Precautions

Gallium arsenide MMIC devices are susceptible to damage from electrostatic discharge. Precautions should be taken during transportation, assembly and testing.