GaAs MMIC 6-bit Digitally Controlled Phase Shifter Chip , 10-14GHz

Performance characteristics

- Frequency range: 10 - 14 GHz
- Insertion loss: 8.5 Typ.
- Insertion loss fluctuation : 0.7 dB
- Phase shift accuracy (RMS): 2.2 °
- 50Ohm input / output
- 100% on-wafer testing
- Chip size 3.82 x 1.37 x 0.1mm

Product Introduction

GPS-1014-6B is a GaAs MMIC 6-bit digitally controlled phase shifter chip with a frequency range of 10 GHz to 14 GHz , an insertion loss of 8.5 dB , a phase shift accuracy of 2.2 ° , and an amplitude variation of 2.4 dB in each state. The chip uses 0/-5V logic control. The chip uses on-chip through-hole metallization technology to ensure good grounding, does not require additional grounding measures, and is simple and convenient to use. The back of the chip is metallized and is suitable for eutectic sintering or conductive adhesive bonding processes.

Use restriction parameter [1]	
Maximum input power	+23dBm
Control voltage range	-8V ～ +0.5V
Operating temperature	-55 ~ +85°C
Storage temperature	-65 ~ +150°C

【1】 Exceeding any of these maximum limits may cause permanent damage.

Electrical performance parameters (T_A = +25°C)

Index	Minimum	Typical Value	Maximum	Unit
Frequency Range		10-14		GHz
Insertion loss		8.5	9.5	dB
Insertion loss flatness		0.7		dB
Phase shift accuracy (RMS)		2.2		degree
Amplitude changes of each state		-	2.4	dB
Input return loss	16	24	-	dB
Output return loss	16	26	-	dB
Switching time		20		ns

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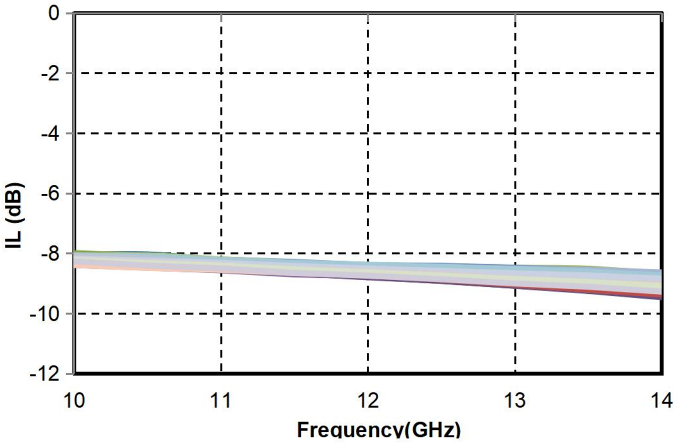
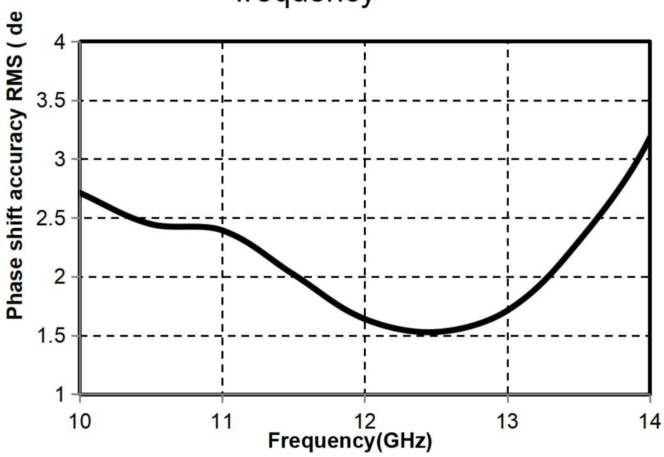
Main index test curve

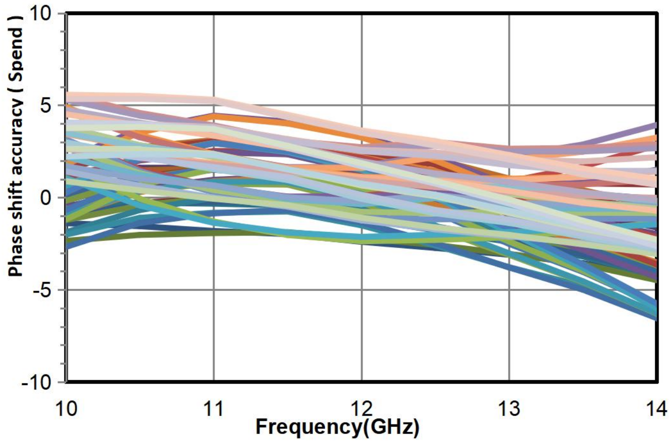
Full-state phase shift insertion loss vs. operating frequency



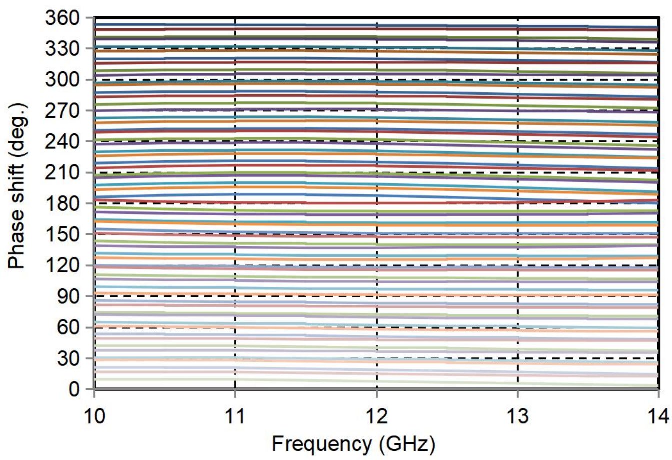
Phase shift accuracy (RMS) vs. operating frequency



Phase shift accuracy (absolute value) vs. operating frequency



Phase shift vs. operating frequency



Full-state phase shift input return loss vs. operating frequency

Full-state phase shift output return loss vs. operating frequency

Add: 101 cecil street #14-10, tong eng building singapore 069533
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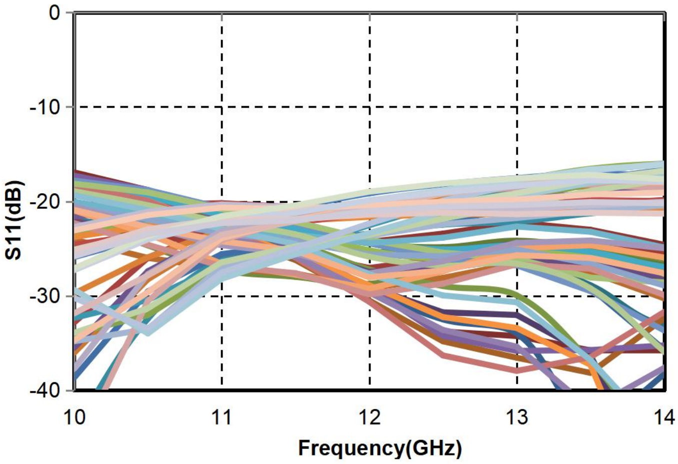
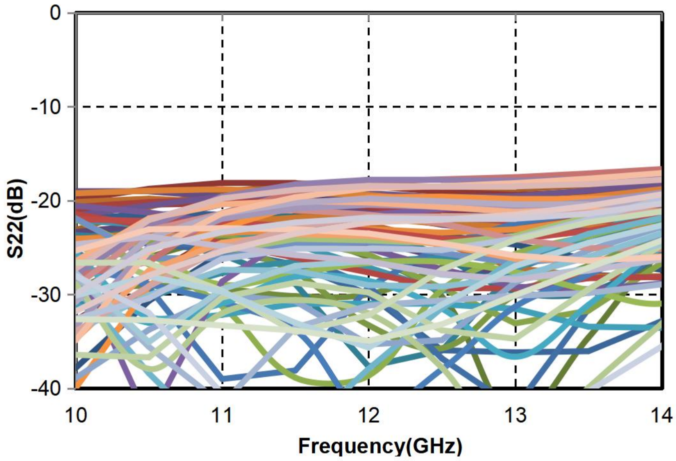
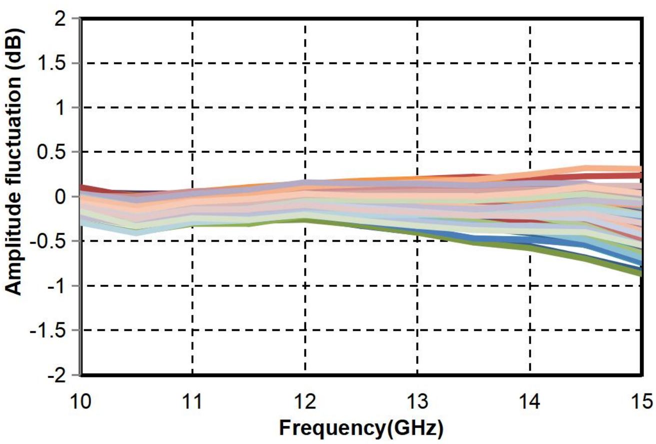
Tel: +65 82613258

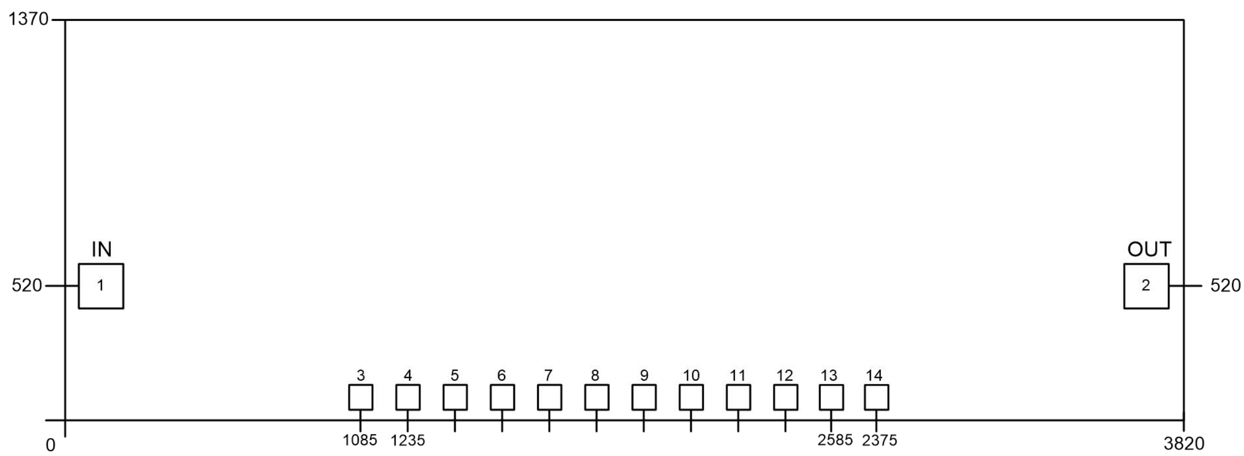




Amplitude changes of each state



Appearance structure [2]



【 2 】All units in the figure are micrometers

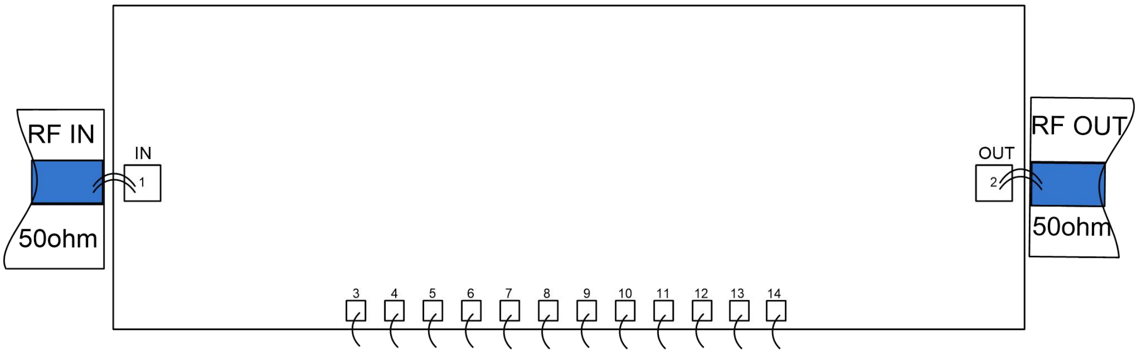
Bonding point definition

Bonding point number	Function Symbol	Functional Description
1	RF IN	RF signal input terminal
2	RF OUT	RF signal output terminal
3~14	CTRL	Control Port
Chip bottom	GND	The bottom of the chip needs to be well grounded to RF and DC

Truth Table

	Pads 3	Pads 4	Pads 5	Pads 6	Pads 7	Pads 8	Pads 9	Pads 10	Pads 11	Pads 12	Pads 13	Pad 14
	C1_0	C1_5	C2_0	C2_5	C3_0	C3_5	C4_0	C4_5	C5_0	C5_5	C6_0	C6_5
Zero state	0	-5	0	-5	0	-5	0	-5	0	-5	0	-5
-5.625°	-5	0	0	-5	0	-5	0	-5	0	-5	0	-5
-11.25°	0	-5	-5	0	0	-5	0	-5	0	-5	0	-5
-22.5°	0	-5	0	-5	-5	0	0	-5	0	-5	0	-5
-45°	0	-5	0	-5	0	-5	-5	0	0	-5	0	-5
-90°	0	-5	0	-5	0	-5	0	-5	-5	0	0	-5
-180°	0	-5	0	-5	0	-5	0	-5	0	-5	-5	0
-354.375°	-5	0	-5	0	-5	0	-5	0	-5	0	-5	0

Recommended assembly drawing



Precautions for use

- The chip needs to be stored in an anti-static container and kept in a nitrogen environment.
- Do not attempt to clean the bare die surface using wet chemical methods.
- Please strictly comply with ESD protection requirements to avoid electrostatic damage to bare chips.
- General operation: Please use precision pointed tweezers to pick up bare chips. Avoid touching the chip surface with tools or fingers during operation.
- Rack mounting operation suggestions: Bare chip mounting can be done by AuSn solder eutectic sintering or conductive adhesive bonding. The mounting surface must be clean and flat.

- Sintering process: It is recommended to use AuSn solder sheets with a gold-tin ratio of 80/20 . The working surface temperature reaches 255 ℃ and the tool (vacuum chuck) temperature reaches 265 ℃. When the high-temperature mixed gas (nitrogen-hydrogen ratio of 90/10) is blown to the chip, the temperature at the top of the tool should be raised to 290 ℃. Do not let the chip exceed 320 ℃ for more than 20 seconds. The friction time should not exceed 3 seconds.
- Bonding process: The amount of conductive glue dispensed should be as small as possible. After the chip is placed in the installation position , the conductive glue should be vaguely visible around it . For curing conditions, please follow the information provided by the conductive glue manufacturer.
- Bonding operation suggestions: Use Φ0.025mm (1mil) gold wire for both ball and wedge bonding. Thermo-ultrasonic bonding temperature is 150 °C. The pressure of the wedge for ball bonding is 40~50gf , and the pressure of the wedge bonding is 18~22gf . Use the smallest possible ultrasonic energy. The bonding starts at the pressure point on the chip and ends at the package (or substrate) .