

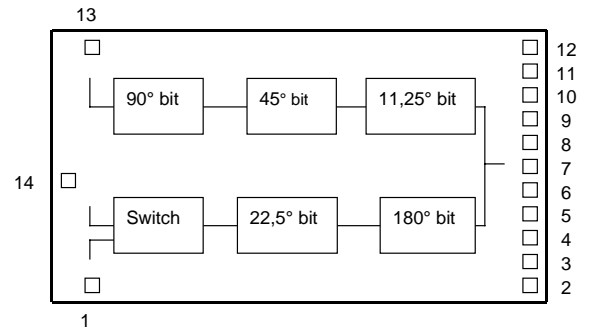
## S-band Phase Shifter / Switch

### GaAs Monolithic Microwave IC

#### Description

The CHP2085 is a S-band monolithic 5 bits phase shifter / switch. The circuit is manufactured with a standard MESFET process : via holes through the substrate, air bridges and electron beam gate lithography.

It is supplied in chip form.



#### Main Features

- Frequency range : 2.7 to 3.4GHz
- 11.25° phase quantization
- 27dB switch isolation
- Chip size : 4,14 x 2,16 x 0,1mm

#### Pin Out

- |           |            |
|-----------|------------|
| 1- RFout2 | 8- B4      |
| 2- P2     | 9- H4      |
| 3- P1     | 10- BH1    |
| 4- H8     | 11- GND    |
| 5- B8     | 12- B9     |
| 6- B2     | 13- RFin   |
| 7- H9     | 14- RFout1 |

#### Main Characteristics

Tamb = +25°C

Symbol	Parameter	Min	Max	Unit
Fop	Operating frequency range	2.7	3.4	GHz
PHlpp	Phase shift precision peak to peak error		10	°
Il	Insertion loss		12	dB
Is	Isolation	27		dB

ESD Protections : Electrostatic discharge sensitive device observe handling precautions !

## Electrical Characteristics

Tamb = +25°C

Symbol	Parameter	Test Conditions	Min	Max	Unit
Fop	Operating frequency range		2.7	3.4	GHz
PHlpp	Phase shift precision peak to peak error	(1)		10	°
Il	Insertion loss	(1)		12	dB
Is	Isolation	(1)	27		dB
VSWRin	Input VSWR	(1)		2:1	
VSWRout	Ouput VSWR	(1)		2:1	
Pin1dB	Pulsed Input power at 1dB increase loss	(2)	23		dBm
Ips	Phase shifter current	(1)		5	mA

(1) Pin ≤ 0dBm, Low level control voltage = -4V, High level control voltage = 0V, Vgi consistent with the Phase Schifter Control Interface table.

(2) These values are representative for pulsed on-wafer measurements

## Absolute Maximum Ratings (1)

Tamb = +25°C

Symbol	Parameter	Values	Unit
Vgi	Phase shifter control voltage	-8.0	V
Vpi	Switch control voltage	-8.0	V
Pin	Maximum peak input power overdrive (2)	+25	dBm
Top	Operating temperature range	-40 to +85	°C
Tstg	Storage temperature range	-55 to +125	°C

(1) Operation of this device above anyone of these paramaters may cause permanent damage.

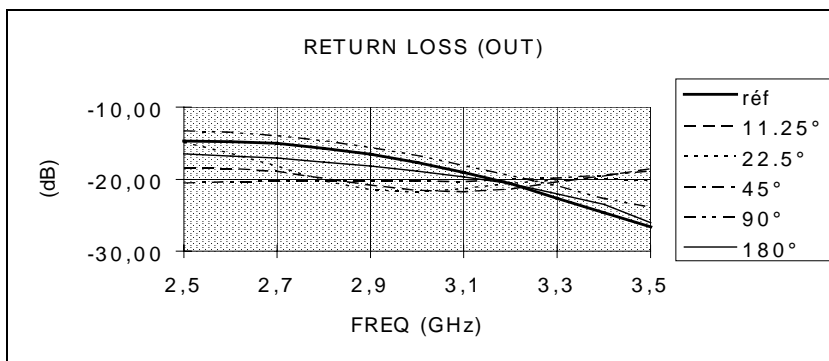
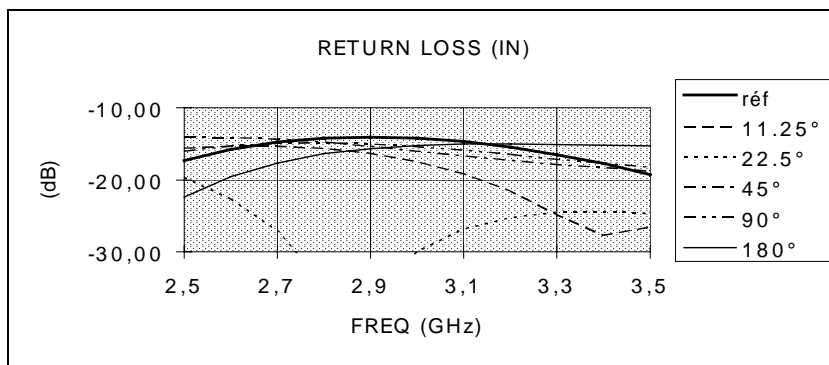
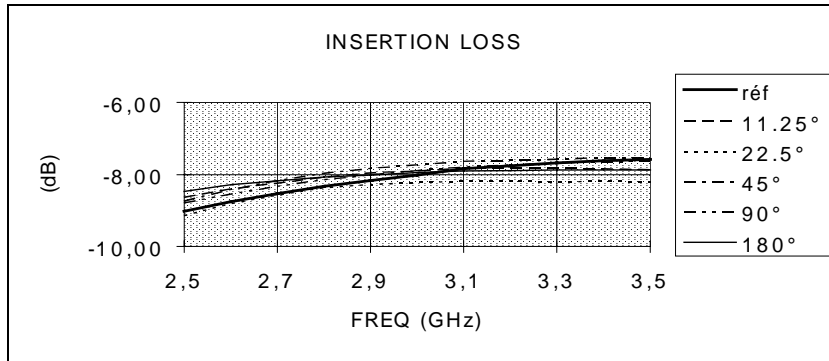
(2) Duration < 1s.

(1) Pin ≤ 0dBm

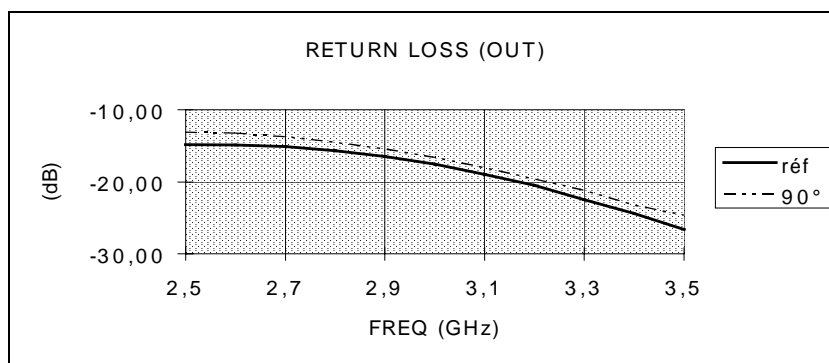
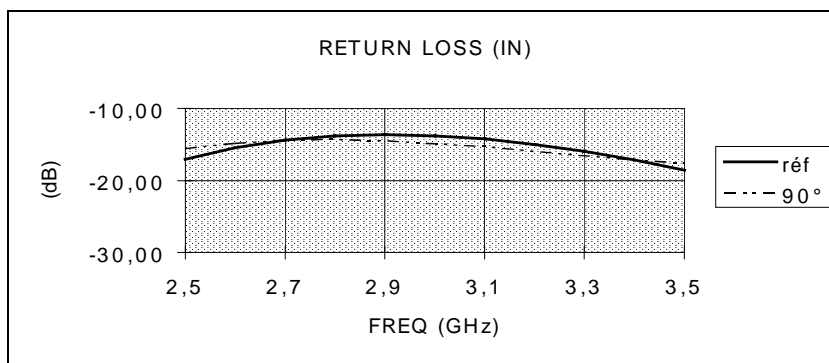
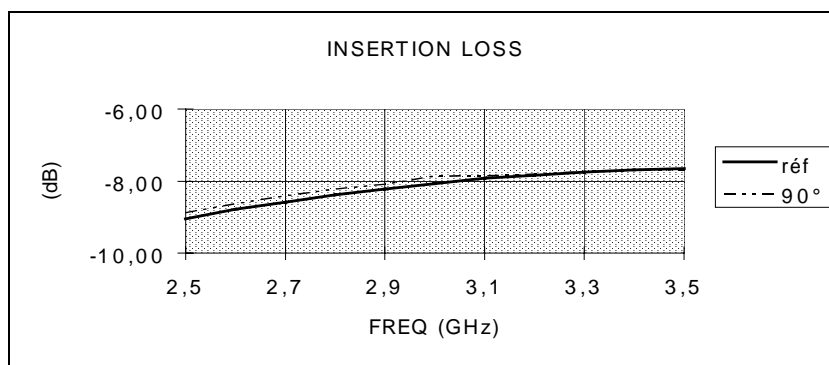
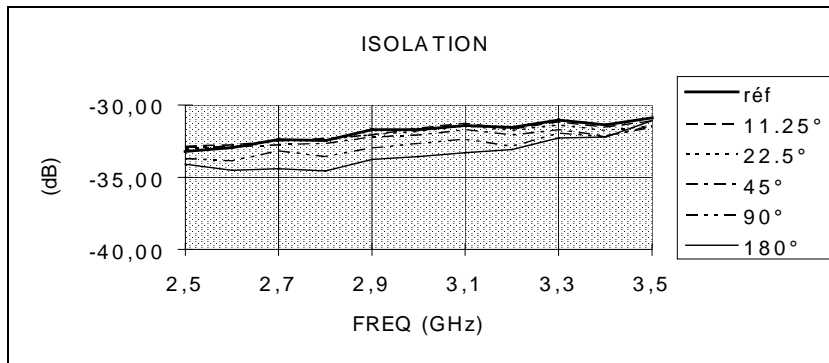
## Switch Control Signal Interface

Switch command	Bond pads	
	P1	P2
Rfin to RFout2	Low level	High level
Rfin to RFout1	High level	Low level

**Typical Wafer [S] Parameters  
RFin to RFout2 path**



Typical Wafer [S] Parameters  
RFin to RFout1 path



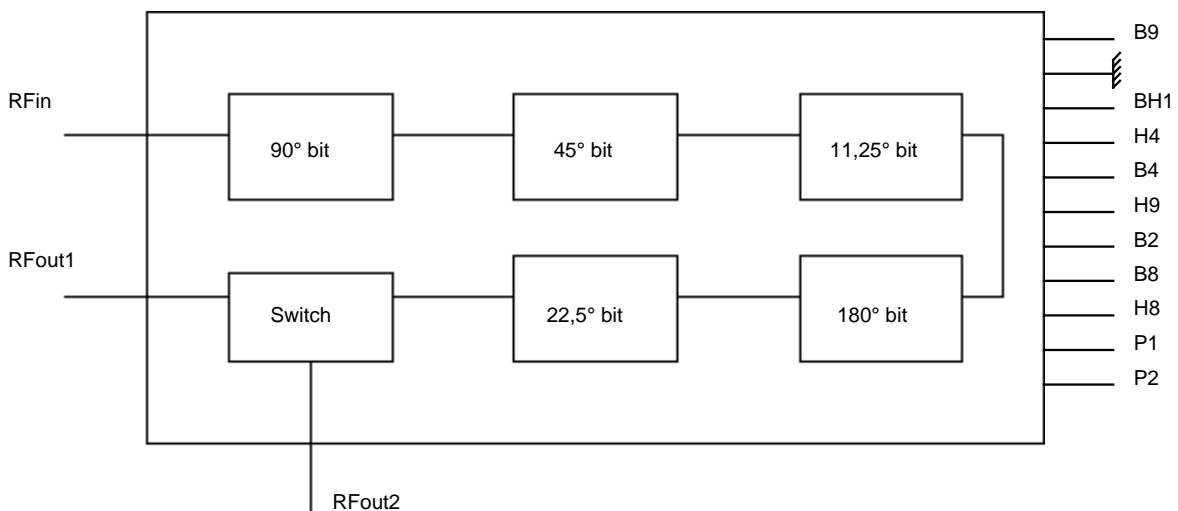
### Phase Shifter Control Interface

The 5 bits phase shifter command is actuated by the 8 voltage control pads  
State = 1 for  $V_{gi} = 0V$  (high level), State = 0 for  $V_{gi} = -5.5V$  (low level)

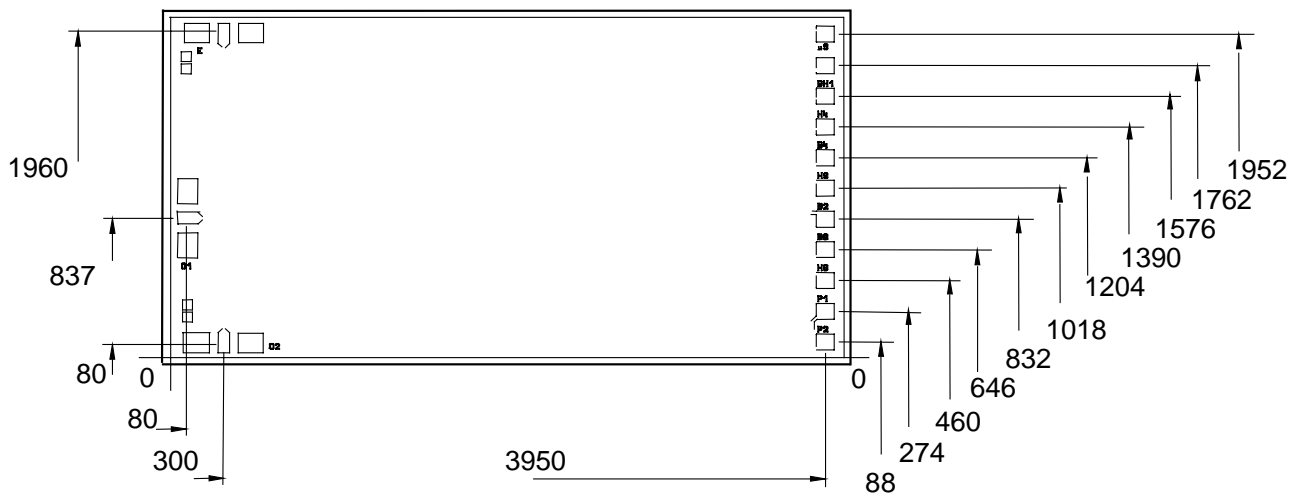
Nominal phase state °	Bond pads (1)							
	H8	B8	H9	B9	H4	B4	B2	BH1
0 (0)	1	0	1	0	1	0	0	0
11.25 ( $\pi/16$ )	1	0	1	0	1	0	0	1
22.50 ( $\pi/8$ )	1	0	1	0	1	0	1	0
33.75 ( $\pi/8 + \pi/16$ )	1	0	1	0	1	0	1	1
45 ( $\pi/4$ )	1	0	1	0	0	1	0	0
56.25 ( $\pi/4 + \pi/16$ )	1	0	1	0	0	1	0	1
67.50 ( $\pi/4 + \pi/8$ )	1	0	1	0	0	1	1	0
78.75 ( $\pi/4 + \pi/8 + \pi/16$ )	1	0	1	0	0	1	1	1
90 ( $\pi/2$ )	1	0	0	1	1	0	0	0
180 ( $\pi$ )	0	1	1	0	1	0	0	0
348.75 ( $\pi + \pi/2 + \pi/4 + \pi/8 + \pi/16$ )	0	1	0	1	0	1	1	1

(1) Terminology : B = Low pass, H = High pass, BH = Low/High pass  
1 = 11°, 2 = 22.5°, 4 = 45°, 9 = 90°, 8 = 180°

### Simplified Schematic



## Chip Mechanical Data



Dimensions :  $4140 \pm 10\mu\text{m} \times 2160 \pm 10\mu\text{m}$   
 Thickness :  $100 \pm 10\mu\text{m}$   
 HF pads :  $80\mu\text{m}$   
 DC pads :  $100\mu\text{m}$

## Ordering Information

Chip form : CHP2085-99F/00

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