

## GaAs PIN Reflective SP8T Switch Chip, 10-40 GHz

### Performance characteristics

- Frequency Range: 10-40 GHz
- Insertion loss : 1.6dB typ.
- Isolation: 47 dB typ.
- P-1dB: 27dBm @17GHz
- 50Ohm input / output
- 100% on-wafer testing
- Chip size: 2.12 x 1.57 x 0.1mm
- Silicon nitride passivation, scratch protection

### Product Introduction

GSW8B2 is a GaAs PIN reflective single-pole eight-throw switch chip with 50Ω matching at the input/output end, a frequency range of 10 to 40GHz , and -5V/+5V control. It has a built-in bias network and DC blocking capacitors, which is easy to use. It has excellent switching characteristics and port standing wave characteristics in the entire operating frequency range, and is very suitable for microwave hybrid integrated circuits, multi-chip modules, and low-power systems. The switch 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, which is suitable for eutectic sintering or conductive adhesive bonding processes.

#### Use restriction parameter <sup>1</sup>

|                       |              |
|-----------------------|--------------|
| Maximum input voltage | 2.5V         |
| Maximum input power   | +31dBm CW    |
| Operating temperature | -55 ~ +85°C  |
| storage temperature   | -65 ~ +150°C |

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

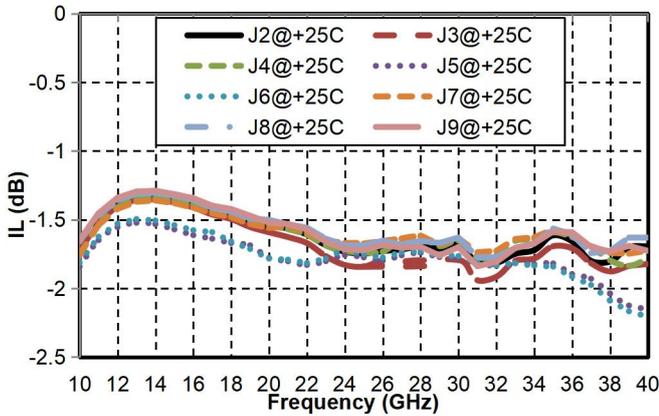
#### Electrical performance parameters ( TA = +25°C)

| index              | Minimum | Typical Value | Maximum | unit |
|--------------------|---------|---------------|---------|------|
| Frequency Range    | 10-40   |               |         | G Hz |
| Insertion loss     | -       | 1.6           | 1.8     | dB   |
| Isolation          | 40      | 47            | -       | dB   |
| Input return loss  | 12      | 16            | -       | dB   |
| Output return loss | 12      | 15            | -       | dB   |
| P-1dB @17GHz       | -       | 27            | -       | dBm  |
| Switching speed    | -       | 30            | -       | ns   |

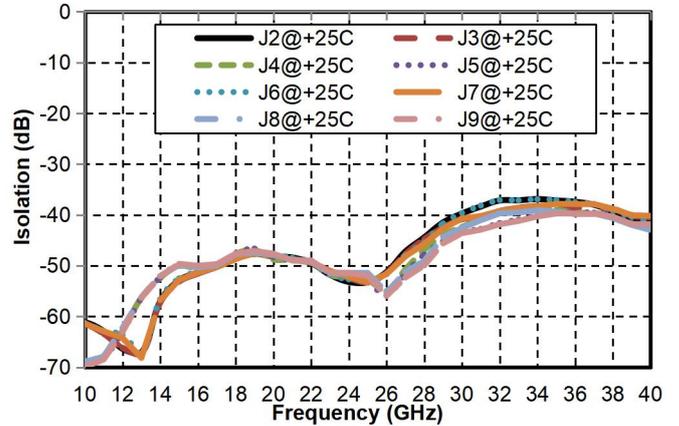
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### Main index test curve

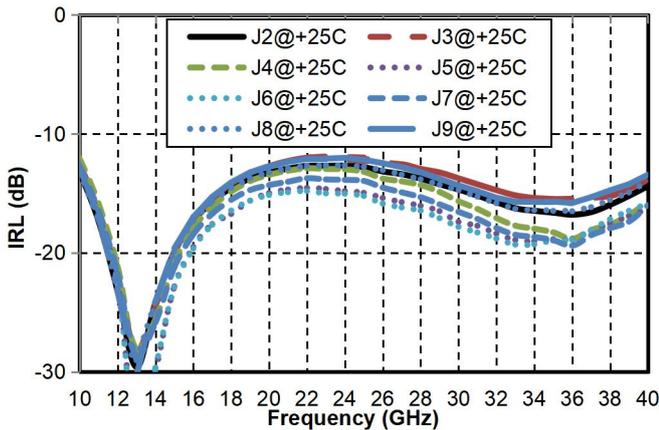
Insertion Loss vs. Operating Frequency



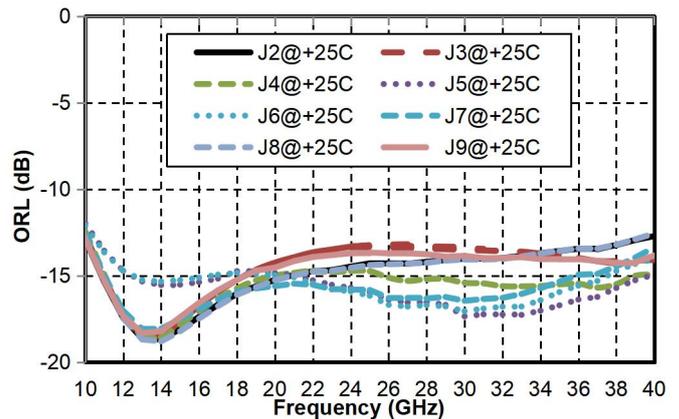
Isolation vs. Operating Frequency



Input Return Loss vs. Frequency



Output Return Loss vs. Frequency



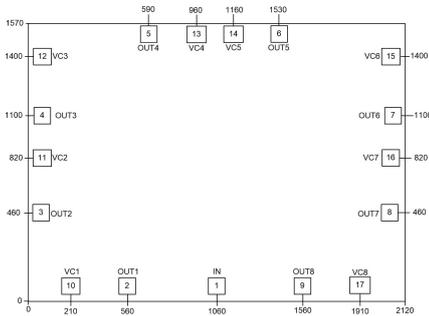
### Typical Driver Connections

| Control port (mA) |     |     |     |     |     |     |     | Output conduction condition |            |            |            |            |            |            |            |
|-------------------|-----|-----|-----|-----|-----|-----|-----|-----------------------------|------------|------------|------------|------------|------------|------------|------------|
| VC1               | VC2 | VC3 | VC4 | VC5 | VC6 | VC8 | VC9 | J2-J1                       | J3-J1      | J4-J1      | J5-J1      | J6-J1      | J7-J1      | J8-J1      | J9-J1      |
| -10               | 20  | 20  | 20  | 20  | 20  | 20  | 20  | Continuity                  | isolation  |
| 20                | -10 | 20  | 20  | 20  | 20  | 20  | 20  | isolation                   | Continuity | isolation  | isolation  | isolation  | isolation  | isolation  | isolation  |
| 20                | 20  | -10 | 20  | 20  | 20  | 20  | 20  | isolation                   | isolation  | Continuity | isolation  | isolation  | isolation  | isolation  | isolation  |
| 20                | 20  | 20  | -10 | 20  | 20  | 20  | 20  | isolation                   | isolation  | isolation  | Continuity | isolation  | isolation  | isolation  | isolation  |
| 20                | 20  | 20  | 20  | -10 | 20  | 20  | 20  | isolation                   | isolation  | isolation  | isolation  | Continuity | isolation  | isolation  | isolation  |
| 20                | 20  | 20  | 20  | 20  | -10 | 20  | 20  | isolation                   | isolation  | isolation  | isolation  | isolation  | Continuity | isolation  | isolation  |
| 20                | 20  | 20  | 20  | 20  | 20  | -10 | 20  | isolation                   | isolation  | isolation  | isolation  | isolation  | isolation  | Continuity | isolation  |
| 20                | 20  | 20  | 20  | 20  | 20  | 20  | -10 | isolation                   | isolation  | isolation  | isolation  | isolation  | isolation  | isolation  | Continuity |

Note: V = +1.35 V, I = +20mA; V = -3.2V, I = -10mA (including J1 on-chip resistor RIN = 50 ohm voltage divider)

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## Appearance structure

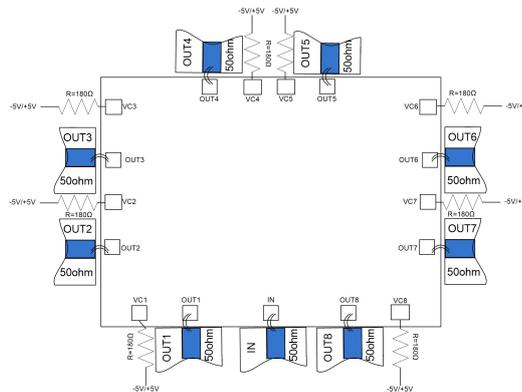


All units in the figure are micrometers

## Bonding point definition

| Bonding point number              | Function Symbol   | Functional Description  |
|-----------------------------------|---|---|
| 1                                 | IN(J1)  | RF input signal terminal                                      |
| 2, 3, 4, 5, 6, 7, 8, 9            | OUT1(J2), OUT2(J3), OUT3(J4),<br>OUT4(J5), OUT5(J6), OUT6(J7), OUT7(J8) | RF output signal terminal                                     |
| 10, 11, 12, 13, 14, 15, 16,<br>17 | VC1, VC2, VC3,<br>VC4, VC5, VC6, VC7, V8                                | Control Port  |
| Chip bottom                       | GND   | The bottom of the chip needs to be well grounded to RF and DC |

## Recommended circuit diagram



+5V is connected in series with  $R=180\text{ ohm}$  resistor ,  $V = + 1.35\text{V}$  ,  $I = +20\text{mA}$  . -5V is connected in series with  $R=180\text{ ohm}$  resistor ,  $V = -3.2\text{V}$  ,  $I = -10\text{mA}$  .

Note: If you need to reduce power consumption, you need to connect +5V /-5V in series with resistors of different resistance values. For example: +5V in series with  $R=370\text{ ohm}$  resistor :  $V = +1.3\text{V}$  ,  $I = +10\text{mA}$ ; -5V in series with  $R=180\text{ ohm}$  resistor  $V = -3.2\text{V}$  ,  $I = -10\text{mA}$  . (Including the internal resistor  $R_{IN} = 50\text{ ohm}$  voltage divider at J1 end ). Please contact the manufacturer for specific usage.