

SAC3301

GaAs MMIC 6-BIT DIGITAL PHASE SHIFTER
0.9~1.3GHz

Rev 2.1

Features

- Frequency: 0.9~1.3GHz
- RMS of Phase Accuracy: 1°
- Low Insertion Loss: 5dB
- Positive Voltage Control: 0/+5V
- Die Size: 3.8mm×1.25mm×0.1mm

Typical Applications

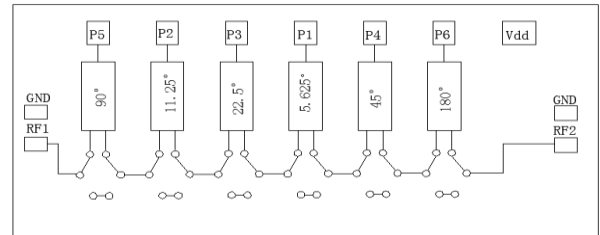
- Radar and ECM
- RF/ Microwave radio
- Military and Space
- Beamforming Modules
- Phase Cancellation

General Description

SAC3301 is a 6-bit digital phase shifter which works from 0.9 to 1.3 GHz, providing 360 degrees of phase coverage with a LSB of 5.625 degrees.

SAC3301 features very low RMS phase error of 1 degree and extremely low insertion loss with variation of ± 0.5 dB across all phase states. This high accuracy phase shifter is controlled with positive control logic of 0/+5V.

Functional Diagram



Electrical Performance ($T_A=+25^\circ\text{C}$, $V_D=-5\text{V}$, Control Voltage=0/+5V, $Z_0=50\Omega$)

| Parameter | Min. | Typ. | Max. | Units |
|-----------------------|---------|------|------|-------|
| Frequency | 0.9~1.3 | | | GHz |
| Input VSWR | — | 1.3 | — | :1 |
| Output VSWR | — | 1.3 | — | :1 |
| Insertion Loss | — | -5 | — | dB |
| IL Variation | -0.5 | — | 0.3 | dB |
| Phase Accuracy | -0.5 | — | 2 | ° |
| RMS of Phase Accuracy | — | 1 | - | ° |

Truth Table (0: 0V, 1: +5V)

| Phase | P1 | P2 | P3 | P4 | P5 | P6 |
|----------|----|----|----|----|----|----|
| REF | 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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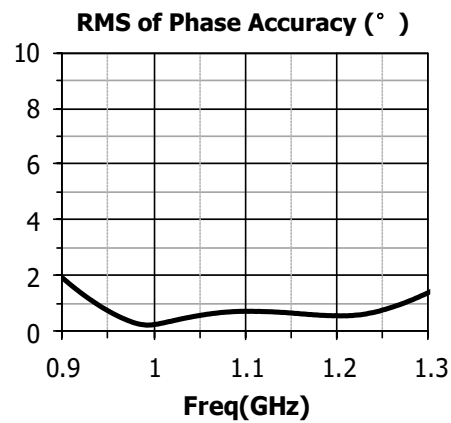
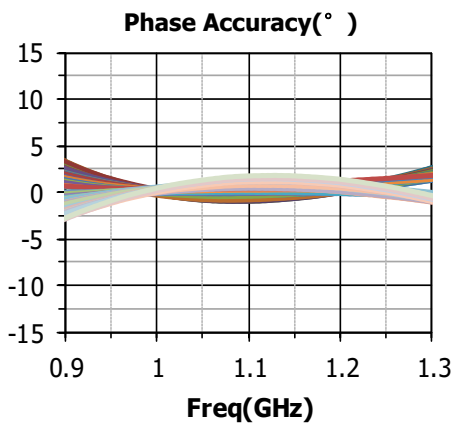
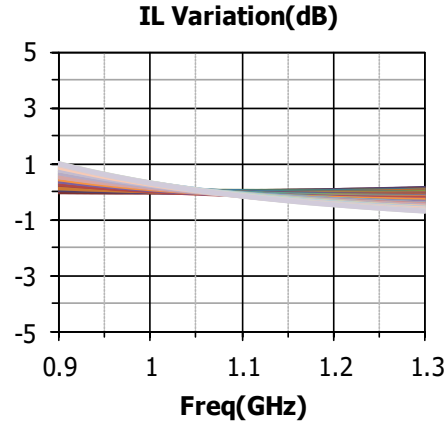
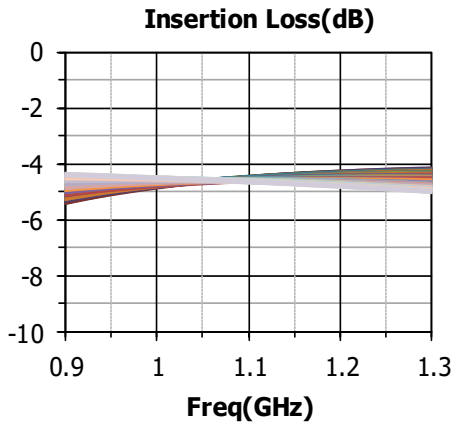
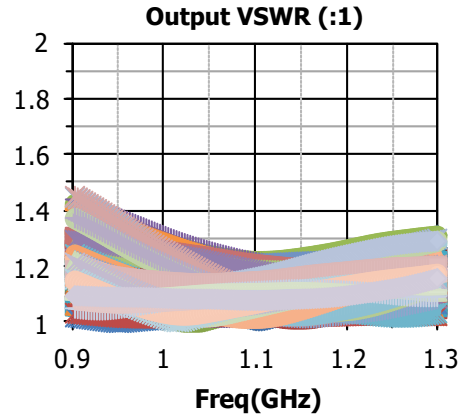
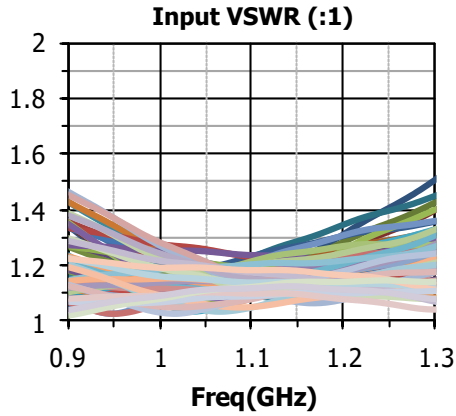
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Typical Performance Curve



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Absolute Maximum Ratings

| | | | |
|-----------------------|-----------|-----------------------|--------------|
| Maximum Input Power | +18dBm | Operating Temperature | -55°C~+85°C |
| Maximum Input Voltage | -8V~+0.5V | Storage Temperature | -65°C~+150°C |

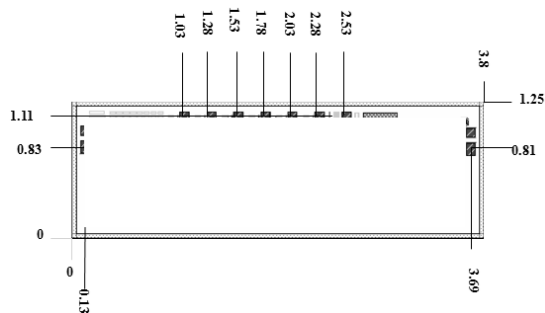
Logic Voltage

| State | Bias |
|-------|----------|
| LOW | 0~0.2V |
| HIGH | 4.5~5.5V |

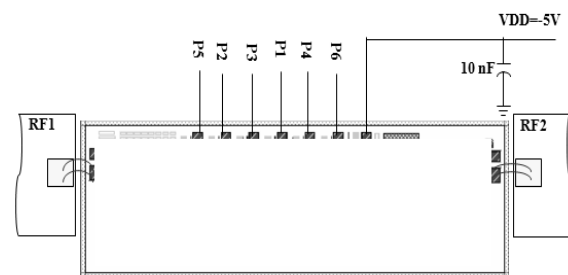
Power Supply

| V _D | I _D |
|----------------|----------------|
| -5V | 8mA |

Die Outline (All dimensions in mm)



Assembly Diagram



Attention:

GaAs MMIC devices are susceptible to damage from electrostatic discharge. Proper precautions should be observed during handling, assembly and test.