## Features

- Phase Shift Accuracy RMS: 3.4 °
- Insertion Loss: 10dB (Typ.)
- Insertion Loss Variation: 1.5dB
- Impedance: 50Ω
- Die Size: 3.5 x 1.5 x 0.1 mm

## Typical Applications

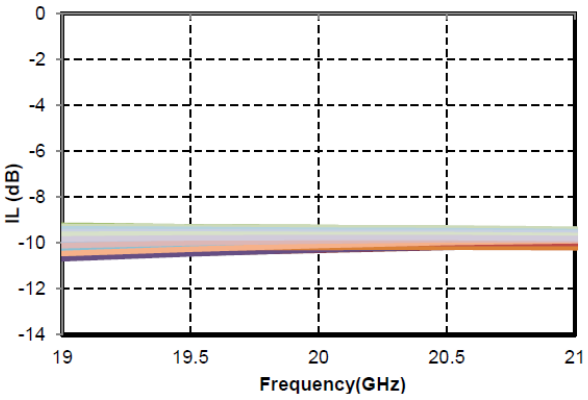
- Test Instrumentation
- Microwave Radio & VSAT
- Military & Space
- Telecom Infrastructure
- Fiber Optics

## Electrical Specifications

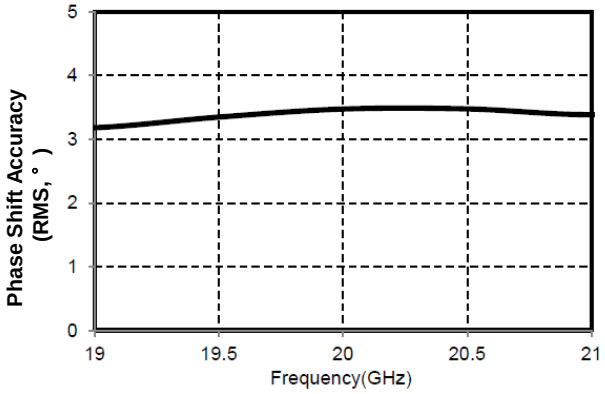
**TA = +25ºC, Vctl = 0/-5V**

| Parameters | Min. | Typ. | Max. | Units |
|---|---|---|---|---|
| Frequency | | 19-21 | | GHz |
| Insertion Loss | | 10 | 10.5 | dB |
| Insertion Loss Variation | | 1.5 | | dB |
| Phase Shift Accuracy RMS | | 3.4 | | ° |
| Amplitude Variation | | 1.5 | | dB |
| Input Return Loss | 11 | 17 | | dB |
| Output Return Loss | 14 | 21 | | dB |
| Switching Speed | | 20 | | ns |

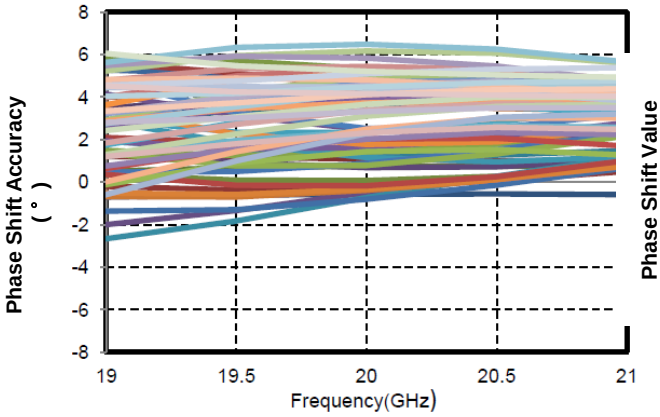
## Insertion Loss



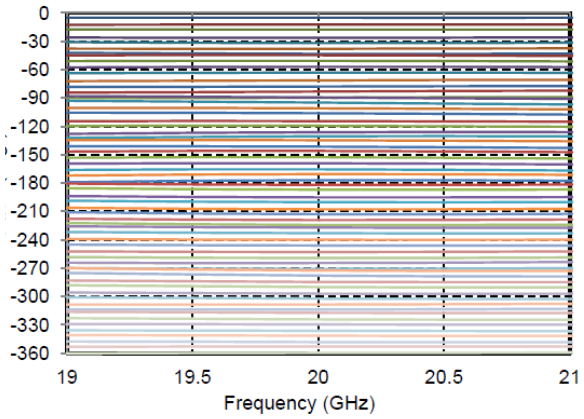

## Phase Shift Accuracy (RMS)



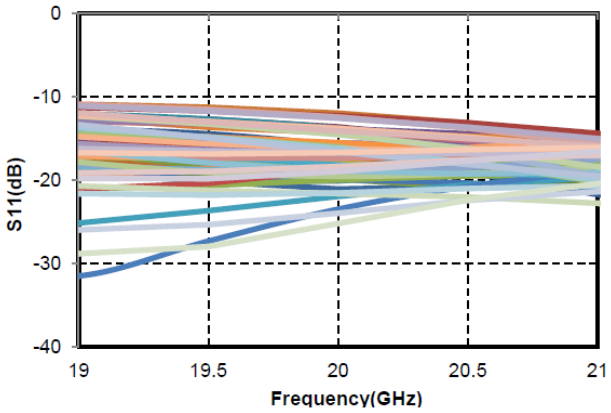

## Phase Shift Accuracy



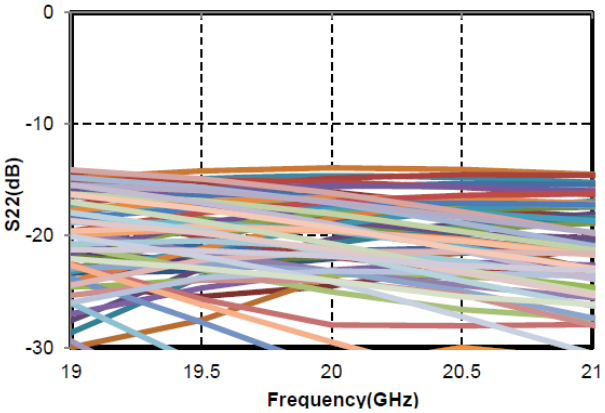

## Phase Shift Value

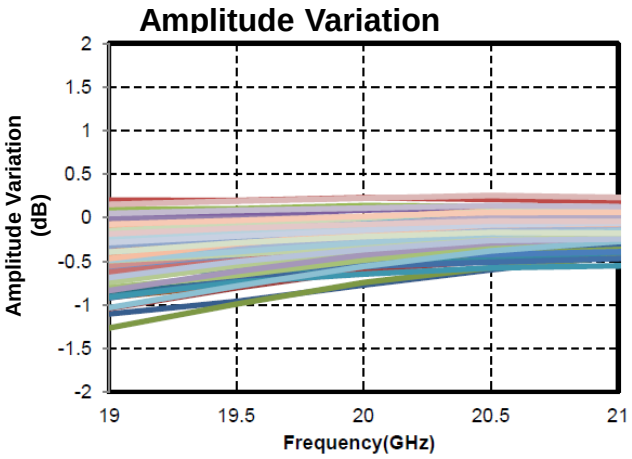



## Input Return Loss



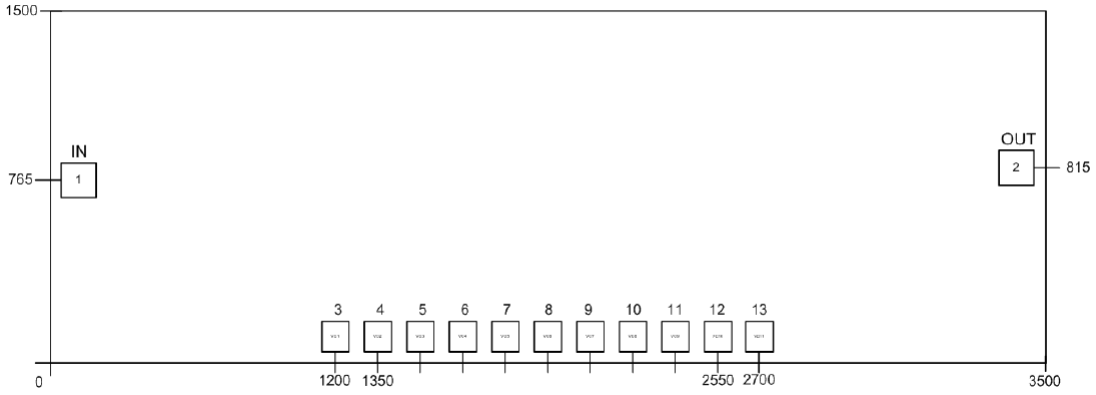

## Output Return Loss






## Outline Drawing:

All Dimensions in um




## Pad Description

| PAD | Function | Description |
|---|---|---|
| 1 | RF IN | RF Input Port |
| 2 | RF OUT | RF Output Port |
| 3-13 | CTRL | Control Port |
| GND | GND | Die bottom must be connected to RF/DC ground |

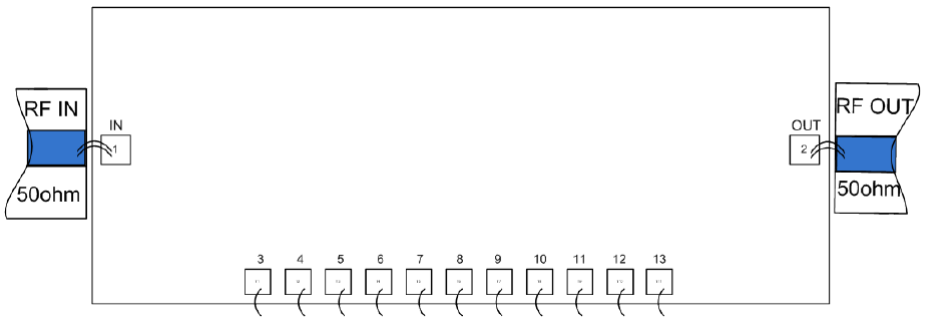
V1.0.0

GaAs pHEMT MMIC
6-Bit Digital Control Phase Shifter
19-21GHz

## Truth Table

| | VC1 | VC2 | VC3 | VC4 | VC5 | VC6 | VC7 | VC8 | VC9 | VC10 | VC11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | -5 | -5 | 0 | -5 | -5 | 0 | -5 | 0 | 0 | -5 |
| -5.625° | 0 | -5 | 0 | 0 | -5 | -5 | 0 | -5 | 0 | 0 | -5 |
| -11.25° | 0 | -5 | -5 | 0 | -5 | 0 | -5 | -5 | 0 | 0 | -5 |
| -22.5° | 0 | -5 | -5 | 0 | -5 | -5 | 0 | 0 | -5 | 0 | -5 |
| -45° | -5 | 0 | -5 | 0 | -5 | -5 | 0 | -5 | 0 | 0 | -5 |
| -90° | 0 | -5 | -5 | -5 | 0 | -5 | 0 | -5 | 0 | 0 | -5 |
| -180° | 0 | -5 | -5 | 0 | -5 | -5 | 0 | -5 | 0 | -5 | 0 |
| -354.375° | -5 | 0 | 0 | -5 | 0 | 0 | -5 | 0 | -5 | -5 | 0 |

## Assembly Drawing




**Notes:**
1. Die thickness: 100um
2. Typical bond pad is 100*100 $\mu m^2$
3. Bond pad metalization: Gold
4. Backside metalization: Gold
5. Backside of the die (GND)
6. No connection required for unlabeled bond pads

**Maximum Ratings:**
1. RF input power: +23dBm
2. Control voltage range: -8V~0.5V
3. Storage temperature: -65℃ to +150℃
4. Operating temperature: -55℃ to +85℃