

# SAC3405

GaAs MMIC Digital Attenuator  
12~18GHz

Rev 2.1

## Features

- Frequency: 12~18GHz
- RMS of Attenuation Accuracy: 1.5dB
- Insertion Loss: 3.8dB
- Positive Voltage Control
- Die Size: 1.79mm×1.25mm×0.1mm

## Typical Applications

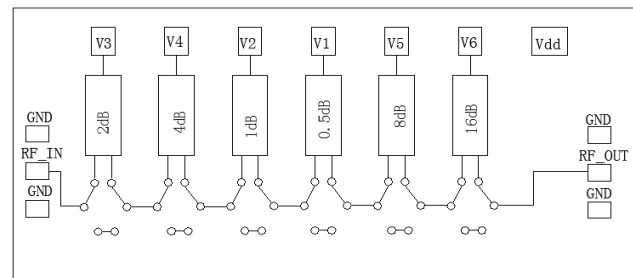
- EW
- Cellular Infrastructure
- SATCOM
- Beamforming Modules
- Test Equipment and Sensors

## General Description

SAC3405 is a broadband 6-bit GaAs digital attenuator MMIC chip. Covering 12 to 18GHz, the insertion loss is less than 3.8 dB typically. The attenuator bit values are 0.5dB, 1dB, 2dB, 4dB, 8dB and 16dB for a total attenuation of 31.5dB. Three TTL 0/+5V inputs are used to select each attenuation state.

The chip offers full passivation for increased reliability and moisture protection.

## 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                   | 12~18 |      |      | GHz   |
| Input VSWR                  | —     | 1.45 | —    | :1    |
| Output VSWR                 | —     | 1.5  | —    | :1    |
| Insertion Loss              | —     | -3.8 | —    | dB    |
| $A_{TT}$ -Phase Error       | -3    | —    | 8    | °     |
| Attenuation Accuracy        | -0.5  | —    | 2.5  | dB    |
| RMS of Attenuation Accuracy | —     | 1.5  | —    | dB    |

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

| Attenuation | V1 | V2 | V3 | V4 | V5 | V6 |
|-------------|----|----|----|----|----|----|
| REF         | 0  | 0  | 0  | 0  | 0  | 0  |
| 0.5dB       | 1  | 0  | 0  | 0  | 0  | 0  |
| 1dB         | 0  | 1  | 0  | 0  | 0  | 0  |
| 2dB         | 0  | 0  | 1  | 0  | 0  | 0  |
| 4dB         | 0  | 0  | 0  | 1  | 0  | 0  |
| 8dB         | 0  | 0  | 0  | 0  | 1  | 0  |
| 16dB        | 0  | 0  | 0  | 0  | 0  | 1  |
| 31.5dB      | 1  | 1  | 1  | 1  | 1  | 1  |

### SuperApex Corporation

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### Control Voltage

| State | Bias     |
|-------|----------|
| Low   | 0~0.2V   |
| High  | 4.5~5.5V |

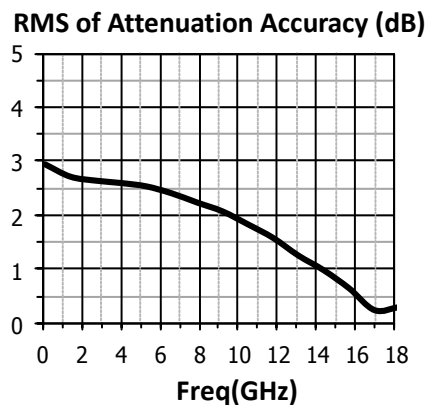
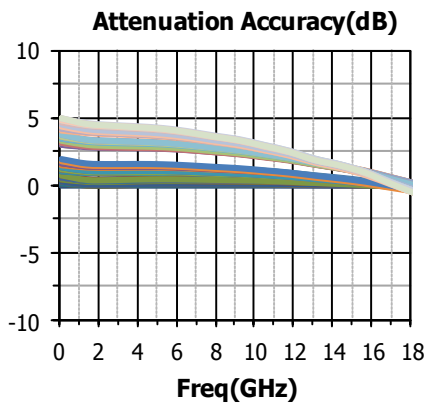
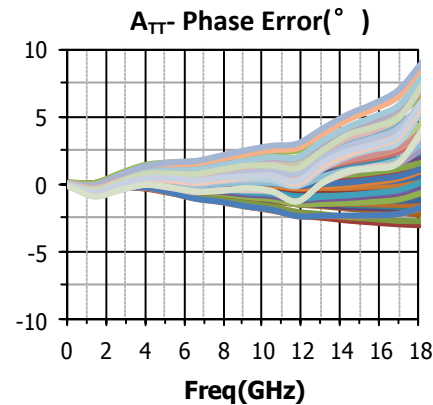
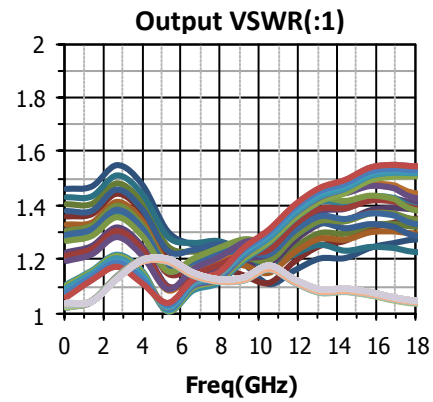
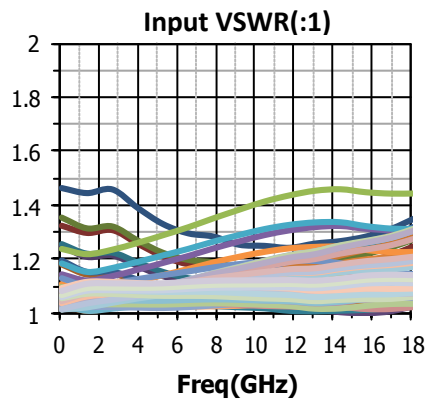
### Absolute Maximum Ratings

|                       |                       |
|-----------------------|-----------------------|
| Maximum Input Power   | Maximum Input Voltage |
| +23dBm                | -8V~+0.5V             |
| Operating Temperature | Storage Temperature   |
| -55°C~+85°C           | -65°C~+150°C          |

### Power Supply

| V <sub>D</sub> | I <sub>D</sub> |
|----------------|----------------|
| -5V            | 8mA            |

## Typical Performance Curve



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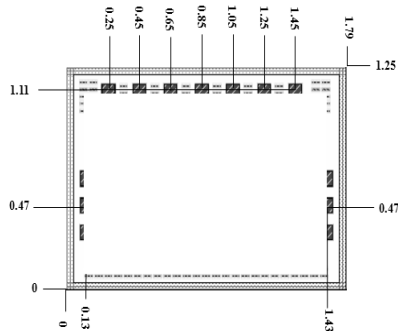
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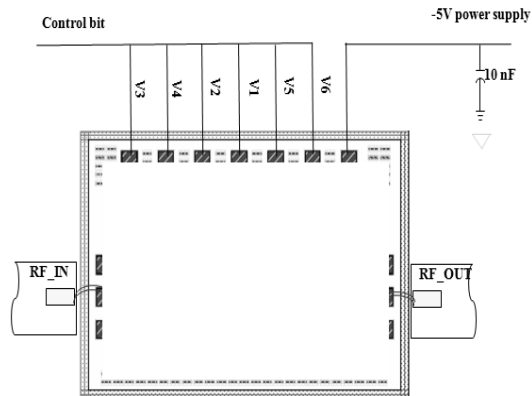
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**Die Outline**  
(all dimensions in mm)



**Assembly Diagram**



**Attention:**

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