

# GaAs IC 5 Bit Digital Attenuator With Serial-to-Parallel Driver DC–2 GHz



AA107-310

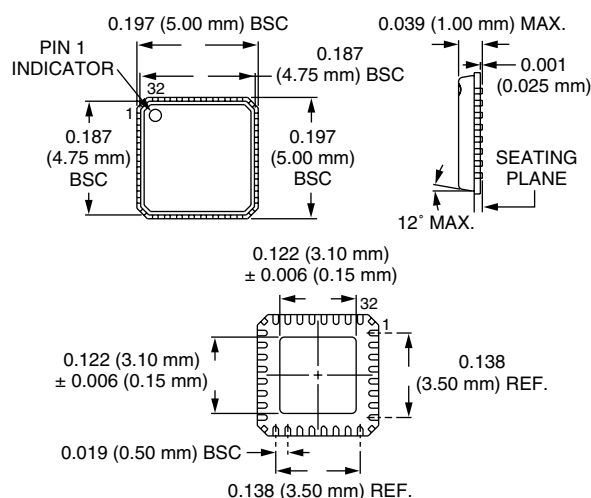
## Features

- Positive Voltage Operation (+5 V)
- MLF 5 x 5 mm Leadless Package
- Integrated Silicon Serial-to-Parallel Driver
- Attenuation 0.5 dB Steps to 15.5 dB

## Description

The AA107-310 is a GaAs FET IC 5 bit digital attenuator with a serial-to-parallel driver packaged in a 32 leadless exposed pad plastic package. It is particularly suited at IF frequencies where high attenuation accuracy, low insertion loss and low intermodulation products are required. Typical applications include base station, wireless and RF data and wireless local loop gain control circuits.

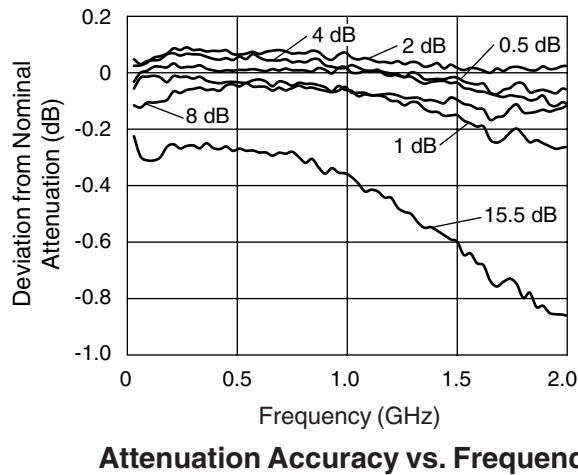
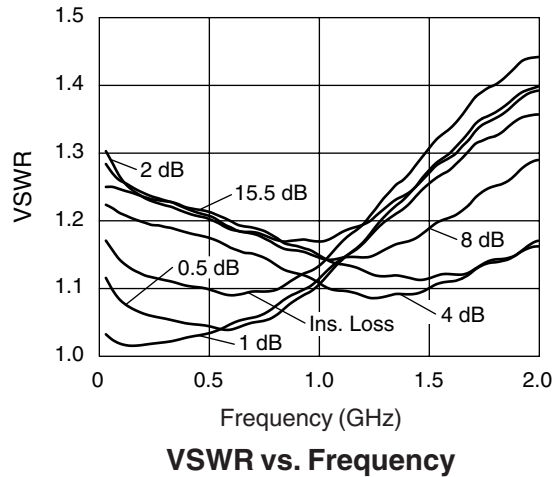
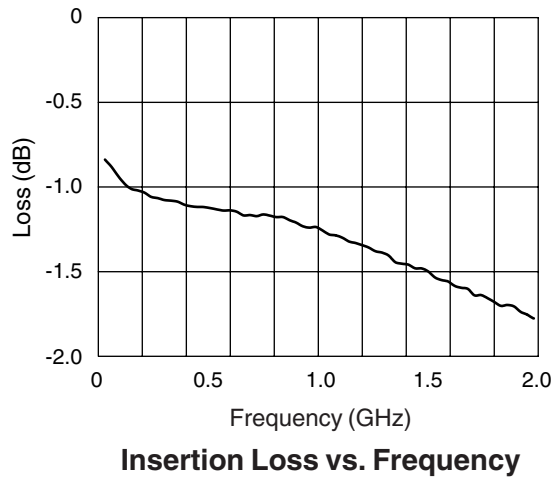
## MLF 5 x 5 (-310)



## Electrical Specifications at 25°C (V<sub>CC</sub> = +5 V)

| Parameter <sup>1</sup>                 | Condition                                            | Frequency <sup>2</sup> | Min.                                      | Typ.  | Max.  | Unit |
|----------------------------------------|------------------------------------------------------|------------------------|-------------------------------------------|-------|-------|------|
| Insertion Loss <sup>3</sup>            |                                                      | DC–1.0 GHz             |                                           | 1.4   | 1.7   | dB   |
|                                        |                                                      | DC–2.0 GHz             |                                           | 1.7   | 2.2   | dB   |
| Attenuation Range <sup>4, 5</sup>      |                                                      |                        |                                           | 15.5  |       | dB   |
| Attenuation Accuracy <sup>4, 5</sup>   |                                                      | DC–1.0 GHz             | ± (0.2 + 3% of Attenuation Setting in dB) |       |       | dB   |
|                                        |                                                      | DC–2.0 GHz             | ± (0.4 + 3% of Attenuation Setting in dB) |       |       | dB   |
| VSWR (I/O)                             |                                                      | DC–2.0 GHz             |                                           | 1.4:1 | 1.8:1 |      |
| Switching Characteristics <sup>6</sup> | Rise, Fall (10/90% or 90/10% RF)<br>On, Off (50% CTL |                        |                                           |       |       |      |

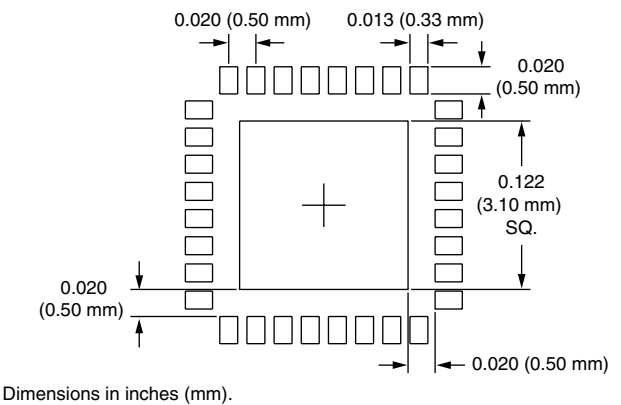
Typical Performance Data (V<sub>CC</sub> = +5 V)



Absolute Maximum Ratings

| Characteristic                           | Value                          |
|------------------------------------------|--------------------------------|
| Supply Voltage (V <sub>CC</sub> )        | -0.5 to +6 V                   |
| Input Voltage (V <sub>I</sub> )          | -0.5 – V <sub>CC</sub> + 0.5 V |
| Power Dissipation (P <sub>D</sub> )      | 500 mW                         |
| Storage Temperature (T <sub>ST</sub> )   | -65°C to +125°C                |
| Operating Temperature (T <sub>OP</sub> ) | -40°C to +85°C                 |

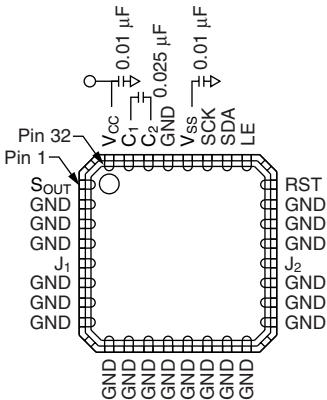
Surface Mount Land Pattern  
5 x 5 mm MLF 32 Lead



Truth Table

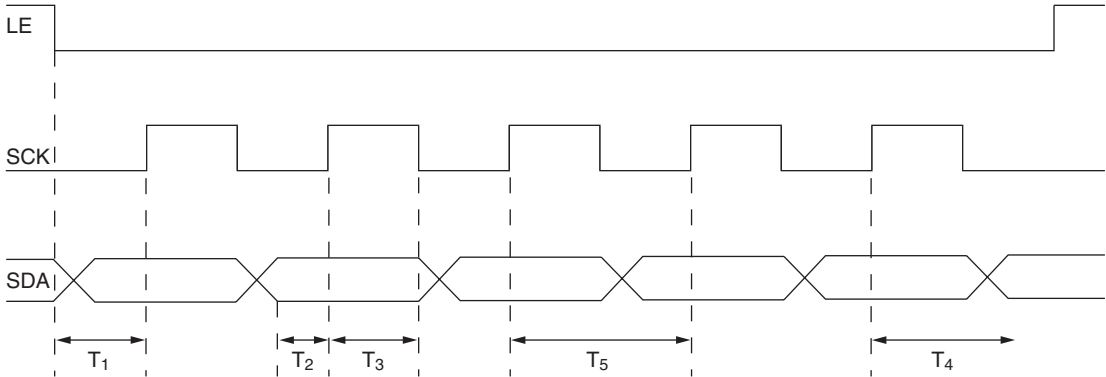
| Reset | Serial Data Input |      |      |      |      | J <sub>1</sub> –J <sub>2</sub><br>Attenuation |
|-------|-------------------|------|------|------|------|-----------------------------------------------|
|       | 0.5 dB            | 1 dB | 2 dB | 4 dB | 8 dB |                                               |
| 1     | 0                 | 0    | 0    | 0    | 0    | Insertion Loss                                |
| 1     | 1                 | 0    | 0    | 0    | 0    | 0.5 dB                                        |
| 1     | 0                 | 1    | 0    | 0    | 0    | 1 dB                                          |
| 1     | 0                 | 0    | 1    | 0    | 0    |                                               |

Pin Out



| Pin   | Symbol           | Function                 |
|-------|------------------|--------------------------|
| 1     | S <sub>OUT</sub> | Serial Data Output       |
| 2–4   | GND              | Ground                   |
| 5     | J <sub>1</sub>   | RF Input/Output          |
| 6–19  | GND              | Ground                   |
| 20    | J <sub>2</sub>   | RF Input/Output          |
| 21–23 | GND              | Ground                   |
| 24    | RST              | Reset                    |
| 25    | LE               | Latch Enable             |
| 26    | SDA              | Serial Data Input        |
| 27    | SCK              | Serial Clock Input       |
| 28    | V <sub>SS</sub>  | Low Output Voltage Level |
| 29    | GND              | Ground                   |
| 30    | C <sub>2</sub>   | Charge Pump Capacitor    |
| 31    | C <sub>1</sub>   | Charge Pump Capacitor    |
| 32    | V <sub>CC</sub>  | Supply Voltage           |

Timing Diagram



| Parameter      | Symbol         | Min. | Typ. | Max. | Unit |
|----------------|----------------|------|------|------|------|
| LE Setup Time  | T <sub>1</sub> |      | 15   |      | ns   |
| SDA Setup Time | T <sub>2</sub> |      | 15   |      | ns   |
| SDA Hold Time  | T <sub>3</sub> |      | 10   |      | ns   |
| LE Hold Time   | T <sub>4</sub> |      | 10   |      | ns   |
| Clock Period   | T <sub>5</sub> |      | 60   |      | ns   |