

# GaAs IC 35 dB Voltage Variable Attenuator

## Single Positive Control 0.5–2.5 GHz



AV103-12

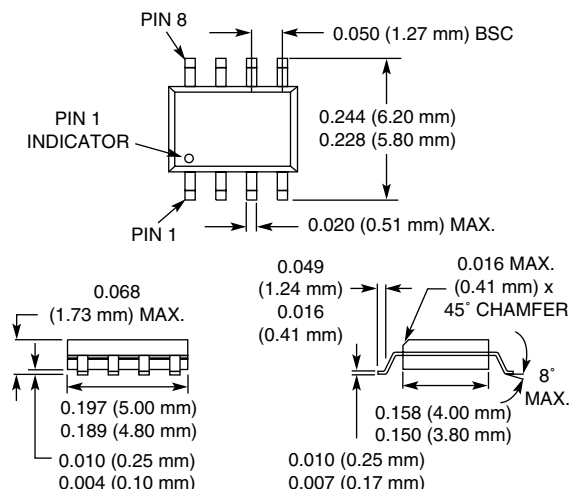
### Features

- Single Positive +5 V Control Voltage
- 35 dB Attenuation Range @ 0.9 GHz
- Less Than  $\pm 1$  dB Attenuation Change Over Temperature
- Excellent Linearity Performance

### Description

The AV103-12 GaAs IC FET voltage variable attenuator provides 35 dB attenuation range at 900 MHz controlled by a single positive voltage. The VVA has a linear transfer curve of 9 dB/V slope, with input and output VSWR better than 2.1:1 over all states. Its attenuation range at 1900 MHz is 33 dB. It operates with supply voltage of +5 V and control voltage of 0 V to +5 V in a low cost SOIC-8 package. The RF ports require 100 pF DC blocking capacitors.

### SOIC-8



### Electrical Specifications at 25°C ( $V_S = 5$ V)

| Parameter <sup>1</sup>                          | Frequency   | Min. | Typ.  | Max. | Unit |
|-------------------------------------------------|-------------|------|-------|------|------|
| Insertion Loss ( $V_C = 5$ V)                   | 0.5–1.0 GHz |      | 2.5   | 2.7  | dB   |
|                                                 | 1.0–2.0 GHz |      | 2.8   | 3.0  | dB   |
|                                                 | 2.0–2.5 GHz |      | 3.2   | 3.4  | dB   |
| Maximum Attenuation ( $V_C = 0$ V) <sup>2</sup> | 0.5–0.8 GHz | 28   | 32    |      | dB   |
|                                                 | 0.8–1.0 GHz | 31   | 35    |      | dB   |
|                                                 | 1.0–1.7 GHz | 30   | 34    |      | dB   |
|                                                 | 1.7–2.0 GHz | 29   | 33    |      | dB   |
|                                                 | 2.0–2.5 GHz | 28   | 32    |      | dB   |
| VSWR (I/O) <sup>3</sup>                         | 0.5–2.5 GHz |      | 2.1:1 |      |      |

### Operating Characteristics at 25°C ( $V_S = 5$ V)

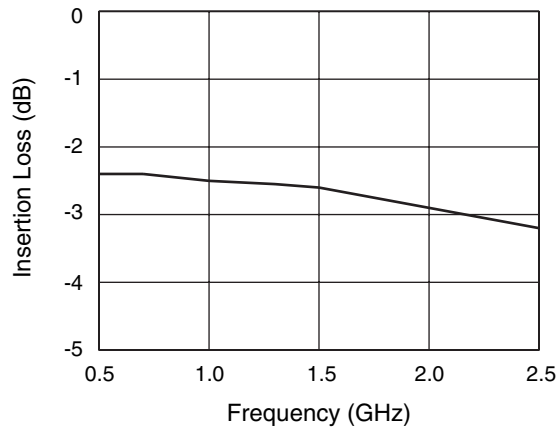
| Parameter <sup>1</sup>                              | Condition                                  | Frequency | Min. | Typ.             | Max.  | Unit    |
|-----------------------------------------------------|--------------------------------------------|-----------|------|------------------|-------|---------|
| Switching Characteristics                           | Rise, On (10/90% or 50% CTL to 90% RF)     |           |      | 130              |       | nS      |
|                                                     | Fall, Off (90/10% RF or 50% CTL to 10% RF) |           |      | 60               |       | nS      |
| Intermodulation Intercept Point (IIP3) <sup>3</sup> | For Two-tone Input Power 0 dBm             | 0.9 GHz   |      | 12               |       | dBm     |
| Control Voltage ( $V_C$ )                           |                                            |           | 0    |                  | $V_S$ | V       |
| Supply Voltage ( $V_S$ )                            |                                            |           |      | 5.0              |       | V       |
| Control Current ( $I_C$ )                           |                                            |           |      | $1.1 \times V_C$ |       | mA      |
| Supply Current ( $I_S$ )                            |                                            |           |      | 150              |       | $\mu$ A |

1. All measurements made in a 50  $\Omega$  system, unless otherwise specified.

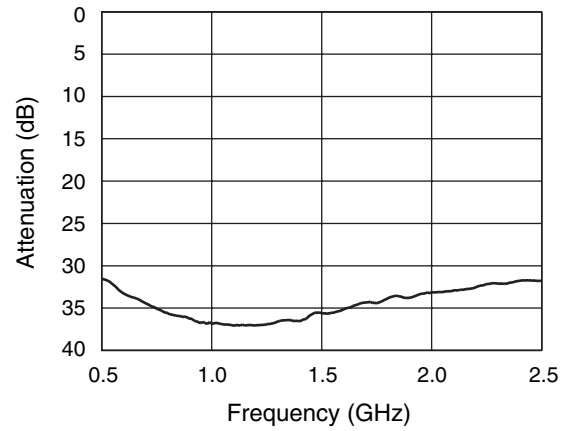
2. Maximum attenuation includes insertion loss.

3. For worst case state.

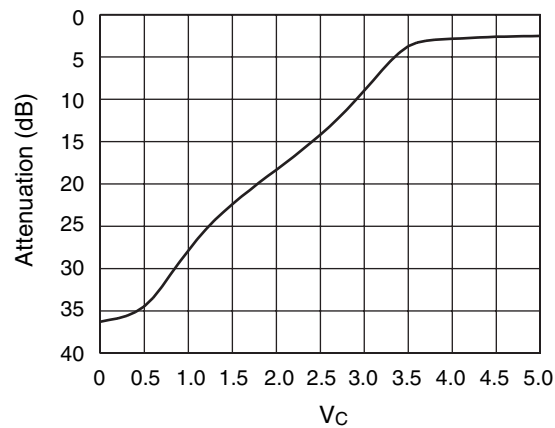
## Typical Performance Data @ 0.9 GHz (Unless Otherwise Specified)



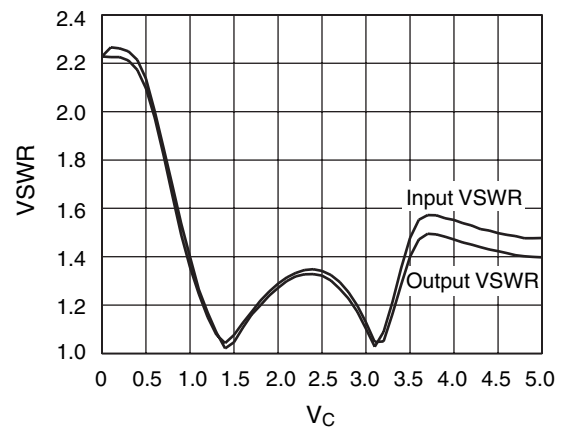
**Insertion Loss vs. Frequency**



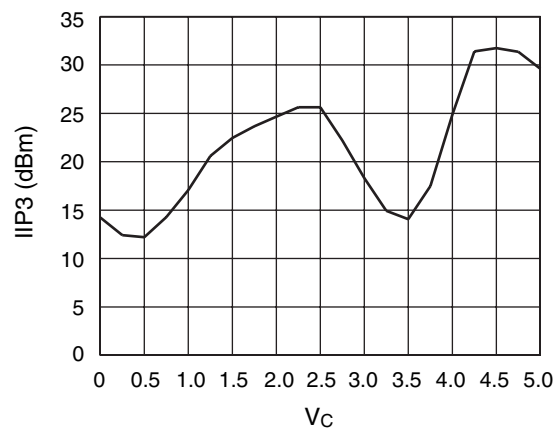
**Maximum Attenuation vs. Frequency**



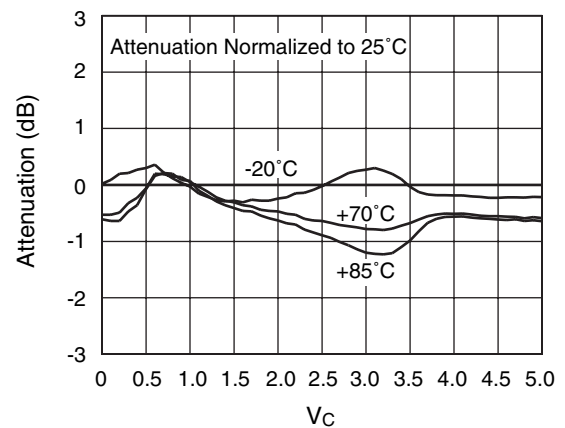
**Attenuation vs. Control Voltage**



**VSWR vs. Control Voltage**



**Input IP3 vs. Control Voltage**



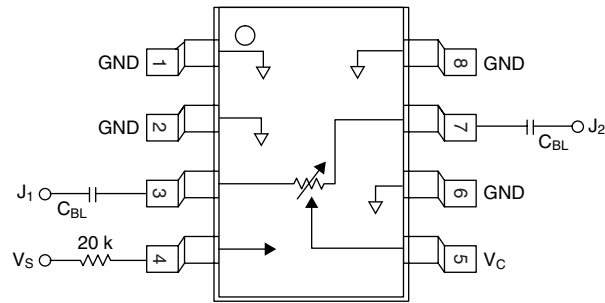
**Attenuation vs. Control Voltage Over Temperature**

Absolute Maximum Ratings

| Characteristic        | Value                                                                           |
|-----------------------|---------------------------------------------------------------------------------|
| RF Input Power        | 50 mW > 500 MHz                                                                 |
| Supply Voltage        | +4 to +8 V                                                                      |
| Control Voltage       | -0.2 V, +6.5 V (Do not allow control voltage to exceed V <sub>S</sub> voltage.) |
| Operating Temperature | -55°C to +125°C                                                                 |
| Storage Temperature   | -65°C to +150°C                                                                 |
| Θ <sub>JC</sub>       | 25°C/W                                                                          |

Note: Exceeding these parameters may cause irreversible damage.

Pin Out



DC blocking capacitors (C<sub>BL</sub>) supplied externally.  
C<sub>BL</sub> = 100 pF for operation >500 MHz.