

# GaAs IC 4 Bit Digital Attenuator

## 1 dB LSB DC–2 GHz

**AD210-25**

### Features

- Attenuation in 1 dB Steps to 15 dB with High Accuracy
- Low Intermodulation Products
- Low Cost SOIC-16 Plastic Package
- Low DC Power Consumption

### Description

The AD210-25 is an IC FET digital attenuator consisting of four monolithic attenuators with LSB of 1 dB and a total attenuation of 15 dB with all attenuators connected. Attenuator bits are switched with -5 and 0 V.

The AD210-25 is particularly suited where high attenuation accuracy, low insertion loss and low intermodulation products are required. Typical applications include cellular, radio, wireless data, wireless local loop and other gain/level control circuits.

### Electrical Specifications at 25°C(0, -5 V)

Parameter <sup>1</sup>	Frequency <sup>2</sup>	Min.	Typ.	Max.	Unit
Insertion Loss <sup>3</sup>	DC–0.1 GHz DC–0.5 GHz DC–1.0 GHz DC–2.0 GHz	0.9 1.1 1.3 2.1	1.2 1.5 1.8 2.5	1.2 1.5 1.8 2.5	dB
Attenuation Range			15		dB
Attenuation Accuracy <sup>4</sup>	DC–1.0 GHz DC–2.0 GHz	± (0.25 + 3% of Attenuation Setting in dB) ± (0.4 + 5% of Attenuation Setting in dB)			dB
VSWR (I/O)	DC–1.0 GHz DC–2.0 GHz	1.3:1 1.6:1	1.4:1 1.8:1		

### Operating Characteristics at 25°C(0, -5 V)

Parameter <sup>1</sup>	Condition	Frequency	Min.	Typ.	Max.	Unit
Switching Characteristics <sup>5</sup>	Rise, Fall (10/90% or 90/10% RF) On, Off (50% CTL to 90/10% RF) Video Feedthru		15 25 25			ns ns mV
Input Power for 1 dB Compression		0.50–2.0 GHz 0.05 GHz	+28 +22			dBm dBm
Intermodulation Intercept Point (IP3)	For Two-tone Input Power +5 dBm	0.50–2.0 GHz 0.05 GHz	+48 +38			dBm dBm
Control Voltages	$V_{Low} = 0$ to $-0.2$ V @ 10 $\mu$ A Typ. $V_{High} = -5$ @ 10 $\mu$ A Typ. to $-8$ V @ 200 $\mu$ A Typ.					

1. All measurements made in a 50 ohm system, unless otherwise specified.

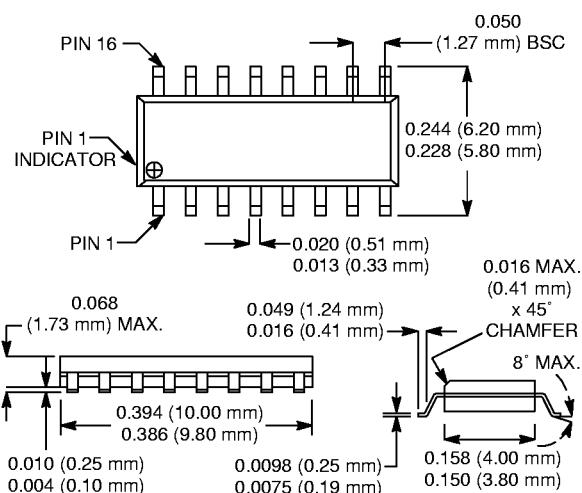
2. DC = 300 kHz.

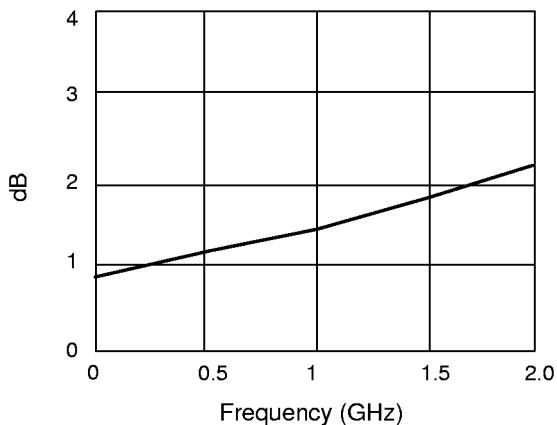
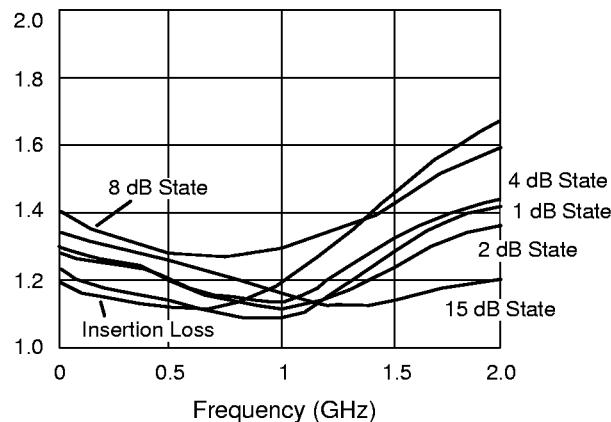
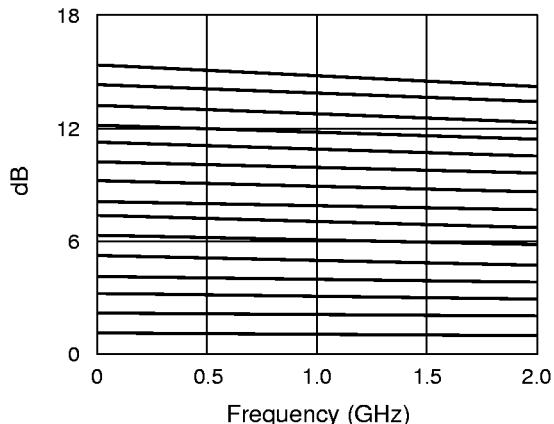
3. Insertion loss changes by 0.003 dB/°C.

4. Attenuation referenced to insertion loss.

5. Video feedthru measured with 1 ns risetime pulse and 500 MHz bandwidth.

### SAC-16



**Typical Performance Data (0, -5 V)****Insertion Loss vs. Frequency****VSWR vs. Frequency****Attenuation vs. Frequency (All States)****Truth Table**

1 dB		2 dB		4 dB		8 dB		J <sub>1</sub> —J <sub>2</sub>	Reference I. L.
V <sub>1</sub>	V <sub>2</sub>	V <sub>3</sub>	V <sub>4</sub>	V <sub>5</sub>	V <sub>6</sub>	V <sub>7</sub>	V <sub>8</sub>		
-5	0	-5	0	-5	0	-5	0		
0	-5	-5	0	-5	0	-5	0		1 dB
-5	0	0	-5	-5	0	-5	0		2 dB
-5	0	-5	0	0	-5	-5	0		4 dB
-5	0	-5	0	-5	0	0	-5		8 dB
0	-5	0	-5	0	-5	0	-5		15 dB

**Absolute Maximum Ratings**

Characteristic	Value
RF Input Power	1.5 W > 500 MHz 0/-8 V 0.5 W @ 50 MHz 0/-8 V
Control Voltage	+0.2 V, -8 V
Operating Temperature	-40°C to 85°C
Storage Temperature	-65°C to 150°C

Note: Exceeding these parameters may cause irreversible damage.

**Pin Out**