GaAs IC 3 Bit Digital Attenuator
4 dB LSB Positive Control 0.75–2 GHz

Alpha

AA100-59

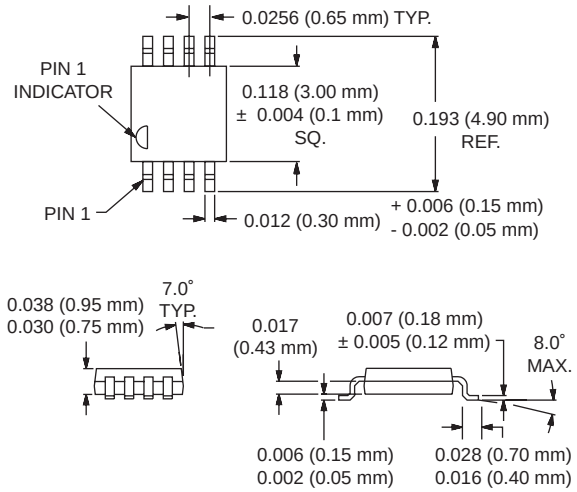
Features

- Attenuation in 4 dB Steps to 28 dB with High Accuracy
- Single Positive Control Voltage for Each Bit
- +3 V to +5 V Operation
- Small Low Cost MSOP-8 Plastic Package

Description

The AA100-59 is a 3 bit, single positive control, 4 dB step GaAs IC FET digital attenuator in a low cost MSOP-8 plastic package. For positive operation external DC blocking capacitors are required on all RF ports. The AA100-59 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.

MSOP-8



Electrical Specifications at 25°C (0, +3 V)

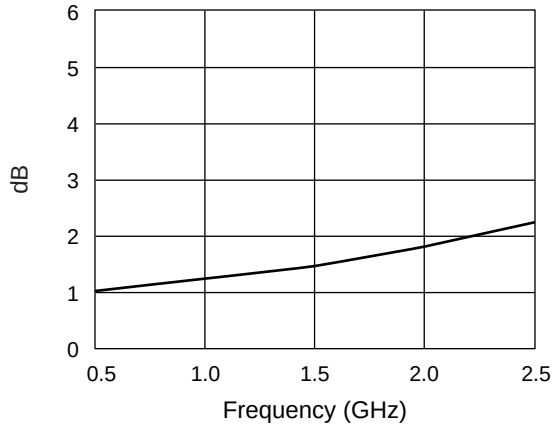
Parameter[1]	Frequency	Min.	Typ.	Max.	Unit
Insertion Loss[2]	0.75–2.0 GHz		1.8	2.1	dB
Attenuation Range	0.75–2.0 GHz		28		dB
Attenuation Accuracy[3]	0.75–1.0 GHz 0.75–2.0 GHz	± (0.2 + 3% of Attenuation Setting in dB) ± (0.3 + 3% of Attenuation Setting in dB)			dB dB
VSWR (I/O)	0.75–2.0 GHz		1.5:1	2.0:1	

Operating Characteristics at 25°C (0, +3 V)

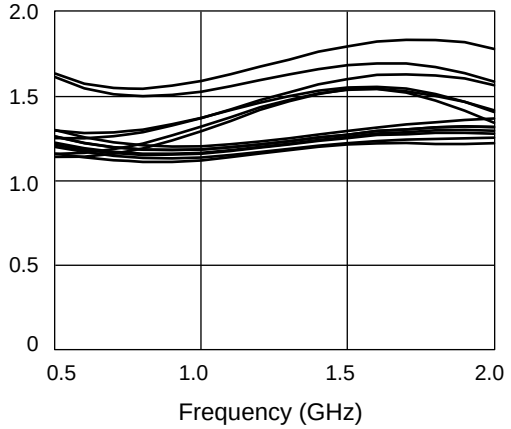
Parameter	Condition	Frequency	Min.	Typ.	Max.	Unit
Switching Characteristics[4]	Rise, Fall (10/90% or 90/10% RF) On, Off (50% CTL to 90/10% RF) Video Feedthru			0.7 1.0 50		µs µs mV
Input Power for 1 dB Compression	V_S = +3 V V_S = +5 V	0.75–2.0 GHz 0.75–2.0 GHz		+20 +26		dBm dBm
Intermodulation Intercept Point (IP3)	For Two-tone Input Power +10 dBm V_S = +3 V V_S = +5 V	 0.75–2.0 GHz 0.75–2.0 GHz		 +32 +45		 dBm dBm
Control Voltages	V_{Low} = 0 to 0.2 V @ 20 µA Max. V_{High} = +3 V @ 100 µA Max. to +5 V @ 200 µA Max. $V_S = V_{High}$ ± 0.2 V					

1. All measurements made in a 50 Ω system, unless otherwise specified.
2. Insertion loss changes by 0.003 dB/°C.
3. Attenuation referenced to insertion loss.
4. Video feedthru measured with 1 ns risetime pulse and 500 MHz bandwidth.

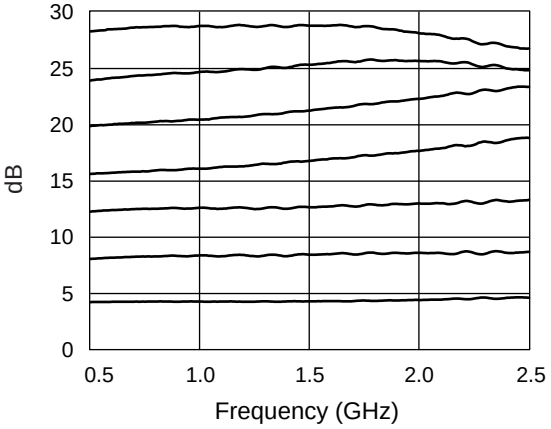
Typical Performance Data (0, +3 V)



Insertion Loss vs. Frequency



VSWR vs. Frequency (All States)



Attenuation vs. Frequency (All States)

Absolute Maximum Ratings

Characteristic	Value
RF Input Power	1 W > 500 MHz 0/8 V 0.5 W @ 50 MHz 0/8 V
Supply Voltage	+8 V
Control Voltage	-0.2 V, +8 V
Operating Temperature	-40°C to +85°C
Storage Temperature	-65°C to +150°C

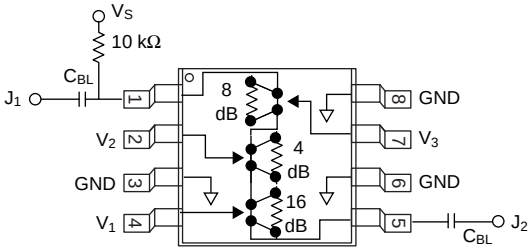
Note: Exceeding these parameters may cause irreversible damage.

Truth Table

V_1	V_2	V_3	Attenuation
16 dB	**4 dB**	**8 dB**	**J_1–J_2**
V_{High}	V_{High}	V_{High}	Ins. Loss
V_{High}	0	V_{High}	4 dB
V_{High}	V_{High}	0	8 dB
V_{High}	0	0	12 dB
0	V_{High}	V_{High}	16 dB
0	0	V_{High}	20 dB
0	V_{High}	0	24 dB
0	0	0	28 dB

V_{High} = +3 to +5 V (V_S = V_{High} ± 0.2 V).

Pin Out



DC blocking capacitors (C_{BL}) and biasing resistor must be supplied externally for positive operation.
C_{BL} = 100 pF for operation >.75 GHz.