GaAs IC 1 Bit Digital Attenuator
10 dB LSB DC–2.5 GHz

AA103-72

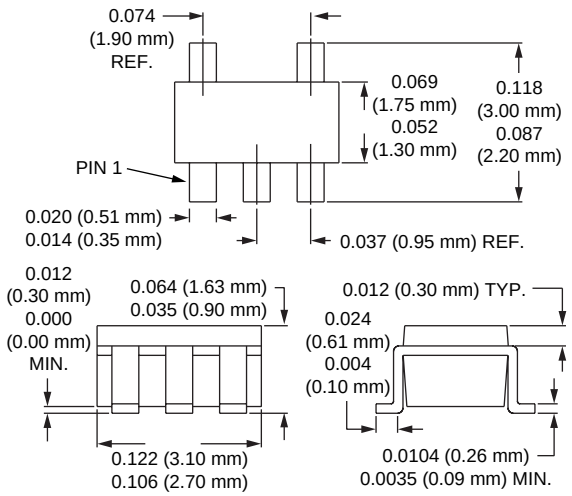
Features

- Attenuation Cutback of 10 dB
- Single Positive 3 V Control
- Low Loss
- Low Cost SOT-5 Plastic Package

Description

The AA103-72 is a 1 bit GaAs IC FET digital attenuator in a low cost package. This attenuator has an LSB of 10 dB. The AA103-72 is particularly suited where high attenuation accuracy, low insertion loss and low intermodulation products are required. Typical applications include cellular radio, wireless data, and wireless local loop gain level control circuits.

SOT-5



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

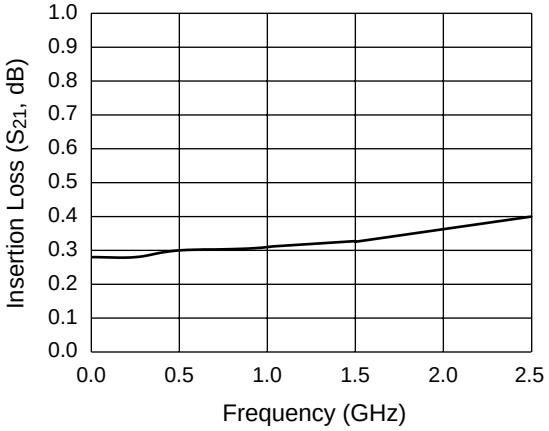
Parameter[1]	Frequency	Min.	Typ.	Max.	Unit
Insertion Loss[2]	DC–0.5 GHz DC–1.0 GHz DC–2.5 GHz		0.3 0.3 0.4	0.5 0.6 0.7	dB dB dB
Attenuation Range			10		dB
Attenuation Accuracy[3]	DC–1.0 GHz DC–2.5 GHz	± (0.25 + 3% of Attenuation Setting in dB) ± (0.4 + 5% of Attenuation Setting in dB)			dB dB
VSWR (I/O)	DC–2.5 GHz		1.2:1	1.4:1	

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

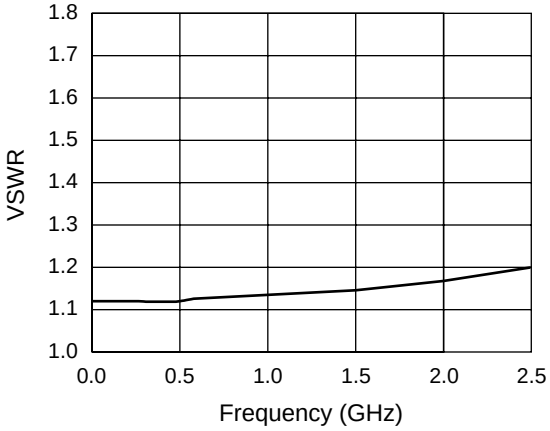
Parameter	Condition	Frequency	Min.	Typ.	Max.	Unit
Switching Characteristics[4, 5]	Rise, Fall (10/90% or 90/10% RF) On, Off (50% CTL to 90/10% RF) Video Feedthru			150 300 70		ns ns mV
Input Power for 1 dB Compression	V_S = +3 V V_S = +5 V	0.5–2.5 GHz 0.5–2.5 GHz		+20 +26		dBm dBm
Intermodulation Intercept Point (IP3)	For Two-tone Input Power +10 dBm V_S = +3 V V_S = +5 V	 0.5–2.5 GHz 0.5–2.5 GHz		 +41 +45		 dBm dBm
Control Voltages	V_{Low} = 0 to 0.2 V V_{High} = +3 V @ 25 µA Typ. to +5 V @ 50 µA Typ.					

1. All measurements made in a 50 Ω system, unless otherwise specified.
2. Insertion loss changes by 0.003 dB/°C.
3. Maximum attenuation includes insertion loss.
4. Video feedthru measured with 1 ns risetime pulse and 500 MHz bandwidth.
5. Switching characteristics will vary with value chosen for C_{BP}.

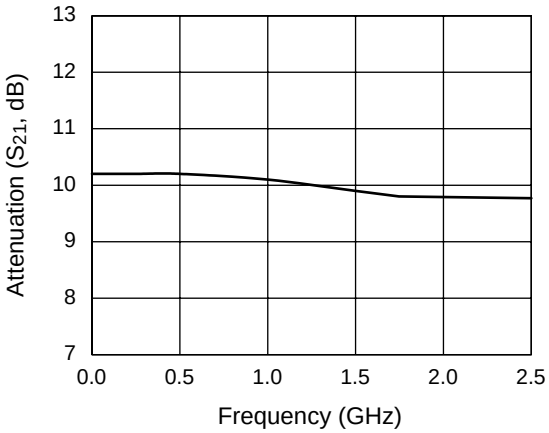
Typical Performance Data (0, +3 V)



Insertion Loss vs. Frequency



VSWR vs. Frequency



Attenuation vs. Frequency

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

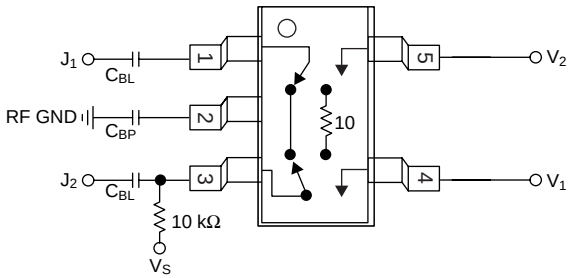
Note: Exceeding these parameters may cause irreversible damage.

Truth Table

V_1	V_2	J_1–J_2
V_{High}	0	Insertion Loss
0	V_{High}	Attenuation

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

Pin Out



DC blocking capacitors (C_{BL}), bypass capacitor (C_{BP}), and biasing resistor must be supplied externally for positive voltage operation.
C_{BL}, C_{BP} = 33 pF for operation @ 900 MHz.