DATA SHEET

AA103-72, AA103-72LF: GaAs IC 1-Bit Digital Attenuator 10 dB LSB LF–2.5 GHz

Features

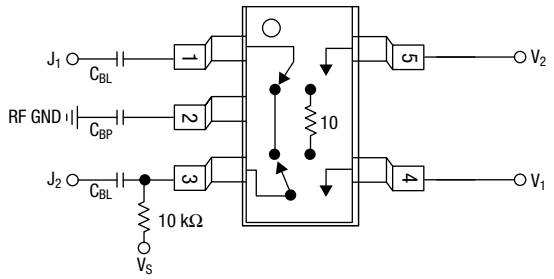
- Attenuation cutback of 10 dB
- Single positive 3 V control
- Low loss
- Low-cost SOT-5 plastic package
- Available lead (Pb)-free and RoHS-compliant MSL-1 @ 260 °C per JEDEC J-STD-020

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.

NEW Skyworks offers lead (Pb)-free, RoHS (Restriction of Hazardous Substances)-compliant packaging.

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.

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

Parameter[1]	Frequency	Min.	Typ.	Max.	Unit
Insertion loss[2]	LF–0.5 GHz LF–1.0 GHz LF–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]	LF–1.0 GHz LF–2.5 GHz	± (0.25 + 3% of Attenuation setting) ± (0.4 + 5% of Attenuation setting)			dB dB
VSWR (I/O)	LF–2.5 GHz		1.2:1	1.4:1	

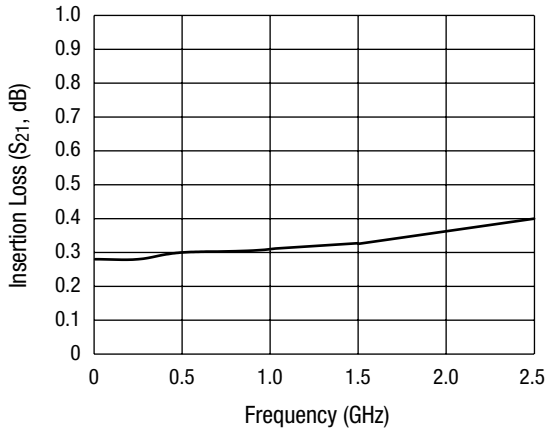
1. All measurements made in a 50 Ω system, unless otherwise specified.
2. Insertion loss changes by 0.003 dB/°C.
3. Maximum attenuation includes insertion loss.

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

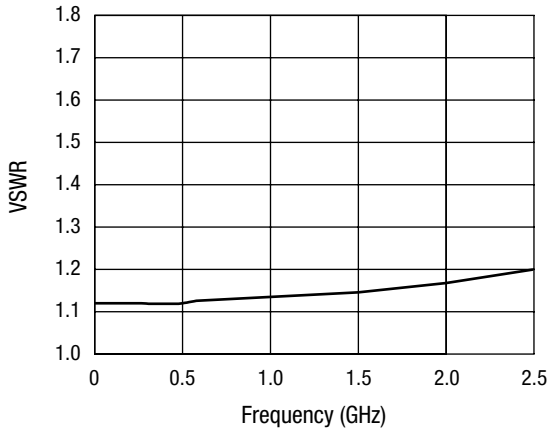
Parameter	Condition	Frequency	Min.	Typ.	Max.	Unit
Switching characteristics[1]						
Rise, fall	10/90% or 90/10% RF			150		ns
On, off	50% CTL to 90/10% RF			300		ns
Video feedthru	T_{RISE} = 1 ns, BW = 500 MHz			70		mV
Input power for 1 dB compression	V_S = 3 V	0.5–2.5 GHz		20		dBm
	V_S = 5 V	0.5–2.5 GHz		26		dBm
Intermodulation intercept point (IP3)	For two-tone input power 10 dBm					
	V_S = 3 V	0.5–2.5 GHz		41		dBm
	V_S = 5 V	0.5–2.5 GHz		45		dBm
Control voltages	V_{LOW} = 0 to 0.2 V V_{HIGH} = 3 V @ 25 µA typ. to 5 V @ 50 µA typ.					

1. Switching characteristics will vary with value chosen for C_{BP}.

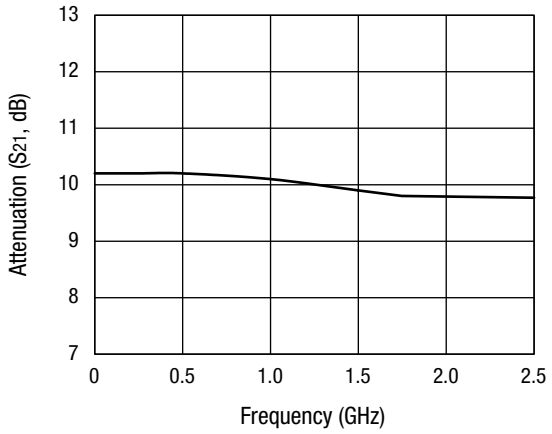
Typical Performance Data (0, 3 V)



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

Performance is guaranteed only under the conditions listed in the specifications table and is not guaranteed under the full range(s) described by the Absolute Maximum specifications. Exceeding any of the absolute maximum/minimum specifications may result in permanent damage to the device and will void the warranty.

CAUTION: *Although this device is designed to be as robust as possible, ESD (Electrostatic Discharge) can damage this device. This device must be protected at all times from ESD. Static charges may easily produce potentials of several kilovolts on the human body or equipment, which can discharge without detection. Industry-standard ESD precautions must be employed at all times.*

Recommended Solder Reflow Profiles

Refer to the *"Recommended Solder Reflow Profile"* Application Note.

Tape and Reel Information

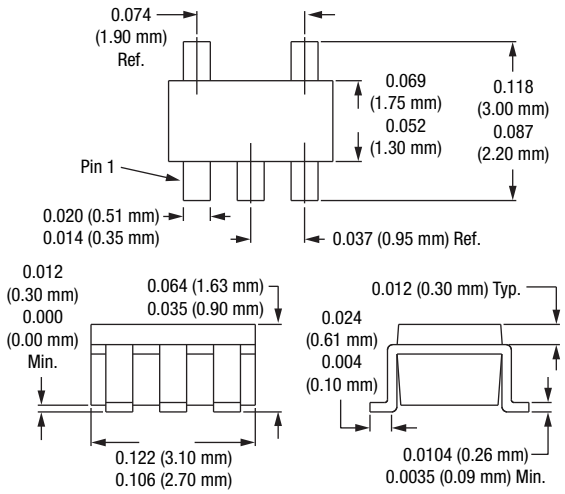
Refer to the *"Discrete Devices and IC Switch/Attenuators Tape and Reel Package Orientation"* Application Note.

Truth Table

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

All other conditions not recommended.
V_{HIGH} = 3 to 5 V ($V_S = V_{HIGH} \pm 0.2$ V).

SOT-5



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