

**DATA SHEET**

# AV103-12, AV103-12LF: GaAs IC 35 dB Voltage Variable Attenuator Single Positive Control 0.5–2.5 GHz

**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
- Available lead (Pb)-free and RoHS-compliant MSL-1 @ 260 °C per JEDEC J-STD-020

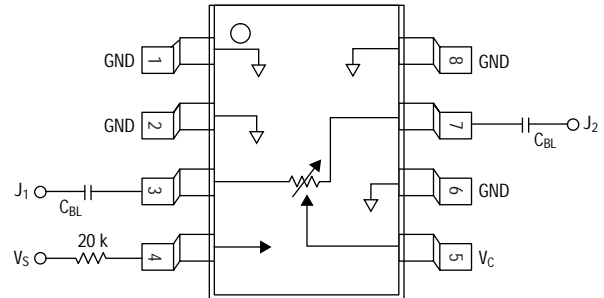
**Description**

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.

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



**Pin Out**



DC blocking capacitors ( $C_{BL}$ ) supplied externally.  
 $C_{BL} = 100$  pF for operation >500 MHz.

**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		

1. All measurements made in a 50  $\Omega$  system, unless otherwise specified.  
 2. Maximum attenuation includes insertion loss.  
 3. For worst-case state.

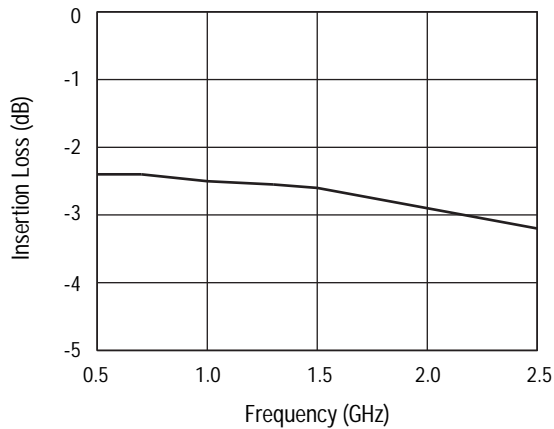
### Operating Characteristics at 25 °C (V<sub>S</sub> = 5 V)

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>(2)</sup>	For two-tone input power 0 dBm	0.9 GHz		12		dBm
Thermal resistance				25		°C/W
Control voltage (V <sub>C</sub> )			0		V <sub>S</sub>	V
Supply voltage (V <sub>S</sub> )				5		V
Control current (I <sub>C</sub> )				1.1 x V <sub>C</sub>		mA
Supply current (I <sub>S</sub> )				150		µA

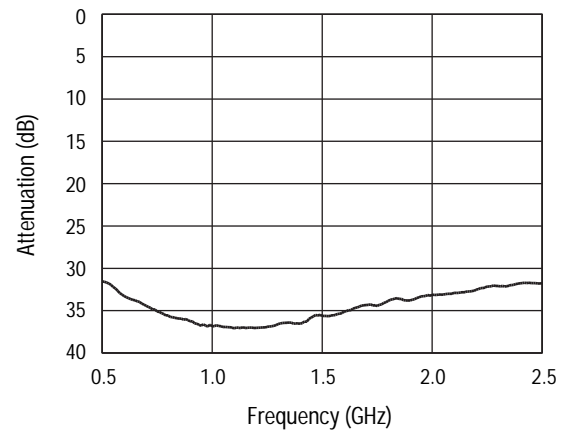
1. All measurements made in a 50 Ω system, unless otherwise specified.  
 2. For worst-case state.

### Typical Performance Data @ 0.9 GHz

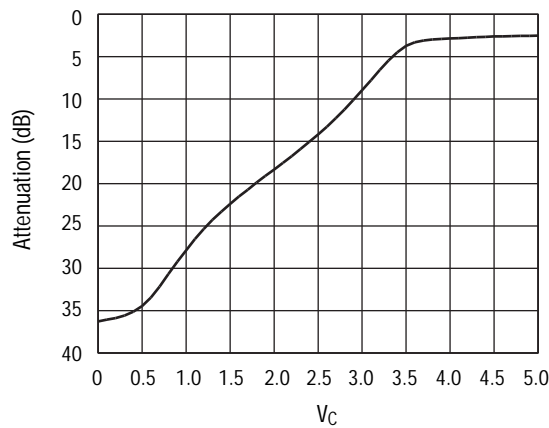
(Unless Otherwise Specified)



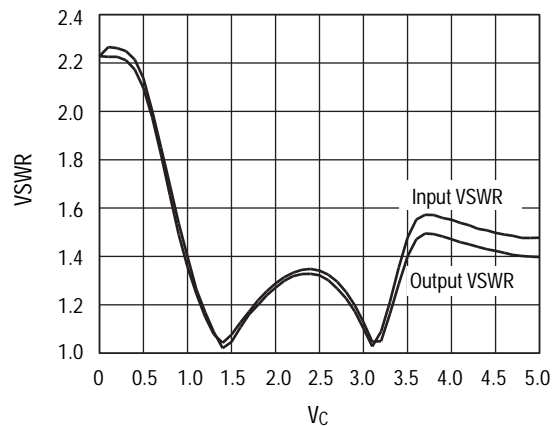
Insertion Loss vs. Frequency



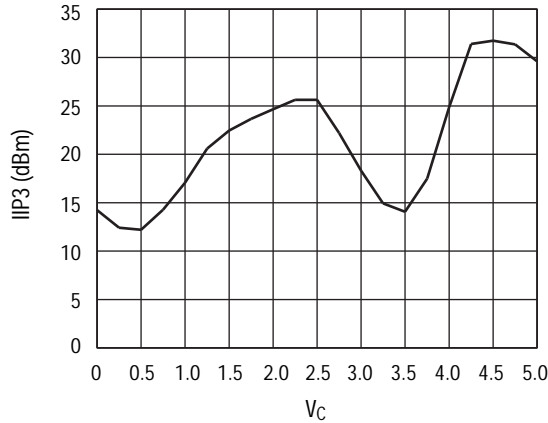
Maximum Attenuation vs. Frequency



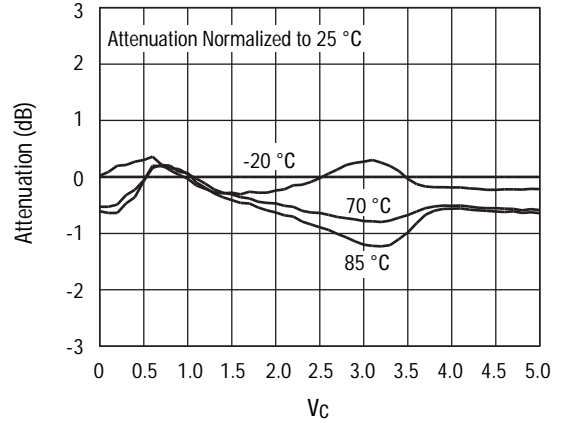
Attenuation vs. Control Voltage



VSWR vs. Control Voltage



Input IP3 vs. Control Voltage



Attenuation vs. Control Voltage Over Temperature

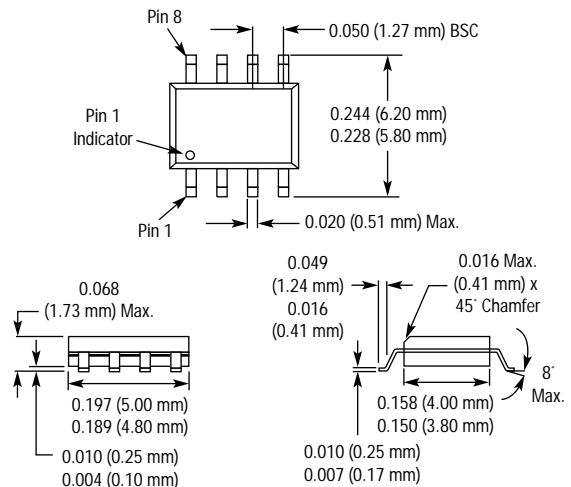
**Absolute Maximum Ratings**

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 Vs voltage.)
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.

**SOIC-8**



**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.

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