GaAs IC 30 dB Voltage Variable Attenuator Dual Bias DC–2.5 GHz

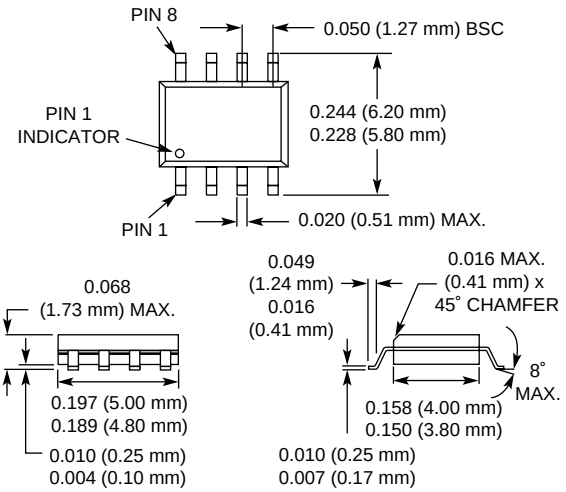
Alpha

AT002N3-12

Features

- Dual Voltage Control
- Low Insertion Loss < (1.2 dB)
- Bridged “T” Design, Non-Reflective
- Low Cost SOIC-8 Plastic Package

SOIC-8



Description

The AT002N3-12 DC–2 GHz GaAs FET IC non-reflective bridged “T” attenuator provides up to 30 dB of “non-reflective” attenuation. The control voltage requirements are 0 to -5 V.

This attenuator has two independent voltage controls, which must be adjusted in a prescribed manner to obtain the desired attenuation under non-reflective conditions. Refer to the Application Notes section, “Dual Voltage Controlled VVA.”

Applications for these fast attenuators are AGC circuits and variable level control in various military and telecommunications systems.

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

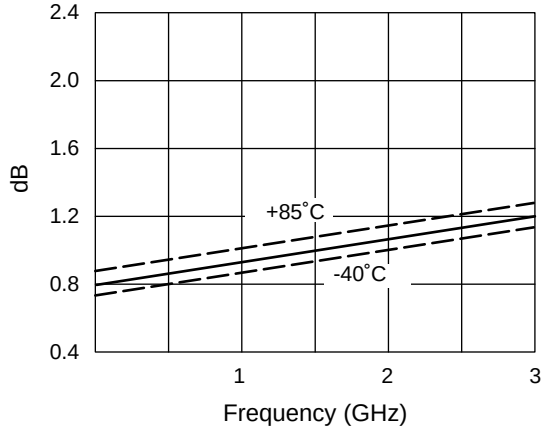
Parameter[1]	Frequency[2]	Min.	Typ.	Max.	Unit
Insertion Loss[3]	DC–1.0 GHz DC–2.0 GHz DC–2.5 GHz		0.9 1.1 1.2	1.0 1.2 1.3	dB dB dB
Attenuation	DC–1.0 GHz DC–2.0 GHz DC–2.5 GHz	30 27 23	31 29 27		dB dB dB
VSWR (I/O)	DC–2.5 GHz		1.6:1	1.8:1	

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

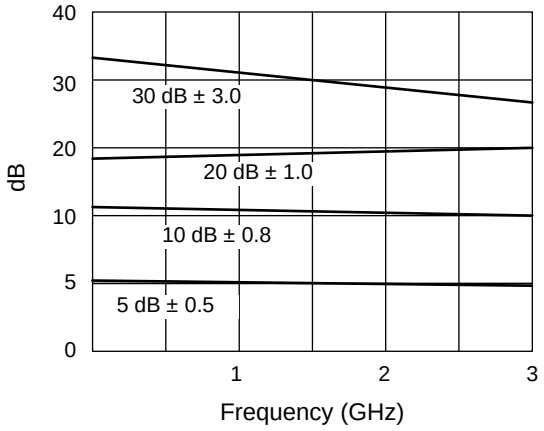
Parameter	Condition	Frequency	Min.	Typ.	Max.	Unit
Switching Characteristics[4]	Rise, Fall (10/90% or 90/10% RF) On, Off (50% CTL to 90/10% RF) Video Feedthru			7 10 20		ns ns mV
Input Power for 1 dB Compression	For All Attenuation Levels	0.5–3 GHz 0.05 GHz		0 -3		dBm dBm
Control Voltages	V_{Low} = 0 to -0.2 V @ 20 µA Max. V_{High} = -5 V @ 50 µA Max.					

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

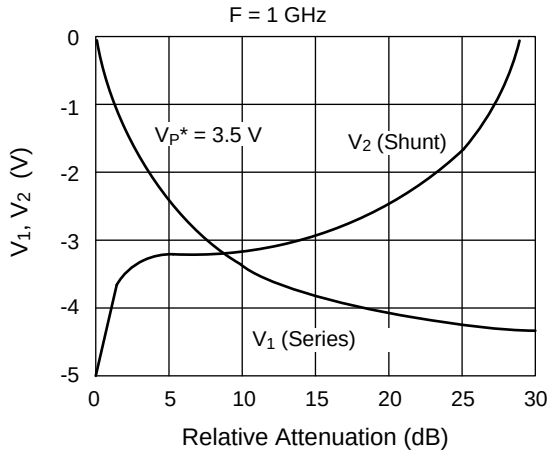
Typical Performance Data (0, -5 V)



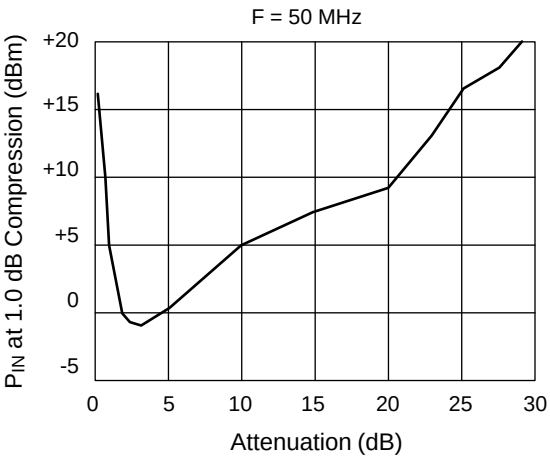
Insertion Loss vs. Frequency



Attenuation (By State) vs. Frequency



Relative Attenuation vs. Control Voltage



Attenuation vs. 1.0 dB Compression Point

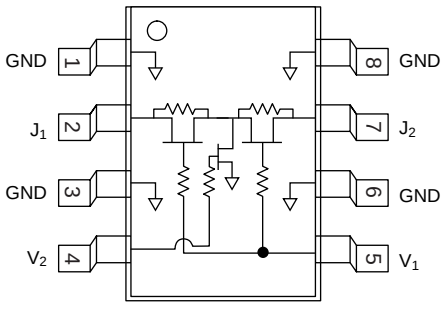
*"Pinch-off" voltage (V_P) varies from unit to unit in the approximate range of -3.2 to -3.8 V. Bias voltages V_1 and V_2 would shift up or down.

Absolute Maximum Ratings

Characteristic	Value
RF Input Power	10 mW > 500 MHz 0/-8 V 4 mW 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
Θ_{JC}	25°C/W

Note: Operating this device above any of these parameters may cause irreversible damage.

Pin Out



Truth Table

V_1	V_2	Attenuation J_1–J_2
0	-5	Insertion Loss
-5	0	Full Attenuation