

GaAs 50 dB IC Voltage Variable Dual Control Attenuator DC–3 GHz



AT002N5-00

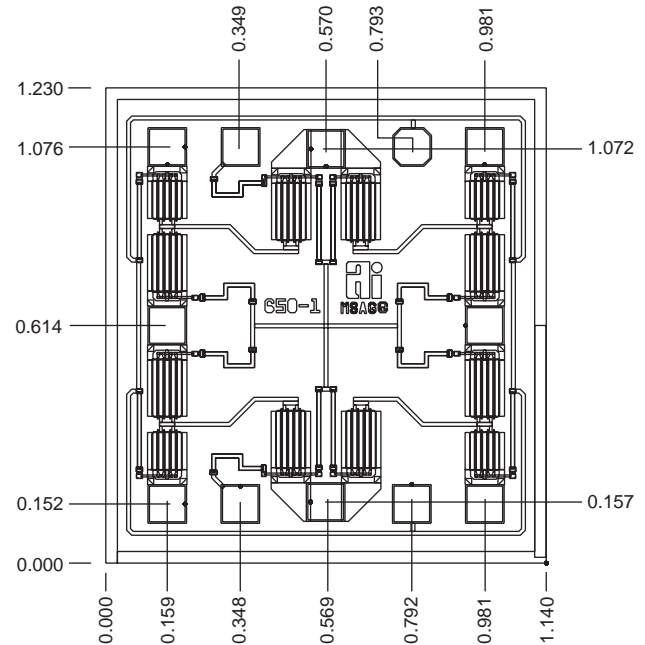
Features

- 50 dB Range
- Low Insertion Loss
- Fast Switching
- Meets MIL-STD-883 Screening Requirements

Description

The AT002N5-00 attenuator provides up to 50 dB variable attenuation from DC–3 GHz under non-reflective conditions. Attenuation can be controlled by varying each of the two control bias voltages from 0 to -5 V. The control current is less than 100 μ A and the attenuator will operate at 0 dBm with switching time, typically 10 ns. The chip is configured using two “T” attenuators in the series and two in parallel. This device may be used with a single bias ($V_1 = 0$) but with reduced attenuation and match. Applications include fast response AGC circuits requiring high attenuation, such as for radar processing, instrumentation, and levelers in RF equipment.

Chip Outline



Dimensions indicated in mm.
All bonding pads are 0.1 x 0.1 mm.
Chip thickness = 0.2 mm.

Electrical Specifications at 25°C

Parameter ¹	Frequency ²	Min.	Typ.	Max.	Unit
Insertion Loss	DC–1.0 GHz		1.2	1.4	dB
	DC–2.0 GHz		1.6	1.8	dB
	DC–3.0 GHz		1.8	2.0	dB
Attenuation Range	DC–1.0 GHz	50	52		dB
	DC–2.0 GHz	48	50		dB
	DC–3.0 GHz	45	48		dB
VSWR (I/O)	DC–1.0 GHz			1.3:1	
	DC–2.0 GHz			1.5:1	
	DC–3.0 GHz			1.8:1	

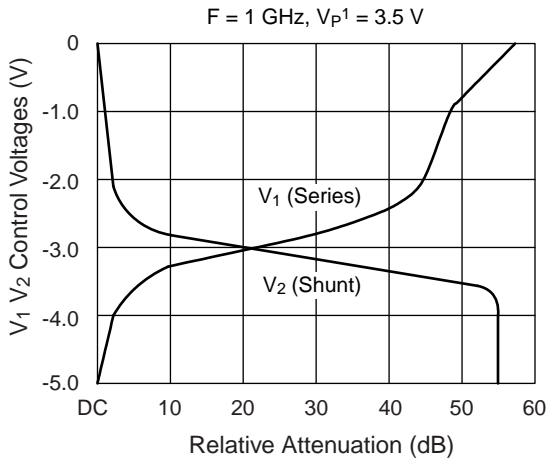
Operating Characteristics at 25°C

Parameter	Condition	Frequency	Min.	Typ.	Max.	Unit
Switching Characteristics	Rise, Fall (10/90% or 90/10% RF)			10		ns
	On, Off (50% CTL to 90/10% RF)			15		ns
	Video Feedthru			20		mV
Attenuation Flatness	0–10	DC–3 GHz		±0.25		dB
	11–20		±0.50		dB	
	21–30		±1.00		dB	
	31–40		±2.00		dB	
	41–50		±4.00		dB	
Compression Point for all Attenuation Levels	1.0 dB	50 MHz–3 GHz		-4		dBm
	> 500 MHz			0		dBm
Control Voltages	$V_{Low} = 0$ to -0.2 V @ 20 μ A Max. $V_{High} = -5$ V @ 100 μ A Max.					

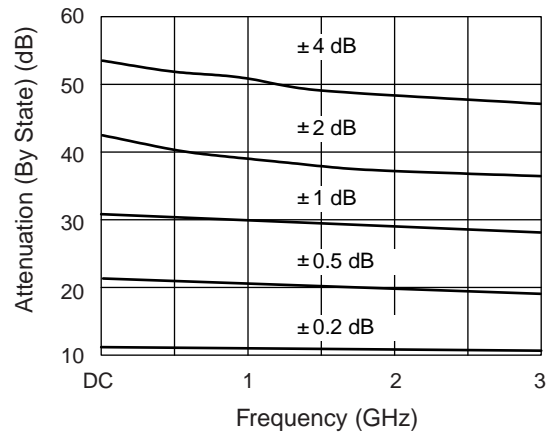
1. All measurements made in a 50 Ω system, unless otherwise specified.

2. DC = 300 kHz.

Typical Performance Data

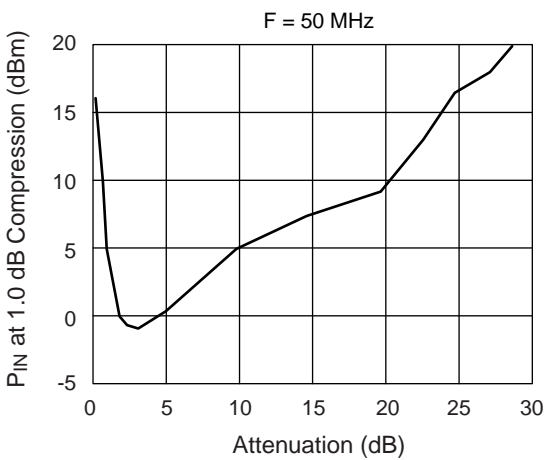


Relative Attenuation vs. Control Voltages



Attenuation (By State) vs. Frequency

1. V_P = FET pinchoff voltage.

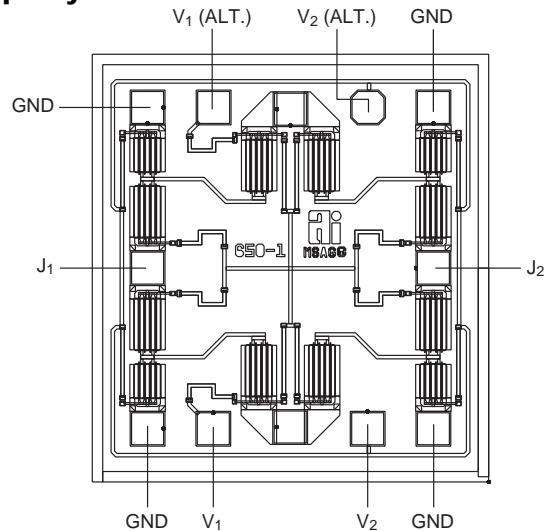


Attenuation vs. 1.0 dB Compression Point

Absolute Maximum Ratings

Characteristic	Value
RF Input Power (RF In)	10 mW > 500 MHz 0/-8 V Control 4 mW 50 MHz, -8 V Control
Control Voltage (V_C)	+0.2 V, -10 V
Operating Temperature (T_{OP})	-55°C to +125°C
Storage Temperature (T_{ST})	-65°C to +150°C
Thermal Resistance (θ_{JC})	25°C/W

Chip Layout



Switch Schematic

