

# GaAs 30 dB IC Voltage Variable Dual Control Attenuator DC–6 GHz



AT006N3-00

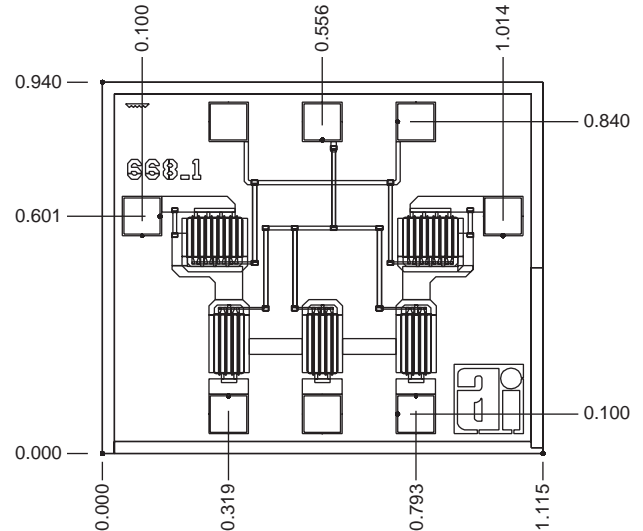
## Features

- 30 dB Range
- Low DC Drain
- Fast Switching
- Capable of Meeting MIL-STD Requirements<sup>5</sup>

## Description

The AT006N3-00 chip is a GaAs FET MMIC non-reflective bridged “T” attenuator that provides over 30 dB of “matched” attenuation. The input and output VSWR is less than 1.5:1 maximum under all attenuation values. Applications for these fast attenuators are AGC circuits and variable level control in high reliability and telecommunications systems.

## Chip Outline



Dimensions indicated in mm.  
All DC (V) pads are 0.1 x 0.1 mm and RF In, Out pads are 0.07 mm wide.  
Chip thickness = 0.1 mm.

## Electrical Specifications at 25°C

Parameter <sup>1</sup>	Frequency <sup>4</sup>	Min.	Typ.	Max.	Unit
Insertion Loss <sup>2</sup>	DC–1.0 GHz		0.8	1.0	dB
	DC–2.0 GHz		1.0	1.2	dB
	DC–4.0 GHz		1.2	1.4	dB
	DC–6.0 GHz		1.5	1.7	dB
Attenuation Range	DC–1.0 GHz	30	38		dB
	DC–2.0 GHz	29	35		dB
	DC–4.0 GHz	26	32		dB
	DC–6.0 GHz	25	30		dB
VSWR (I/O)	DC–2.0 GHz		1.2:1	1.3:1	
	DC–4.0 GHz		1.4:1	1.5:1	
	DC–6.0 GHz		1.5:1	1.6:1	

## Operating Characteristics at 25°C

Parameter	Condition	Frequency	Min.	Typ.	Max.	Unit
Switching Characteristics	Rise, Fall (10/90% or 90/10% RF)			7		ns
	On, Off (50% CTL to 90/10% RF)			10		ns
	Video Feedthru <sup>3</sup>			20		mV
Attenuation Flatness	0–10 dB	DC–6 GHz		±0.5		dB
	11–20 dB			±1.0		dB
	21–30 dB			±1.5		dB
	31–Max.			±2.0		dB
Compression Point for all Attenuation Levels 50 MHz (> 500 MHz)	0.1 dB			-8 (-4)		dBm
	1.0 dB			-3 (0)		dBm
Control Voltages	$V_{Low} = 0 \text{ to } -0.2 \text{ V @ } 20 \mu\text{A Max.}$ $V_{High} = -5 \text{ V @ } 50 \mu\text{A Max.}$					

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

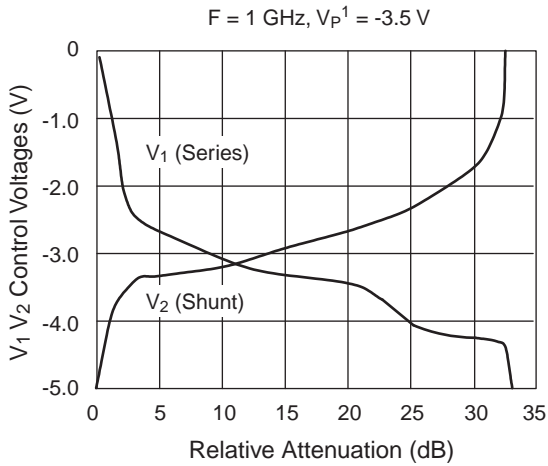
2. Insertion loss changes by 0.003 dB/°C.

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

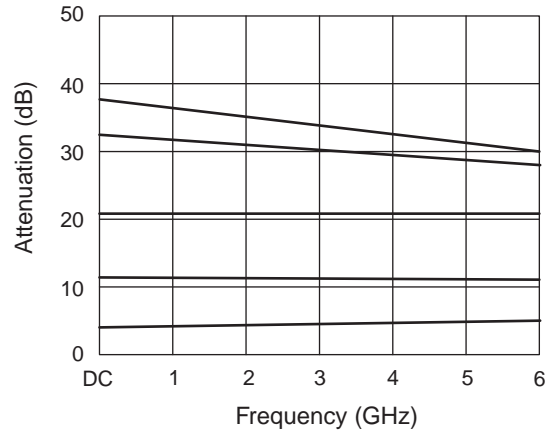
4. DC = 300 kHz.

5. See Quality/Reliability section.

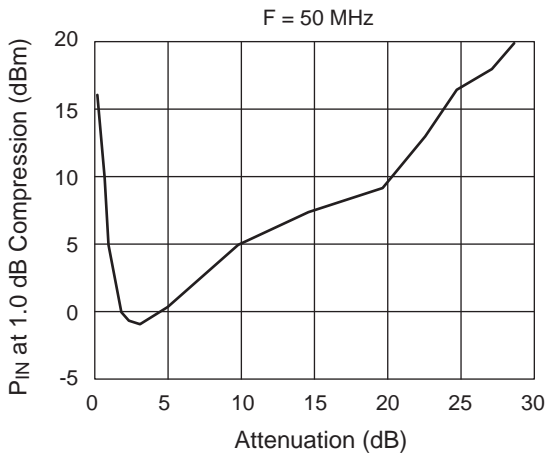
### Typical Performance Data



Relative Attenuation vs. Control Voltages

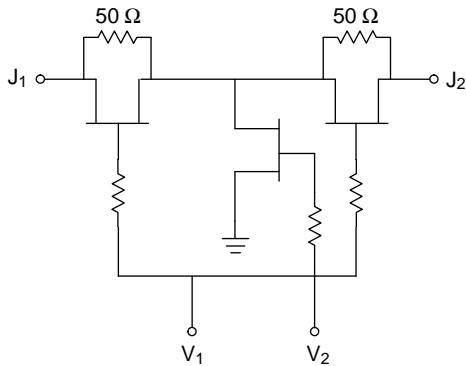


Attenuation (By State) vs. Frequency



Attenuation vs. 1.0 dB Compression Point

### Switch Schematic



### Absolute Maximum Ratings

Characteristic	Value
RF Input Power (RF In)	10 mW > 500 MHz 4 mW @ 50 MHz
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 ( $\Theta_{JC}$ )	25°C/W

### Chip Layout

