

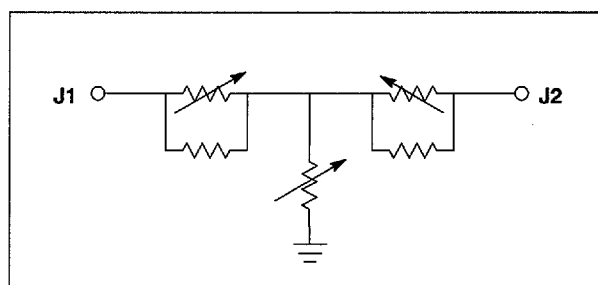
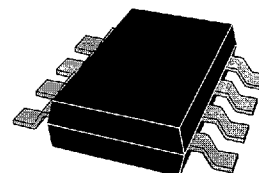
GaAs 30 dB MMIC FET Voltage Variable Attenuator Dual Bias DC–2.5 GHz

Alpha

AT002N3–12

Features

- 8 Lead SOIC Package
- Dual Bias
- 30 dB Range
- Low DC Drain
- Low Insertion Loss < (1.2 dB)
- Low Phase Shift
- Bridged "T" Design, Non-Reflective
- Low Cost



Description

The AT002N3–12 DC–2 GHz GaAs FET MMIC non-reflective bridged "T" attenuators provides up to 30 dB of "non-reflective" attenuation. The input and output VSWR is less than 1.8:1 maximum under all attenuation values. The control voltage requirements are 0 to –5 volts on each bias port.

This attenuator has two independent bias 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."

This attenuator may be used with a single bias (set $V_1=0$ and vary V_2 from 0 to –5 volts) but with reduced attenuation and match.

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

Electrical Specifications at 25°C

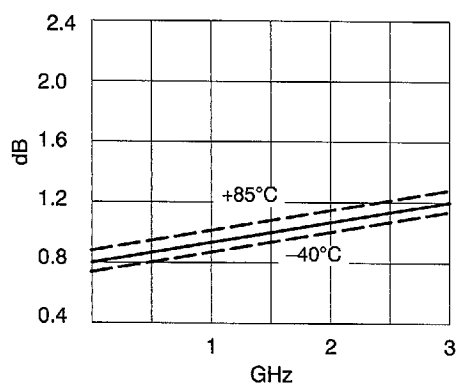
Insertion Loss	DC – 1 GHz	1.0	dB	Max
	DC – 2 GHz	1.2	dB	Max
	DC – 2.5 GHz	1.2	dB	Max
Attenuation	DC – 1 GHz	30	dB	Min
	DC – 2 GHz	27	dB	Min
	DC – 2.5 GHz	23	dB	Min
VSWR (I/O)	DC – 2.5 GHz	1.8:1	dB	Max

Operating Characteristics at 25°C

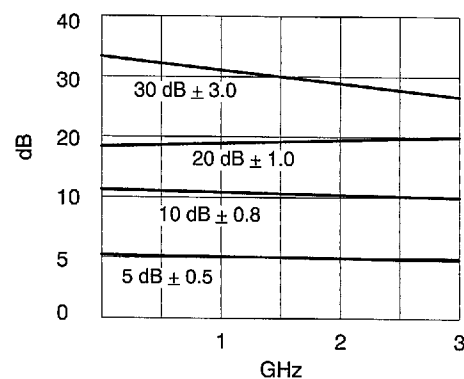
Impedance	50 Ohms Nominal			
Switching Characteristics				
RISE, FALL (10/90% or 90/10% RF)	7	ns	Typ	
ON, OFF (50% CTL to 90/10% RF)	10	ns	Typ	
Video Feedthru	20	mV	Typ	
Compression Points for all Attenuation Levels				
	50 MHz	> 500 MHz		
0.1 dB	−8	−4	dBm	Typ
1.0 dB	−3	0	dBm	Typ
Control Voltages				
V ₀ (Low)	0 to −0.2V @ 20 μA Max			
V ₀ (High)	−5V @ 50 μA Max			

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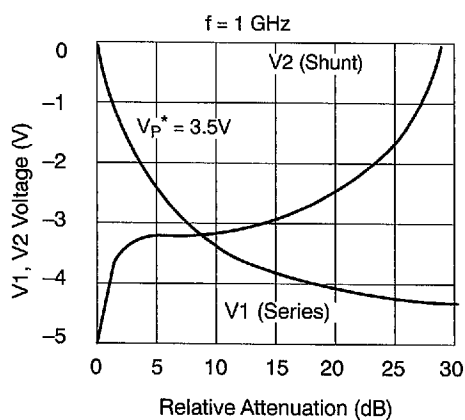
Typical Performance Data



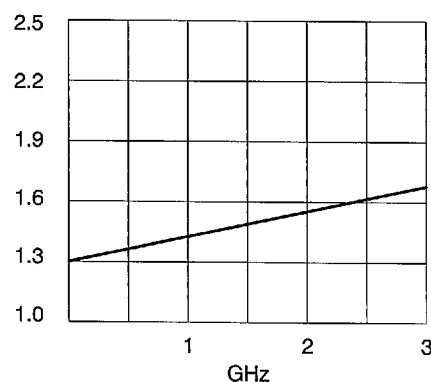
Insertion Loss vs. Frequency



**Attenuation (By State)
vs. Frequency**

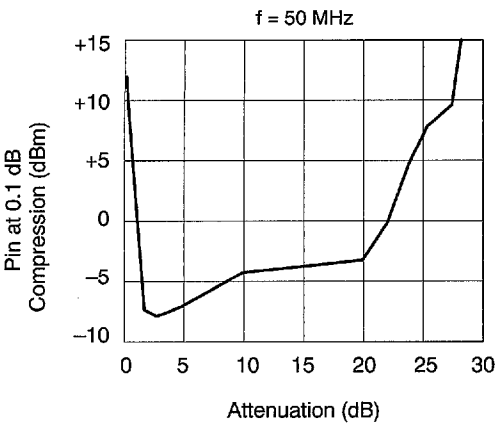


**Relative Attenuation vs.
Control Voltage**

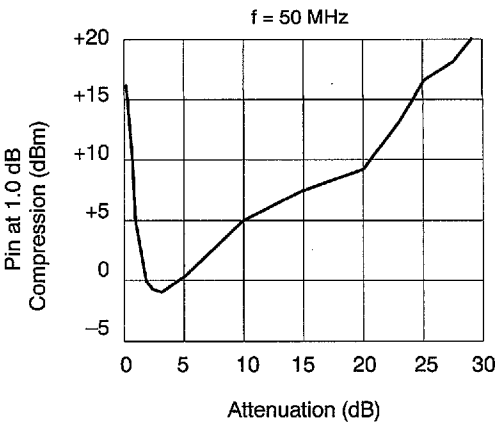


VSWR vs. Frequency

* Pinch off voltage (V_p) varies from unit to unit in the approximate range of -3.2 to -3.8 volts. Bias voltages V1 and V2 would shift up or down.

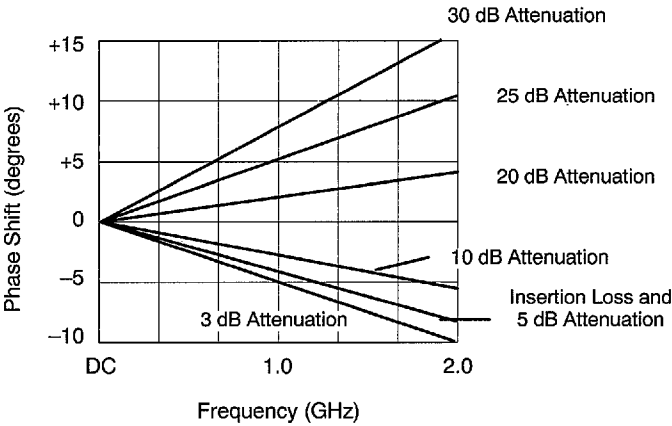


**Attenuation vs. 0.1 dB
Compression Point**



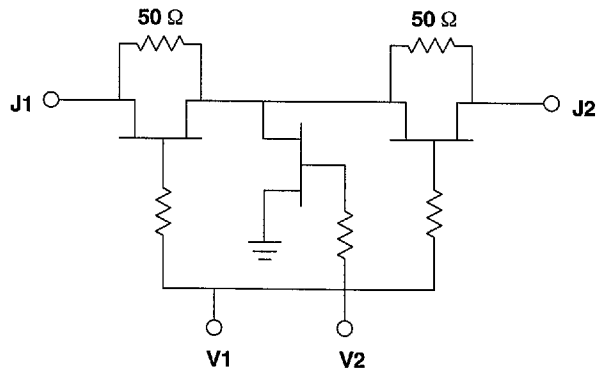
**Attenuation vs. 1.0 dB
Compression Point**

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



Frequency vs. Phase Shift

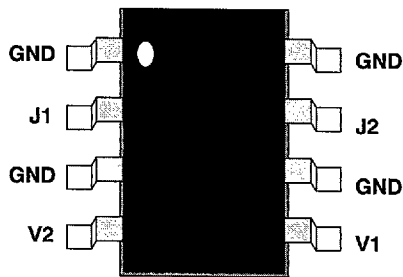
Attenuator Schematic



Truth Table

V1	V2	Attenuation State
0	–5	Insertion Loss
–5	0	Full Attenuation

Pin Out



Absolute Maximum Ratings

RF Input Power: 10 mW > 500 MHz 0/–8V
4 mW 50 MHz 0/–8V

Control Voltages: +0.2V, –10V

Operating Temperature: –40 to 85°C

Storage Temperature: –65 to 150°C

Θ_{JC} : 25°C/W

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

RF GaAs MMIC Products in Metal Packages

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