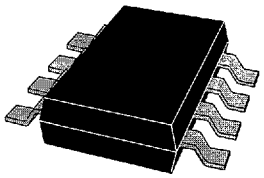
GaAs 30 dB MMIC FET Voltage Variable Attenuator Dual Bias DC–2.5 GHz

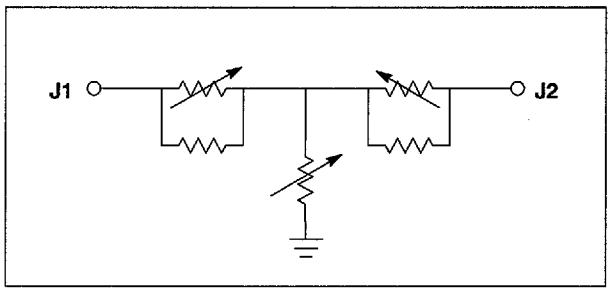
Alpha

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 V1=0 and vary V2 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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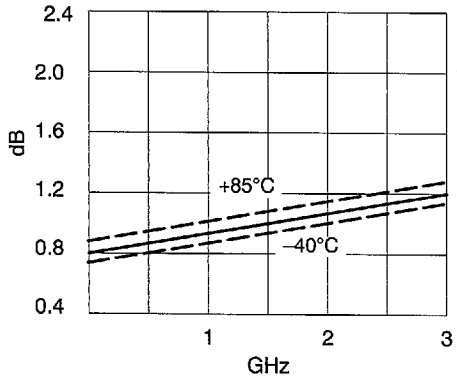
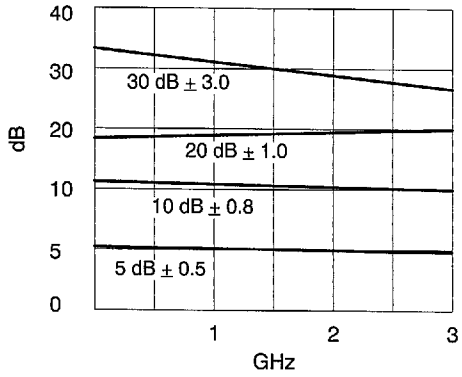
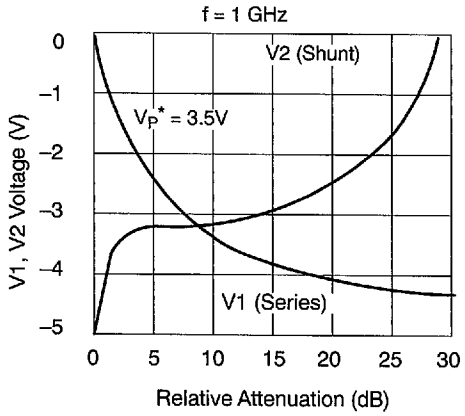
Typical Performance Data



Insertion Loss vs. Frequency



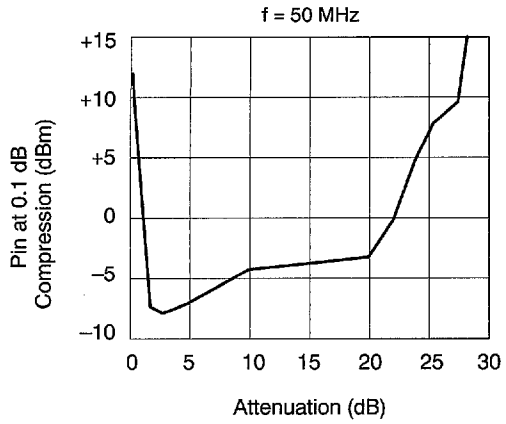
Attenuation (By State) vs. Frequency



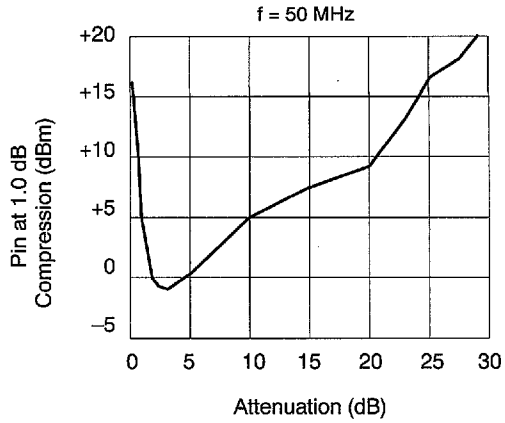
Relative Attenuation vs. Control Voltage

VSWR vs. Frequency

* Pinch off voltage (Vp) 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.

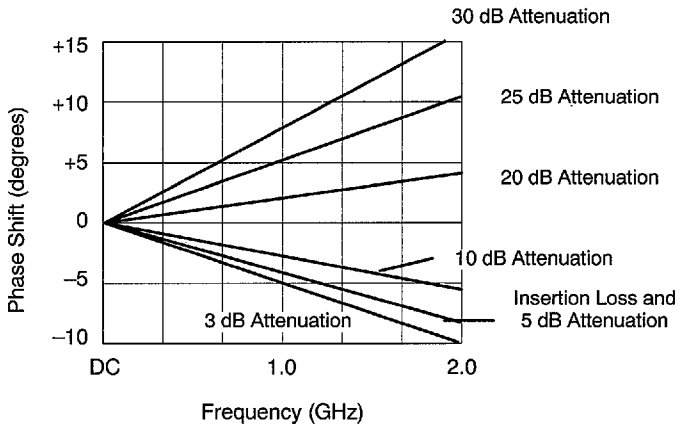


Attenuation vs. 0.1 dB Compression Point



Attenuation vs. 1.0 dB Compression Point

* Pinch off voltage (Vp) 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.



Frequency vs. Phase Shift

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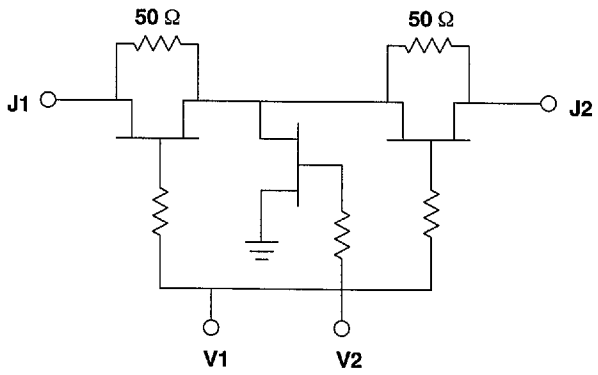
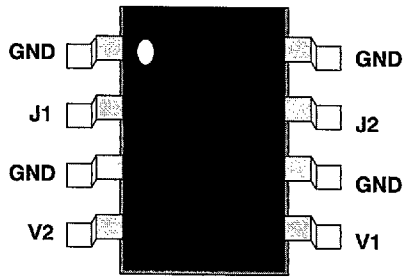
Attenuator Schematic



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.)

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RF GaAs MMIC Products in Metal Packages

Numerical Index