

# Digital Attenuator, 1 Bit, 10 dB Step DC - 2.0 GHz



## Features

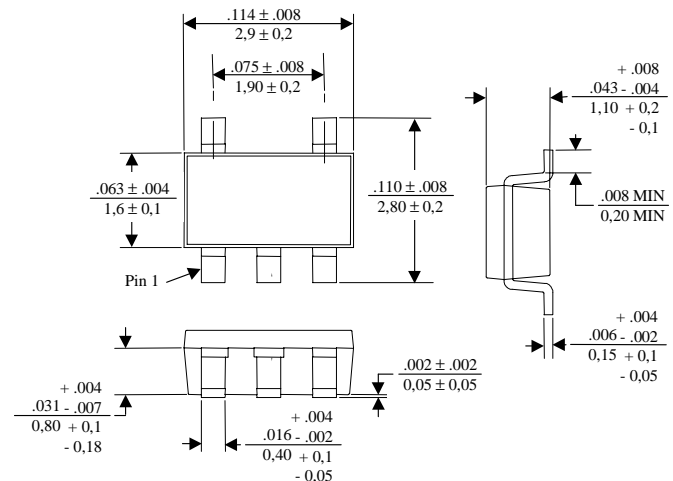
- Single 10 dB Step
- Low Loss 0.3dB Typ. @ 900 MHz
- Low Cost Plastic SOT25 Package

## Description

M/A-COM's AT-266 is a 1 bit, 10 dB step GaAs MMIC Digital Attenuator in a low cost SOT-25 surface mount plastic package. The AT-266 is ideally suited for use where high accuracy, very low power consumption and low intermodulation products are required. Typical applications include radio, wireless LANs, GPS equipment and other gain/level control circuits.

The AT-266 is a GaAs MMIC using a mature 1 micron process. The process features full chip passivation for increased performance and reliability.

## SOT-25 Plastic Package



## Pin Configuration

PIN No.	Function	Description
1	RF1 <sup>1</sup>	RF In/Out
2	GND <sup>1</sup>	RF Ground
3	RF2 <sup>1</sup>	RF In/Out
4	V1	Control Voltage
5	V2	Control Voltage

1. Series Capacitors on PINs1, 3 and 5, Shunt Capacitor on PIN 2 are required for Postive Control. 39pF capacitors used for positive control performance curves.

## Truth Table

MODE (Control)	V1	V2	Atten.
Postive <sup>1</sup>	0 ± 0.2V	+3 to +8V	10 dB
	+3 to +8V	0 ± 0.2V	IL
Postive / Negative <sup>1,2</sup>	-V <sub>C</sub> ± 0.2 V	+V <sub>C</sub>	10 dB
	+ V <sub>C</sub>	-V <sub>C</sub> ± 0.2V	IL
Negative <sup>3</sup>	0 ± 0.2V	-3V to -8V	IL
	-3V to -8V	0 ± 0.2V	10 dB

1. External DC blocking capacitors are required as noted<sup>1</sup>
2.  $|-V_C| + V_C \leq 8 V$ .
3. If negative control is used, DC blocking capacitors are not required on RF Ports.

## Electrical Specifications T<sub>A</sub> = 25°C<sup>1</sup>

Parameter	Test Conditions	Units	Min.	Typ.	Max.
Insertion Loss	0 - 1 GHz	dB		0.3	0.45
Insertion Loss	1 - 2 GHz	dB		0.5	0.7
Attenuation	0 - 1 GHz	dB		10	±0.4
	1 - 2 GHz	dB		10	±0.5
VSWR	0 - 2 GHz			1.4:1	1.5:1
IP <sub>3</sub>	2 Tone @ 0 dBm, 5 MHz spacing	dBm	42	50	
P <sub>1dB</sub>	1 GHz	dBm	23	28	
Trise, Tfall	10% to 90% RF, 90% to 10% RF	ns		5	20
Ton, Toff	50% Control to 90% RF, 50% Control to 10% RF	ns		10	25
Transients	In Band	mV		6	10

1. All measurements at 1.0 GHz, -3 Volts control unless otherwise specified.

V2.00

**Ordering Information**

Part Number	Package
AT-266	SOT-25 Plastic Package
AT-266TR	Forward Tape and Reel <sup>1</sup>
AT-266RTR	Reverse Tape and Reel <sup>1</sup>

1. Refer to Application Note M513 for reel size information.

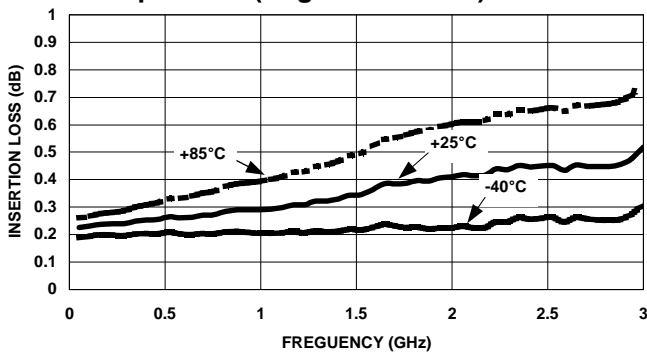
**Absolute Maximum Ratings<sup>1</sup>**

Parameter	Absolute Maximum
Max. Input Power	
50 MHz	+27 dBm
500 - 2000 MHz	+34 dBm
Control Voltage	+5V, -8.5V
Operating Temperature	-40°C to +85°C
Storage Temperature	-65°C to +150°C

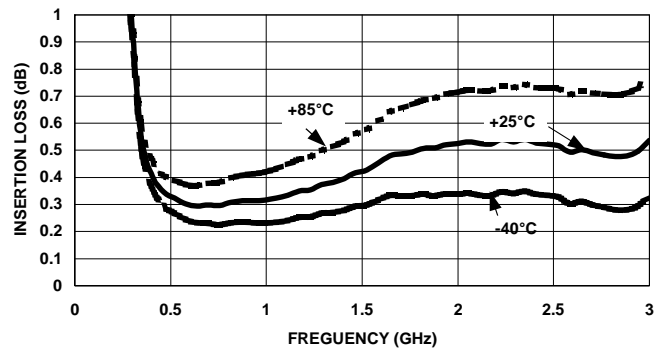
1. Operation of this device above any one of these parameters may cause permanent damage.

**Typical Performance Curves**

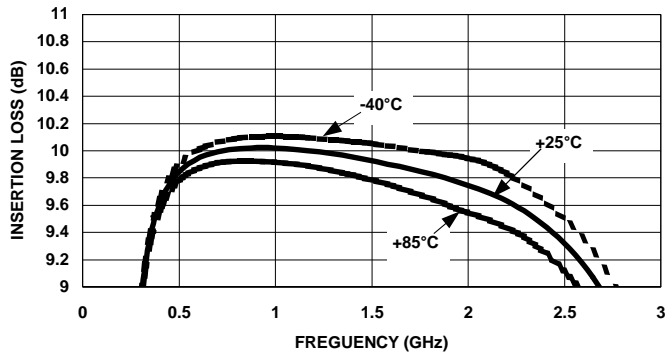
**Insertion Loss vs. Frequency Over Temperature (Negative Control)**



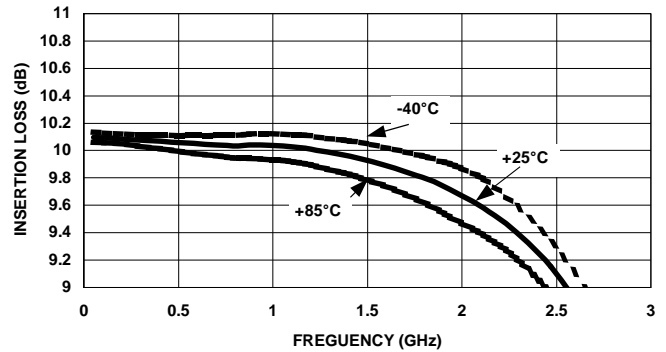
**Insertion Loss vs. Frequency Over Temperature (Positive Control)**



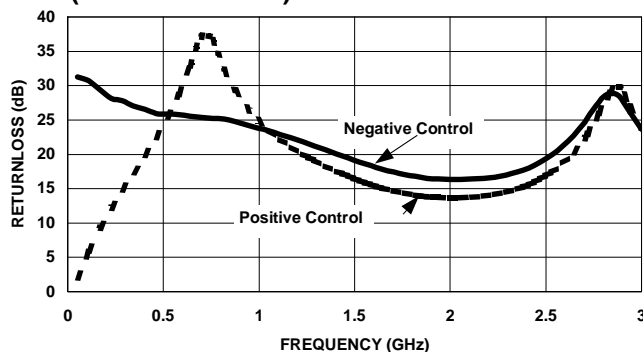
**Relative Attenuation vs. Frequency Over Temperature (Positive Control)**



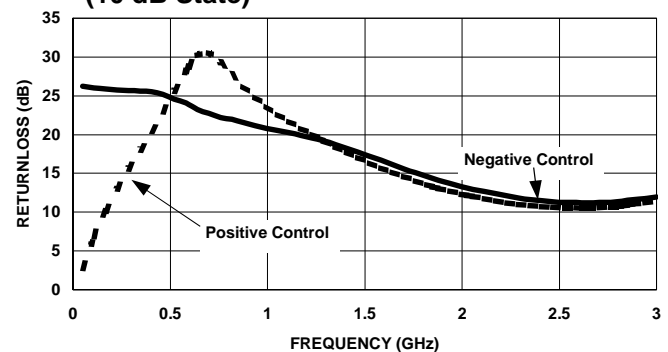
**Relative Attenuation vs. Frequency Over Temperature (Negative Control)**



**Return Loss vs. Frequency (Reference State)**



**Return Loss vs. Frequency (10 dB State)**



V2.00