



Digital Attenuator, 1 Bit, Variable Step 10 - 20 dB, DC - 3000 MHz



Features

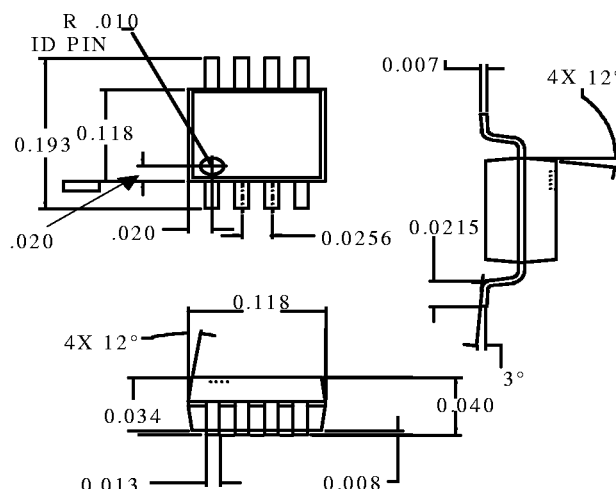
- Variable Step (10 - 20 dB) with an External Resistor
- Matched Input and Output
- Low Intermodulation Product: +53 dBm IP₃
- Low DC Power Consumption: 50 μ W
- Low Cost, Low Profile MSOP 8 Plastic Package
- Tape and Reel Packaging Available

Description

M/A-COM's AT-246 is a GaAs MMIC matched 1 bit attenuator in a low cost plastic MSOP-8 package. It is designed to be a building block for a single step attenuator by placing a resistor across RF1-RF2. Attenuation levels of 10 to 20 dB with flat response are achievable from DC to 3 GHz. The AT-246 is ideally suited for circuits where fast switching, very low power consumption and low intermodulation products are required. Typical applications include gain/level and sensitivity control in radio and cellular equipment, wireless LAN's, GPS equipment and other gain/level control circuits.

The AT-246 is fabricated using a mature 1-micron gate length GaAs MESFET process. The process features full chip passivation for increased performance and reliability.

MSOP-8¹



1. Dimensions are in inches.

Ordering Information

Part Number	Package
AT-246 PIN	MSOP-8 Lead Plastic
AT-246TR	Forward Tape and Reel ¹

1. If specific reel size is required, consult factory for part number assignment.

Electrical Specifications: T_A = +25° C^{1, 2}

Parameter	Test Conditions	Units	Min.	Typ.	Max.
Reference Insertion Loss	DC - 3.0 GHz	dB		0.8	1.0
Attenuation Flatness	DC - 1.5 GHz	dB		±0.5	±1.0
	1.5 - 3.0 GHz	dB		±1.5	±2.0
VSWR	DC - 3.0 GHz			1.3:1	
1 dB Compression	Input Power 50 MHz	dBm		24	
	Input Power 500 MHz	dBm		30	
T _{rise} , T _{fall} T _{on} , T _{off} Transients	10% to 90% RF, 90% to 10% RF	μ S		20	
	50% Control to 90% RF, Control to 10% RF	μ S		23	
	In-band	mV		25	
IP ₂	Measured Relative to Input Power ² 50 MHz	dBm		54	
	500 MHz	dBm		73	
IP ₃	Measured Relative to Input Power ² 50 MHz	dBm		45	
	500 MHz	dBm		55	

1. All measurements in a 50 Ω system unless otherwise specified. Loss varies at 0.003 dB/°C.

2. For two-tone Input Power up to +5 dBm.

Absolute Maximum Ratings¹

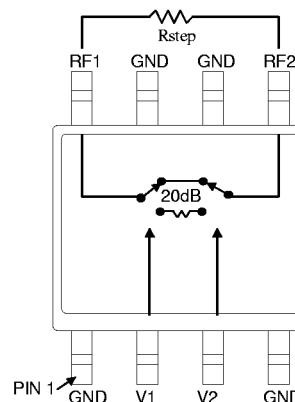
Parameter	Absolute Maximum
Input Power	
50 MHz	+27 dBm
500 - 2000 MHz	+33 dBm
Control Voltage	+5V, -8.5V
Operating Temperature	-40°C to +85°C
Storage Temperature	-65°C to +150°C

1. Exceeding any one or a combination of these limits may cause permanent damage.

PIN Configuration

PIN No.	Function	Description
1	GND	RF Ground
2	V1	Bit Control
3	V2	Bit Control
4	GND	RF Ground
5	RF2	RF in/out
6	GND	RF Ground
7	GND	RF Ground
8	RF1	RF in/out

Functional Schematic



Note:

Rstep value is selected for desired attenuation level. The usable range is 50Ω to OPEN to achieve 10 - 20 dB attenuation with >15 dB Return Loss.

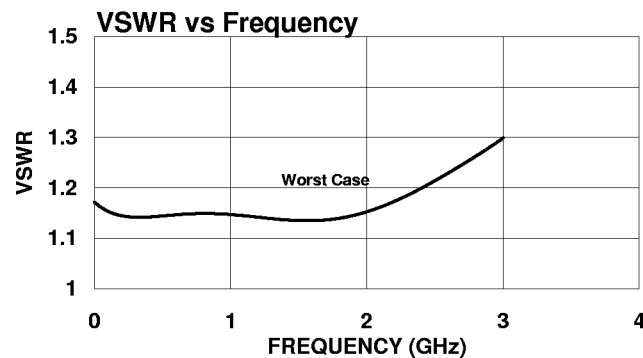
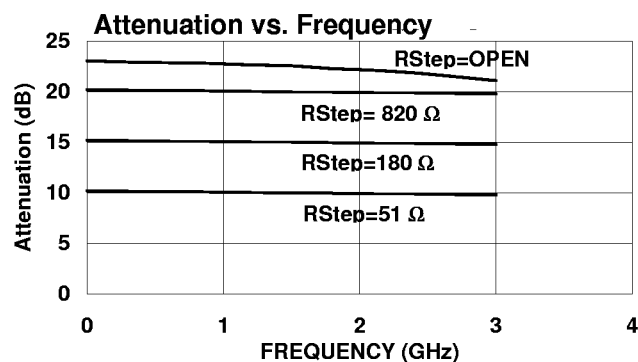
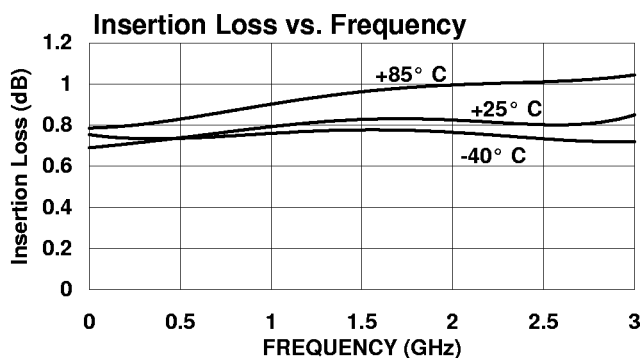
Truth Table

V1	V2	Attenuation (dB)
0	1	Reference I.L.
1	0	Step

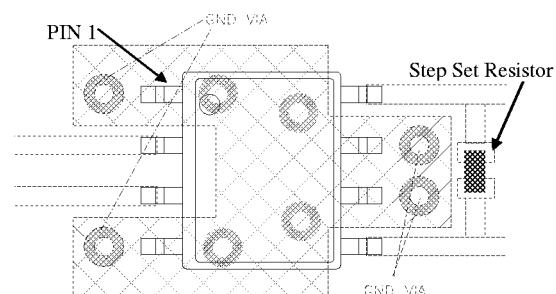
"0" = 0 ±0.2V

"1" = -5 ±0.2V

Typical Performance Curves



Recommended Layout



V2.00