

Digital Attenuator, 31.5 dB, 6-Bit, TTL Driver DC - 2 GHz

AT-107

V3.00

Features

- Attenuation: 0.5-dB Steps to 31.5 dB²
- Temperature Stability: ± 0.18 dB from -55°C to +85°C Typical
- Low DC Power Consumption
- Hermetic Surface Mount Package
- Integral TTL Driver
- 50 Ω Nominal Impedance

Description

M/A-COM's AT-107 is a GaAs FET 6-bit digital attenuator with a 0.5-dB minimum step size and 31.5 dB total attenuation. This attenuator and integral TTL driver is in a hermetically sealed ceramic 24-lead surface mount package. The AT-107 is ideally suited for use where accuracy, fast switching, very low power consumption and low intermodulation products are required. Typical applications include dynamic range setting in precision receiver circuits and other gain/leveling control circuits. Environmental screening is available. Contact the factory for information.

Electrical Specifications, $T_A = -55^\circ\text{C}$ to $+85^\circ\text{C}$

Parameter	Test Conditions	Units	Min.	Typ.	Max.
Reference Insertion Loss	DC - 0.5 GHz DC - 1.0 GHz DC - 2.0 GHz	dB dB dB			3.2 3.6 4.0
Attenuation Accuracy ^{3,4}	Any Single Bit Any Combination of Bits	DC - 1.0 GHz DC - 2.0 GHz DC - 1.0 GHz DC - 2.0 GHz	$\pm (0.15 + 3\% \text{ of attenuation setting in dB})$ dB $\pm (0.2 + 3\% \text{ of attenuation setting in dB})$ dB $\pm (0.2 + 3\% \text{ of attenuation setting in dB})$ dB or ± 0.4 dB, whichever is greater $\pm (0.2 + 3\% \text{ of attenuation setting in dB})$ dB or ± 0.4 dB, whichever is greater		
VSWR	DC - 2.0 GHz				1.8:1
Trise, Tfall Ton, Toff Transients	10% to 90% 50% Control to 90/10% RF In-band (peak-peak)	nS nS mV		9 45 40	
1 dB Compression ⁵	Input Power Input Power	0.05 GHz 0.5 - 2.0 GHz		+21 +29	
Input IP ₃ ⁵	For two-tone input power up to +5 dBm	0.05 GHz 0.5 - 2.0 GHz		+35 +48	
Input IP ₂ ⁵	For two-tone input power up to +5 dBm	0.05 GHz 0.5 - 2.0 GHz		+75 +79	
V _{CC} V _{EE}		V	4.5 -8.0	5.0	5.5 -5.0
I _{CC}	V _{CC} = 4.5 to 5.5 V V _{ctl} = 0 to 0.8 V, or V _{CC} - 2.1 V to V _{CC}	mA			6.0
I _{EE}	V _{EE} = -5.0 to -8.0 V	mA			1.0
V _{ctl} V _{ctll}	Logic 0 (TTL) Logic 1 (TTL)	V	0.0 2.0		0.8 5.0
Input Leakage Current (Low) Input Leakage Current (High)	0 to 0.8 V 2.0 to 5.0 V	μ A μ A			1.0 1.0

1. All specifications apply when operated with bias voltages of +5 V for V_{CC} and -5.0 V to -8.0 V for V_{EE}, and 50 Ω impedance at all ports unless otherwise specified.

2. Above reference insertion loss.

3. This attenuator is guaranteed monotonic.

4. For the attenuator to meet the guaranteed specifications, it is necessary to have a DC return on either RF1 or RF2. The DC return can be either a 10 k Ω resistor, or an RF choke.

5. V_{EE} = -5 V for the typical numbers given.

Specifications Subject to Change Without Notice.

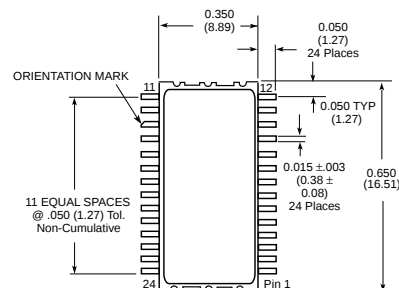
M/A-COM, Inc.

North America: Tel. (800) 366-2266
Fax (800) 618-8883

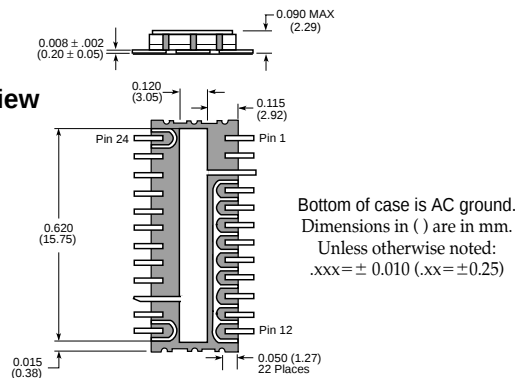
■ Asia/Pacific: Tel. +81 (03) 3226-1671
Fax +81 (03) 3226-1451

■ Europe: Tel. +44 (1344) 869 595
Fax +44 (1344) 300 020

CR-13



Bottom View



Absolute Maximum Ratings

Parameter	Absolute Maximum
Maximum Input Power	
0.5 GHz	+27 dBm
0.5 - 2.0 GHz	+34 dBm
Supply Voltages	
V _{CC}	+5.5 V
V _{EE}	-8.5 V
Control Voltage	-0.5 V to V _{CC} + 0.5 V
Operating Temperature	-55°C to +125°C
Storage Temperature	-65°C to +150°C

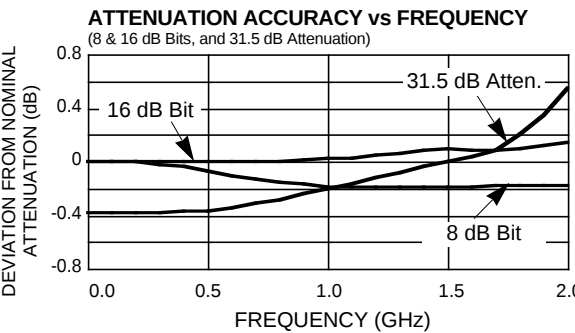
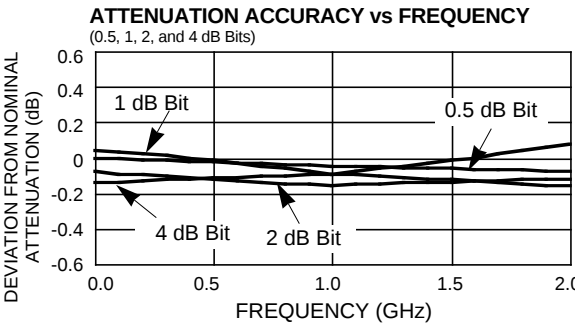
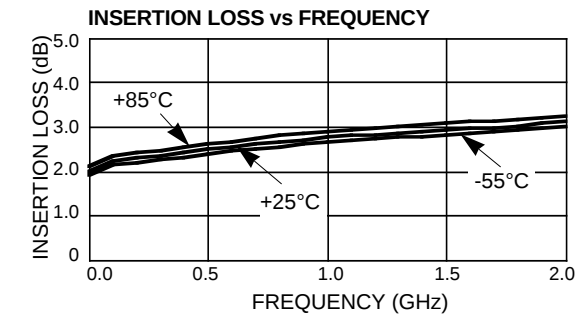
Note: Operation of this device above any one of these parameters may cause permanent damage.

Ordering Information⁶

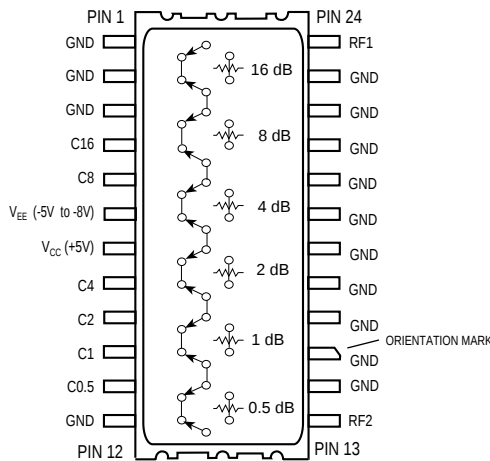
Part Number	Package
AT-107 PIN	Ceramic

6. Contact the factory for standard or custom screening requirements.

Typical Performance @ +25°C



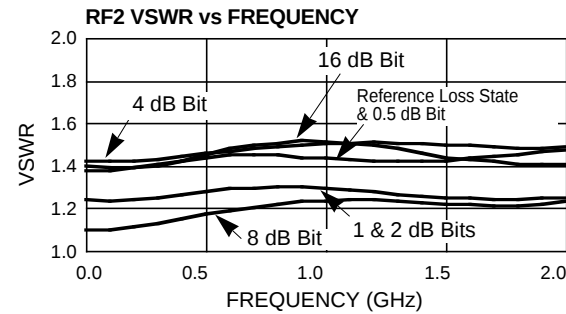
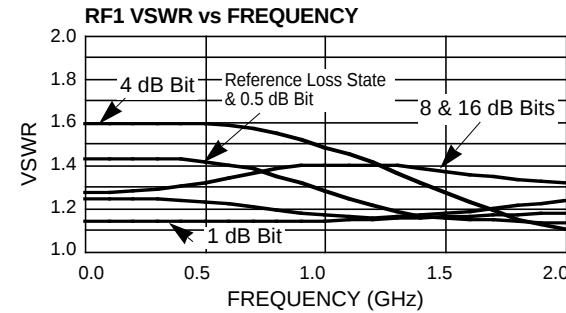
Functional Schematic (Top View)



Truth Table

Control Inputs						Attenuation
C6	C5	C4	C3	C2	C1	
0	0	0	0	0	0	Reference
0	0	0	0	0	1	0.5 dB
0	0	0	0	1	0	1 dB
0	0	0	1	0	0	2 dB
0	0	1	0	0	0	4 dB
0	1	0	0	0	0	8 dB
1	0	0	0	0	0	16 dB
1	1	1	1	1	1	31.5 dB

0 = TTL Low 1 = TTL High



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