



Digital Attenuator, 31.5 dB, 6-Bit, TTL Driver
DC - 2.0 GHz

Features

- Attenuation: 0.5 dB Steps to 31.5 dB¹
- Temperature Stability: ±0.18 dB from -40°C to +85°C Typ.
- Low DC Power Consumption
- Surface Mount Package
- Integral TTL Driver
- High Intercept Point
- Low Cost/High Performance

Description

M/A-COM's AT20-0107 is a GaAs FET 6-bit digital attenuator with a 0.5 dB minimum step size and a 31.5 dB total attenuation. This attenuator and integral TTL driver is in a ceramic 24-lead surface mount package. The AT20-0107 is ideally suited for use where accuracy, fast speed, very low power consumption and low inter-modulation products are required. Typical applications include dynamic range setting in precision receiver circuits and other gain/leveling control circuits. Available with enhanced performance as fully hermetic version. Environmentally screenable as P/N AT-107.

Ordering Information

Part Number	Package
AT20-0107	Bulk Packaging
AT20-0107-TR	Tape and Reel ²
AT20-0107-TB	Unit mounted on a test board

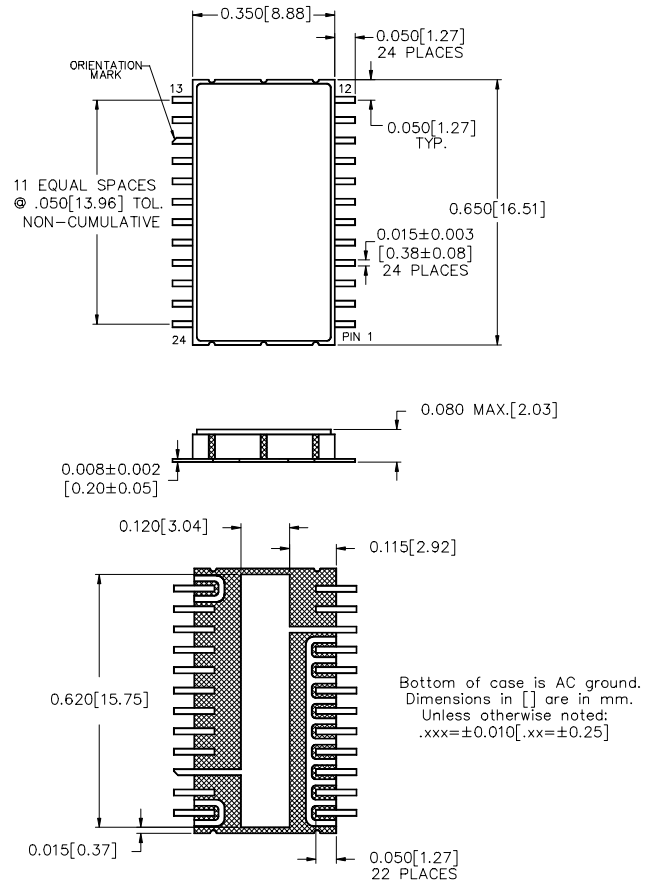
2. Check with the factory for available quantities and reel size.

Electrical Specifications³ T_A = +25°C

Parameter	Test Conditions	Frequency	Units	Min	Typical	Max
Insertion Loss	—	DC - 0.5 GHz	dB	—	2.5	3.0
	—	DC - 1.0 GHz	dB	—	2.9	3.4
	—	DC - 2.0 GHz	dB	—	3.2	3.8
Attenuation Accuracy ^{4,5}	Any Bit or Combination of Bits	DC - 2.0 GHz	dB	—	—	+(.3 +7% of atten.) -(.2 +1% of atten.)
VSWR	Full Range	DC - 2.0 GHz	Ratio	—	—	1.8:1
Trise, Tfall	10% to 90%		nS	—	50	—
Ton, Toff	50% Control to 90%/10% RF		nS	—	150	—

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

CR-13



Specifications subject to change without notice.

V 3.00

- **North America:** Tel. (800) 366-2266, Fax (800) 618-8883
- **Asia/Pacific:** Tel. +81-44-844-8296, Fax +81-44-844-8298
- **Europe:** Tel. +44 (1344) 869 595, Fax +44 (1344) 300 020

Visit www.macom.com for additional data sheets and product information.



Electrical Specifications $T_A = +25^\circ\text{C}$

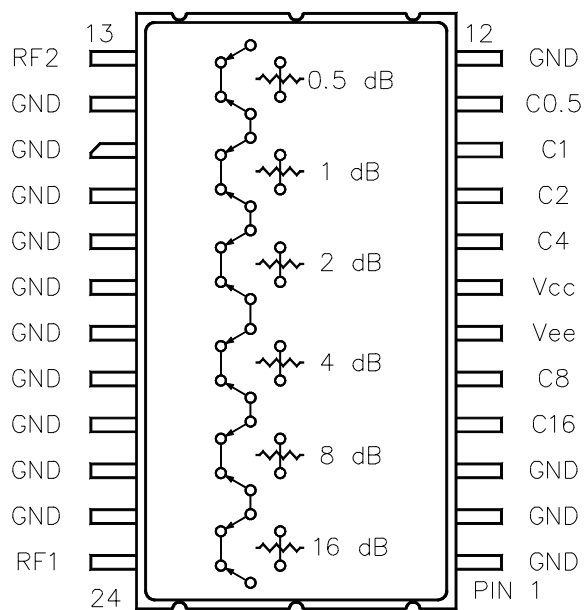
Parameter	Test Conditions	Frequency	Units	Min	Typical	Max
1 dB Compression ⁶	Input Power	0.05 GHz	dBm	—	+75	—
	Input Power	0.5 - 2.0 GHz	dBm	—	+79	—
Input IP ₃ ⁶	Two-tone inputs up to +5 dBm	50 MHz	dB	—	+35	—
		0.5-2.0 GHz	dB	—	+48	—
Input IP ₂ ⁶	Two-tone inputs up to +5 dBm	50 MHz	dB	—	+75	—
		0.5-2.0 GHz	dB	—	+79	—
V _{cc}	—	—	V	4.5	5.0	5.5
-V _{ee}	—	—	V	-8.0	—	-5.0
I _{cc}	V _{cc} = 4.5 to 5.5 V		mA	—	—	6.0
-I _{ee}	-V _{ee} = -5.0 to -8.0 V		mA	—	—	1.0

Absolute Maximum Ratings⁷

Parameter	Absolute Maximum
Max. Input Power	
0.05 GHz	+27 dBm
0.5 - 2.0 GHz	+34 dBm
+V _{cc}	+5.5V
-V _{ee}	-8.5V
Control Voltage	-0.5V to V _{cc} +0.5V
Operating Temperature	-40°C to +125°C
Storage Temperature	-65°C to +150°C

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

Functional Schematic (Top View)



Truth Table

C16	C8	C4	C2	C1	C0.5	Attenuation
0	0	0	0	0	0	Loss, Reference
0	0	0	0	0	1	0.5 dB
0	0	0	0	1	0	1.0 dB
0	0	0	1	0	0	2.0 dB
0	0	1	0	0	0	4.0 dB
0	1	0	0	0	0	8.0 dB
1	0	0	0	0	0	16.0 dB
1	1	1	1	1	1	31.5 dB

0 = TTL Low; 1 = TTL High

Specifications subject to change without notice.

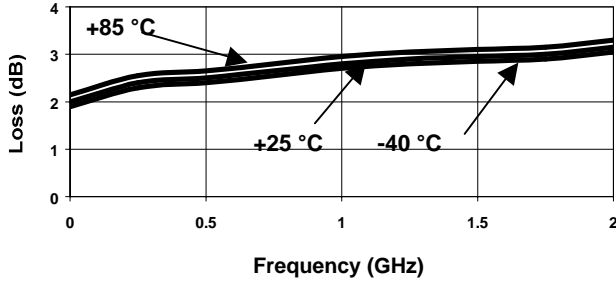
V 3.00

- **North America:** Tel. (800) 366-2266, Fax (800) 618-8883
- **Asia/Pacific:** Tel. +81-44-844-8296, Fax +81-44-844-8298
- **Europe:** Tel. +44 (1344) 869 595, Fax +44 (1344) 300 020

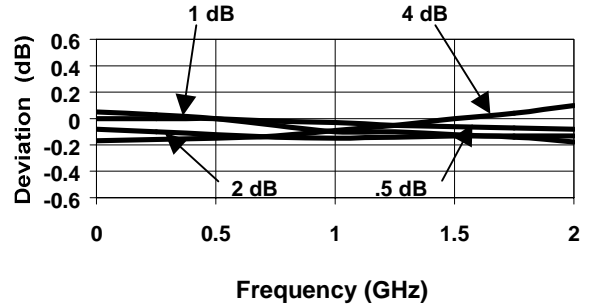
Visit www.macom.com for additional data sheets and product information.

Typical Performance

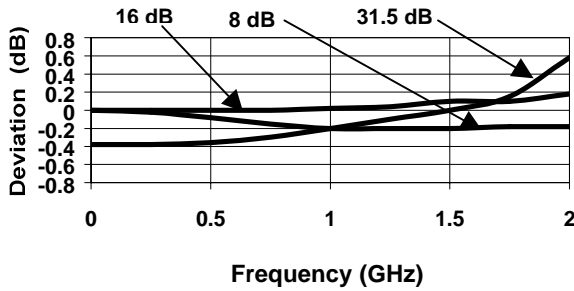
Insertion Loss vs Frequency



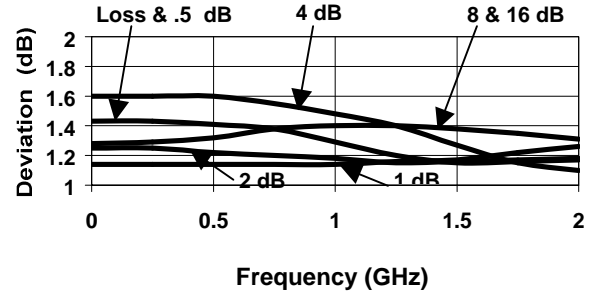
Attenuation Accuracy vs. Frequency



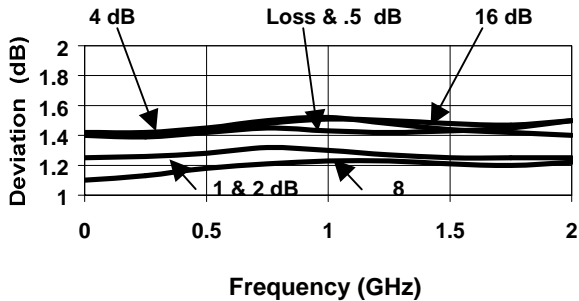
Attenuation Accuracy vs. Frequency



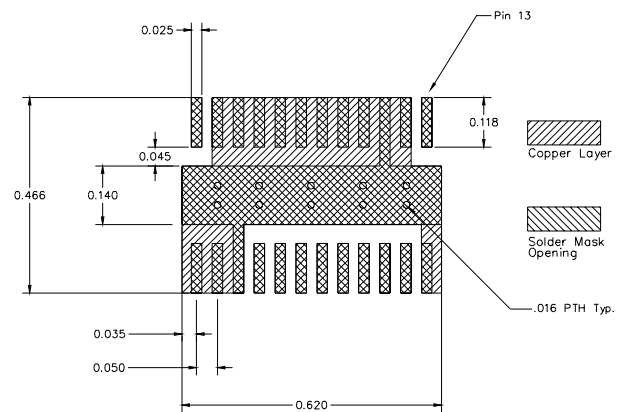
RF1 VSWR vs. Frequency



RF2 VSWR vs. Frequency



PCB Layout



Typical Metal/Solder Mask Layout for CR-13 Package.

Specifications subject to change without notice.

- North America: Tel. (800) 366-2266, Fax (800) 618-8883
- Asia/Pacific: Tel. +81-44-844-8296, Fax +81-44-844-8298
- Europe: Tel. +44 (1344) 869 595, Fax +44 (1344) 300 020

Visit www.macom.com for additional data sheets and product information.

V 3.00