



Digital Attenuator, 31.5 dB, 6-Bit, TTL Driver DC - 4.0 GHz

Features

- Attenuation: 0.5 dB Steps to 31.5 dB
- Single Positive Supply
- Contains internal DC to DC converter
- Low DC Power Consumption
- Plastic MLP SMT Package
- Integral TTL Driver
- 50 ohm Impedance

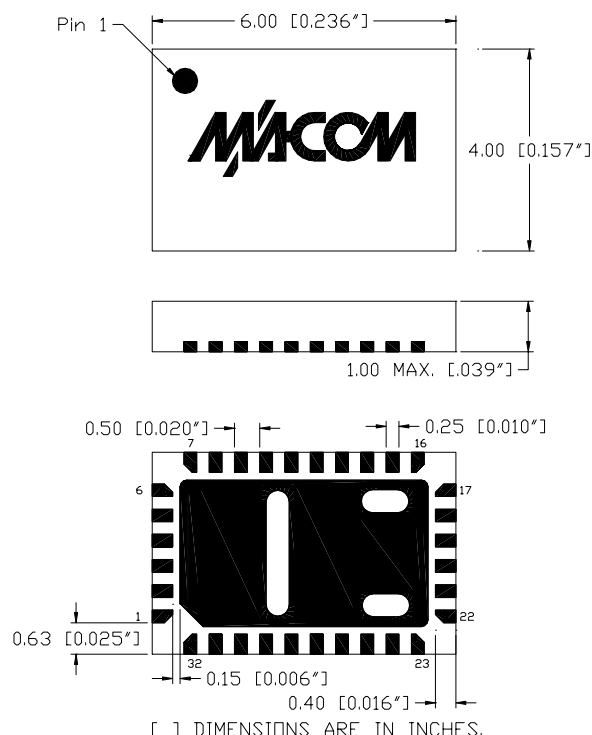
Description

M/A-COM's AT90-1107 is a GaAs FET 6-bit digital attenuator with integral TTL driver. Step size is 0.5 dB providing a 31.5 dB total attenuation range. This device is in an MLP plastic surface mount package. The AT90-1107 is ideally suited for use where accuracy, fast speed, very low power consumption and low costs are required.

Ordering Information

Part Number	Package
AT90-1107	Bulk Packaging
AT90-1107TR	Tape and Reel
AT90-1107-TB	Units Mounted on Test Board

MLP-1



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

Parameter	Test Conditions	Frequency	Units	Min	Typical	Max
Insertion Loss	—	DC - 4.0 GHz	dB	—	4.5	5.1
Attenuation Accuracy	Individual Bits 0.5-1-2-4-8-16 dB	DC - 4.0 GHz	dB	—	—	$\pm(.3 + 7\% \text{ of atten setting})$
	Any Combination of Bits 1 to 31.5 dB	DC - 4.0 GHz	dB	—	—	$\pm(.5 + 8\% \text{ of atten setting})$
VSWR	Full Range	DC - 4.0 GHz	Ratio	—	2.0:1	2.2:1
Switching Speed	50% Cntl to 90%/10% RF	—	nS	—	75	150
	10% to 90% or 90% to 10%	—	nS	—	20	50
1 dB Compression	—	50 MHz	dBm	—	+21	—
	—	0.5 - 4.0 GHz	dBm	—	+29	—
Input IP_3	Two-tone inputs up to +5 dBm	50 MHz	dB	—	+35	—
		0.5-4.0 GHz	dB	—	+48	—
+Vcc	—	—	V	4.75	5.0	5.25
Logic "0"	Sink Current is 20 μA max.	—	V	0.0	—	0.8
Logic "1"	Source Current is 20 μA max.	—	V	2.0	—	5.0
Icc	Vcc min to max, Logic "0" or "1"	—	mA	—	6	10

Specifications subject to change without notice.

V 3.00

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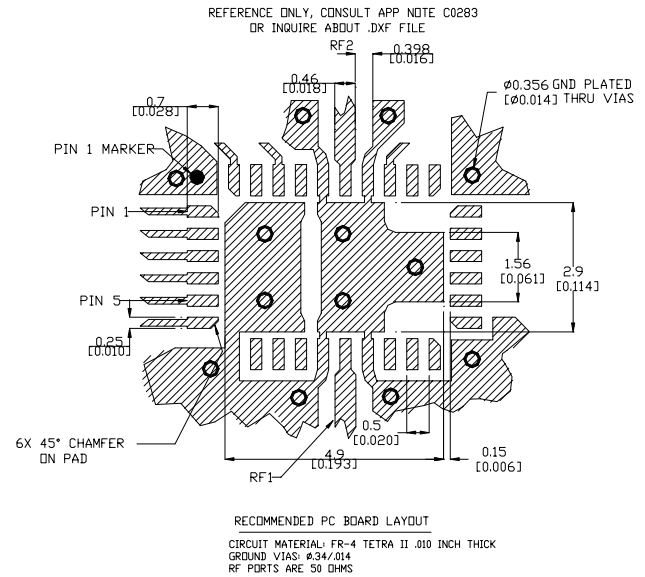


Pin Configuration

Pin #	Function	Pin #	Function
1	C8	17	NC
2	C4	18	NC
3	C2	19	+Vcc ²
4	C1	20	NC
5	C0.5	21	Cp ⁴
6	C16	22	NC
7	GND	23	Cp ⁴
8	NC	24	NC
9	NC	25	-Vee ³
10	NC ¹	26	GND
11	GND	27	RF2
12	RF1	28	GND
13	GND	29	NC ¹
14	NC	30	-Vee ^{3,5}
15	NC	31	NC
16	NC	32	+Vcc ^{2,6}

1. Pins 10 & 29 Must be isolated
2. Pin 19 must be connected to Pin 32
3. Pin 25 must be connected to Pin 30
4. .01μF cap must be connected between Pins 21 and 23
5. -Vee is produced internally and requires a .1μF cap to GND
6. +Vcc requires a .1μF cap to GND

Recommended PCB Layout



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

Absolute Maximum Ratings ⁷

Parameter	Absolute Maximum
Max. Input Power	
0.05 GHz	+27 dBm
0.5 - 4.0 GHz	+34 dBm
+Vcc	+5.5V
Logic Voltages	-0.5 to +Vcc + 0.5V
Operating Temperature	-40°C to +85°C
Storage Temperature	-65°C to +125°C

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

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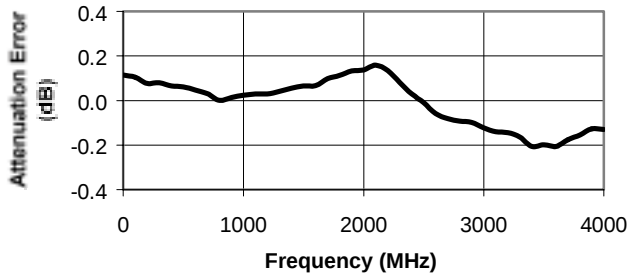
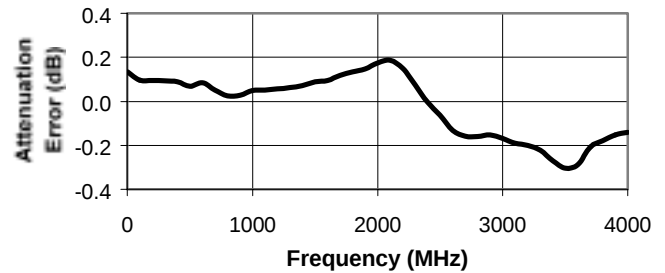
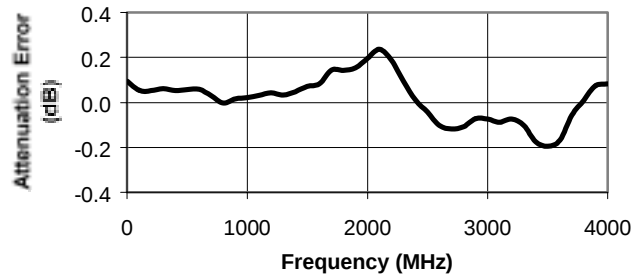
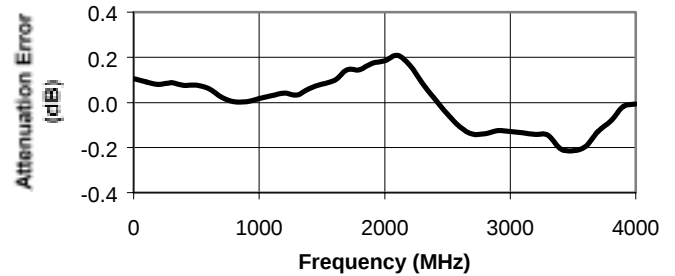
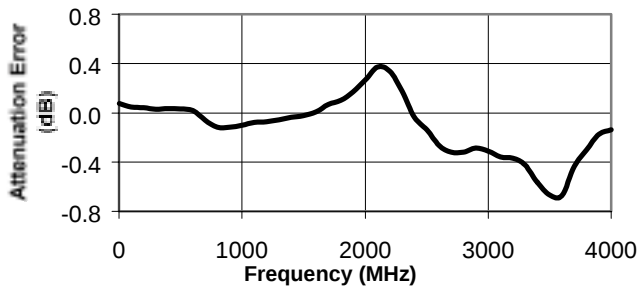
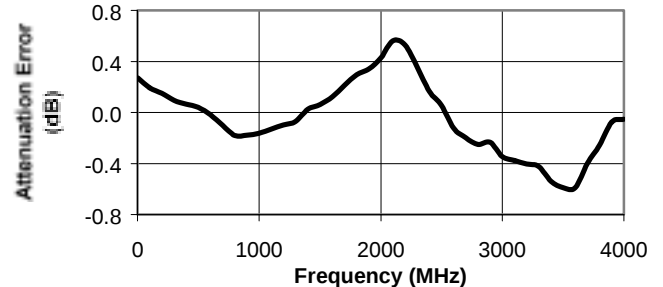
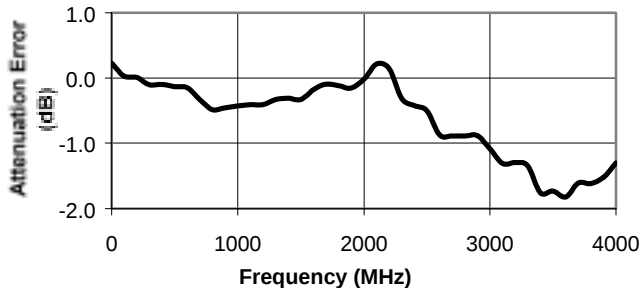
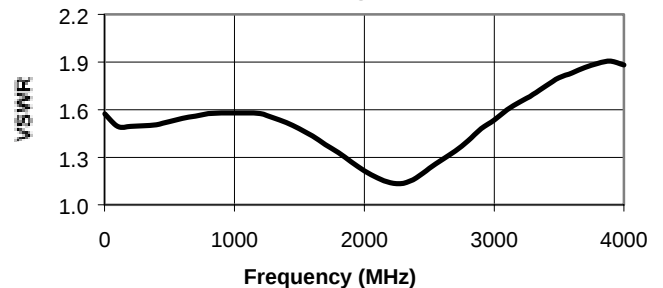
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Typical Performance



V 3.00

Typical Performance

Attenuation Error
0.5 dB BitAttenuation Error
1 dB BitAttenuation Error
2 dB BitAttenuation Error
4 dB BitAttenuation Error
8 dB BitAttenuation Error
16 dB BitAttenuation Error
Max AttenuationVSWR
Rfin @ Loss

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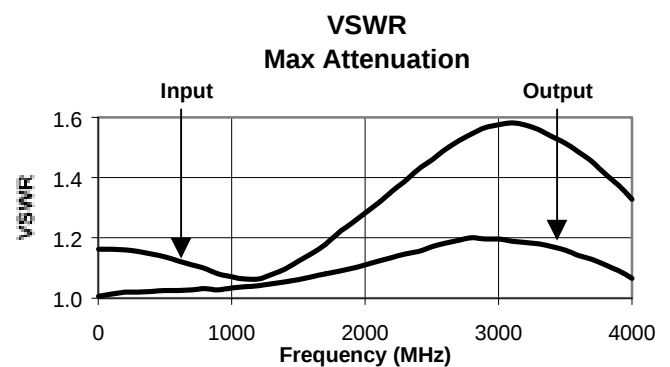
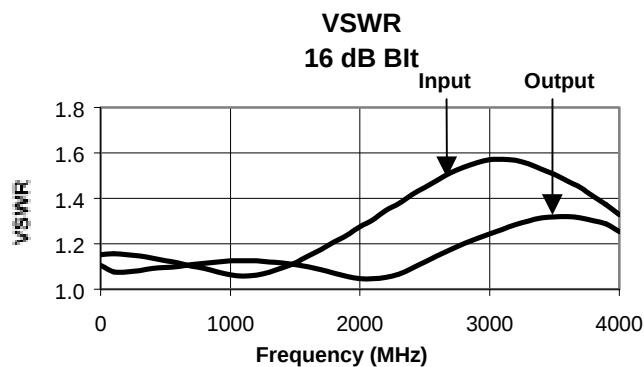
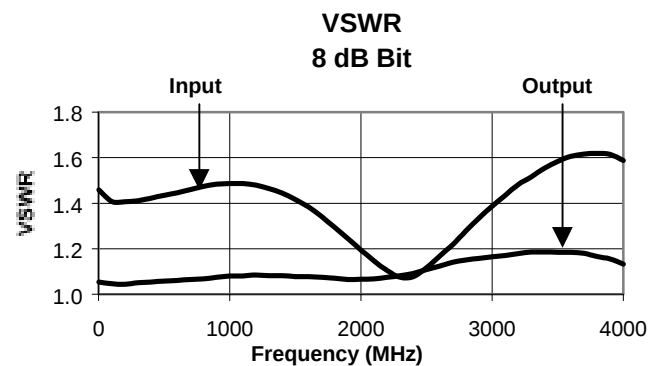
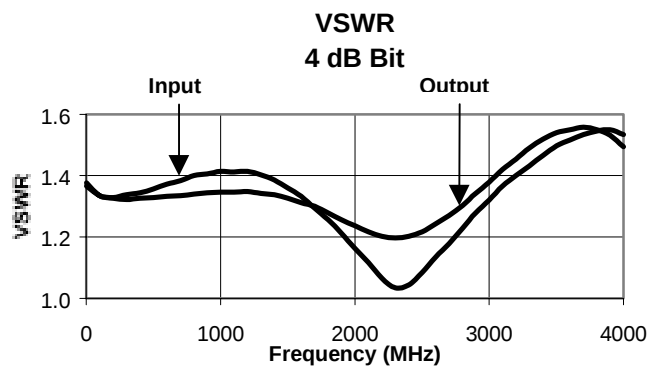
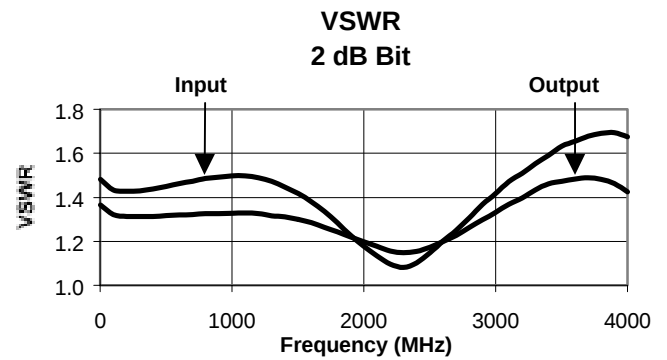
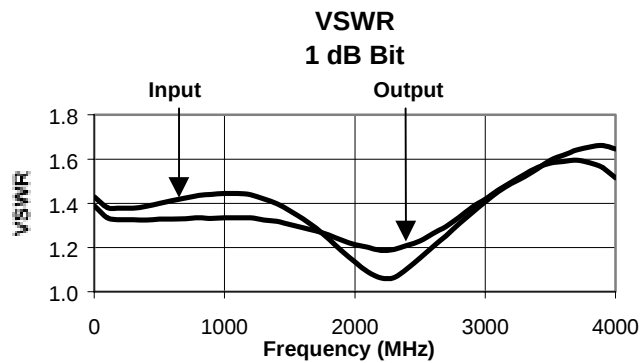
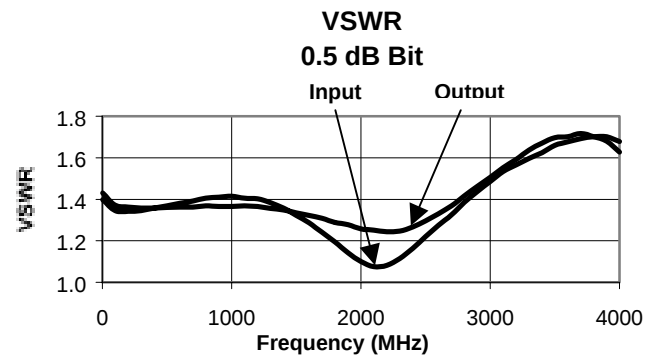
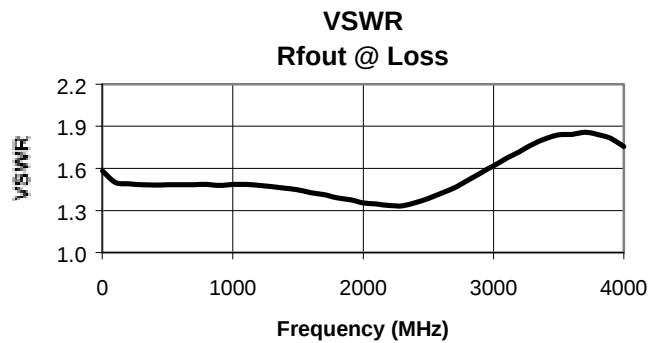
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