



Digital Attenuator, 31.0 dB, 5-Bit, TTL Driver, DC-6.0 GHz

V 5.00

AT90-0001

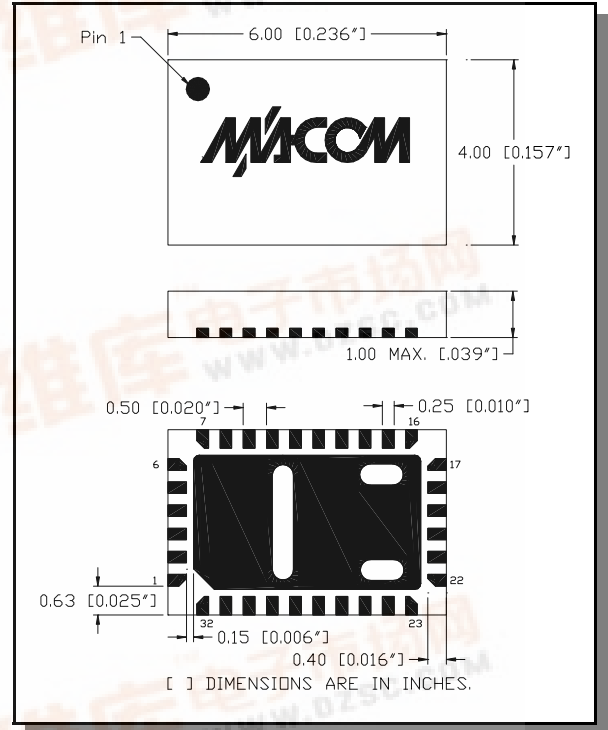
Features

- Attenuation: 1.0 dB Steps to 31 dB
- High Accuracy to 6 GHz
- Small Footprint, JEDEC Package
- Integral TTL driver
- 50 ohm impedance
- Test boards are available
- Tape and Reel Packaging Available

Description

M/A-COM's AT90-0001 is a GaAs FET 5-bit digital attenuator with an integral TTL driver. Step size is 1.0 dB providing 31 dB total attenuation range. This device is in a 32 lead FQFP-N surface mount package. Due to superior grounding techniques this digital attenuator offers superior performance to 6 GHz. The AT90-0001 is ideally suited for use where accuracy, fast speed, very low power consumption and low costs are required.

CSP-1



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

Parameter	Test Conditions	Frequency	Units	Min	Typical	Max
Insertion Loss	—	DC - 2.0 GHz	dB	—	2.5	3.1
		DC - 4.0 GHz	dB	—	3.3	3.8
		DC - 6.0 GHz	dB	—	5.0	5.8
Attenuation Accuracy	1 to 24 dB Bits	DC - 6.0 GHz	dB	—	—	$\pm(0.3 +4\% \text{ of atten.})$
	25 to 31 dB Bits	DC - 6.0 GHz	dB	—	—	$\pm(0.3 +5\% \text{ of atten.})$
VSWR	Full Range	DC - 2.0 GHz	Ratio	—	1.4:1	1.7:1
		DC - 6.0 GHz	Ratio	—	1.7:1	2.4:1
1 dB Compression	—	50 MHz	dBm	—	+22	—
		0.5 - 6.0 GHz	dBm	—	+28	—
Input IP2	Two tone inputs to +5 dBm	50 MHz	dBm	—	+43	—
		0.5 - 6.0 GHz	dBm	—	+60	—
Input IP3	Two-tone inputs up to +5 dBm	50 MHz	dB	—	+37	—
		0.5-6.0 GHz	dB	—	+48	—
Vcc	—	—	V	4.75	5.0	5.25
-Vee	—	—	V	-8.0	-5.0	-4.75
Switching Speed	50% Cntl to 90%/10% RF 10% to 90% or 90% to 10%	—	nS	—	25	—
		—	nS	—	15	—
Logic "0" Logic "1"	Sink Current is 20 μA Max. Source Current is 20 μA Max.	—	V	0.0	-	0.8
		—	V	2.0	-	5.0
Icc	Vcc min to max, Logic "0" or "1"	—	mA	—	0.2	6
-Iee	Vee min to max, Logic "0" or "1"	—	mA	—	-0.2	-1



Absolute Maximum Ratings ¹

Parameter	Absolute Maximum
Max. Input Power 0.05 GHz 0.5 - 6.0 GHz	+27 dBm +34 dBm
+Vcc	+5.5V
-Vee	-8.5V
Logic Voltages ²	-0.5 to Vcc + 0.5V
Operating Temperature	-40°C to +85°C
Storage Temperature	-65°C to +125°C

1. Operation of this device above any one of these parameters may cause permanent damage.
2. Standard CMOS TTL interface, latch-up will occur if logic signal is applied prior to power supply.

Truth Table

C16	C8	C4	C2	C1	Attenuation
0	0	0	0	0	Loss, Reference
0	0	0	0	1	1 dB
0	0	0	1	0	2 dB
0	0	1	0	0	4 dB
0	1	0	0	0	8 dB
1	0	0	0	0	16 dB
1	1	1	1	1	31 dB

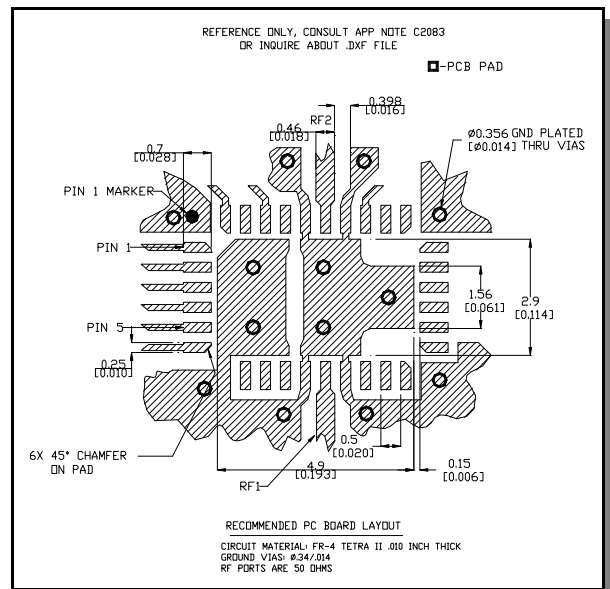
0 = TTL Low; 1 = TTL High

Pin Configuration

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

NC = No Connection

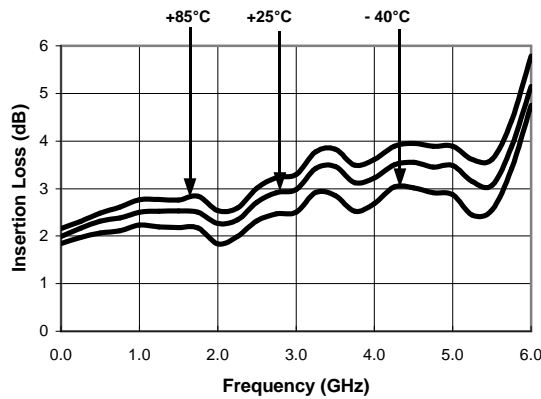
Recommended PCB Layout ³



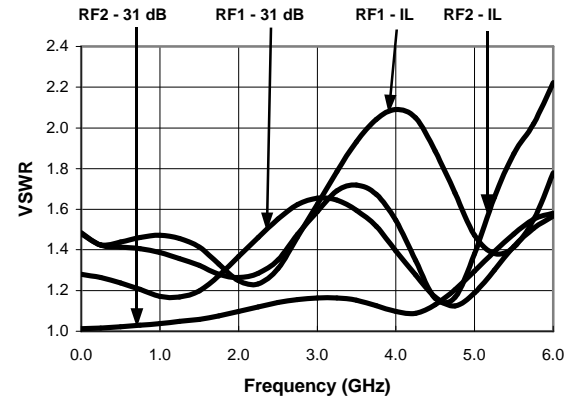
3. Application Note C2083 is available on line at www.macom.com

Typical Performance Curves

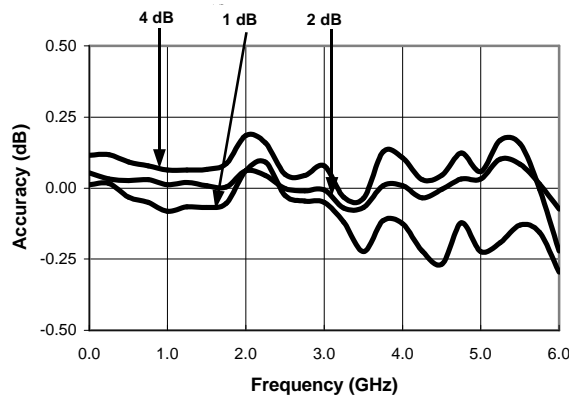
Insertion Loss vs. Frequency



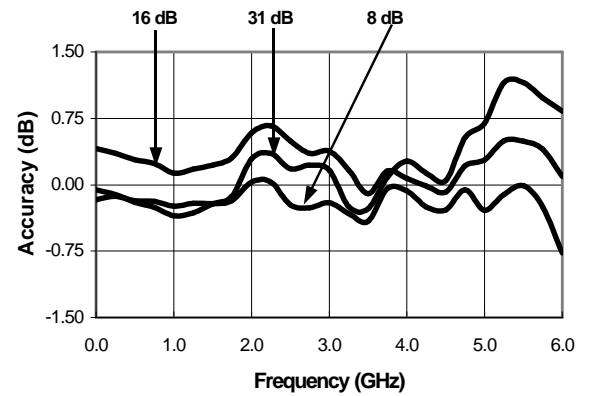
VSWR vs. Frequency



Accuracy (dB) vs. Frequency



Accuracy (dB) vs. Frequency



Ordering Information

Part Number	Package
AT90-0001	Bulk Packaging
AT90-0001TR	Tape and Reel (1K Reel)
AT90-0001-TB	Units Mounted on Test Board

Specifications subject to change without notice.

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