

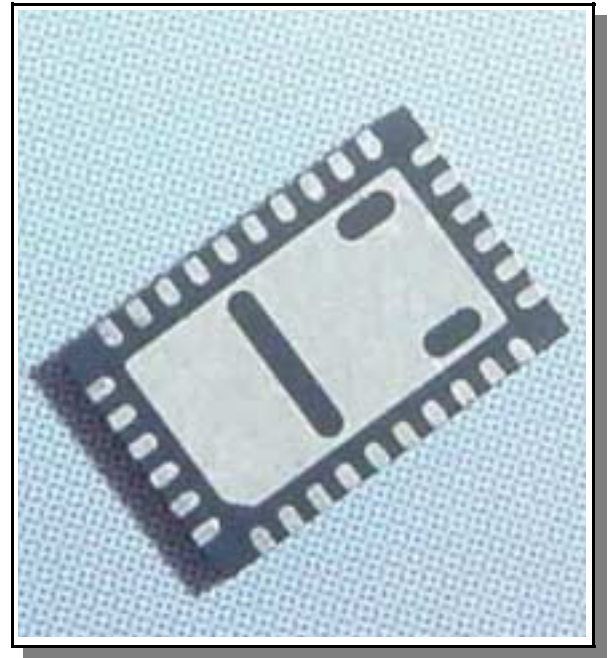
## Features

- Attenuation: 0.5 dB Steps to 15.5 dB
- Low DC Power Consumption
- Small Footprint, JEDEC Package
- Integral TTL Driver
- 50 ohm Impedance
- Test Boards are Available
- Tape and Reel Packaging Available

## Description

M/A-COM's AT90-0283 is a GaAs FET 5-bit digital attenuator with integral TTL driver. Step size is 0.5 dB providing a 15.5 dB total attenuation range. This device is in an FQFP-N plastic surface mount package. The AT90-0283 is ideally suited for use where accuracy, fast speed, very low power consumption and low costs are required.

## CSP-1



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

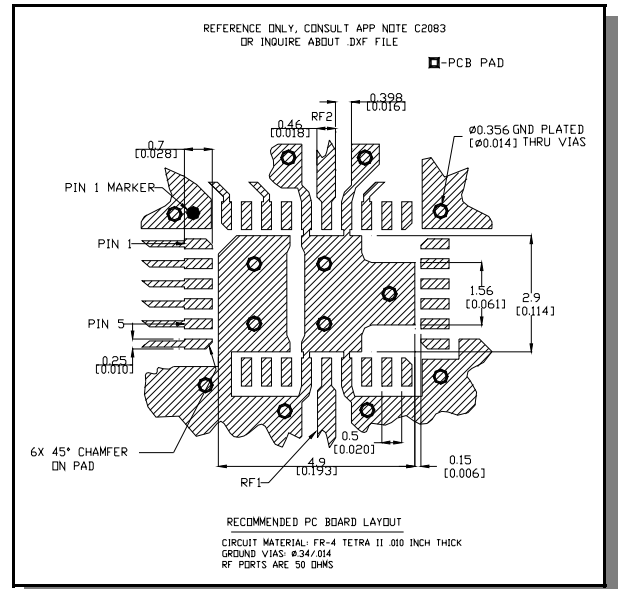
Parameter	Test Conditions	Frequency	Units	Min	Typical	Max
Insertion Loss	—	DC - 3.5 GHz	dB	—	2.8	3.2
Attenuation Accuracy	Individual Bits 0.5-1-4-8 dB	DC - 3.5 GHz	dB	—	—	$\pm(.3 +5\%$ of atten setting)
	Individual Bit 2 dB	DC - 3.5 GHz	dB	—	—	$\pm(.4 +10\%$ of atten setting)
	Any Combination of Bits 1 to 15.5 dB	DC - 3.5 GHz	dB	—	—	$\pm(.5 +7\%$ of atten setting)
VSWR	Full Range	DC - 3.5 GHz	Ratio	—	1.6:1	1.8:1
Switching Speed	50% Cntl to 90%/10% RF 10% to 90% or 90% to 10%	—	nS	—	75	150
		—	nS	—	20	50
1 dB Compression	— —	50 MHz	dBm	—	+21	—
		0.5 - 3.5 GHz	dBm	—	+29	—
Input $IP_3$	Two-tone inputs up to +5 dBm	50 MHz	dB	—	+35	—
		0.5-3.5 GHz	dB	—	+48	—
+Vcc	—	—	V	4.75	5.0	5.25
-Vee	—	—	V	-8.0	-5.0	-4.75
Logic "0"	Sink Current is 20 $\mu\text{A}$ max.	—	V	0.0	—	0.8
Logic "1"	Source Current is 20 $\mu\text{A}$ max.	—	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
Thermal Resistance $\theta_{jc}$	—	—	$^\circ\text{C/W}$	—	15	—

Pin Configuration

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

1. Pins 10 & 29 must be isolated

Recommended PCB Layout <sup>2</sup>



2. Application Note C2083 is available on line at [www.macom.com](http://www.macom.com)

Truth Table

C8	C4	C2	C1	C0.5	Attenuation
0	0	0	0	0	Loss, Reference
0	0	0	0	1	0.5 dB
0	0	0	1	0	1.0 dB
0	0	1	0	0	2.0 dB
0	1	0	0	0	4.0 dB
1	0	0	0	0	8.0 dB
1	1	1	1	1	15.5 dB

0 = TTL Low; 1 = TTL High

Absolute Maximum Ratings <sup>3</sup>

Parameter	Absolute Maximum
Max. Input Power 0.05 GHz 0.5 - 3.5 GHz	+27 dBm +34 dBm
+Vcc	+5.5V
-Vee	-8.5V
Logic Voltages <sup>4</sup>	-0.5 to +Vcc + 0.5V
Operating Temperature	-40°C to +85°C
Storage Temperature	-65°C to +125°C

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

M/A-COM Inc. and its affiliates reserve the right to make changes to the product(s) or information contained herein without notice. M/A-COM makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does M/A-COM assume any liability whatsoever arising out of the use or application of any product(s) or information.

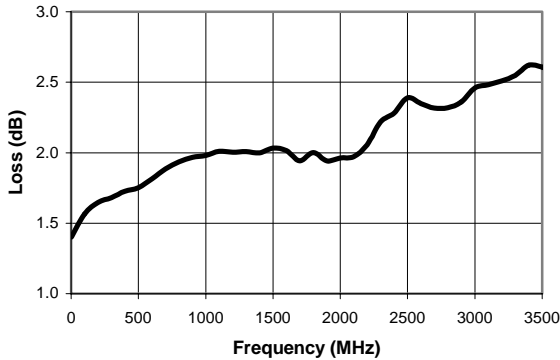
Visit [www.macom.com](http://www.macom.com) for additional data sheets and product information.

■ 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

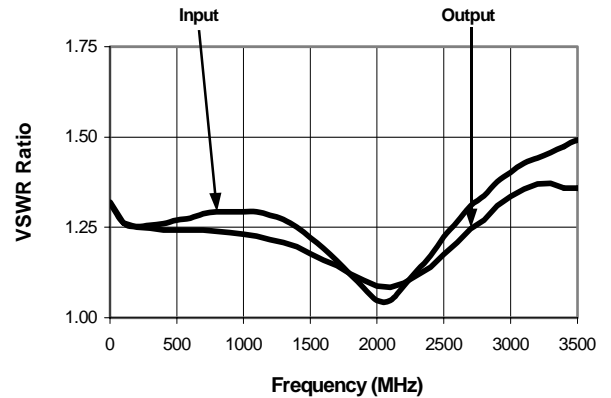


### Typical Performance Curves

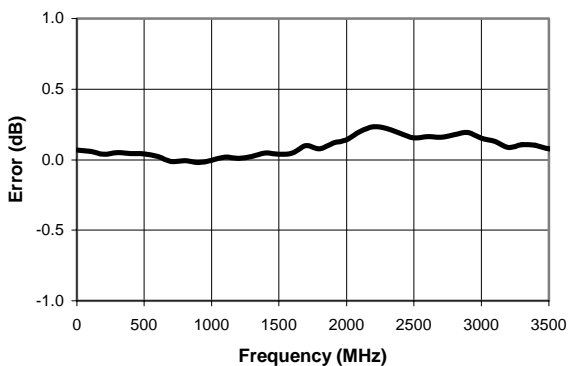
**Insertion Loss**



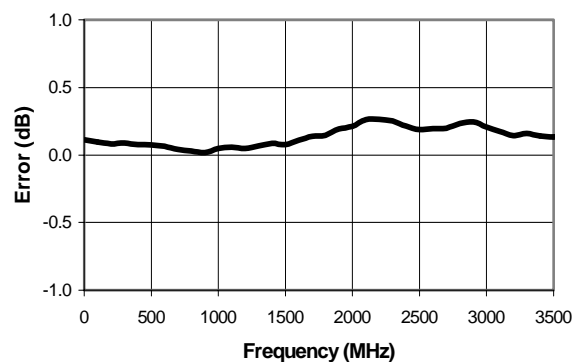
**VSWR @ Insertion Loss**



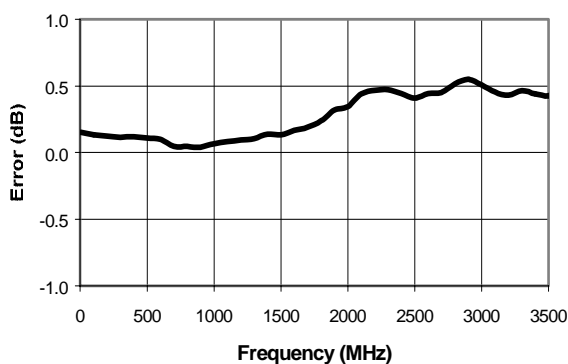
**Attenuation Error, 0.5 dB Bit**



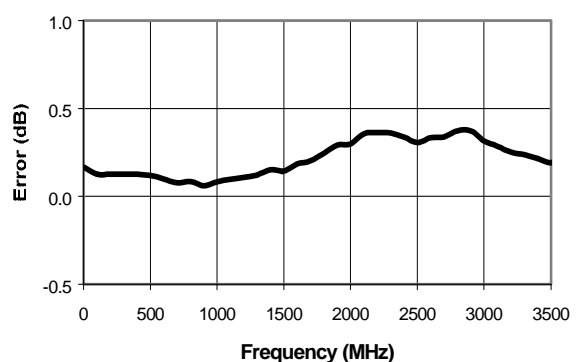
**Attenuation Error, 1 dB Bit**



**Attenuation Error, 2 dB Bit**



**Attenuation Error, 4 dB Bit**



M/A-COM Inc. and its affiliates reserve the right to make changes to the product(s) or information contained herein without notice. M/A-COM makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does M/A-COM assume any liability whatsoever arising out of the use or application of any product(s) or information.

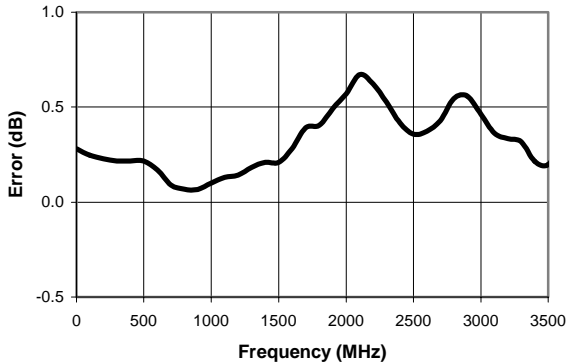
Visit [www.macom.com](http://www.macom.com) for additional data sheets and product information.

- 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

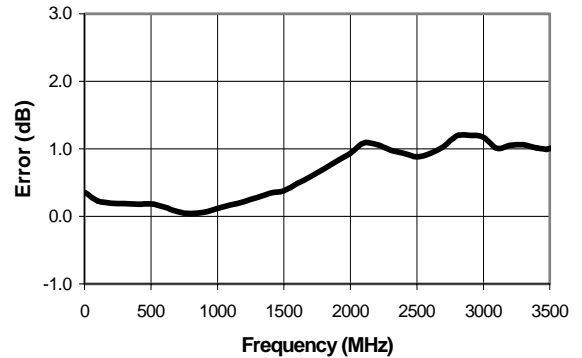


Typical Performance Curves

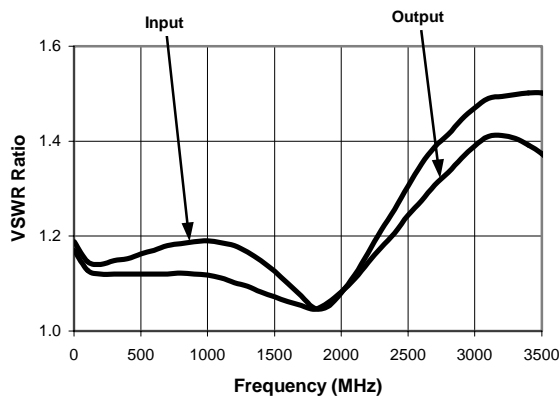
Attenuation Error, 8 dB Bit



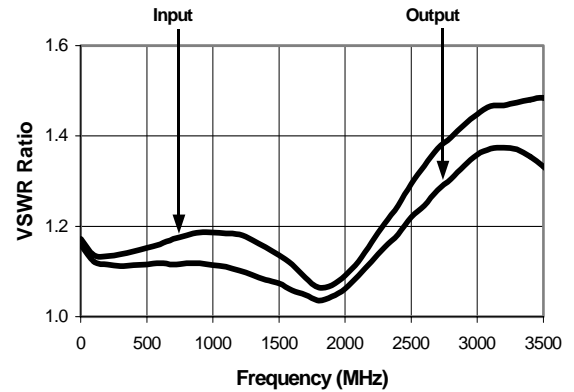
Attenuation Error, Max. Attenuation



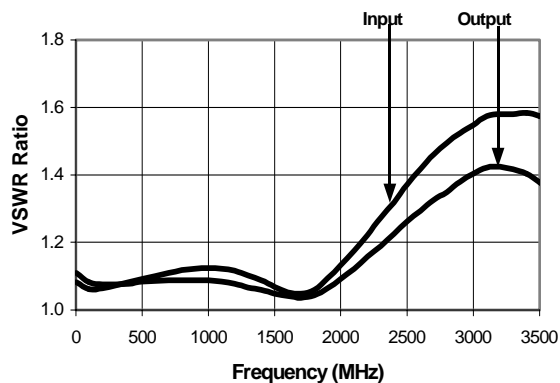
VSWR, 0.5 dB Bit



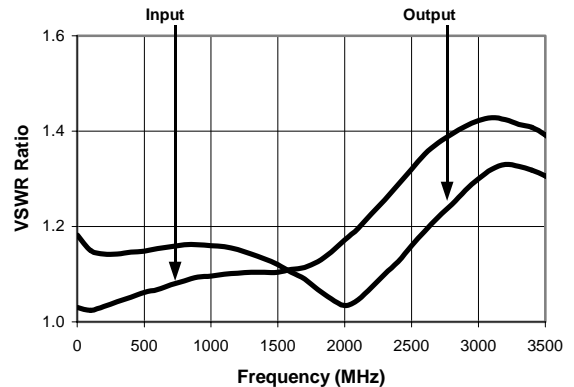
VSWR, 1 dB Bit



VSWR, 2 dB Bit



VSWR, 4 dB Bit



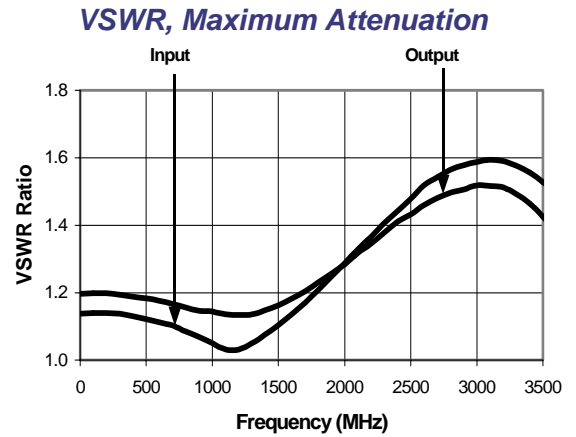
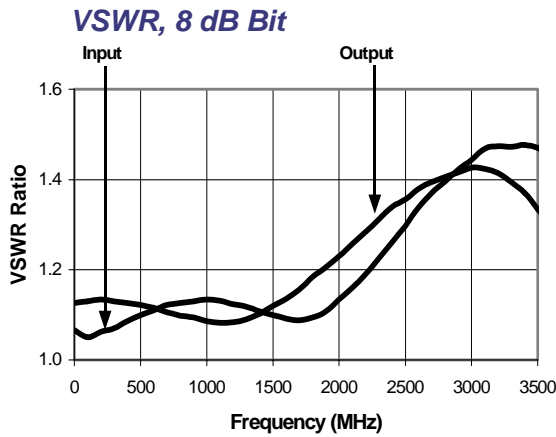
M/A-COM Inc. and its affiliates reserve the right to make changes to the product(s) or information contained herein without notice. M/A-COM makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does M/A-COM assume any liability whatsoever arising out of the use or application of any product(s) or information.

Visit [www.macom.com](http://www.macom.com) for additional data sheets and product information.

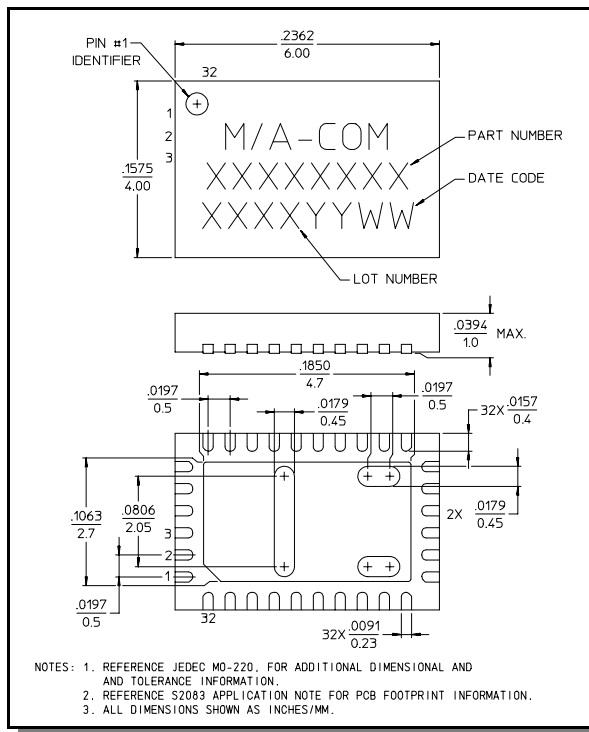
- North America: Tel. (800) 366-2266
- Asia/Pacific: Tel.+81-44-844-8296, Fax +81-44-844-8298
- Europe: Tel. +44 (1344) 869 595, Fax+44 (1344) 300 020



### Typical Performance Curves



### CSP-1



### Ordering Information

Part Number	Package
AT90-0283	Bulk Packaging
AT90-0283TR	Tape and Reel (1K Reel)
AT90-0283-TB	Units Mounted on Test Board

Note: Reference Application Note M513 for reel size information.

M/A-COM Inc. and its affiliates reserve the right to make changes to the product(s) or information contained herein without notice. M/A-COM makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does M/A-COM assume any liability whatsoever arising out of the use or application of any product(s) or information.

Visit [www.macom.com](http://www.macom.com) for additional data sheets and product information.

- 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

