



# Digital Attenuator, 31 dB, 5-Bit, TTL Driver, DC-4.0 GHz

V 6.00

AT90-0263

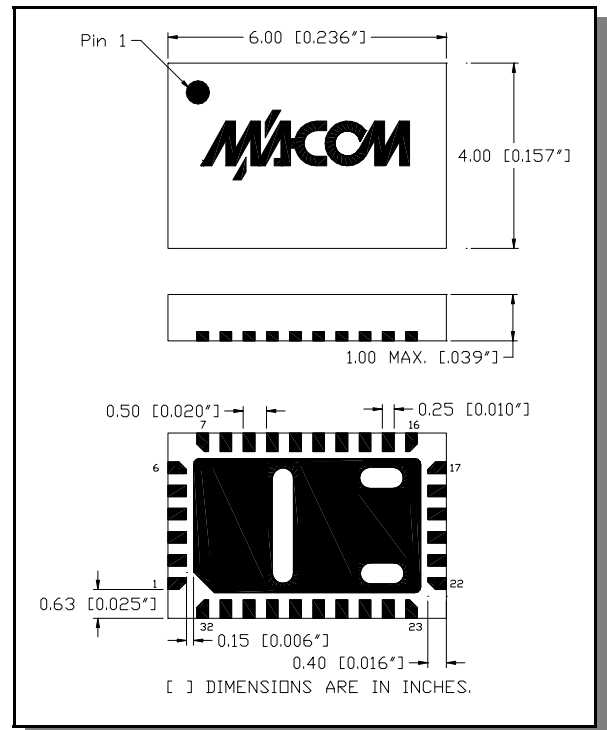
## Features

- Attenuation: 1.0dB Steps to 31dB
- 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 AT90-0263 is a GaAs FET 5-bit digital attenuator with integral TTL driver. Step size is 1.0 dB providing 31dB total attenuation range. This device is in a FQFP-N plastic surface mount package. The AT90-0263 is ideally suited for use where accuracy, fast speed, very low power consumption and low costs are required.

## CSP-1



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

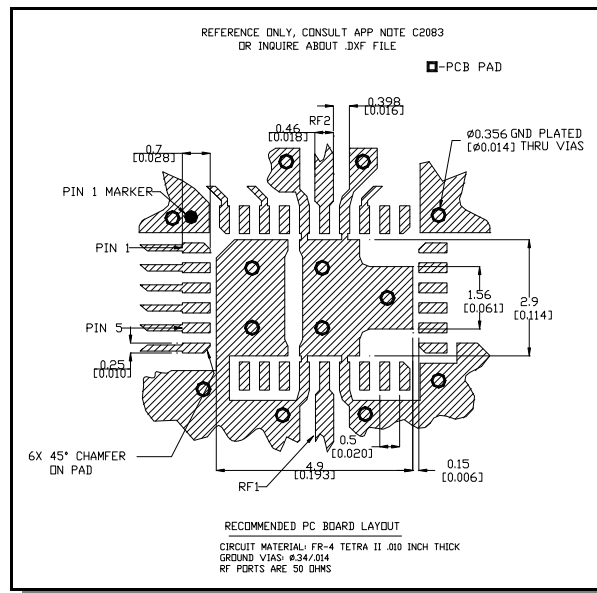
Parameter	Test Conditions	Frequency	Units	Min	Typical	Max
Insertion Loss	—	DC - 4.0 GHz	dB	—	3.6	4.0
Attenuation Accuracy	Individual Bits 1-2-4-8-16 dB Any Combination of Bits 1 to 31 dB	DC - 3.0 GHz	dB	—	—	$\pm(.3 + 5\%$ of atten setting)
		DC - 4.0 GHz	dB	—	—	$\pm(.4 + 6\%$ of atten setting)
		DC - 4.0 GHz	dB	—	—	$\pm(.5 + 7\%$ 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 10% to 90% or 90% to 10%	—	nS	—	75	150
		—	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
-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

### Pin Configuration

Pin #	Function	Pin #	Function
1	GND	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 <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)

### Absolute Maximum Ratings <sup>3</sup>

Parameter	Absolute Maximum
Max. Input Power 0.05 GHz	+27 dBm
0.5 - 4.0 GHz	+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.

### Truth Table

C16	C8	C4	C2	C1	Attenuation
0	0	0	0	0	Loss, Reference
0	0	0	0	1	1.0 dB
0	0	0	1	0	2.0 dB
0	0	1	0	0	4.0 dB
0	1	0	0	0	8.0 dB
1	0	0	0	0	16.0 dB
1	1	1	1	1	31.0 dB

0 = TTL Low; 1 = TTL High

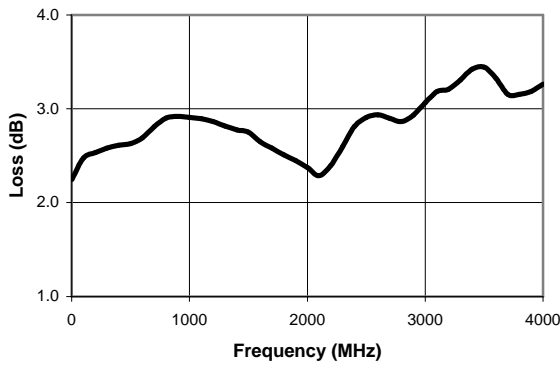
Specifications subject to change without notice.

- 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

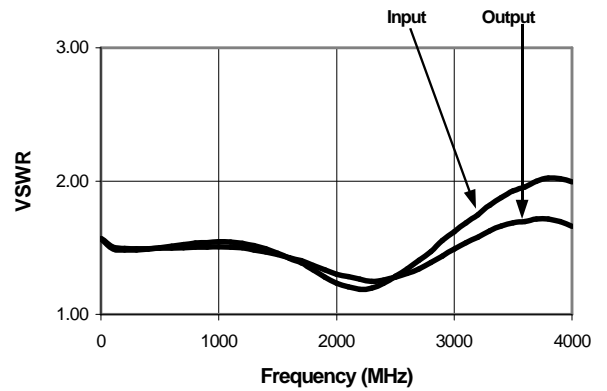
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Typical Performance Curves

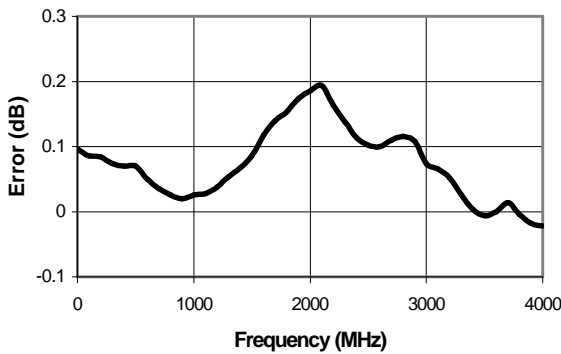
Insertion Loss



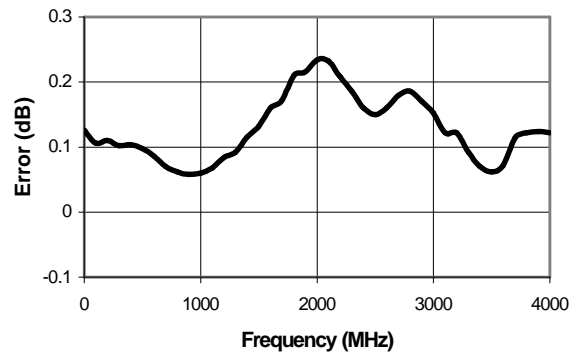
VSWR @ Insertion Loss



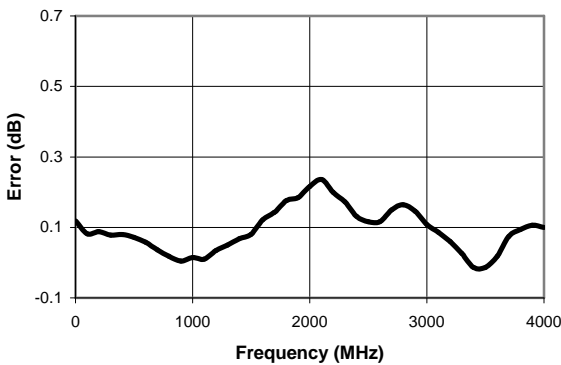
Attenuation Error, 1 dB Bit



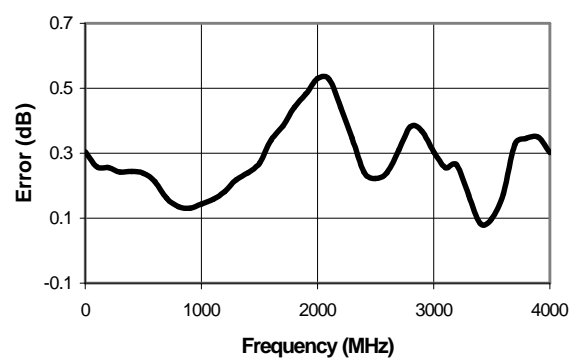
Attenuation Error, 2 dB Bit



Attenuation Error, 4 dB Bit



Attenuation Error, 8 dB Bit



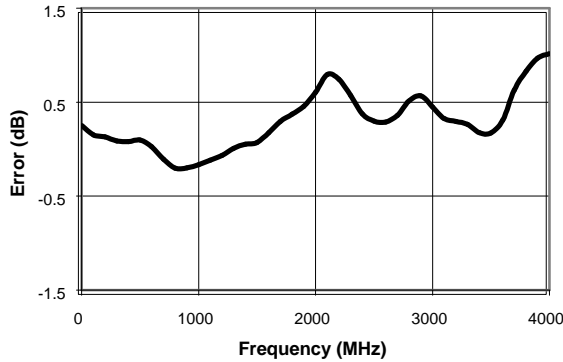
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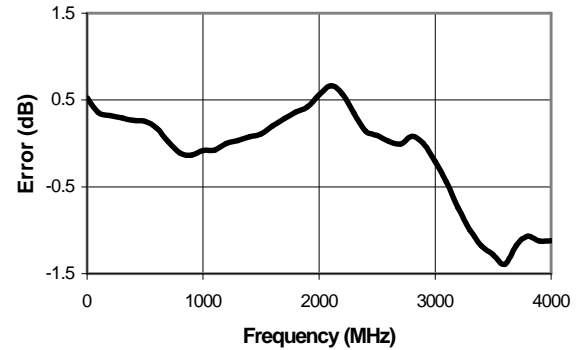
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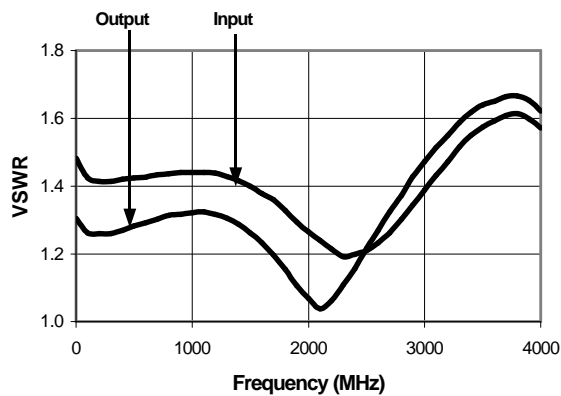
Attenuation Error, 16 dB Bit



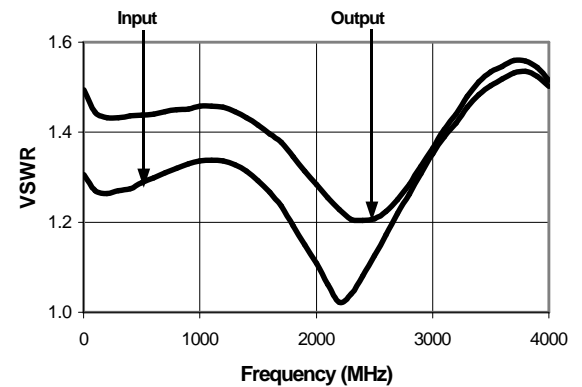
Attenuation Error, Max. Attenuation



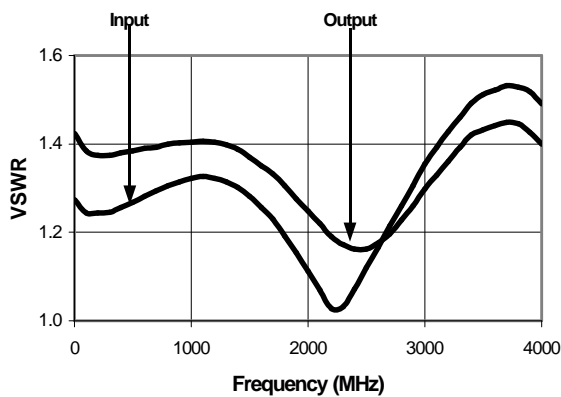
VSWR, 1 dB Bit



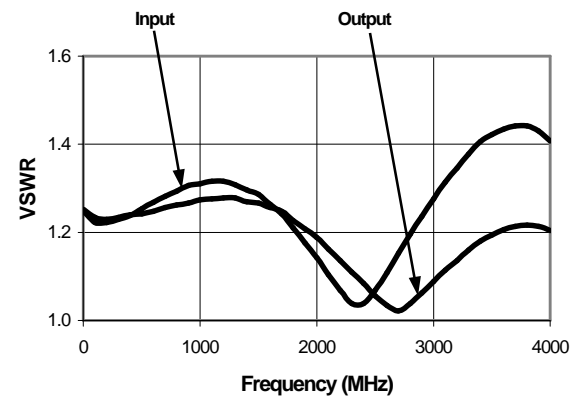
VSWR, 2 dB Bit



VSWR, 4 dB Bit



VSWR, 8 dB Bit

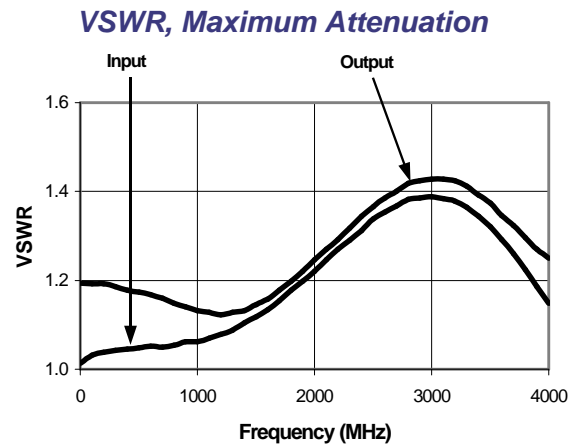
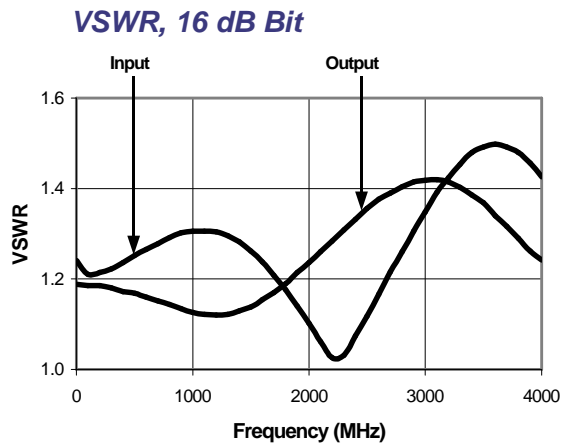


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### Typical Performance Curves



### Ordering Information

Part Number	Package
AT90-0263	Bulk Packaging
AT90-0263TR	Tape and Reel (1K Reel)
AT90-0263-TB	Units Mounted on Test Board

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