



Digital Attenuator, 30 dB, 4-Bit, TTL Driver, DC - 2.5 GHz

V 1.00

AT90-0233

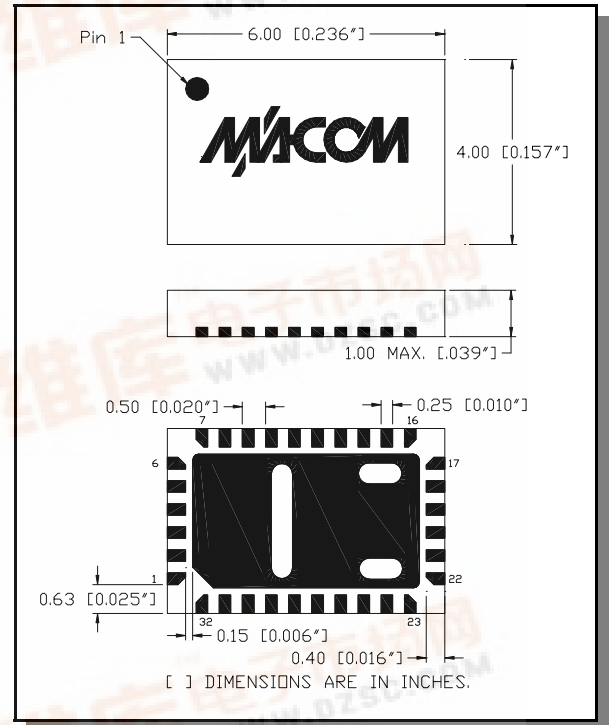
Features

- Attenuation: 2 dB Steps to 30 dB
- Low DC Power Consumption
- Small Footprint, JEDEC Package
- Integral TTL Driver
- 50 Ohm Impedance
- Test Boards Available
- Tape and Reel Packaging Available

Description

M/A-COM's AT90-0233 is a GaAs FET 4-Bit digital attenuator with integral driver. Step size is 2 dB providing a 30 dB attenuation range. This device is in an FQFP-N plastic surface mount package. The AT90-0233 is 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 - 2.5 GHz	dB	—	2.7	3.0
Attenuation Accuracy	Individual Bits or Combination of Bits	DC - 2.5 GHz	dB	—	—	$\pm(.3 + 5\% \text{ of atten setting})$
VSWR	Full Range	DC - 2.5 GHz	Ratio	—	1.5:1	1.8:1
Switching Speed	50% Cntl to 90%/10% RF 10% to 90% or 90% to 10%	— —	nS nS	— —	75 20	150 50
1 dB Compression	— —	50 MHz 0.5 - 2.5 GHz	dBm dBm	— —	+21 +29	— —
Input IP ₃	Two-tone inputs up to +5 dBm	50 MHz 0.5 - 2.5 GHz	dB dB	— —	+35 +48	— —
+Vcc -Vee	— —	— —	V V	4.75 -8.0	5.0 -5.0	5.25 -4.75
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	—	0.2	6
-Iee	-Vee min to max, Logic "0" or "1"	—	mA	—	-0.2	-1

Pin Configuration

Pin No.	Function	Pin No.	Function
1	GND	17	N/C
2	C16	18	N/C
3	C8	19	N/C
4	C4	20	N/C
5	C2	21	N/C
6	GND	22	N/C
7	GND	23	N/C
8	N/C	24	N/C
9	N/C	25	N/C
10	N/C ¹	26	GND
11	GND	27	RF2
12	RF1	28	GND
13	GND	29	N/C ¹
14	N/C	30	V _{EE}
15	N/C	31	N/C
16	N/C	32	V _{CC}

1. Pins 10 and 29 must be isolated.

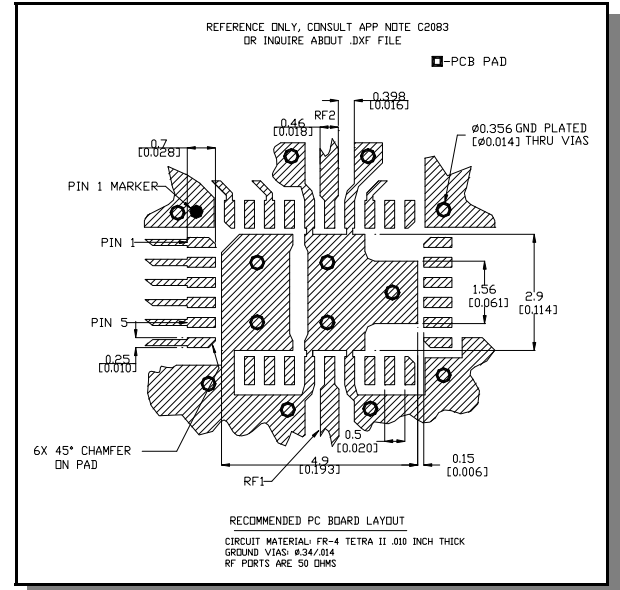
Truth Table

C16	C6	C4	C2	Attenuation
0	0	0	0	Loss, Reference
0	0	0	1	2.0 dB
0	0	1	0	4.0 dB
0	1	0	0	8.0 dB
1	0	0	0	16.0 dB
1	1	1	1	30.0 dB

0 = TTL Low; 1 = TTL High

Ordering Information

Part Number	Package
AT90-0233	Bulk Packaging
AT90-0233TR	Tape and Reel (1K Reel)
AT90-0233-TB	Units Mounted on Test Board

Recommended PCB Layout²

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

Absolute Maximum Ratings³

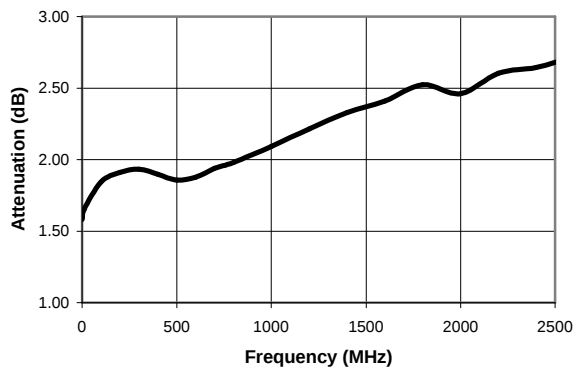
Parameter	Absolute Maximum
Max. Input Power	
0.05 GHz	+27 dBm
0.5 - 2.5 GHz	+34 dBm
+V _{CC}	+5.5V
-V _{EE}	-8.5V
Logic Voltages ⁴	-0.5 to +V _{CC} + 0.5V
Operating Temperature	-40°C to +85°C
Storage Temperature	-65°C to +125°C

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

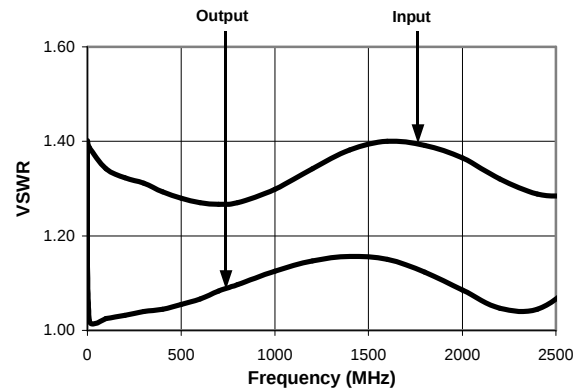
4. Standard CMOS TTL interface, latch-up will occur if logic signal is applied prior to power supply.

Typical Performance Curves

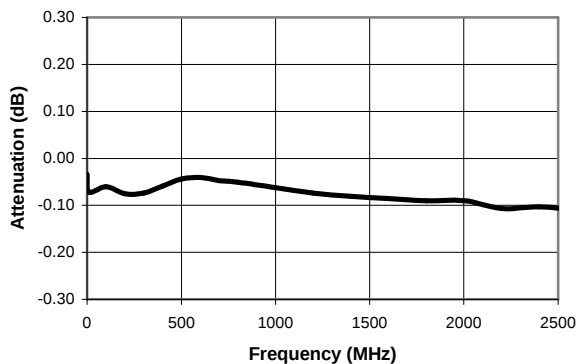
Insertion Loss



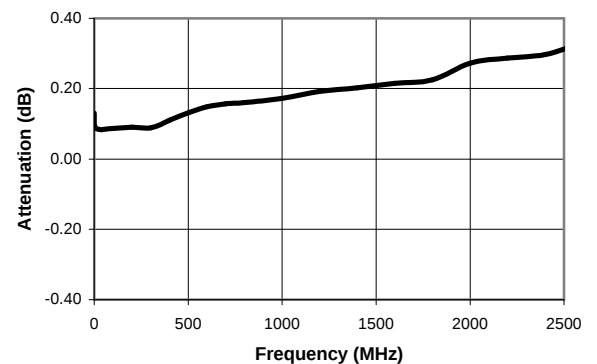
VSWR @ Insertion Loss



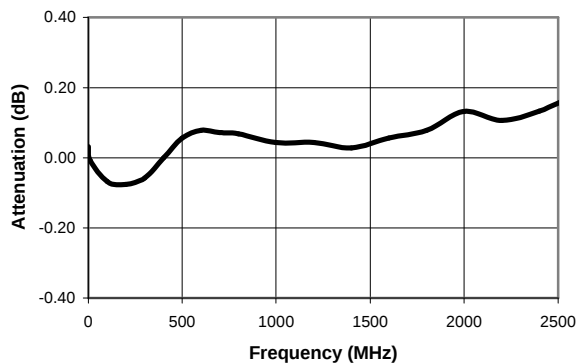
Attenuation Error, 2 dB Bit



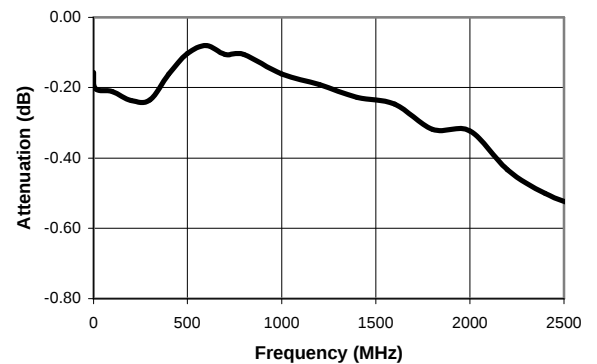
Attenuation Error, 4 dB Bit



Attenuation Error, 8 dB Bit



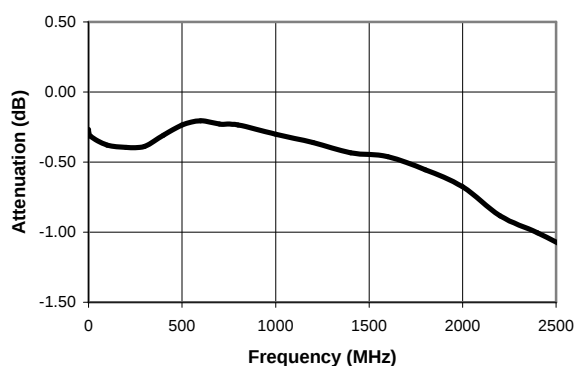
Attenuation Error, 16 dB Bit



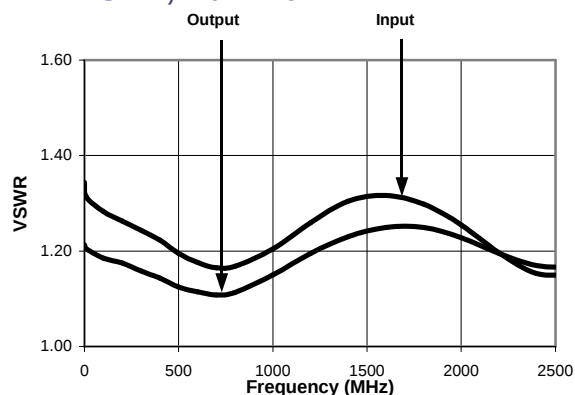
Specifications subject to change without notice.

Typical Performance Curves

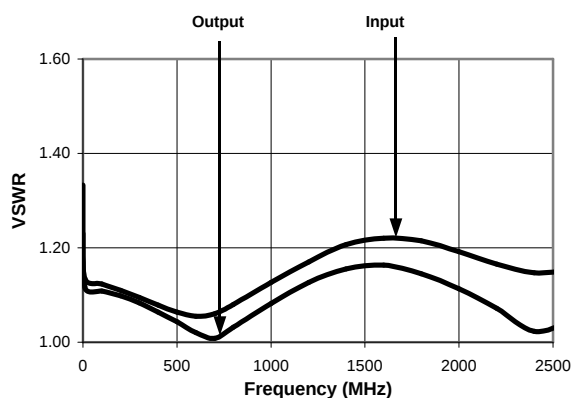
Attenuation Error, Max. Attenuation



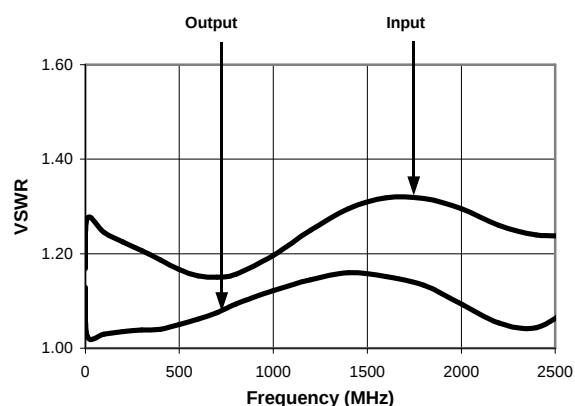
VSWR, 2 dB Bit



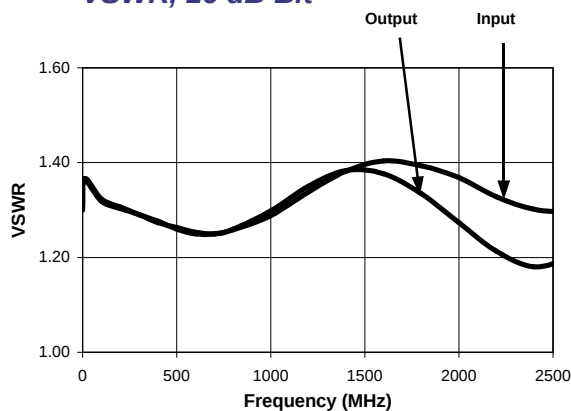
VSWR, 4 dB Bit



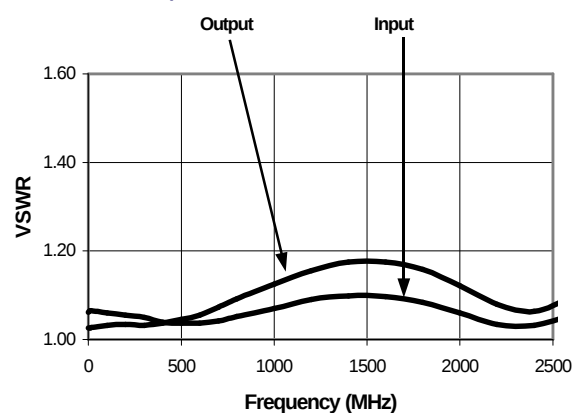
VSWR, 8 dB Bit



VSWR, 16 dB Bit



VSWR, Maximum Attenuation



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