tyco Electronics

M/ACOM

Digital Attenuator, 15.5 dB, 5-Bit, TTL Driver DC - 3.5 GHz

AT90-1283
V9

Features

- Attenuation: 0.5 dB Steps to 15.5 dB
- Single Positive Supply
- Contains Internal DC to DC Converter
- Low DC Power Consumption
- Small Footprint, JEDEC Package
- Integral TTL Driver
- 50 ohm Impedance

Description

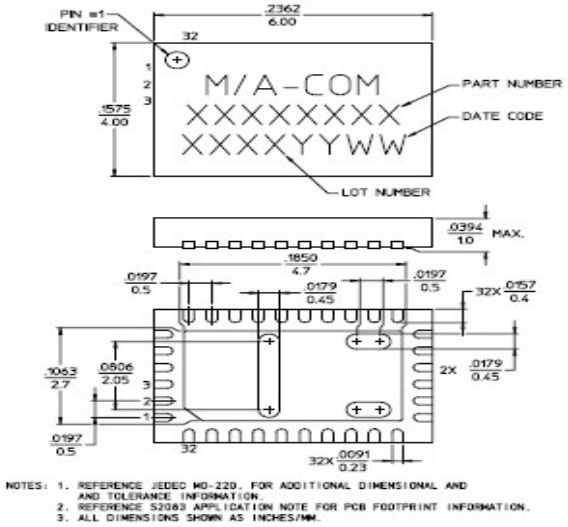
M/A-COM's AT90-1283 is a GaAs FET 5-bit digital attenuator with integral TTL driver. Step size is 0.5 dB providing a 15.5 dB total attenuation range. This device is in an FQFP-N plastic surface mount package. The AT90- 1283 is ideally suited for use where accuracy, fast speed, very low power consumption and low costs are required. For dual supply designs without switching noise, use AT90-0283.

Pin Configuration

Pin No.	Function	Pin No.	Function
1	GND	17	NC
2	C8	18	NC
3	C4	19	+Vcc[2]
4	C2	20	NC
5	C1	21	Cp[4]
6	C0.5	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 and 29 must be isolated.
2. Pin 19 must be connected to Pin 32.
3. Pin 25 must connect to Pin 30.
4. A .01 µF cap must be connected between Pins 21 and 23.
5. -VEE is produced internally and requires a .1 µF cap to GND. Generated noise is typical of switching DC-DC Converters.
6. +VCC requires a .1 µF cap to GND.

CSP-1



Ordering Information

Part Number	Package
AT90-1283	Bulk Packaging
AT90-1283TR	Tape and Reel (1K Reel)
AT90-1283-TB	Units Mounted on Test Board

Note: Reference Application Note M513 for reel size information.

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

- **North America** Tel: 800.366.2266 / Fax: 978.366.2266
- **Europe** Tel: 44.1908.574.200 / Fax: 44.1908.574.300
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Visit www.macom.com for additional data sheets and product information.

Digital Attenuator, 15.5 dB, 5-Bit, TTL Driver DC - 3.5 GHz

AT90-1283 V9

Electrical Specifications: T_A = +25°C

Parameter	Test Conditions	Frequency	Units	Min.	Typ.	Max.
Insertion Loss	—	DC - 3.5 GHz	dB	—	2.8	3.2
Attenuation Accuracy	Individual Bits 0.5-1-4-8 dB Individual Bit 2 dB Any Combination of Bits 1 to 15.5 dB	DC - 3.5 GHz DC - 3.5 GHz DC - 3.5 GHz	dB dB dB	— — —	— — —	±(.3 +5% of atten setting) ±(.4 +10% of atten setting) ±(.5 +7% of atten setting)
VSWR	Full Range	DC - 3.5 GHz	Ratio	—	1.5\6:1	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 - 3.5 GHz	dBm dBm	— —	+21 +29	— —
Input IP3	Two-tone inputs up to +5 dBm	50 MHz 0.5 - 3.5 GHz	dB dB	— —	+35 +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 [1]	Vcc min to max, Logic “0” or “1”	—	mA	—	6	10
Turn-on Current [2]	For guaranteed start-up	—	mA	—	—	125
Switching Noise	Generated from DC-DC Converter with recommended capacitors	3.5 MHz	dBm	—	-93	—
Thermal Resistance θ_{JA}	—	—	°C/W	—	15	—

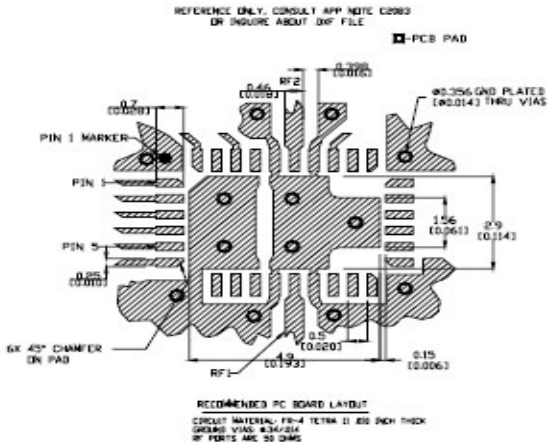
1. During turn-on, the device requires an initial start up current (Icc) specified as “Turn-on Current”. Once operational, Icc will drop to the specified levels.
2. The DC-DC converter is guaranteed to start in 100 µs as long as the power supplies have the maximum turn-on current available for start-up.

Absolute Maximum Ratings [3]

Parameter	Absolute Maximum
Max. Input Power 0.05 GHz 0.5 - 3.5 GHz	 +27 dBm +34 dBm
Supply Voltages Vcc	 +5.5V
Logic Voltage[4]	-0.5V to Vcc +0.5V
Operating Temperature	-40°C to +85°C
Storage Temperature	-65°C to +125°C

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

Recommended PCB Configuration[5]



5. Application Note 2083 is available on line at www.macom.com

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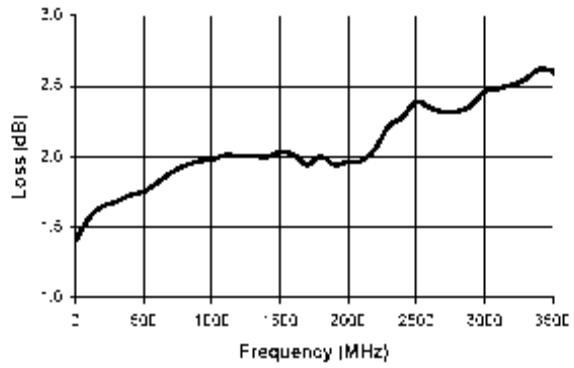
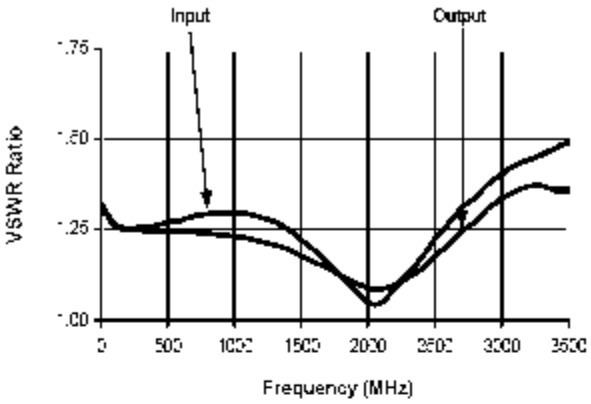
Typical Performance Curves @ 25ºC

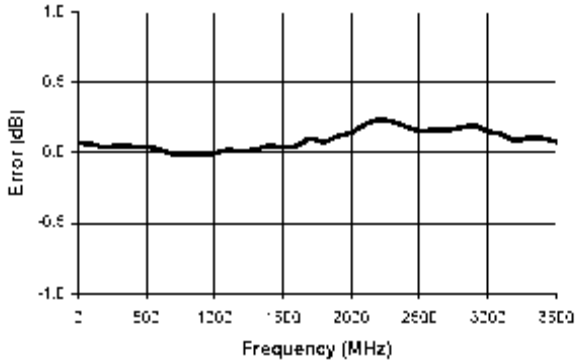
Insertion Loss



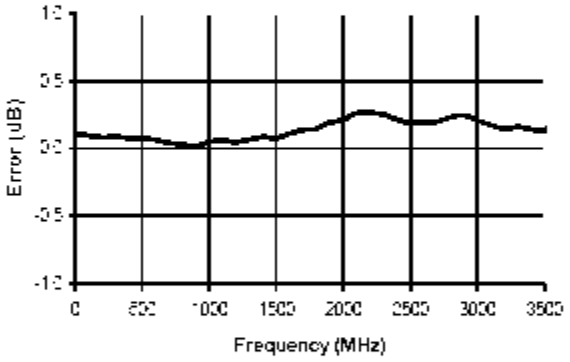
VSWR @ Insertion Loss



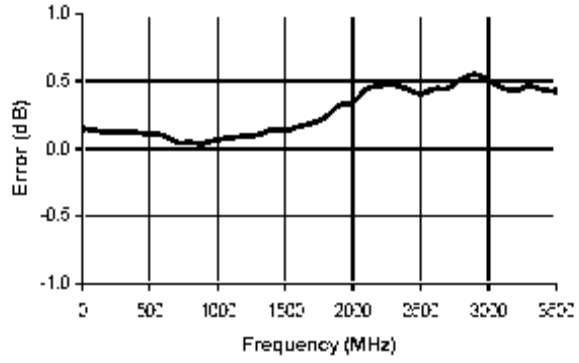
Attenuation Error. 0.5 dB Bit



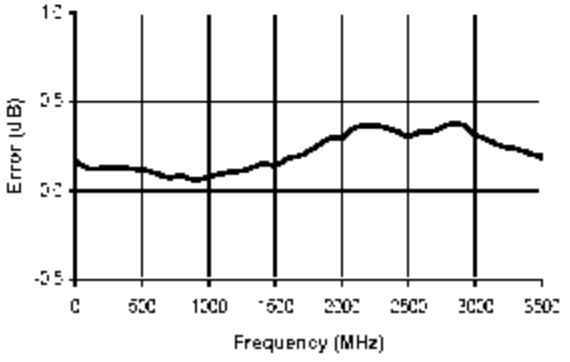
Attenuation Error. 1 dB Bit



Attenuation Error. 2 dB Bit



Attenuation Error, 4 dB Bit



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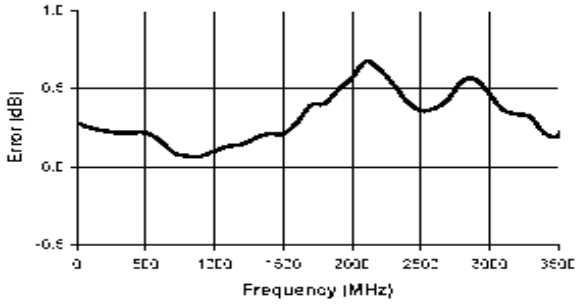
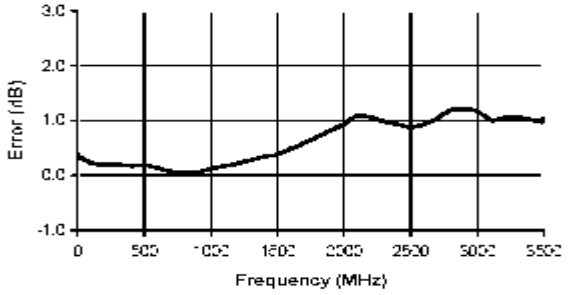
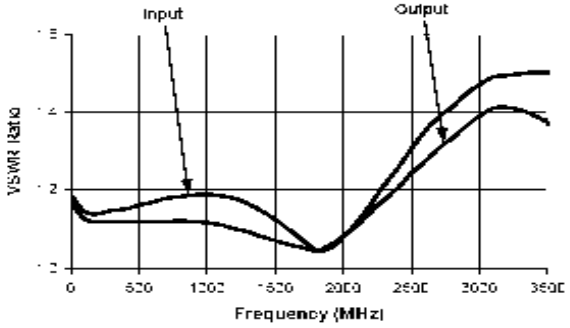
Attenuation Error. 8 dB Bit



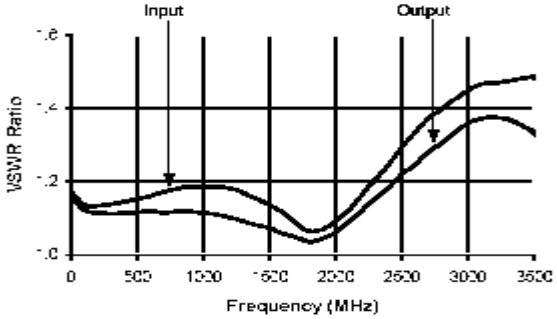
Attenuation Error, Max. Attenuation



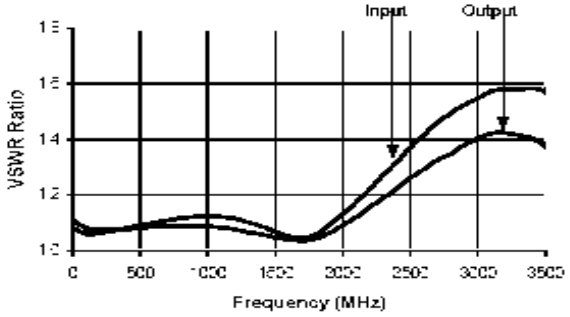
VSWR, 0.5 dB Bit



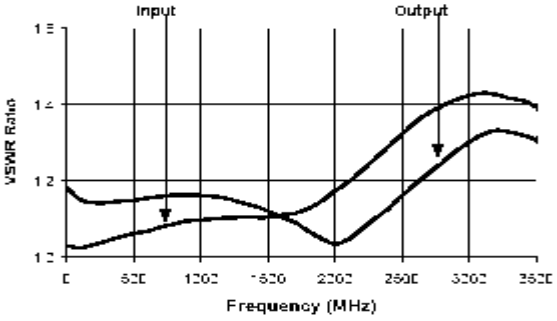
VSWR, 1 dB Bit



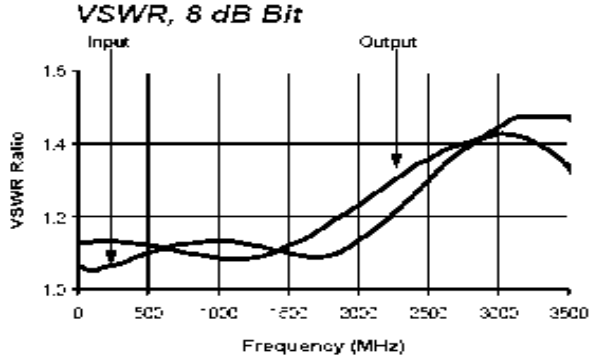
VSWR, 2 dB Bit



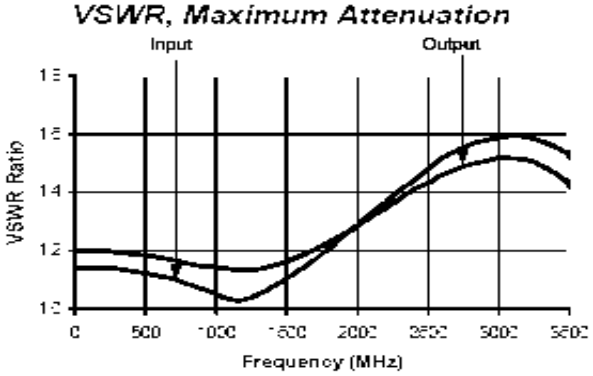
VSWR, 4 dB Bit



VSWR, 8 dB Bit



VSWR, Maximum Attenuation



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