Digital Attenuator, 31 dB, 5-Bit, TTL Driver DC - 3.0 GHz

AT90-0263
V9

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
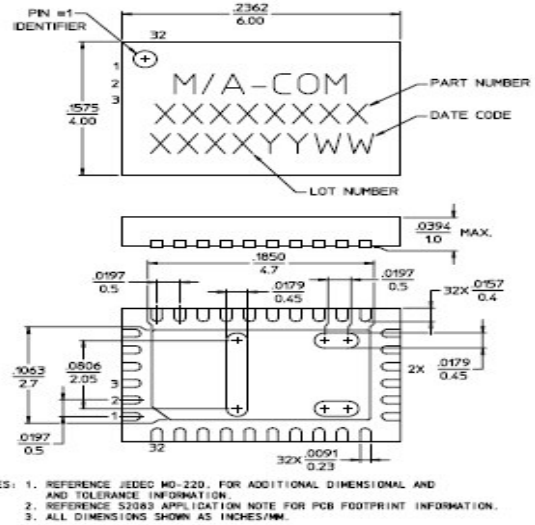- Tape and Reel Packaging Available

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 31 dB 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

Ordering Information

Part Number	Package
AT90-0263	Bulk Packaging
AT90-0263TR	1000 piece reel
AT90-0263-TB	Units Mounted on Test Board

Note: Reference Application Note M513 for reel size information.

Pin Configuration

Pin No.	Function	Pin No.	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[1]	26	GND
11	GND	27	RF2
12	RF1	28	GND
13	GND	29	NC[1]
14	NC	30	Vee
15	NC	31	NC
16	NC	32	+Vcc

1. Pins 10 and 29 must be isolated.

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

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- **Europe** Tel: 44.1908.574.200 / Fax: 44.1908.574.300
- **Asia/Pacific** Tel: 81.44.844.8296 / Fax: 81.44.844.8298

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Electrical Specifications: $T_A = 25°C$

Parameter	Test Conditions	Frequency	Units	Min.	Typ.	Max.
Insertion Loss	—	DC - 3.0 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 DC - 3.0 GHz	dB dB	— —	— —	±(.3 +5% of atten setting) ±(.5+7% of atten setting)
VSWR	Full Range	DC - 3.0 GHz	Ratio	—	2.0:1	2.2:1
Switching Speed	50% Cntl to 90%/10% RF 10% to 90% or 90% to 10%	— —	nS nS	— —	75 20	— —
1 dB Compression	— —	50 MHz 0.5 - 3.0 GHz	dBm dBm	— —	+21 +24	— —
Input IP3	Two-tone inputs up to +5 dBm	50 MHz 0.5 - 3.0 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
Thermal Resistance θ_{JA}	—	—	°C/W	—	35	—

Absolute Maximum Ratings [3]

Parameter	Absolute Maximum
Max. Input Power 0.05 GHz 0.5 - 3.0 GHz	+27 dBm +34 dBm
Supply Voltages Vcc Vee	-0.5V ≤ Vcc ≤5.5V -8.5V ≤ Vcc ≤0.5V
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.
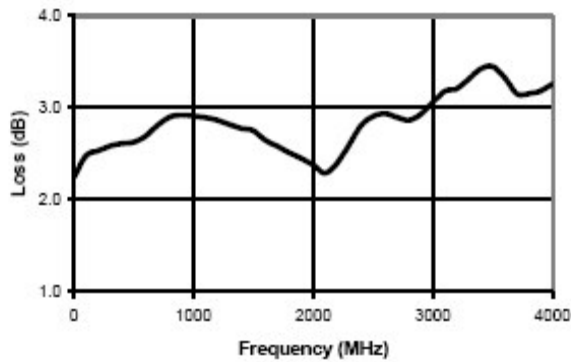
Handling Procedures

Please observe the following precautions to avoid damage:
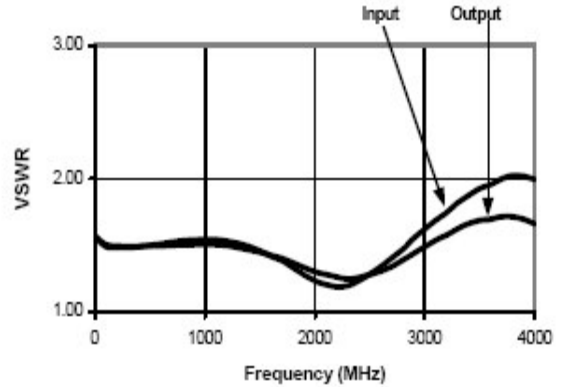
Static Sensitivity

GMIC Circuits are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Proper ESD control techniques should be used when handling these devices.

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DC - 3.0 GHz

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Typical Performance Curves @ 25ºC
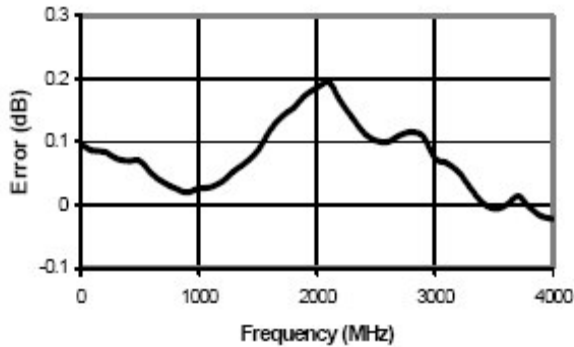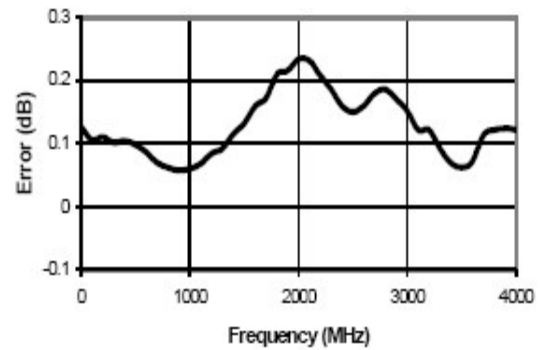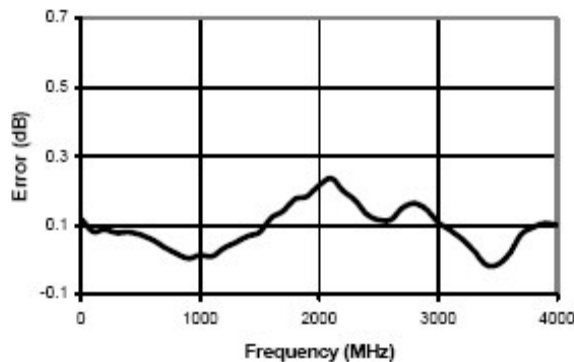
Insertion Loss

VSWR @ Insertion Loss

Attenuation Error, 1 dB Bit

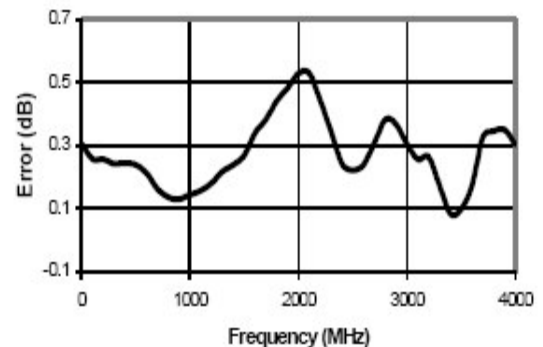Attenuation Error, 2 dB Bit

Attenuation Error, 4 dB Bit

Attenuation Error, 8 dB Bit

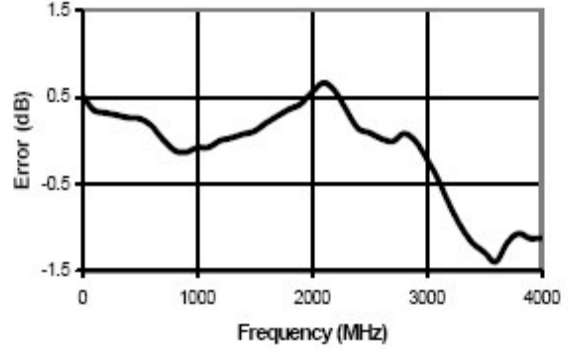• **North America** Tel: 800.366.2266 / Fax: 978.366.2266
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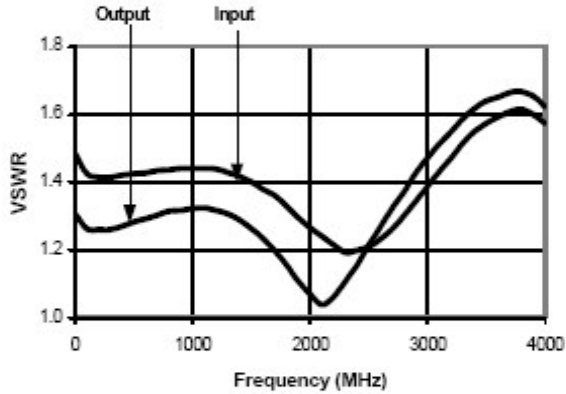Visit www.macom.com for additional data sheets and product information.
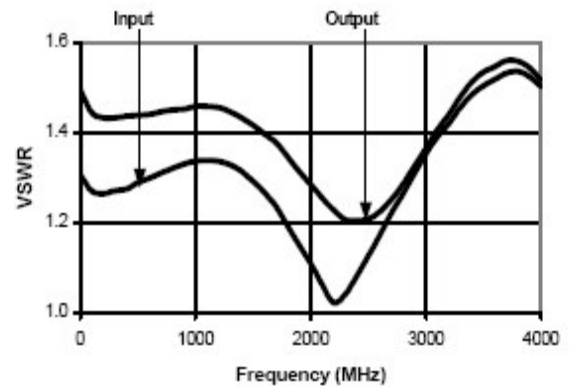
Attenuation Error, 16 dB Bit
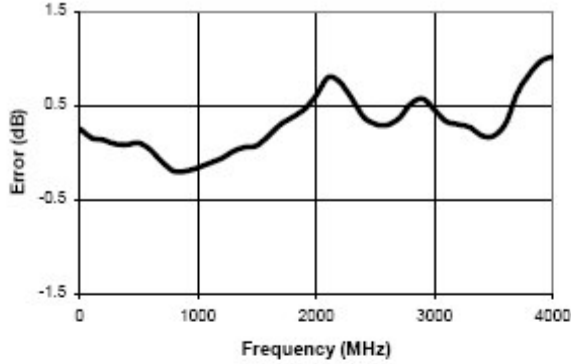
Attenuation Error, Max. Attenuation

VSWR, 1 dB Bit

VSWR, 2 dB Bit

VSWR, 4 dB Bit

VSWR, 8 dB Bit

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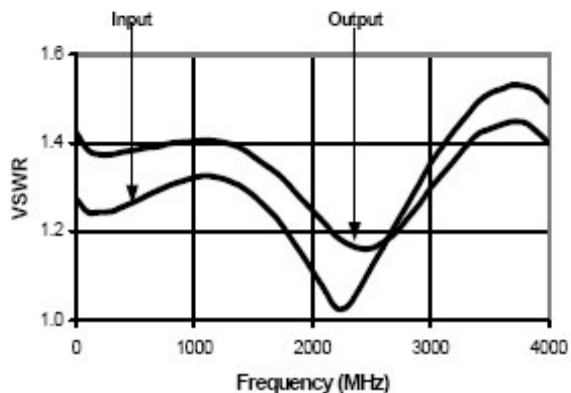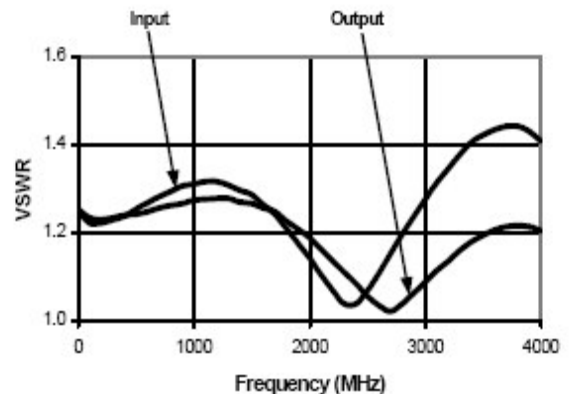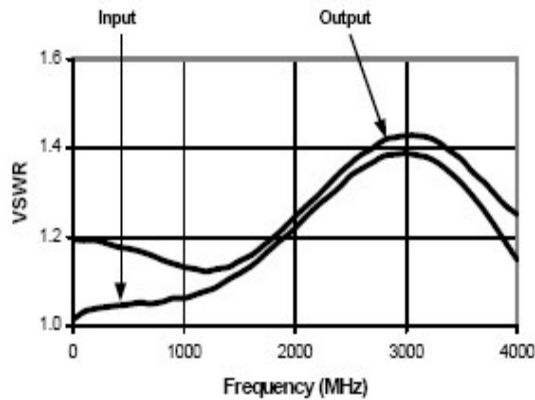
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VSWR, 16 dB Bit

Recommended PCB Configuration5
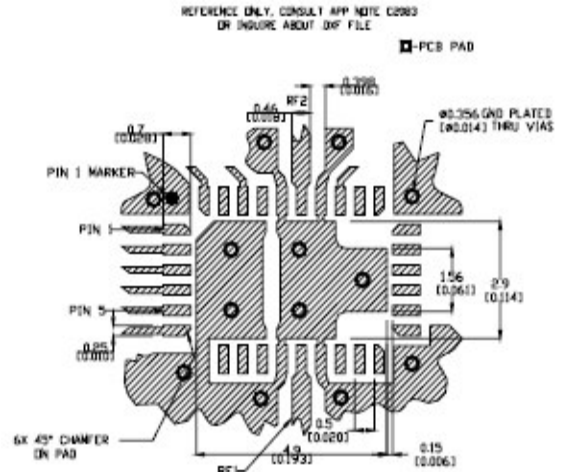
5. Application Note S2083 is available on line at www.macom.com

VSWR, Maximum Attenuation

Block Diagram

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