



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

V 6.00

AT90-1263

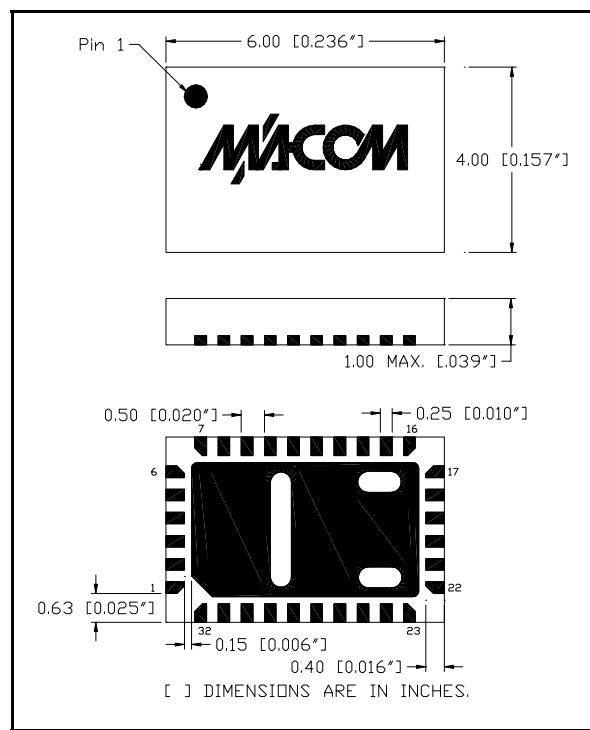
Features

- Attenuation: 1.0dB Steps to 31dB
- 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 AT90-1263 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 an FQFP-N plastic surface mount package. The AT90-1263 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 | — | 3.5 | 3.8 |
| Attenuation Accuracy | Individual Bits 1-2-4-8-16 dB Any Combination of Bits 1 to 31 dB | DC - 3.0 GHz | dB | — | — | $\pm(.3 + 5\% \text{ of atten setting})$ |
| | | DC - 4.0 GHz | dB | — | — | $\pm(.4 + 6\% \text{ of atten setting})$ |
| | | DC - 4.0 GHz | dB | — | — | $\pm(.5 + 7\% \text{ of atten setting})$ |
| 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 |
| 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 | — | 6 | 10 |

Pin Configuration

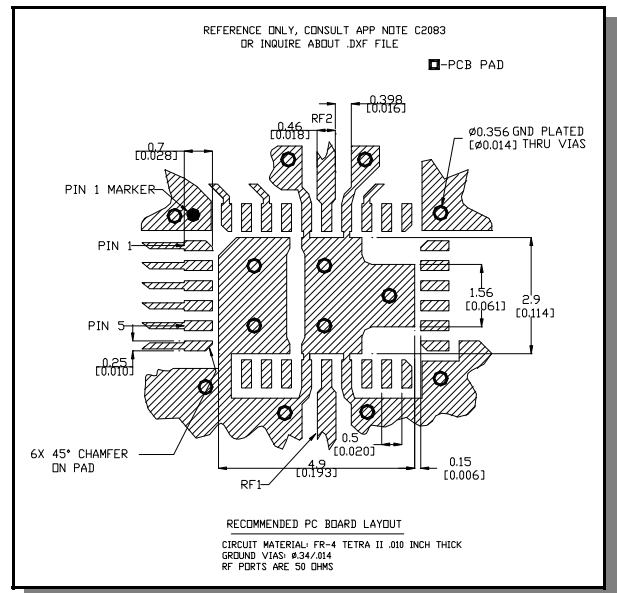
| Pin # | Function | Pin # | Function |
|-------|-----------------|-------|---------------------|
| 1 | GND | 17 | NC |
| 2 | C16 | 18 | NC |
| 3 | C8 | 19 | +Vcc ² |
| 4 | C4 | 20 | NC |
| 5 | C2 | 21 | Cp ⁴ |
| 6 | C1 | 22 | NC |
| 7 | GND | 23 | Cp ⁴ |
| 8 | NC | 24 | NC |
| 9 | NC | 25 | -Vee ³ |
| 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 & 29 must be isolated
2. Pin 19 must be connected to Pin 32
3. Pin 25 must be connected to Pin 30
4. .01µF cap must be connected between Pins 21 and 23
5. -Vee is produced internally and requires a .1µF cap to GND
6. +Vcc requires a .1µF cap to GND

Absolute Maximum Ratings ⁸

| Parameter | Absolute Maximum |
|---|---------------------|
| Max. Input Power 0.05 GHz 0.5 - 4.0 GHz | +27 dBm +34 dBm |
| +Vcc | +5.5V |
| Logic Voltages ⁹ | -0.5 to +Vcc + 0.5V |
| Operating Temperature | -40°C to +85°C |
| Storage Temperature | -65°C to +125°C |

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

Recommended PCB Layout ⁷

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

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

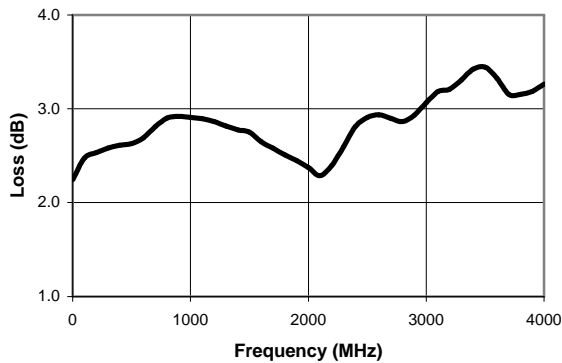
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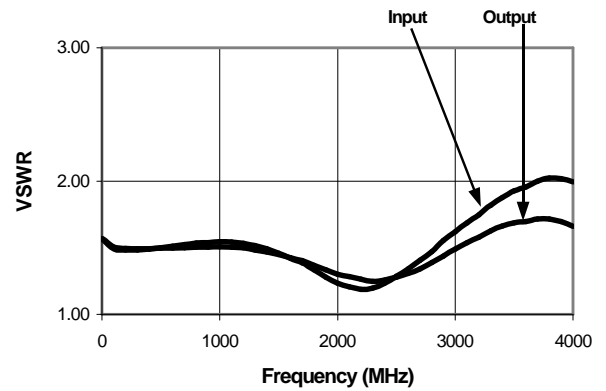
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Typical Performance Curves

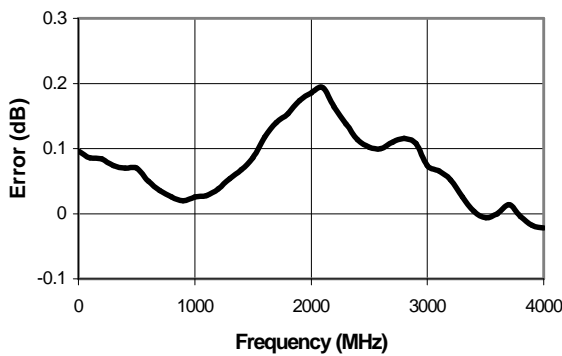
Insertion Loss



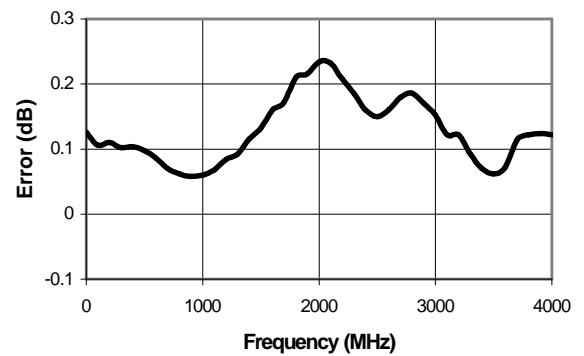
VSWR @ Insertion Loss



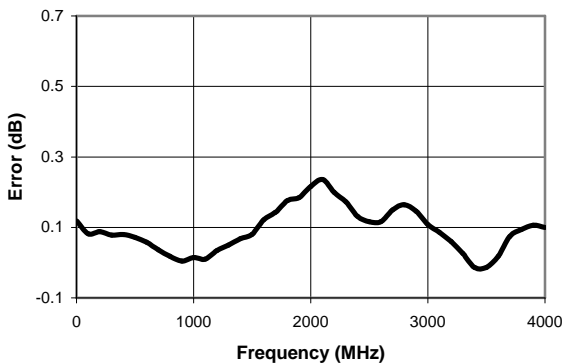
Attenuation Error, 1 dB Bit



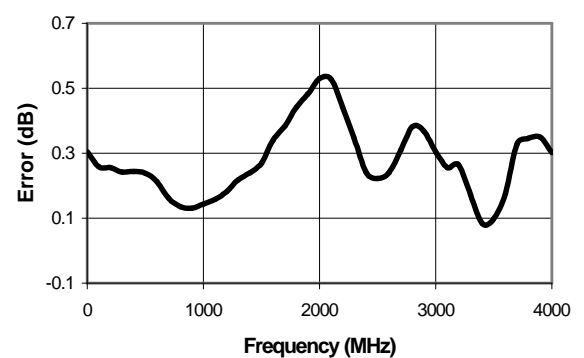
Attenuation Error, 2 dB Bit



Attenuation Error, 4 dB Bit



Attenuation Error, 8 dB Bit



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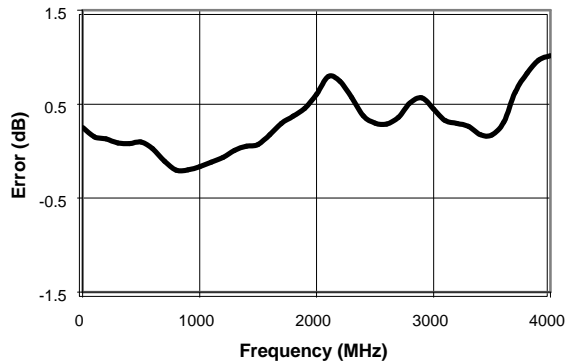
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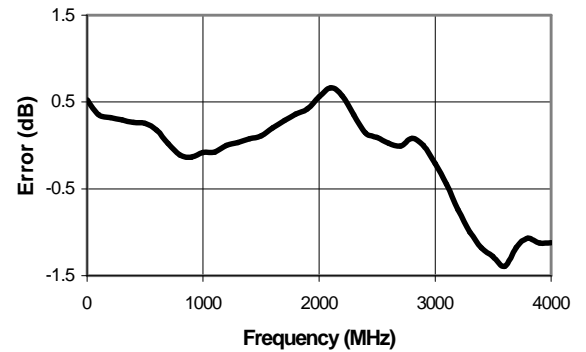
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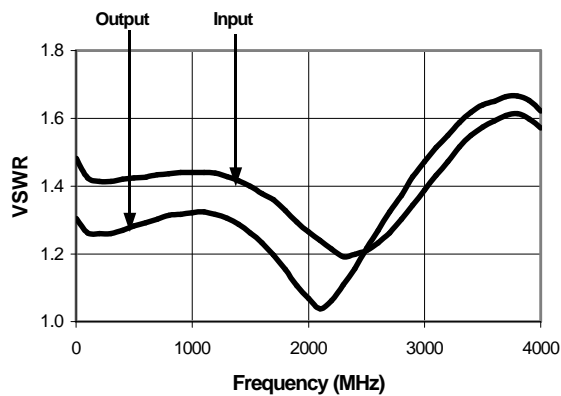
Attenuation Error, 16 dB Bit



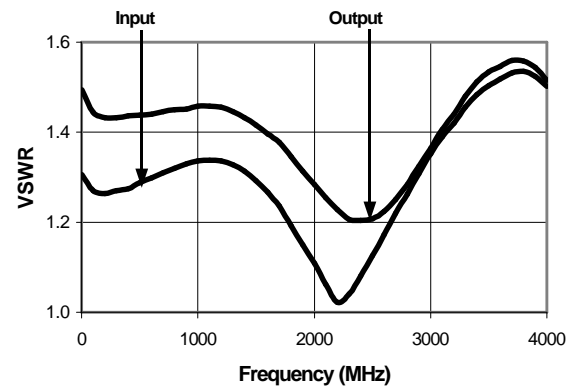
Attenuation Error, Max. Attenuation



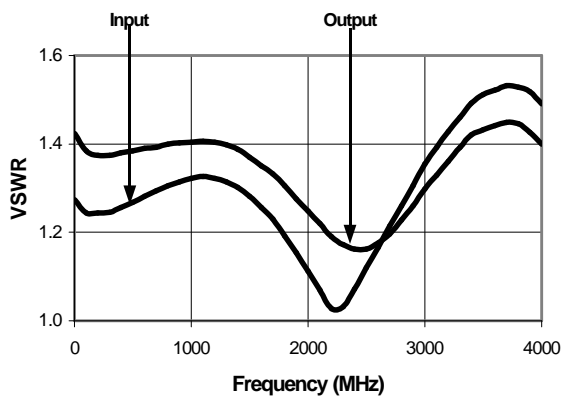
VSWR, 1 dB Bit



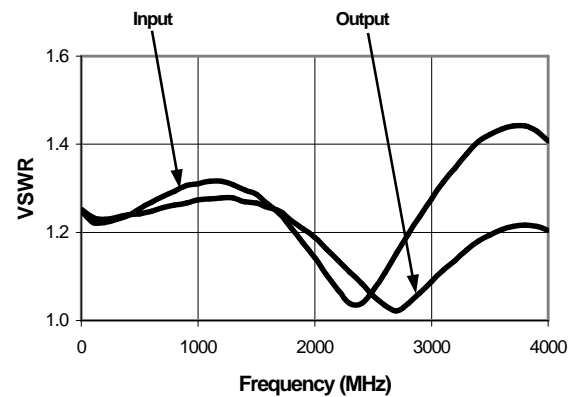
VSWR, 2 dB Bit



VSWR, 4 dB Bit



VSWR, 8 dB Bit



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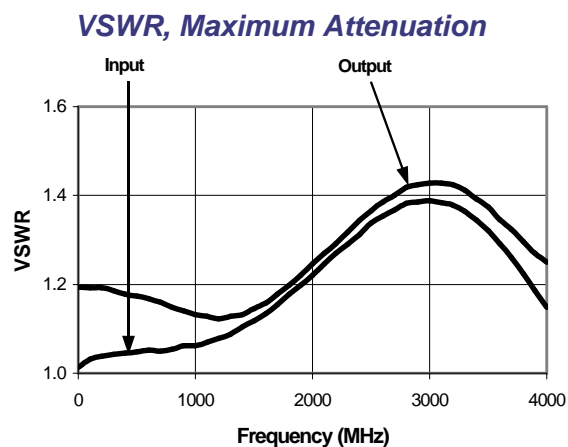
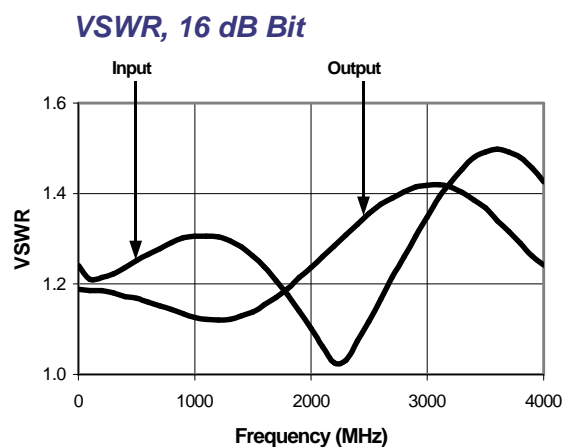
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Typical Performance Curves



Ordering Information

| Part Number | Package |
|--------------|-----------------------------|
| AT90-1263 | Bulk Packaging |
| AT90-1263TR | Tape and Reel (1K Reel) |
| AT90-1263-TB | Units Mounted on Test Board |

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