

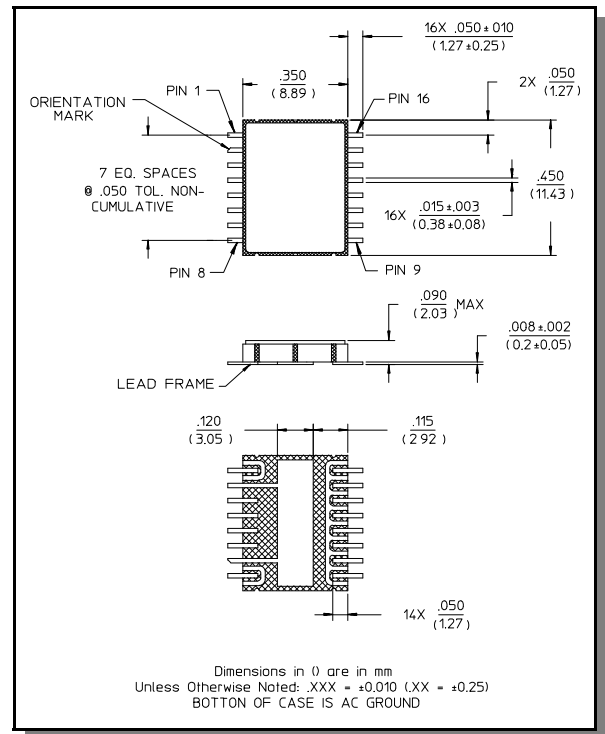
Features

- Attenuation: 1 dB steps to 31 dB
- Temperature Stability: ± 0.18 dB from -40°C to $+85^{\circ}\text{C}$ Typical
- Low DC Power Consumption
- Surface Mount Package
- Integral TTL Driver
- Low Cost/High Performance
- 50 Ohm Nominal Impedance

Description

M/A-COM's AT20-0263 is a GaAs FET 5-bit digital attenuator with a 1 dB minimum step size and 31 dB total attenuation. This attenuator and integral TTL driver is in a ceramic 16-lead surface mount package. The AT20-0263 is ideally suited for use where accuracy, fast switching, very low power consumption and low intermodulation products are required. Typical applications include dynamic range setting in precision receiver circuits and other gain/leveling control circuits. Available with enhanced performance as fully hermetic version. Environmentally screenable as P/N AT-263.

CR-12



Electrical Specifications: $T_A = 25^{\circ}\text{C}^1$

| Parameter | Test Conditions | Frequency | Units | Min | Typ | Max |
|-----------------------------------|---|------------------------------|------------|---|------------|--------|
| Reference Insertion Loss | — | DC - 0.5 GHz | dB | — | 2.0 | 2.4 |
| | | DC - 1.0 GHz | dB | — | 2.2 | 2.8 |
| | | DC - 2.0 GHz | dB | — | 2.5 | 3.0 |
| Attenuation Accuracy ² | Any Single Bit Any Combination of Bits | DC - 1.0 GHz DC - 2.0 GHz | dB | $\pm (0.25 + 3\% \text{ of atten setting in dB})$ dB $\pm (0.25 + 3\% \text{ of atten setting in dB})$ dB or ± 0.4 dB, whichever is greater | | |
| VSWR | — | DC - 2.0 GHz | Ratio | — | — | 1.6:1 |
| Trise, Tfall | 10% to 90% | — | ns | — | 50 | — |
| Ton, Toff | 50% Control to 90/10% RF | — | ns | — | 150 | — |
| Transients | In-Band (peak-peak) | — | mV | — | 50 | — |
| 1 dB Compression | Input Power Input Power | 0.05 GHz | dBm | — | +20 | — |
| | | 0.5 - 2.0 GHz | dBm | — | +28 | — |
| Input IP3 | For two-tone Input Power Up to +5 dBm | 0.05 GHz 0.5 - 2.0 GHz | dBm dBm | — — | +40 +48 | — — |
| Input IP2 | For two-tone Input Power Up to +5 dBm | 0.05 GHz 0.5 - 2.0 GHz | dBm dBm | — — | +45 +68 | — — |
| Vcc | — | — | V | 4.5 | 5.0 | 5.5 |
| Vee | — | — | V | -8.0 | — | -5.0 |

1. All specifications apply when operated with bias voltages of +5V for Vcc and -5.0V for Vee.
 2. This attenuator is guaranteed monotonic.

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| Parameter | Test Conditions | Frequency | Units | Min | Typ | Max |
|-----------------|--|-----------|-------|-----|-----|-----|
| I _{cc} | V _{cc} = 4.5 to 5.5V V _{ctl} = 0 to 0.8V, or V _{cc} -2.1V to V _{cc} | — | mA | — | — | 5.0 |
| I _{ee} | V _{ee} = -5.0 to -8.0V | — | mA | — | — | 1.0 |

Absolute Maximum Ratings ³

| Parameter | Absolute Maximum |
|---|--------------------------------|
| Max Input Power 0.5 GHz 0.5 - 2.0 GHz | +27 dBm +34 dBm |
| Supply Voltages V _{cc} V _{ee} | +5.5V -8.5V |
| Control Voltage ⁴ | -0.5V to V _{cc} +0.5V |
| Operating Temperature | -40°C to +125°C |
| Storage Temperature | -65°C to +150°C |

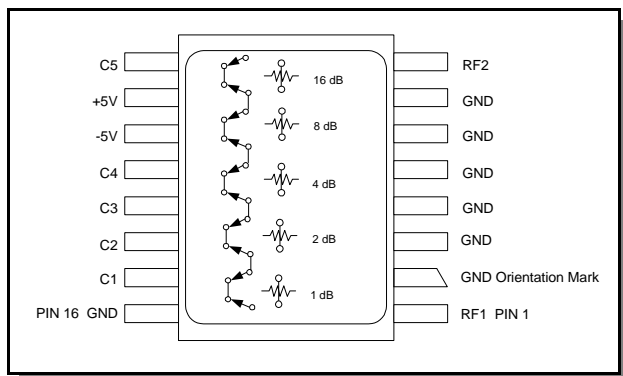
- Operation of this device above any one of these parameters may cause permanent damage.
- Standard CMOS TTL interface, latch-up will occur if logic signal is applied prior to power supply.

Truth Table

| Control Inputs | | | | | |
|----------------|----|----|----|----|-------------|
| C5 | C4 | C3 | C2 | C1 | Attenuation |
| 0 | 0 | 0 | 0 | 0 | Reference |
| 0 | 0 | 0 | 0 | 1 | 1 dB |
| 0 | 0 | 0 | 1 | 0 | 2 dB |
| 0 | 0 | 1 | 0 | 0 | 4 dB |
| 0 | 1 | 0 | 0 | 0 | 8 dB |
| 1 | 0 | 0 | 0 | 0 | 16 dB |
| 1 | 1 | 1 | 1 | 1 | 31 dB |

0 = TTL Low 1 = TTL High

Functional Schematic (Top View)



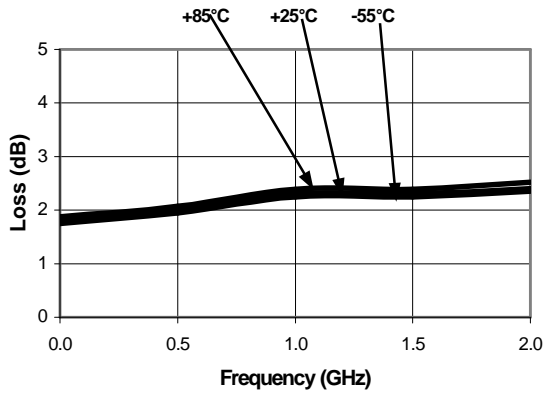
Specifications subject to change without notice.

- 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

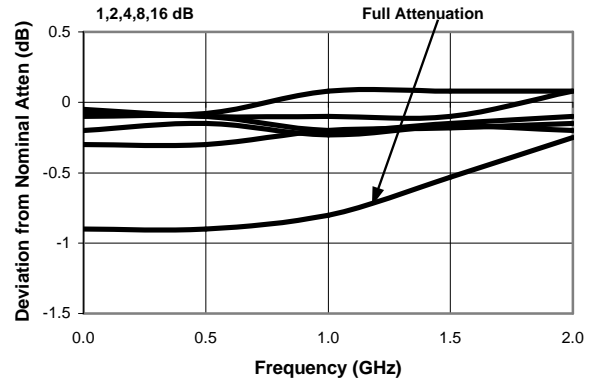
Visit www.macom.com for additional data sheets and product information.

Typical Performance Curves

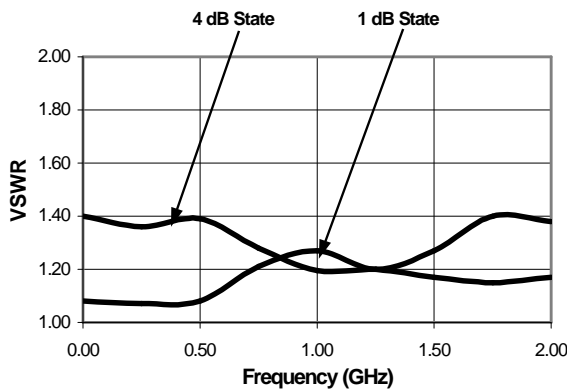
Ref. Insertion Loss vs. Frequency



Attenuation Accuracy vs. Frequency



VSWR vs. Frequency



Ordering Information

| Part Number | Package |
|-------------|---------|
| AT20-0263 | CR-12 |

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