

Features

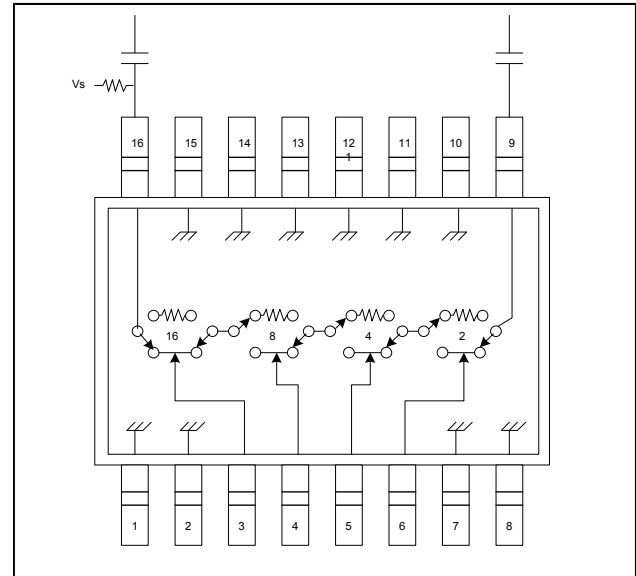
- Positive Single Control
- 2-dB Attenuation Steps to 30 dB
- Low DC Power Consumption
- TSSOP-16 Plastic Package

Description

M/A-COM's AT-264 is a 4-bit, 2-dB step GaAs MMIC digital attenuator in a low cost TSSOP-16 surface mount plastic package. The AT-264 is ideally suited for use where high accuracy, very low power consumption and low intermodulation products are required. Typical applications include radio, cellular, wireless LANs, GPS equipment and other gain/level control circuits.

The AT-264 is fabricated using a mature 1 micron GaAs MESFET process. The process features full chip passivation for increased performance and reliability.

Functional Schematic ^{2,3}



2. Blocking caps are required on all RF ports (39 pF used for data measurements).
3. $V_s = +5 \pm 0.2$ VDC must be applied at RF1 or RF2 using a 10 K Ω or greater pull-up resistor.

Ordering Information¹

| Part Number | Package |
|-------------|-----------------|
| AT-264-PIN | Bulk Packaging |
| AT-264TR | 1000 piece reel |

1. Reference Application Note M513 for reel size information.

Pin Configuration

| Pin No. | Function | Pin No. | Function |
|---------|----------|---------|----------|
| 1 | Ground | 9 | RF2 |
| 2 | Ground | 10 | Ground |
| 3 | VC1 | 11 | Ground |
| 4 | VC2 | 12 | Ground |
| 5 | VC3 | 13 | Ground |
| 6 | VC4 | 14 | Ground |
| 7 | Ground | 15 | Ground |
| 8 | Ground | 16 | RF1 |

Digital Attenuator, 4-Bit, Single Control 30 dB, 0.5 - 2.0 GHz

Rev. V7

Electrical Specifications⁴: $T_A = 25^\circ\text{C}$, $Z_0 = 50 \Omega$, $V_S = 5 \text{ V}$

| Parameter | Test Conditions | Units | Min. | Typ. | Max. |
|--------------------------|--|---|------|-------|------|
| Reference Insertion Loss | 0.5 - 1.0 GHz | dB | — | 2.0 | 2.4 |
| | 0.5 - 2.0 GHz | dB | — | 2.2 | 2.6 |
| Attenuation Accuracy | 0.5 - 1.0 GHz 0.5 - 2.0 GHz | $\pm (0.15 \text{ dB} + 5\% \text{ of attenuation setting in dB}) \text{ dB}$ $\pm (0.3 \text{ dB} + 5\% \text{ of attenuation setting in dB}) \text{ dB}$ | | | |
| VSWR | 1.0 - 1.5 GHz | Ratio | — | 1.5:1 | — |
| | 0.5 - 2.0 GHz | Ratio | — | 1.9:1 | — |
| Trise, Tfall | 10% to 90% RF, 90% to 10% RF | ns | — | 200 | — |
| Ton, Toff | 50% Control to 90% RF, 50% Control to 10% RF | ns | — | 200 | — |
| Transients | In Band | mV | — | 75 | — |
| 1 dB Compression | Input Power, 0.5 GHz | dBm | — | 25 | — |
| | Input Power, 0.9 GHz | dBm | — | 25 | — |
| IP ₂ | 0.5 GHz | dBm | — | 65 | — |
| | 0.5 - 2.0 GHz Measured Relative to Input (for two-tone Input Power up to +5 dBm) | dBm | — | 71 | — |
| IP ₃ | 0.5 GHz | dBm | — | 43 | — |
| | 0.5 - 2.0 GHz Measured Relative to Input (for two-tone Input Power up to +5 dBm) | dBm | — | 47 | — |
| I _c | V _c = 5 V | μA | — | — | 10 |
| I _{vs} | — | μA | — | — | 20 |

4. External DC blocking capacitors are required on all RF ports. Loss varies at 0.003 dB/°C.

Absolute Maximum Ratings^{5,6}

| Parameter | Absolute Maximum |
|---|--|
| Input Power 50 MHz 500 - 2000 MHz | +27 dBm +34 dBm |
| Control Voltage | $-0.5 \text{ V} \leq V_C \leq 8.5 \text{ V}$ |
| Operating Temperature | -40°C to $+85^\circ\text{C}$ |
| Storage Temperature | -65°C to $+150^\circ\text{C}$ |

- Exceeding any one or combination of these limits may cause permanent damage to this device.
- M/A-COM does not recommend sustained operation near these survivability limits.

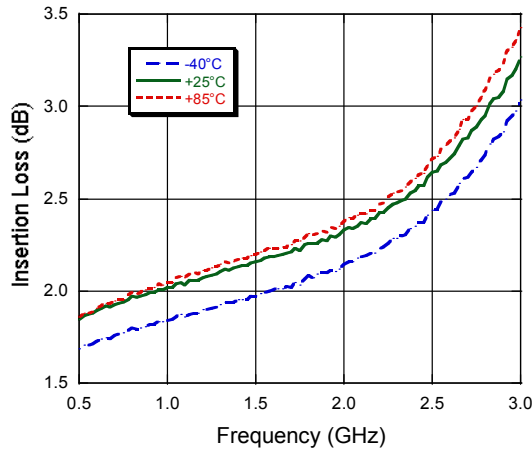
Truth Table⁷

| VC1 | VC2 | VC3 | VC4 | Attenuation (dB) |
|-----|-----|-----|-----|--------------------------|
| 1 | 1 | 1 | 1 | Reference Insertion Loss |
| 1 | 1 | 1 | 0 | 2 |
| 1 | 1 | 0 | 1 | 4 |
| 1 | 0 | 1 | 1 | 8 |
| 0 | 1 | 1 | 1 | 16 |
| 0 | 0 | 0 | 0 | 30 |

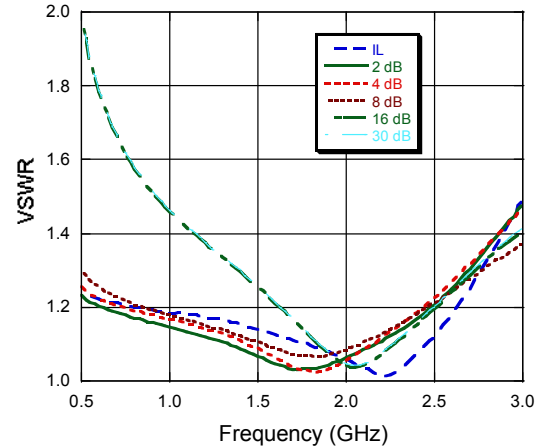
7. 0 = 0 ± 0.2 V, 1 = +5 V

Typical Performance Curves

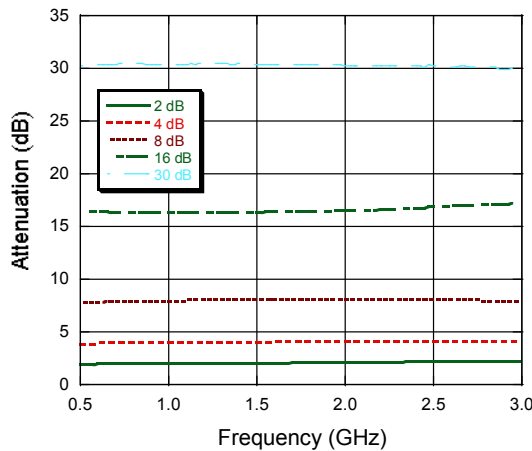
Insertion Loss



VSWR



Attenuation



Attenuation Accuracy

