

**Digital Attenuator, 15 dB, 4-Bit, TTL Driver,
DC - 3.0 GHz**

**AT65-0213
V6**

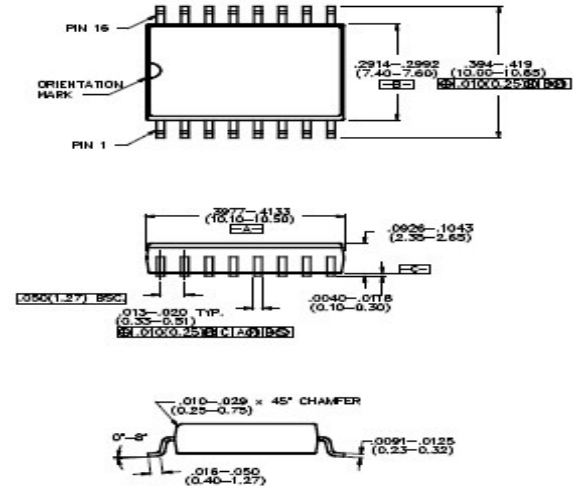
Features

- Attenuation: 1.0dB Steps to 15dB
- Low DC Power Consumption
- Plastic SOIC, Wide Body, SMT Package
- Integral TTL Driver
- 50 ohm Impedance
- Temperature Stability: ± 0.18 dB from -55°C to $+85^{\circ}\text{C}$
- Typ.
- Tape and Reel Packaging Available

Description

M/A-COM's AT65-0213 is a GaAs FET 4-bit digital attenuator with a 1.0dB minimum step size and a 15 dB total attenuation range. This device is in a SOIC-16 plastic surface mount package. The AT65-0213 is ideally suited for use where accuracy, fast speed, very low power consumption and low costs are required. Typical applications include dynamic range setting in precision receiver circuits and other gain/leveling control circuits.

SOW-16



Package outline conforms to JEDEC standard MS-013AA.

Pin Configuration

| Pin No. | Function | Pin No. | Function |
|---------|------------------|---------|------------------|
| 1 | GND | 9 | C2 |
| 2 | RF1 | 10 | C1 |
| 3 | GND | 11 | GND |
| 4 | N/C | 12 | GND |
| 5 | Vee ¹ | 13 | Vee ¹ |
| 6 | Vcc | 14 | GND |
| 7 | C4 | 15 | RF2 |
| 8 | C3 | 16 | GND |

1. Either or both pins may be connected to Vee.

Absolute Maximum Ratings²

| Parameter | Absolute Maximum |
|-----------------------------------------------|----------------------|
| Max. Input Power 0.05 GHz 0.5 - 3.0 GHz | +27 dBm +34 dBm |
| +Vcc | +5.5V |
| -Vee | -8.5V |
| Control Voltage ³ | -0.5 to Vcc to +0.5V |
| Operating Temperature | -40°C to +85°C |
| Storage Temperature | -65°C to +125°C |

2. Operation of this device above any one of these parameters may cause permanent damage.

3. Standard CMOS TTL interface, latch-up will occur if logic signal is applied prior to power supply.

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Electrical Specifications: T_A = 25°C

| Parameter | Test Conditions | Frequency | Units | Min. | Typ. | Max. |
|------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------|------------|-------------------------------------|------------|--------|
| Insertion Loss | — | DC - 0.5 GHz | dB | — | — | 2.2 |
| | | DC - 2.0 GHz | dB | — | — | 2.5 |
| | | DC - 3.0 GHz | dB | — | — | 2.8 |
| Attenuation Accuracy | Any Bit or Combination of Bits | DC - 3.0 GHz | dB | + (0.4 +10% of attenuation setting) | | |
| VSWR | Full Range | DC - 2.0 GHz | dB | — | — | 2.0:1 |
| Trise, Tfall, Ton, Toff Transients | 10% to 90% 50% Cntl to 90%/10% RF In-Band | | nS | — | 9 | — |
| | | | nS | — | 40 | — |
| | | | mV | — | 30 | — |
| 1 dB Compression | Input Power Input Power | 0.05 GHz | dBm | — | +22 | — |
| | | 0.5 - 3.0 GHz | dBm | — | +28 | — |
| Input IP3 | Two-tone inputs up to +5 dBm | 0.05 GHz 0.5 - 3.0 GHz | dBm dBm | — — | +40 +50 | — — |
| Input IP2 | Two-tone inputs up to +5 dBm | 0.05 GHz 0.5 - 3.0 GHz | dBm dBm | — — | +45 +68 | — — |
| V _{cc} | — | — | V | 4.5 | 5.0 | 5.5 |
| -V _{ee} | — | — | V | -8.0 | -5.0 | -4.75 |
| V _{ctl} | Logic (0) TTL | — | V | 0.0 | — | 0.8 |
| | Logic (1) TTL | — | V | 2.0 | — | 5.0 |
| Input Leakage Current (Low) | 0 to 0.8 V | — | µA | — | — | 20 |
| Input Leakage Current (High) | 2.0 to 5.0 V | — | µA | — | — | 20 |
| I _{cc} | V _{cc} =4.5 to 5.5V V _{ctl} =0 to 0.8V Or V _{cc} -2.1V to V _{cc} | — | mA | — | — | 4.0 |
| -I _{ee} | V _{ee} = -5.0 to -8.0 | — | mA | — | — | -1 |

Ordering Information

| Part Number | Package |
|--------------|----------------------------|
| AT65-0213 | Bulk Packaging |
| AT65-0213TR | Tape and Reel (1K Reel) |
| AT65-0213-TB | Unit Mounted on Test Board |

Truth Table

| C1 | C2 | C3 | C4 | Attenuation |
|----|----|----|----|-----------------|
| 0 | 0 | 0 | 0 | Loss, Reference |
| 1 | 0 | 0 | 0 | 1.0 dB |
| 0 | 1 | 0 | 0 | 2.0 dB |
| 0 | 0 | 1 | 0 | 4.0 dB |
| 0 | 0 | 0 | 1 | 8.0 dB |
| 1 | 1 | 1 | 1 | 15.0 dB |

0 = TTL Low; 1 = TTL High