

Features

- Attenuation: 1 dB steps to 50 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
- High Intercept Point
- Low Cost/High Performance
- 50 Ohm Nominal Impedance
- Lead-Free CR-13 Package
- 260°C Reflow Compatible
- RoHS* Compliant

Description

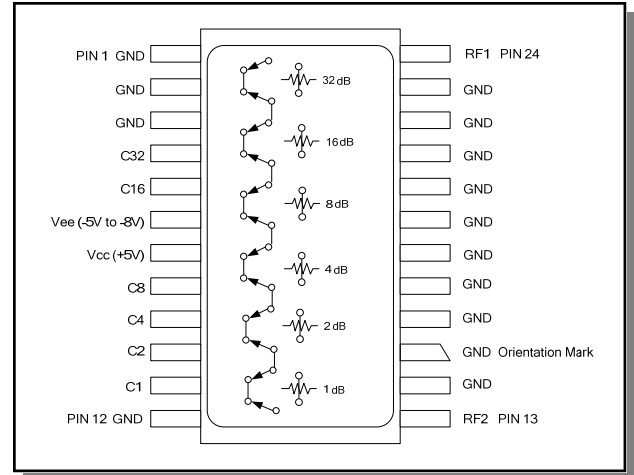
M/A-COM's AT20-0106 is a GaAs FET 6-bit digital attenuator with a 1 dB minimum step size and 50 dB total attenuation. This attenuator and integral TTL driver is in a ceramic 24-lead surface mount package. The AT20-0106 is ideally suited for use where accuracy, fast switching, low power consumption and 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-106-PIN.

Ordering Information

| Part Number | Package |
|---------------|-------------------|
| AT20-0106-PIN | Bulk Packaging |
| AT20-0106-TR | 1000 piece reel |
| AT20-0106-TB | Sample Test Board |

Note: Reference Application Note M513 for reel size information.

Functional Schematic



Pin Configuration

| Pin No. | Function | Pin No. | Function |
|---------|------------------|---------|----------|
| 1 | GND | 13 | RF2 |
| 2 | GND | 14 | GND |
| 3 | GND | 15 | GND |
| 4 | C32 | 16 | GND |
| 5 | C16 | 17 | GND |
| 6 | Vee (-5V to -8V) | 18 | GND |
| 7 | Vcc (+5V) | 19 | GND |
| 8 | C8 | 20 | GND |
| 9 | C4 | 21 | GND |
| 10 | C2 | 22 | GND |
| 11 | C1 | 23 | GND |
| 12 | GND | 24 | RF1 |

The metal bottom of the case must be connected to RF and DC ground.

* Restrictions on Hazardous Substances, European Union Directive 2002/95/EC.

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 | — | 3.5 | 3.8 |
| | | DC - 1.0 GHz | dB | — | 3.9 | 4.2 |
| | | DC - 2.0 GHz | dB | — | 4.2 | 4.6 |
| Attenuation Accuracy ² | Any Single Bit Any Combination of Bits (For attenuation to 26 dB) Any Combination of Bits (For attenuation 27 to 50 dB) | DC - 2.0 GHz | dB | ± (0.3 +4% of atten. setting) | | |
| | | DC - 2.0 GHz | dB | ± (0.4 +4% of atten. setting) | | |
| | | DC - 1.5 GHz | dB | ± (0.5 +5% of atten. setting) | | |
| VSWR | — | 0.05 - 0.10 GHz 0.101 - 2.0 GHz | Ratio Ratio | — — | — — | 2.0:1 1.8:1 |
| 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 | dBm | — | +34 | — |
| | | 0.5 - 2.0 GHz | dBm | — | +46 | — |
| Input IP2 | For two-tone Input Power Up to +5 dBm | 0.05 GHz | dBm | — | +45 | — |
| | | 0.5 - 2.0 GHz | dBm | — | +79 | — |
| Vcc | — | — | V | 4.5 | 5.0 | 5.5 |
| Vee | — | — | V | -8.0 | — | -5.0 |
| Icc | Vcc = 4.5 to 5.5V Vctl = 0 to 0.8V, or Vcc – 2.1V to Vcc | — | mA | — | — | 6.0 |
| Iee | Vee = -5.0 to -8.0V | — | mA | — | — | 1.0 |

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

Absolute Maximum Ratings ^{3,4}

| Parameter | Absolute Maximum |
|--|---|
| Max Input Power 0.05 GHz 0.5 - 2.0 GHz | +27 dBm +34 dBm |
| V_{CC} | $-0.5V \leq V_{CC} \leq +7.0V$ |
| V_{EE} | $-8.5V \leq V_{EE} \leq +0.5V$ |
| $V_{CC} - V_{EE}$ | $-0.5V \leq V_{CC} - V_{EE} \leq 14.5V$ |
| V_{in}^5 | $-0.5V \leq V_{in} \leq V_{CC} + 0.5V$ |
| Operating Temperature | $-40^{\circ}C$ to $+125^{\circ}C$ |
| Storage Temperature | $-65^{\circ}C$ to $+150^{\circ}C$ |

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

Handling Procedures

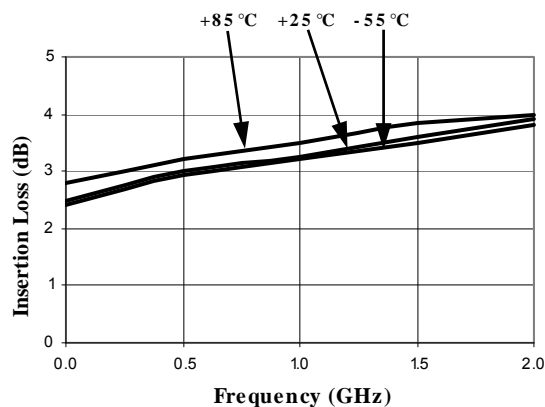
Please observe the following precautions to avoid damage:

Static Sensitivity

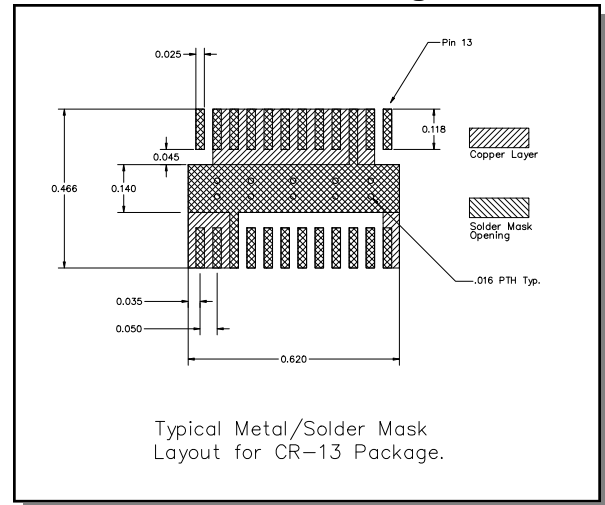
Gallium Arsenide Integrated Circuits are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Proper ESD control techniques should be used when handling these devices.

Typical Performance Curves

Insertion Loss vs. Frequency



Recommended PCB Configuration

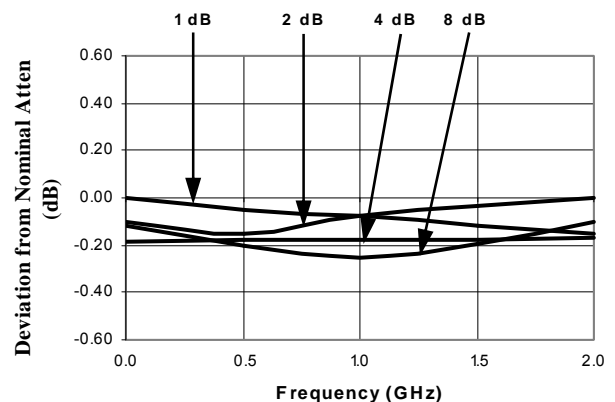


Truth Table (Digital Attenuator)

| Control Inputs | | | | | | |
|----------------|----|----|----|----|----|-------------|
| C6 | C5 | C4 | C3 | C2 | C1 | Attenuation |
| 0 | 0 | 0 | 0 | 0 | 0 | Reference |
| 0 | 0 | 0 | 0 | 0 | 1 | 1 dB |
| 0 | 0 | 0 | 0 | 1 | 0 | 2 dB |
| 0 | 0 | 0 | 1 | 0 | 0 | 4 dB |
| 0 | 0 | 1 | 0 | 0 | 0 | 8 dB |
| 0 | 1 | 0 | 0 | 0 | 0 | 16 dB |
| 1 | 0 | 0 | 0 | 0 | 0 | 32 dB |
| 1 | 1 | 1 | 1 | 1 | 1 | 63 dB |

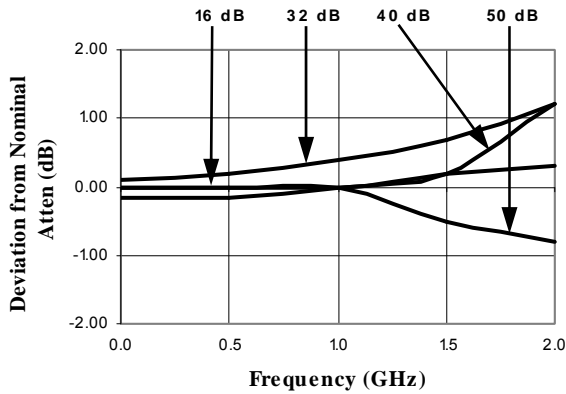
0 = TTL Low; 1 = TTL High

Attenuation Accuracy vs. Frequency

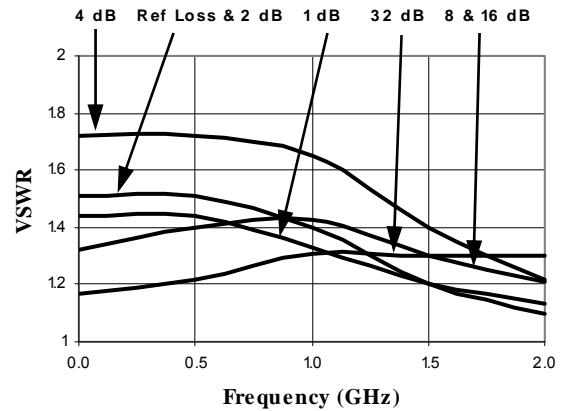


Typical Performance Curves

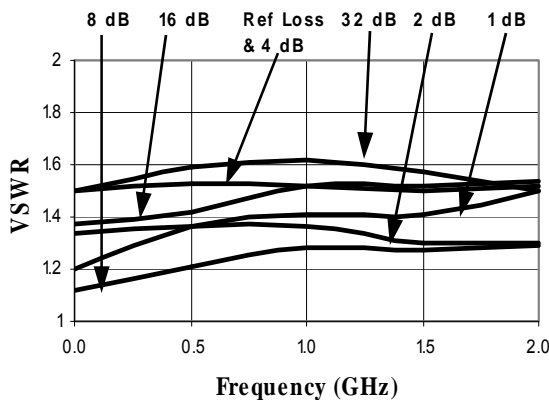
Attenuation Accuracy vs. Frequency



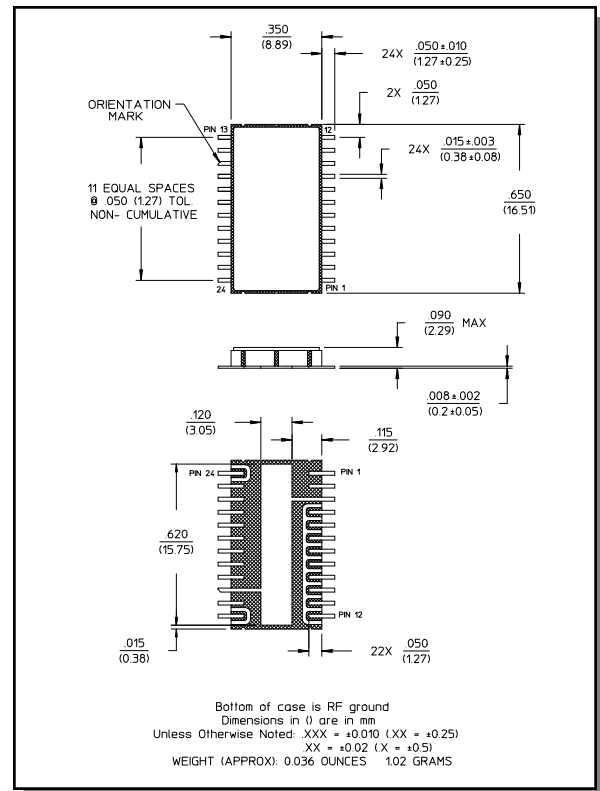
RF1 VSWR vs. Frequency



RF2 VSWR vs. Frequency



Lead-Free, CR-13 Ceramic Package[†]



[†] Reference Application Note M538 for lead-free solder reflow recommendations.



Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

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- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
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- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



Как с нами связаться

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