

**Digital Attenuator, 50 dB, 6-Bit, TTL Driver
DC - 2.0 GHz**

**AT65-0106
V8**

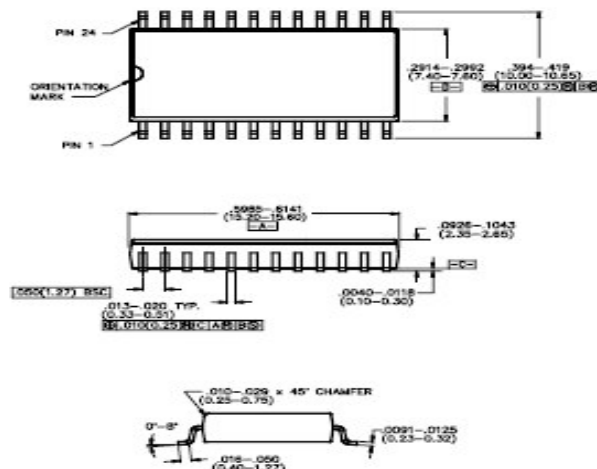
Features

- Attenuation: 1 dB Steps to 50 dB
- Low DC Power Consumption
- Plastic SOIC, Wide Body, SMT Package
- Integral TTL Driver
- 50 ohm Impedance
- Test Boards are Available
- Tape and Reel Packaging Available

Description

M/A-COM's AT65-0106 is a GaAs FET 6-bit digital attenuator with a 1 dB minimum step size and a 50 dB total attenuation range. This device is in a SOIC-24, wide body plastic surface mount package. The AT65-0106 is ideally suited for use where accuracy, fast speed, very low power consumption and low costs are required.

SOW-24



Package outline conforms to JEDEC standard MS-013AD.

Pin Configuration

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

Ordering Information

Part Number	Package
AT65-0106	Bulk Packaging
AT65-0106TR	1000 piece reel
AT65-0106-TB	Units Mounted on Test Board

Note: Reference Application Note M513 for reel size information.

Truth Table

C32	C16	C8	C4	C2	C1	Attenuation
0	0	0	0	0	0	Loss, Reference
0	0	0	0	0	1	1.0 dB
0	0	0	0	1	0	2.0 dB
0	0	0	1	0	0	4.0 dB
0	0	1	0	0	0	8.0 dB
0	1	0	0	0	0	16.0 dB
1	0	0	0	0	0	32.0 dB
1	1	1	1	1	1	50.0 dB

0 = TTL Low; 1 = TTL High

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Electrical Specifications: T_A = 25°C

Parameter	Test Conditions	Frequency	Units	Min.	Typ.	Max.
Insertion Loss	—	DC - 2.0 GHz	dB	—	4.2	4.7
Attenuation Accuracy	Individual Bits 1-2-4-8-16-32 dB Any Combination of Bits 3 to 15 dB Any Combination of Bits 17 to 31 dB Any Combination of Bits 32 to 50 dB	DC - 2.0 GHz DC - 2.0 GHz DC - 2.0 GHz DC - 2.0 GHz	dB dB dB dB	— — — —	— — — —	±(.3 +3% of atten setting) ±(.5+5% of atten setting) ±(.3 +3% of atten setting) ±(.5+7% of atten setting)
VSWR	Full Range	DC - 2.0 GHz	Ratio	—	1.8:1	2.1
Switching Speed ¹	50% Cntl to 90%/10% RF 10% to 90% or 90% to 10%	— —	nS nS	— —	75 20	150 50
1 dB Compression	— —	50 MHz 0.5 - 2.0 GHz	dBm dBm	— —	+21 +24	— —
Input IP3	Two-tone inputs up to +5 dBm @ 0 dB Attenuation	50 MHz 0.5 - 2.0 GHz	dB dB	— —	+35 +48	— —
V _{cc} -V _{ee}	— —	— —	V V	4.75 -8.0	5.0 -5.0	5.25 -4.75
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
I _{cc}	V _{cc} min to max, Logic "0" or "1"	—	mA	—	0.2	6
-I _{ee}	-V _{ee} min to max, Logic "0" or "1"	—	mA	—	-0.2	-1
Thermal Resistance θ _{JA}	PCB mount on FR4 material, copper trace, still air at +25 °C	—	°C/W	—	60-80	—

1. Decoupling capacitors (.01µF) are required on power supply lines.

Absolute Maximum Ratings ³

Parameter	Absolute Maximum
Max. Input Power 0.05 GHz 0.5 - 2.0 GHz	+27 dBm +34 dBm
Supply Voltages V _{cc} V _{ee}	+5.5V -8.5V
Logic Voltage ⁴	-0.5V to V _{cc} +0.5V
Operating Temperature	-40°C to +85°C
Storage Temperature	-65°C to +125°C

3. Exceeding any one or combination of these limits may cause permanent damage to this device.

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

Handling Procedures

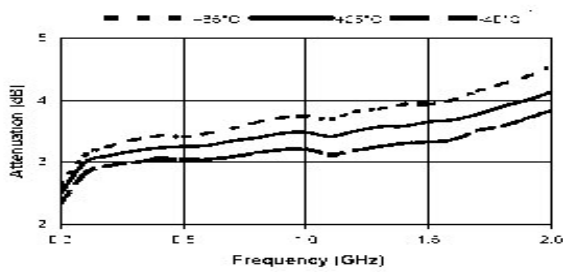
Please observe the following precautions to avoid damage:

Static Sensitivity

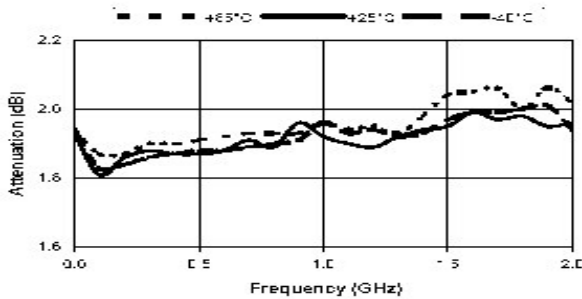
GMIC Circuits are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Proper ESD control techniques should be used when handling these devices.

Typical Performance Curves @ 25°C

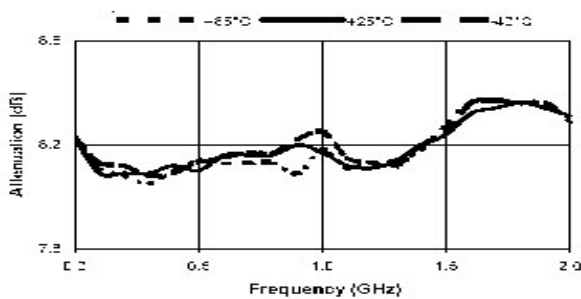
Loss vs. Temperature



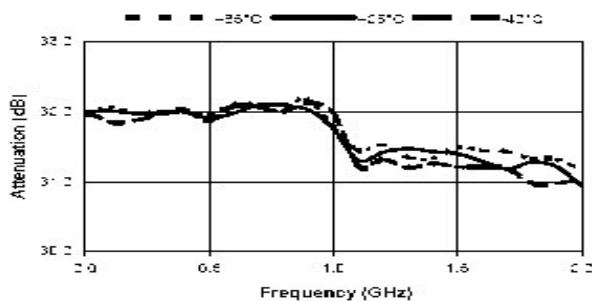
2 dB Bit vs. Temperature



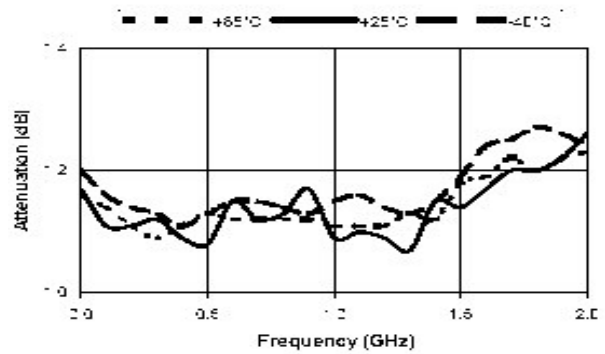
8 dB Bit vs. Temperature



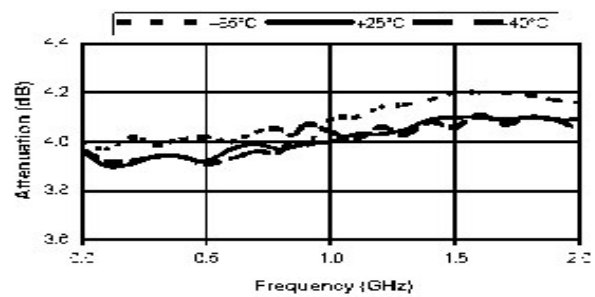
32 dB Bit vs. Temperature



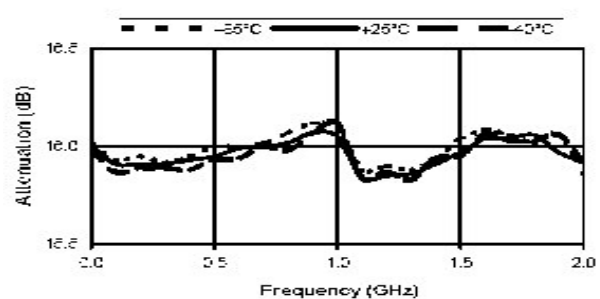
1 dB Bit vs. Temperature



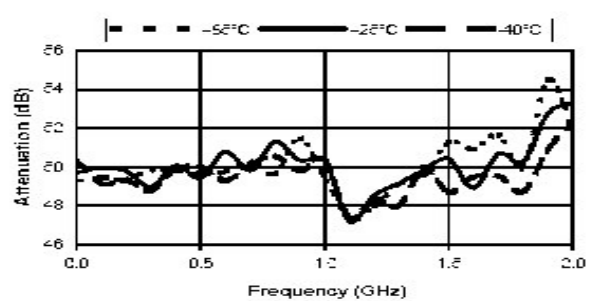
4 dB Bit vs. Temperature



16 dB Bit vs. Temperature



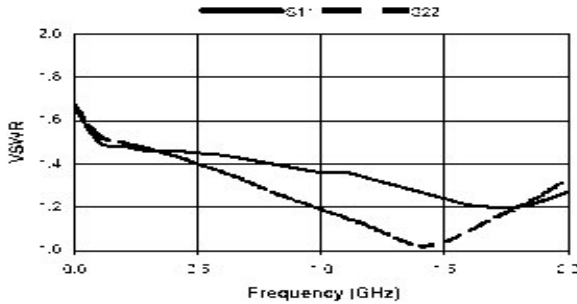
Max. Attenuation vs. Temperature



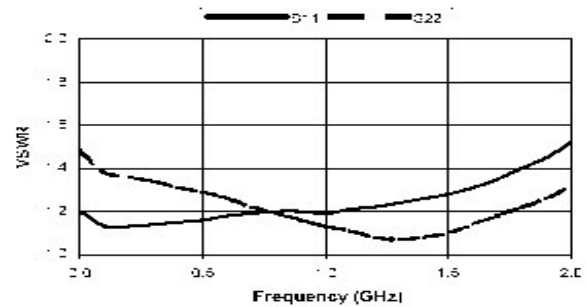
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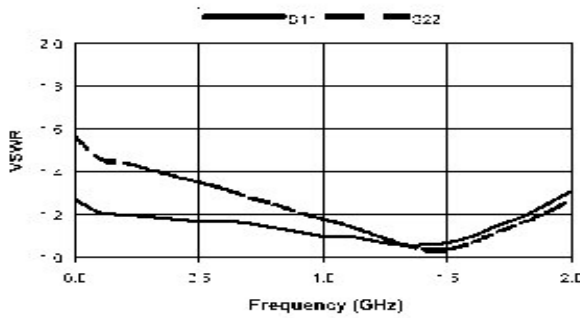
VSWR (S11, S22), Loss



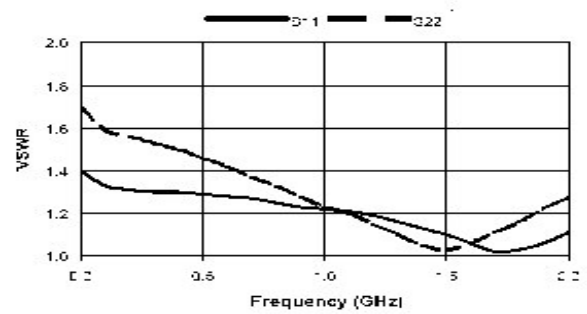
VSWR (S11, S22), 1 dB Bit



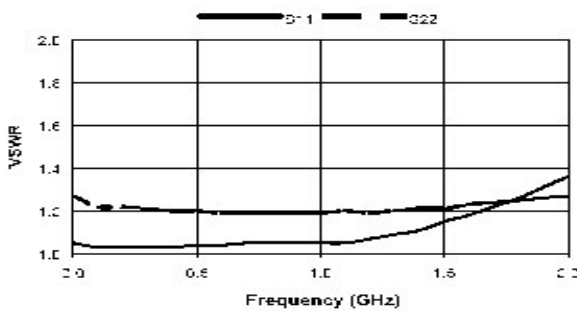
VSWR (S11, S22), 2 dB Bit



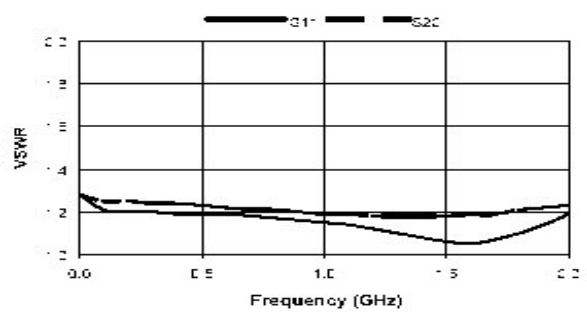
VSWR (S11, S22), 4 dB Bit



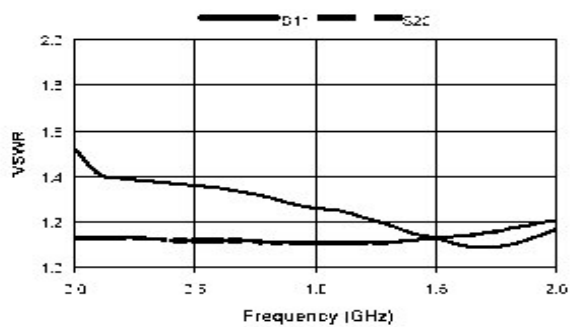
VSWR (S11, S22), 8 dB Bit



VSWR (S11, S22), 16 dB Bit



VSWR (S11, S22), 32 dB Bit



VSWR (S11, S22), Max. Attenuation

