

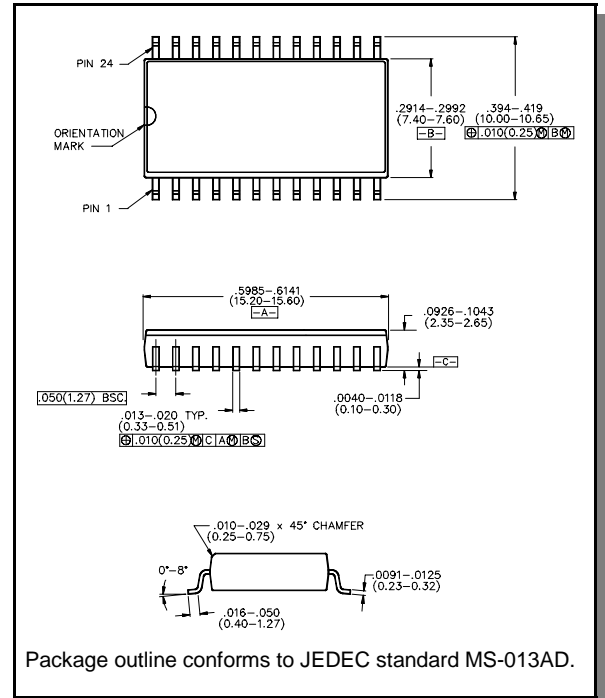
## Features

- 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



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

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	dB	—	—	$\pm(.3 + 3\%$ of atten setting)
		DC - 2.0 GHz	dB	—	—	$\pm(.5 + 5\%$ of atten setting)
		DC - 2.0 GHz	dB	—	—	$\pm(.3 + 3\%$ of atten setting)
		DC - 2.0 GHz	dB	—	—	$\pm(.5 + 7\%$ of atten setting)
VSWR	Full Range	DC - 2.0 GHz	Ratio	—	1.8:1	2:1
Switching Speed <sup>1</sup>	50% Cntl to 90%/10% RF 10% to 90% or 90% to 10%	—	nS	—	75	150
		—	nS	—	20	50
1 dB Compression	—	50 MHz	dBm	—	+21	—
		0.5 - 2.0 GHz	dBm	—	+24	—
Input IP <sub>3</sub>	Two-tone inputs up to +5 dBm @ 0 dB Attenuation	50 MHz	dB	—	+35	—
		0.5-2.0 GHz	dB	—	+48	—
V <sub>cc</sub>	—	—	V	4.75	5.0	5.25
-V <sub>ee</sub>	—	—	V	-8.0	-5.0	-4.75
Logic "0"	Sink Current is 20 $\mu\text{A}$ max.	—	V	0.0	—	0.8
Logic "1"	Sink Current is 20 $\mu\text{A}$ max.	—	V	2.0	—	5.0
I <sub>cc</sub>	V <sub>cc</sub> min to max, Logic "0" or "1"	—	mA	—	0.2	6
-I <sub>ee</sub>	-V <sub>ee</sub> min to max, Logic "0" or "1"	—	mA	—	-0.2	-1
Thermal Resistance $\theta_{JA}$	PCB mount on FR4 material, copper trace, still air at +25°C	—	°C/W	—	60-80	—

1. Decoupling capacitors (.01 $\mu\text{F}$ ) are required on power supply lines.

Pin Configuration

Pin #	Function	Pin #	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

Truth Table

C32	C16	C8	C4	C2	C1	Attenuation
0	0	0	0	0	0	Loss, 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	0	0	1	0	50 dB

0 = TTL Low; 1 = TTL High

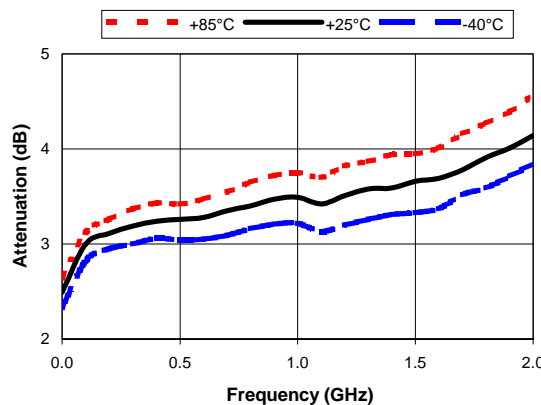
Absolute Maximum Ratings <sup>2</sup>

Parameter	Absolute Maximum
Max. Input Power 0.05 GHz 0.5 - 2.0 GHz	+27 dBm +34 dBm
+Vcc	+5.5V
-Vee	-8.5V
Logic Voltages <sup>3</sup>	-0.5 to Vcc + 0.5V
Operating Temperature	-40°C to +85°C
Storage Temperature	-65°C to +125°C

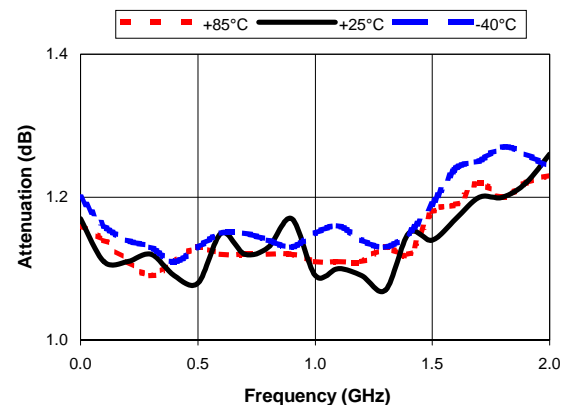
- Exceeding any one or combination of these limits may cause permanent damage to this device.
- Standard CMOS TTL interface, latch-up will occur if logic signal is applied prior to power supply.

Typical Performance Curves

Loss vs. Temperature



1 dB Bit vs. Temperature



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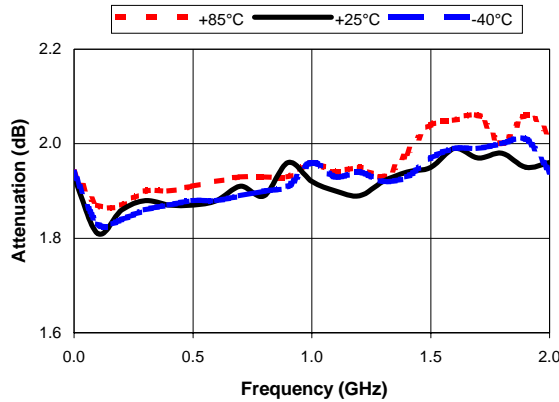
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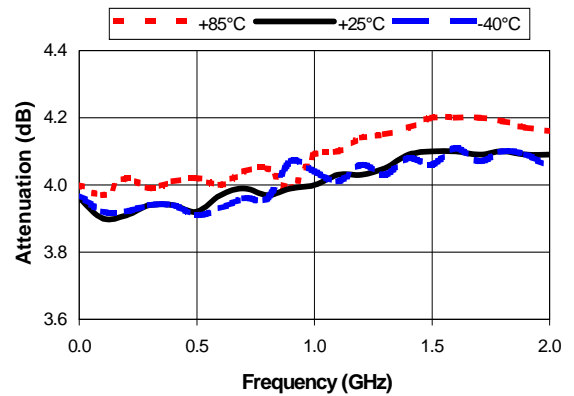


Typical Performance Curves

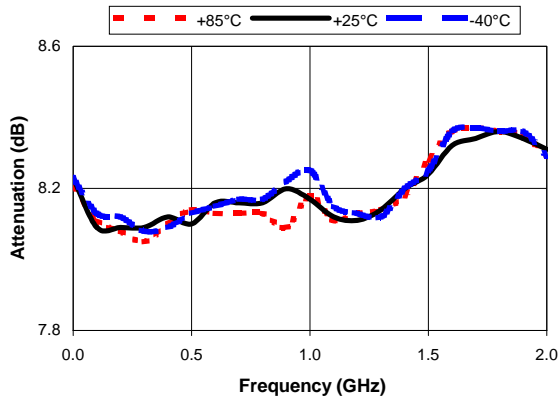
2 dB Bit vs. Temperature



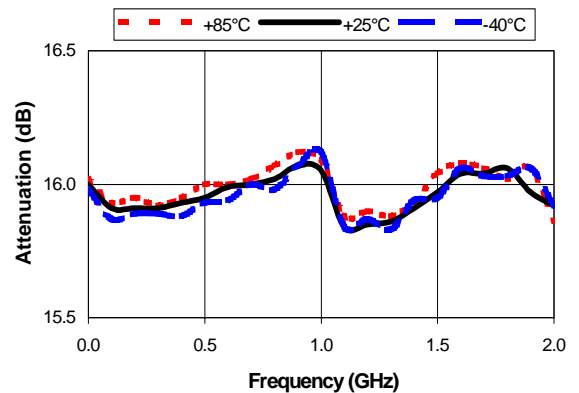
4 dB Bit vs. Temperature



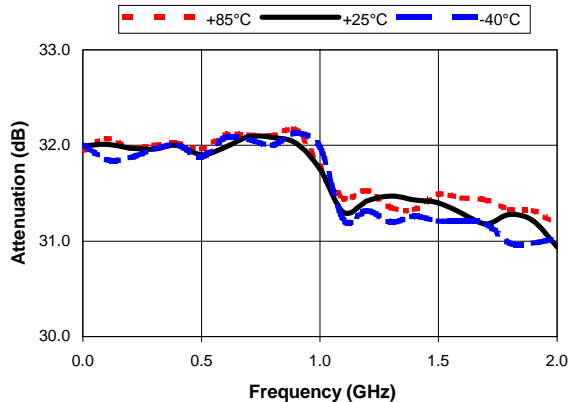
8 dB Bit vs. Temperature



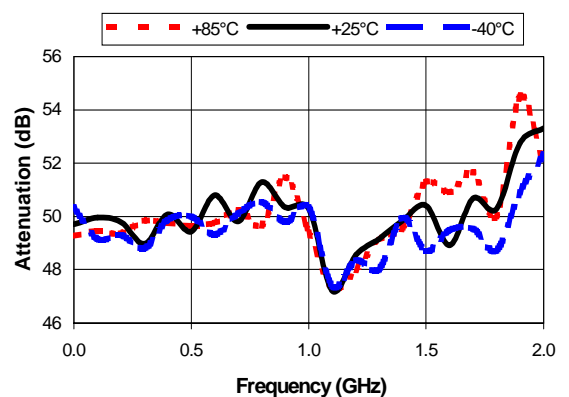
16 dB Bit vs. Temperature



32 dB Bit vs. Temperature



Max. Attenuation vs. Temperature



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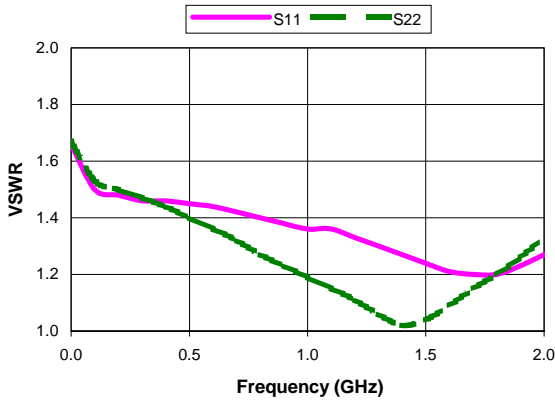
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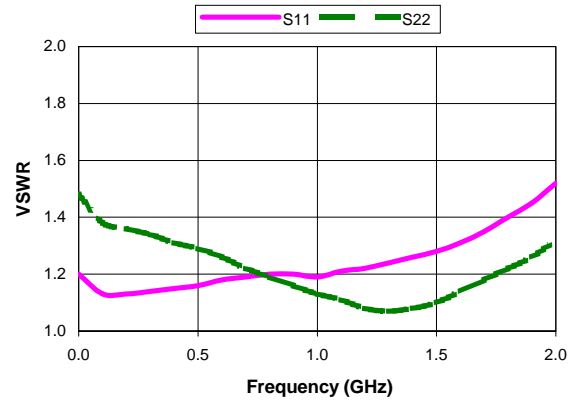


Typical Performance Curves

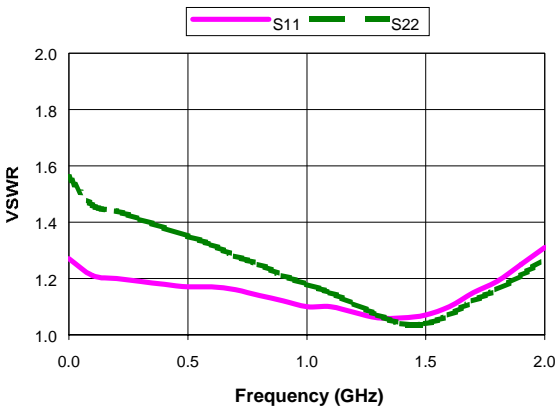
VSWR (S11, S22), Loss



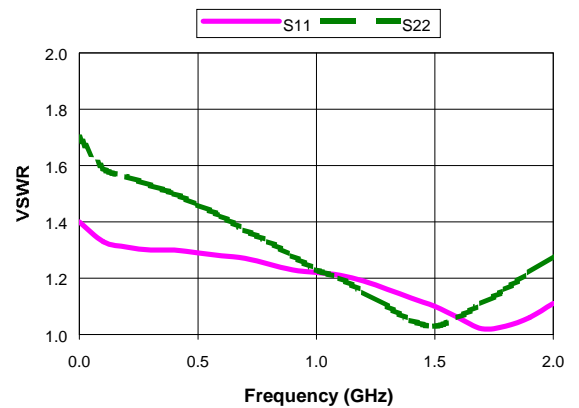
VSWR (S11, S22), 1 dB Bit



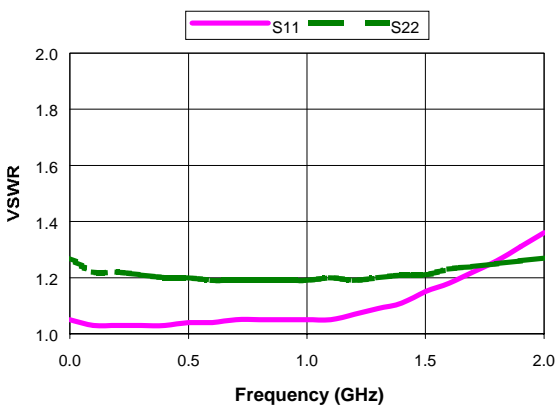
VSWR (S11, S22), 2 dB Bit



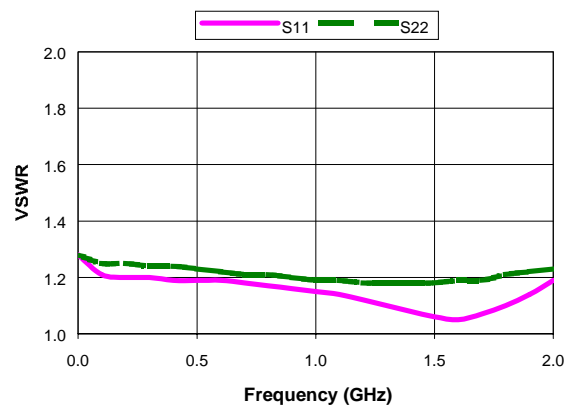
VSWR (S11, S22), 4 dB Bit



VSWR (S11, S22), 8 dB Bit



VSWR (S11, S22), 16 dB Bit



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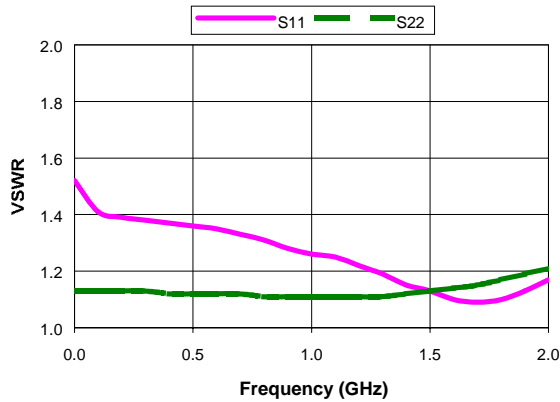
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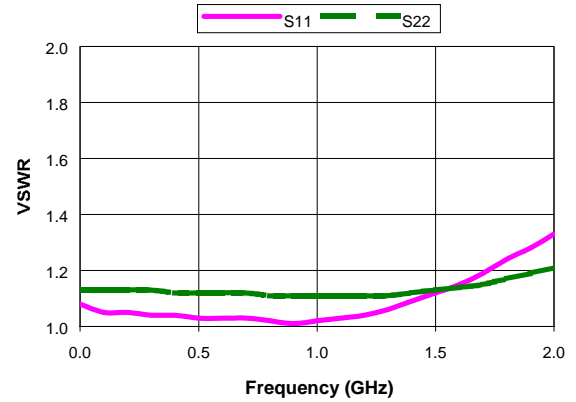


### Typical Performance Curves

VSWR (S11, S22), 32 dB Bit



VSWR (S11, S22), Max. Attenuation



### 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.

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