Digital Attenuator, 28 dB, 3-Bit DC-2.0 GHz

AT-230 V4

Features

- 4-dB Attenuation Steps to 28 dB
- High Accuracy
- Low DC Power Consumption: 50 µW
- Low Intermodulation Product: +50 dBm IP3
- Temperature Range: -40°C to +85°C
- SOIC-14 Plastic Package
- Tape and Reel Packaging Available

Description

M/A-COM's AT-230 is a 3-bit, 4-dB step GaAs MMIC digital attenuator in a low cost SOIC 14-lead surface mount plastic package. The AT-230 is ideally suited for use where high accuracy, fast switching, very low power consumption and low intermodulation products are required.

Typical applications include radio and cellular equipment, wireless LANs, GPS equipment and other Gain/Level Control circuits.

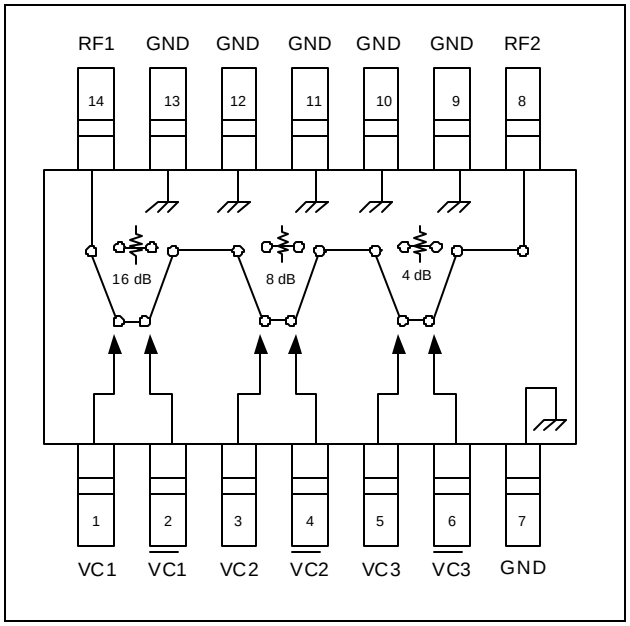
The AT-230 is fabricated with a monolithic GaAs MMIC using a mature 1-micron process. The process features full chip passivation for increased performance and reliability.

Ordering Information

Part Number	Package
AT-230	SOIC 14-Lead Plastic Package
AT-230TR	Forward Tape & Reel

Note: Reference Application Note M513 for reel size information.

Functional Schematic



Pin Configuration

Pin No.	Function	Pin No.	Function
1	VC1	8	RF2
2	$\overline{\text{VC1}}$	9	Ground
3	VC2	10	Ground
4	$\overline{\text{VC2}}$	11	Ground
5	VC3	12	Ground
6	$\overline{\text{VC3}}$	13	Ground
7	Ground	14	RF1

Absolute Maximum Ratings [1]

Parameter	Absolute Maximum
Input Power: 50 MHz 500-2000 MHz	 +27 dBm +34 dBm
Control Voltage	+5V, -8.5V
Operating Temperature	-40°C to +85°C
Storing Temperature	-65°C to +150°C

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

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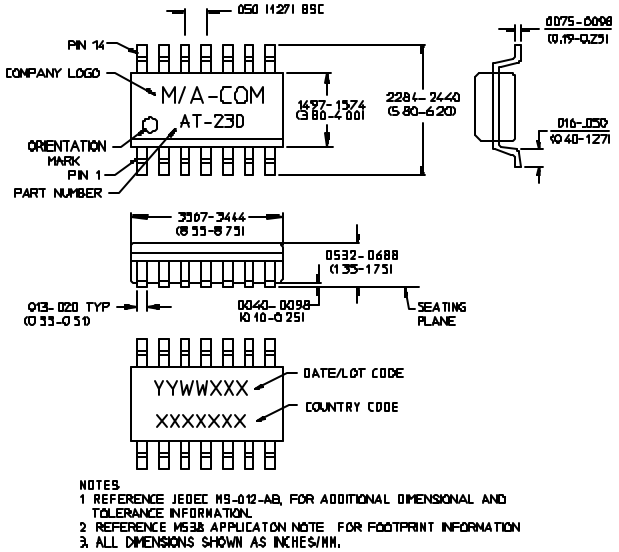
Electrical Specifications: T_A = 25°C, Z_0 = 50 Ω

Parameter	Test Conditions	Units	Min	Typ	Max
Reference Insertion Loss	DC-0.1 GHz DC-0.5 GHz DC-1.0 GHz DC-2.0 GHz	dB dB dB dB	— — — —	1.2 1.5 1.6 1.8	1.4 1.7 1.8 2.1
Attenuation Accuracy	DC-1.0 GHz DC-2.0 GHz	± (0.15 dB +3% of Atten Setting in dB) dB ± (0.30 dB +3% of Atten Setting in dB) dB			
VSWR		Ratio	—	1.2:1	—
Trise, Tfall	10% to 90% RF, 90% to 10% RF	nS	—	12	—
Ton, Toff	50% Control to 90% RF, 50% Control to 10% RF	nS	—	18	—
Transients	In Band	mV	—	25	—
1 dB Compression (Input Power)	0.05 GHz 0.5-2.0 GHz	dBm dBm	— —	20 28	— —
IP_2	0.05 GHz 0.5-2.0 GHz Measured Relative to Input Power (for two-tone input power up to +5 dBm)	dBm dBm	— —	45 68	— —
IP_3	0.05 GHz 0.5-2.0 GHz Measured Relative to Input Power (for two-tone input power up to +5 dBm)	dBm dBm	— —	40 50	— —

SOIC-14



Truth Table

Control Input						
$\overline{VC3}$	VC3	$\overline{VC2}$	VC2	$\overline{VC1}$	VC1	Atten (dB)
1	0	1	0	1	0	Reference
0	1	1	0	1	0	4 dB
1	0	0	1	1	0	8 dB
1	0	1	0	0	1	16 dB
0	1	0	1	0	1	28 dB

0 = VIN Low = 0 V to –0.2 V @ 20 µA maximum.
1 = VIN High = -5 V @ 10 µA typical to –8 V @ 200 µA maximum.

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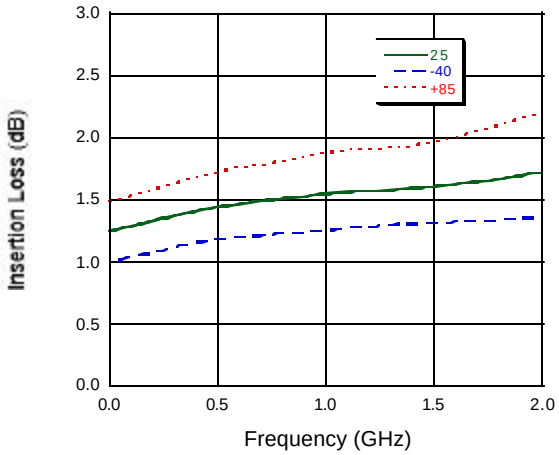
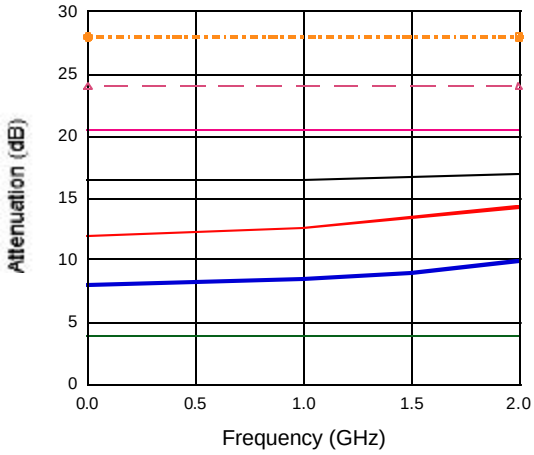
Typical Performance Curves

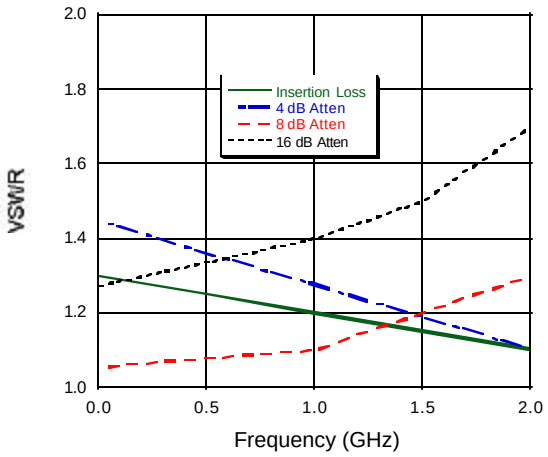
Insertion Loss



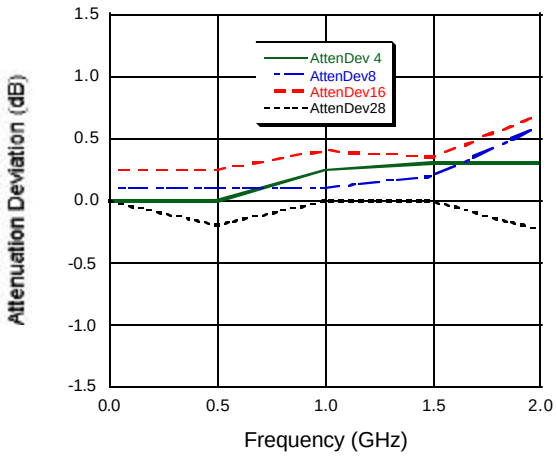
Attenuation



VSWR



Attenuation Accuracy



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