AT-260

Digital Attenuator, 31 dB, 5-Bit
DC - 2.0 GHz

Rev. V5

Features

- 1-dB Attenuation Steps to 31 dB
- Ultra Low DC Power Consumption
- Low Intermodulation Products: IP3 = 50 dBm
- SSOP-20 Plastic Package
- Tape and Reel Packaging Available
- Temperature Stability: ± 0.15 dB from –40°C to +85°C

Description

M/A-COM's AT-260 is a 5-bit, 1-dB step GaAs MMIC digital attenuator in a low cost SSOP-20 surface mount plastic package. The AT-260 is ideally suited for use where high accuracy, fast switching, very low power consumption and low intermodulation products are required at a low cost.

Typical applications include radio and cellular equipment, wireless LANS, GPS equipment and other gain/level control circuits.

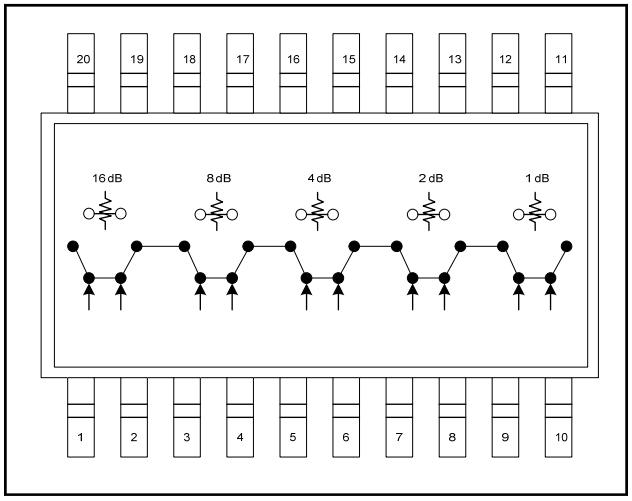
The AT-260 is fabricated with a monolithic GaAs MMIC using a mature 1-micron process. The process features full chip passivation for increased performance and reliability.

Ordering Information [1]

Part Number	Package
AT-260	SSOP 20-Lead
AT-260TR	Forward Tape and Reel

1. Reference Application Note M513 for reel size information.

Functional Schematic



Pin Configuration

Pin No.	Function	Pin No.	Function
1	VC1	11	RF1
2	$\overline{VC1}$	12	Ground
3	VC2	13	Ground
4	$\overline{VC2}$	14	Ground
5	VC3	15	Ground
6	$\overline{VC3}$	16	Ground
7	VC4	17	Ground
8	$\overline{VC4}$	18	Ground
9	No Connection	19	Ground
10	$\overline{VC5}$	20	RF2

Absolute Maximum Ratings [2,3]

Parameter	Absolute Maximum
Input Power: 0.05 GHz 0.5 - 2.0 GHz	 +27 dBm +34 dBm
Control Voltage	+5V, -8.5V
Operating Temperature	-40°C to +85°C
Storage Temperature	-65°C to +150°C

2. Exceeding any one or combination of these limits may cause permanent damage to this device.
3. M/A-COM does not recommend sustained operation near these survivability limits.

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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	— — — —	1.6 1.7 1.9 2.2	1.8 1.9 2.2 2.5
Attenuation Accuracy [4]	DC - 1.0 GHz DC - 2.0 GHz	± (0.20 dB +3% of Atten Setting in dB) dB ± (0.30 dB +3% of Atten Setting in dB) dB			
VSWR	(Any state)	Ratio	—	1.5:1	—
Trise, Tfall	10% to 90% RF, 90% to 10% RF	nS	—	8	—
Ton, Toff	50% Control to 90% RF, 50% Control to 10% RF	nS	—	15	—
Transients	In Band	mV	—	2	—
1 dB Compression	Input Power 0.05 GHz 0.5 - 2.0 GHz	 dBm dBm	 — —	 20 27	 — —
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 60	 — —
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	 — —	 34 50	 — —

4. Attenuation accuracy specifications apply with negative bias control and low inductance grounding.

Truth Table [5]

Control Inputs									
$\overline{VC5}$	$\overline{VC4}$	VC4	$\overline{VC3}$	VC3	$\overline{VC2}$	VC2	$\overline{VC1}$	VC1	Atten (dB)
1	1	0	1	0	1	0	1	0	Reference
0	1	0	1	0	1	0	1	0	1 dB
1	0	1	1	0	1	0	1	0	2 dB
1	1	0	0	1	1	0	1	0	4 dB
1	1	0	1	0	0	1	1	0	8 dB
1	1	0	1	0	1	0	0	1	16 dB
0	0	1	0	1	0	1	0	1	31 dB

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

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.

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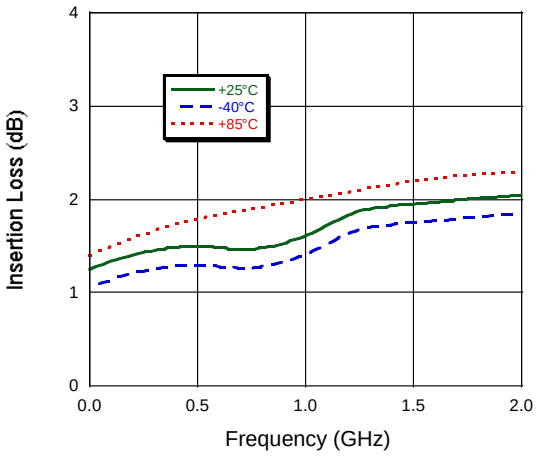
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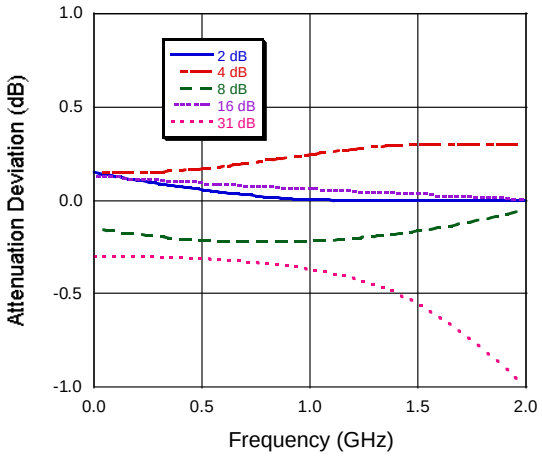
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Typical Performance Curves

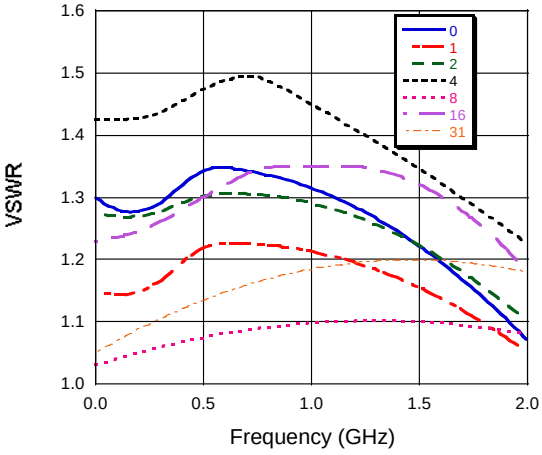
Insertion Loss



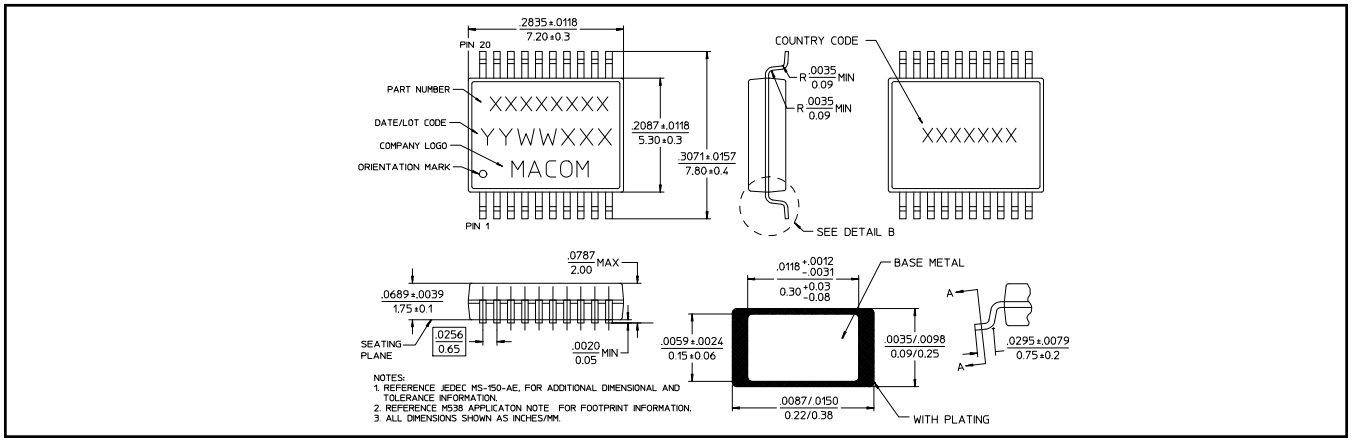
Attenuation Accuracy



VSWR



SSOP-20



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