



Digital Attenuator, 15 dB, 4-Bit, TTL Driver, DC - 3 GHz

V 3.00

AT-213

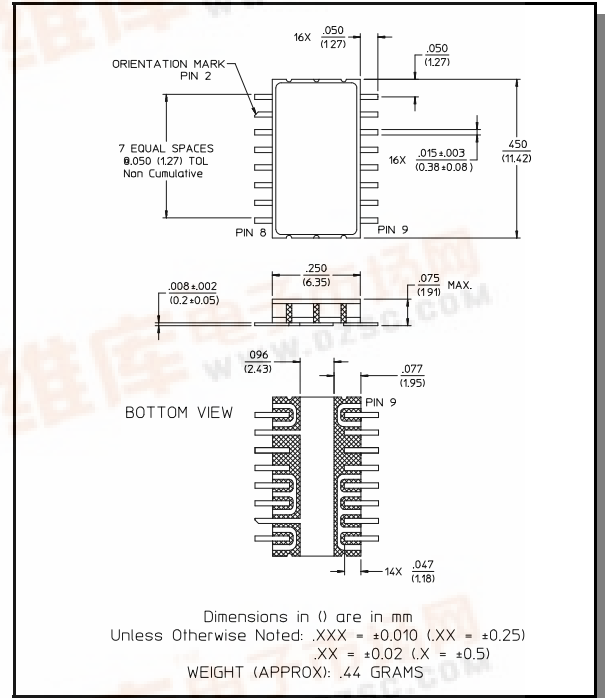
Features

- Attenuation: 1 dB steps to 15 dB
- Temperature Stability: ± 0.18 dB from -55°C to $+85^{\circ}\text{C}$ Typical
- Low DC Power Consumption
- Hermetic Surface Mount Package
- Integral TTL Driver
- 50 Ohms Nominal Impedance

Description

M/A-COM's AT-213 is a 4-bit, 1 dB step digital attenuator in a hermetically sealed ceramic 16-lead surface mount package. The AT-213 is ideally suited for use where high accuracy, fast switching, very low power consumption and low intermodulation products are required. Typical applications include dynamic range setting in a precision receiver circuits and other gain/leveling control circuits. Environmental screening is available. Contact the factory for information.

CR-11



Electrical Specifications: $T_A = -55^{\circ}\text{C}$ to $+85^{\circ}\text{C}$ ¹

Parameter	Test Conditions	Frequency	Units	Min	Typ	Max
Reference Insertion Loss	—	DC - 0.5 GHz	dB	—	—	1.7
		DC - 1.0 GHz	dB	—	—	1.9
		DC - 2.0 GHz	dB	—	—	2.2
		DC - 3.0 GHz	dB	—	—	2.5
Attenuation Accuracy ²	Any Single Bit	DC - 2.0 GHz DC - 3.0 GHz	dB	$\pm (0.15 \text{ dB} + 3\% \text{ of atten setting in dB})$ $\pm (0.2 \text{ dB} + 3\% \text{ of atten setting in dB})$ Or $\pm 0.4 \text{ dB}$, whichever is greater		
	Any Combination of Bits	DC - 2.0 GHz DC - 3.0 GHz	dB	$\pm (0.2 \text{ dB} + 3\% \text{ of atten setting in dB})$ $\pm (0.2 \text{ dB} + 3\% \text{ of atten setting in dB})$ Or $\pm 0.4 \text{ dB}$, whichever is greater		
VSWR	—	—	Ratio	—	—	1.6:1
Trise, Tfall	10% to 90%	—	ns	—	9	—
Ton, Toff	50% Control to 90/10% RF	—	ns	—	40	—
Transients	In-Band (peak-peak)	—	mV	—	30	—
1 dB Compression	Input Power Input Power	0.05 GHz	dBm	—	+22	—
		0.5 - 3.0 GHz	dBm	—	+28	—
Input IP3	For two-tone Input Power Up to +5 dBm	0.05 GHz 0.5 - 3.0 GHz	dBm dBm	— —	+40 +50	— —
Input IP2	For two-tone Input Power Up to +5 dBm	0.05 GHz 0.5 - 3.0 GHz	dBm dBm	— —	+45 +68	— —
Vcc	—	—	V	4.5	5.0	5.5
Vee	—	—	V	-8.0	—	-5.0

1. All specifications apply when operated with bias voltages of +5V for Vcc and -5.0V for Vee.

2. This attenuator is guaranteed monotonic.



Electrical Specifications: $T_A = -55^{\circ}\text{C}$ to $+85^{\circ}\text{C}$

Parameter	Test Conditions	Frequency	Units	Min	Typ	Max
I _{cc}	V _{cc} = 4.5 to 5.5V V _{ctl} = 0 to 0.8V, or V _{cc} -2.1V to V _{cc}	—	mA	—	—	4.0
I _{ee}	V _{ee} = -5.0 to -8.0V	—	mA	—	—	1.0
V _{ctl}	Logic 0 (TTL)	—	V	0.0	—	0.8
V _{ctl}	Logic 1 (TTL)	—	V	2.0	—	5.0
Input Leakage Current (Low)	0 to 0.8V	—	μA	—	—	1.0
Input Leakage Current (High)	2.0 to 5.0V	—	μA	—	—	1.0

Absolute Maximum Ratings ³

Parameter	Absolute Maximum
Max Input Power 0.5 GHz 0.5 - 3.0 GHz	+27 dBm +34 dBm
Supply Voltages V _{cc} V _{ee}	+5.5V -8.5V
Control Voltage ⁴	-0.5V to V _{cc} +0.5V
Operating Temperature	-55°C to +125°C
Storage Temperature	-65°C to +150°C

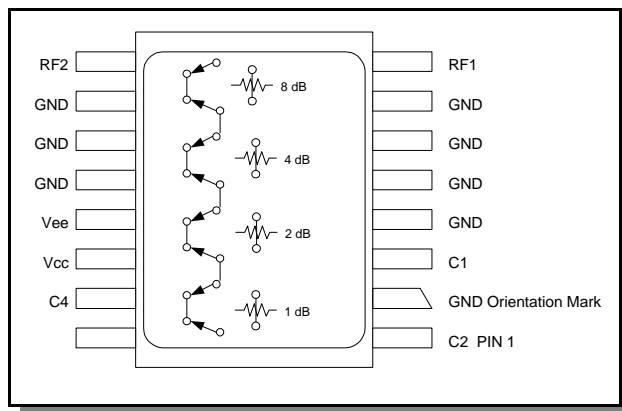
3. Operation of this device above any one of these parameters may cause permanent damage.
4. Standard CMOS TTL interface, latch-up will occur if logic signal is applied prior to power supply.

Truth Table

Control Inputs				
C4	C3	C2	C1	Attenuation
0	0	0	0	Reference
0	0	0	1	1 dB
0	0	1	0	2 dB
0	1	0	0	4 dB
1	0	0	0	8 dB
1	1	1	1	15 dB

0 = TTL Low 1 = TTL High

Functional Schematic (Top View)

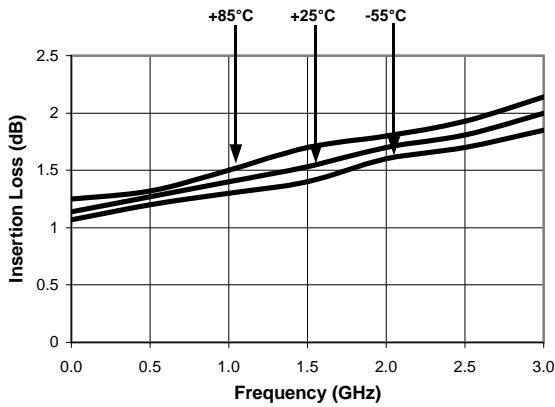


Specifications subject to change without notice.

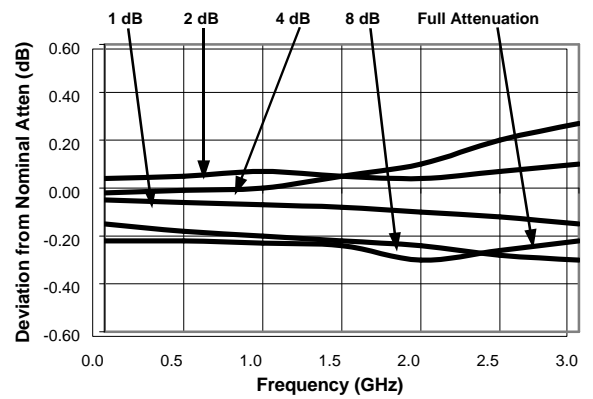
- **North America:** Tel. (800) 366-2266
- **Asia/Pacific:** Tel.+81-44-844-8296, Fax +81-44-844-8298
- **Europe:** Tel. +44 (1344) 869 595, Fax+44 (1344) 300 020

Typical Performance Curves

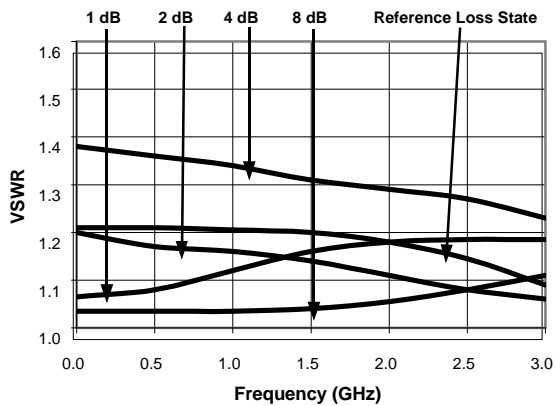
Ref. Insertion Loss vs. Frequency



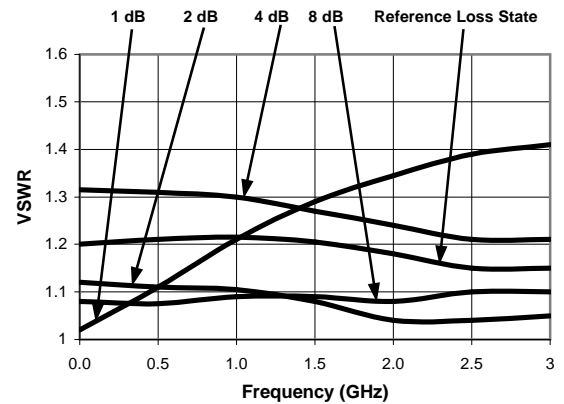
Attenuation Accuracy vs. Frequency



RF1 VSWR vs. Frequency



RF2 VSWR vs. Frequency



Ordering Information

Part Number	Package
AT-213 PIN	CR-11

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