

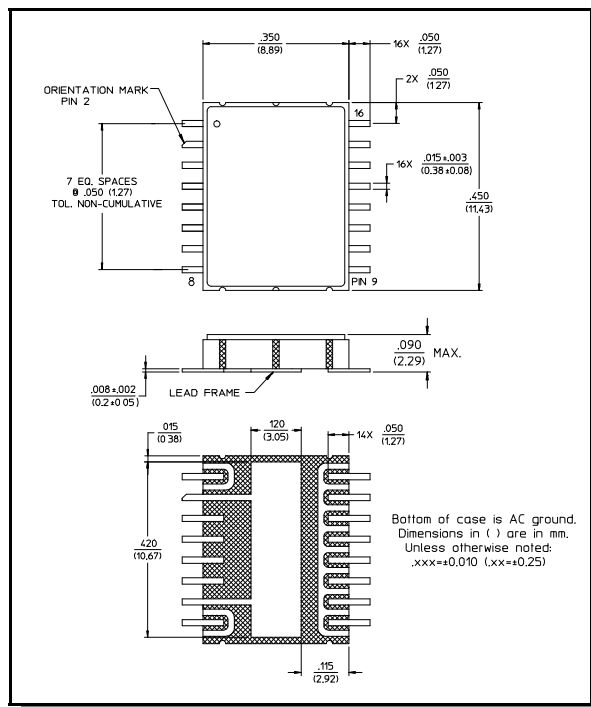
## Features

- Attenuation: 0.5 dB Steps to 15.5 dB<sup>2</sup>
- Temperature Stability:  $\pm 0.18$  dB from  $-55^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$  Typical
- Low DC Power Consumption
- Hermetic Surface Mount Package
- Integral TTL Driver
- 50  $\Omega$  Nominal Impedance

## Description

M/A-COM's AT-283 is a GaAs FET 5-bit digital attenuator with a 0.5 dB minimum step size and 15.5 dB total attenuation. This attenuator and integral TTL driver is in a hermetically sealed ceramic 16-lead surface mount package. The AT-283 is ideally suited for use where accuracy, fast switching, very low power consumption and low intermodulation products are required. Typical applications include dynamic range setting in precision receiver circuits and other gain/leveling control circuits. Environmental screening is available. Contact the factory for information.

## CR-12



## Electrical Specifications<sup>1</sup>: $T_A = 25^{\circ}\text{C}$

Parameter	Test Conditions	Units	Min	Typical	Max
Reference Insertion Loss	DC-0.5 GHz	dB	—	—	2.2
	DC-1.0 GHz	dB	—	—	2.5
	DC-2.0 GHz	dB	—	—	2.9
Attenuation Accuracy <sup>3</sup>	Any Single Bit Any Combination of Bits	DC-2.0 GHz DC-2.0 GHz	$\pm (0.25 + 3\% \text{ of attenuation setting in dB})$ dB $\pm (0.25 + 3\% \text{ of attenuation setting in dB})$ dB or $\pm 0.4$ dB, whichever is greater		
VSWR	DC-1.0 GHz DC-2.0 GHz	—	—	—	1.6:1
		—	—	—	1.7:1
Trise, Tfall Ton, Toff Transients	10% to 90% 50% Control to 90/10% RF In-band (peak—peak)	nS	—	10	—
		nS	—	27	—
		mV	—	22	—
1 dB Compression <sup>4</sup>	Input Power	0.05 GHz	—	+20	—
	Input Power	0.5-2.0 GHz	—	+28	—
Input IP <sub>3</sub> <sup>4</sup>	For two-tone input power up to +5 dBm	0.05 GHz	—	+40	—
		0.5-2.0 GHz	—	+47	—

1. All specifications apply when operated with bias voltages of +5.0V for  $V_{CC}$  and  $-5.0\text{V}$  to  $-8.0\text{V}$  for  $V_{EE}$ , and 50  $\Omega$  impedance at all ports unless otherwise specified.
2. Above reference insertion loss.
3. This attenuator is guaranteed monotonic.
4.  $V_{EE} = -5.0\text{V}$  for the typical numbers given.

Electrical Specifications<sup>1</sup>: T<sub>A</sub> = 25°C

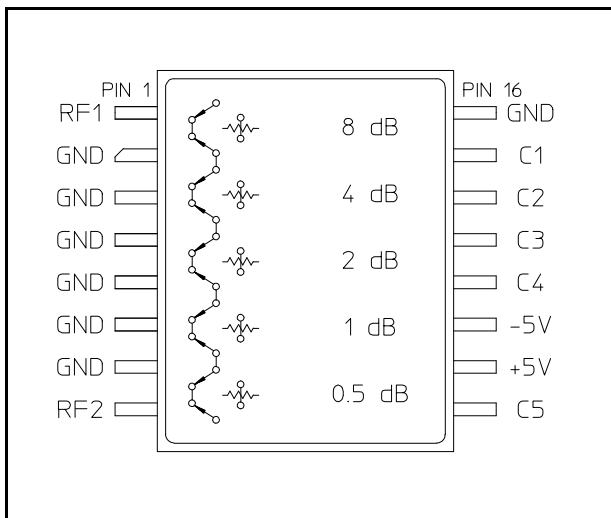
Parameter	Test Conditions	Units	Min	Typical	Max
Input IP <sub>2</sub> <sup>4</sup>	For two-tone input power up to +5 dBm 0.05 GHz 0.5-2.0 GHz	dBm dBm	— —	+53 +68	— —
V <sub>CC</sub> V <sub>EE</sub>	— —	V V	4.5 -8.0	5.0 —	5.5 -5.0
I <sub>CC</sub>	V <sub>CC</sub> = 4.5 to 5.5V V <sub>ctl</sub> = 0 to 0.8V, or V <sub>CC</sub> - 2.1V to V <sub>CC</sub>	mA	—	—	5.0
I <sub>EE</sub>	V <sub>EE</sub> = -5.0 to -8.0V	mA	—	—	1.0
V <sub>ctl</sub> V <sub>cti</sub>	Logic 0 (TTL) Logic 1 (TTL)	V V	0.0 2.0	— —	0.8 5.0
Input Leakage Current (Low) Input Leakage Current (High)	0 to 0.8V 2.0 to 5.0V	μA μA	— —	— —	1.0 1.0

Truth Table

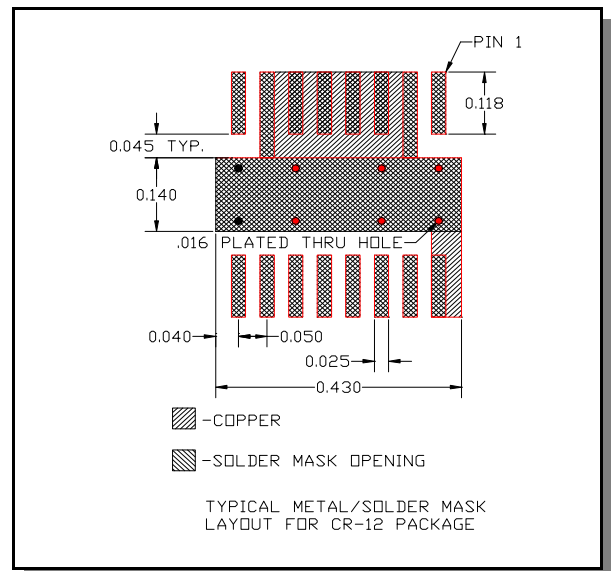
Control Inputs					
C1	C2	C3	C4	C5	Attenuation
0	0	0	0	0	Reference
1	0	0	0	0	0.5 dB
0	1	0	0	0	1 dB
0	0	1	0	0	2 dB
0	0	0	1	0	4 dB
0	0	0	0	1	8 dB
1	1	1	1	1	15.5 dB

0 = TTL Low; 1 = TTL High

Functional Schematic (Top View)



Recommended PCB Layout



Absolute Maximum Ratings

Parameter	Absolute Maximum
Maximum Input Power 0.05 GHz 0.5-2.0 GHz	+27 dBm +34 dBm
Supply Voltages V <sub>CC</sub> V <sub>EE</sub>	+5.5V -8.5V
Control Voltage	-0.5V to V <sub>CC</sub> + 0.5V
Operating Temperature	-55°C to +125°C
Storage Temperature	-65°C to +150°C

Note: Operation of this device above any on of these parameters may cause permanent damage.

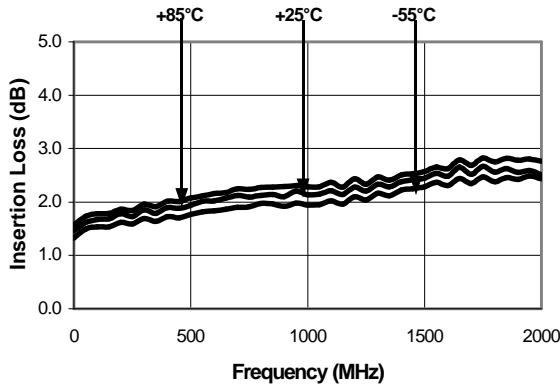
Specifications subject to change without notice.

- 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

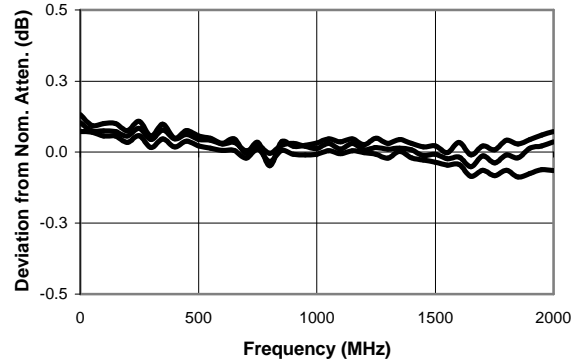
Visit [www.macom.com](http://www.macom.com) for additional data sheets and product information.

Typical Performance Curves

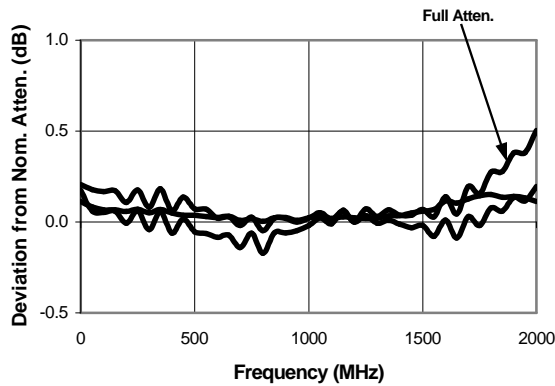
Reference Insertion Loss vs.



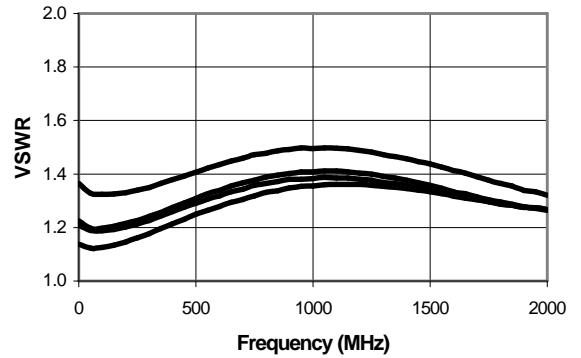
Attenuation Accuracy vs. Frequency 0.5, 1, 2 dB Bits



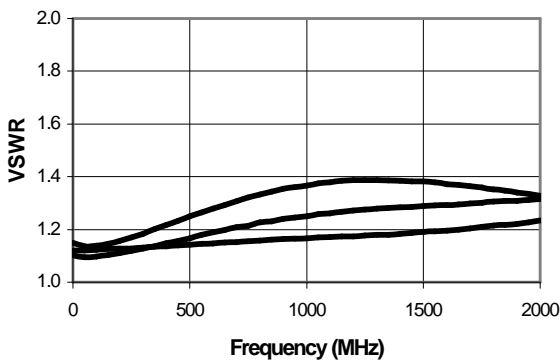
Attenuation Accuracy vs. Frequency 4, 8 dB Bits and Full Attenuation



VSWR vs. Frequency Reference Loss, 0.5, 1, 2 dB Bits



VSWR vs. Frequency 4, 8 dB Bits and Full Attenuation



Ordering Information <sup>5</sup>

Part Number	Package
AT-283 PIN	CR-12

5. Contact the factory for standard or custom screening requirements.

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