

# Digital Attenuator, 15.5 dB, 5-Bit DC - 2 GHz

## AT-280

V 2.00

### Features

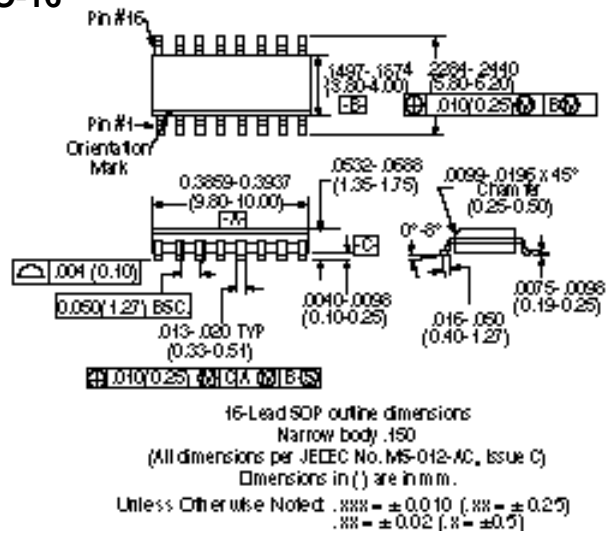
- Attenuation: 0.5-dB Steps to 15.5 dB
- Temperature Stability:  $\pm 0.15$  dB from  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$  Typical
- Ultra Low DC Power Consumption
- Low Intermodulation Products,  $\text{IP}_3$ : 45 dBm
- Tape and Reel Packaging Available

### Description

M/A-COM's AT-280 is a 5-bit, 0.5 dB-step GaAs MMIC digital attenuator in a low cost SOIC 16-lead surface mount plastic package. The AT-280 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-280 is fabricated with a monolithic GaAs MMIC using a mature 1-micron process. The process features full chip passivation for increased performance and reliability.

### SO-16



### Ordering Information

Part Number	Package
AT-280 PIN	SOIC 16-Lead
AT-280TR	Forward Tape & Reel*
AT-280RTR	Reverse Tape & Reel*

\* If specific reel size is required, consult factory for part number assignment.

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

Parameter	Test Conditions <sup>2</sup>	Unit	Min.	Typ.	Max
Reference Insertion Loss	DC - 0.1 GHz	dB		1.1	1.3
	DC - 0.5 GHz	dB		1.3	1.5
	DC - 1.0 GHz	dB		1.5	1.8
	DC - 2.0 GHz	dB		1.8	2.0
Attenuation Accuracy <sup>2</sup>	DC - 1.0 GHz DC - 2.0 GHz		$\pm (0.20 \text{ dB} + 3\% \text{ of Atten. Setting in dB})$ dB $\pm (0.30 \text{ dB} + 3\% \text{ of Atten. Setting in dB})$ dB		
VSWR	(any state)		1.5:1	1.8:1	
Trise, Tfall Ton, Toff Transients	10% to 90% RF, 90% to 10% RF	nS		12	
	50% Control to 90% RF, 50% Control to 10% RF	nS		18	
	In Band	mV		30	
One dB Compression	Input Power 0.05 GHz	dBm		22	
	Input Power 0.5 - 2.0 GHz	dBm		27	
$\text{IP}_2$	Measured Relative to Input Power 0.05 GHz	dBm		53	
	(for two-tone input power up to +5 dBm) 0.5 - 2.0 GHz	dBm		68	
$\text{IP}_3$	Measured Relative to Input Power 0.05 GHz	dBm		40	
	(for two-tone input power up to +5 dBm) 0.5 - 2.0 GHz	dBm		45	

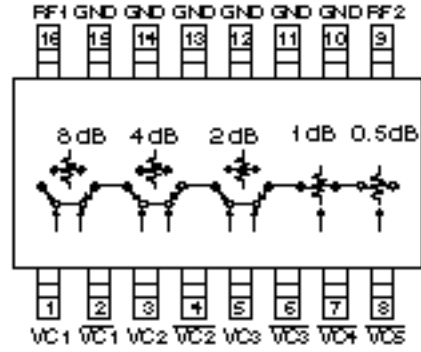
1. All measurements at 1 GHz in a 50  $\Omega$  system, unless otherwise specified.  
2. Attenuation accuracy specifications apply with negative bias control and low inductance grounding.

### Absolute Maximum Ratings<sup>1</sup>

Parameter	Absolute Maximum <sup>1</sup>
Max. Input Power 0.05 GHz	+27 dBm
0.5 – 2.0 GHz	+34 dBm
Control Voltage	+5V, -8.5V
Operating Temperature	-40°C to +85°C
Storage Temperature	-65°C to +150°C

1.Operation of this device above any one of these parameters may cause permanent damage.

### Functional Schematic



### Truth Table

Control Inputs								Attenuation (dB)
VC5	VC4	VC3	VC3	VC2	VC2	VC1	VC1	
1	1	1	0	1	0	1	0	Reference
0	1	1	0	1	0	1	0	0.5 dB
1	0	1	0	1	0	1	0	1 dB
1	1	0	1	1	0	1	0	2 dB
1	1	1	0	0	1	1	0	4 dB
1	1	1	0	1	0	0	1	8 dB
0	0	0	1	0	1	0	1	15.5 dB

0 = VinLow = 0 V = 0 to -0.2 V @ 20 A maximum

### Typical Performance

