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August 15, 2014

Mouser Electronics  
1000 N. Main St.  
Mansfield, Texas 76063

ATTN: Quality/Purchasing Manager

**Subject:** Addition of testing requirement for M/A-COM Component Product AT-263-PIN.  
**PCN #:** PCN-00655

Dear Valued Customer:

M/A-COM Technology Solutions has added a 1.8:1 VSWR test requirement for the attenuation states of our AT-263-PIN product. The updated data sheet for this product is attached for your review.

M/A-COM is sending this notification because you have purchased the AT-263-PIN product within the last two years. This change will not affect product form, fit, function or reliability. If you have any questions about this change, please contact your customer service representative.

Regards,

**Loren Reifsteck**  
**U.S. Quality Manager**  
M/A-COM Technology Solutions, Inc.  
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## AT-263-PIN



**Digital Attenuator**  
**31.0 dB, 5-Bit, TTL Driver, DC-2.0 GHz**

Rev. V7

### Features

- Attenuation: 1 dB steps to 31 dB
- 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 Ohm Nominal Impedance
- Lead-Free CR-12 Package
- $260^{\circ}\text{C}$  Reflow Compatible
- RoHS\* Compliant

### Description

M/A-COM's AT-263-PIN is a GaAs FET 5-bit digital attenuator with a 1 dB minimum step size and 31 dB total attenuation. This attenuator and integral TTL driver is in a hermetically sealed ceramic 16-lead surface mount package. The AT-263-PIN 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.

### Ordering Information

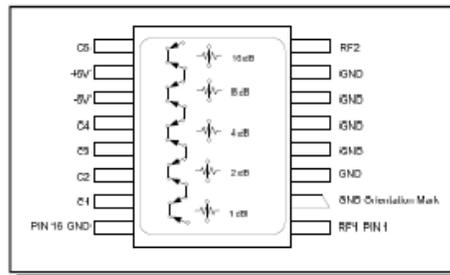
Part Number	Package
AT-263-PIN	Bulk Packaging
AT-263TR	1000 piece reel
AT-263-TB	Sample Test Board

Note: Reference Application Note M513 for reel size information.

\* Restrictions on Hazardous Substances, European Union Directive 2011/65/EU.

### Functional Schematic

### Functional Schematic



### Pin Configuration

Pin No.	Function	Pin No.	Function
1	RF1	9	C5
2	GND	10	+5V
3	GND	11	-5V
4	GND	12	C4
5	GND	13	C3
6	GND	14	C2
7	GND	15	C1
8	RF2	16	GND

The metal bottom of the case must be connected to RF and DC ground.

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### Electrical Specifications: (From -55°C to +85°C)<sup>1</sup>

Parameter	Test Conditions	Frequency	Units	Min	Typ	Max
Reference Insertion Loss	—	DC - 0.5 GHz	dB	—	—	2.4
		DC - 1.0 GHz	dB	—	—	2.6
		DC - 2.0 GHz	dB	—	—	3.0
Attenuation Accuracy <sup>2</sup>	Any Single Bit Any Combination of Bits	DC - 1.0 GHz DC - 2.0 GHz	± (0.25 +3% of atten setting in dB) dB ± (0.25 +3% of atten setting in dB) dB or ± 0.4 dB, whichever is greater			
VSWR	Insertion Loss Attenuation States	DC - 2.0 GHz DC - 2.0 GHz	Ratio Ratio	—	—	1.6:1 1.8:1
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	—	+20	—
		0.5 - 2.0 GHz	dBm	—	+28	—
Input IP3	For two-tone Input Power Up to +5 dBm	0.05 GHz	dBm	—	+40	—
		0.5 - 2.0 GHz	dBm	—	+48	—
Input IP2	For two-tone Input Power Up to +5 dBm	0.05 GHz	dBm	—	+45	—
		0.5 - 2.0 GHz	dBm	—	+68	—
Vcc	—	—	V	4.5	5.0	5.5
Vee	—	—	V	-8.0	—	-5.0
Icc	Vcc = 4.5 to 5.5V Vctl = 0 to 0.8V, or Vcc -2.1V to Vcc	—	mA	—	—	5.0
Iee	Vee = -5.0 to -8.0V	—	mA	—	—	1.0
Vctl	Logic 0 (TTL) Logic 1 (TTL)	—	V	0.0	—	0.8
		—	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

1. All specifications apply when operated with bias voltages of +5V for Vcc and -5.0V for Vee.
2. This attenuator is guaranteed monotonic.

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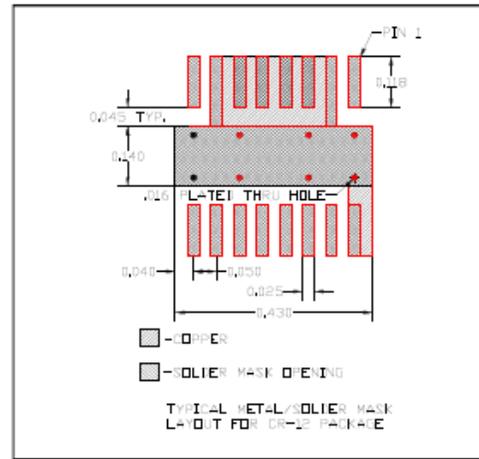
Rev. V7

### Absolute Maximum Ratings <sup>3,4</sup>

Parameter	Absolute Maximum
Max Input Power 0.05 GHz 0.5 - 2.0 GHz	+27 dBm +34 dBm
V <sub>CC</sub>	-0.5V ≤ V <sub>CC</sub> ≤ +7.0V
V <sub>EE</sub>	-8.5V ≤ V <sub>EE</sub> ≤ +0.5V
V <sub>CC</sub> - V <sub>EE</sub>	-0.5V ≤ V <sub>CC</sub> - V <sub>EE</sub> ≤ 14.5V
V <sub>in</sub>	-0.5V ≤ V <sub>in</sub> ≤ V <sub>CC</sub> + 0.5V
Operating Temperature	-55°C to +125°C
Storage Temperature	-65°C to +150°C

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

### Recommended PCB Configuration



### 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.

### Truth Table (Digital Attenuator)

Control Inputs					Attenuation
C5	C4	C3	C2	C1	
0	0	0	0	0	Reference
0	0	0	0	1	1 dB
0	0	0	1	0	2 dB
0	0	1	0	0	4 dB
0	1	0	0	0	8 dB
1	0	0	0	0	16 dB
1	1	1	1	1	31 dB

0 = TTL Low; 1 = TTL High

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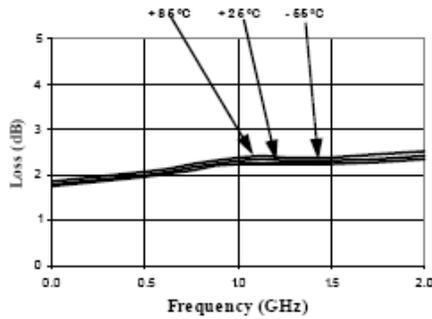


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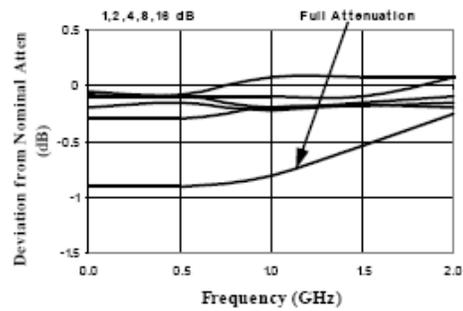
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## Typical Performance Curves

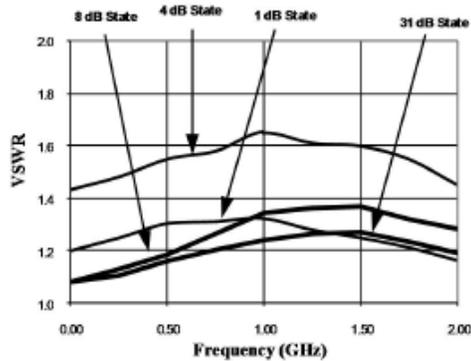
Ref. Insertion Loss vs. Frequency



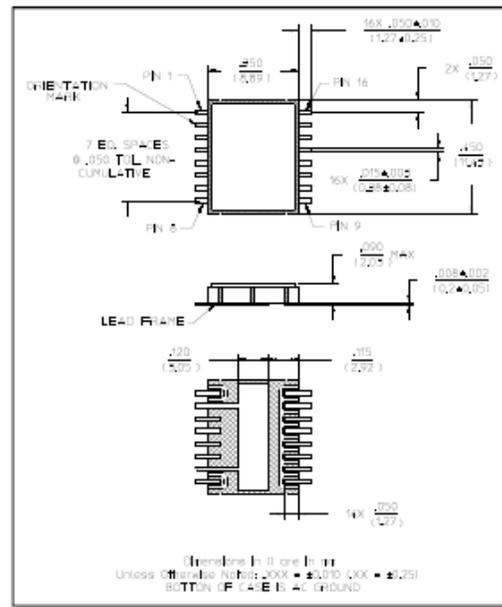
Attenuation Accuracy vs. Frequency



VSWR vs. Frequency



Lead-Free, CR-12 Ceramic Package†



† Reference Application Note M538 for lead-free solder reflow recommendations.

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