Digital Attenuator, 1 Bit, 15 dB Step DC - 2.0 GHz

V 2.00

AT-267

Features

- Single 15 dB Step
- Low Loss, 0.3 dB Typical @ 900 MHz
- 2.7 to 5.0 Volt Operation
- Insertion Loss, Attenuation insensitive to Control Voltage
- Low Cost SOT-25 Plastic Package
- Tape and Reel Packaging Available

Description

M/A-COM's AT-267 is a 1 bit, 15 dB step GaAs MMIC digital attenuator in a low cost SOT-25 5 lead surface mount plastic package. The AT-267 is ideally suited for use where high accuracy, very low power consumption and low intermodulation products are required.

Typical applications include wireless handsets, base stations, wireless LAN equipment, GPS receivers and any RF applications with automatic gain/level control circuits.

The AT-267 is fabricated as a monolithic GaAs integrated circuit using a proven self-aligned gate process. The process features full chip passivation for performance and reliability.

Truth Table [1, 2, 3]

Mode (Control)	V1	V2	Atten
Positive[1]	0 ± 0.2 V +2.5 V to +5 V	+2.5 V to +5 V 0 ± 0.2 V	15 dB IL
Postitive/ Negative[1,2]	-Vc ± 0.2 V +Vc	+Vc -Vc ± 0.2 V	15 dB IL
Negative[3]	0 ± 0.2 V -2.5 V to -5 V	-2.5 V to -5 V 0 ± 0.2 V	IL 15 dB

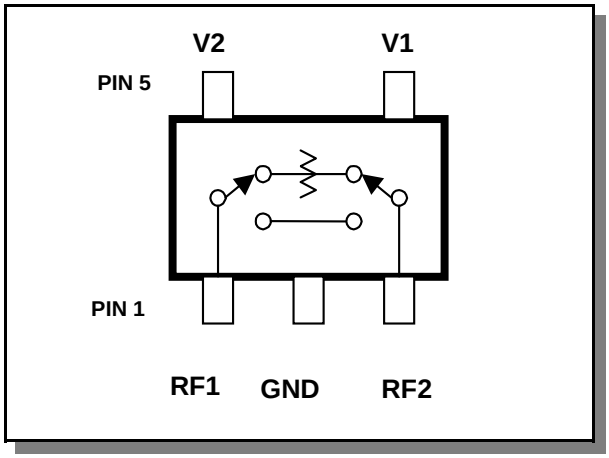
1. External DC blocking capacitors are required as noted*
2. $|-Vc|+ Vc \leq 8$ V
3. If negative control is used, DC blocking capacitors are not required on RF Ports and Ground.

Absolute Maximum Ratings[1]

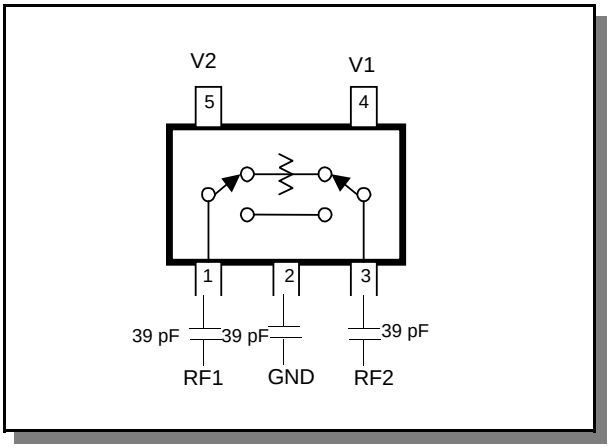
Parameter	Absolute Maximum
Maximum Input Power	+21 dBm
Control Voltage V_{CTL}	-8 V
Operating Temperature	-40° C to +85° C
Storage Temperature	-65° C to +150° C

1. Exceeding any one or a combination of these limits may cause permanent damage.

Functional Schematic



Positive Control Voltage



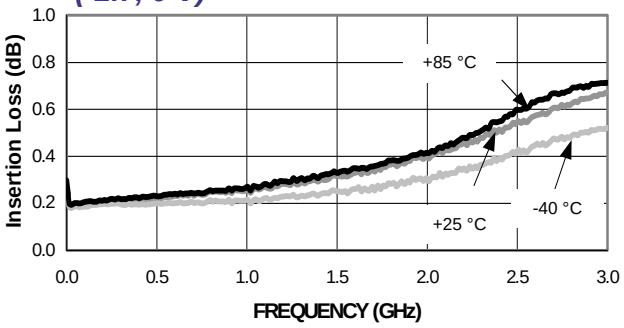
Electrical Specifications: T_A = +25 °C, V_{CTRL} = +2.7 Volts[1]

Parameter	Test Conditions	Units	Min.	Typ.	Max.
Insertion Loss	1.0 GHz	dB		0.3	0.4
	2.0 GHz	dB		0.4	0.5
Attenuation	1.0 GHz	dB	15	15.5	16
	2.0 GHz	dB	14	14.5	15
V_{SWR}	1.0 GHz				1.2:1
	2.0 GHz				1.3:1
Input IP_3	1.0 GHz (0 dBm), Attenuator OFF	dBm	40	43	
	Attenuator ON		40	45	
P_{1dB}	1 GHz, Attenuator OFF	dBm	19	22	
	Attenuator ON		13	17	
Leakage Current		µA			10
T_{rise}, T_{fall}	10% to 90% RF, 90% to 10% RF	nS		150	
T_{on}, T_{off}	50% Control to 90% RF, Control to 10% RF	nS		150	
Transients	In Band	mV		10	

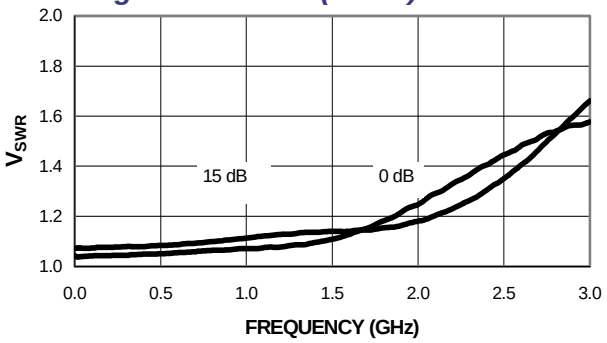
1. All measurements in a 50-Ω system unless otherwise specified. The RF ports must be blocked out side of the package from ground or any other voltage.

Typical Performance Curves

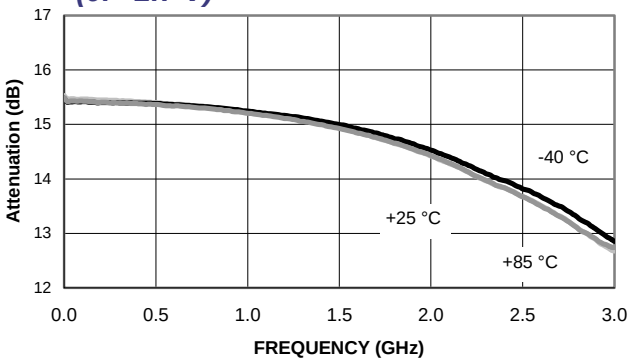
Insertion Loss with Negative Control (-2.7, 0 V)



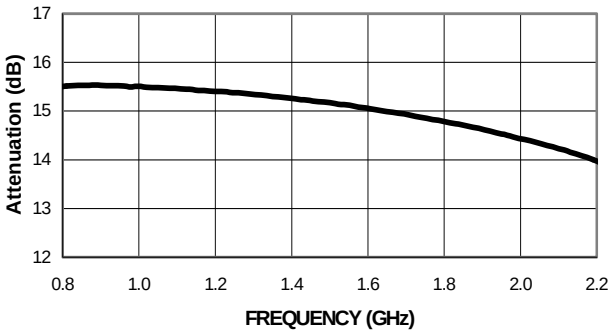
VSWR, 0 and 15 dB States with Negative Control (-2.7 V) +25 °C



Attenuation with Negative Control (0. –2.7 V)



Attenuation with Positive Control (0, +2.7 V)



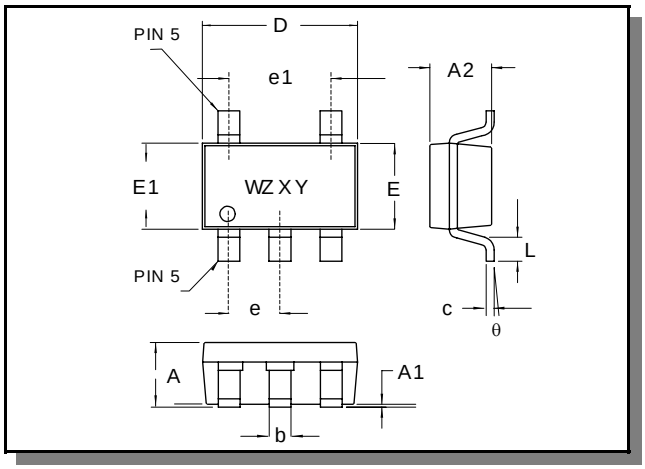
- **North America:** Tel. (800) 366-2266
- **Asia/Pacific:** Tel.+81-44-844-8296, Fax +81-44-844-8298
- **Europe:** Tel. +44 (1344) 869 595, Fax+44 (1344) 300 020

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SOT-25 Package Outline [1,2]



1. Dimensions do not include mold flash, protrusion or gate burrs which shall not exceed 0.0098 in (0.25mm) per side.
2. Lead Coplanarity is 0.003 (0.08) max.

SOT-25 Dimensions

DIM	MEASUREMENT (mm)		
	MIN	NOM	MAX
A	-	-	1.45
A1	-	-	0.15
A2	0.90	1.15	1.30
b	0.30	-	0.50
c	0.08	-	0.22
D	-	2.90 basic	-
e	-	0.95 basic	-
e1	-	1.90 basic	-
E	-	2.80 basic	-
E1	-	1.60 basic	-
L	0.30	0.60	0.45
θ	0°	4°	8°

Note: See JEDEC MO-178 VAR AA for additional dimensions and tolerances.

Ordering Information

Part Number	Package
AT-267TR	Forward Tape and Reel[1]
AT-267TR-3000	3000 Piece Tape and Reel
AT-267SMB	Sample Board

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