

# Voltage Variable Attenuator

## 824 - 960 MHz

AT65-0009

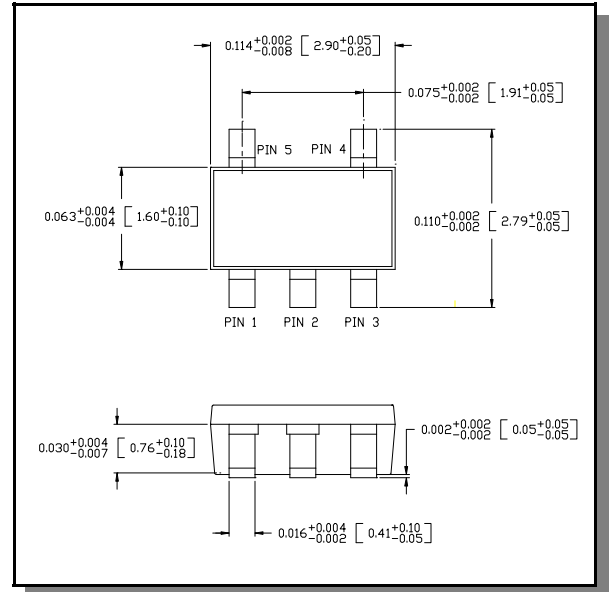
### Features

- 25 dB Attenuation Range
- High IP3
- Excellent Linearity Performance
- Surface Mount SOT-25 Package
- Low Cost/High Performance
- 50 Ohm Nominal Impedance

### Description

M/A-COM's AT65-0009 is an integrated assembly containing two PIN diodes and a passive glass quadrature hybrid. This device is packaged in a 5 leaded SOT plastic surface mount package. The diodes are biased to +3.5V for maximum attenuation using the suggested Bias Circuit. The AT65-0009 is ideally suited for GSM communication applications requiring variable attenuation in the 824 to 960 MHz bandwidth.

### SOT-25



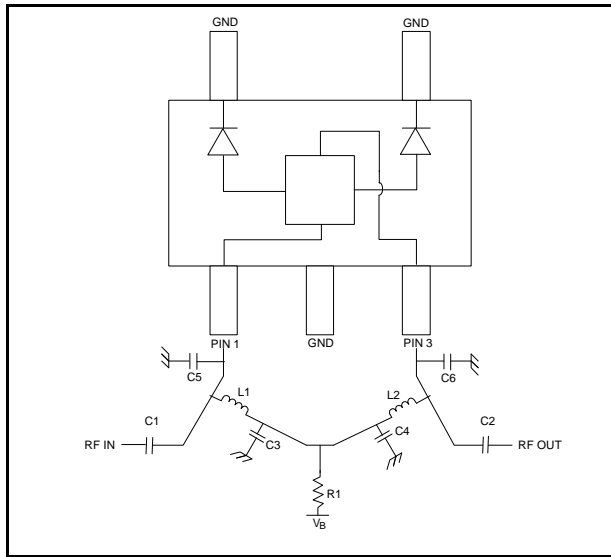
### Electrical Specifications: $T_A = 25^\circ\text{C}$ , $Z_0 = 50\Omega$

Parameter	Test Conditions	Units	Min.	Typ.	Max.
Insertion Loss	$V_B = 0V$	dB	—	1.7	2.1
VSWR		Ratio	—	1.7	2.2
Attenuation Flatness vs. Frequency	0 - 10 dB	dB	—	0.5	1.3
	0 - 20 dB	dB	—	0.5	1.3
	0 - 30 dB	dB	—	1.0	2.5
Switching Speed	50% control to 90%/10% RF	$\mu\text{Sec}$	—	5.0	7.0
Input IP3	Two Tones 900 MHz, 905 MHz, +5 dBm $V_B = 0V$	dB	—	40	—
Input IP2	Two Tones 900 MHz, 905 MHz, +5 dBm $V_B = 0V$	dB	—	34	—
Attenuation	$V_B = 3.7V$	dB	25	28	—

## Pin Configuration

Pin #	Function
1	RFIN $V_B$
2	GND
3	RFOUT $V_B$
4	GND
5	GND

## Functional Diagram and Bias Circuitry

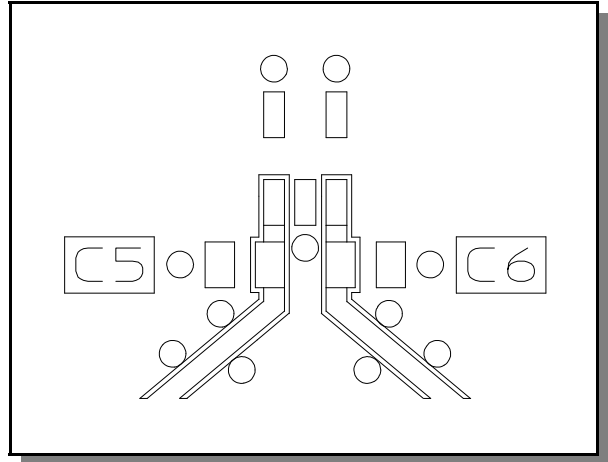


## External Circuitry Parts <sup>4</sup>

Part	Value	Purpose
C1	390 pF	DC Block
C2	390 pF	DC Block
C3	390 pF	By-pass
C4	390 pF	By-pass
L1	180 nH	RF Choke
L2	180 nH	RF Choke
R1	10 kOhm	Current Limiting
C5 <sup>5</sup>	1.5 pF	RF Tune
C6 <sup>5</sup>	1.5 pF	RF Tune

- All external circuitry parts are readily available, low cost surface mount components (.060 in. x .030 in or .080 in x .050 in.).
- See Application Note MA-C-05010008A for external tuning capacitor values to suit specific Communication Bandwidths.

## Recommended PCB Configuration



- Circuit Material = FR-4, TETRA II, 0.031 inches thick.
- Line Width = 0.025 inches, Line Spacing = 0.0056 inches.

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

Parameter	Absolute Maximum
Max Input Power	+27 dBm
Operating Voltage	+5 V
Operating Temperature	-40°C to +85°C
Storage Temperature	-65°C to +125°C

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

## Ordering Information

Part Number	Package
AT65-0009	Bulk Packaging
AT65-0009TR	Tape and Reel (1K Reel)
AT65-0009-TB	Units Mounted on Test Board

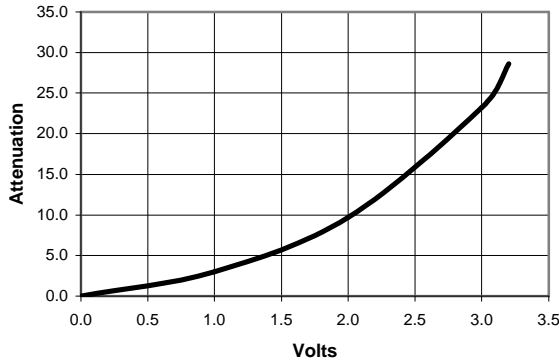
Specifications subject to change without notice.

- 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

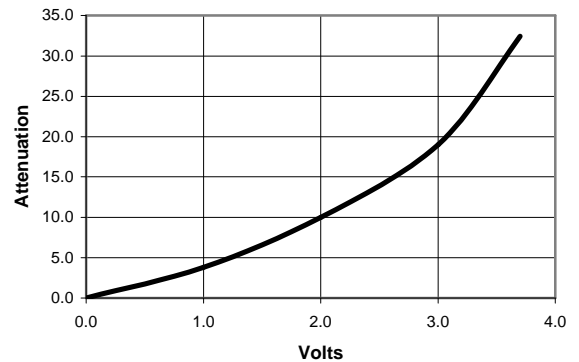
Visit [www.macom.com](http://www.macom.com) for additional data sheets and product information.

Typical Performance Curves

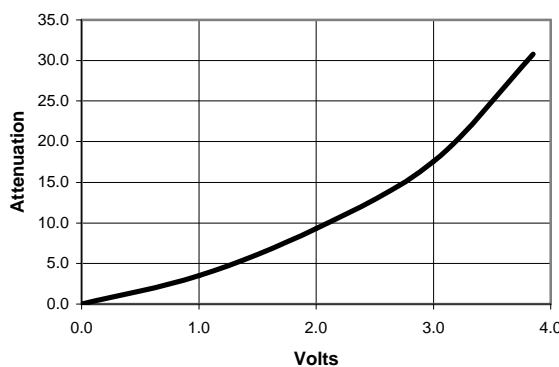
Attenuation vs. Voltage with 1.5 pF Tuning Cap @ -40°C



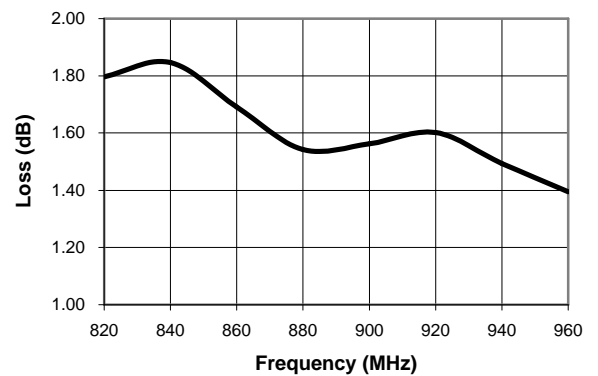
Attenuation vs. Voltage with 1.5 pF Tuning Cap @ +85°C



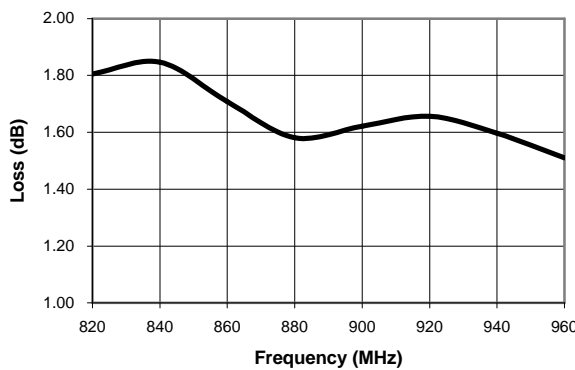
Attenuation vs. Voltage with 1.5 pF Tuning Cap @ +25°C



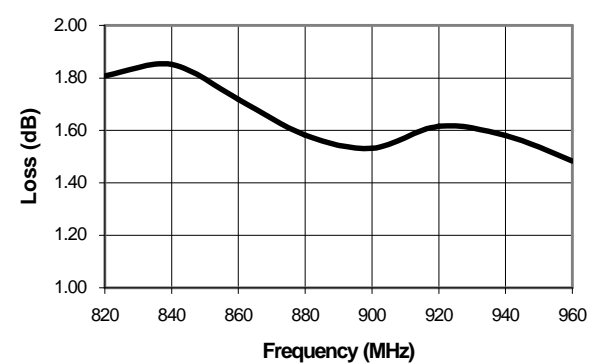
Loss vs. Frequency @ -40°C No Tuning Cap



Loss vs. Frequency @ +85°C No Tuning Cap



Loss vs. Frequency @ +25°C No Tuning Cap



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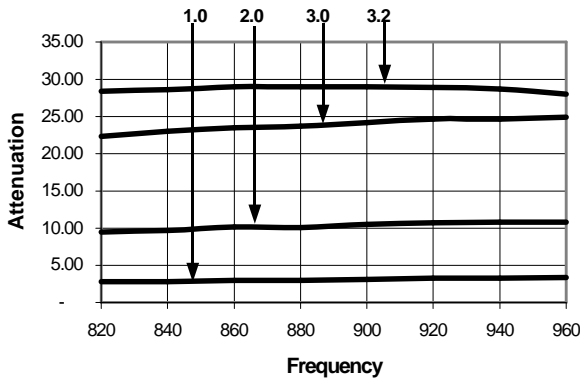
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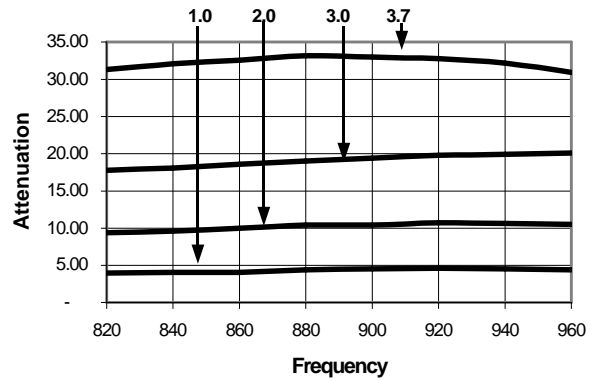


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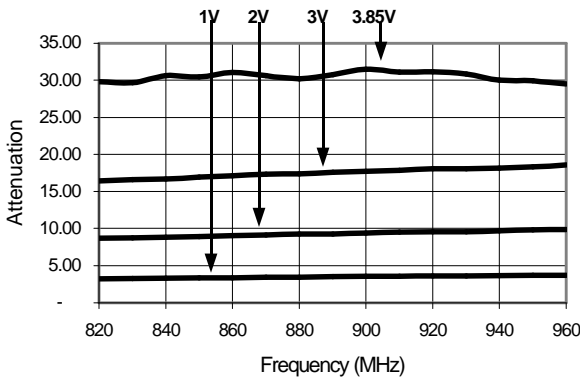
Attenuation vs. Freq. With 1.5 pF Tuning Cap @ -40°C



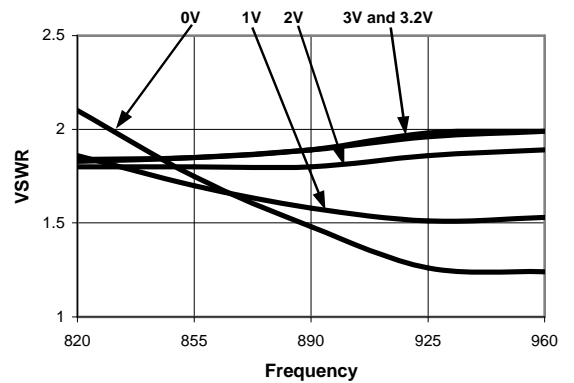
Attenuation vs. Freq. With 1.5 pF Tuning Cap @ +85°C



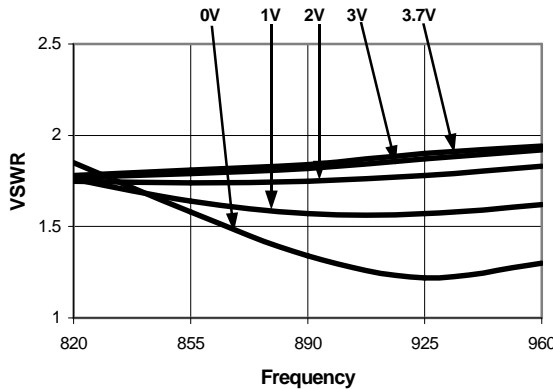
Attenuation vs. Freq. With 1.5 pF Tuning Cap @ +25°C



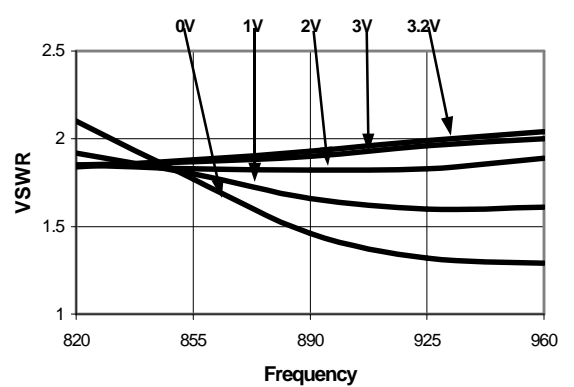
Input VSWR vs. Freq. With 1.5 pF Tuning Cap @ -40°C



Input VSWR vs. Freq. With 1.5 pF Tuning Cap @ +85°C



Input VSWR vs. Freq. With 1.5 pF Tuning Cap @ +25°C



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