

**HMIC PIN Diode Variable Attenuator**  
**0.80-1.0 GHz**

**MA4VAT900-1277T**  
**V2**

**Features**

- Bandwidth: 0.80 GHz to 1.00 GHz
- <1.0 dB Insertion Loss, Typical
- 1.4:1 VSWR, Typical
- 24 dB Attenuation, Typical
- 40 dBm IIP3, Typical ( 1MHz Offset, @ +0dBm Pinc )
- 0-1.8 Volt Control Voltage.
- User can add an External Resistor for higher voltage requirements.
- RoHs Compliant

**Extra Features**

- Usable Bandwidth: 0.60 GHz to 2.00 GHz
- 1.9 dB Insertion Loss, Max
- 2:1 VSWR, Max
- 20 dB Attenuation, Max

**Description and Applications**

M/A-COM's MA4VAT900-1277T is a HMIC MONLITHIC PIN Diode Variable Attenuator which utilizes an integrated 90 degree 3dB hybrid with a pair of Silicon PIN Diodes to perform the required attenuation function as Voltage (Current) is applied.

This device operates from 0 to 2 Volts at 330 uA typical control current for maximum attenuation. The user can add external biasing resistors to the bias ports for higher voltage requirements as required.

M/A-COM's MA4VAT900-1277T PIN Diode Variable Attenuator is designed for AGC Circuit Applications requiring:

- Lower Insertion Loss
- Lower distortion through attenuation
- Larger dynamic range for wide spread spectrum applications

**MLP 3mm Package—Circuit Side View**



**PIN 1**

**PIN 16**

**PIN Configuration**

PIN	Function	PIN	Function
1	GND	9	DC2
2	GND	10	GND
3	GND	11	GND
4	GND	12	DC1
5	GND	13	GND
6	RF2	14	GND
7	GND	15	RF1
8	GND	16	GND

**Center Paddle is RF and D.C. Ground**

Note: RF Input & RF Output Ports are Functionally Symmetrical

**Absolute Maximum Ratings @ +25 °C**

Parameter	Maximum Ratings
Operating Temperature	-40 °C to +85 °C
Storage Temperature	-65 °C to +150 °C
Junction Temperature	+175 °C
RF C.W. Incident Power	+33 dBm C.W.
Reversed Current @ -30 V	50nA
Control Current	5 mA per Diode

Notes:

1. All the above values are at +25 °C, unless otherwise noted.
2. Exceeding these limits may cause permanent damage.

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**Electrical Specifications @ +25 °C**

Parameter	Frequency Band	Unit	Min	Typ	Max
<b>No DC Bias RF Parameter</b>					
Insertion Loss	0.80 GHz—1.00 GHz	dB	-	1.0	1.2
Input Return Loss		dB	11	14	-
Output Return Loss		dB	11	14	-
P1dB		dBm	30	33	-
IIP3		dBm	37	40	-
Control Voltage		V	-	0 V @ 0uA	-
<b>DC Bias RF Parameter</b>					
Maximum Attenuation	0.80 GHz—1.00 GHz	dB	21	24	-
Input Return Loss @ Max Attenuation		dB	17	20	-
Output Return Loss @ Max Attenuation		dB	17	20	-
Input IP3		dBm	15	18	-
Control Voltage @ Max Attenuation		V	-	1.80 V @ 330 uA	-

**Typical RF Performance Over Industry Designated RF Frequency Bands**

Band		Freq	I. Loss	Att.	R. Loss	IIP3	Phase -Relative-
		(MHz)	(dB)	(dB)	(dB)	(dBm)	(Degree)
<b>AMPS</b>	<b>RX</b>	824-849	0.9	24	13	40	-15°
	<b>TX</b>	869-894	0.9	24	13	40	
<b>GSM</b>	<b>RX</b>	880-915	1.1	21	11	40	-15°
	<b>TX</b>	925-960	1.1	21	11	40	

Notes:

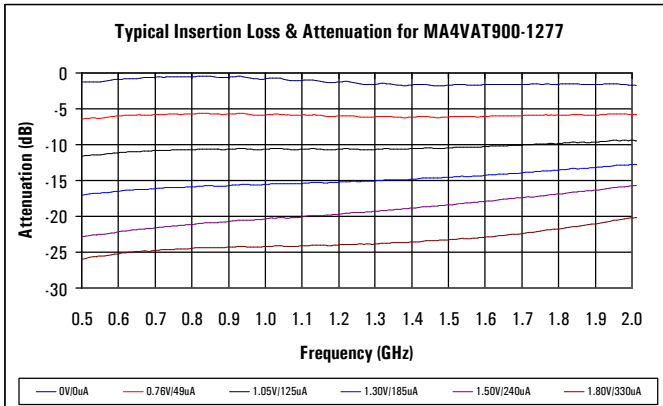
1. All are typical values only.
2. Relative phase is the measured Insertion Phase difference between Insertion Loss and 15 dB Attenuation. (Please refer to the plots below)

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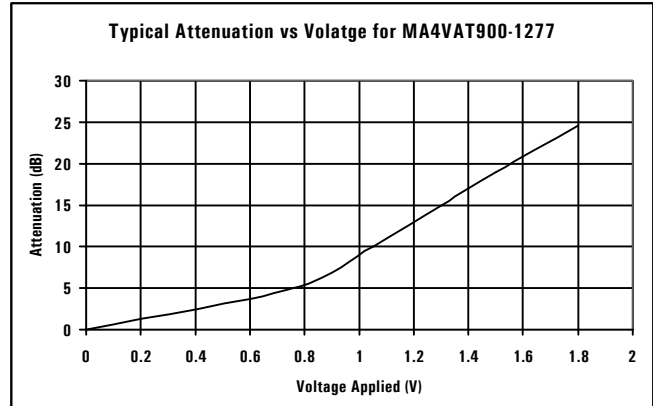
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**Plots of Typical RF Characteristics @ +25 °C**

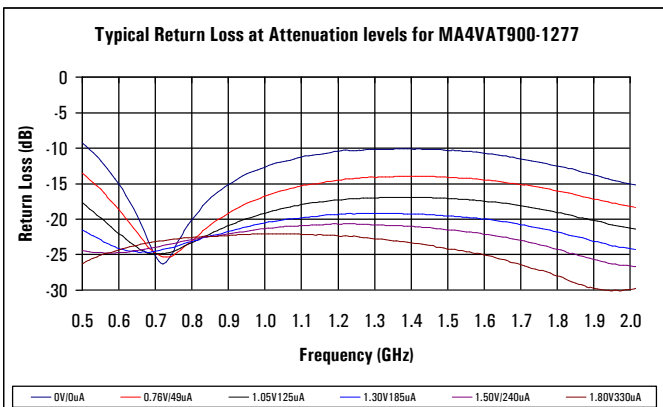
**Typical Insertion Loss & Attenuation Plot**



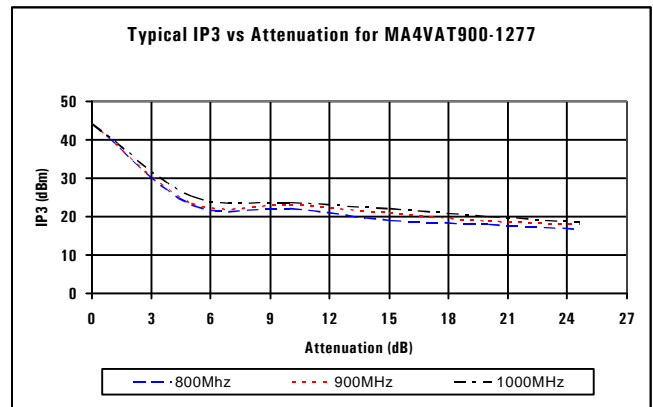
**Typical Attenuation vs Voltage Plot (@900 MHz)**



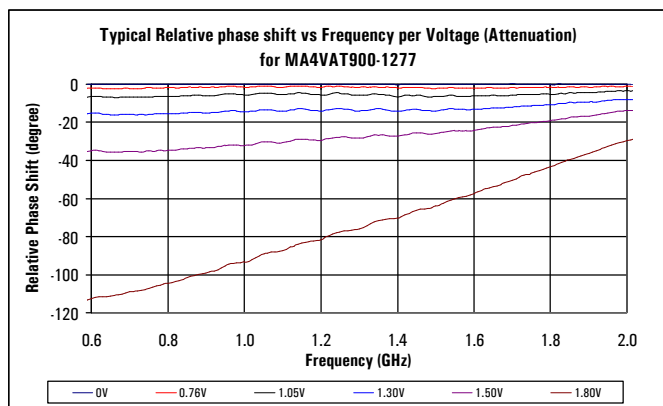
**Typical Return Loss @ All Attenuation Levels Plot**



**Typical IIP3 vs Attenuation Plot**



**Typical Relative Phase Shift Per Attenuation (Voltage) Plot**



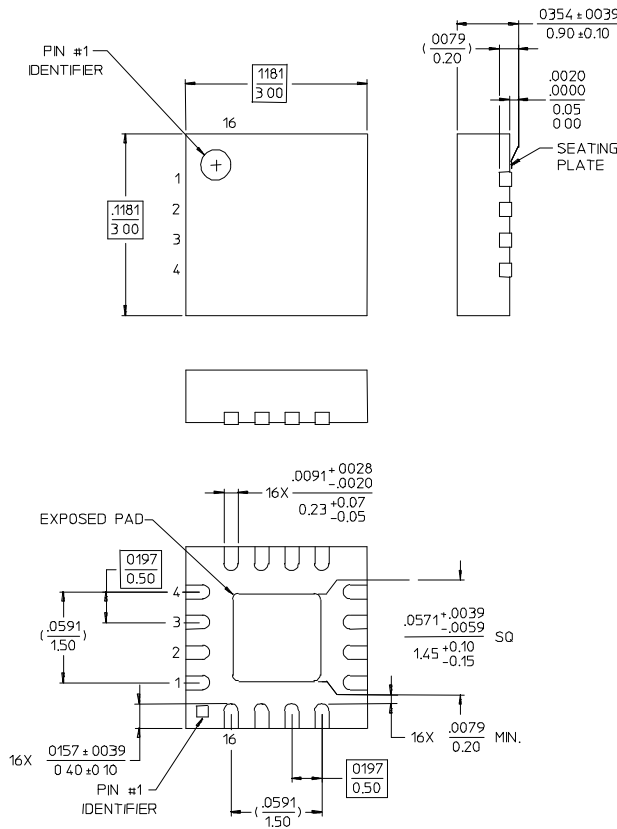
For Reference ONLY:  
With 0 Ω External Bias Resistor, the following are  
Approximate Values:

- Insertion Loss = 0 V @ 0 uA
- 5dB Attenuation = 0.76 V @ 49 uA
- 10dB Attenuation = 1.05 V @ 125uA
- 15dB Attenuation = 1.30 V @ 185 uA
- 20dB Anttenuation = 1.50 V @ 240 uA
- Max Attenuation = 1.8 V @ 330 uA

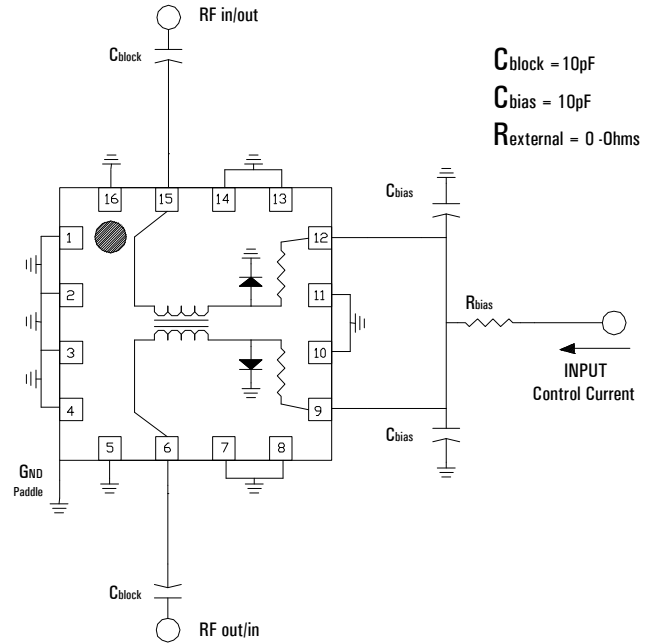
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**Package PIN Designation, External Components, and Equivalent Circuit**



NOTES: 1. RBFBRNCB JEDBC MO-220, VAR. VBBD-1 FOR ADDITIONAL DIMENSIONAL AND TOLERANCE INFORMATION.  
2. RBFBRNCB S2083 APPLICATION NOTE FOR PCB FOOTPRINT INFORMATION.  
3. ALL DIMENSIONS SHOWN AS INCHES/MM.



$C_{block} = 10\text{pF}$   
 $C_{bias} = 10\text{pF}$   
 $R_{external} = 0.0\text{ohms}$