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

Absolute Maximum Ratings @ +25 °C  

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

2. All the above values are at +25 °C, unless otherwise noted.
3. Exceeding these limits may cause permanent damage.
### Electrical Specifications @ +25 °C

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

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

| Band     | Freq       | I. Loss | Att. | R. Loss | IIP3 | Phase -Relative-
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(MHz)</td>
<td>(dB)</td>
<td>(dB)</td>
<td>(dB)</td>
<td>(dBm)</td>
<td>(Degree)</td>
</tr>
<tr>
<td><strong>AMPS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RX</td>
<td>824-849</td>
<td>0.9</td>
<td>24</td>
<td>13</td>
<td>40</td>
<td>-15°</td>
</tr>
<tr>
<td>TX</td>
<td>869-894</td>
<td>0.9</td>
<td>24</td>
<td>13</td>
<td>40</td>
<td></td>
</tr>
</tbody>
</table>

| **GSM**  |            |         |      |         |      |               |
| RX       | 880-915    | 1.1     | 21   | 11      | 40   | -15°          |
| TX       | 925-960    | 1.1     | 21   | 11      | 40   |               |

4. All are typical values only.
5. Relative phase is the measured Insertion Phase difference between Insertion Loss and 15 dB Attenuation.
   (Please refer to the plots below)
Plots of Typical RF Characteristics @ +25 °C

**Typical Insertion Loss & Attenuation**

![Graph showing typical insertion loss and attenuation](image)

**Typical Return Loss @ All Attenuation Levels**

![Graph showing typical return loss at all attenuation levels](image)

**Typical IIP3 vs Attenuation**

![Graph showing typical IIP3 vs attenuation](image)

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

![Graph showing typical attenuation vs voltage](image)

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

![Graph showing typical relative phase shift per attenuation](image)

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 @ 125 uA
- 15dB Attenuation = 1.30 V @ 185 uA
- 20dB Attenuation = 1.50 V @ 240 uA
- Max Attenuation = 1.8 V @ 330 uA
Package PIN Designation, External Components, and Equivalent Circuit

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