**Features**
- Integrated TTL level conversion circuit
- Attenuation Range: 21dB
- Attenuation Accuracy: ±0.6dB
- Insertion Loss: 1dB
- Impedance: 50Ω
- Die Size: 1.3 x 1.0 x 0.1 mm

**Typical Applications**
- Test Instrumentation
- Microwave Radio & VSAT
- Military & Space
- Telecom Infrastructure
- Fiber Optics

**Electrical Specifications**

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>8-12</td>
<td></td>
<td></td>
<td>GHz</td>
</tr>
<tr>
<td>Insertion Loss</td>
<td></td>
<td>1</td>
<td></td>
<td>dB</td>
</tr>
<tr>
<td>Attenuation Range</td>
<td></td>
<td>21</td>
<td></td>
<td>dB</td>
</tr>
<tr>
<td>Return Loss</td>
<td></td>
<td>20</td>
<td></td>
<td>dB</td>
</tr>
<tr>
<td>Input 1dB Compression (P1dB)</td>
<td></td>
<td>24</td>
<td></td>
<td>dBm</td>
</tr>
<tr>
<td>Switching Speed</td>
<td></td>
<td>50</td>
<td></td>
<td>ns</td>
</tr>
</tbody>
</table>

**Functional Block Diagram**

TA = +25°C, Vctl = 0/5V
MM5001

V1.0.0 GaAs pHEMT MMIC 1-Bit Digital Control Attenuator 8-12GHz

Attenuation

Insertion Loss

Return Loss

Attenuation Return Loss

MM5001
1-BIT DIGITAL CONTROL ATTENUATOR – MMIC 8-12GHz
Pad Description

<table>
<thead>
<tr>
<th>PAD</th>
<th>Function</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,2</td>
<td>RF1,RF2</td>
<td>This pad is RF port and matched to 50Ω impedance.</td>
</tr>
<tr>
<td>3</td>
<td>VDD</td>
<td>This pad is the TTL control circuit ESD power supply, and the +5V voltage.</td>
</tr>
<tr>
<td>4</td>
<td>A1</td>
<td>This pad is the control signal input terminal, A1=0V is the ground state, and A1=5V attenuation 21dB.</td>
</tr>
<tr>
<td>5</td>
<td>VSS</td>
<td>This pad is TTL control circuit power supply, and then -5V power supply.</td>
</tr>
<tr>
<td>Die Bottom</td>
<td>GND</td>
<td>Die bottom must be connected to RF/DC ground.</td>
</tr>
</tbody>
</table>
Notes:
1. Die thickness: 100um
2. Typical bond pad is 100*100 μm²
3. Bond pad metalization: Gold
4. Backside metalization: Gold
5. Backside of the die (GND)
6. No connection required for unlabeled bond pads

Maximum Ratings:
1. RF input power: +24dBm
2. Storage temperature: -65°C to +175°C
3. Operating temperature: -55°C to +85°C