DESCRIPTION

AMCOM's AM204434WM-QN6-R is part of the GaAs MMIC power amplifier series. It has 31dB gain and 34dBm output power over the 2.2 to 4.0GHz band. This MMIC is in a QFN 6x6mm with both RF, DC leads and RF ground at the lower level of the package to facilitate low-cost SMT assembly to the PC board. When mounting directly to PCB, please see application note AN700 for instructions. These devices should be mounted directly on via holes to dissipate the heat and for RF ground. This MMIC is RoHS compliant.

FEATURES

- Wide bandwidth from 2.0 to 4.4GHz
- High output power, $P_{sat} = 34$dBm
- High gain, 31dB
- Fully matched; 50-ohm input/output impedance

APPLICATIONS

- Wireless Internet Access
- Wireless Local Loop
- Two-way radio

PERFORMANCE* ($V_{ds} = +6V$, $I_{dq} = 1400mA$, $V_{gs}^{**} = -0.87V$, $T_a = 25^\circ C$)

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Minimum</th>
<th>Typical</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>2.2 – 4.0GHz</td>
<td>2.0 – 4.4GHz</td>
<td></td>
</tr>
<tr>
<td>Gain (Small signal)</td>
<td>27dB</td>
<td>31dB</td>
<td>35dB</td>
</tr>
<tr>
<td>Gain Ripple</td>
<td>± 1.0dB</td>
<td>± 3.0dB</td>
<td></td>
</tr>
<tr>
<td>$P_{1dB}$</td>
<td>32dBm</td>
<td>33dBm</td>
<td></td>
</tr>
<tr>
<td>$P_{sat}$</td>
<td>34dBm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Efficiency at $P_{sat}$</td>
<td>20%</td>
<td>25%</td>
<td></td>
</tr>
<tr>
<td>Input Return Loss</td>
<td>7dB</td>
<td>13dB</td>
<td></td>
</tr>
<tr>
<td>Output Return Loss</td>
<td>8dB</td>
<td>15dB</td>
<td></td>
</tr>
<tr>
<td>Thermal Resistance</td>
<td>4.9°C/W</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Specifications subject to change without notice

** Gate bias is for reference only and may vary from lot to lot
**ABSOLUTE MAXIMUM RATING**

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Symbol</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drain source voltage</td>
<td>$V_{ds}$</td>
<td>10V</td>
</tr>
<tr>
<td>Gate source voltage</td>
<td>$V_{gs}$</td>
<td>-5V</td>
</tr>
<tr>
<td>Drain source current</td>
<td>$I_{ds}$</td>
<td>2.5A</td>
</tr>
<tr>
<td>Continuous dissipation at room temp</td>
<td>$P_t$</td>
<td>12W</td>
</tr>
<tr>
<td>Channel temperature</td>
<td>$T_{ch}$</td>
<td>175°C</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>$T_{op}$</td>
<td>-55°C to +100°C</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>$T_{sto}$</td>
<td>-55°C to +135°C</td>
</tr>
</tbody>
</table>

**SMALL SIGNAL DATA**

![Small Signal Data Graph](image-url)
POWER DATA

P1dB (5V/1400mA)

P3dB (5V/1400mA)

P1dB (5V/1800mA)

P3dB (5V/1800mA)
PACKAGE OUTLINE

PIN LAYOUT* \( V_{gs1}, V_{gs2}, \) & \( V_{gs3} \) may vary from lot to lot

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Function</th>
<th>Bias*</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>RF in</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Vgs1</td>
<td>-0.87V</td>
</tr>
<tr>
<td>10</td>
<td>Vgs2</td>
<td>-0.87V</td>
</tr>
<tr>
<td>12</td>
<td>Vgs3</td>
<td>-0.87V</td>
</tr>
<tr>
<td>14</td>
<td>Vds3</td>
<td>+6V</td>
</tr>
<tr>
<td>18</td>
<td>RF out</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>Vds3</td>
<td>+6V</td>
</tr>
<tr>
<td>24</td>
<td>Vgs3</td>
<td>-0.87V</td>
</tr>
<tr>
<td>26</td>
<td>Vds2</td>
<td>+6V</td>
</tr>
<tr>
<td>28</td>
<td>Vds1</td>
<td>+6V</td>
</tr>
<tr>
<td>Other PINs</td>
<td>NC</td>
<td></td>
</tr>
</tbody>
</table>
Important Notes:

1- The MMIC should have a good heat sink to avoid overheating. If SMT is used use PC board thickness < 10 mils and ensure vias are filled with solder or metal to lower PCB heat resistance. MMIC could be attached on direct ground for lowest junction temperature.

2- Recommended current biases are 100mA, 300mA & 1000mA for the first, second and third stages respectively. We recommend using same negative voltages on $V_{gs1}$, $V_{gs2}$ & $V_{gs3}$. Different voltages could be applied to get small improvements in efficiency.

3- Do not apply $V_{ds1}$, $V_{ds2}$ & $V_{ds3}$ without proper negative voltages on $V_{gs1}$, $V_{gs2}$ & $V_{gs3}$.

4- The currents flowing out of the $V_{gs1}$, $V_{gs2}$ & $V_{gs3}$ pins are less than 100µA, 600µA & 12mA at $P_{1dB}$.

5- External 1 µF dipped tantalum capacitor may be attached to Vd and Vg to decouple external bias leads.

6- Positive bias terminals could be tied together, and negative biases could be tied if using same voltages.