FEATURES
- **BROAD BAND INTERNALLY MATCHED HEMT**
- **HIGH POWER**
  \( P_{out} = 51.0 \text{dBm} \) at \( P_{in} = 44.0 \text{dBm} \)
- **HIGH GAIN**
  \( G_{L} = 11.5 \text{dB} \) at \( P_{in} = 20.0 \text{dBm} \)
- **LOW INTERMODULATION DISTORTION**
  \( I_{M3}(\text{Min.}) = -25 \text{dBc} \) at \( P_{out} = 44.0 \text{dBm} \)
  Single Carrier Level
- **HERMETICALLY SEALED PACKAGE**

**RF PERFORMANCE SPECIFICATIONS (Ta= 25°C)**

<table>
<thead>
<tr>
<th>CHARACTERISTICS</th>
<th>SYMBOL</th>
<th>CONDITIONS</th>
<th>UNIT</th>
<th>MIN.</th>
<th>TYP.</th>
<th>MAX.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output Power</td>
<td>Pout</td>
<td>( V_{DS} = 40 \text{V} ) ( I_{DS} = 0.8 \text{A} ) ( f = 7.7 \text{ to } 8.5 \text{GHz} ) ( @P_{in} = 44 \text{dBm} )</td>
<td>dBm</td>
<td>50.0</td>
<td>51.0</td>
<td>—</td>
</tr>
<tr>
<td>Drain Current</td>
<td>IDS1</td>
<td>( @P_{in} = 20 \text{dBm} )</td>
<td>A</td>
<td>—</td>
<td>7.0</td>
<td>9.0</td>
</tr>
<tr>
<td>Power Added Efficiency</td>
<td>( \eta_{add} )</td>
<td></td>
<td>%</td>
<td>—</td>
<td>36</td>
<td>—</td>
</tr>
<tr>
<td>Linear Gain</td>
<td>GL</td>
<td>( @P_{in} = 20 \text{dBm} )</td>
<td>dB</td>
<td>10.5</td>
<td>11.5</td>
<td>—</td>
</tr>
<tr>
<td>Gain flatness</td>
<td>( \Delta G )</td>
<td></td>
<td>dB</td>
<td>—</td>
<td>—</td>
<td>±0.8</td>
</tr>
<tr>
<td>3rd Order Intermodulation Distortion</td>
<td>IM3-2</td>
<td>Two-Tone Test ( P_{o} = 44.0 \text{dBm} ) (Single Carrier Level) ( \Delta f_1 = 5 \text{MHz} ) (IM3) ( \Delta f_2 = 150 \text{MHz} ) (IM3-2)</td>
<td>dBc</td>
<td>—25</td>
<td>—27</td>
<td>—</td>
</tr>
<tr>
<td>Drain Current</td>
<td>IDS2</td>
<td>( @P_{in} = 20 \text{dBm} )</td>
<td>A</td>
<td>—</td>
<td>—</td>
<td>5.0</td>
</tr>
<tr>
<td>Channel Temperature Rise *1</td>
<td>( \Delta T_{ch} )</td>
<td></td>
<td>°C</td>
<td>—</td>
<td>120</td>
<td>140</td>
</tr>
</tbody>
</table>

Recommended Gate Resistance(Rg): 10 Ω

*1: \( \Delta T_{ch} = (V_{DS} \times I_{DS} + P_{in}(\text{two-tone}) – P_{o}(\text{two-tone})) \times R_{th(c-c)} \), calculated using parameters of IM3 test

**ELECTRICAL CHARACTERISTICS (Ta= 25°C)**

<table>
<thead>
<tr>
<th>CHARACTERISTICS</th>
<th>SYMBOL</th>
<th>CONDITIONS</th>
<th>UNIT</th>
<th>MIN.</th>
<th>TYP.</th>
<th>MAX.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transconductance</td>
<td>( gm )</td>
<td>( V_{DS} = 5 \text{V} ) ( I_{DS} = 10.0 \text{A} )</td>
<td>S</td>
<td>—</td>
<td>8.0</td>
<td>—</td>
</tr>
<tr>
<td>Pinch-off Voltage</td>
<td>( VG_{Soff} )</td>
<td>( V_{DS} = 5 \text{V} ) ( I_{DS} = 30 \text{mA} )</td>
<td>V</td>
<td>-2.0</td>
<td>-3.0</td>
<td>-5.0</td>
</tr>
<tr>
<td>Gate-Source Breakdown Voltage</td>
<td>( VG_{SO} )</td>
<td>( I_{GS} = -25 \text{mA} )</td>
<td>V</td>
<td>-10</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Thermal Resistance</td>
<td>( R_{th(c-c)} )</td>
<td>Channel to Case</td>
<td>°C/W</td>
<td>—</td>
<td>0.8</td>
<td>1.0</td>
</tr>
</tbody>
</table>

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### ABSOLUTE MAXIMUM RATINGS (Ta= 25°C)

<table>
<thead>
<tr>
<th>CHARACTERISTICS</th>
<th>SYMBOL</th>
<th>UNIT</th>
<th>RATING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drain-Source Voltage</td>
<td>VDS</td>
<td>V</td>
<td>50</td>
</tr>
<tr>
<td>Gate-Source Voltage</td>
<td>VGS</td>
<td>V</td>
<td>-10</td>
</tr>
<tr>
<td>Drain Current</td>
<td>IDS</td>
<td>A</td>
<td>6</td>
</tr>
<tr>
<td>Total Power Dissipation (Tc= 25°C)</td>
<td>PT</td>
<td>W</td>
<td>200</td>
</tr>
<tr>
<td>Channel Temperature</td>
<td>Tch</td>
<td>°C</td>
<td>225</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>Tstg</td>
<td>°C</td>
<td>-65 to +175</td>
</tr>
</tbody>
</table>

### PACKAGE OUTLINE (7-AA06A)

![Package Outline Diagram]

**HANDLING PRECAUTIONS FOR PACKAGE MODEL**

Soldering iron should be grounded and the operating time should not exceed 10 seconds at 260°C or 3 seconds at 350°C.
Pout, Gain, PAE, IDS vs. Pin

VDS = 40 V, IDSset = 0.8 A, f = 7.7, 8.1, 8.5 GHz, Ta = +25 °C

- Pout vs Pin
  - VDS = 40V, IDS = 0.8A

- Gain vs Pin
  - VDS = 40V, IDS = 0.8A

- PAE vs Pin
  - VDS = 40V, IDS = 0.8A

- IDS vs Pin
  - VDS = 40V, IDS = 0.8A
- **IM3, IM5 vs. Pout**

\[
\begin{align*}
V_{DS} &= 40 \text{ V}, \quad I_{DSset} = 0.8 \text{ A}, \quad f = 7.7, 8.1, 8.5 \text{ GHz}, \quad \Delta f = 5 \text{ MHz}, \quad T_{a} = +25 \ ^\circ\text{C} \\
\end{align*}
\]

- **IM3-2, IM5-2 vs. Pout**

\[
\begin{align*}
V_{DS} &= 40 \text{ V}, \quad I_{DSset} = 0.8 \text{ A}, \quad f = 7.7, 8.1, 8.5 \text{ GHz}, \quad \Delta f = 150 \text{ MHz}, \quad T_{a} = +25 \ ^\circ\text{C} \\
\end{align*}
\]
- **S-Parameters**

  VDS = 40 V, IDS$_{set}$ = 0.8 A, $f_1$ = 5.0 to 10.0 GHz, $T_a$ = +25 °C

  ![S11](image1)

  ![S22](image2)

  ![S11, S22](image3)

  ![S21, S12](image4)
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