**MECPKC45W**

4.7 to 5.1 GHz GaN HEMT Power Amplifier

Functional Block Diagram

<table>
<thead>
<tr>
<th>Pin #</th>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Vg/RF IN</td>
<td>Gate voltage/RF Input matched to 50Ω</td>
</tr>
<tr>
<td>2</td>
<td>Vd/RF OUT</td>
<td>Drain voltage/RF Output matched to 50Ω</td>
</tr>
<tr>
<td></td>
<td>Package Bottom</td>
<td>Ground</td>
</tr>
</tbody>
</table>

Main Features

- 0.5µm GaN HEMT Technology
- 4.7 – 5.1 GHz full performances Frequency Range
- more than 40W Output Power @ Pin 36 dBm
- more than 40% PAE @ Pin 36 dBm
- 14 dB Linear Gain
- Bias: VDD = 40V, Idq = 400 mA, Vg = -1.9V (Typ.)
- CuMo Power package with RFin and RFout pin interfaces
- Fully matched to 50 Ω within the package

Product Description

MECPKC45W is a single stage High Power Amplifier designed by MEC for C-Band applications and based on a 0.5µm GaN on SiC process. The MECPKC45W provides more than 40W of output power in the frequency range from 4.7 GHz to 5.1 GHz with a PAE higher than 40% and 14 dB of Linear Gain. The MECPKC45W is provided within a CuMo power package for optimal thermal dissipation. It is fully matched to 50 Ω at the pin of the package. Advanced Thin Film technology and manufacturing has been exploited to get a reliable and reproducible product performance.

Applications

- Radar
- Telecom
### Main Characteristics*  

Test Conditions: $T_{\text{base,plate}} = 25^\circ\text{C}$, $V_{\text{dd}} = 40\ \text{V}$, $I_{\text{dq}} = 400\ \text{mA}$, Pulse Width = 50 $\mu$s, Duty Cycle = 15%

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating frequency</td>
<td>4.7</td>
<td>5.1</td>
<td>GHz</td>
<td></td>
</tr>
<tr>
<td>Small Signal Gain</td>
<td>13.9</td>
<td>14.3</td>
<td>14.7</td>
<td>dB</td>
</tr>
<tr>
<td>Input Return Loss</td>
<td>-5</td>
<td></td>
<td></td>
<td>dB</td>
</tr>
<tr>
<td>Output Return Loss</td>
<td>-11.9</td>
<td></td>
<td></td>
<td>dB</td>
</tr>
<tr>
<td>Output Power @ Pin = 36 dBm</td>
<td>41</td>
<td>49</td>
<td>W</td>
<td></td>
</tr>
<tr>
<td>Power Added Efficiency @ Pin = 36 dBm</td>
<td>41</td>
<td>46</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td>Drain Supply Voltage</td>
<td></td>
<td>40</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>Supply Quiescent Drain Current</td>
<td></td>
<td>400</td>
<td>mA</td>
<td></td>
</tr>
<tr>
<td>Supply Drain Current @ Pin = 36 dBm</td>
<td>2.1</td>
<td>2.5</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td>Gate Voltage</td>
<td></td>
<td>1.9</td>
<td>V</td>
<td></td>
</tr>
</tbody>
</table>

*Performances described in this document are based on preliminary on-jig characterization. More details are available upon request at contact.mec@mec-mmic.com
Typical Measured Performances

Linear Gain, Input and Output Return Loss Vs. Frequency (Operating Band)

Linear Gain, Input and Output Return Loss Vs. Frequency (Broadband)**

** S-parameter file is available upon request at contact.mec@mec-mmic.com
Output Power and PAE Vs. Input Power

Gain and Drain Current Vs. Input Power
Output Power and PAE @ Pin = 36 dBm Vs. Frequency

Gain and Drain Current @ Pin = 36 dBm Vs. Frequency
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Package Outline

Detailed package dimensions and characteristics are available upon request at contact.mec@mec-mmic.com
The device characteristics were measured at the package pins, by de-embedding at both ports the Shielded Conductor-backed Coplanar Waveguide access plus the input and output connectors by a TRL calibration.

Further details of the Test Board are available upon request at contact.mec@mec-mmic.com.

To implement RF to DC decoupling and improve input return loss, custom test-fixtures can be designed and provided upon request (contact.mec@mec-mmic.com).

### Bias Procedure

**Bias-Up**

1. Vg set to -5 V.
2. Vd set to +40 V.
3. Adjust Vg until quiescent Id is 400 mA (Vg = -1.9 V Typical).
4. Apply RF signal.

**Bias-Down**

1. Turn off RF signal.
2. Reduce Vg to -5 V (Id0 ≈ 0 mA).
3. Set Vd to 0 V.
4. Set Vg to 0 V.
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Notice

The furnished information is believed to be reliable. However, performances and specifications contained herein are based on preliminary characterizations and then susceptible to possible variations. On the basis of customer requirements the product can be tested and characterized in specific operating conditions and, if needed, tuned to meet custom specifications.

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