

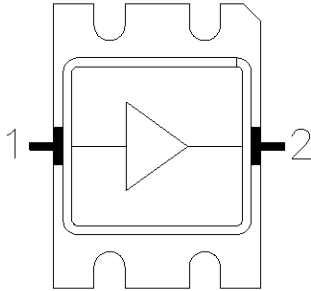
MECPKC45W

4.7 to 5.1 GHz GaN HEMT Power Amplifier



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Functional Block Diagram



Pin #	Symbol	Description
1	Vg/ RF IN	Gate voltage/RF Input matched to 50Ω
2	Vd/ RF OUT	Drain voltage/RF Output matched to 50Ω
Package Bottom	Ground	Source connected to ground

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.

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

Applications

- Radar
- Telecom

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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 = $50\text{ }\mu\text{s}$, Duty Cycle = 15%

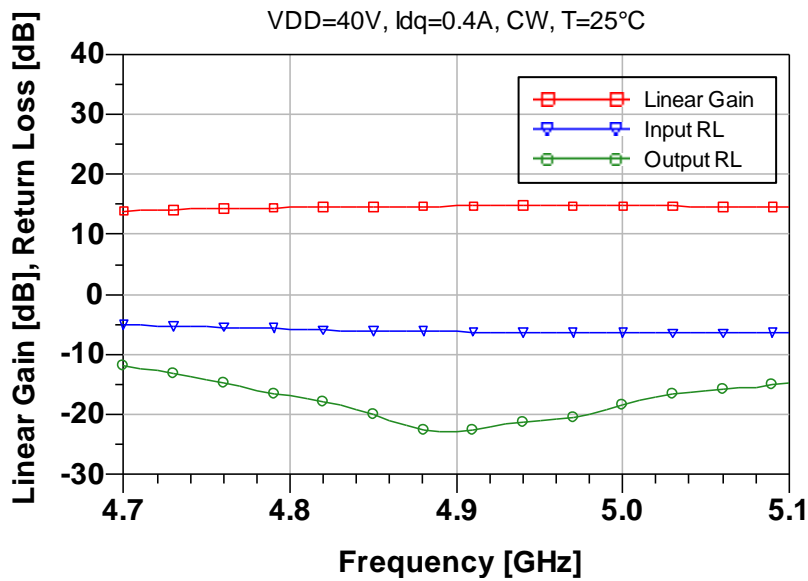
Parameter	Min	Typ	Max	Unit
Operating frequency	4.7		5.1	GHz
Small Signal Gain	13.9	14.3	14.7	dB
Input Return Loss			-5	dB
Output Return Loss			-11.9	dB
Output Power @ $P_{\text{in}} = 36\text{ dBm}$	41		49	W
Power Added Efficiency @ $P_{\text{in}} = 36\text{ dBm}$	41		46	%
Drain Supply Voltage		40		V
Supply Quiescent Drain Current		400		mA
Supply Drain Current @ $P_{\text{in}} = 36\text{ dBm}$	2.1		2.5	A
Gate Voltage		1.9		V

*Performances described in this document are based on preliminary on-jig characterization.

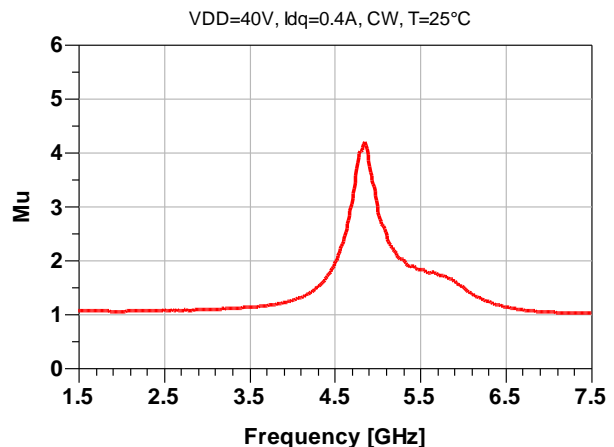
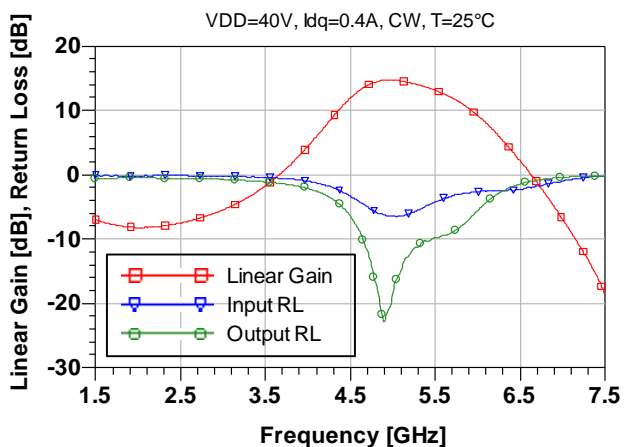
More details are available upon request at contact.mec@mec-mmic.com

Typical Measured Performances

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

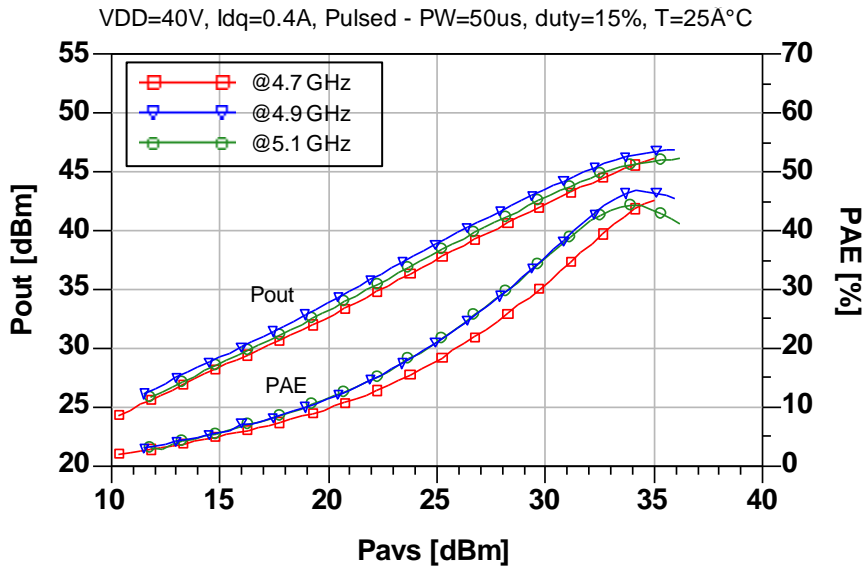


Linear Gain, Input and Output Return Loss Vs. Frequency (Broadband)**

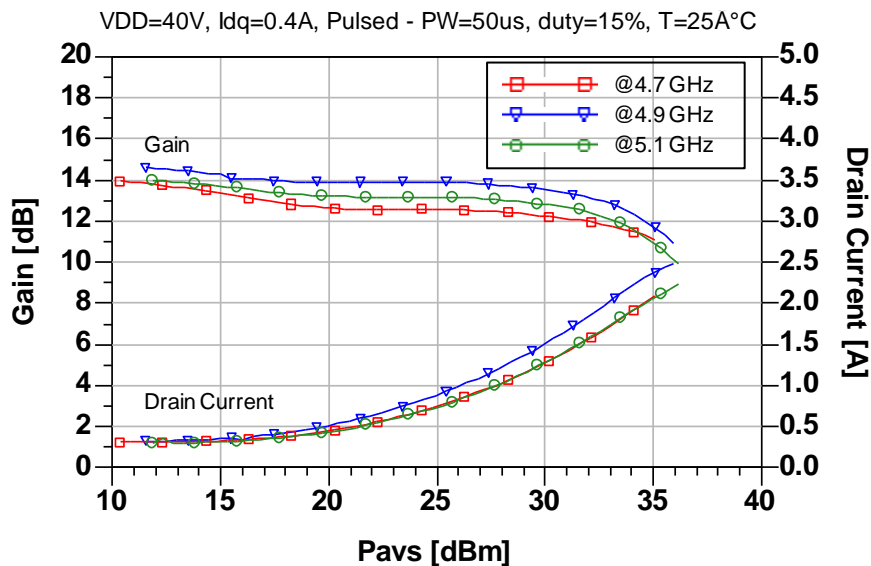


** S-parameter file is available upon request at contact.mec@mec-mmic.com

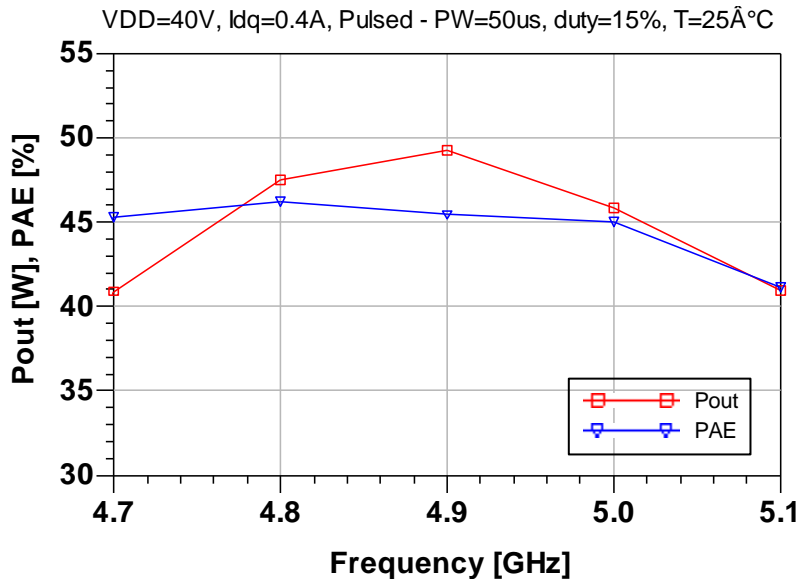
Output Power and PAE Vs. Input Power



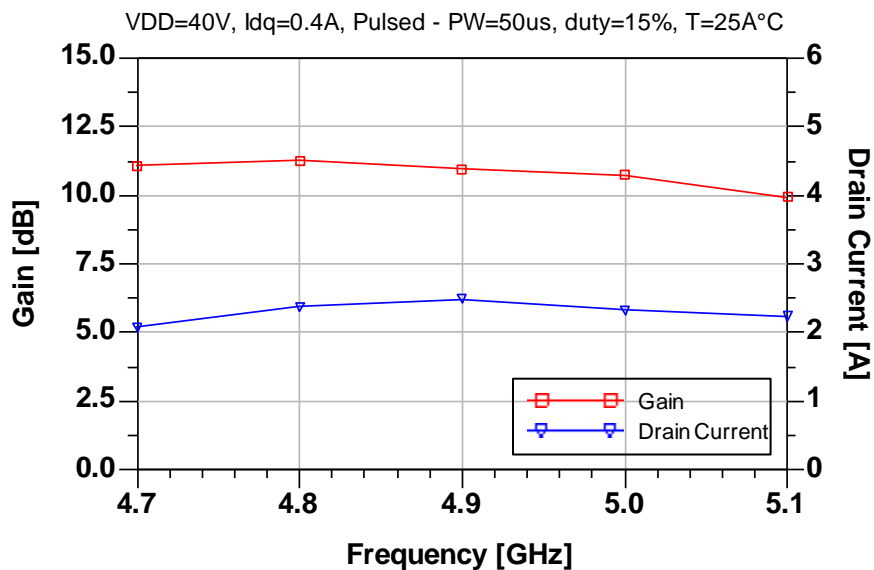
Gain and Drain Current Vs. Input Power



Output Power and PAE @ Pin = 36 dBm Vs. Frequency



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



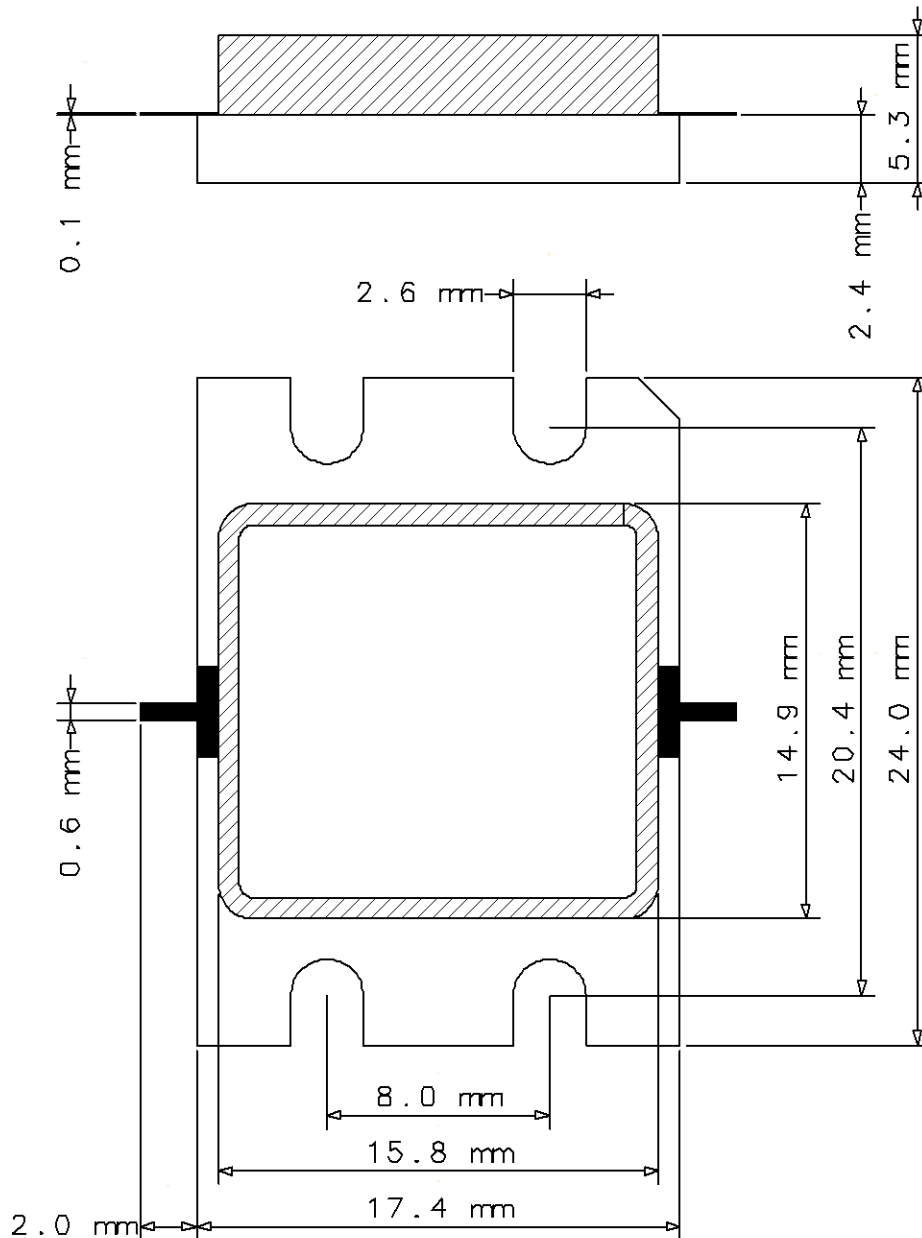
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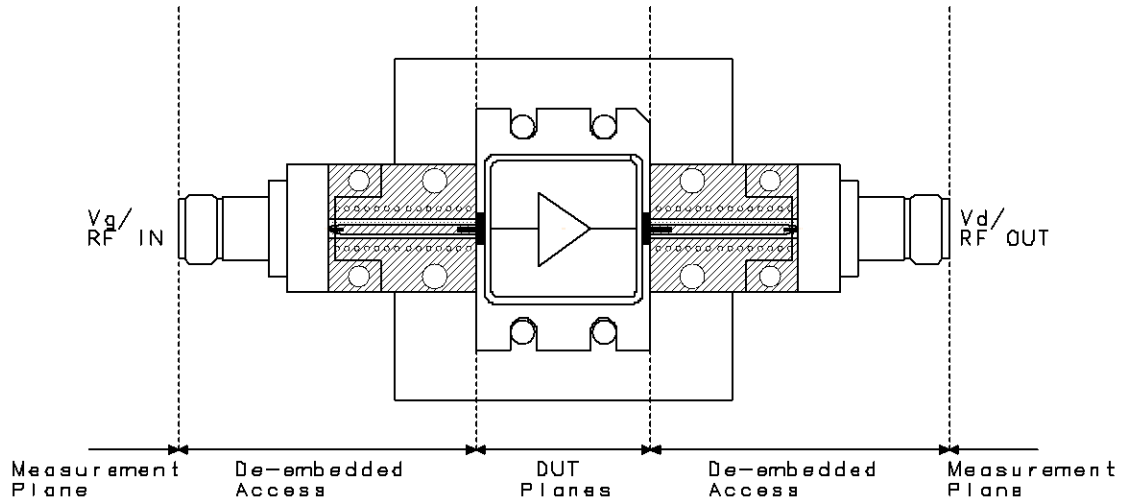
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Package Outline



Detailed package dimensions and characteristics are available upon request at contact.mec@mec-mm.com

Test Board



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-mmhc.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-mmhc.com).

Bias Procedure

Bias-Up

1. V_g set to -5 V.
2. V_d set to +40 V.
3. Adjust V_g until quiescent I_d is 400 mA ($V_g = -1.9$ V Typical).
4. Apply RF signal.

Bias-Down

1. Turn off RF signal.
2. Reduce V_g to -5 V ($I_{d0} \approx 0$ mA).
3. Set V_d to 0 V.
4. Set V_g to 0 V.

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