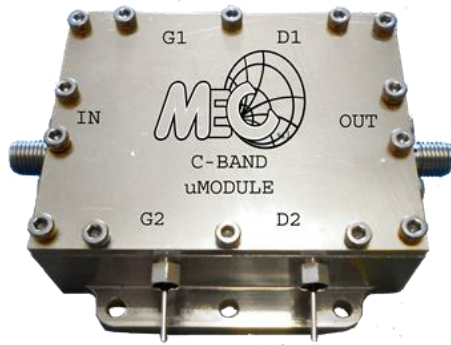


MECGaNCMOD-100W

4.8 to 5.8 GHz GaN HEMT Power Module



Product Description

MECGaNCMOD-100W is a single-stage High Power Amplifier designed by MEC for C-Band applications. It is based on a 0.25 μ m GaN on SiC process.

The MECGaNCMOD-100W provides more than 100W of output power in the frequency range from 4.85 GHz to 5.80 GHz with a PAE higher than 40% and 8dB of Saturated Gain.

The Power Module integrates both Bias conditioning networks and DC blocking capacitors on both RF I/O ports, simplifying system integration. It is fully matched to 50 Ω .

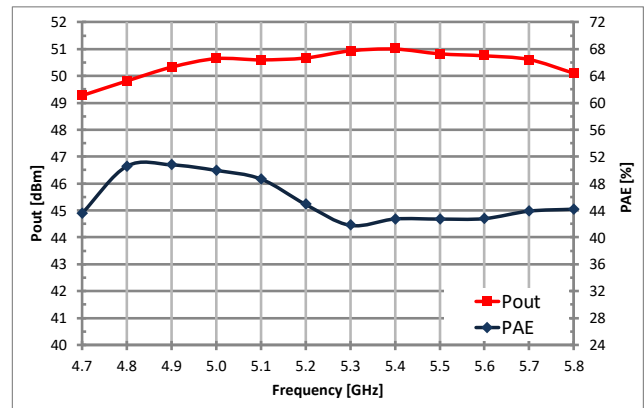
The MECGaNCMOD-100W can be provided in connectorized version (standard or customized version) or in chip&wire configuration, to be integrated in specific module or package.

Main Features

- 0.25 μ m GaN HEMT Technology
- 4.85 – 5.80 GHz full performances Frequency Range
- 100W min. Saturated Output Power
- 42% to 50% PAE @ Saturated Pout
- 8 dB Saturated Gain
- Bias: VDD = 30V, Idq = 2.2 A Pulsed Regime
- Fully matched to 50 Ω
- Integrated RF to DC decoupling
- Very compact hybrid assembly
- Available for connectorized or chip&wire solution
- Terminals for temperature sensing available

Applications

- Radar
- Defence
- Space
- Itar-free



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Main Characteristics*

Test Conditions: $T_{\text{base_plate}} = 25^{\circ}\text{C}$, $V_{\text{dd}} = 30\text{ V}$, $I_{\text{dq}} = 2.2\text{ A}$, Pulse width = 128 μs , Duty Cycle = 10%

Parameter	Min	Typ	Max	Unit
Operating frequency	4.85		5.80	GHz
Small Signal Gain	13		15	dB
Input Return Loss	13			dB
Output Return Loss	10			dB
Output Power @ Pin = 42 dBm	100		125	W
Power Added Efficiency @ Pin = 42 dBm	42		50	%
Drain Supply Voltage		30		V
Supply Quiescent Drain Current		2.2		A
Supply Drain Current @ Pin = 42 dBm	5		9	A
Gate Voltage		-3.3		V

*Performances described in this document are based on characterization of not-connectorized version.

Absolute Maximum Rating*			
Symbol	Parameter	Values	Unit
Vd	Drain Bias Voltage	35	V
Vg_min	Negative Gate Bias Voltage	-10	V
Vg_max	Positive Gate Bias Voltage	0	V
Pin	Maximum peak input Power	44	dBm
Tj	Maximum junction temperature	230	$^{\circ}\text{C}$

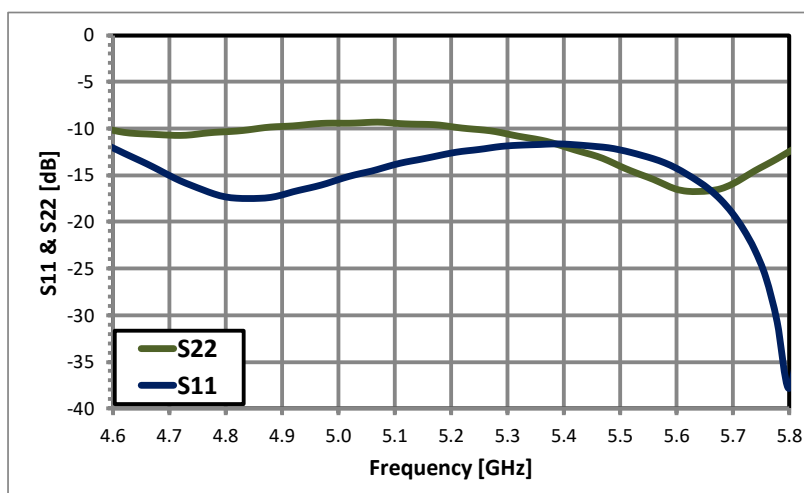
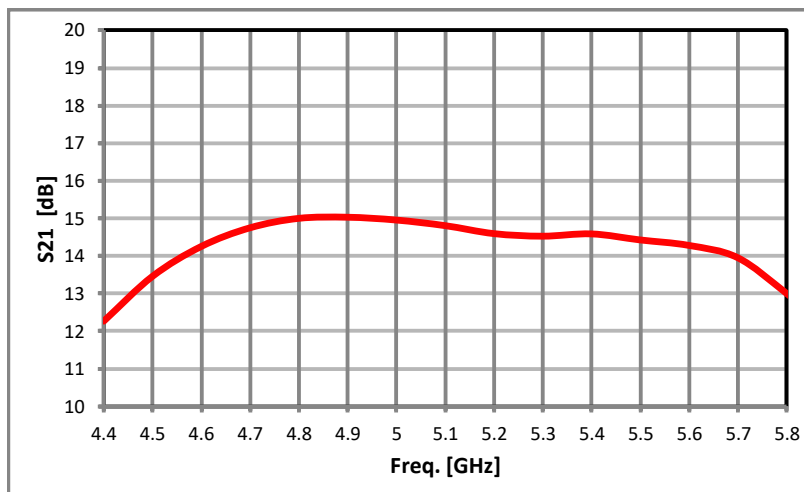
* $T_{\text{amb}} = 25^{\circ}\text{C}$

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Thermal and Reliability Information			
Conditions	Parameter	Values	Unit
VD = 30 V, ID = 8.6 A Pin = 42 dBm Pout = 120W Pdis = 150W CW Tbaseplate = 90°C Duty= 10%	Equivalent Thermal Resistance	4.7	°C/W
	Channel Temperature	160	°C
	Mean Time Failure	2E+7	Hrs

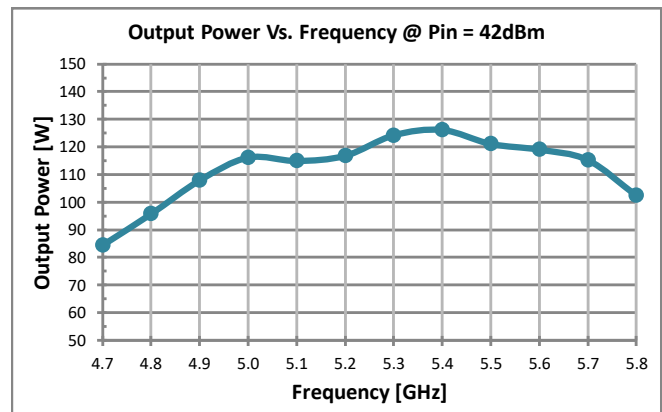
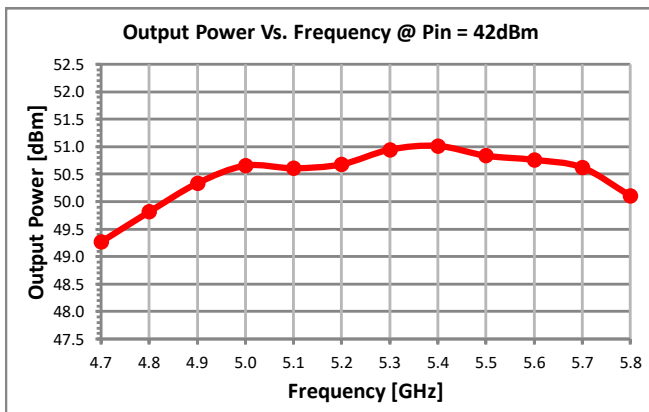
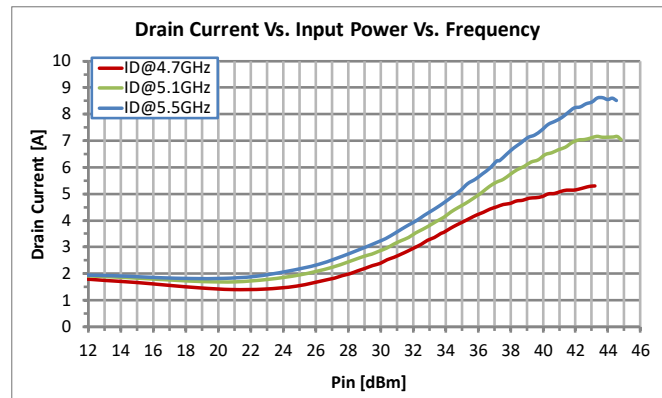
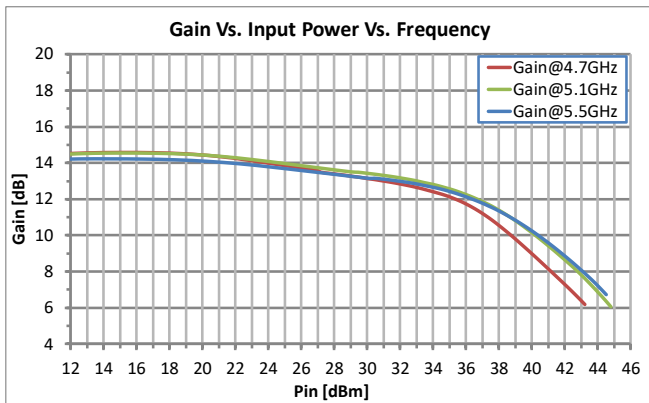
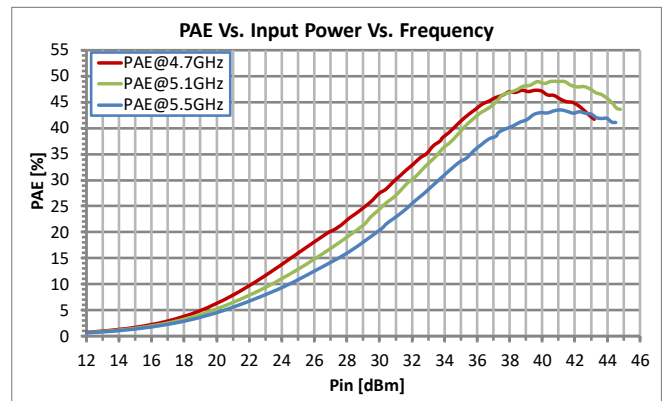
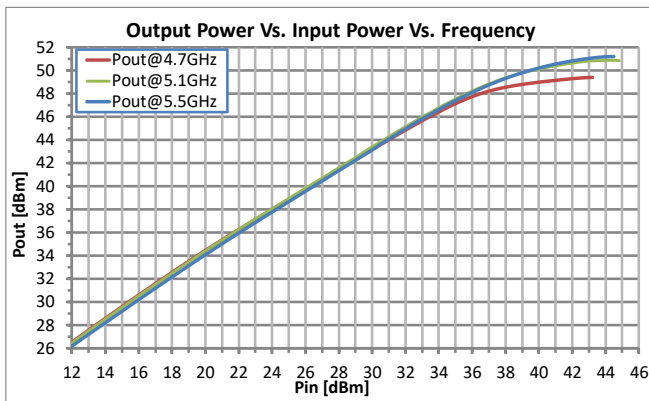
Measured Performance – Small Signal (Pulsed)

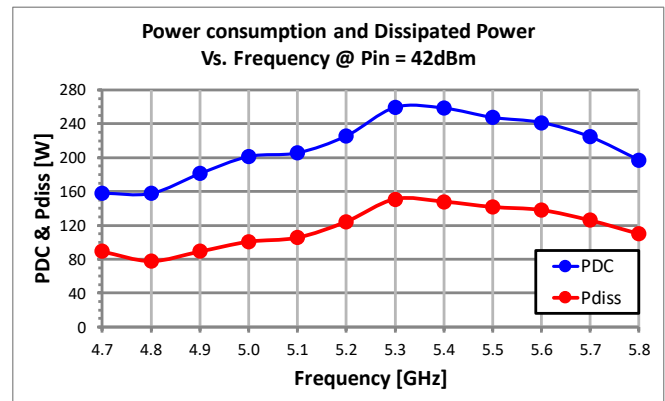
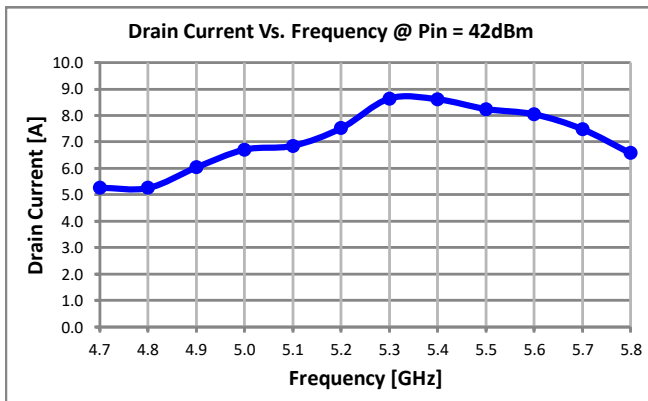
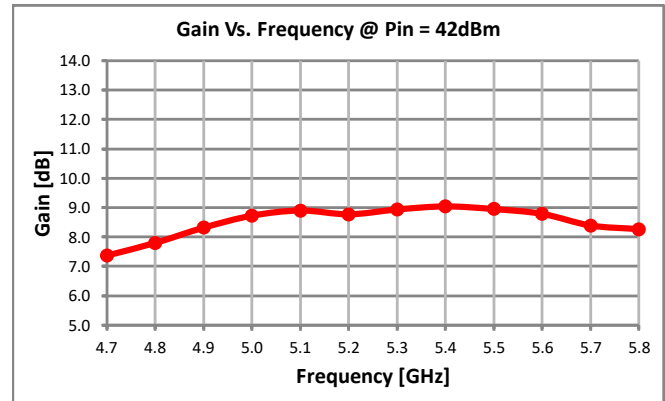
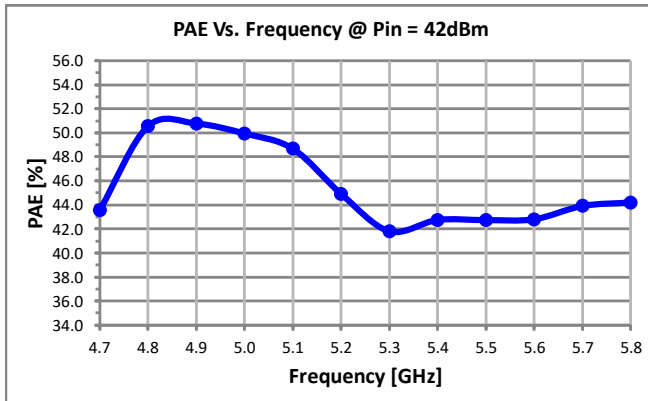
Test Conditions: $T_{baseplate} = 25^{\circ}\text{C}$, $V_{dd} = 30\text{ V}$, $I_{dq} = 2.3\text{ A}$, Pulse width = 128 μs , Duty Cycle = 10%



Measured Performance – Large Signal (Pulsed)

Test Conditions: $T_{base_plate} = 25^{\circ}C$, $V_{dd} = 30 V$, $I_{dq} = 2.3 A$, Pulse width = 128 μs , Duty Cycle = 10%





Bias Procedure

Bias-Up

1. V_g set to -5 V.
2. V_d set to +30 V.
3. Adjust V_g until quiescent I_d is 2.3 A ($V_g = -3.3$ 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.

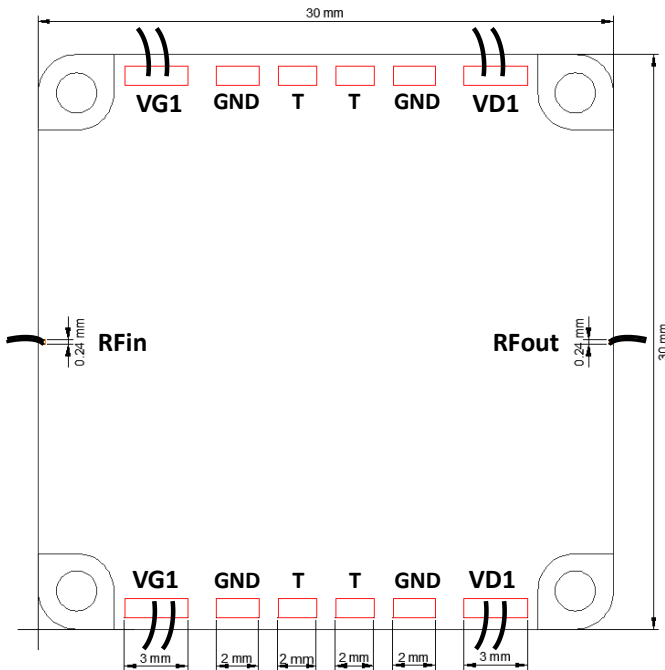
The embedded DC network can be configured for either Gate or Drain pulsing.

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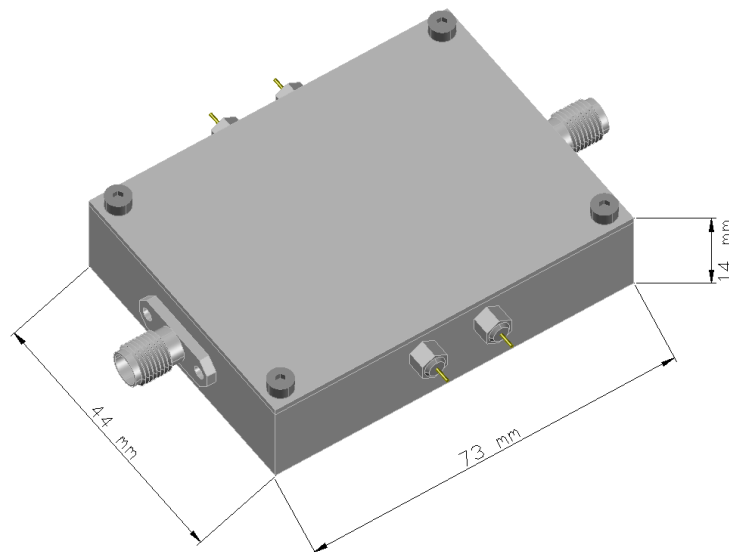
Assembly Outline for Chip&Wire option



Bond Pad	Description
RFin	Input RF Port
RFout	Output RF Port
VG1	Gate Negative Supply Voltage
VD1	Drain Positive Supply Voltage
GND	Ground Pad
T	Thermistor Terminal

The drawing shows a standard assembly configuration. If required, the Drain Pads and the Gate Pads of the different stages can be easily joint in one common Pad

Mechanical Drawing of possible connectorized version



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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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