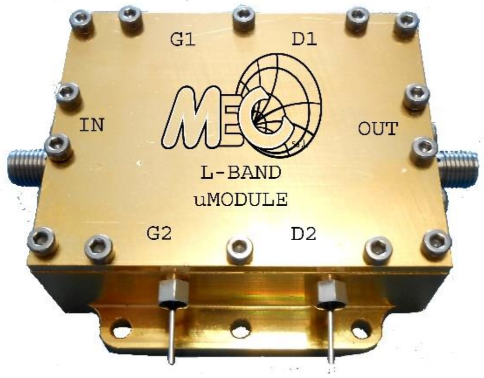
MECGaNLMOD-280W

1.49 to 1.67 GHz GaN HEMT Power Module



Product Description

MECGaNLMOD-280W is a single-stage High Power Amplifier designed by MEC for L-Band applications. It is based on a 0.5µm GaN on SiC process.

The MECGaNLMOD-280W provides about than 280W of output power in the frequency range from 1.49 GHz to 1.67 GHz, with minimum power of about 240W in the range [1.45 – 1.75] GHz. The PAE is higher than 60%, the Linear Gain is greater than 16dB and the Saturated Gain is about 14 dB.

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.

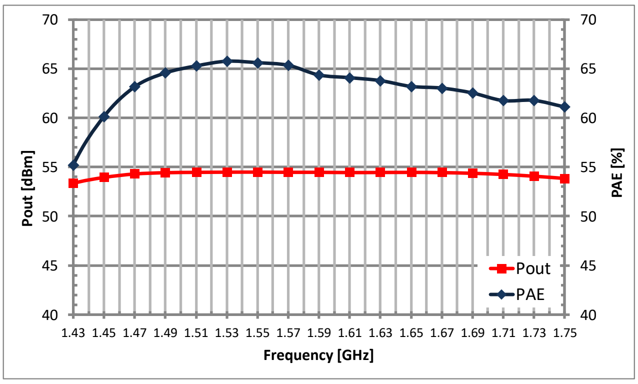
The MECGaNLMOD-280W can be provided in connectorized version (standard or customized version) or in chip&wire configuration, to be integrated in specific module or package.

Main Features

- 0.5µm GaN HEMT Technology
- 1.49 – 1.67 GHz full performances Frequency Range
- 280W typ. Saturated Output Power
- 60% min. PAE @ Saturated Pout
- 14 dB Saturated Gain
- Bias: VDD = 50V, Idq = 1.3 A
  Pulsed Regime
- Fully matched to 50 Ω
- Integrated RF to DC decoupling
- Very compact hybrid assembly
- Available for connectorized or chip&wire solution

Applications

- Radar
- Defence
- Space
- Itar-free



Main Characteristics*

Test Conditions: T_{base_plate} = 25°C, Vdd = 50 V, Idq = 1.3 A, Pulse width = 128 µs, Duty Cycle = 10%

Parameter	Min	Typ	Max	Unit
Operating frequency	1.49		1.67	GHz
Small Signal Gain		17		dB
Input Return Loss		8		dB
Output Return Loss		10		dB
Output Power @ Pin = 40 dBm		280		W
Power Added Efficiency @ Pin = 40 dBm	60			%
Drain Supply Voltage		50		V
Supply Quiescent Drain Current		1.3		A
Supply Drain Current @ Pin = 40 dBm	8		8.6	A
Gate Voltage		-1.25		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	60	V
Vg_min	Negative Gate Bias Voltage	-10	V
Vg_max	Positive Gate Bias Voltage	+2	V
Ig_max	Gate current in forward mode	350	mA
Ig_min	Gate current in reverse mode	-20	mA
Pin	Maximum peak input Power (1)	42	dBm
Tj	Maximum junction temperature	230	°C

* Tamb = 25°C

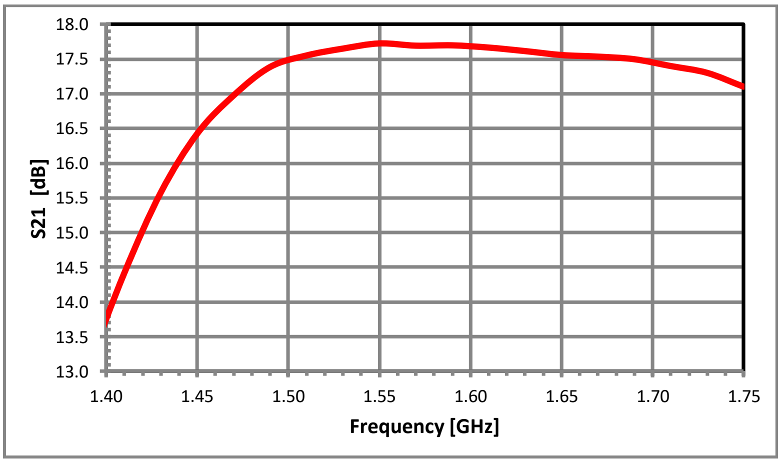
(1) *Limited by Ig_max and Ig_min values*

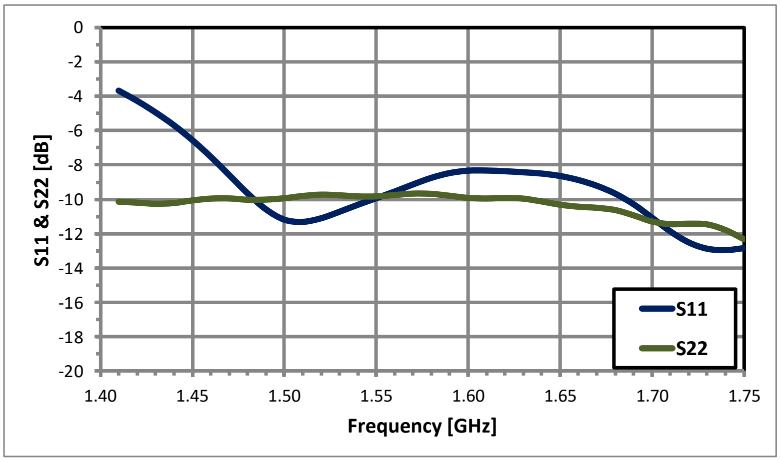
Thermal and Reliability Information

Conditions	Parameter	Values	Unit
VD = 50V, ID = 8.5A Pin = 40dBm **Pout = 280W** **Pdiss = 150W CW** Tbaseplate = 90°C Duty= 10%	**Equivalent Thermal Resistance**	**6.67**	**°C/W**
	Channel Temperature	**190**	**°C**
	Mean Time Failure	**1E+6**	**Hrs**

Measured Performance – Small Signal (Pulsed)

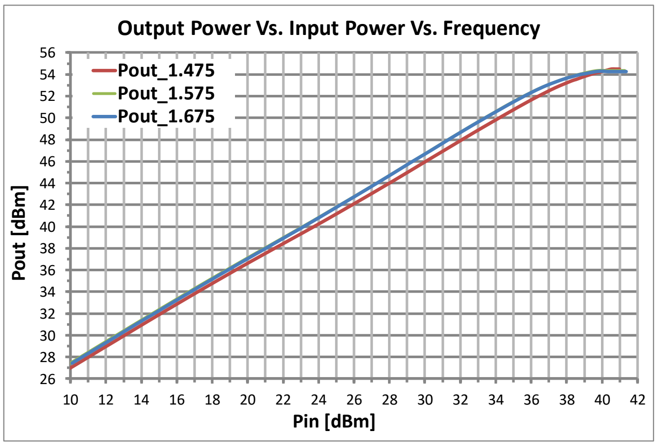
Test Conditions: T_{base_plate} = 25°C, Vdd = 50 V, Idq = 1.3 A, Pulse width = 128 μs, Duty Cycle = 10%

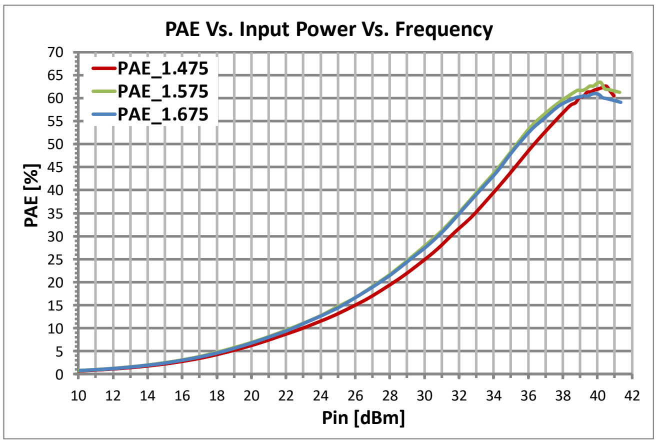


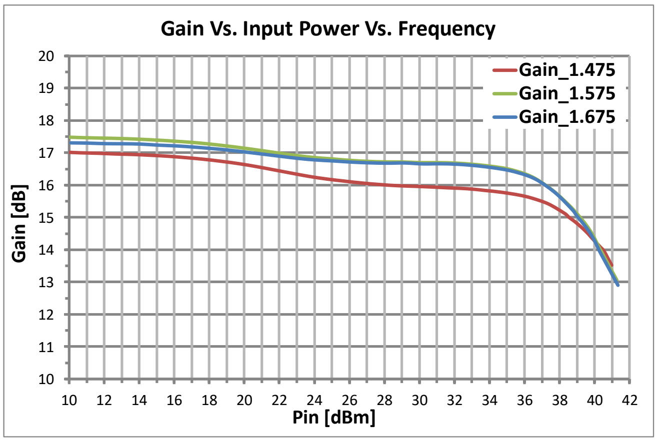


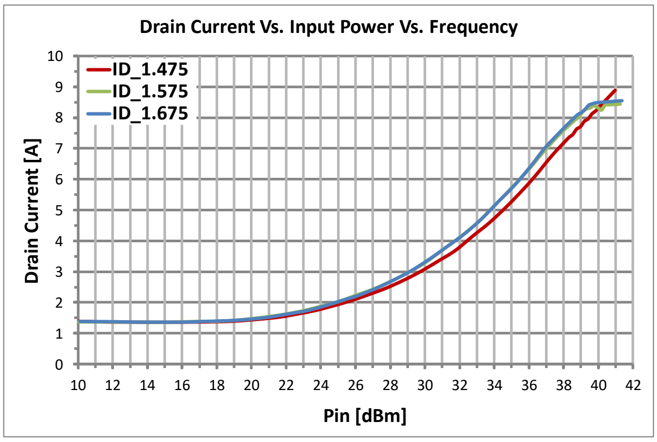
Measured Performance – Large Signal (Pulsed)

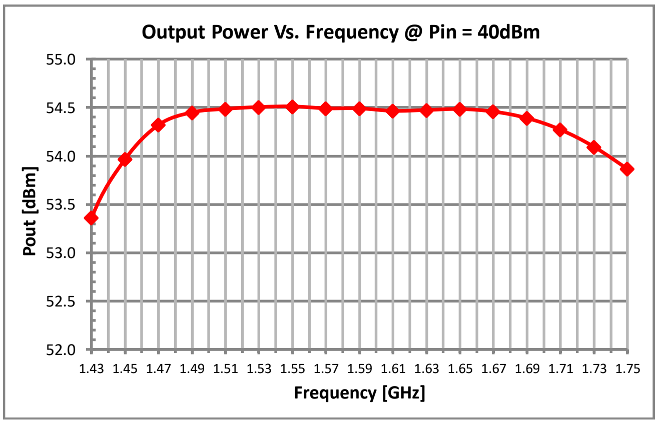
Test Conditions: T_{base_plate} = 25°C, Vdd = 50 V, Idq = 1.3 A, Pulse width = 128 µs, Duty Cycle = 10%

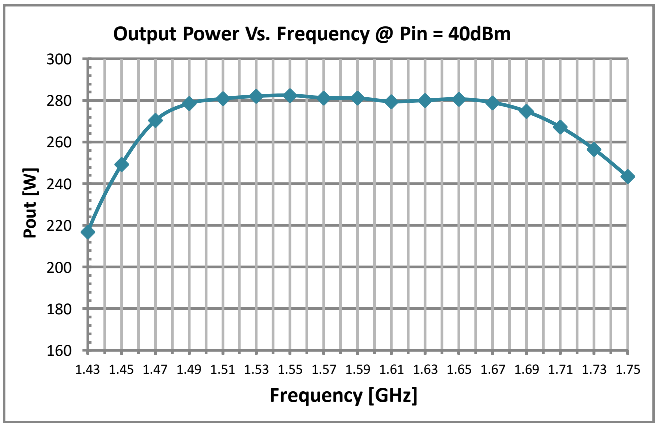


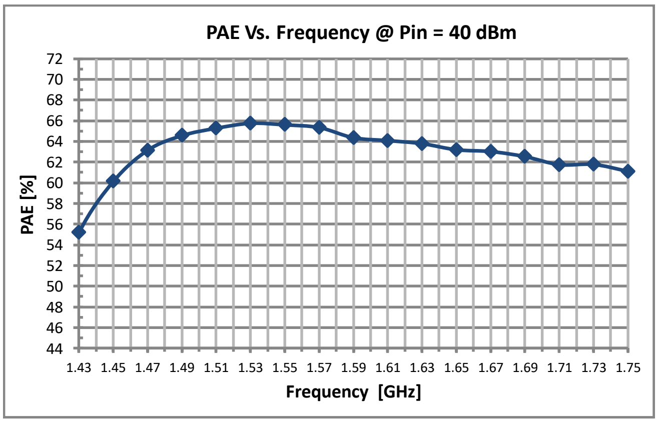


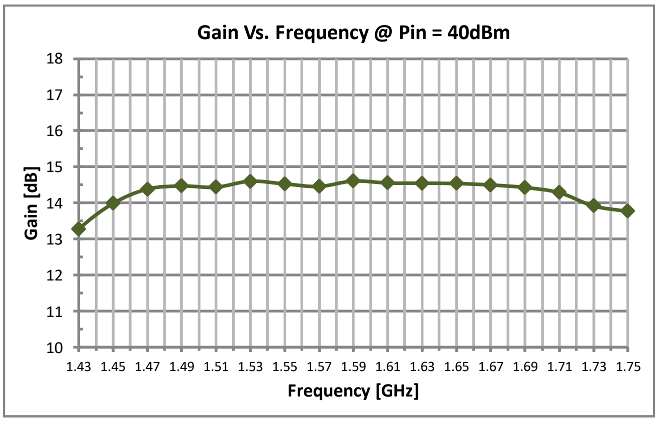


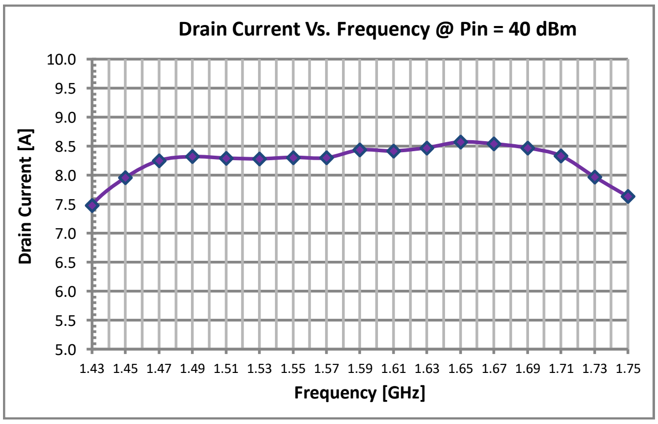


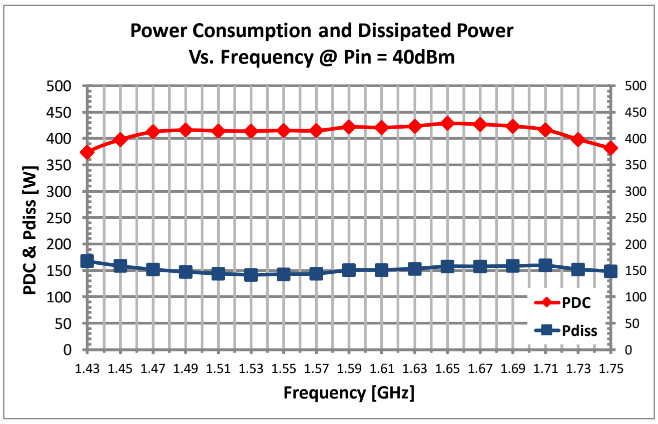












Bias Procedure

Bias-Up

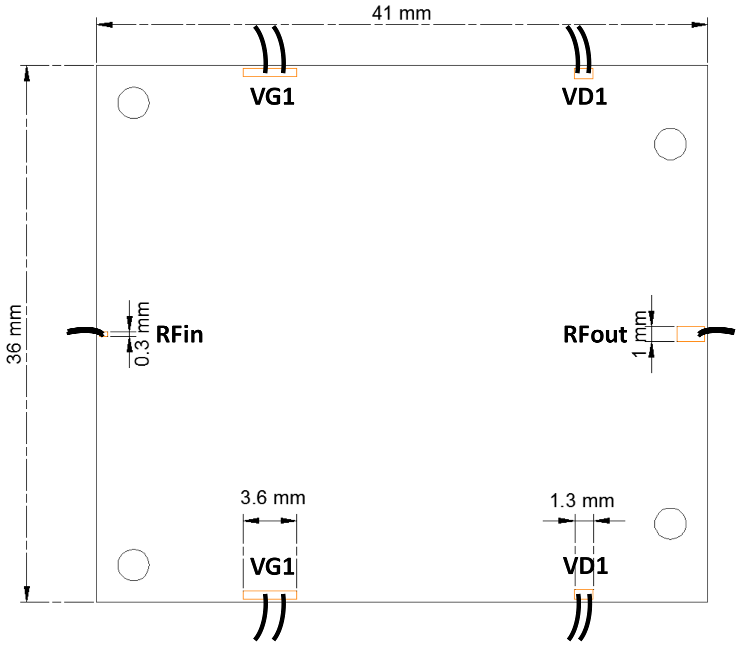
1. Vg set to -5 V.
2. Vd set to +50 V.
3. Adjust Vg until quiescent Id is 1.3 A (Vg = -1.25 V Typical).
4. Apply RF signal.

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.

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

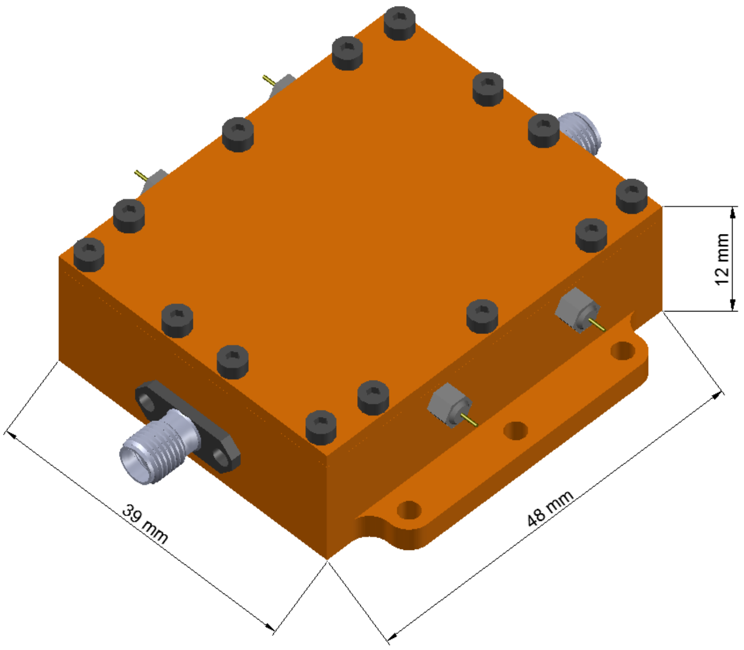
Assembly Outline for Chip&Wire option



Bond Pad	Description
RFin	Input RF Port
RFout	Output RF Port
VG1	Gate Negative Supply Voltage
VD1	Drain Positive Supply Voltage

The drawing shows a standard assembly configuration.

Mechanical Drawing of possible connectorized version



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Notice

The furbished 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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