# MECGaNC30

## 4 to 6 GHz GaN HEMT Power Amplifier


## Product Description

***MECGaNC30*** is a GaN HEMT based High Power Amplifier designed by MEC for C-Band applications and fabricated on 0.25µm GaN on SiC process.

The MECGaNC30 provides more than 30W of saturated output power in the frequency range from 4.1 GHz to 5.9 GHz with a PAE higher than 37% and 27 dB of small signal Gain. Operating in the reduced range from 4.6 GHz to 5.8 GHz it reaches an output Power from 35W to 40W.

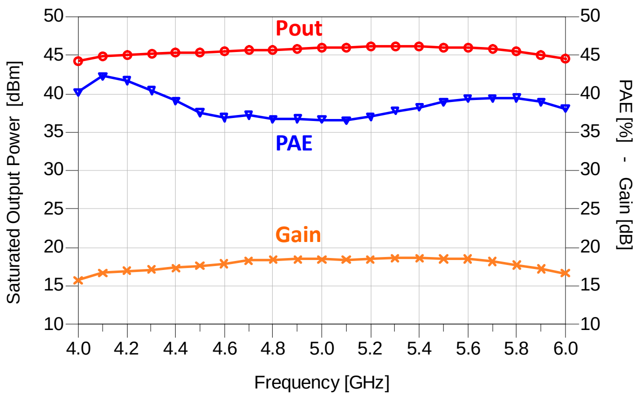
The MECGaNC30 is fully matched to 50 Ω with DC decoupling capacitors on both Input and Output ports. Bond Pad are gold plated for compatibility with thermo-compression bonding process.

## Main Features

- 0.25µm GaN HEMT Technology
- 4.1 – 5.9 GHz full performances Frequency Range
- 30W Output Power @ Pin 27.5 dBm
- 37% PAE @ Pin 27.5 dBm
- 30% PAE @ Pout 20 Watt
- 27 dB Small Signal Gain
- Bias: Vd = 28V, Id = 1A, Vg = -3V (Typ.)
- Chip Size: 5.5 x 3.8 x 0.1 mm

## Applications

- Radar
- Telecom
- Test Instrumentation



## Main Characteristics

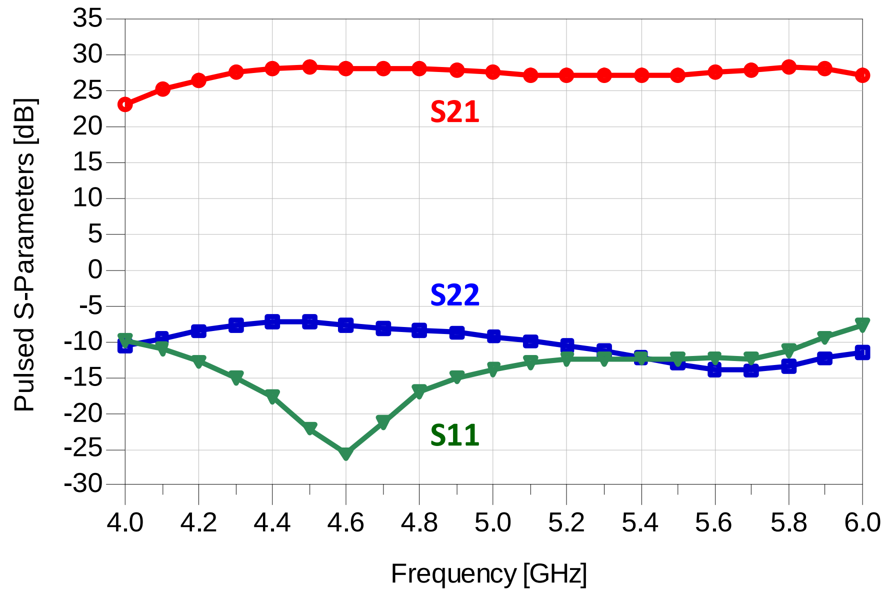
Test Conditions: $T_{base\_plate}$ = 25°C , Vd = 28 V, Idq = 1 A, Pulse Width = 50 µs, Duty Cycle = 15%

| Parameter | Min | Typ | Max | Unit |
|---|---|---|---|---|
| Operating frequency | 4.1 | 5 | 5.9 | GHz |
| Small Signal Gain | 25 | 27 | 28 | dB |
| Input Return Loss | 10 | 13 | | dB |
| Output Return Loss | 7 | 10 | | dB |
| Saturated Output Power | 45 | | 46 | dBm |
| Power Added Efficiency | 37 | | 42 | % |
| Power Added Efficiency @ Pout = 20 Watt | 30 | | 37 | % |
| Saturated Output Power @ [4.6 – 5.8] GHz | 45 | | 46 | dBm |
| Drain Supply Voltage | 25 | 28 | 30 | V |
| Supply Quiescent Drain Current | | 1 | | A |
| Supply Drain Current | 2.5 | | 3.8 | A |
| Gate Voltage | | -3 | | V |

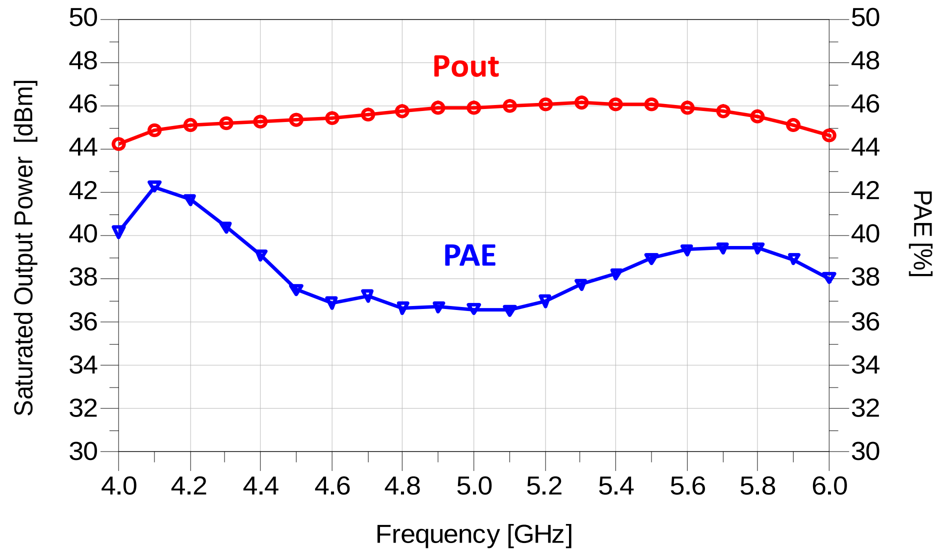
* Performances described in this document are based on preliminary on-jig characterization.
More details and new parameter will be carried out by the ongoing test campaign.

## Typical Measured Performances

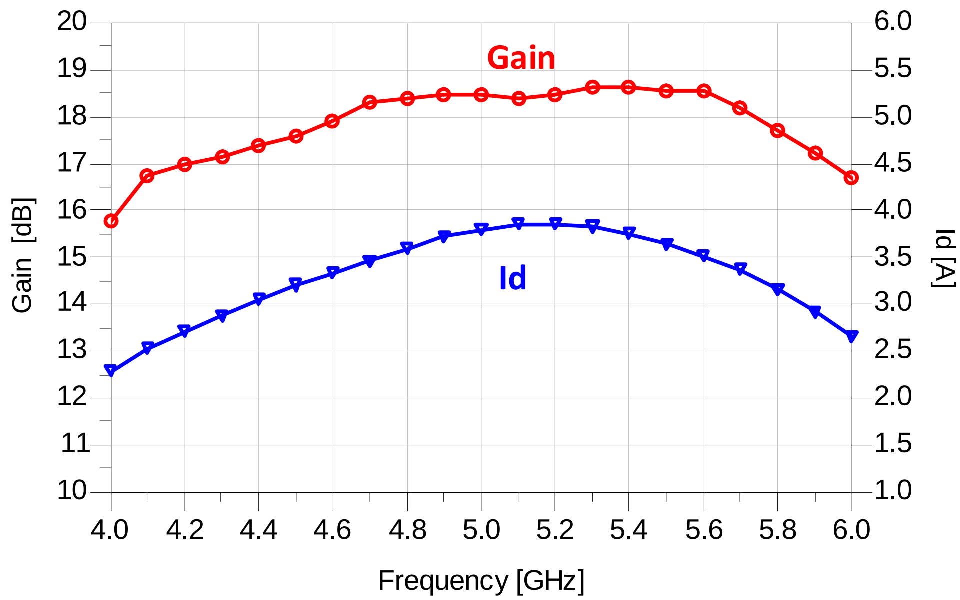
### Linear Gain (S21), Input (S11) and Output (S22) Reflection Coefficients Vs. Frequency



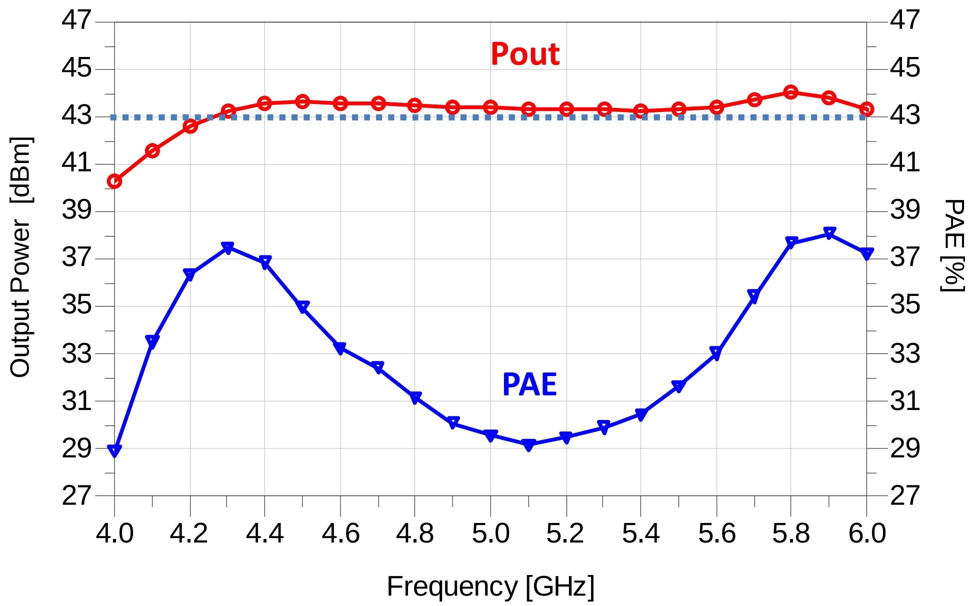

### Output Power and PAE @ Pin = 27.5 dBm Vs. Frequency



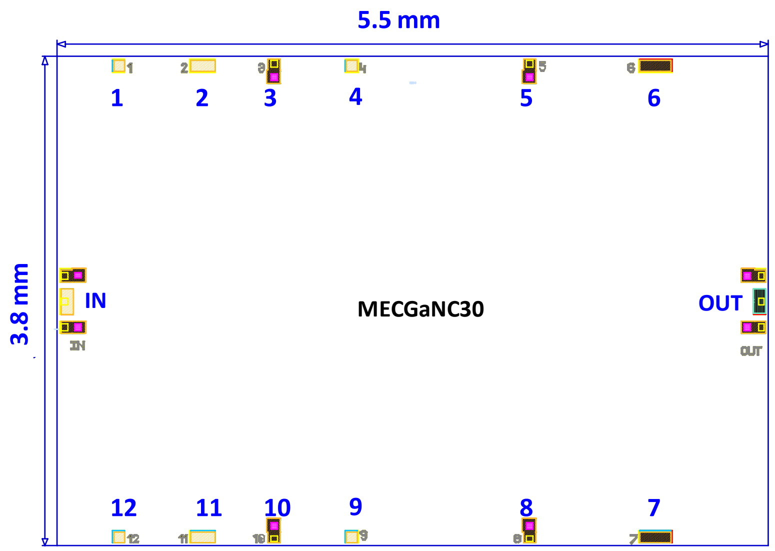
## Gain and Drain Current @ Pin = 27.5 dBm Vs. Frequency




## Output Power and PAE @ Pin = 19.5 dBm Vs. Frequency



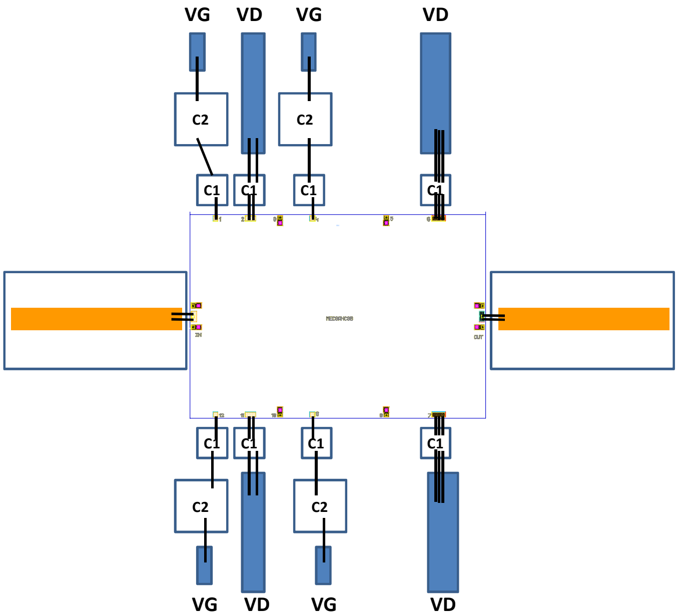
## Bond Pad Configuration




- A tolerance of ± 35µm has to be considered for chip dimensions
- Chip Thickness is 100 µm ± 10 µm
- RF Pads [IN, OUT]  = 100µm x 200µm
- DC Pads [1, 3, 4, 5, 8, 9, 10, 12] = 100µm x 100µm
- DC Pads [2, 11] = 200µm x 100µm
- DC Pads [6, 7] = 250µm x 100µm

| Bond Pad # | Symbol | Description |
|---|---|---|
| IN | RFin | Input RF Port |
| OUT | RFout | Output RF Port |
| 1, 4, 9, 12 | Vg | Gate Negative Supply Voltage |
| 2, 6, 7, 11 | Vd | Drain Positive Supply Voltage |
| 3, 5, 8, 10 | GND | Ground Pads – Not Connected |

## Assembly Recommendations




| Bond Pad # | Connection | External Components |
|---|---|---|
| IN and OUT | **2** Bonding Wires L_bond = 0.3nH | |
| 1, 4, 9, 12 - **Vg** | L_bond ≤ 1 nH | C1 = 100pF/10V C2 = 10nF/10V |
| 2, 11 - **Vd** | **2** Bonding Wires L_bond ≤ 1nH | **Pulsed mode** C1 = 100pF/50V |
| 6, 7 - **Vd** | **3** Bonding Wires L_bond ≤ 1nH | **CW mode:** C1 = 100pF/50V C2 = 10nF/50V |

- Eutectic Die bond using AuSn (80/20) solder is recommended.
- Great care must be used for thermal dimensioning.
- The backside of the die is the Source (ground) contact.
- Thermosonic ball or wedge bonding are the preferred connection methods.
- Gold wire must be used for connections.

## Bias Procedure

### Bias-Up

1. Vg set to -5 V.
2. Vd set to +28 V.
3. Adjust Vg until quiescent Id is 1 A (Vg = -3.0 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.

## Contact Information

For additional technical Information and Requirements:

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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.