MECGaNX27

8.5 to 10.2 GHz GaN HEMT Power Amplifier

Product Description

MECGaNX27 is a GaN HEMT based High Power Amplifier designed by MEC for X-Band applications and fabricated on 0.25µm GaN on SiC process.

The MECGaNX27 provides more than 27 W of saturated output power in the frequency range from 8.5 GHz to 10.2 GHz with a PAE higher than 35% and 24 dB of small signal Gain.

The MECGaNX27 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
- 8.5 – 10.2 GHz full performances Frequency Range
- 27W Output Power @ Pin 27 dBm
- 36% PAE @ Pin 27 dBm
- 24 dB Small Signal Gain
- Bias: Vd = 30V, Id = 1A, Vg = -2.85V (Typ.)
- Chip Size: 5.5 x 4.0 x 0.1 mm

Applications

- Radar
- Telecom

Main Characteristics

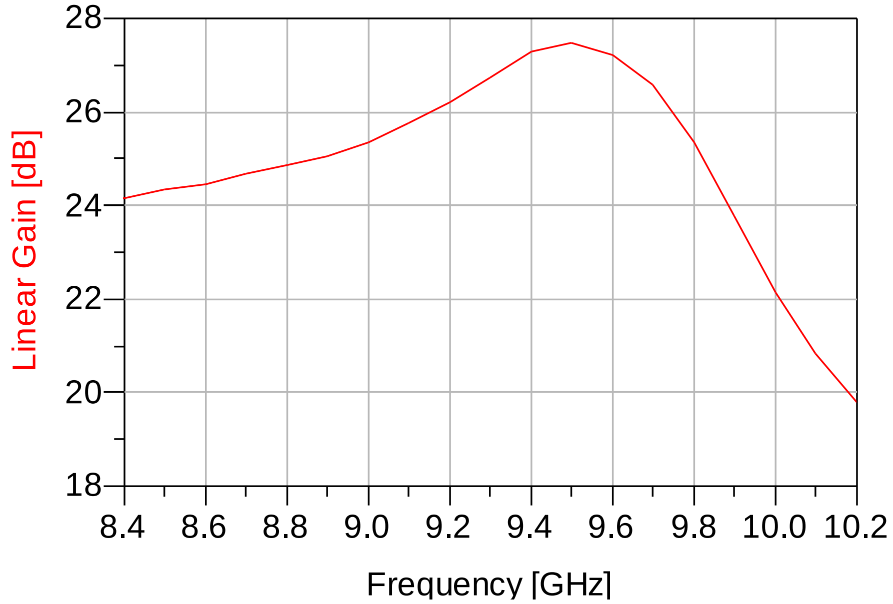
Test Conditions: T_{base_plate} = 25°C , Vd = 30 V, Idq = 1 A, Pulse Width = 50 µs, Duty Cycle = 15%

Parameter	Min	Typ	Max	Unit
Operating frequency	8.5		10.2	GHz
Small Signal Gain	21	24	27	dB
Input Return Loss	7	10		dB
Output Return Loss	8	10		dB
Saturated Output Power	44.5		45.2	dBm
Power Added Efficiency @ Pout=Psat	35		38	%
Gain @ Pout=Psat	17		19	
Drain Supply Voltage		30		V
Supply Quiescent Drain Current		1		A
Supply Drain Current	2.0		3.0	A
Gate Voltage		-2.85		V

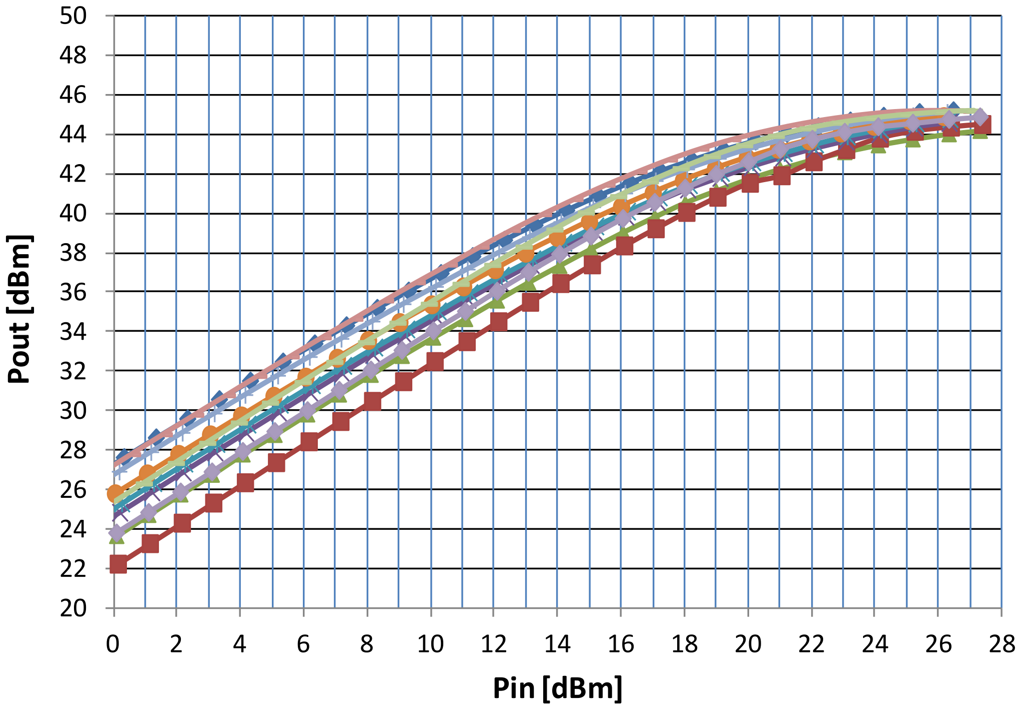
* Performances described in this document are based on preliminary on-jig characterization.
More details and new parameter will be carried out by the ongoing test campaign.

Typical Measured Performances

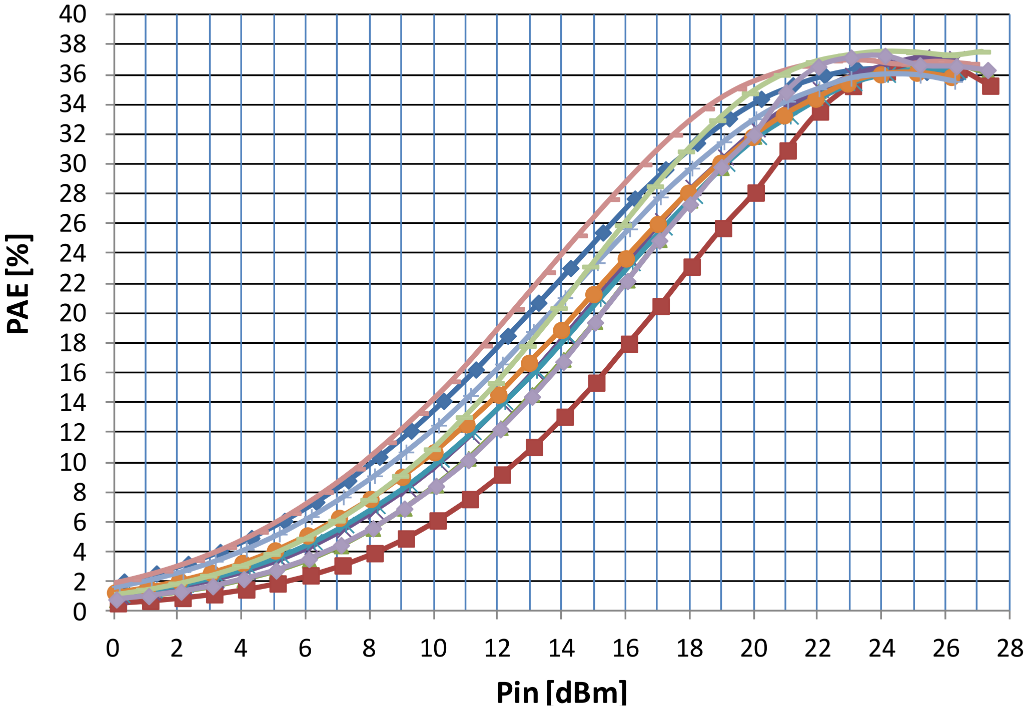
Linear Gain Vs. Frequency



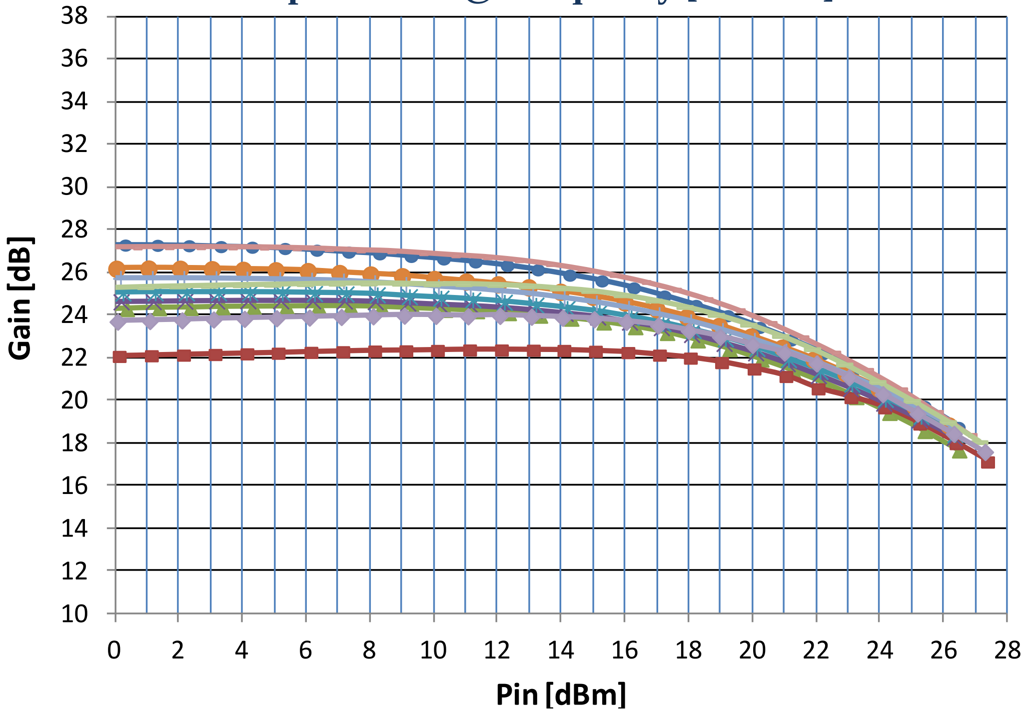
Output Power Vs. Input Power @ Frequency [8.5-10.2]GHz



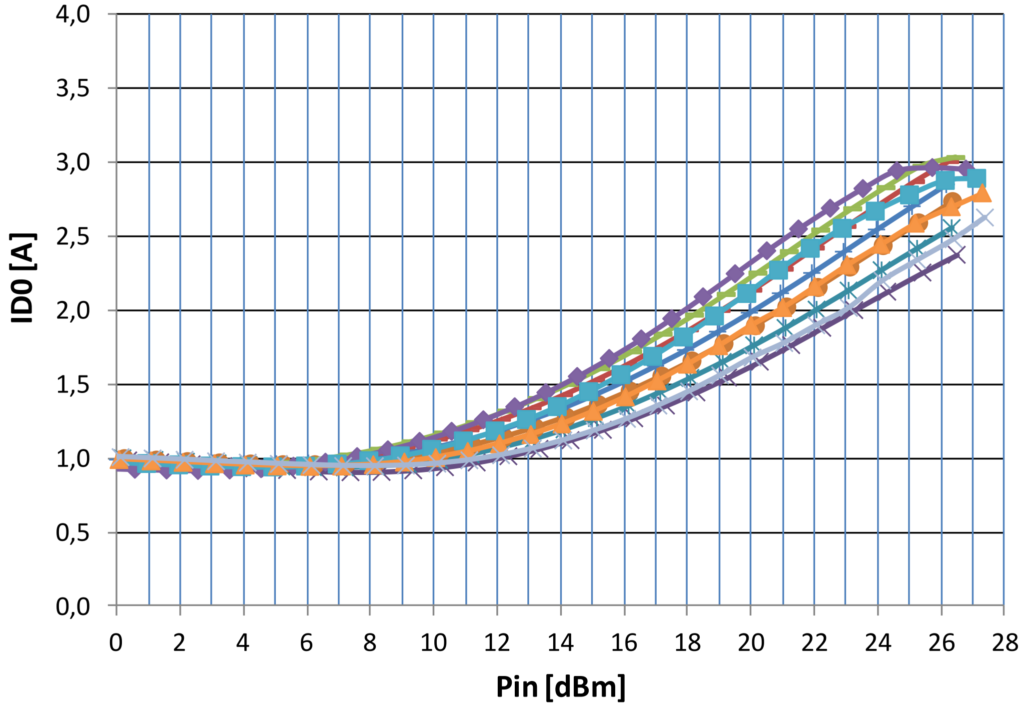
PAE Vs. Input Power @ Frequency [8.5-10.2]GHz



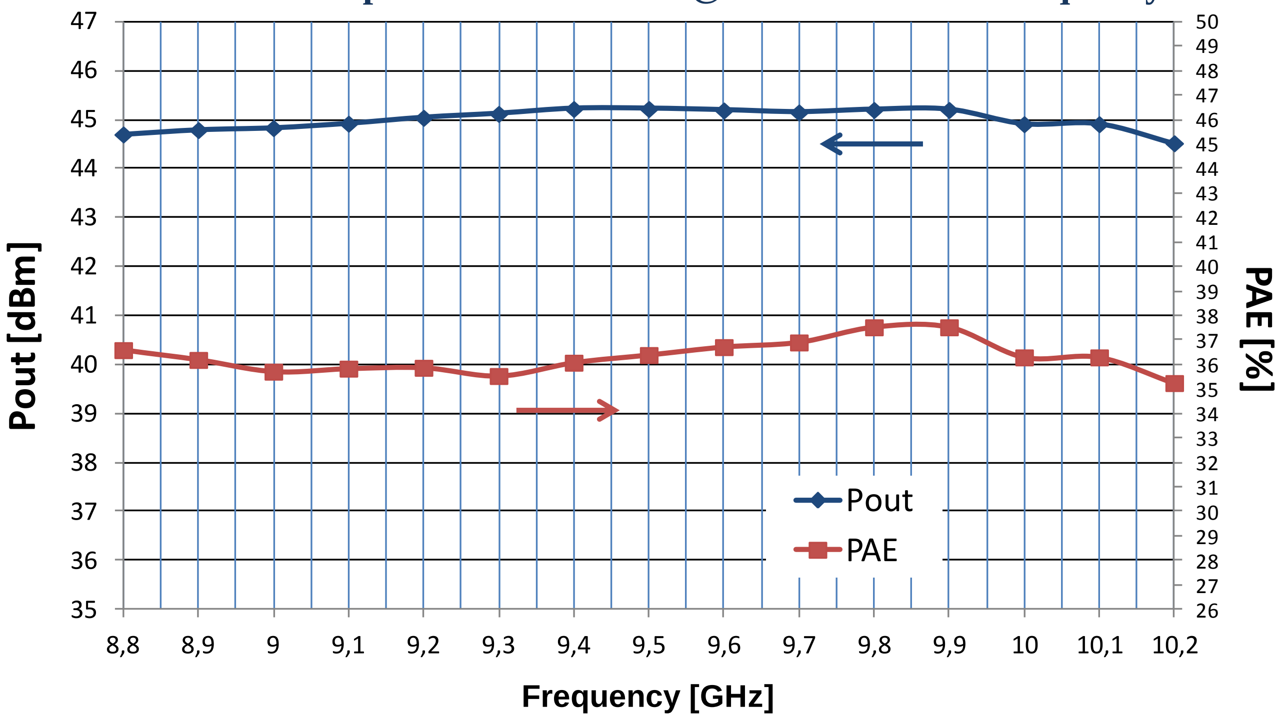
Gain Vs. Input Power @ Frequency [8.5-10.2]GHz



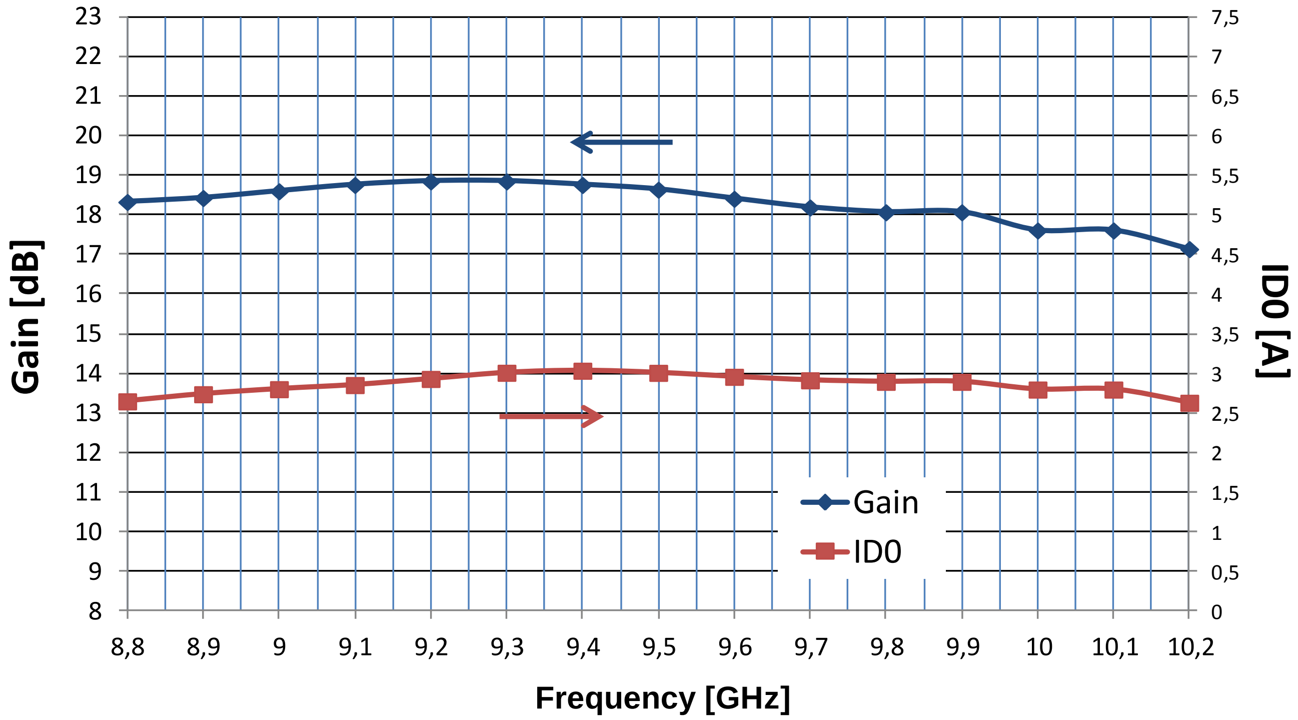
Drain Current Vs. Input Power @ Frequency [8.5-10.2]GHz



Saturated Output Power and PAE @ Pin=27dBm Vs. Frequency

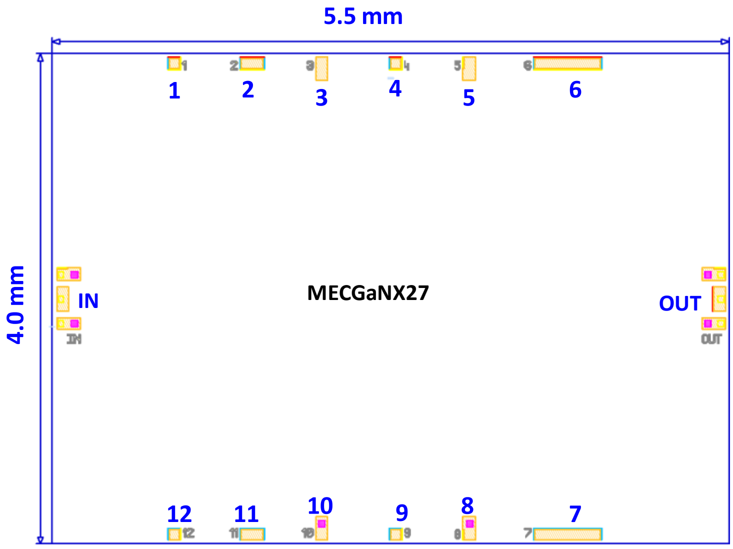


Gain and Drain Current @ Psat, Pin=27dBm Vs. Frequency



Gain [dB]
ID0 [A]
Frequency [GHz]
Gain
ID0
23
22
21
20
19
18
17
16
15
14
13
12
11
10
9
8
7,5
7
6,5
6
5,5
5
4,5
4
3,5
3
2,5
2
1,5
1
0,5
0
8,8
8,9
9
9,1
9,2
9,3
9,4
9,5
9,6
9,7
9,8
9,9
10
10,1
10,2

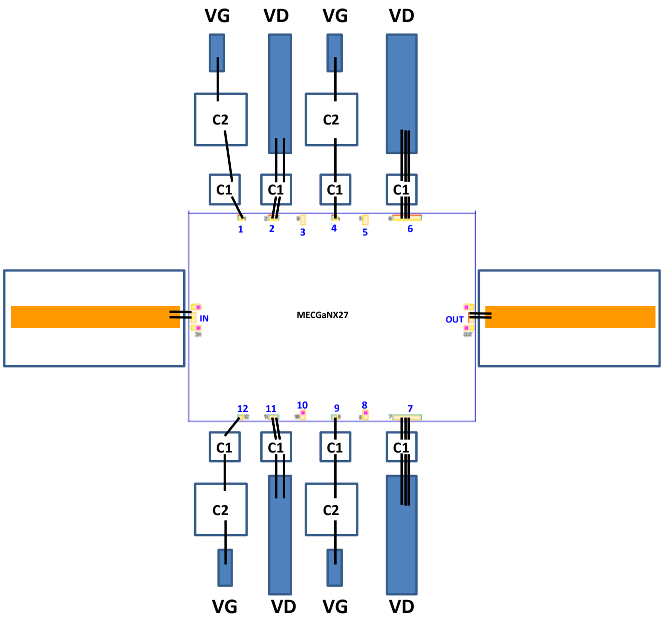
Bond Pad Configuration



- 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] = 550µm 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 **CW mode:** C1 = 100pF/50V C2 = 10nF/50V
6, 7 - **Vd**	**3** Bonding Wires L_bond ≤ 1nH	

- 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 +30 V.
3. Adjust Vg until quiescent Id is 1 A (Vg = -2.85 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:

Email**:** **contact.mec@mec-mmic.com** Tel: **+39 0516333403**

For sales Information and Requirements:

Email**:** **sales@mec-mmic.com** Tel: **+39 0637511124**

Notice