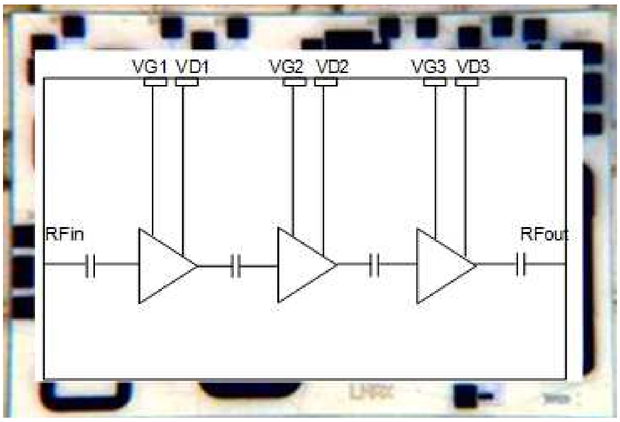
MECGaNLNAX

X-Band GaN HEMT Low Noise Amplifier



Main Features

- 0.25 µm GaN HEMT Technology
- 7.4 – 11.4 GHz full performance Frequency Range
- Small Signal Gain > 23 dB
- Noise Figure: 1.6 dB
- P1dB > 22 dBm, Psat > 26 dBm
- Bias: Vd = 10 V, Id = 120 mA, Vg = -2.7 V (Typ.)
- Chip Size: 3 x 2.02 x 0.1 mm^3

Product Description

MECGaNLNAX is a 0.25 µm GaN HEMT based Low Noise Amplifier designed and tested by MEC for X-Band applications.

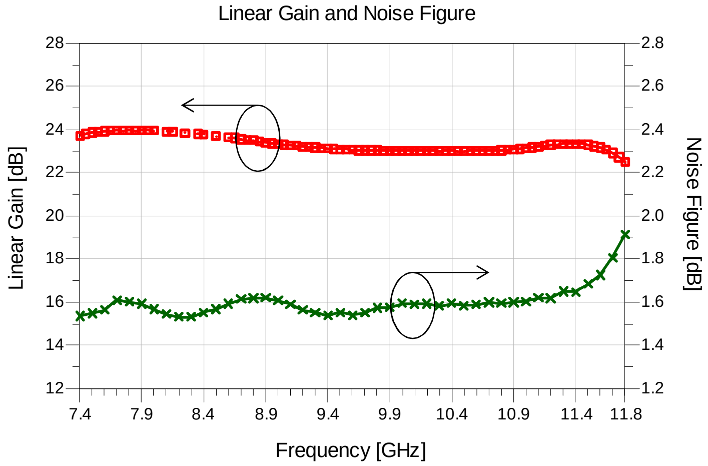
In the frequency range from 7.4 GHz to 11.6 GHz MECGaNLNAX provides more than 23 dB of linear gain with ±0.5 dB of gain flatness and 1.6 dB of noise figure.

In addition to the high electrical performances, this GaN LNA provides an high level of input power robustness being capable of surviving up to 24 dBm without degrading its performance.

Typical Applications

- Radar
- Telecom

Measured Data



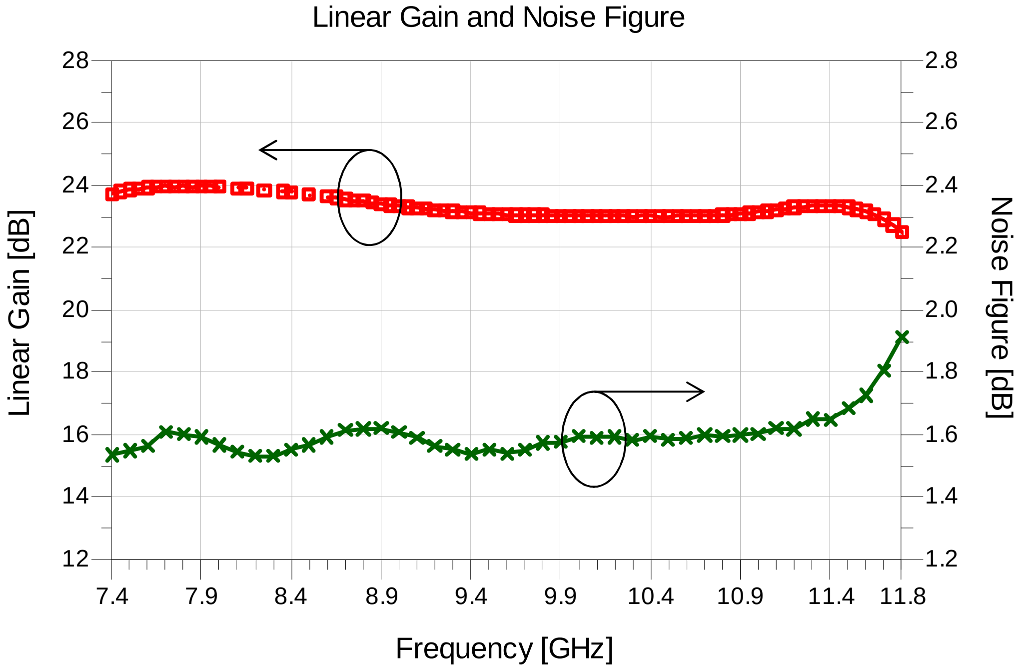
Main Characteristics

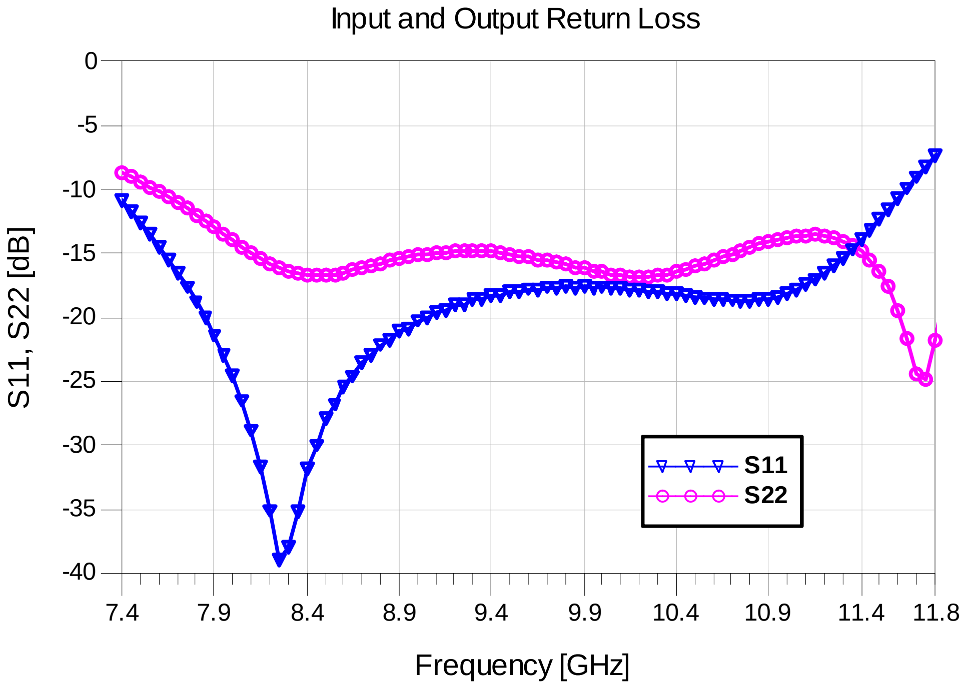
Test Conditions: T_{base_plate} = 25 °C , Vd = 10 V, Idq = 120 mA

Parameter	Min	Typ	Max	Unit
Operating frequency	7.4		11.6	GHz
Small Signal Gain		23		dB
Noise Figure		1.6		dB
Input Return Loss		-15		dB
Output Return Loss		-15		dB
Output Power at 1 dB of Gain Compression*		22.5		dBm
Output Power at Saturation*		26.5		dBm
Max. Overdrive Input Power			24	dBm
Drain Supply Voltage		10		V
Supply Quiescent Drain Current		120		mA
DC Power Consumption		1.2		W
DC Power Consumption at 1 dB of Gain Compr.		1.2		W

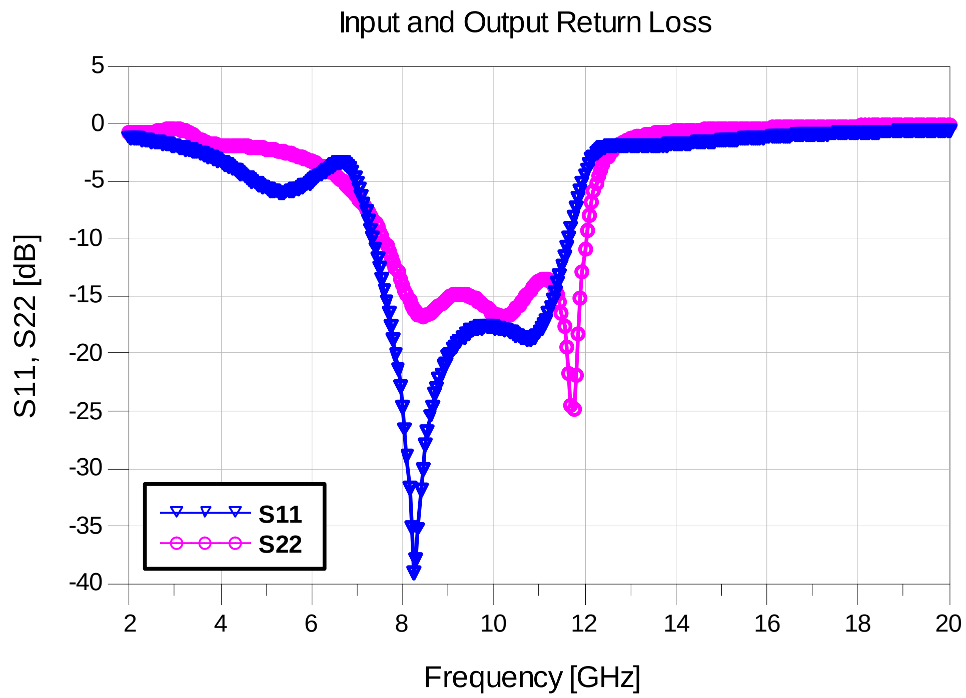
Small Signal Measurements

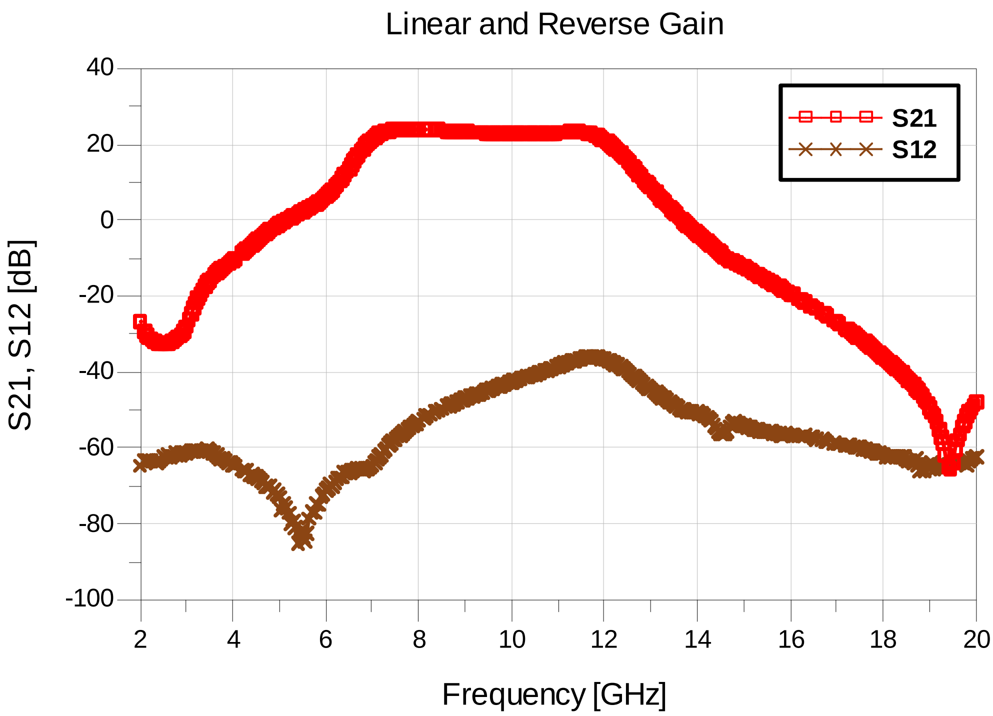
Test Conditions: T_{base_plate} = 25°C , Vd = 10 V, Idq = 120 mA





Broadband Small Signal Measurements

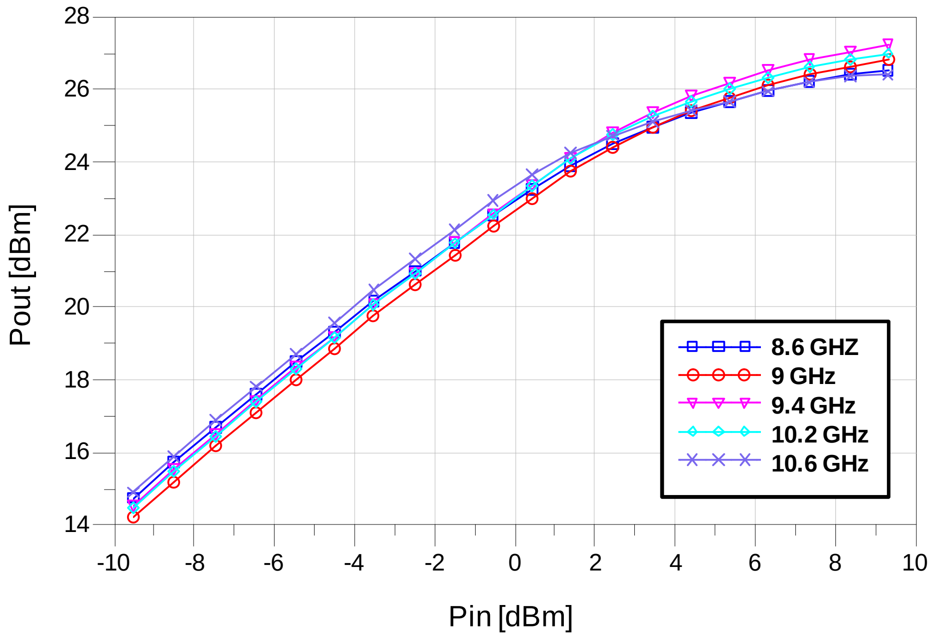




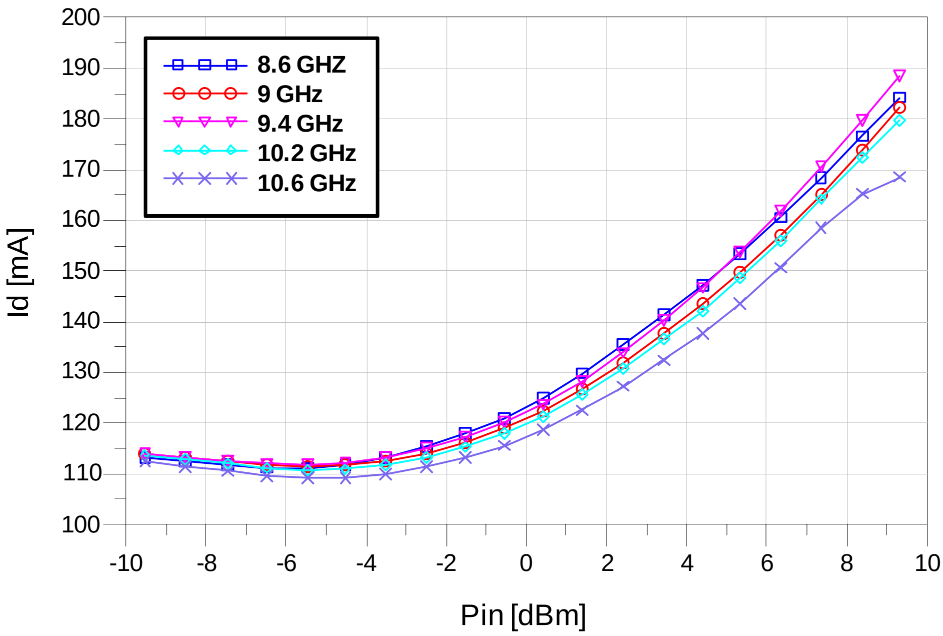
Measured Performances Vs. Pin @ Freq. [8.6, 9, 9.4, 10.2, 10.6] GHz

Test Conditions: T_{base_plate} = 25 °C , Vd = 10 V, Idq = 120 mA

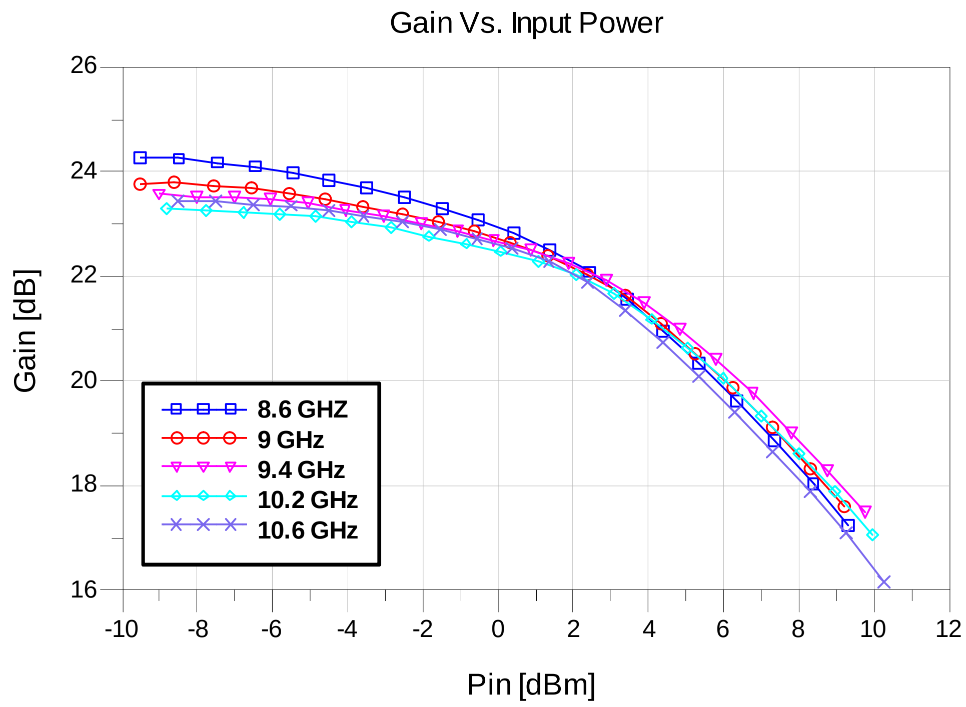
Output Power Vs. Input Power

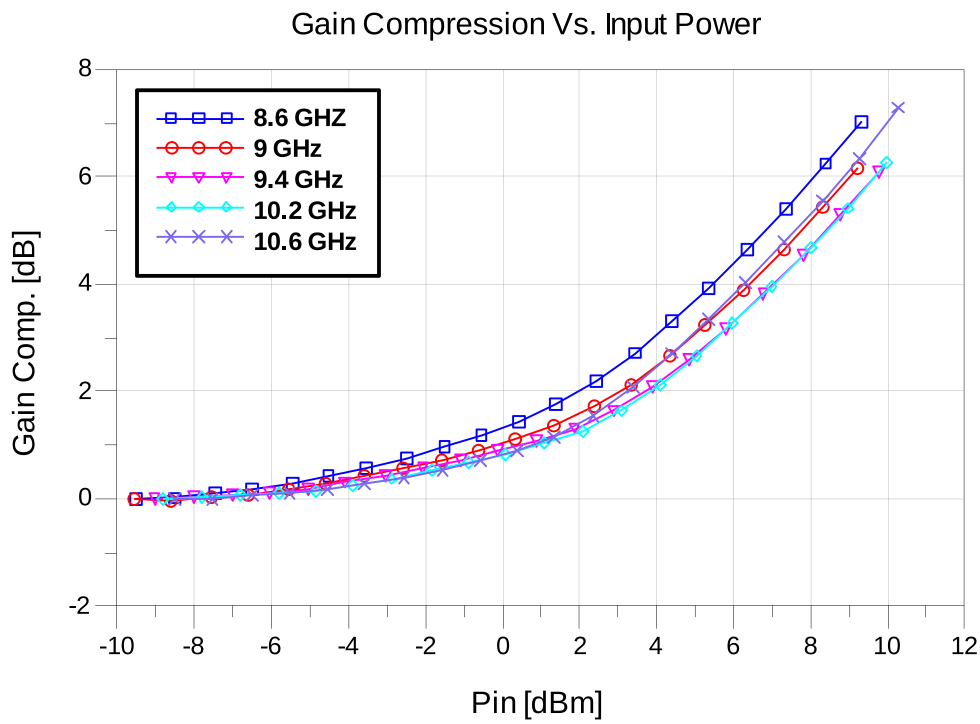


Drain Current Vs. Input Power



Test Conditions: T_{base_plate} = 25 °C , Vd = 10 V, Idq = 120 mA

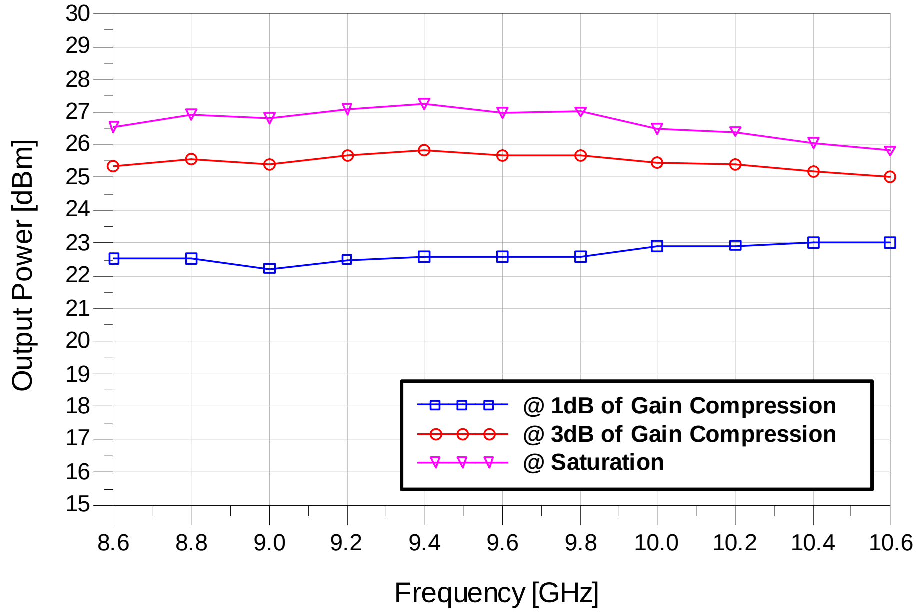


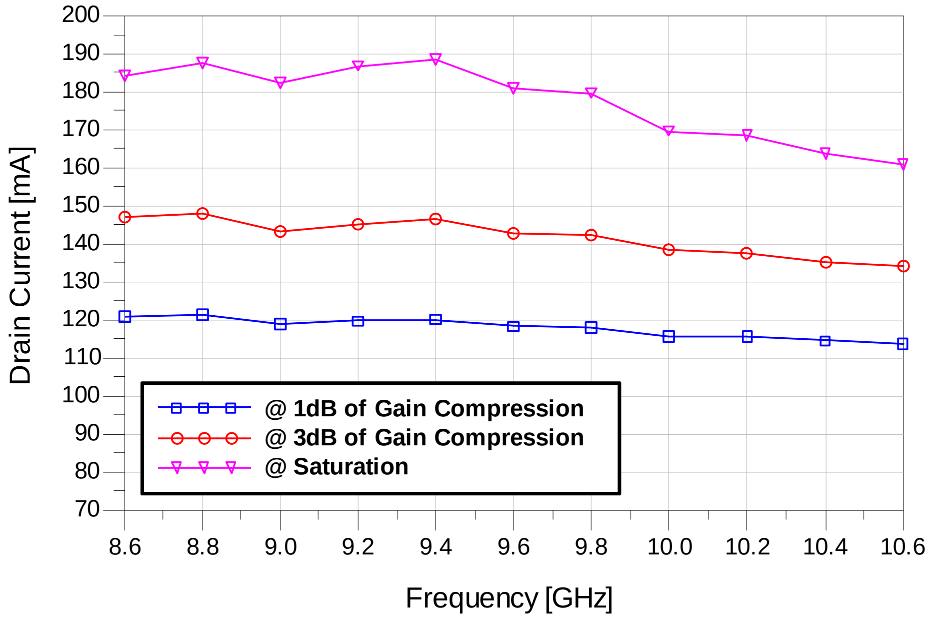


Measured Performances Vs. Frequency

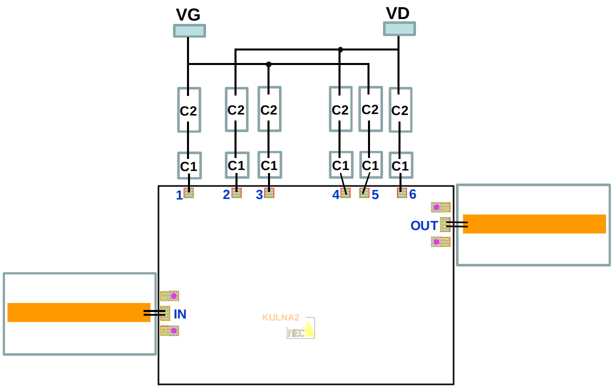
Test Conditions: T_{base_plate} = 25 °C , Vd = 10 V, Idq = 120 mA

- P1dB condition reached at Pin = 0 dBm
- P3dB condition reached at Pin = 5 dBm
- PSat condition reached at Pin = 10 dBm

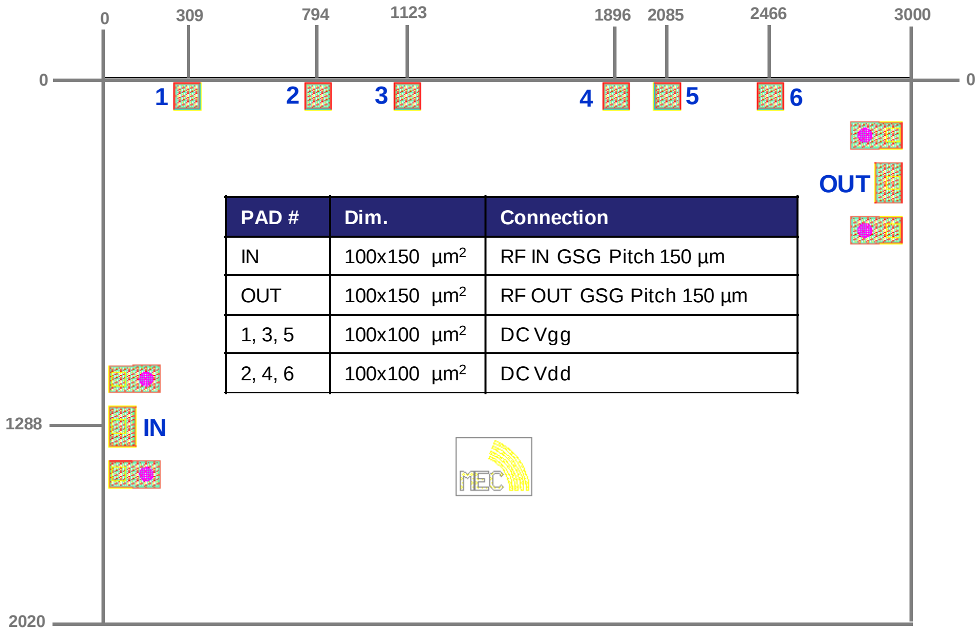




Bond Pad Configuration & Assembly Recommendations



Bond Pad #	Connection	External Components
IN and OUT	2 Bonding Wires L_bond = 0.3nH	
1, 3, 5 **Vg**	L_bond ≤ 1 nH	C1 = 100pF/10V C2 = 10nF/10V
2, 4, 6, **Vd**	L_bond ≤ 1nH	C1 = 100pF/50V C2 = 10nF/50V



PAD #	Dim.	Connection
IN	100x150 μm^2	RF IN GSG Pitch 150 μm
OUT	100x150 μm^2	RF OUT GSG Pitch 150 μm
1, 3, 5	100x100 μm^2	DC Vgg
2, 4, 6	100x100 μm^2	DC Vdd

Eutectic Die bond using AuSn (80/20) solder is recommended.

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 +10 V.
3. Adjust Vg until quiescent Id is 120 mA (Vg = -2.7 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. Turn off Vd.
5. Turn off Vg.

Contact Information

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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.