

C08122126

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8 to 12 GHz – 21 dB – 26 dBm  
Medium Power QFN MMIC

## General description

The **C08122126** is a 3 stages medium power MMIC amplifier, packaged in a 4x4 mm 24 lead Plastic Surface Mount Package (ROHS).

The device is operating in the frequency range 8 to 12 GHz and is capable of more than +26 dBm of output power in saturation regime. Linear gain is more than 21 dB from 8 to 12 GHz with less than 1 dB of gain variation. The Design has been optimized to provide high efficiency, typical operating supply current is only 190 mA with a drain voltage at +8 V.

## Applications

- X band Medium Power Amplifier
- Radar / ECM / ECCM
- Test and measurement

## Features

- 3 stages Medium Power pHEMT GaAs MMIC
- High output Psat > +26 dBm
- High P1dB : + 25 dBm
- Small signal gain: 21 dB min
- 50 Ω, AC coupled RF input and output,
- Power supply: 190 mA @ +8 V (typical conditions)
- Package : QFN 4x4 mm 24 Lead

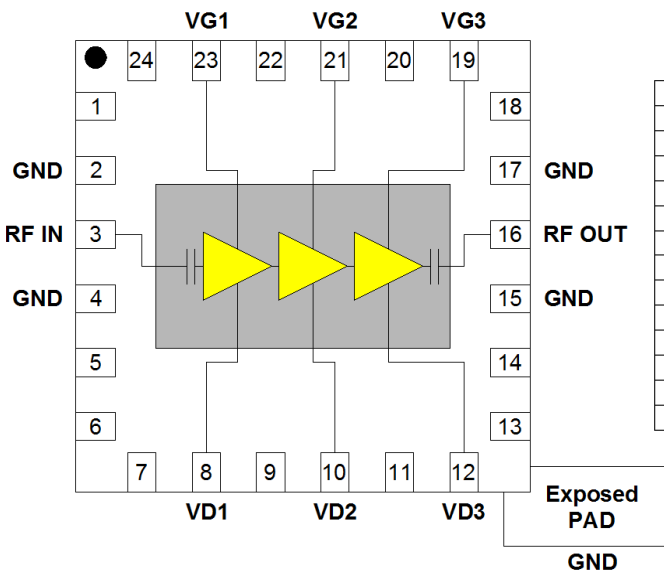
## Tools

S2P file can be provided for system design simulation.  
DXF drawing file is available for mechanical design.  
Evaluation board available on request.

## Ordering information

| Product code     | Definition             |
|------------------|------------------------|
| <b>C08122126</b> | QFN 4x4 mm 24 Lead MPA |

## Functional diagram / Pinout



| PINOUT |      |     |       |
|--------|------|-----|-------|
| PIN    | Name | PIN | Name  |
| 1      | NC   | 13  | NC    |
| 2      | GND  | 14  | NC    |
| 3      | RFIN | 15  | GND   |
| 4      | GND  | 16  | RFOUT |
| 5      | NC   | 17  | GND   |
| 6      | NC   | 18  | NC    |
| 7      | NC   | 19  | VG3   |
| 8      | VD1  | 20  | NC    |
| 9      | NC   | 21  | VG2   |
| 10     | VD2  | 22  | NC    |
| 11     | NC   | 23  | VG1   |
| 12     | VD3  | 24  | NC    |

## Typical Characteristics (Ambient temperature T= 25°C)

Operating conditions:

Drain voltage : VD=VD1=VD2=VD3=+8V

Gate voltage: VG=VG1=VG2=VG3: adjusted to obtain Darin current ID= (ID1+ID2+ID3)=190 mA<sup>(\*)</sup>

(Typically VG= -0.75 V)

| Measured parameters             | Symbol     | Min | Typ    | Max | Unit |
|---------------------------------|------------|-----|--------|-----|------|
| Frequency range                 | F          | 8   |        | 12  | GHz  |
| Small signal gain               | G          |     | 21     |     | dB   |
| Small signal gain flatness      | $\Delta G$ |     | +/-0.5 |     | dB   |
| Input return loss               | S11        |     | -15    | -10 | dB   |
| Output return loss              | S22        |     | -18    |     | dB   |
| Output power at 1dB compression | P1dB       |     | 25     |     | dBm  |
| Saturated output power          | PSat       | 26  | 27     |     | dBm  |
| Drain supply voltage            | VD         |     | + 8    |     | V    |
| Supply current <sup>(*)</sup>   | ID         |     | 190    |     | mA   |

(\*) : without RF input signal

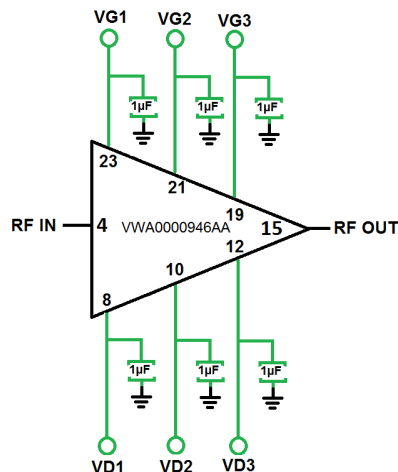
## Absolute maximum ratings

| Maximum ratings                 | Symbols        | Min  | Max  | Units |
|---------------------------------|----------------|------|------|-------|
| Drain voltage                   | VD=VD1=VD2=VD3 |      | +8.5 | V     |
| Gate voltage                    | VG=VG1=VG2=VG3 | -2.5 |      | V     |
| Drain current 1 <sup>(**)</sup> | ID1            |      | 50   | mA    |
| Drain current 2 <sup>(**)</sup> | ID2            |      | 75   | mA    |
| Drain current 3 <sup>(**)</sup> | ID3            |      | 185  | mA    |
| CW RF input power               | Pin            |      | +20  | dBm   |
| Continuous power dissipation    | Pcw            |      | 2.3  | W     |
| Storage temperature             | Tst            | -55  | +125 | °C    |
| Operating temperature           | Top            | -40  | +85  | °C    |

(\*\*) : with RF input signal

Operation of this device above any of these parameters may cause permanent damages.

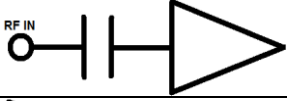
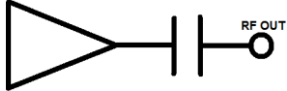
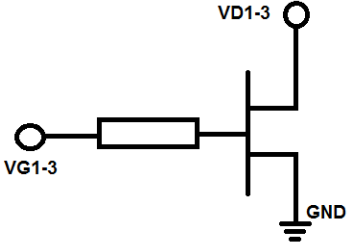


## Application circuit



1µF : 0402 capacitor, must be placed as closed as possible to the QFN access

# Preliminary DATA SHEET **VWA** Product-Line

## Pin description

| Pin number   | Name          | Description   | Electrical interface   |
|--------------|---------------|---|--|
| 3            | RFin          | AC coupled, amplifier input access.<br>Internally matched 50 Ohms.  |   |
| 16           | RFout         | AC coupled amplifier output access.<br>Internally matched 50 Ohms.  |   |
| 8, 10, 12    | VD1, VD2, VD3 | 1st stage second stage and third stage drain biasing access. External 1µF 0402 decoupling capacitor are required on each VD access. |   |
| 23, 21, 19   | VG1, VG2, VG3 | 1st stage second stage and third stage gate biasing access. External 1µF 0402 decoupling capacitor are required on each VG access.  |  |
| Exposed PAD  | GND           | Ground paddle must be connected to HF and DC Ground   |   |
| 2, 4, 15, 17 | GND           | This PINS must be connected to HF and DC Ground   |  |

## Typical performances measurements (Ambient temperature T= 25°C)

### Operating conditions:

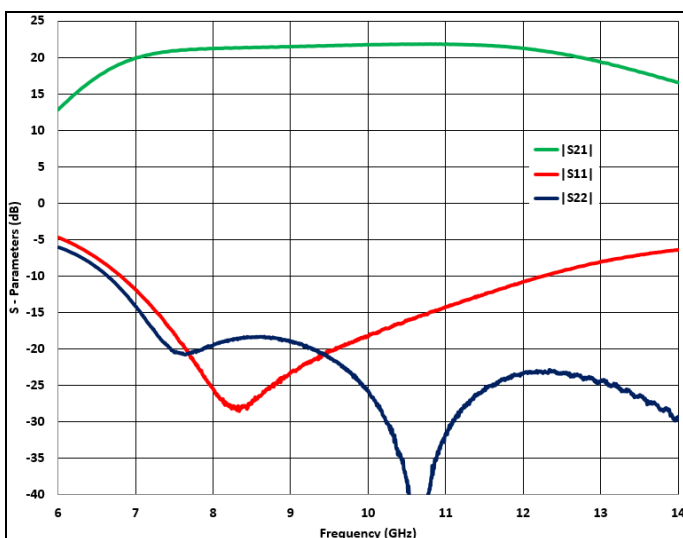
Drain voltage : VD=VD1=VD2=VD3=+8V

Gate voltage: VG=VG1=VG2=VG3: adjusted to obtain Darin current ID= (ID1+ID2+ID3)=190 mA<sup>(\*)</sup>  
(Typically VG= -0.75 V)

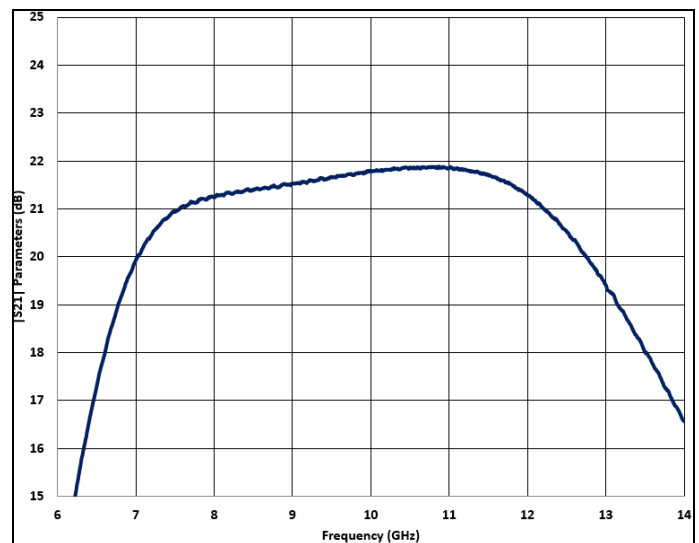
### Measurement conditions :

Component on connectorized PCB Measurements, measurement reference planes at the component.

### Gain (dB)

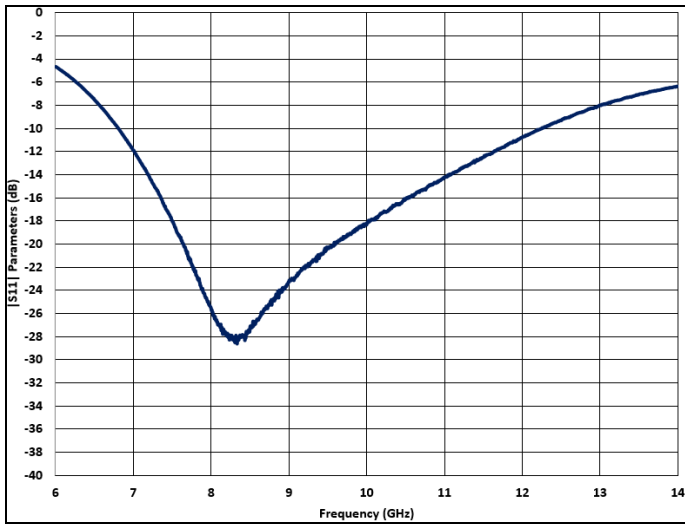


### Gain (dB)

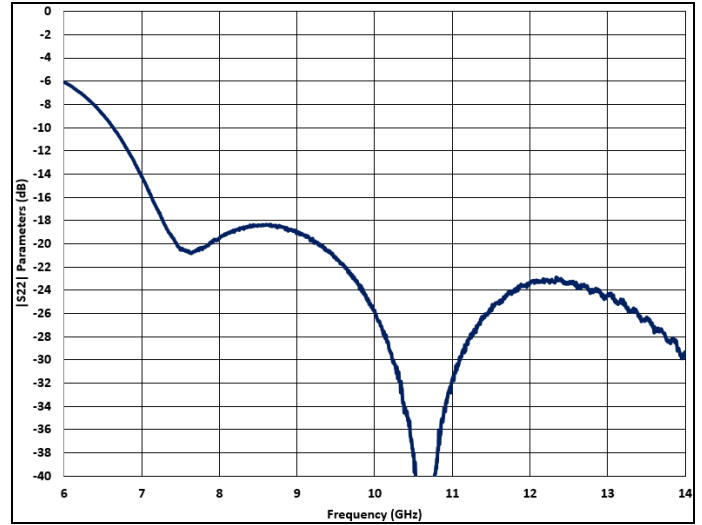


# Preliminary DATA SHEET VWA Product-Line

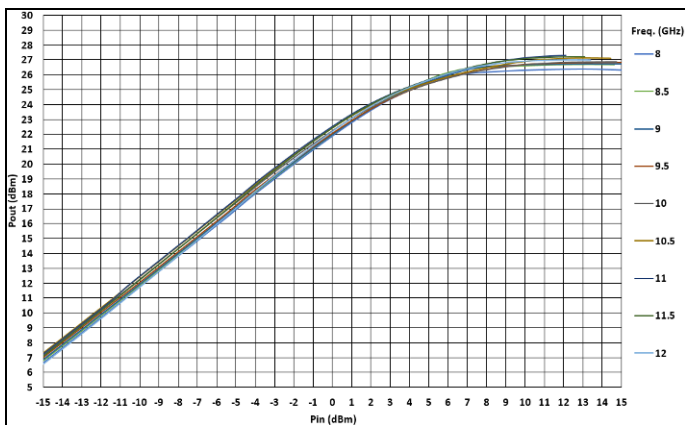
### Input return loss (dB):



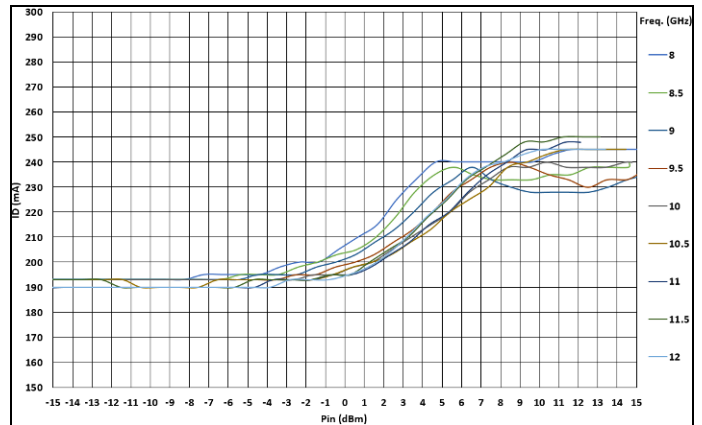
### Output return loss (dB):



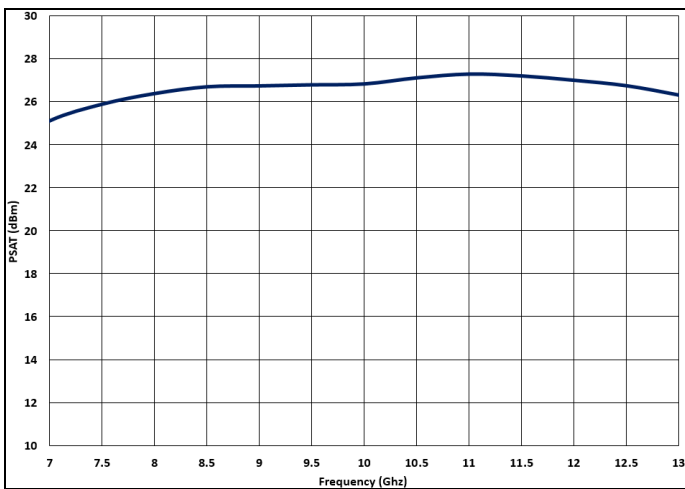
### Output power VS Input Power :



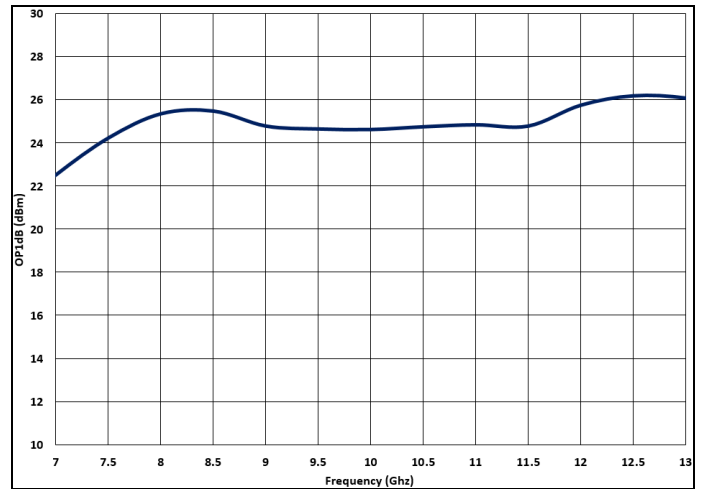
### Drain current VS Input power



### Saturation power VS Frequency

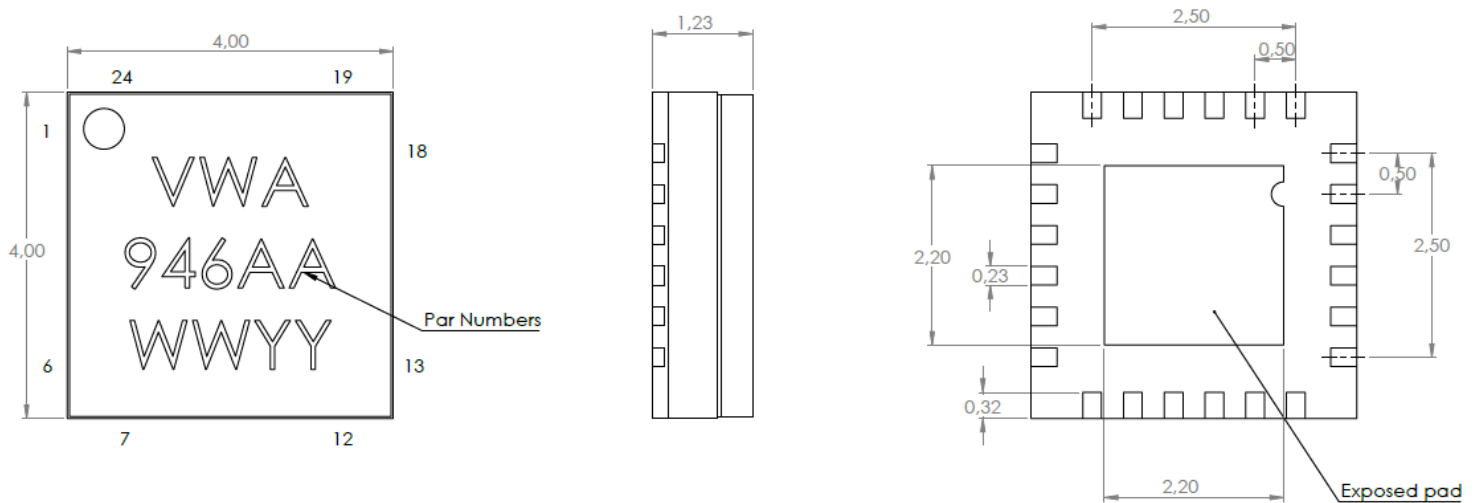


### P1dB VS Frequency



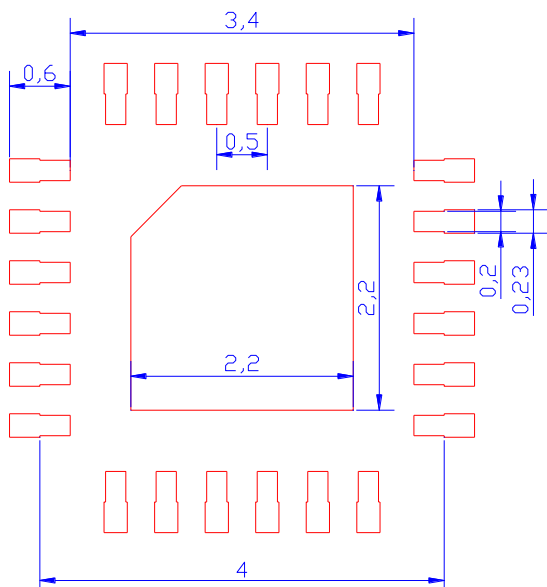
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## Mechanical Drawing

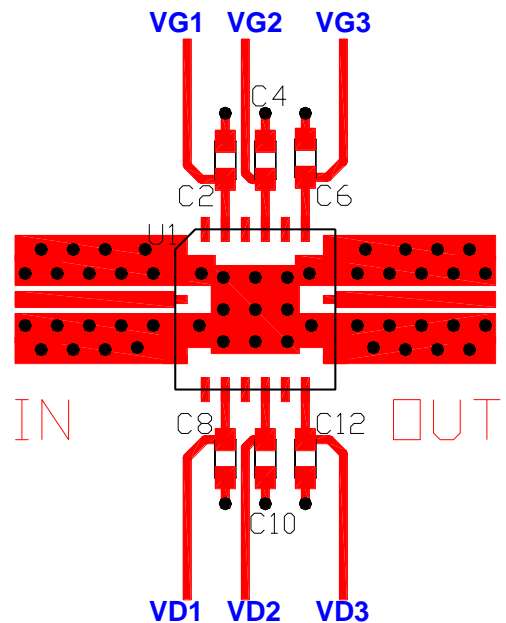


➤ QFN exposed PAD must be connected to ground (RF and DC).

## Recommended Land pattern



## Suggested Board Layout



C2, C4, C6, C8, C10, C12 : 0402 1µF/16V capacitor  
Substrate : RO4350B, thickness 0.254mm

## Handling

This product is sensitive to electrostatic discharge and should not be handled except at a static free workstation. Take precautions to prevent ESD; use wrist straps, grounded work surfaces and recognized anti-static techniques when handling the **VWA 0000946 AA** device.

