

### VM066D

#### General Description

The VM066D is a 2 stages analog medium power MMIC amplifier operating in the frequency range 9.2 to 10.5GHz. The device is a cascaded 2 stages auto biased amplifier designed in 0.25 $\mu$ m pHEMT process.

The device is capable of more than +23dBm saturated output power, and provide more than 22dB of gain from 9.2 to 10.5GHz with less than 1dB of Gain variation. The Design has been optimized to provide high efficiency, supply current is as low as 120mA with  $V_D = +8V$ , when delivering +23dBm output power.

#### Features

2 stages Medium Power pHEMT GaAs MMIC

Single Bias, Low power consumption < 1W

Bandwidth **9.2 – 10.5GHz**

$P_{SAT}$  **+23dBm**

$P_{1dB}$  **+22dBm**

Linear Gain **22dB**

50 $\Omega$ , AC coupled RF input and output

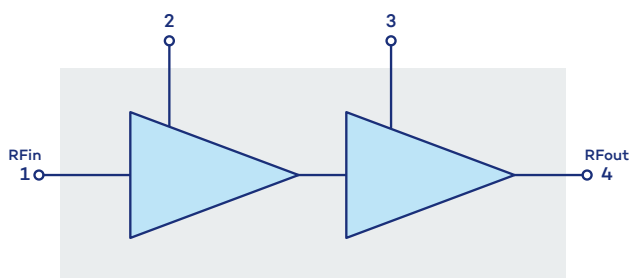
Power supply **120mA @ +8V**

Small size **2 x 1.5 x 0.1 (mm)**

#### Applications

- X band Medium Power amplifier
- Radar / ECM / ECCM
- Test and measurement
- Broadband communication

#### Pins Assignment & Functional Block Diagram



Function	Pin number
RF in	1
$V_{D1}$	2
$V_{D2}$	3
RF out	4

## • Electrical Specifications

Test conditions: unless otherwise noted

- $T_{amb} = +25^{\circ}\text{C}$
- $V_{DD} = V_{D1} = V_{D2} = +8\text{V}$
- $I_{DD} = I_{D1} + I_{D2} = 120\text{mA}$

Symbol	Parameter	Min	Typ	Max	Unit
F	Frequency range @3dB	9.2		10.5	GHz
G	Gain		22		dB
$\Delta G$	Gain flatness		+/-0.5		dB
NF	Noise figure @10GHz		7		dB
S11	Input return loss		-14		dB
S22	Output return loss		-14		dB
P1dB	Output power @1dB compression		22		dBm
P <sub>SAT</sub>	Saturated output power		23		dBm
V <sub>DD</sub>	Drain supply voltage		8		V
I <sub>DD</sub>	Supply current		120		mA

## • Environmental parameters

Symbol	Parameter	Min	Max	Unit
T <sub>st</sub>	Storage temperature	-55	+150	°C
T <sub>op</sub>	Operating temperature	-40	+85	°C

## • Absolute Maximum Ratings

Symbol	Parameter	Min	Max	Unit
V <sub>DD</sub>	Positive External DC bias voltage		8.5	V
P <sub>in max</sub>	RF input power (I <sub>n</sub> )		+7	dBm
T <sub>j</sub>	Junction temperature		+150	°C
T <sub>process</sub>	Temperature process max 10 seconds		+290	°C
P <sub>cw</sub>	Continuous power dissipation (@ 85°C)		1.2	W

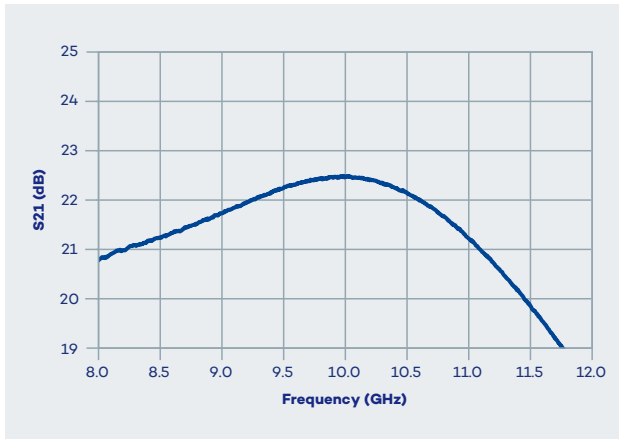
Care should be taken to avoid supply transient and over voltage. Over voltage above the maximum specified in absolute maximum rating section may cause permanent damage to the device.

- **Typical Performance**  
(Small signal / Test under Probe)

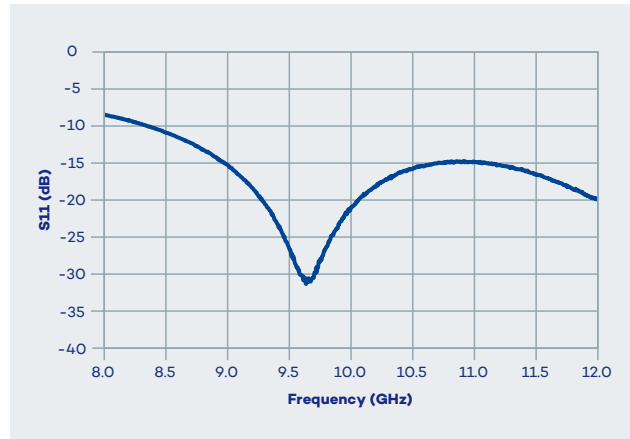
Test conditions: unless otherwise noted

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- $V_{\text{DD}} = +8\text{V}$
- $I_{\text{DD}} = 120\text{mA}$

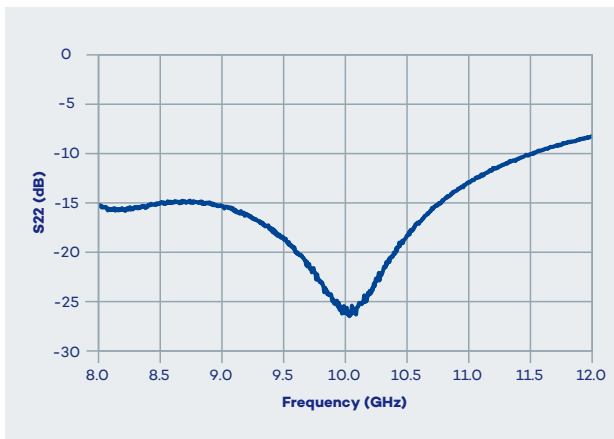
**Small Signal Gain vs Frequency**



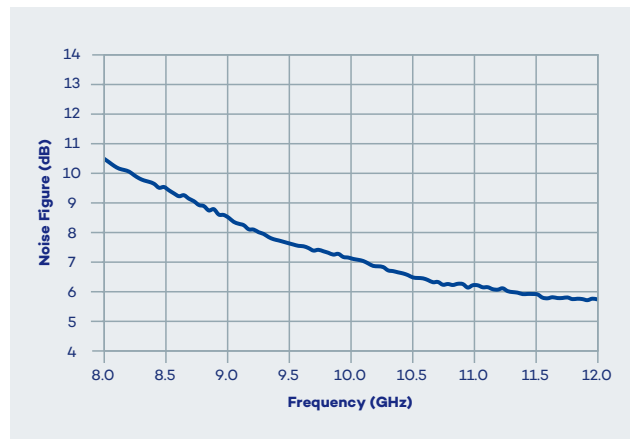
**Input Return Loss vs Frequency**



**Output Return Loss vs Frequency**



**Noise Figure vs Frequency**

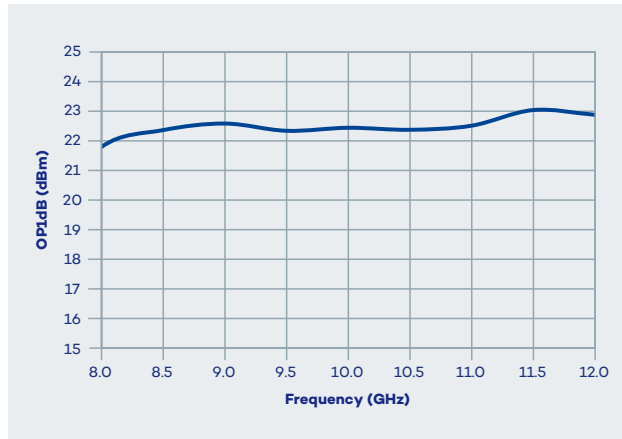


## • Typical Performance (Large signal / Test under Probe)

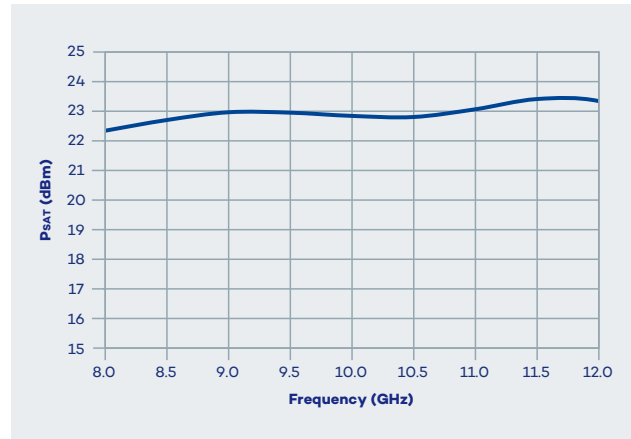
Test conditions: unless otherwise noted

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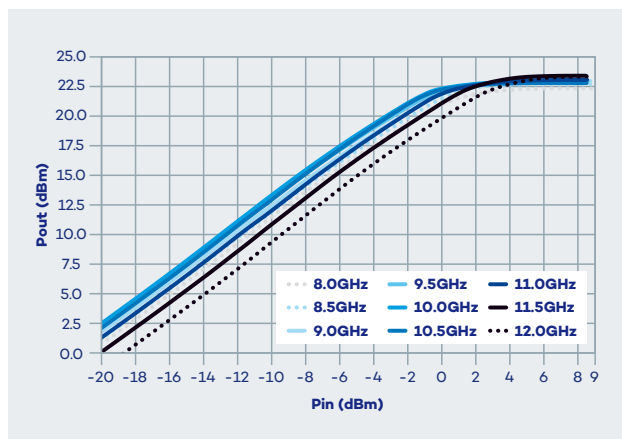
### Output P1dB vs Frequency



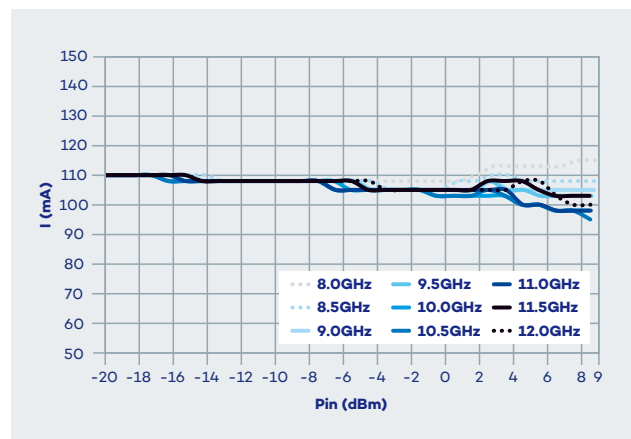
### Saturated Output Power vs Frequency



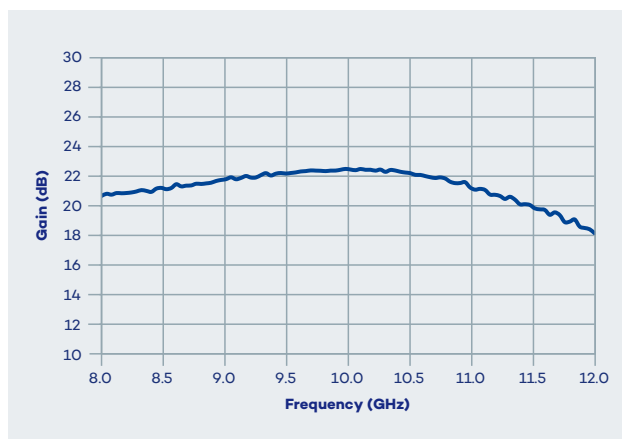
### Pout vs Pin vs Frequency



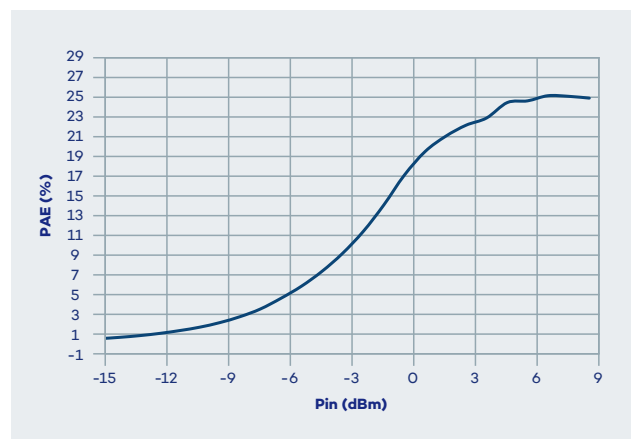
### I vs Pin vs Frequency



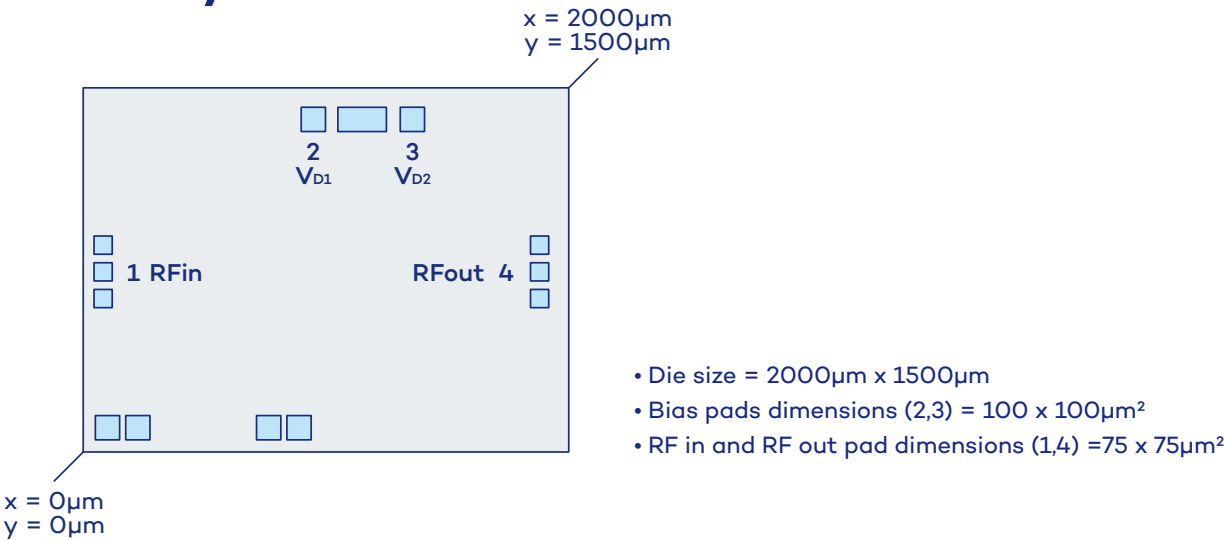
### Gain vs Frequency



### PAE vs Pin



Die Layout & Pin Out

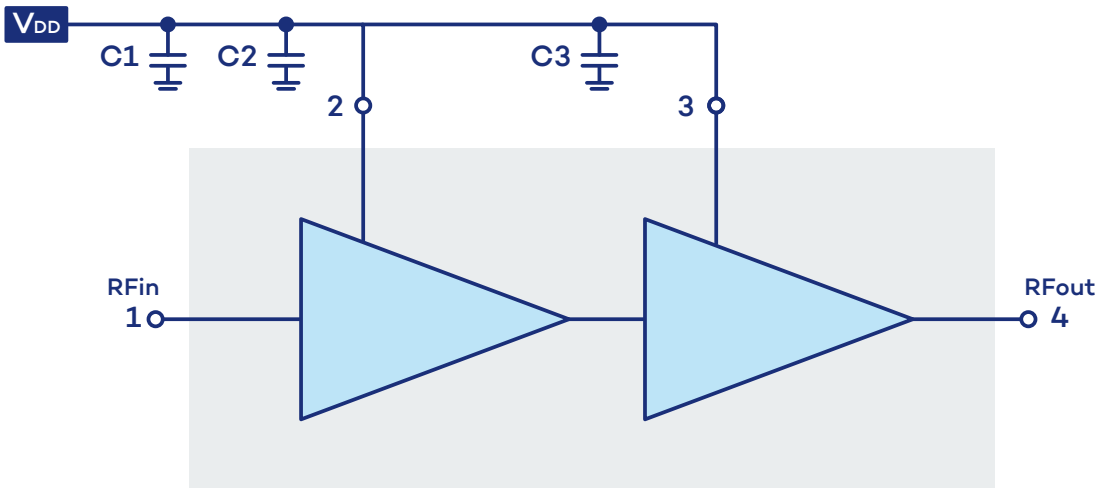


Pad number	X (µm)	Pad center	Y (µm)	Size (µm x µm)	Name	Function
1	82		742	75 x 75	RFin	RF Input
2	948		1370	100 x 100	V <sub>b1</sub>	Drain Bias
3	1356		1370	100 x 100	V <sub>b2</sub>	Drain Bias
4	1880		742	75 x 75	RFout	RF Output

Die bottom must be connected to ground (RF and DC)

Application circuit

- C1 = 1µF
- C2 and C3 = 100pF capacitors are MIM type and must be placed as close as possible to the die access.



## • Ordering information

Product Code	Parameter
VM066D	9.2 to 10.5GHz - 22dB - 23dBm Medium Power Amplifier

## • Associated Material

- Packaged die
- Die Evaluation Board (die EVB)
- Packaged die Evaluation Board (packaged die EVB)
- Mechanical files (DXF)
- Measurements files (S2P)

## • Product Compliance Information

### Solderability

Use only AuSn (80/20) solder and limit exposure to temperature above 300 °C during 3-4 minutes, maximum.

### ESD Sensitivity Rating

Test: Human Body Model (HBM)  
Std: JEDEC Standard JESD22-A114



### RoHS-Compliance

This part is compliant with EU 2011/65/EU RoHS directive (Restrictions on the Use of Certain Hazardous Substances in Electrical and Electronic Equipment).

### Other attributes

- Lead Free
- Halogen Free (Chlorine, Bromine)
- Antimony Free
- TBBP-A (C15H12Br4O2) Free
- PFOS Free
- SVHC Free

## • Contact information

For the latest specifications, additional product information, worldwide sales and distribution locations, and information about Vectrawave.

### vectrawave.com

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### Vectrawave Device

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