

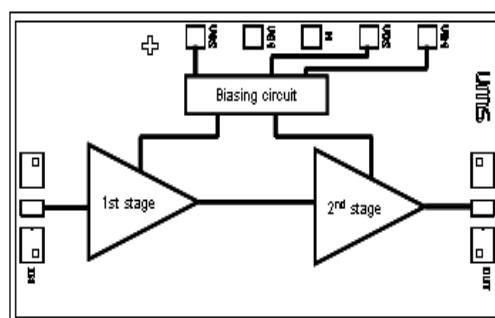
7-14GHz Low Noise Amplifier GaAs Monolithic Microwave IC

Description

The CHA1014 is a monolithic two-stage wide band low noise amplifier designed for a wide range of applications.

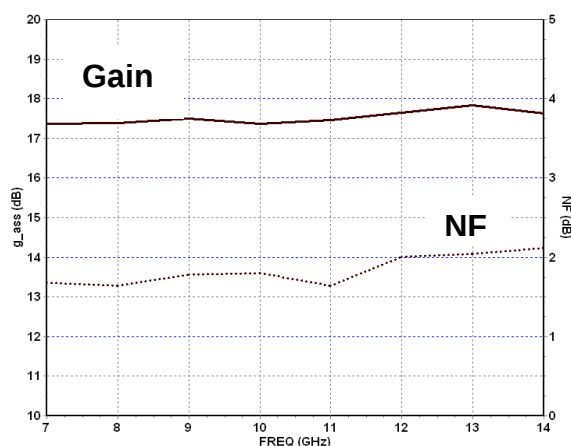
The circuit is manufactured with a standard pHEMT process 0.25 μ m gate length, via holes through the substrate, air bridges.

It is supplied in chip form.



Main Features

- Frequency range: 7 - 14GHz
- 1.5dB Noise figure
- 17dB Gain
- ± 0.5 dB Gain flatness
- 10dBm Output power@1dB Gain compression.
- DC power consumption: 57mA
- Chip size: 2.57 x 1.37 x 0.1mm



Main Characteristics

Tamb = +25°C

Symbol	Parameter	Min	Typ	Max	Unit
Fop	Operating frequency range	7		14	
NF	Noise figure		1.5	2.0	dB
G	Gain		17		dB
P1dB	Output power at 1dB gain compression		10		dBm

ESD Protections: Electrostatic discharge sensitive device observe handling precautions!

Electrical Characteristics

Tamb = +25°C, Vd = +2V

Symbol	Parameter	Min	Typ	Max	Unit
Fop	Operating frequency range	7		14	Ghz
G	Gain at 25°C		17		dB
ΔG	Gain flatness		± 0.5		dB
NF	Noise figure 25°C		1.5	2	dB
NF	Noise figure 85°C		2	2.8	dB
RL_in	Input RL			-10	dB
RL_out	Ouput RL			-10	dB
P1dB	Output power at 1dB gain compression		10		dBm
Vd ₁	Positive drain supply voltage		2		V
Vd ₂	Positive drain supply voltage		3		V
Id1	Drain bias current		55		mA
Vg ₂	Negative supply voltage		-2.5		V
Id2	Biasing circuit current		2		mA

Absolute Maximum Ratings (1)

Tamb = +25°C

Symbol	Parameter (1)	Values	Unit
Vd	Drain bias voltage (2)	4	V
Pin	Maximum input power overdrive	10	dBm
Top	Operating temperature range	-40 to + 85	°C
Tstg	Storage temperature range	-55 to +125	°C

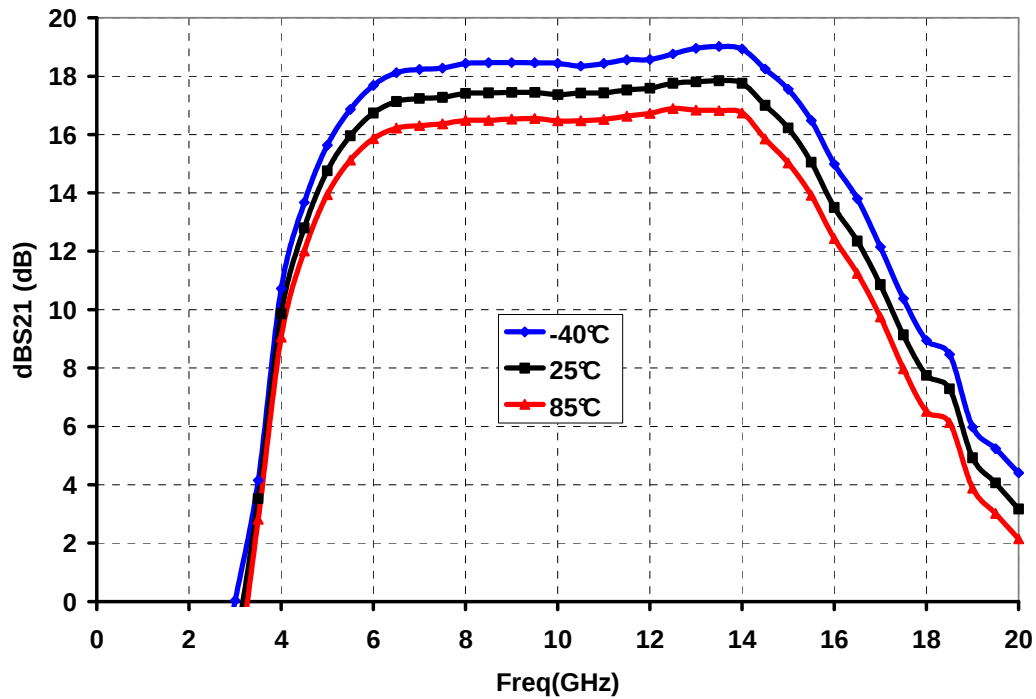
(1) Operation of this device above anyone of these paramaters may cause permanent damage.

(2) Without RF signal

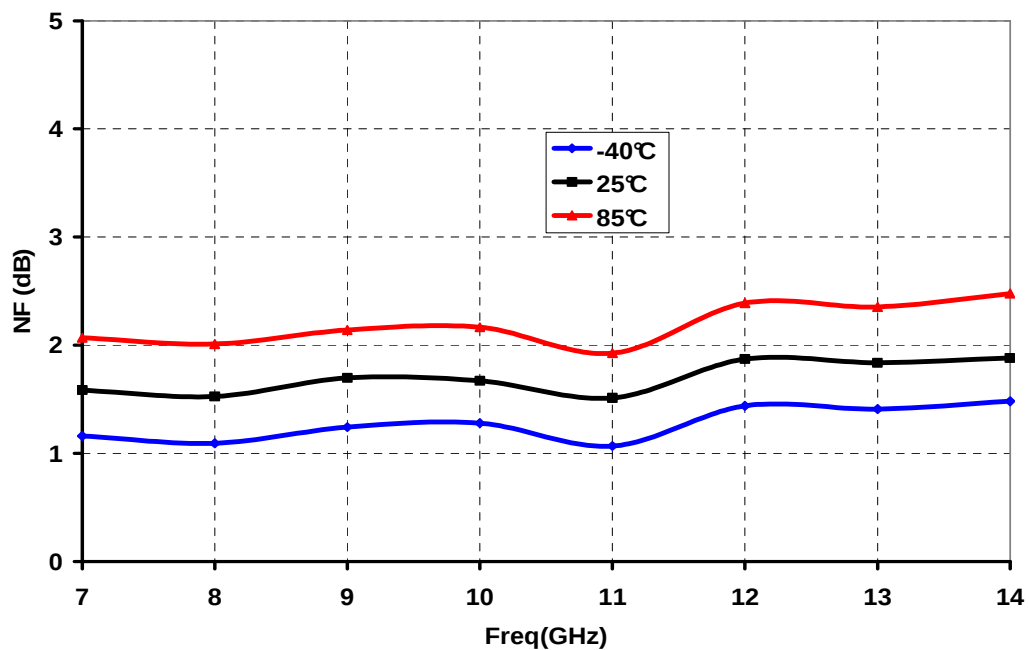
Typical Measured Performance in test fixture.

Tamb = -40°C, +25°C, +85°C, Vd1 = +2V, Vd2 = +3V, Vg2 = -2.5V

Gain versus frequency and temperature from 0.5GHz to 20GHz.

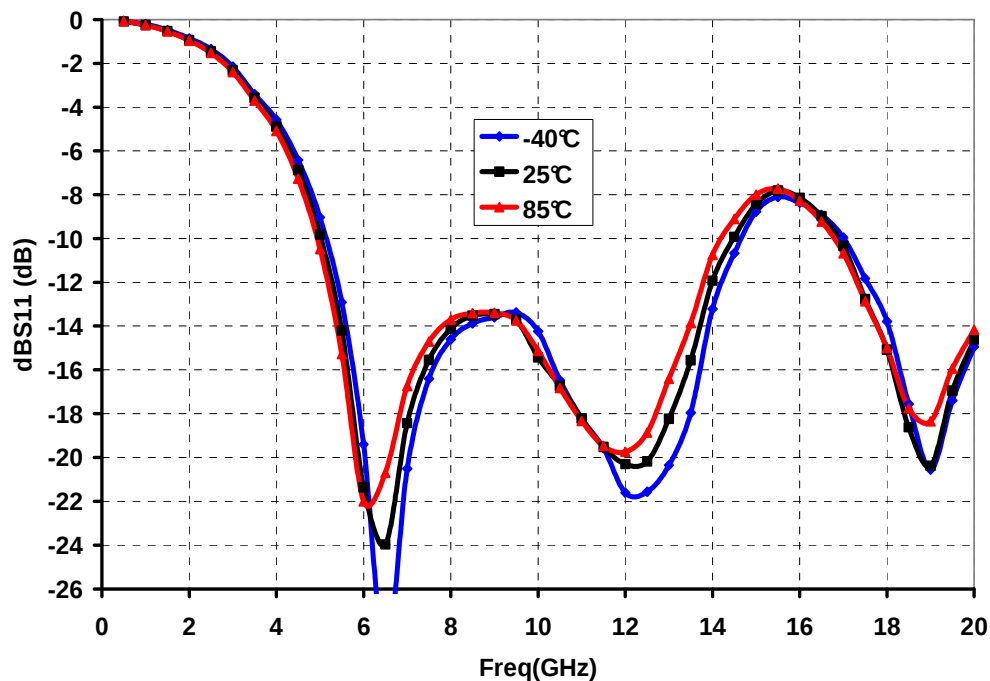


Noise figure versus frequency and temperature from 7GHz to 14GHz.

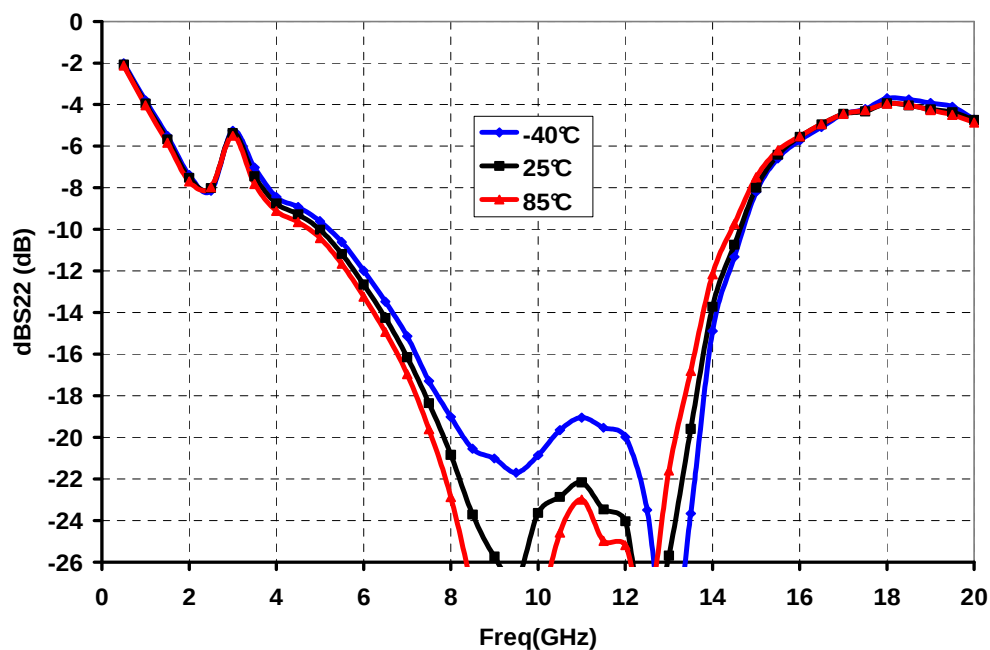


Tamb = -40°C, +25°C, +85°C, Vd1 = +2V

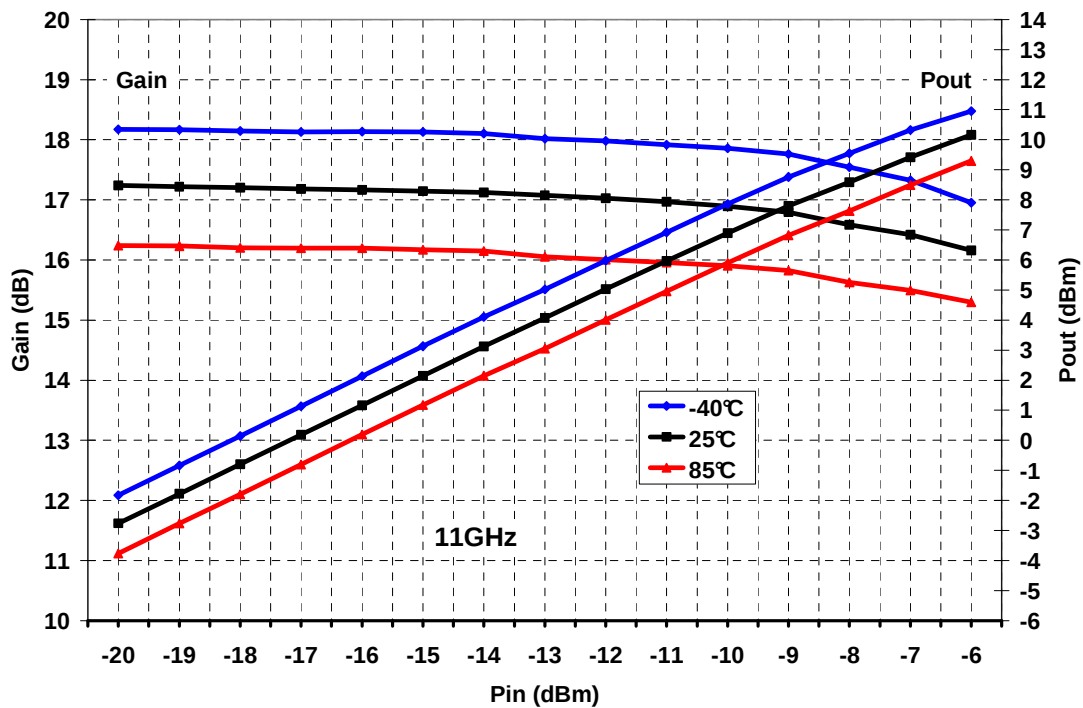
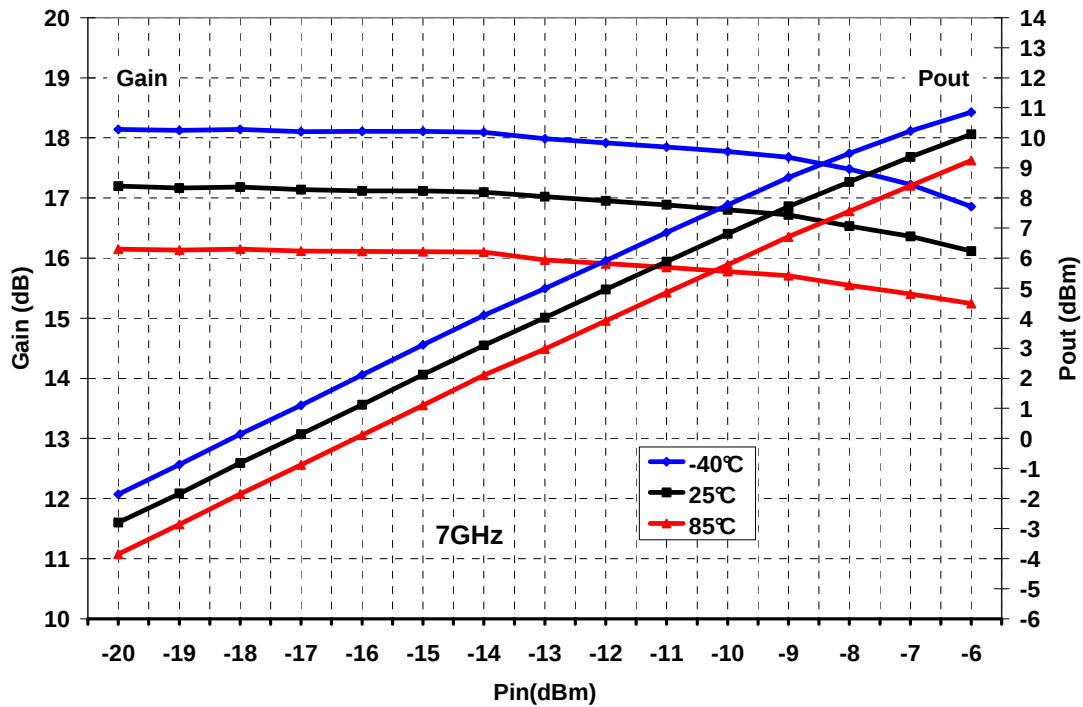
Input return loss versus frequency and temperature from 0.5GHz to 20GHz.

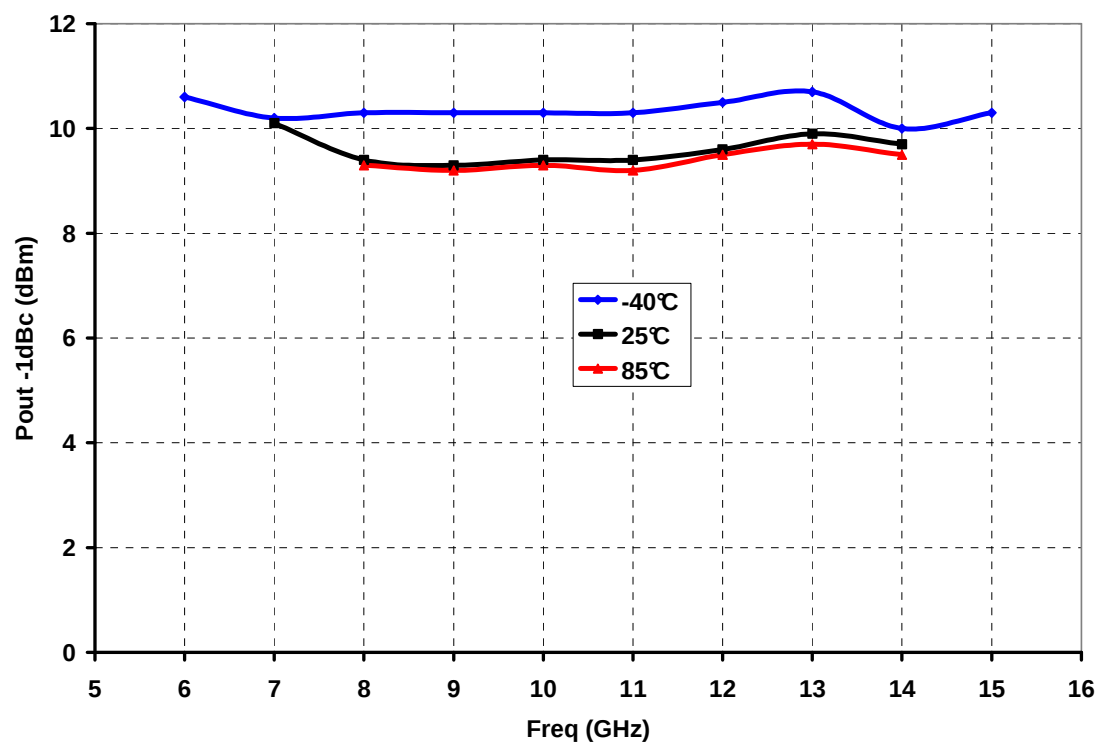
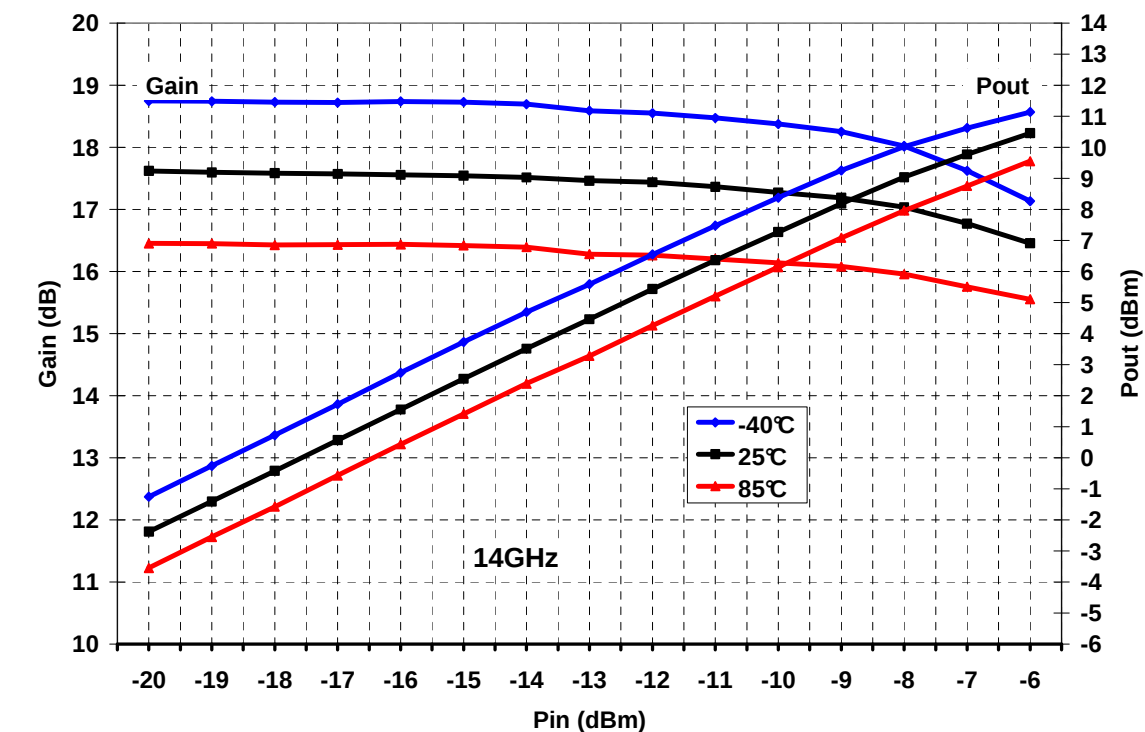


Output return loss versus frequency and temperature from 0.5GHz to 20GHz.

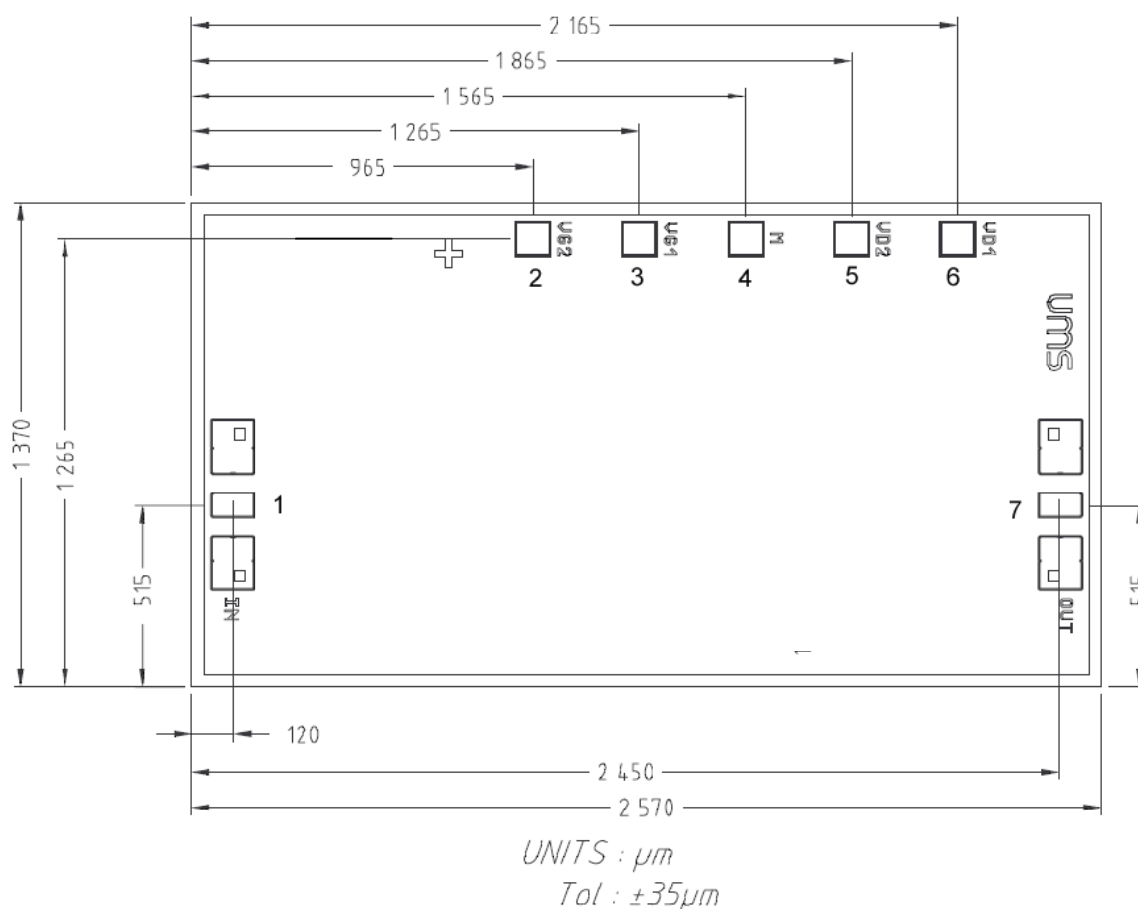


Gain and Output power versus Pin and temperature





Chip Mechanical Data and Pin references



Chip thickness = $100 \pm 10 \mu m$

RF pads (1, 7) = $68 \times 118 \mu m^2$

DC pads (2, 3, 4, 5, 6) = $96 \times 96 \mu m^2$

Pin number	Pin name	Description
1	IN	Input RF port
2	Vg ₂	Negative supply voltage Vg ₂
3	Vg ₁	Negative supply voltage Vg ₁ (NC)
4	M	Ground (NC)
5	Vd ₂	Positive supply voltage Vd ₂
6	Vd ₁	Positive supply voltage Vd ₁
7	OUT	Output RF port

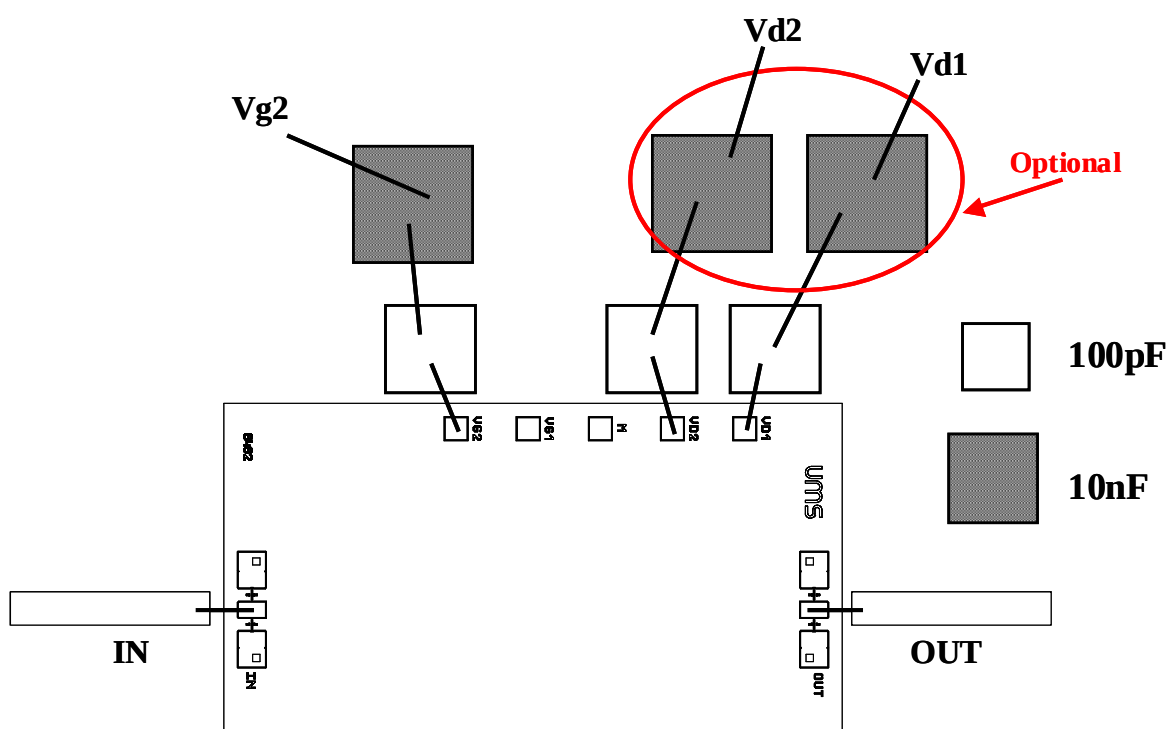
Recommended ESD management

Refer to the application note AN0020 available at <http://www.ums-gaas.com> for ESD sensitivity and handling recommendations for the UMS products.

Bonding recommendations

Port	Connection
IN (1)	Inductance (L_{bonding}) = 0.4nH 530 μm length with wire diameter of 25 μm
OUT (7)	Inductance (L_{bonding}) = 0.4nH 530 μm length with wire diameter of 25 μm

Assembly recommendations in test fixture



Ordering Information

Chip form : CHA1014-99F/00

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