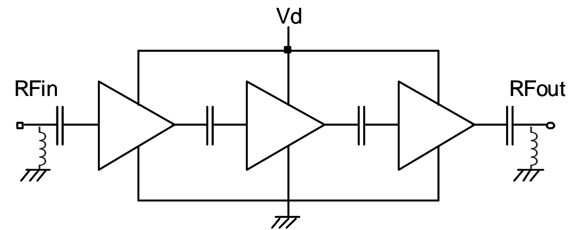
7-20GHz Medium Power Amplifier

GaAs Monolithic Microwave IC

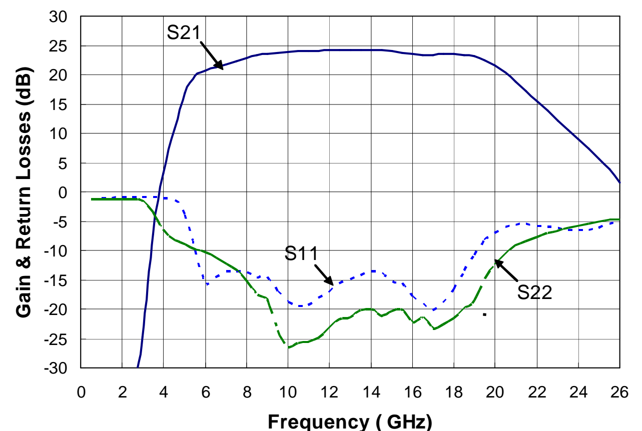
Description



The CHA3667a is a wide band monolithic medium power amplifier.
It is designed for a wide range of applications, from military to commercial communication systems. The circuit is manufactured with a Power pHEMT process, 0.15µm gate length, via hole through the substrate.
It is ESD protected on RF ports thanks to DC specific filter circuits.

It is supplied in chip form.

On wafer typical measurements



Main Features

- ■ Broadband performance 7-20GHz
- ■ Self biased
- ■ 23dB gain @ 2.7dB noise figure
- ■ 20 dBm Output power at 1dB compression
- ■ DC power consumption, 175mA @ 4.2V
- ■ Chip size : 2,45 x 1,21 x 0,1mm

Main Characteristics

Tamb = +25°C

Symbol	Parameter	Min	Typ	Max	Unit
Fop	Input frequency range	7		20	GHz
G	Small signal gain		23		dB
NF	Noise Figure		2.7	3.5	dB
P-1dB	Output power at 1dB gain compression	21	23		dBm
Id	Bias current	130	175	220	mA

ESD Protections : Electrostatic discharge sensitive device observe handling precautions !

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Electrical Characteristics

Tamb = +25°C, Vd = +4V

Symbol	Parameter	Min	Typ	Max	Unit
Fop	Operating frequency range	7		20	GHz
G	Gain				
	(7-8GHz)	19	21		dB
	(8-20GHz)	21	23		dB
NF	Noise figure (7-18 GHz)		2.7	3.5	dB
RLin	Input Return Loss		-10	-8	dB
RLout	Output Return Loss		-10	-8	dB
IP3	Output IP3		28		dBm
P1dB	Pout at 1dB gain compression:				
	(7-14GHz)		20		dBm
	(14-20GHz)		21		dBm
Isol	Reverse isolation		45		dB
Vd	Drain bias voltage		4.2		V
Id	Drain bias current	130	175	220	mA

These values are representative for on wafer measurements that are made without bonding wires at the RF ports.

Absolute Maximum Ratings (1)

Tamb = +25°C

Symbol	Parameter (1)	Values	Unit
Vd	Drain bias voltage	4.5	V
Id	Drain bias current	240	mA
Pin	RF input power (2)	3	dBm
Tch	Maximum chanel temperature	+175	°C
Ta	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) Duration<1s

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Typical Chip on wafer Sij parameters

Tamb.=+25℃, Vd1=+4.2V, Id=175mA

Freq (GHz)	dBS11 (dB)	PhS11 (°)	dBS21 (dB)	PhS21 (°)	dBS12 (dB)	PhS12 (°)	dBS22 (dB)	PhS22 (°)
1	-1.2	137.6	-60.8	116.0	-61.8	119.4	-1.3	139.8
2	-1.0	64.1	-59.4	-145.5	-65.2	125.0	-1.2	67.6
3	-0.9	5.0	-34.5	-82.6	-79.0	6.5	-1.3	7.0
4	-0.9	-48.9	-7.3	-103.5	-57.8	137.2	-3.5	-55.9
5	-1.5	-115.5	10.8	130.8	-58.0	134.0	-8.2	-80.3
6	-10.0	127.5	19.8	-1.5	-66.7	127.6	-9.9	-98.5
7	**-14.5**	**-26.5**	**21.2**	**-97.9**	**-63.3**	**58.3**	**-11.2**	**-121.3**
8	**-13.6**	**-74.8**	**22.2**	**-169.1**	**-51.0**	**-57.2**	**-13.3**	**-143.3**
9	**-14.5**	**-98.8**	**23.3**	**128.6**	**-60.3**	**-47.0**	**-17.5**	**-160.1**
10	**-17.0**	**-116.1**	**23.8**	**70.9**	**-54.8**	**153.4**	**-23.7**	**-173.6**
11	**-19.4**	**-108.1**	**24.0**	**18.2**	**-49.7**	**170.8**	**-25.8**	**-147.8**
12	**-18.1**	**-93.3**	**24.1**	**-30.6**	**-61.4**	**40.1**	**-24.8**	**-124.2**
13	**-15.6**	**-91.5**	**24.2**	**-77.3**	**-71.6**	**-148.0**	**-21.8**	**-129.3**
14	**-14.2**	**-105.9**	**24.2**	**-123.1**	**-57.8**	**78.5**	**-20.2**	**-153.6**
15	**-13.8**	**-128.5**	**24.2**	**-169.3**	**-51.3**	**172.9**	**-21.3**	**169.4**
16	**-15.6**	**-159.4**	**23.6**	**145.7**	**-46.4**	**126.1**	**-20.2**	**116.4**
17	**-19.1**	**164.0**	**23.4**	**103.3**	**-44.0**	**63.4**	**-21.5**	**56.6**
18	**-19.0**	**113.6**	**23.5**	**59.3**	**-50.5**	**-40.7**	**-22.7**	**42.6**
19	**-13.6**	**47.5**	**23.4**	**10.5**	**-55.8**	**-78.9**	**-20.0**	**43.3**
20	**-8.2**	**1.6**	**22.5**	**-43.8**	**-45.0**	**-133.1**	**-15.0**	**27.7**
21	-6.0	-38.0	20.3	-97.5	-47.5	-157.9	-10.6	6.1
22	-5.5	-66.9	17.2	-145.8	-51.0	127.1	-8.4	-16.1
23	-5.9	-85.7	13.8	170.9	-48.5	119.3	-7.1	-36.5
24	-6.5	-97.8	10.6	130.5	-51.4	70.7	-6.2	-51.7
25	-6.5	-104.0	7.4	90.0	-55.3	88.6	-5.5	-66.0
26	-5.5	-113.5	3.9	48.3	-49.9	32.8	-4.8	-79.5

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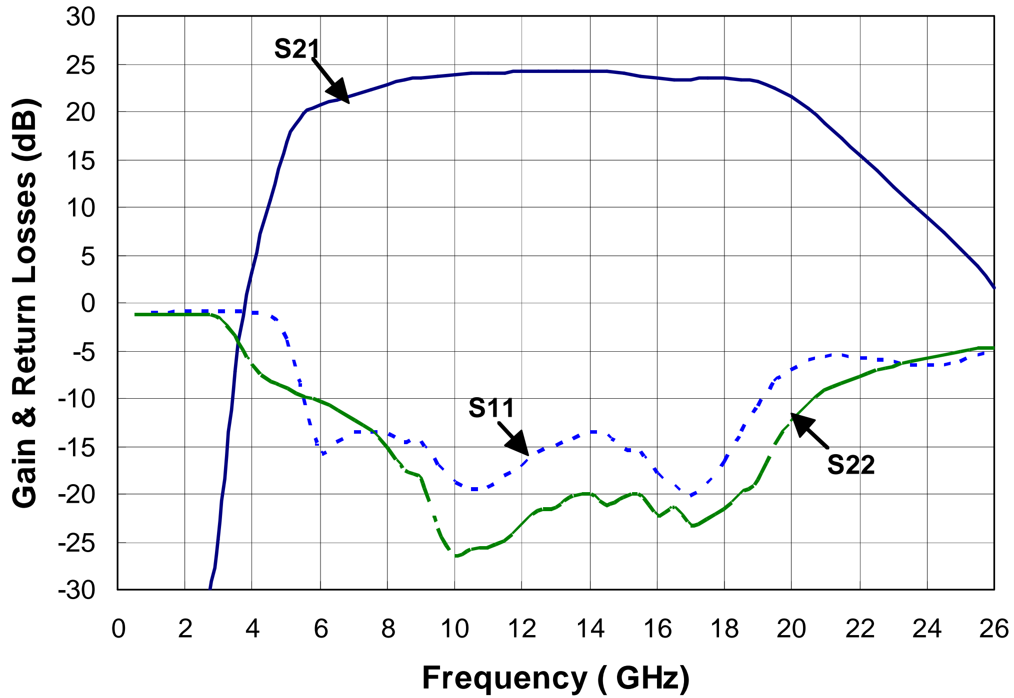
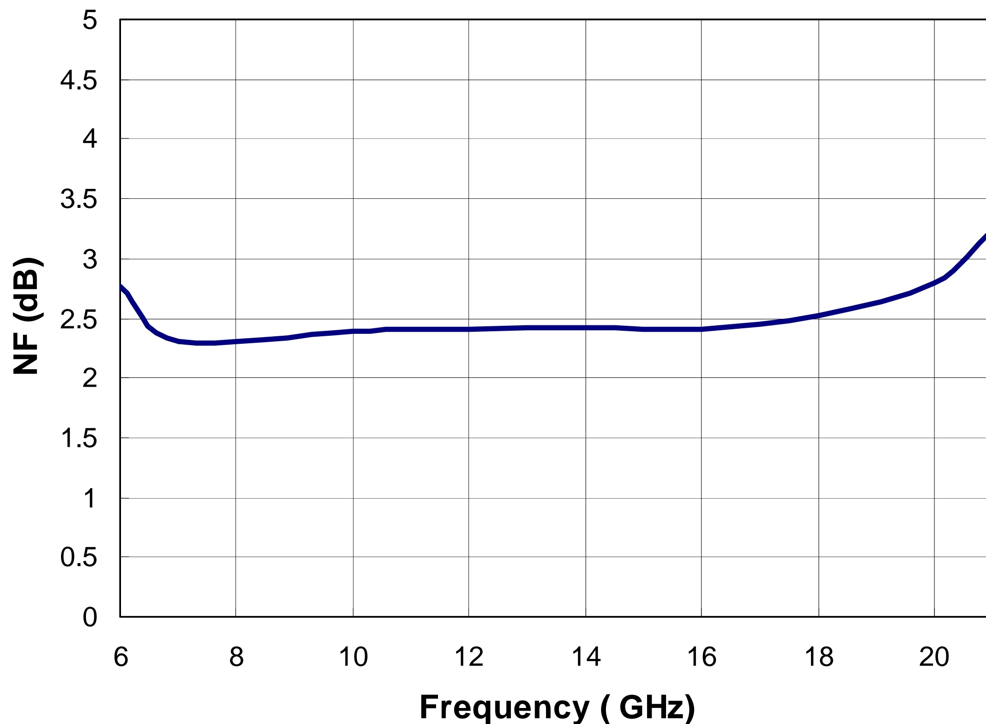
Typical Measured Performance

On wafer measurement (without bonding wires at the RF ports)
Tamb.=+25°C, Vd=+4.2V Id=175mA





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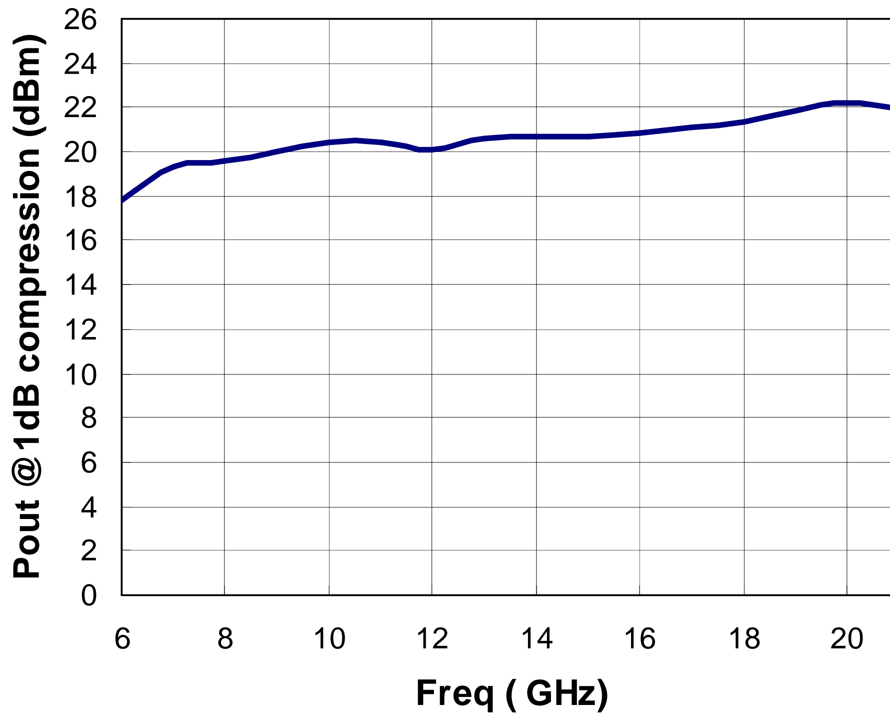

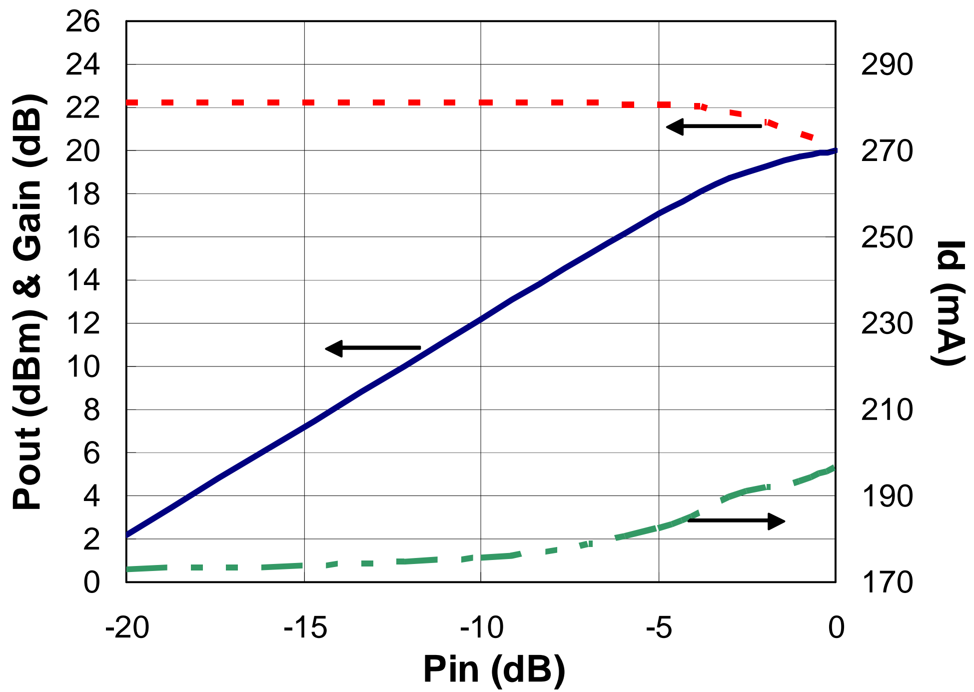

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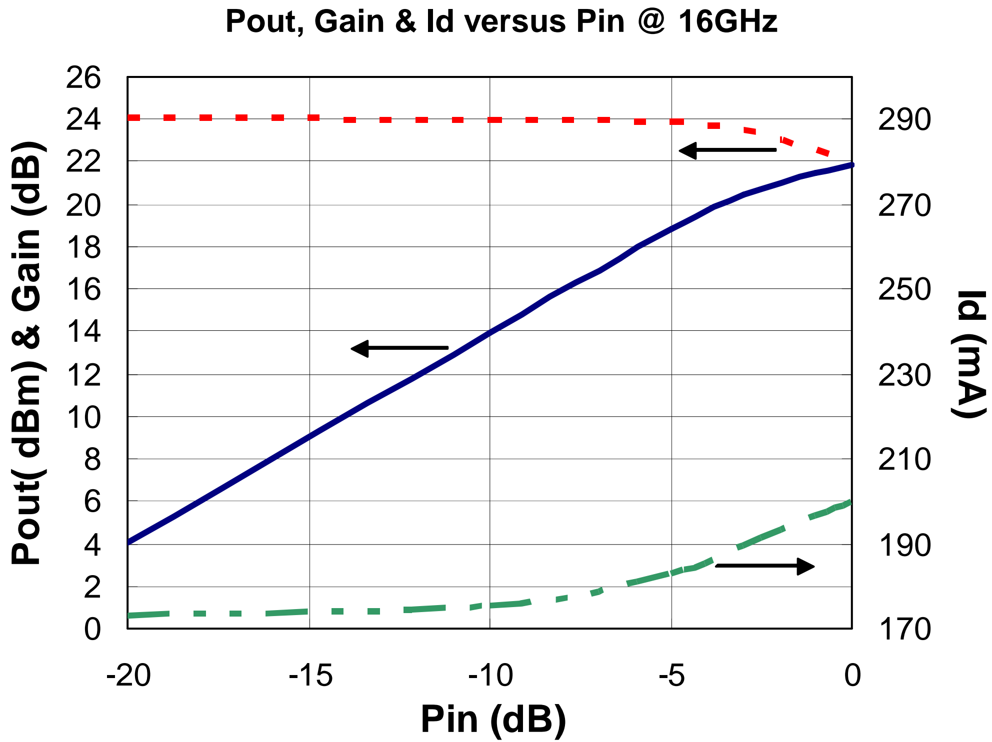

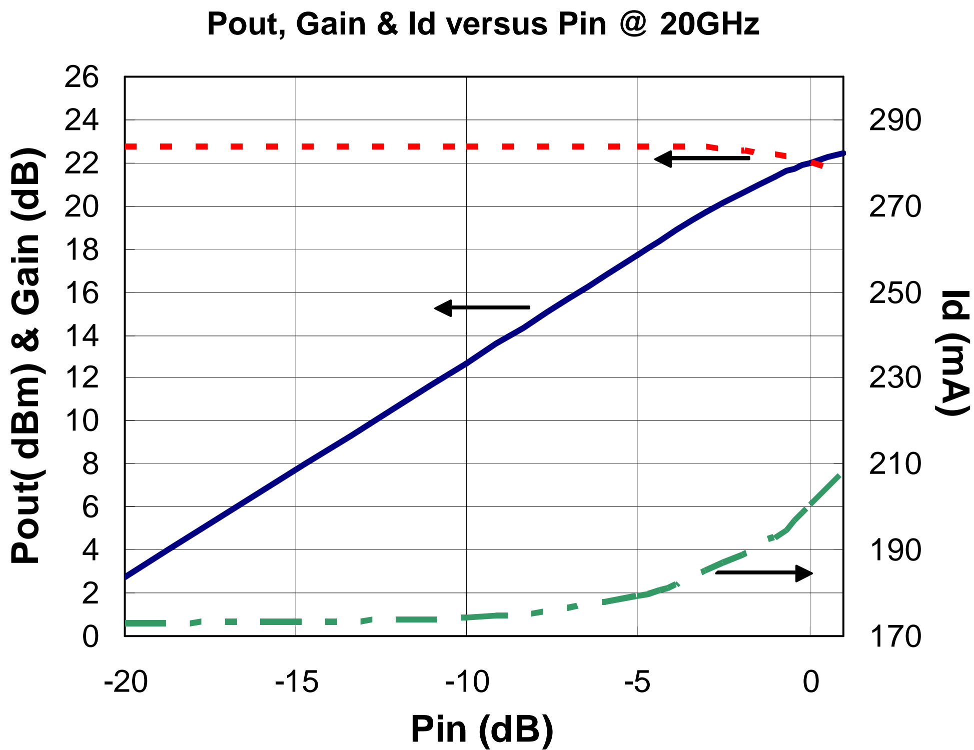

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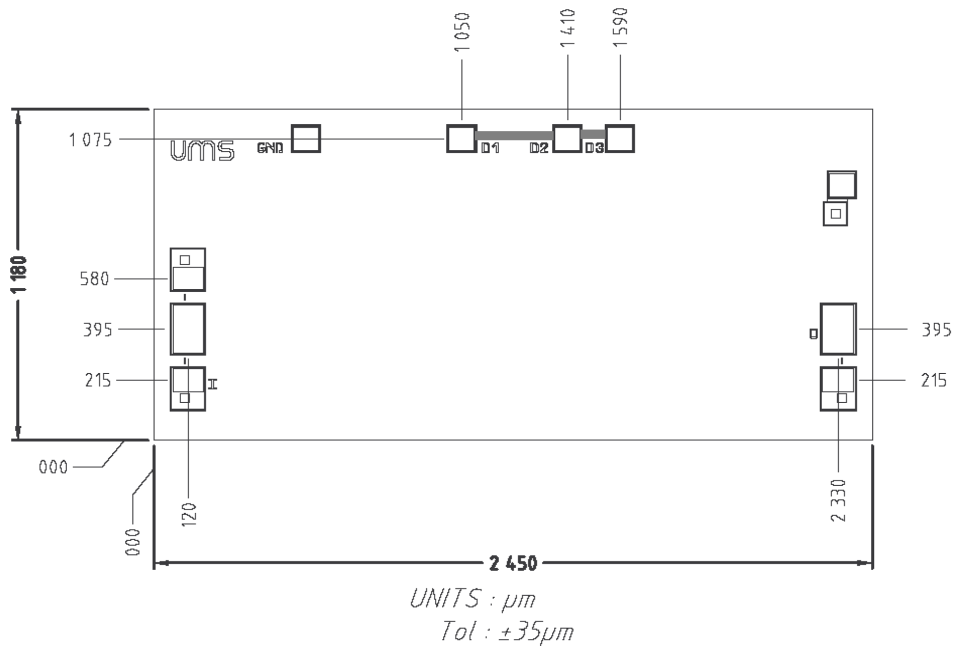
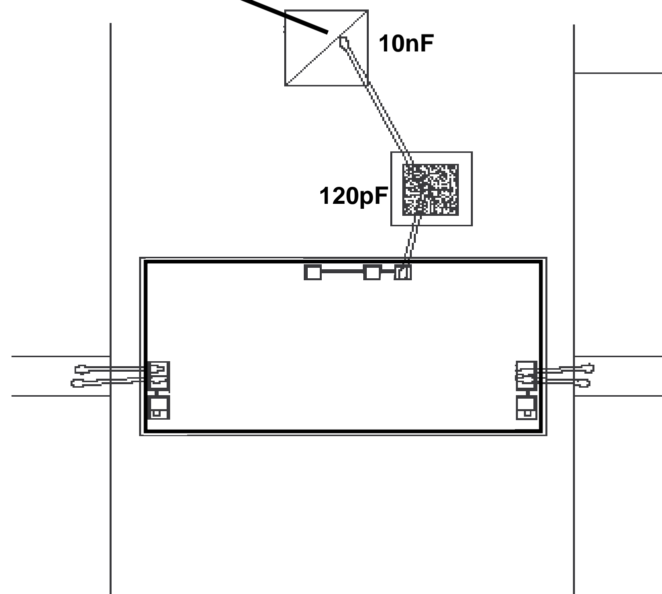
Bonding pad position



Chip Assembly and Mechanical Data



Note:
25µm diameter gold wire is to be prefered.
DC Pad size: 86 / 83µm
RF Pad size: 105/171µm
RF wire bondings should be as short as possible, lower than 0.35mm.
Chip thickness: 100µm ±.10µm

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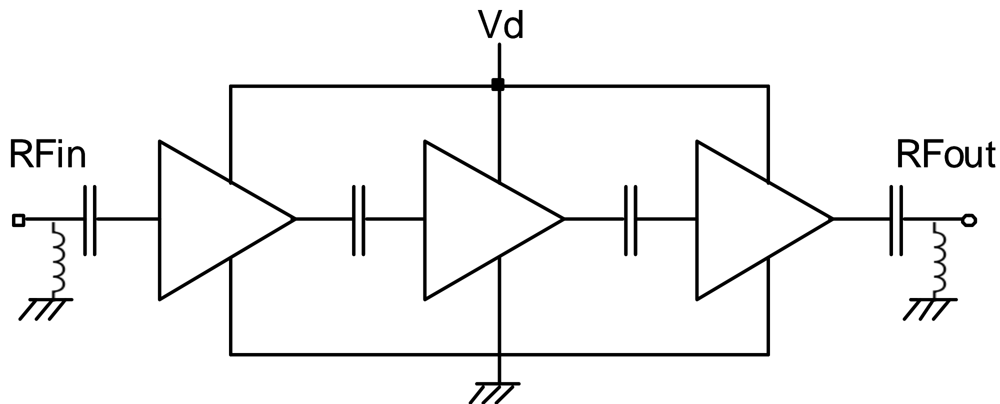
Notes

Due to ESD protection circuits on RF input and output, an external capacitance might be requested to isolate the product from external voltage that could be present on the RF accesses.



Due to BCB coating on the chip, qualification domain implies the chip must be glued.

Ordering Information

Chip form : CHA3667a98F/00

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