

12.5-17GHz Low-Noise Driver Amplifier

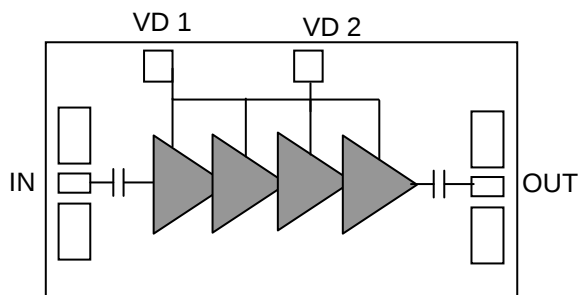
GaAs Monolithic Microwave IC

Description

The CHA2266 is a self biased, low-noise high gain driver amplifier. It is designed mainly for VSAT applications in Ku-band. The backside of the chip is both RF and DC grounded. This helps to simplify the assembly process.

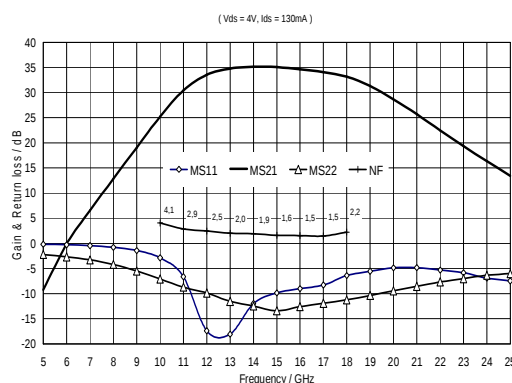
The circuit is manufactured on a standard GaAs pHEMT process, with via holes through the substrate, air bridges and electron beam gate lithography.

It is available in chip form.



Main Features

- Broadband performance 12.5–17GHz
- 2.5dB noise figure
- 34dB gain, +/- 0.5dB gain flatness
- Low DC power consumption: 130mA
- Saturated output power : 16dBm
- Chip size 2.32 x 1.02 x 0.1mm



Main Characteristics

Tamb=+25°C

Symbol	Parameter	Min	Typ	Max	Unit
Fop	Operating frequency range	12.5		17	GHz
G	Small signal gain	31	34		dB
NF	Noise Figure		2.5	3	dB
P1dB	Output power at 1 dB gain compression		14.5		dBm

ESD Protection : Electrostatic discharge sensitive device. Observe handling precautions !

Electrical Characteristics on wafer

Tamb = +25°C, Vd = 4V

Symbol	Parameter	Min	Typ	Max	Unit
Fop	Operating frequency range	12.5		17	GHz
G	Small signal gain	31	34		dB
ΔG	Small signal gain flatness		± 0.5		dB
NF	Noise Figure		2.5	3.0	dB
RLin	Input return loss		-10	-6	dB
RLout	Output return loss		-10	-6	dB
P1dB	Output power at 1 dB gain compression	13.5	14.5		dBm
P3dB	Saturated output power	15	16		
Id small signal	Drain bias current		130	170	mA
Rth	Thermal resistance @ Tback side=25°C		80°C		°C/ W

Absolute maximum Ratings (1)

Symbol	Parameter	Values	Unit
Vd	Drain bias voltage	4.3	V
Pin	Maximum continuous input power overdrive	-15	dBm
	Maximum peak input power overdrive(2)	+15	dBm
Tj max	Maximum junction temperature	175	°C
Top	Operating temperature range	-40 to +85	°C
Tstg	Storage temperature	-55 to +125	°C

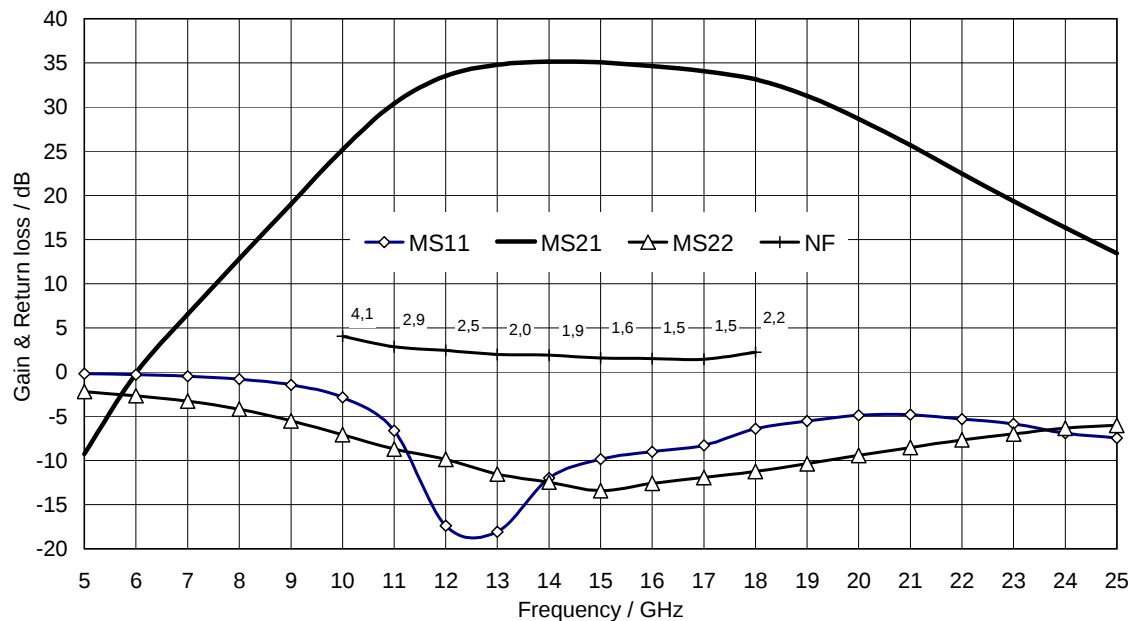
(1) Operation of this device above any of these parameters may cause permanent damage.

(2) Duration <1s

Typical Results

Typical Chip Response (On wafer S-parameter*)

($V_{ds} = 4V$, $I_{ds} = 130mA$)



*Return loss improves with bondings

Typical On Wafer Scattering Parameters

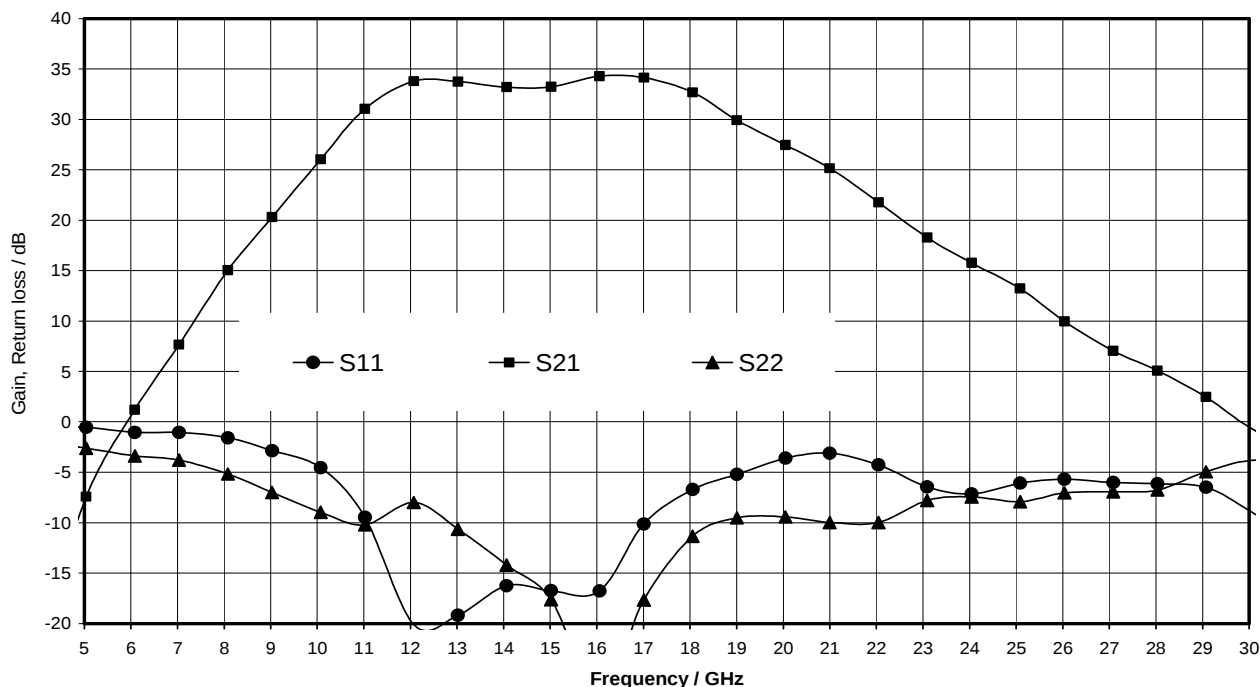
Tamb = +25°C, Bias Conditions: Vd = 4V

Freq/GHz	MS11	PS11	MS12	PS12	MS21	PS21	MS22	PS22	NF
5.00	-0.19	-60.43	-80.46	-28.08	-9.27	55.33	-2.21	-70.44	
6.00	-0.30	-74.26	-78.78	-70.24	-0.12	-24.96	-2.68	-82.41	
7.00	-0.46	-89.33	-75.88	2.69	6.56	-88.05	-3.27	-95.03	
8.00	-0.80	-106.32	-72.20	32.17	12.83	-142.23	-4.19	-107.99	
9.00	-1.44	-125.75	-73.72	-51.84	19.02	165.74	-5.51	-118.06	
10.00	-2.86	-151.22	-66.33	-115.35	25.20	108.42	-7.08	-126.35	4.06
11.00	-6.63	177.56	-70.35	-76.43	30.42	42.05	-8.70	-131.49	2.88
12.00	-17.39	153.85	-66.55	-128.54	33.53	-28.39	-9.87	-134.03	2.46
13.00	-18.06	-84.40	-65.32	168.52	34.77	-94.85	-11.53	-135.84	2.01
14.00	-12.00	-98.21	-59.86	-136.83	35.15	-154.68	-12.46	-131.75	1.92
15.00	-9.86	-113.78	-76.73	168.29	35.05	149.44	-13.41	-127.10	1.60
16.00	-9.01	-121.29	-56.32	80.85	34.64	97.72	-12.58	-114.59	1.55
17.00	-8.27	-129.83	-57.21	-170.04	34.05	46.71	-11.91	-113.66	1.46
18.00	-6.40	-139.02	-62.54	-89.64	33.15	-4.88	-11.24	-113.55	2.24
19.00	-5.55	-156.24	-65.06	53.72	31.28	-55.40	-10.37	-116.41	
20.00	-4.88	-174.36	-67.73	-90.69	28.65	-101.56	-9.43	-117.46	
21.00	-4.83	166.53	-55.41	154.09	25.68	-143.31	-8.53	-120.11	
22.00	-5.31	149.22	-53.79	91.59	22.47	-179.42	-7.66	-125.61	
23.00	-5.85	132.80	-52.72	-168.14	19.33	148.56	-7.00	-131.61	
24.00	-6.91	118.54	-50.50	80.81	16.33	119.70	-6.35	-137.67	
25.00	-7.45	103.68	-71.86	-7.37	13.42	93.05	-6.02	-145.44	

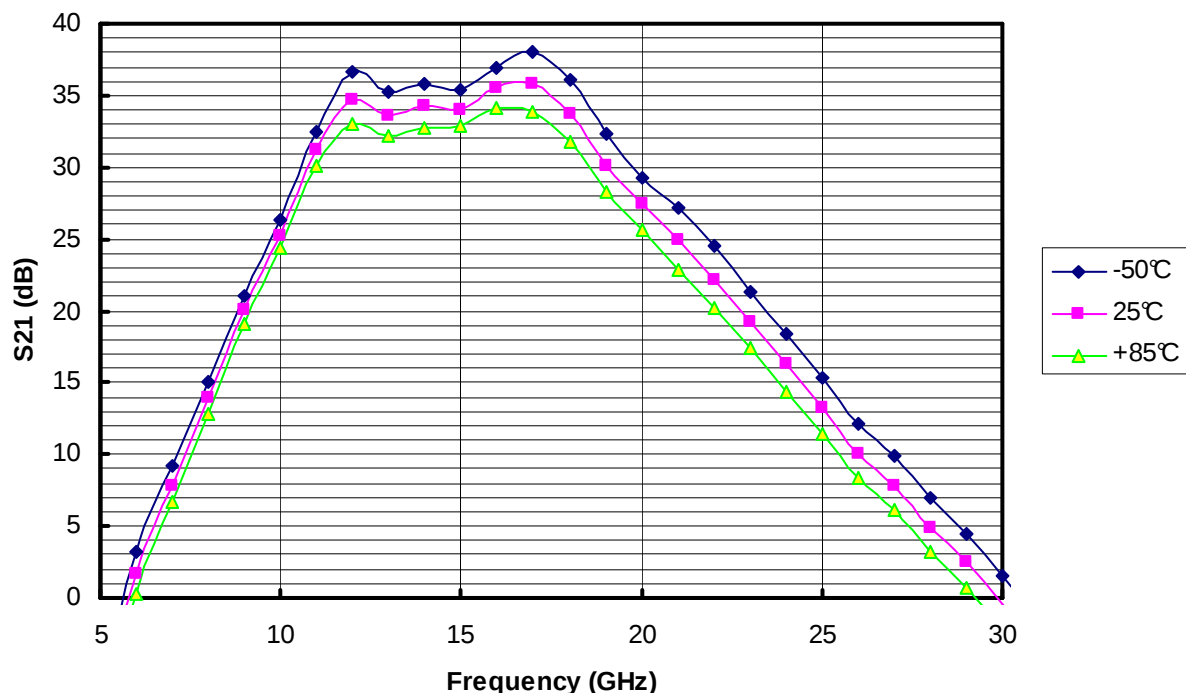
Typical Test-Jig Results

S- Parameters @ small signal

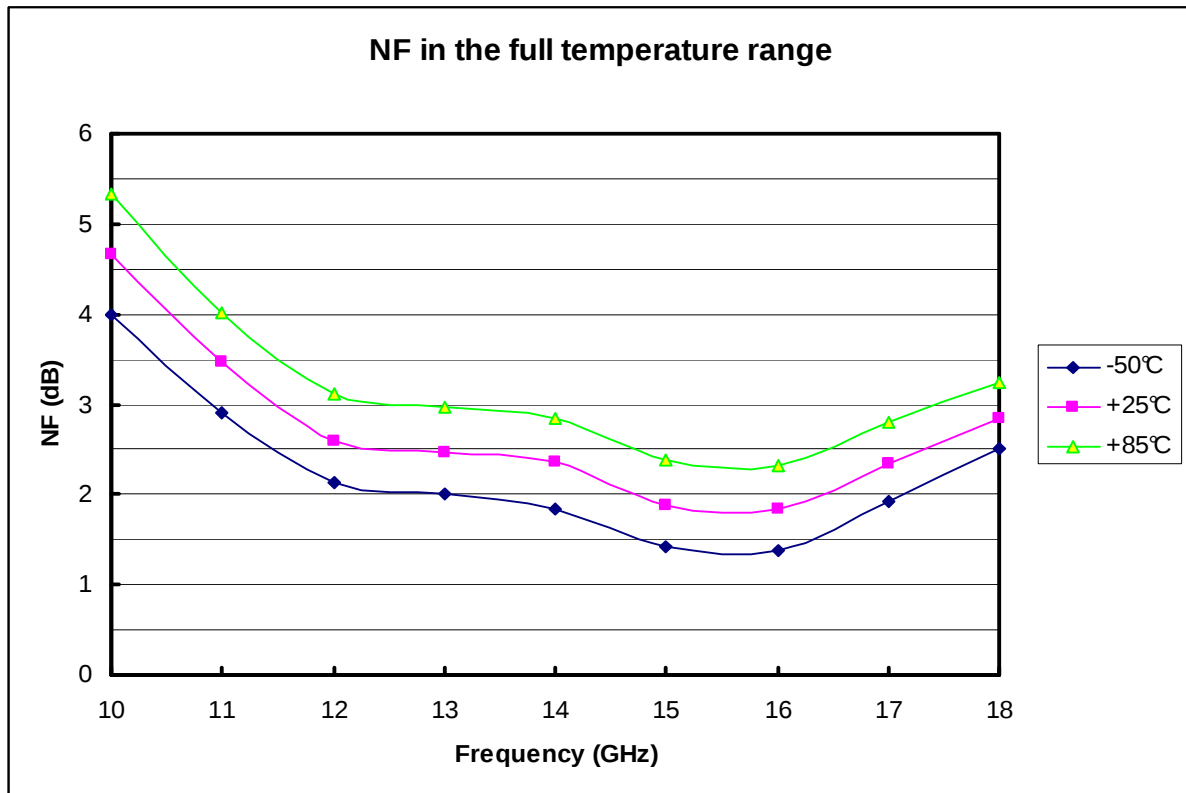
Tamb 25 °C, Vd = 4V



S21 in the full temperature range

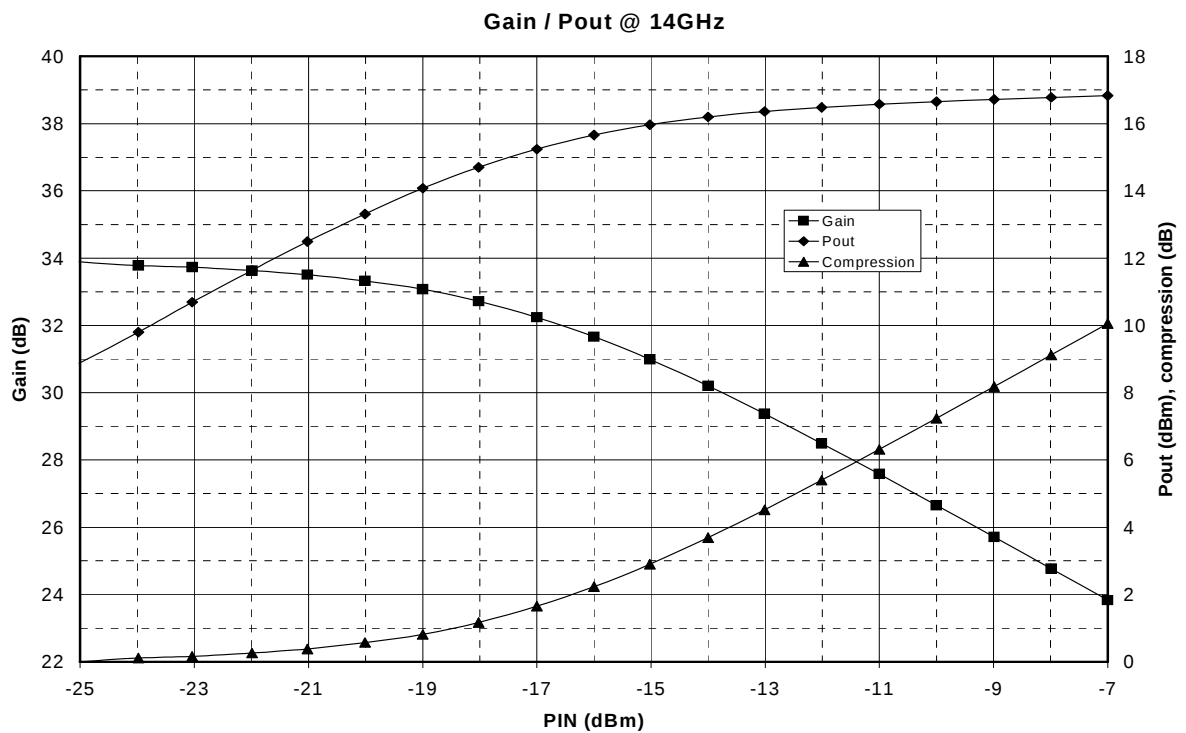


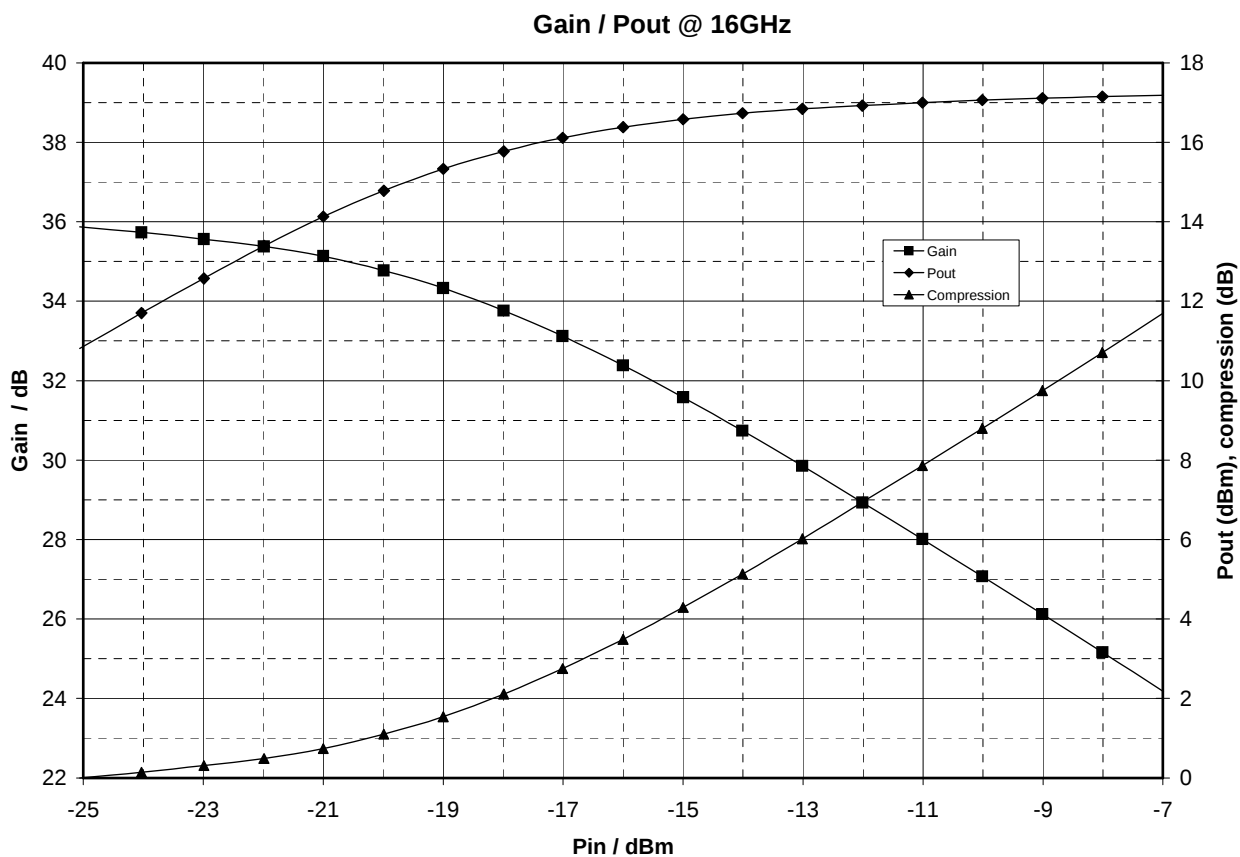
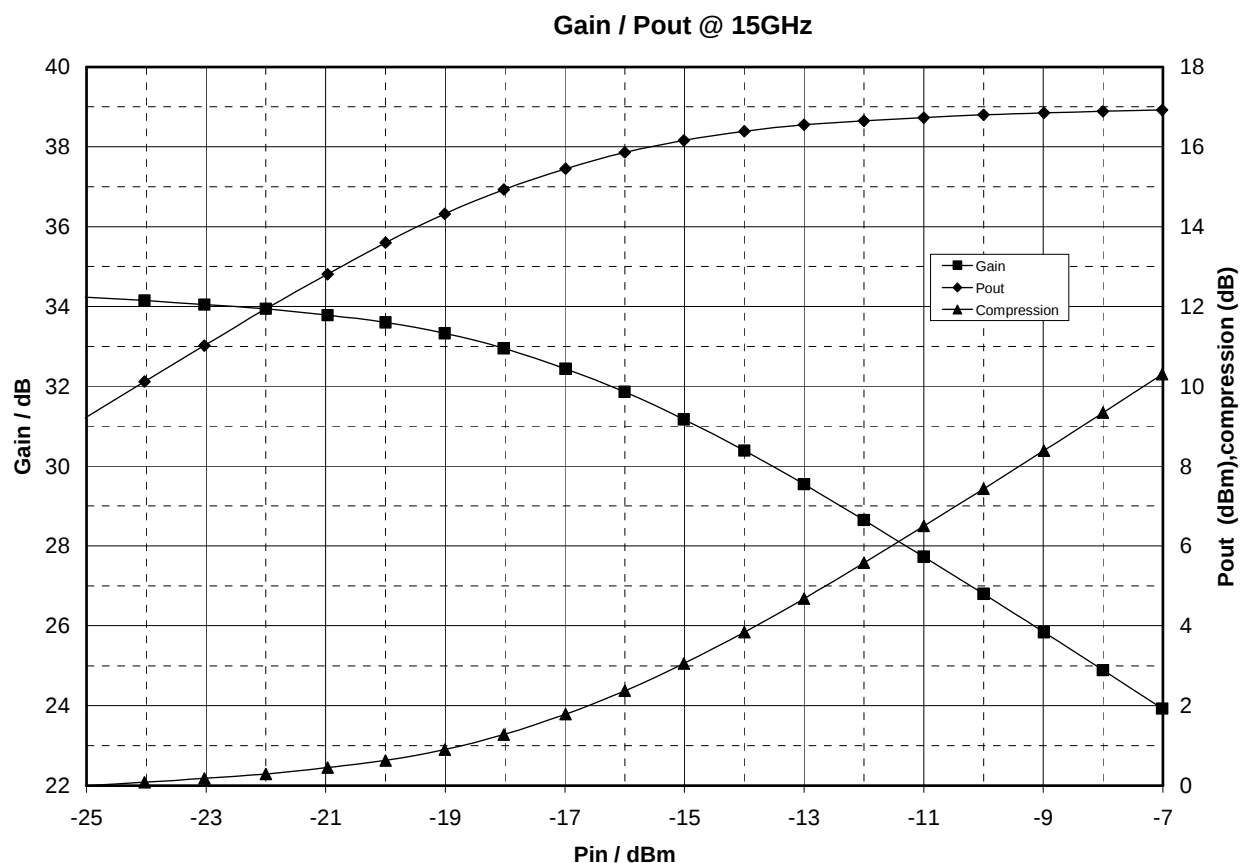
NF vs Frequency and Temperature

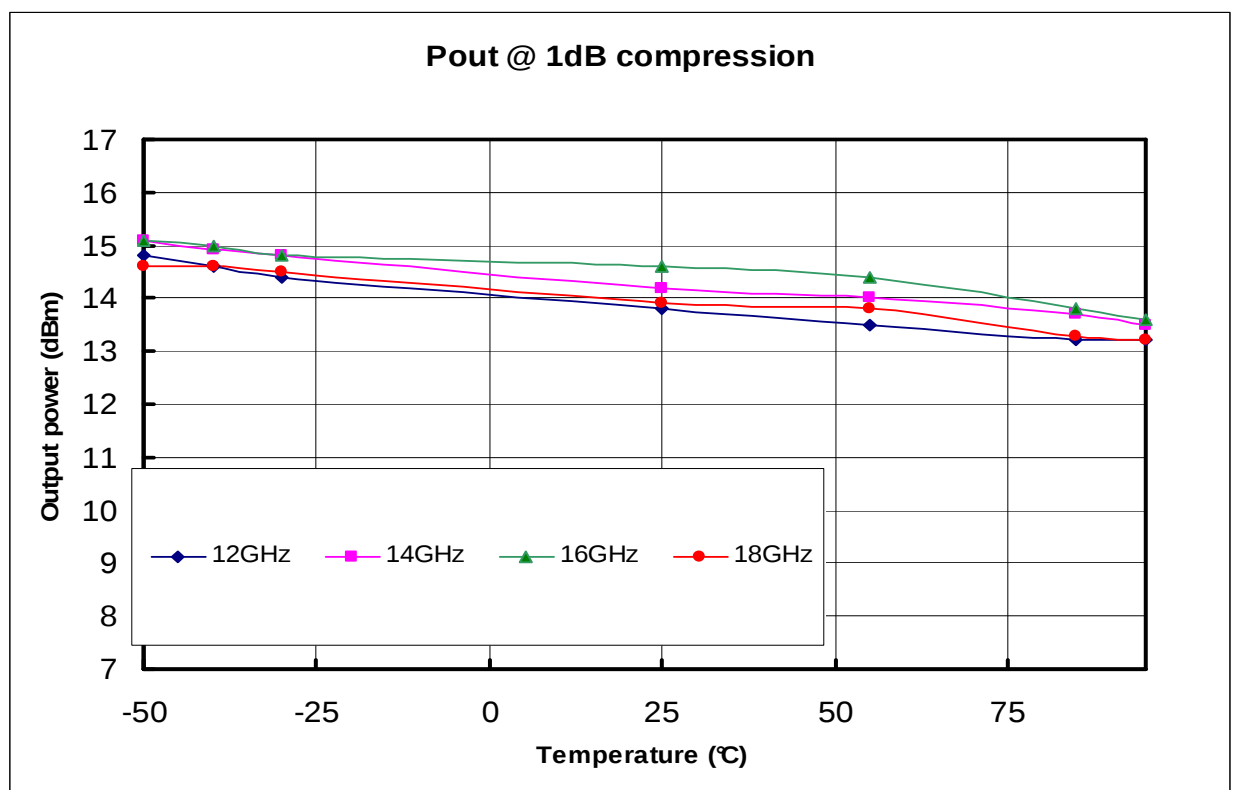
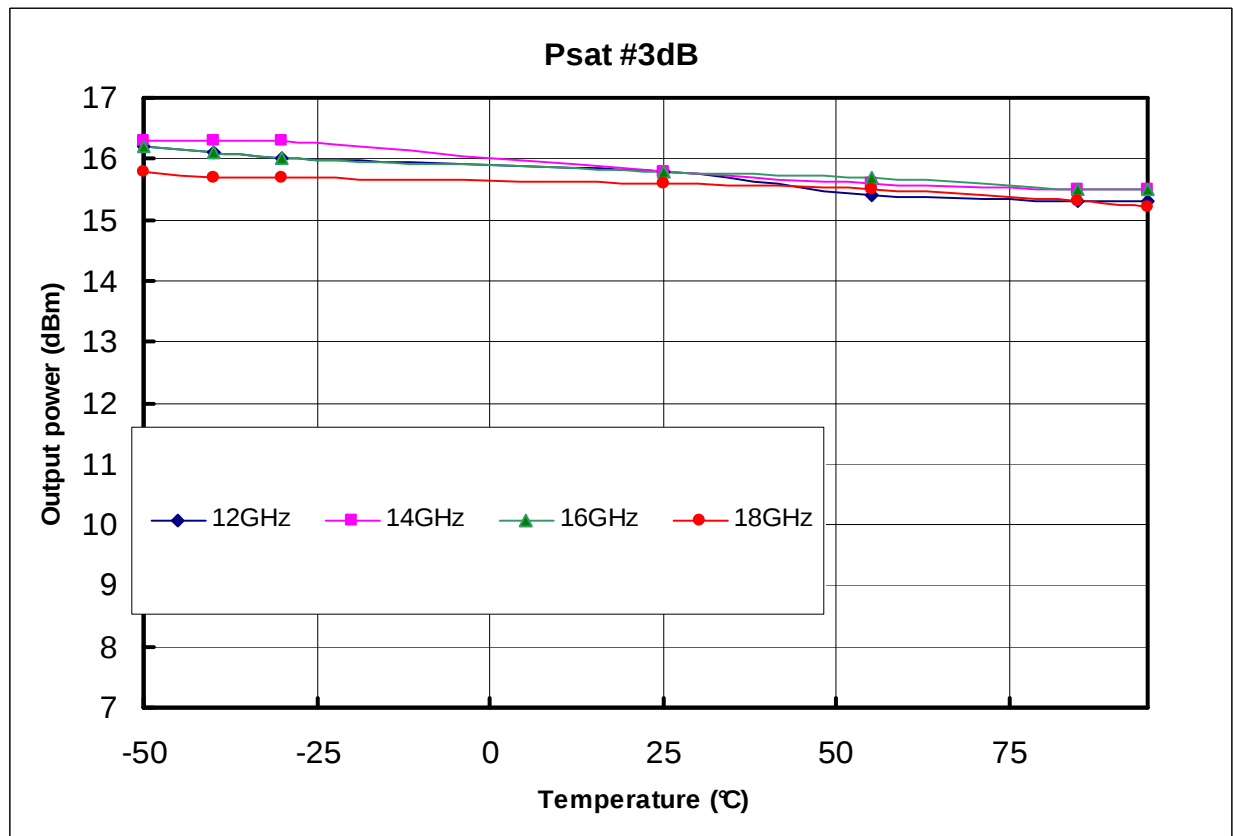


Gain & Pout vs Pin @ 14, 15 and 16GHz

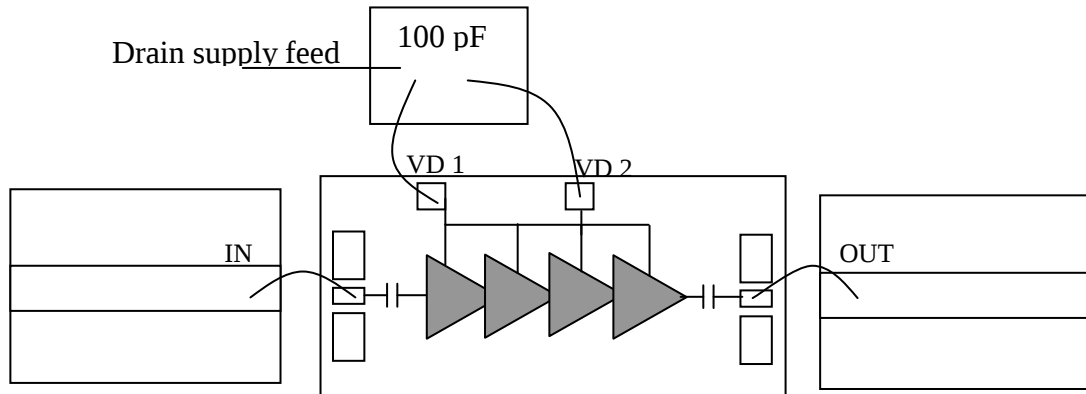
Tamb = 25°C, Vd = 4 V







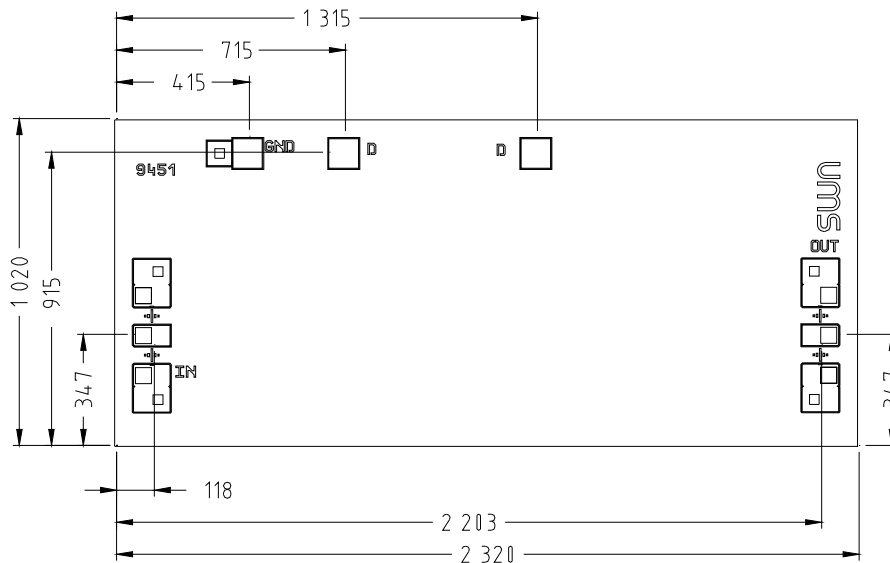
Chip Assembly and Mechanical Data



Notes: Vd1 & Vd2 pads are internally connected
Supply feed should be bypassed. 25µm diameter gold wire is recommended

Bond pad positions and Pin references

(Chip thickness: 100 µm. all dimensions are in micrometers)
Dimensions : 2320 x 1020µm ± 35µm



Ordering Information

Chip Form : CHA2266-99F/00

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