CHA3063-99F

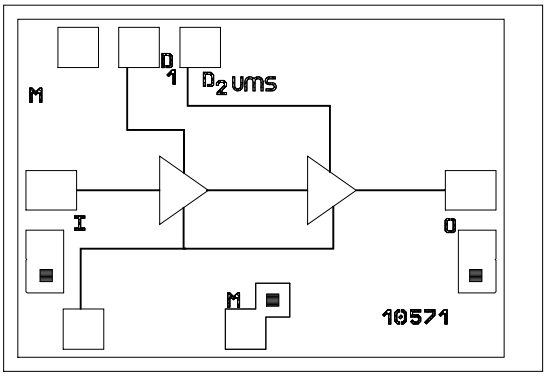
5.5-23GHz Driver Amplifier

GaAs Monolithic Microwave IC

Description

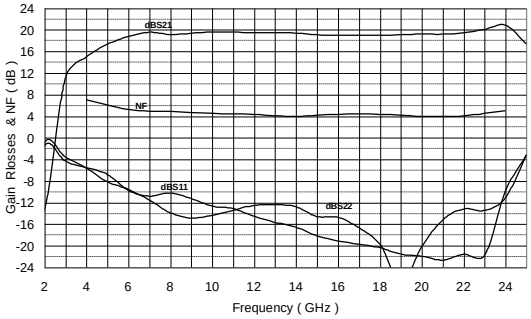
The CHA3063-99F is a two-stage general purpose monolithic medium power amplifier.The backside of the chip is both RF and DC grounded.This helps to simplify the assembly process.

The circuit is manufactured with a pHemt process: 0.25µm gate length, via holes through the substrate, air bridges and electron beam gate lithography.
It is supplied in chip form.



Main Features

- Broadband performance: 5.5-23GHz
- 21dBm output power (Psat)
- 19dB gain, ± 1dB gain flatness
- Typical PAE:11% @ P-1dB comp.
- Chip size: 1.33 x 0.910x 0.1mm



Typical On wafer measurements

Main Electrical Characteristics

Tamb = +25°C

Symbol	Parameter	Min	Typ	Max	Unit
Fop	Operating frequency range	5.5		23	GHz
G	Small signal gain	18	19		dB
Pout	Output power, Pin=0dBm	+18	+20		dBm
Id_small_signal	Bias current		160	210	mA

ESD Protection : Electrostatic discharge sensitive device observe handling precautions !

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Electrical Characteristics on wafer

Tamb = +25°C, **Vd1=Vd2=4V Vg tuned for Id=160mA (around –0.27V)**

Symbol	Parameter	Min	Typ	Max	Unit
Fop	Operating frequency range	5.5		23	GHz
G	Small signal gain (5.5-6GHz) Small signal gain (6-23GHz)	17 18	 19		dB dB
ΔG	Small signal gain flatness		±1.0		dB
Is	Reverse isolation		35		dB
P1dB	CW output power at 1dB compression (1)	+16	+18		dBm
Pout	Output Power (Pin=0dBm)	+18	+20		dBm
OIP3	Output 3rd order intercept point (2)		28		dBm
RL_IN	Input Return Loss (3)		-15	-7	dB
RL_OUT	Output Return Loss (3)		-15	-7	dB
NF	Noise figure		4.5	6	dB
Id_small signal	Bias current		160	210	mA

(1) These values are representative for CW on-wafer measurements that are made without bonding wires at the RF ports.
(2) Value representative for CW on jig measurement
(3) RL_IN, RL_OUT < 6dB from 5.5GHz to 7GHz

Absolute Maximum Ratings (1)

Tamb. = 25°C

Symbol	Parameter	Values	Unit
Vds	Drain bias voltage_small signal	5.0	V
Ids	Drain bias current_small signal	210	mA
Vg	Gate bias voltage	-2 to +0.4	V
Ig	Gate bias current	0.7	mA
Vgd	Maximum negative gate drain Voltage (Vg-Vd)	-5	V
Pin	Maximum continuous input power Maximum peak input power overdrive (2)	+1 +15	dBm dBm
Ta	Operating temperature range	-40 to +85	°C
Tstg	Storage temperature range	-55 to +150	°C

(1) Operation of this device above anyone of these parameters may cause permanent damage.
(2) Duration < 1s.

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Typical Scattering Parameters *(On wafer Sij measurements)*

Bias Conditions: Vd1,2= 4V, Vg = -0.27V, Id = 160 mA, Ta=+25°C.

FREQ	S11	S11	S12	S12	S21	S21	S22	S22
GHz	dB	/°	dB	/°	dB	/°	dB	/°
1.0	-0.3	-35.6	-60.9	84.0	-12.7	86.9	-0.6	-35.0
2.0	-0.7	-75.6	-63.1	142.8	-13.7	-179.2	-1.4	-67.7
3.0	-3.4	-113.7	-54.5	-53.2	11.6	123.1	-4.7	-93.2
4.0	-5.7	-140.7	-53.1	138.2	15.2	58.5	-6.2	-111.6
5.0	-7.9	-170.3	-43.5	67.4	16.4	19.0	-7.4	-133.3
6.0	-9.0	162.5	-44.2	34.7	18.8	-12.3	-11.1	-149.1
7.0	-11.3	121.8	-41.0	13.6	19.3	-46.9	-12.0	-155.1
8.0	-13.5	82.5	-38.7	-16.7	18.9	-75.2	-11.6	-173.2
9.0	-14.3	39.7	-37.6	-39.6	19.1	-100.4	-12.9	171.7
10.0	-14.0	0.9	-37.1	-61.4	19.3	-125.2	-14.4	165.8
11.0	-13.2	-34.0	-36.7	-82.9	19.5	-150.7	-13.7	164.9
12.0	-13.2	-62.6	-35.6	-107.7	19.6	-175.1	-13.5	148.9
13.0	-15.3	-95.8	-36.0	-126.6	19.5	159.3	-11.9	131.3
14.0	-16.7	-125.2	-35.0	-148.4	19.2	133.1	-11.9	116.0
15.0	-21.2	-125.5	-34.7	-175.9	18.5	111.1	-13.1	95.0
16.0	-18.6	-140.0	-36.4	170.4	18.2	89.1	-14.7	79.9
17.0	-19.8	-124.7	-36.4	137.3	18.1	70.4	-19.5	72.4
18.0	-18.8	-172.0	-38.5	135.9	18.1	44.3	-17.4	72.2
19.0	-20.8	101.6	-37.4	154.6	18.0	22.0	-18.5	57.4
20.0	-19.8	23.1	-35.2	125.8	18.0	-2.5	-19.4	47.4
21.0	-15.4	-14.7	-34.0	101.5	18.2	-26.4	-23.3	32.5
22.0	-14.2	-34.2	-33.8	71.7	18.9	-57.7	-21.4	76.8
23.0	-11.5	-43.5	-35.3	46.5	19.5	-89.3	-16.9	77.6
24.0	-11.6	-30.9	-33.1	-0.4	20.4	-144.0	-6.3	46.6
25.0	-3.9	-46.7	-34.9	-86.0	17.6	153.9	-3.1	-13.3
26.0	-2.0	-74.8	-35.3	-172.0	10.9	104.5	-3.2	-59.0
27.0	-1.3	-99.2	-39.7	157.6	3.9	69.9	-4.3	-90.9
28.0	-1.3	-115.8	-33.9	138.6	-3.5	44.6	-4.7	-113.7
29.0	-1.3	-128.4	-32.3	128.4	-12.1	29.3	-5.0	-133.9
30.0	-1.2	-140.1	-28.7	96.4	-21.0	47.7	-5.9	-153.6

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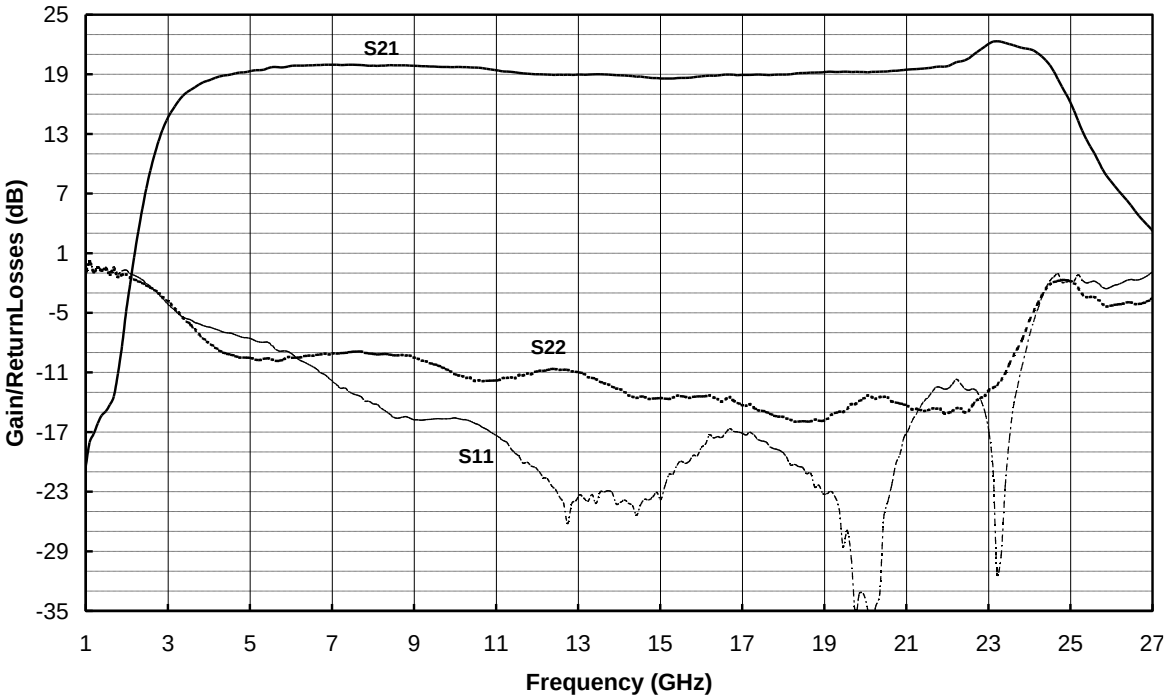
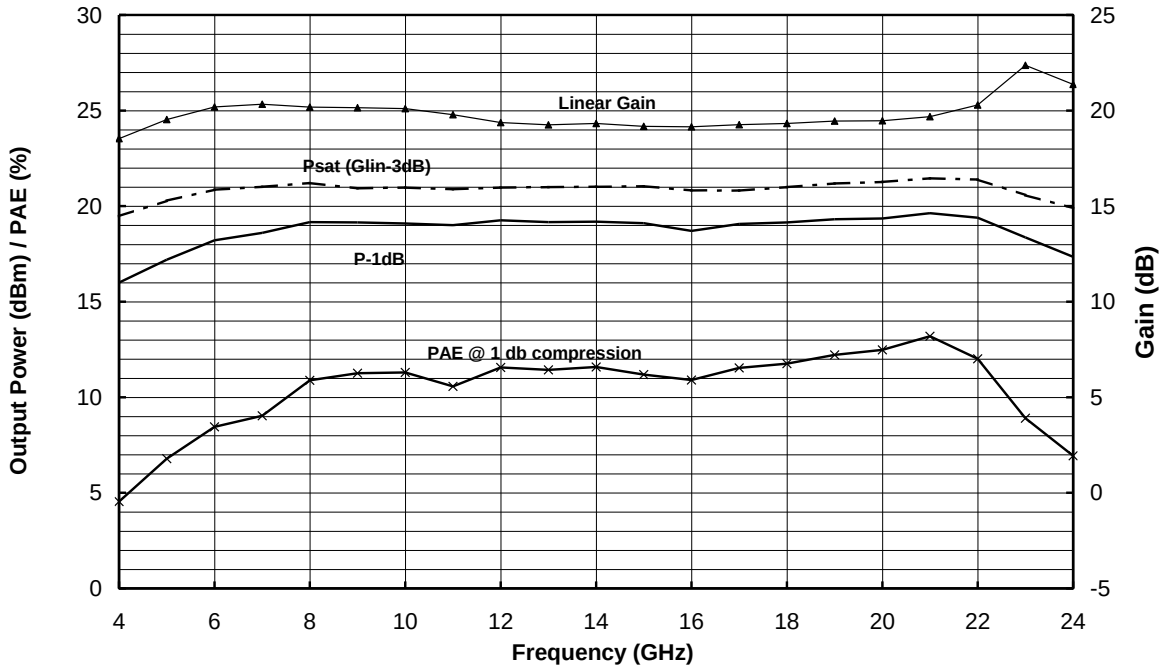
Typical ON JIG Measurements (deembedded)

Bias Conditions: Vd1,2= 4V, Vg = -0.27V, Id = 160 mA, Ta=+25°C

GAIN & ReturnLosses MEASUREMENTS IN TEST JIG



POWER MEASUREMENTS IN TEST JIG (deembedded)



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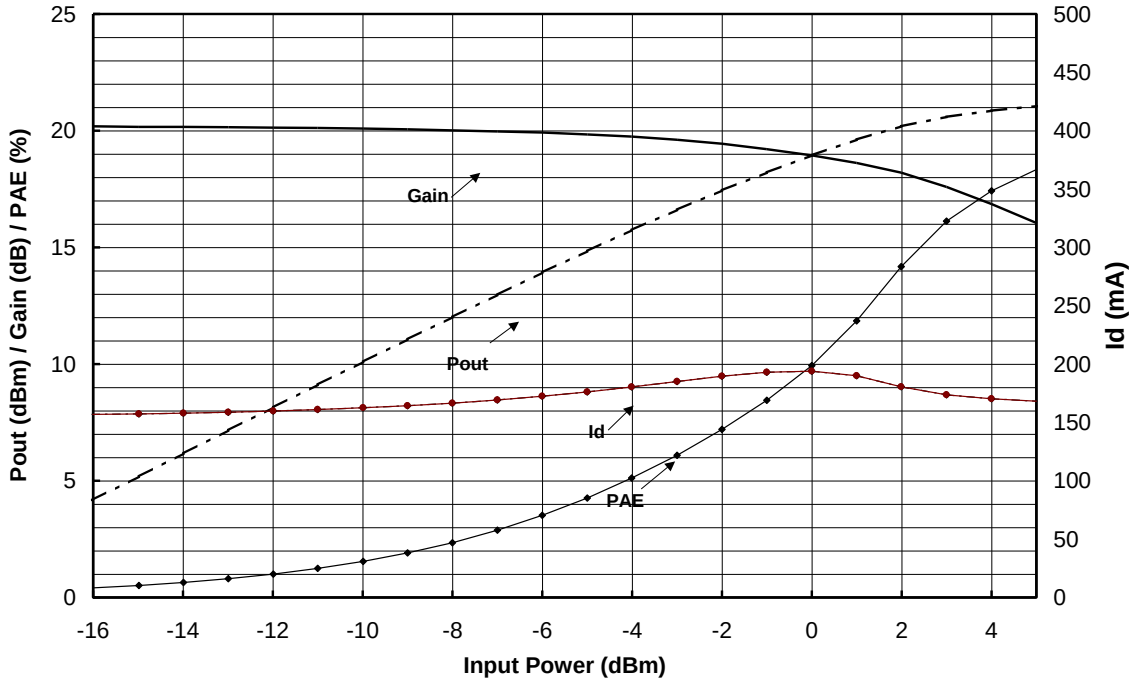
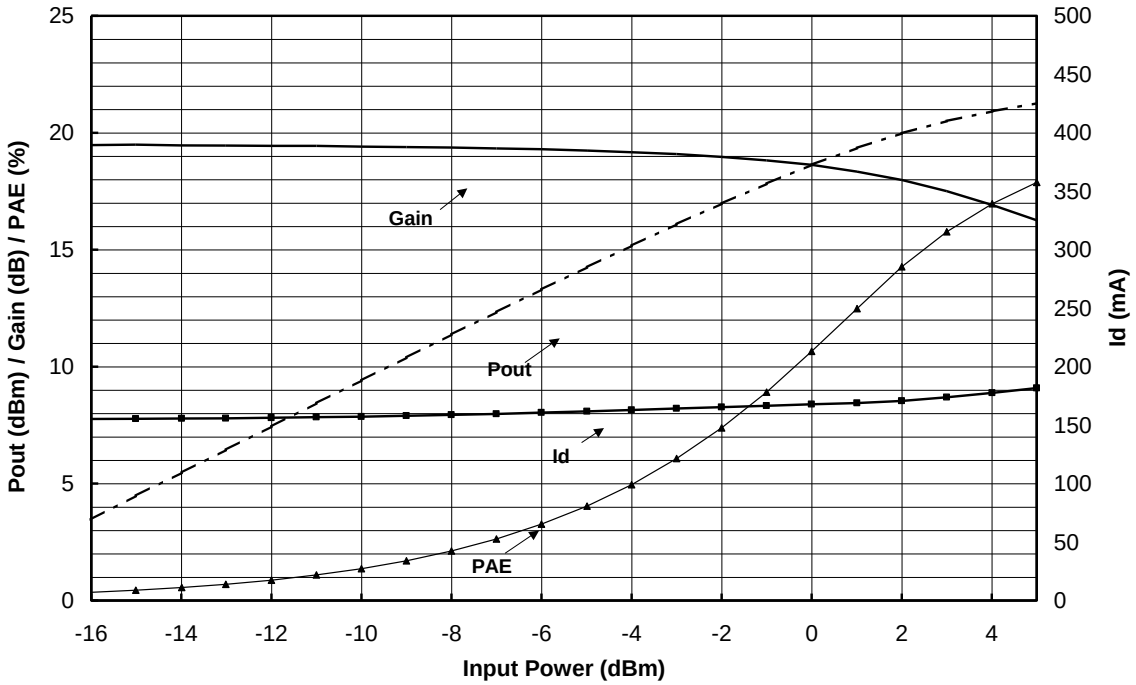
Typical ON JIG Power Measurements (deembedded)

Bias Conditions: Vd1,2= 4V, Vg = -0.27V, Id = 160 mA, Ta=+25°C

Frequency : 6 GHz



Frequency : 20GHz



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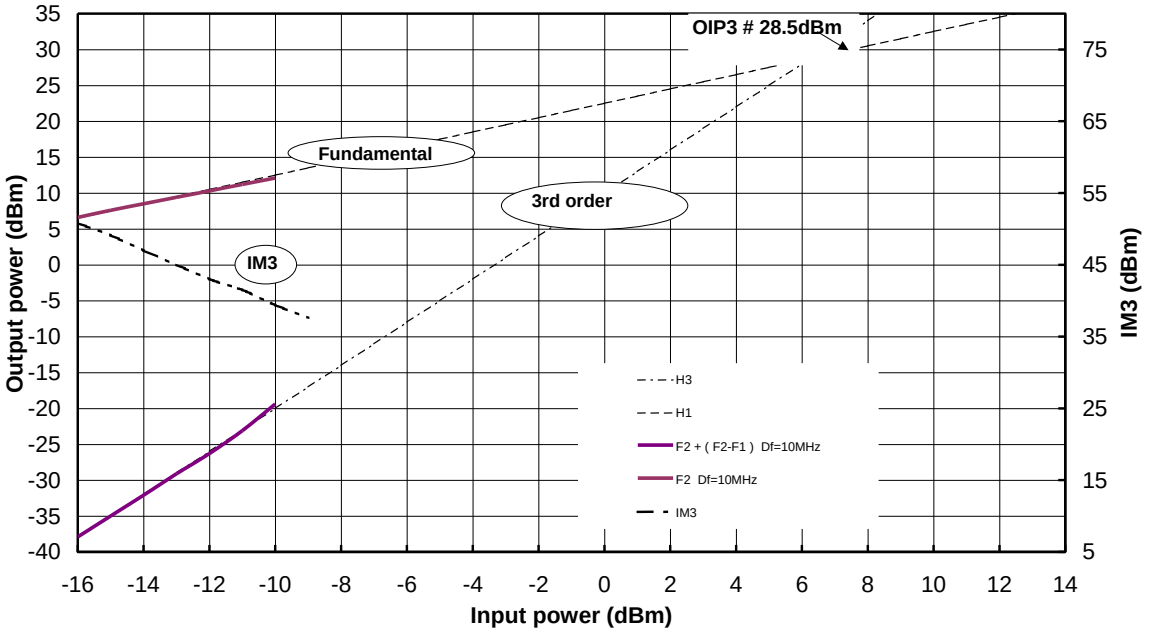
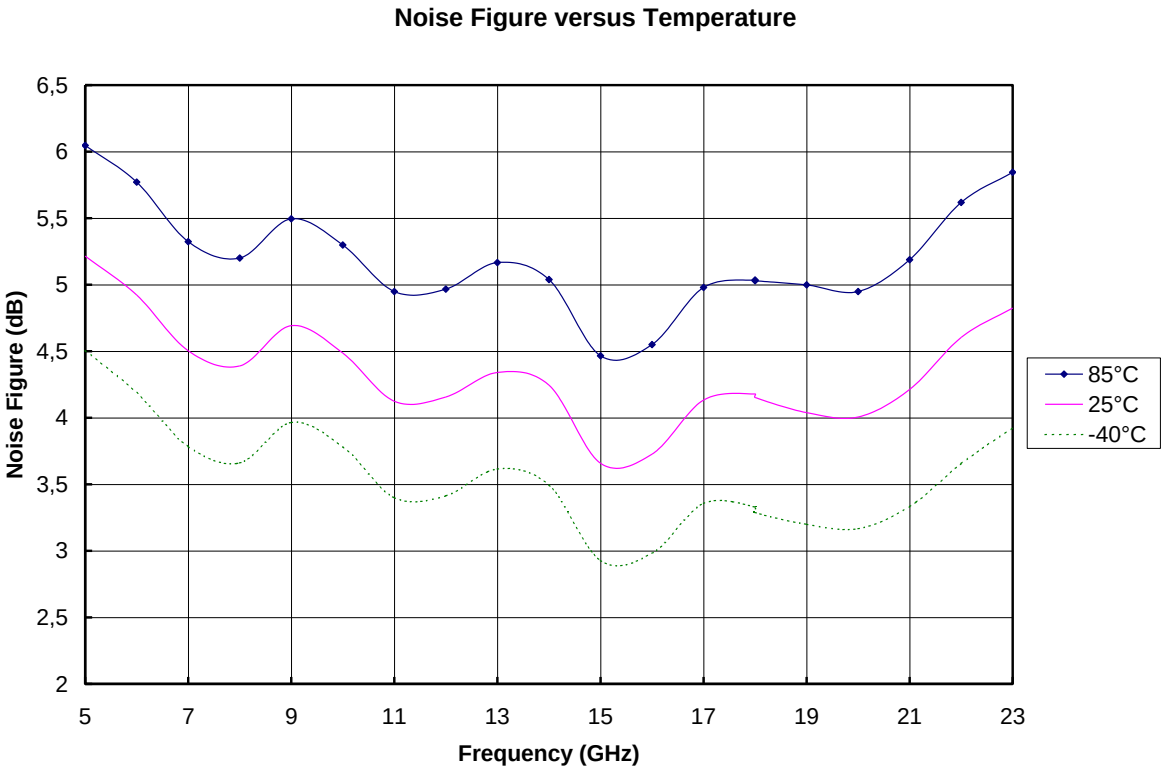
Vd=4V Id=160mA @ 23GHz Δf=10MHz



Typical ON JIG Noise Figure Measurements



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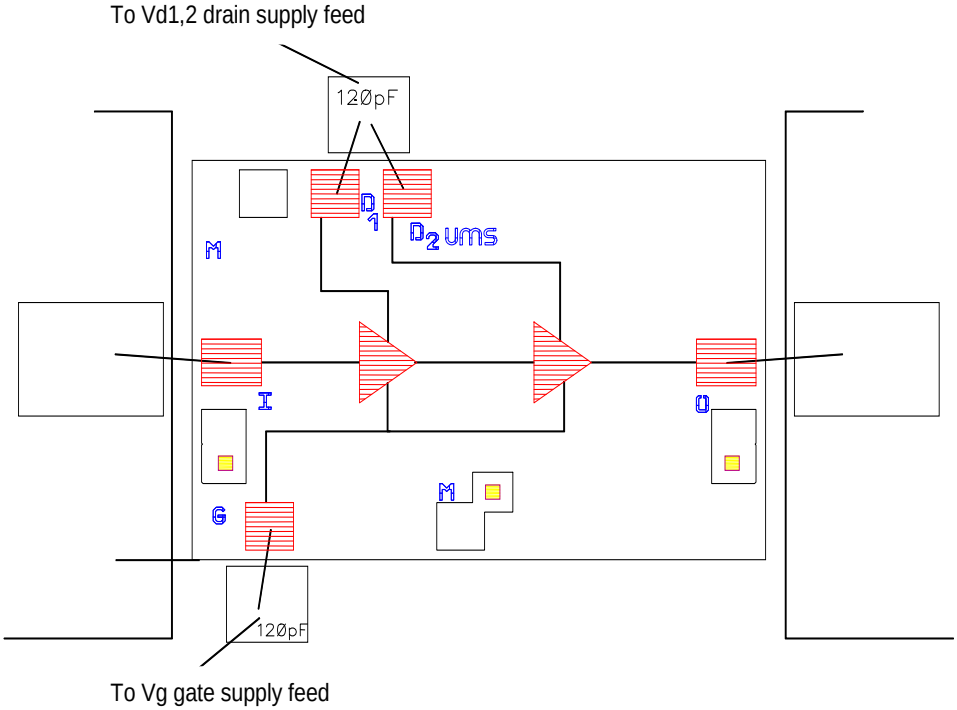
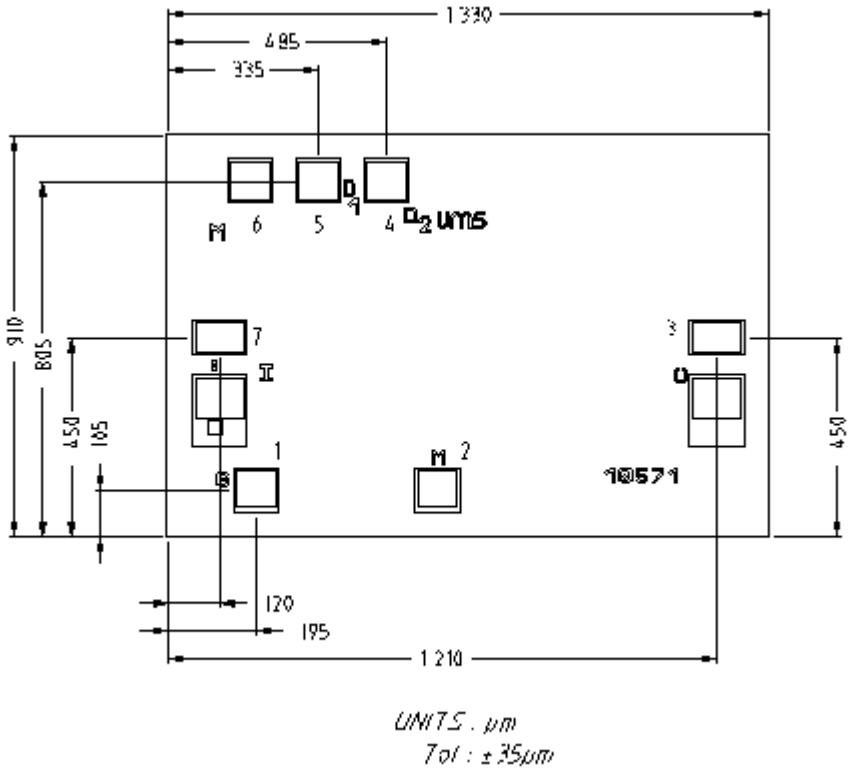
Chip Assembly and Mechanical Data



Note: Supply feed should be capacitively bypassed. 25µm diameter gold wire is recommended

Chip Mechanical Data and Pin references

(Chip thickness: 100µm. All dimensions are in micrometers)



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Ordering Information

Chip form : CHA3063-99F/00

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