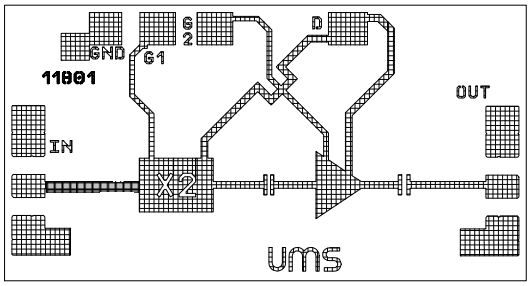
7.5-15GHz Frequency Multiplier

GaAs Monolithic Microwave IC

Description

The CHX2193 is a frequency multiplier by 2 monolithic circuit.
It is designed for a wide range of applications, from military to commercial communication systems. The backside of the chip is both RF and DC ground. 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.



Main Features

■ Broadband performance: 6.25-8.25 GHz
■ 12dBm output power for +12dBm input power
■ DC power consumption, 60mA @ 3.5V (with RF)
■ Chip size: 1.62 x 0.89 x 0.10 mm

Main Characteristics

Tamb. = 25℃

Symbol	Parameter	Min	Typ	Max	Unit
F_{in}	Input frequency range	6.25		8.25	GHz
F_{out}	Output frequency range	12.5		16.5	GHz
P_{in}	Input power		12		dBm
P_{out}	Output power for +12dBm input power	10	12	16	dBm

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

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Electrical Characteristics

T_{amb} = +25°C, V_{g1} = -0.9V, V_{g2} adjusted for I_d = 60mA under RF, P_{in}=+12dBm

Symbol	Parameter	Min	Typ	Max	Unit
F_{in}	Input frequency range	6.25		8.25	GHz
F_{out}	Output frequency range	12.5		16.5	GHz
P_{in}	Input power		12		dBm
P_{out}	Output power for +12 dBm input power	10	12	16	dBm
I_s/F_o	F_{in} level at the output (6.25 < F_{in} < 8.25GHz), for +12dBm input power	-8	-16	-30	dBm
$VSWR_{in}$	Input VSWR		2.5:1		
$VSWR_{out}$	Output VSWR		2.5:1		
V_d	Drain bias voltage		3.5		V
I_d	Bias current (with RF)		60		mA

A wire bond of typically 0.1 to 0.15nH will improve the input and output matching.

Absolute Maximum Ratings

Tamb = +25°C

Symbol	Parameter	Values	Unit
V_d	Drain bias voltage	4.0	V
I_d	Drain bias current	150	mA
T_a	Operating temperature range (1)	-40 to +85	°C
T_{stg}	Storage temperature range	-55 to +125	°C

Operation of device above anyone of these parameters may cause permanent damage.

(1) Reference: backside of the chip

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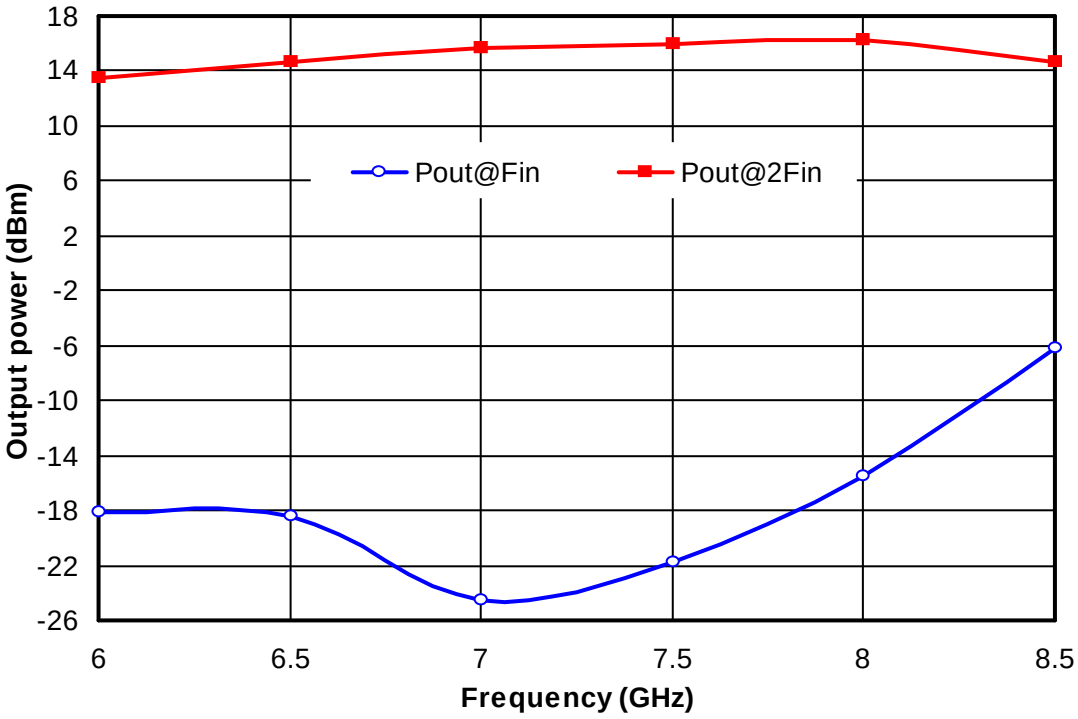
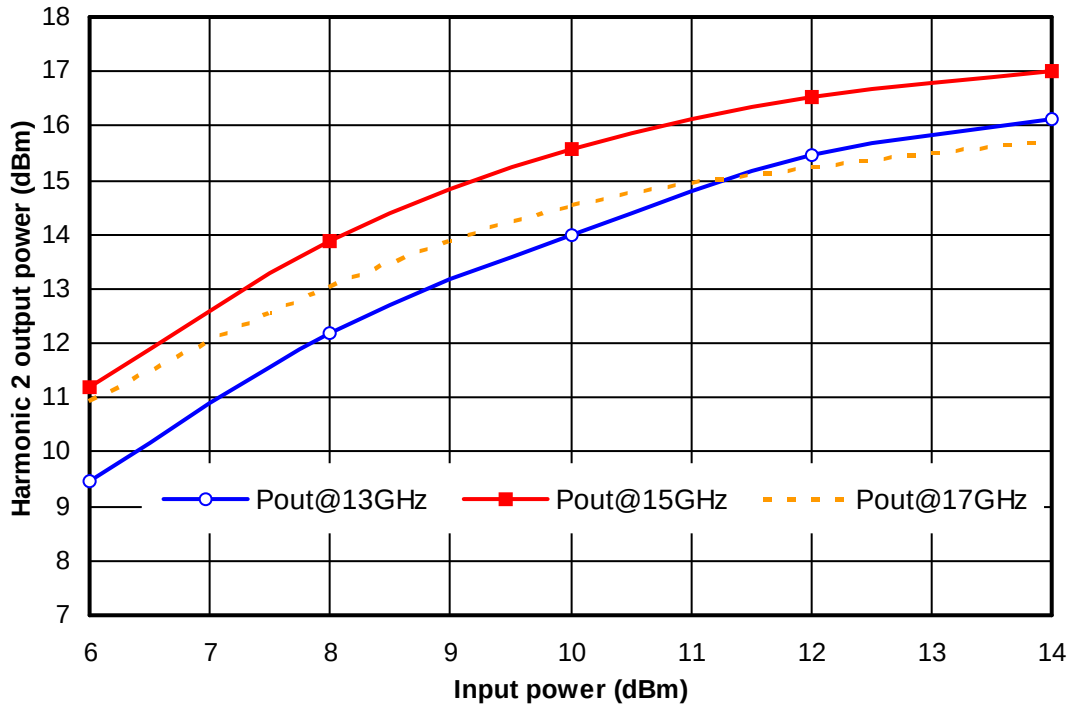
Typical on Wafer Measurements

Bias conditions: T_{amb} = +25°C, V_d = 3.5V V_{g1} = -0.9V

V_{g2} adjusted for Id = 60mA under RF, P_{in}=+12dBm



Bias conditions: T_{amb} = +25°C, V_d = 3.5V, V_{g1} = -0.9V, V_{g2} adjusted for Id = 60mA under RF, F_{in}=6.5GHz – 7.5GHz – 8.5GHz



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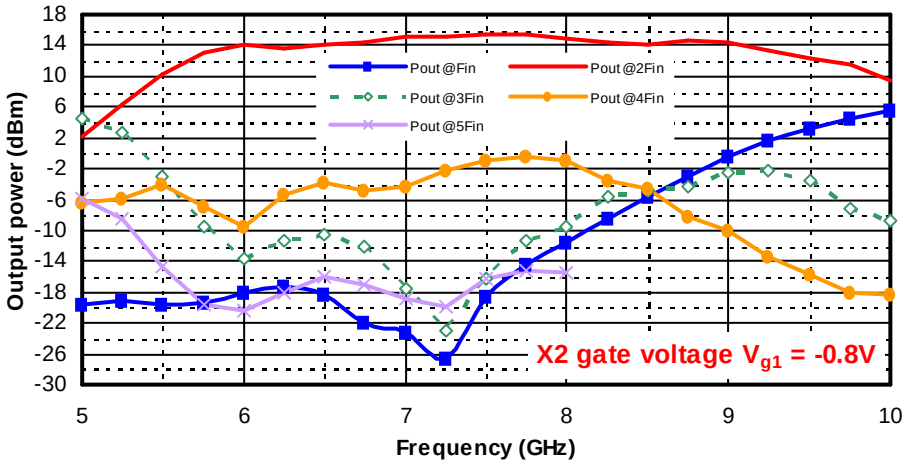
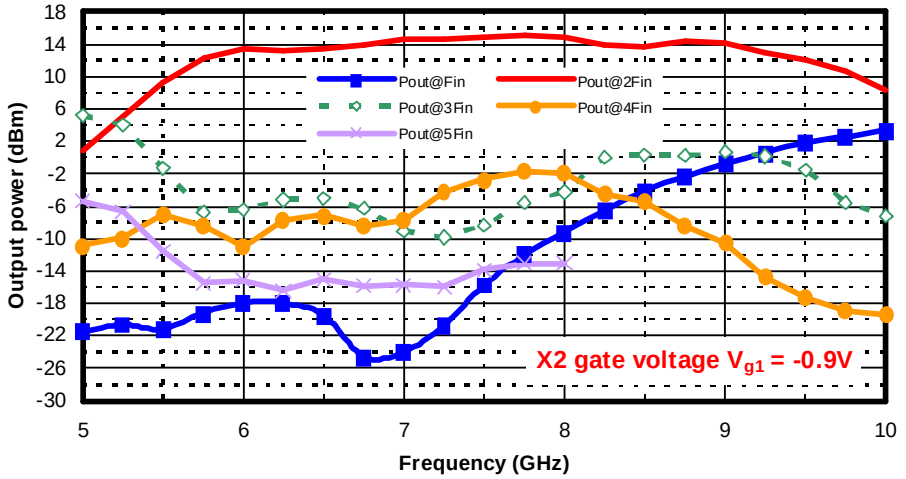
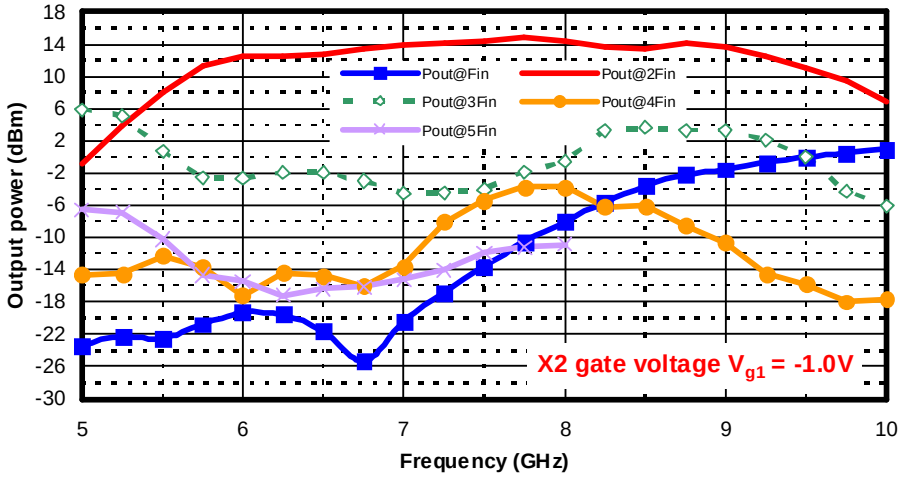
Typical In Test fixture Measurements

Bias conditions: T_{amb} = +25°C, V_d = 3.5V
V_{g2} adjusted for I_d = 60mA under RF P_{in}=+10dBm

Harmonics output power versus gate voltage V_{g1}







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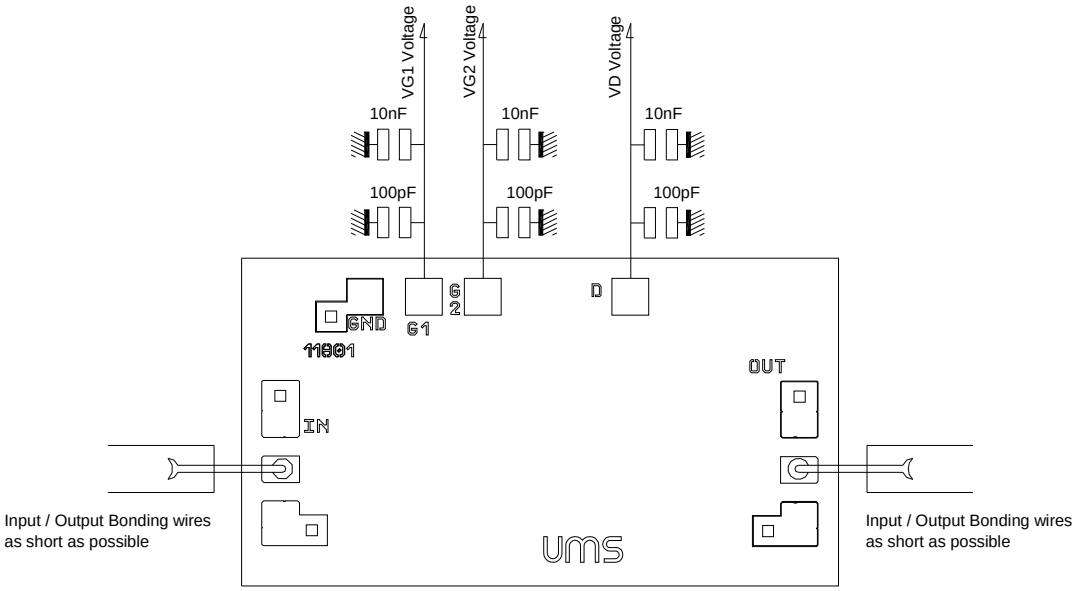
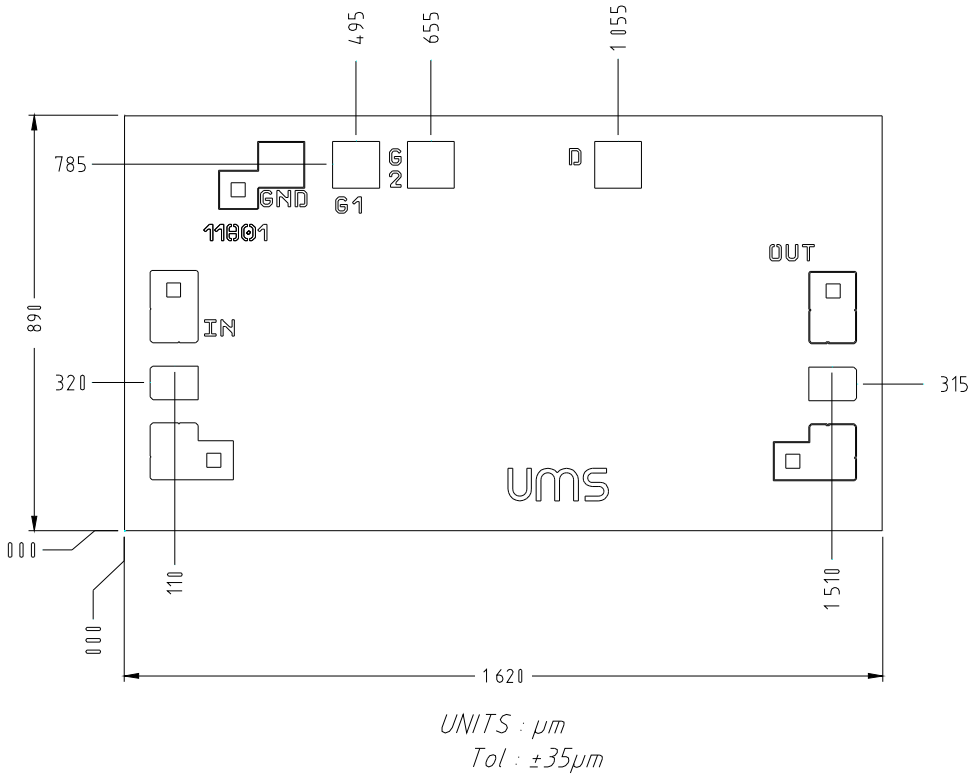
Chip Assembly and Mechanical Data



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



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

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Ordering Information

Chip form : CHX2193-99F/00

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