

7.5-15GHz Frequency Multiplier

GaAs Monolithic Microwave IC

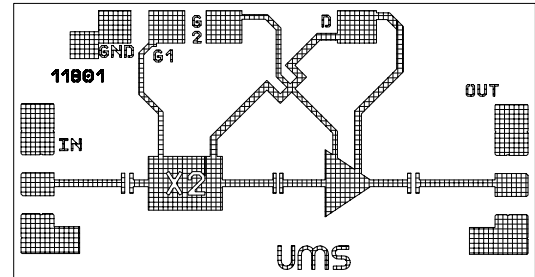
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Description

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 PM-HEMT 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°C

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

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

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 ($6.25 < F_{in} < 8.25\text{GHz}$), 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 0.15 nH will improve the input and output matching.

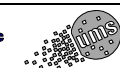
Absolute Maximum Ratings

$T_{amb} = +25^{\circ}\text{C}$

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	$^{\circ}\text{C}$
T_{stg}	Storage temperature range	-55 to +125	$^{\circ}\text{C}$

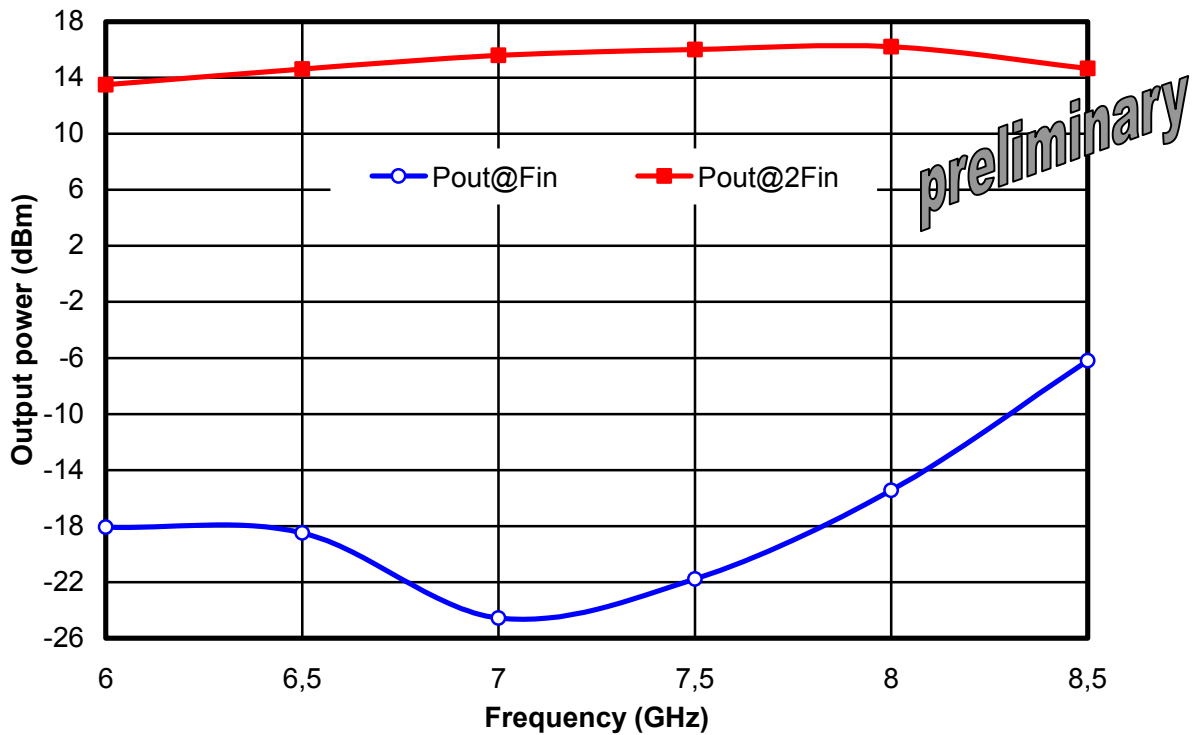
Operation of device above anyone of these parameters may cause permanent damage.

(1) Reference : backside of the chip

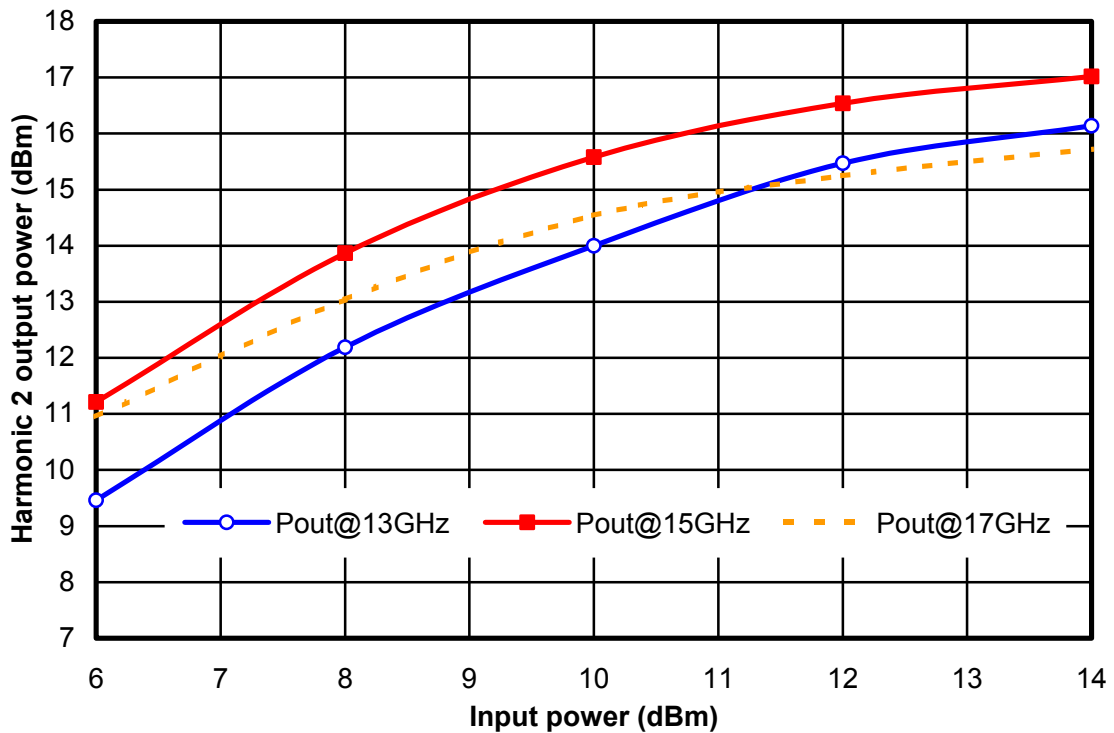


Typical on Wafer Measurements

Bias conditions: $T_{amb} = +25^{\circ}\text{C}$, $V_d = 3.5\text{V}$ $V_{g1} = -0.9\text{V}$ V_{g2} adjusted for $I_d = 60\text{mA}$ under RF $P_{in}=+12\text{dBm}$



Bias conditions: $T_{amb} = +25^{\circ}\text{C}$, $V_d = 3.5\text{V}$ $V_{g1} = -0.9\text{V}$ V_{g2} adjusted for $I_d = 60\text{mA}$ under RF $F_{in}=6.5\text{GHz} - 7.5\text{GHz} - 8.5\text{GHz}$

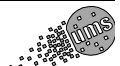
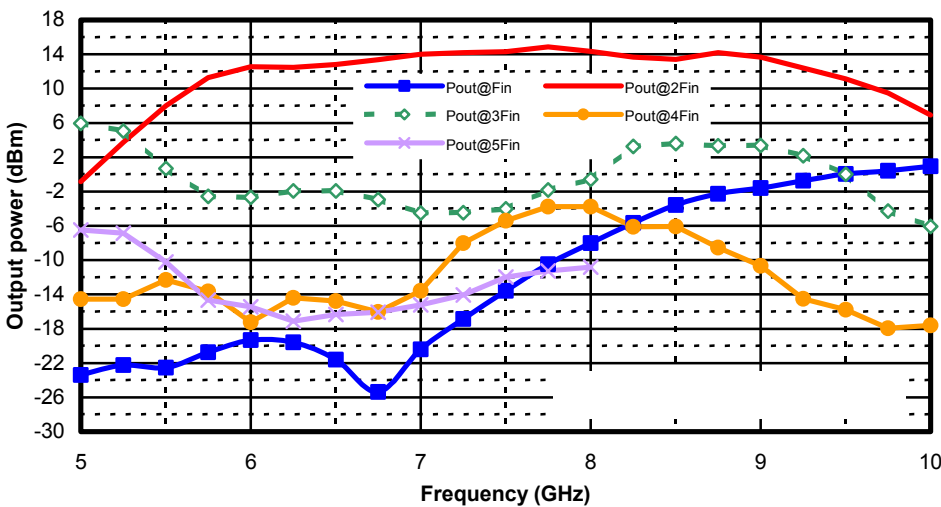
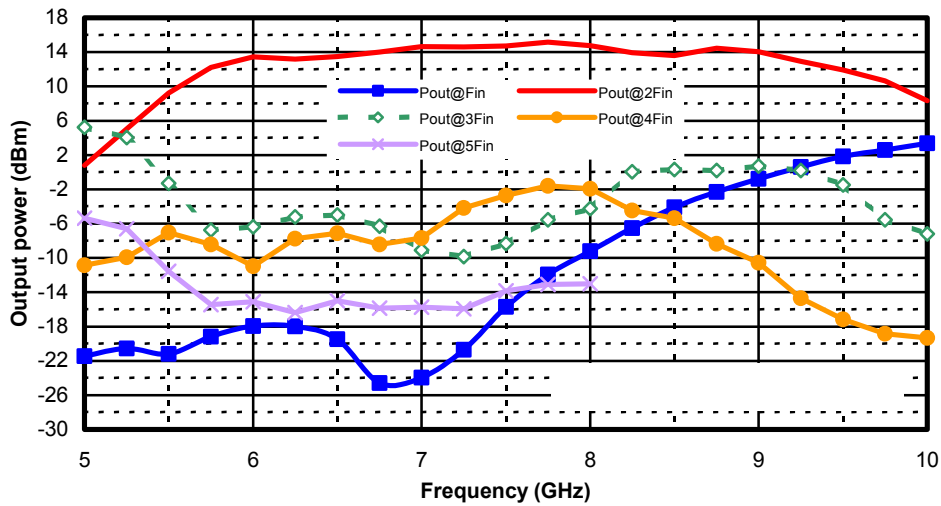
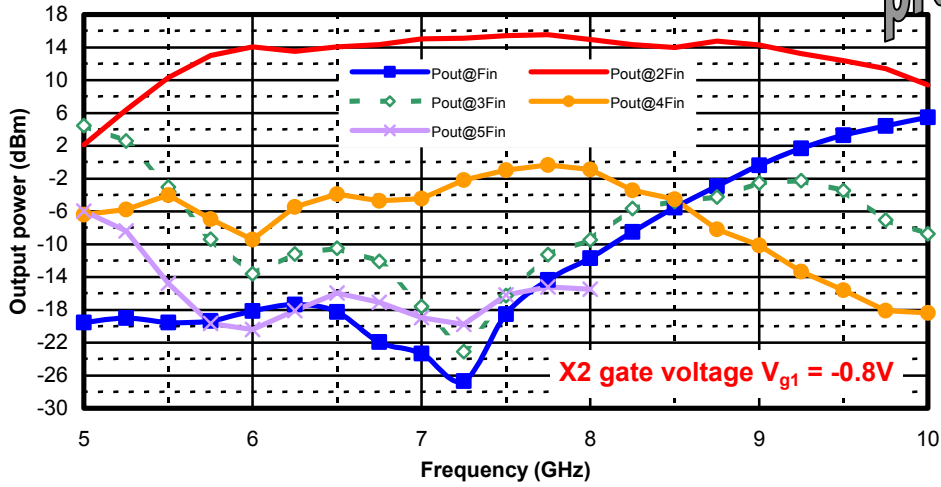


Typical In-Jig Measurements

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

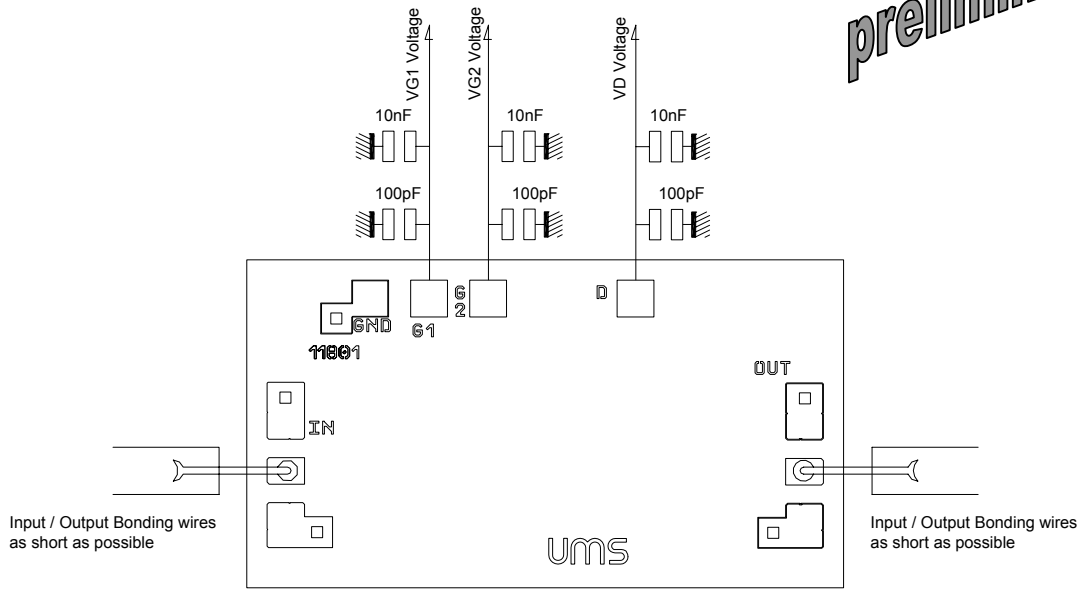
Harmonics output power versus gate voltage V_{g1}

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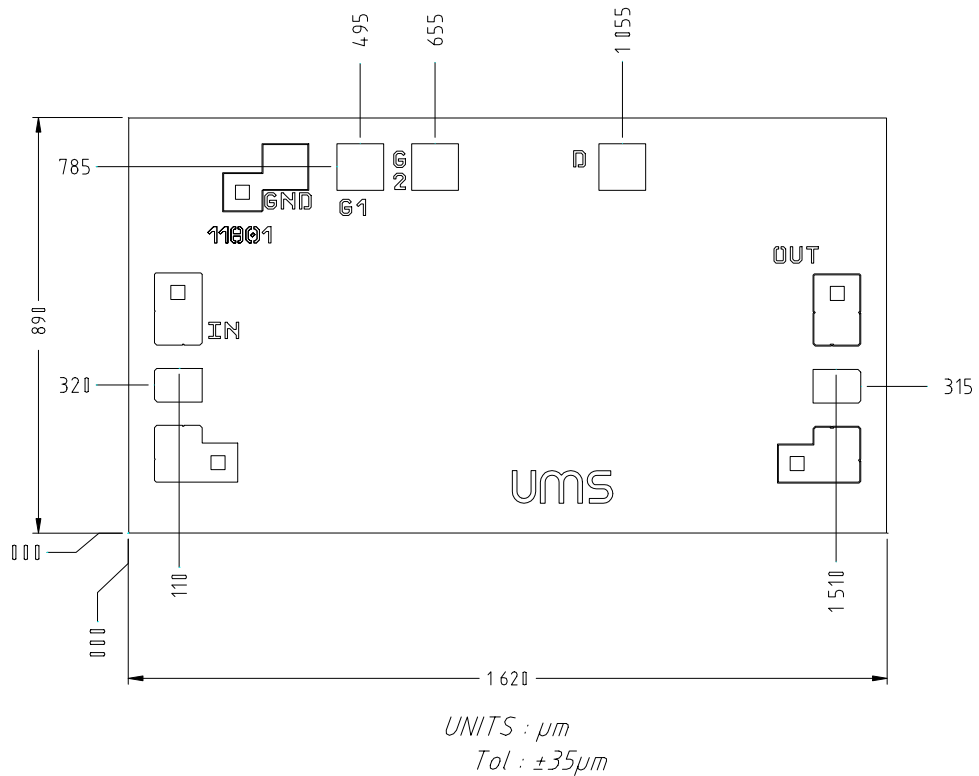


Chip Assembly and Mechanical Data

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



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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