20-24GHz Integrated Down Converter

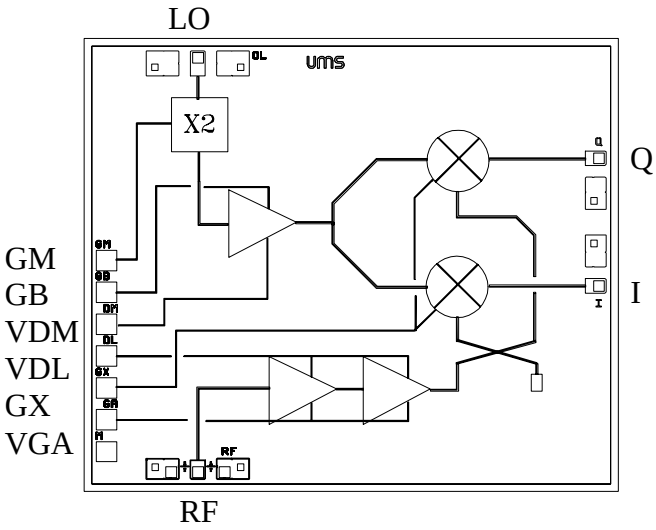
preliminary

GaAs Monolithic Microwave IC

Description

The CHR2293 is a multifunction chip which integrates a LO X2 multiplier, a balanced cold FET mixer, and a RF LNA. It is designed for a wide range of applications, typically commercial communication systems. The backside of the chip is both RF and DC grounds. This helps 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.
It is available in chip form.



Main Features

- Broadband performances : 20-24GHz
- 11 dB conversion gain
- 4dB noise figure
- 10dBm LO input power
- -8dBm RF input power (1dB gain comp.)
- Low DC power consumption, 130mA@3.5V
- Chip size : 2.49 X 1.97 X 0.10 mm

Main Characteristics

Tamb. = 25°C

	Parameter	Min	Typ	Max	Unit
F_{RF}	RF frequency range	24		30	GHz
F_{LO}	LO frequency range	9.25		12.75	GHz
F_{IF}	IF frequency range	0.25		1.5	GHz
G_c	Conversion gain		+11		dB

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

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Electrical Characteristics for Broadband Operation

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Tamb = +25°C, Vd = 3.5V

Symbol	Parameter	Min	Typ	Max	Unit
F_{RF}	RF frequency range	20		24	GHz
F_{LO}	LO frequency range	9.25		12.75	GHz
F_{IF}	IF frequency range	0.25		1.5	GHz
G_c	Conversion gain (1)		+11		dB
NF	Noise Figure (1)		4		dB
P_{LO}	LO Input power		+10		dBm
Img Sup	Image Suppression (2)		17		dBc
P1dB	Input power at 1dB gain compression		-8		dBm
LO VSWR	Input LO VSWR (1)		2.0:1		
RF VSWR	Input RF VSWR (1)		2.0:1		
Id	Bias current (3)		130		mA

(1) On Wafer measurements
(2) With external I/ Q combiner
(3) Current source biasing network is recommended. Optimum performances for Idm= 50mA and Idl= 80mA

Absolute Maximum Ratings

Tamb. = 25°C (1)

Symbol	Parameter	Values	Unit
Vd	Drain bias voltage	4.0	V
Id	Drain bias current	200	mA
Vg	Gate bias voltage	-2.0 to +0.4	V
Pin	Maximum peak input power overdrive (2)	+15	dBm
Ta	Operating temperature range	-40 to +85	°C
Tstg	Storage temperature range	-55 to +155	°C

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

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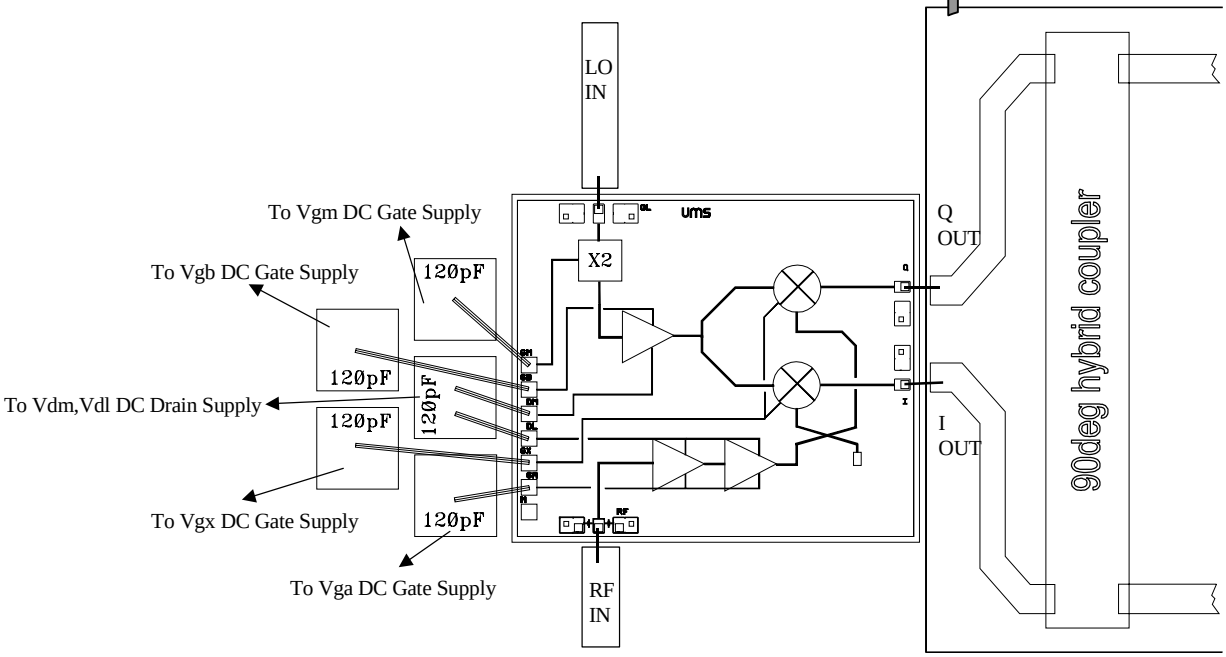
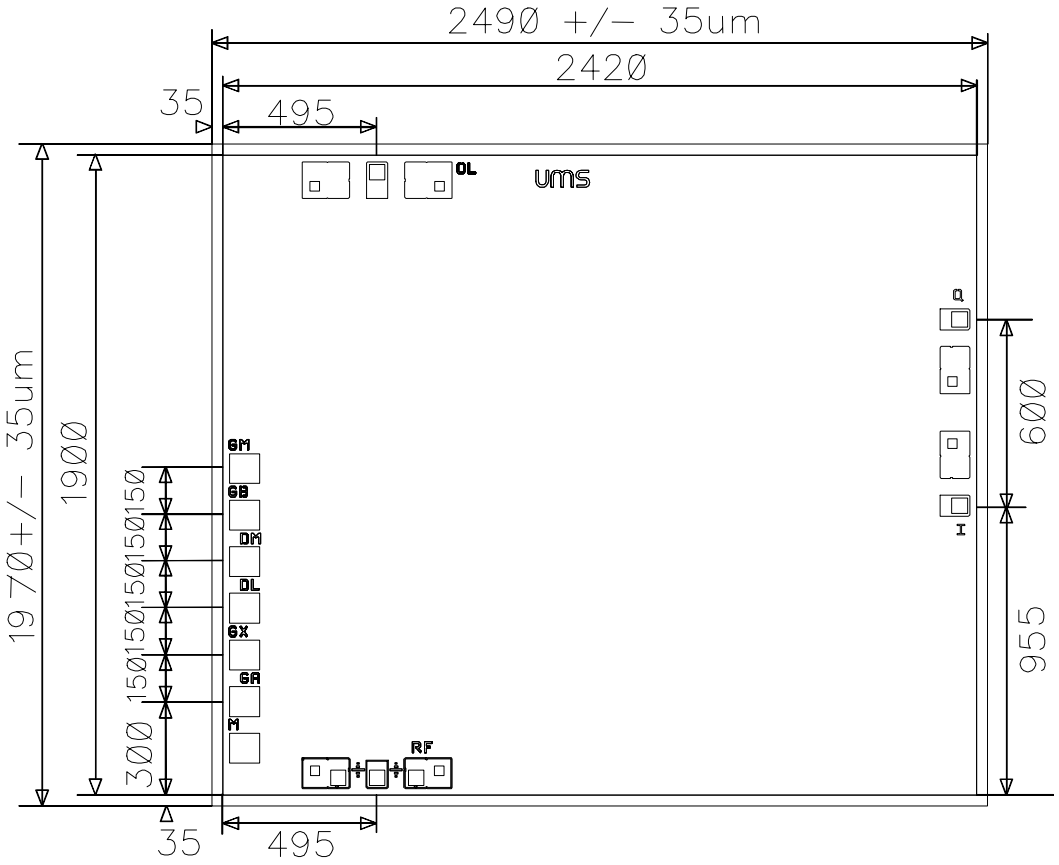
Chip Assembly and Mechanical Data



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



Bonding pad positions

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

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Ordering Information

Chip form : CHR2293-99F/00

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