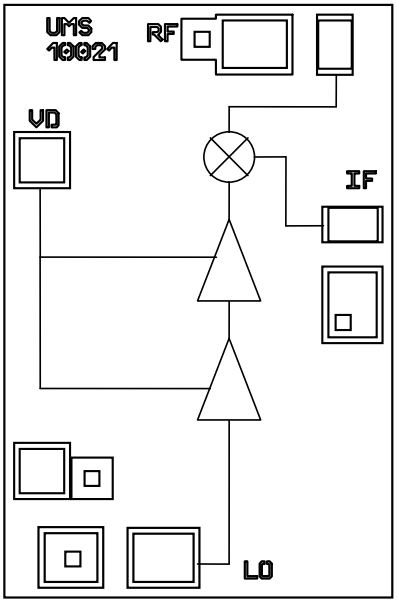
20-30GHz Sub-Harmonic Mixer

GaAs Monolithic Microwave IC

Description

The CHM1290-99F is a Multi-Function Circuit which integrates a self biased LO buffer amplifier and a sub harmonically diode mixer for 2LO suppression. It is usable both for up conversion and down-conversion. It is designed for a wide range of applications, typically commercial communication systems for broadband local access (LMDS). The backside of the chip is both RF and DC grounds. This helps 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 available in chip form.



Main Features

- Broadband performance: 20-30GHz
- 10dB conversion Loss
- 29dB 2LO to RF isolation
- -4dBm LO input power
- -3dBm input power 1dB compression
- Low DC consumption: 33mA@4.0V
- Chip size: 0.86x1.28x0.10mm

Main Electrical Characteristics

Tamb.= +25°C

Symbol	Parameter	Min	Typ	Max	Unit
F_{RF}	RF frequency range	20		30	GHz
F_{LO}	LO frequency range	10		15	GHz
F_{IF}	IF frequency range	DC		6	GHz
L_c	Conversion Loss		10	12	dB

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Electrical Characteristics

Tamb.= +25°C, Vd = +4.0V, Id=33mA

Symbol	Parameter	Min	Typ	Max	Unit
F_{RF}	RF frequency range	20		30	GHz
F_{LO}	LO frequency range	10		15	GHz
F_{IF}	IF frequency range	DC		6	GHz
L_c	Conversion Loss		10	12	dB
P_{LO}	LO Input power		-4	8	dBm
2xLO Leak	2xLO Leakage (for P_{LO}=-4dBm)		30		dBm
IP1dB	Input power at 1dB gain compression	-3	0	3	dBm
LO Match	LO Matching		2.0:1		
RF Match	RF Matching		2.0:1		
IF Match	IF Matching		2.0:1		
Vd	DC voltage		4.0		V
Id	Bias current		33		mA

These values are representative of on-wafer measurements that are made without bonding wires at the RF ports.
A bonding wire of typically 0.1 to 0.15nH will improve the matching at the accesses.

Absolute Maximum Ratings (1)

Tamb.= +25°C

Symbol	Parameter	Values	Unit
Vd	Drain bias voltage	5.0	V
Id	Drain bias current	50	mA
Pin	Maximum peak input power overdrive (2)	10	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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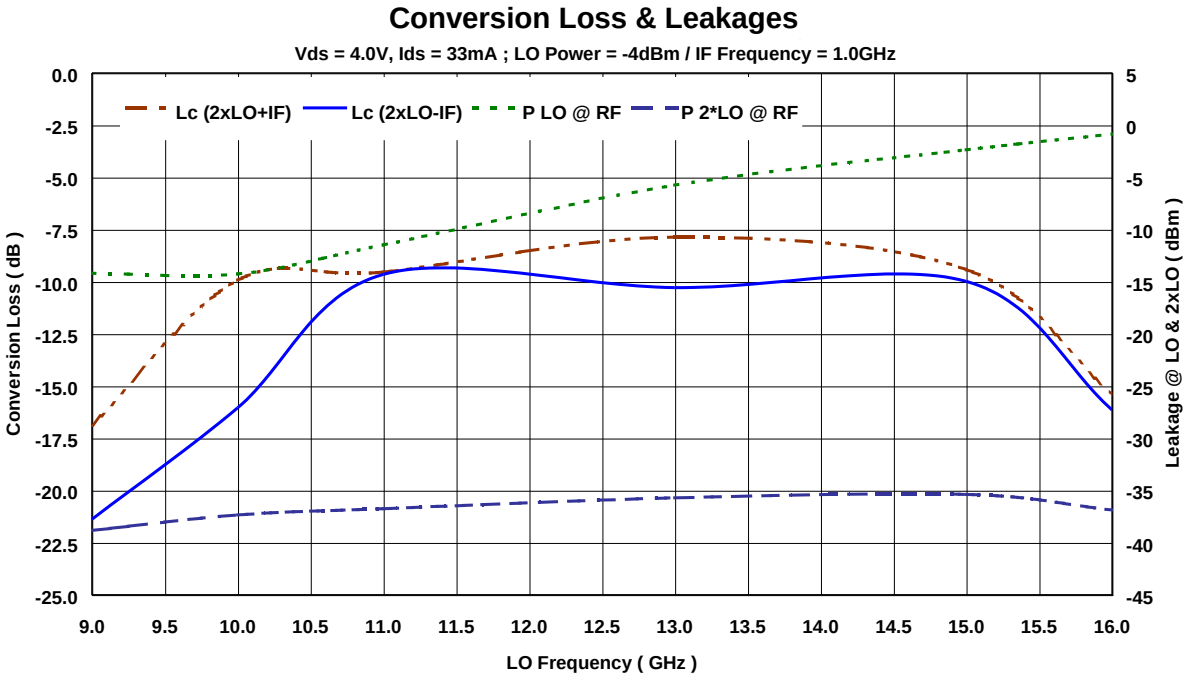
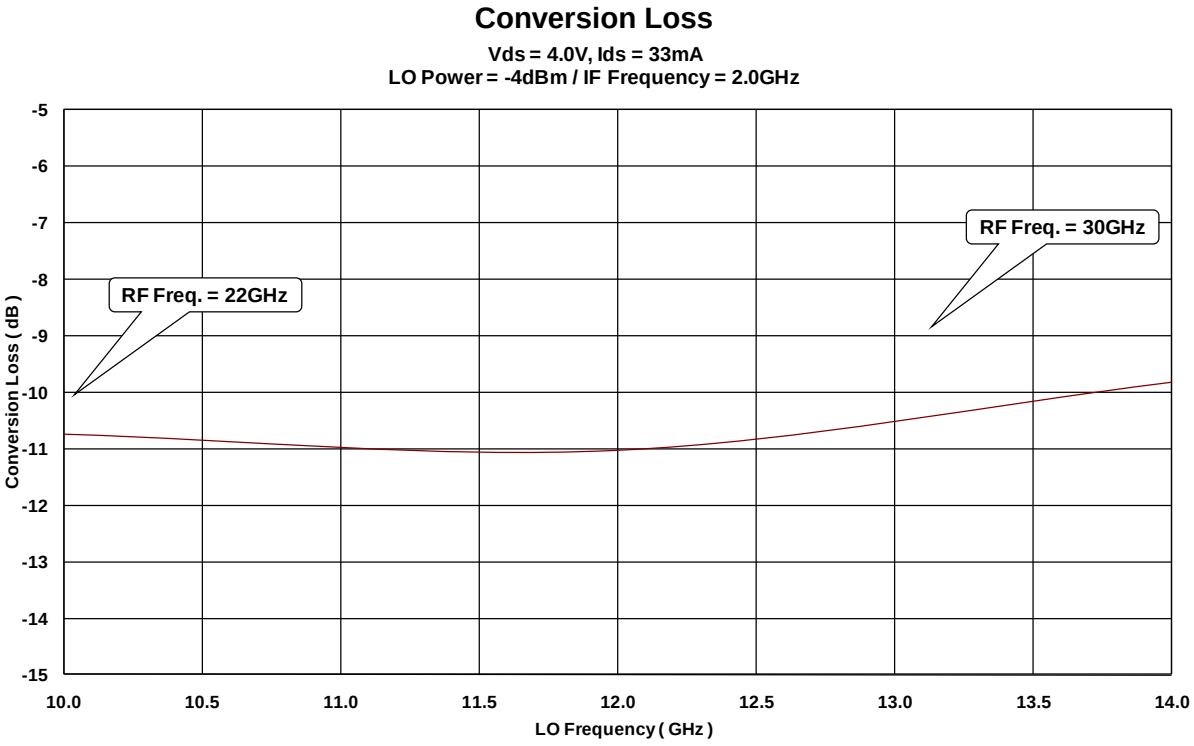
Typical on wafer Measurements

Local oscillator input power: LO = -4dBm





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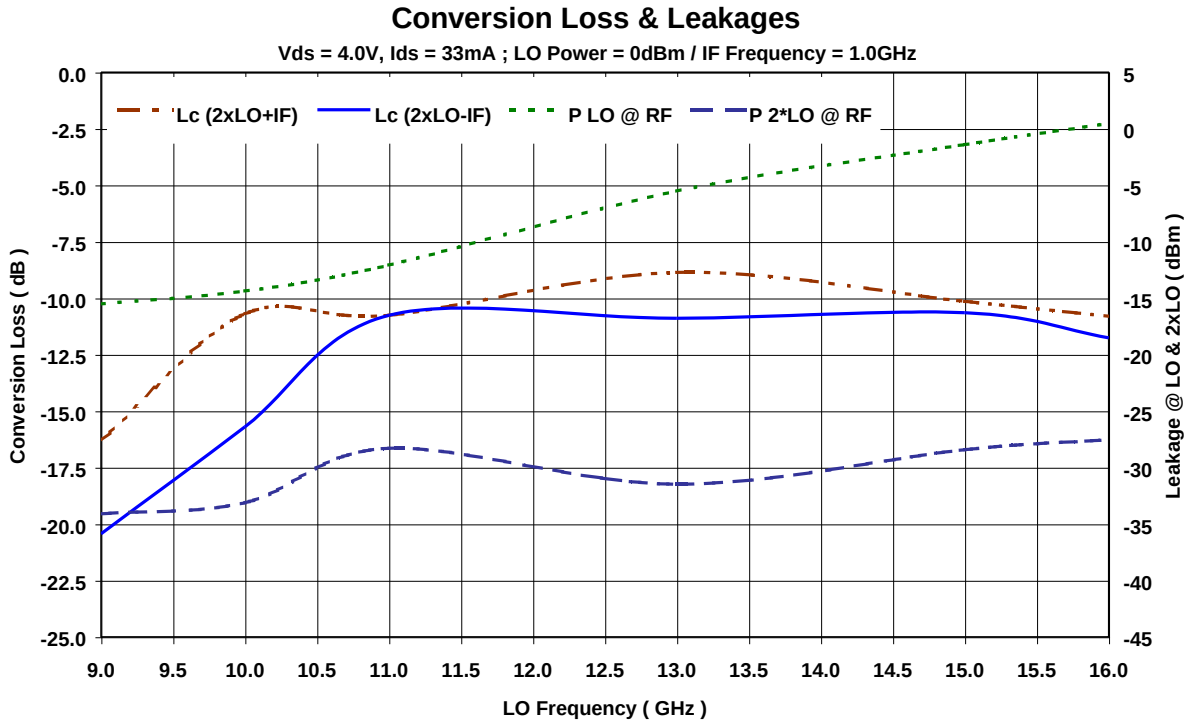
Typical on wafer Measurements

Local oscillator input power: LO = 0dBm



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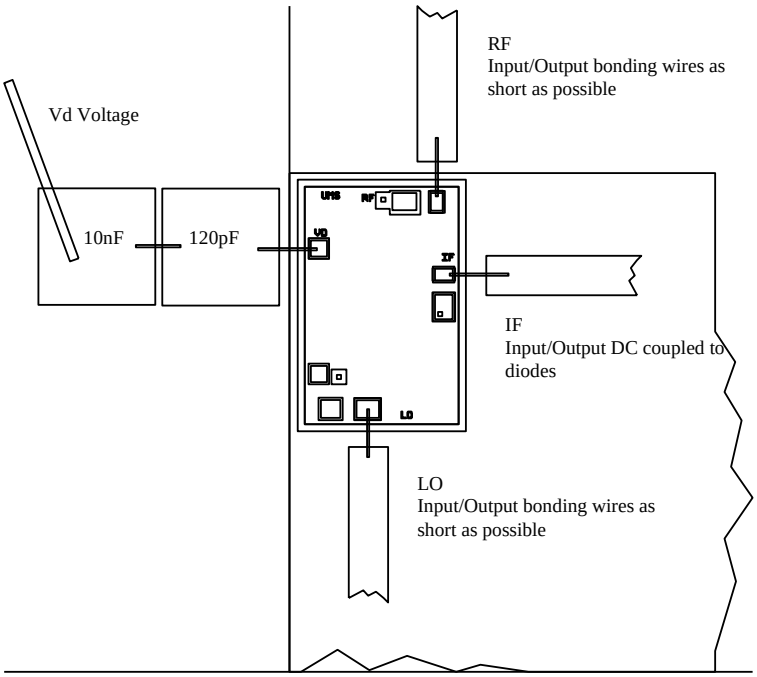
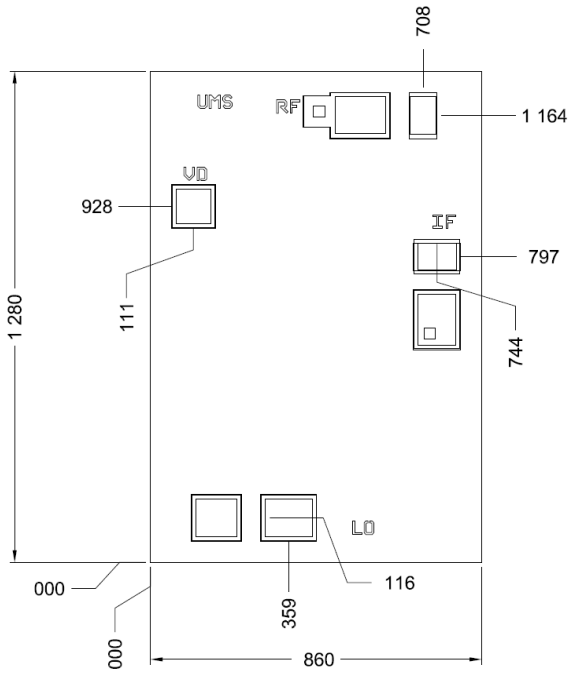
Chip Assembly and Mechanical Data



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



UNITS : µm
Tol : ±35µm

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

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Recommended ESD management

Refer to the application note AN0020 available at http://www.ums-gaas.com for ESD sensitivity and handling recommendations for the UMS products.

Recommended environmental management

UMS products are compliant with the regulation in particular with the directives RoHS N°2011/65 and REACh N°1907/2006. More environmental data are available in the application note AN0019 also available at http://www.ums-gaas.com.

Ordering Information

Chip form:	CHM1290-99F/00

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