

20-30GHz Sub-Harmonic Mixer

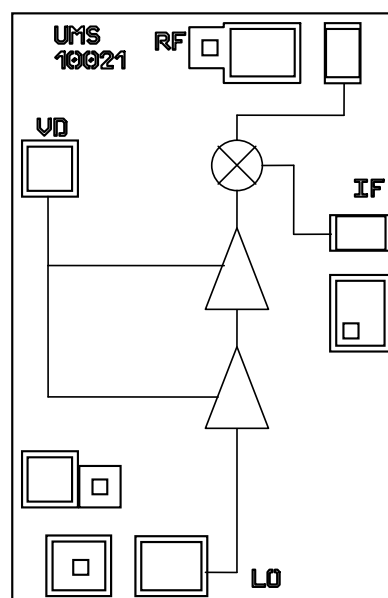
GaAs Monolithic Microwave IC

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, 0.25 μ m 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

Electrical Characteristics

T_{amb.} = +25°C, V_d = +4.0V, I_d = 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		
V _d	DC voltage		4.0		V
I _d	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⁾

T_{amb.} = +25°C

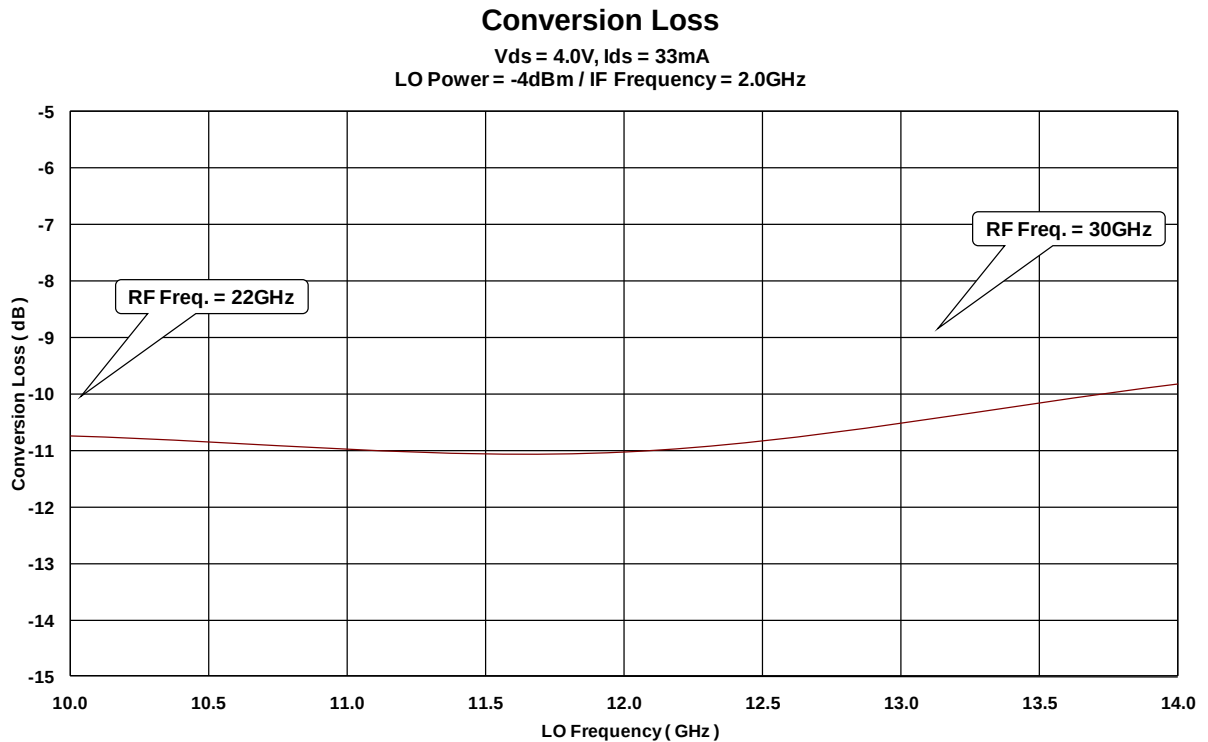
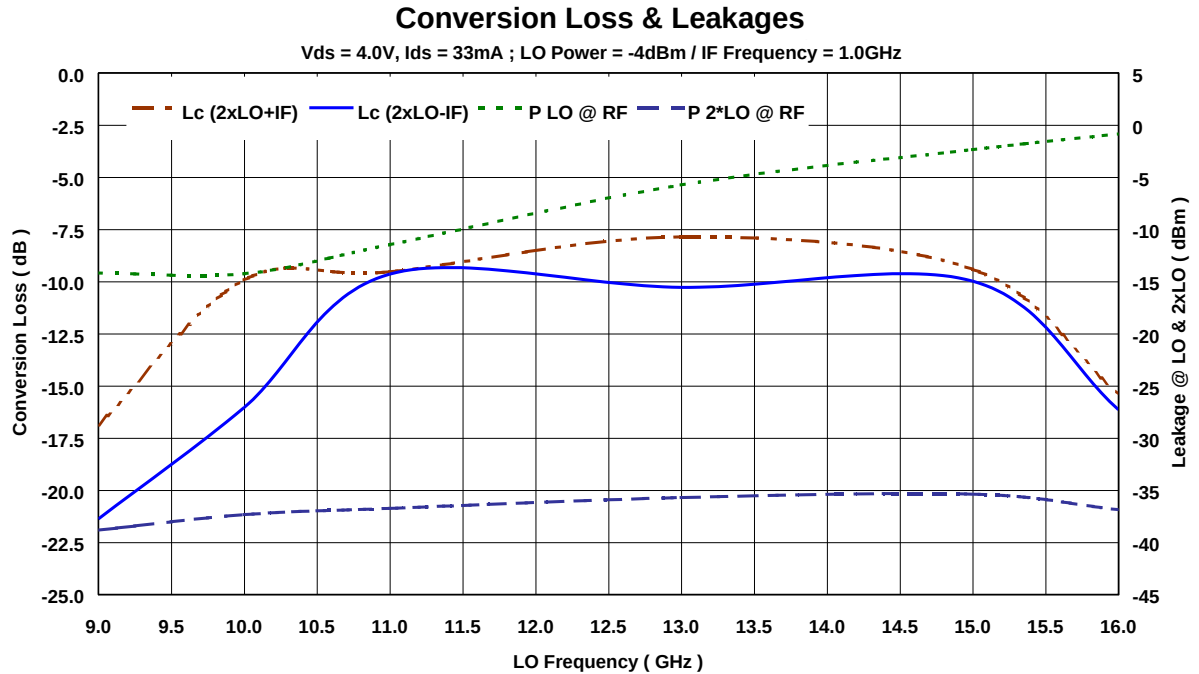
Symbol	Parameter	Values	Unit
V _d	Drain bias voltage	5.0	V
I _d	Drain bias current	50	mA
P _{in}	Maximum peak input power overdrive ⁽²⁾	10	dBm
T _a	Operating temperature range	-40 to +85	°C
T _{stg}	Storage temperature range	-55 to +150	°C

⁽¹⁾ Operation of this device above any one of these parameters may cause permanent damage.

⁽²⁾ Duration < 1s.

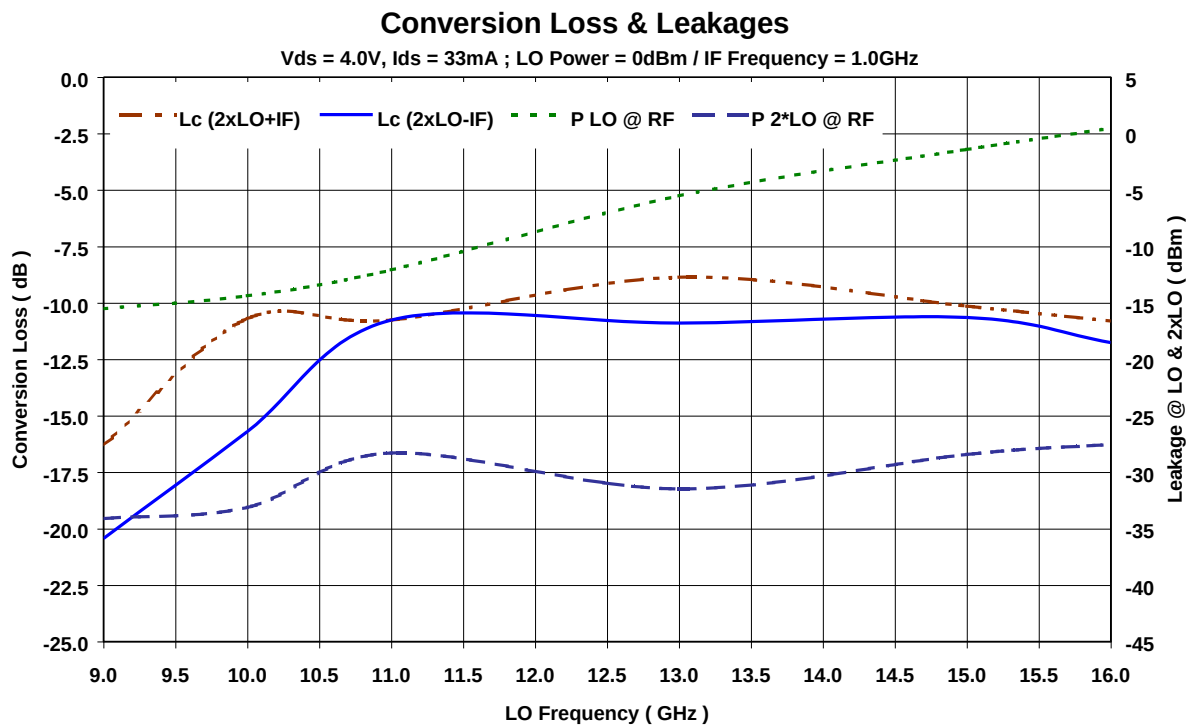
Typical on wafer Measurements

Local oscillator input power: LO = -4dBm

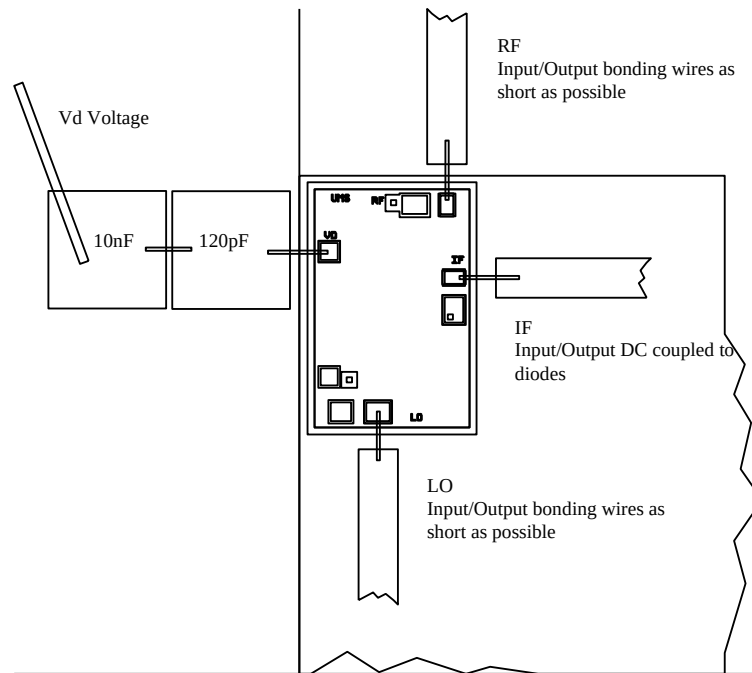


Typical on wafer Measurements

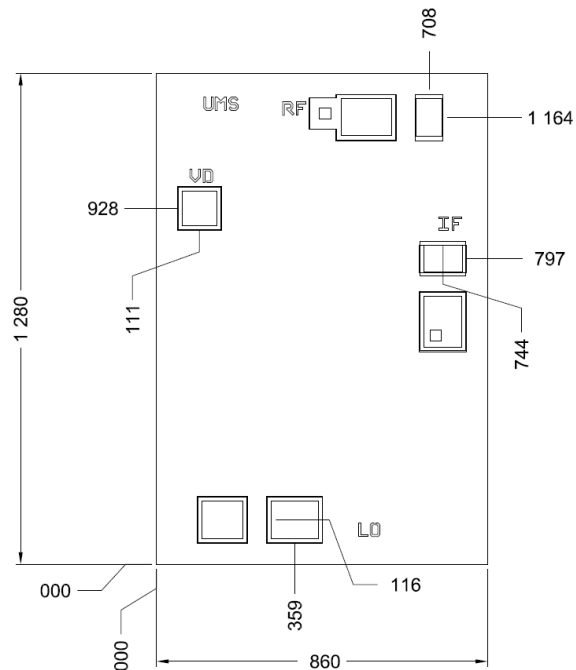
Local oscillator input power: LO = 0dBm



Chip Assembly and Mechanical Data



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



UNITS : μ m
Tol : $\pm 35\mu$ m

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

Recommended ESD management

Refer to the application note AN0020 available at <https://www.ums-rf.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 <https://www.ums-rf.com>.

Ordering Information

Chip form: CHM1290-99F/00

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