

K-Band Mixer

GaAs Monolithic Microwave IC

Preliminary

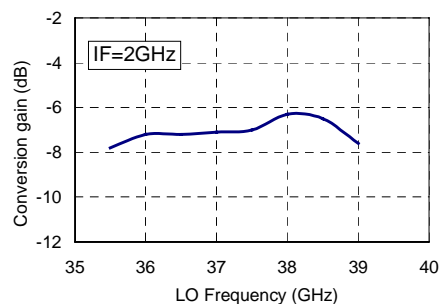
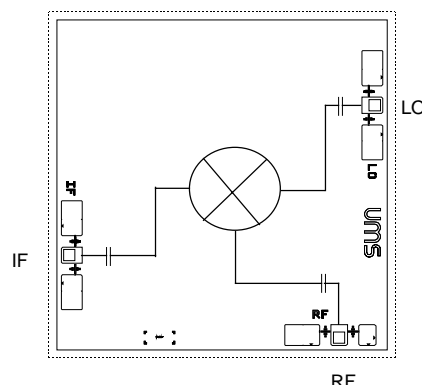
Description

The CHM1193 is a balanced Schottky diode mixer based on a six quarter wave ring structure. It could be use in receiver or transmitter part.

This circuit is manufactured with the Schottky diode process : 1 μ m Schottky diode device, air bridges, via holes through the substrate, stepper lithography.

It is available in chip form.

An electrically identical chip with a mirror drawing versus de LO side is available under the part number CHM1192. These two MMICs could be helpful in a TX, RX architecture module.



Typical conversion characteristic
(measurement in test fixture)

Main Features

- 36-38 GHz LO frequency range
- IF from 1 to 3 GHz
- Low conversion loss up & down
- High LO/RF isolation
- Low LO input power
- Small chip size: 1.53 x 1.53 x 0.10 mm

Main Characteristics

Tamb. = 25°C

Symbol	Parameter	Typ	Unit
F_LO,	LO frequency range	36-38	GHz
F_IF	IF frequency range	1 - 3	GHz
Lc	Conversion loss	7	dB
I_LO/RF	LO/RF isolation	30	dBc

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

Electrical CharacteristicsT_{amb.} = 25°C

Symbol	Parameter	Min	Typ	Max	Unit
F_LO	LO frequency range	36		38	GHz
F_IF	IF frequency range	1		3	GHz
Lc	Conversion loss @ P_LO=7dBm (1)		7		dB
P_LO	LO input power	5	7	9	dBm
P-1dB	Input power for 1dB compression @ P_LO = 9dBm		0		dBm
VSWR_LO	LO port VSWR (50Ω) (2)		2.5:1		
VSWR_RF	RF port VSWR (50Ω) (2)		2.5:1		
VSWR_IF	IF port VSWR (50Ω) (2)		2.5:1		
I_LO/RF	LO/RF isolation		30		dBc

(1) On wafer measurements.

(2) Depends on the wire bonding conditions and on the external matching network.

Absolute Maximum Ratings (3)T_{amb} = +25°C

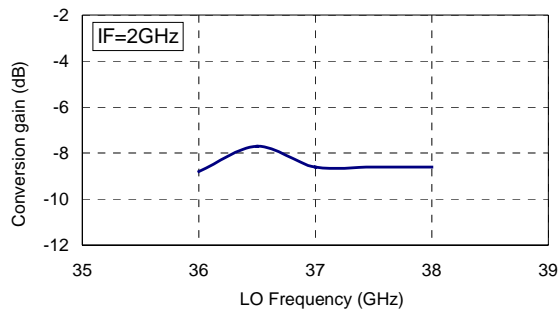
Symbol	Parameter	Values	Unit
P_LO	Maximum peak input power overdrive at LO port (4)	10	dBm
P_RF	Maximum peak input power overdrive at RF port (4)	10	dBm
P_IF	Maximum peak input power overdrive at IF port (4)	10	dBm
Top	Operating temperature range	-40 to +85	°C
Tstg	Storage temperature range	-55 to +125	°C

(3) Operation of this device above anyone of these parameters may cause permanent damage.

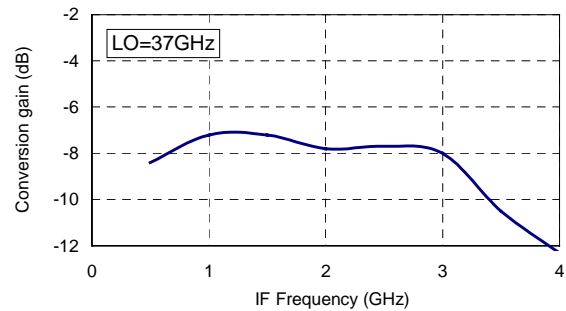
(4) Duration < 1s

Typical test fixture measurements

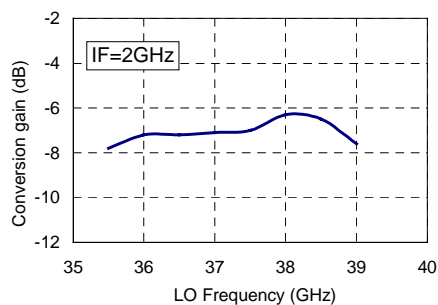
Tamb. = 25°C

A) Down- converter

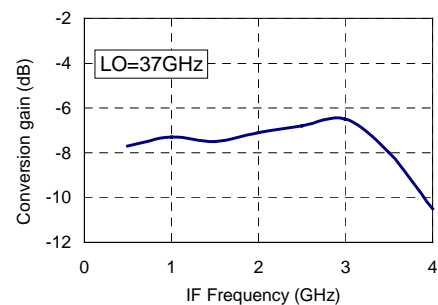
Conversion gain versus LO frequency
LO Input power= 9dBm



Conversion gain versus IF frequency
LO Input power= 9dBm

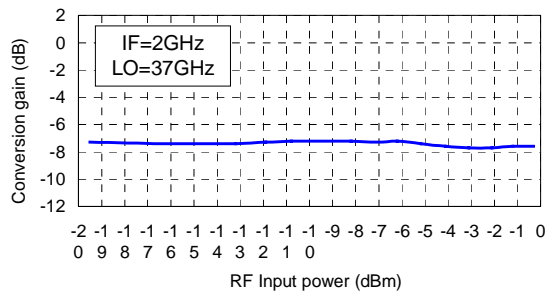
B) Up- converter

Conversion gain versus LO frequency
LO Input power= 9dBm

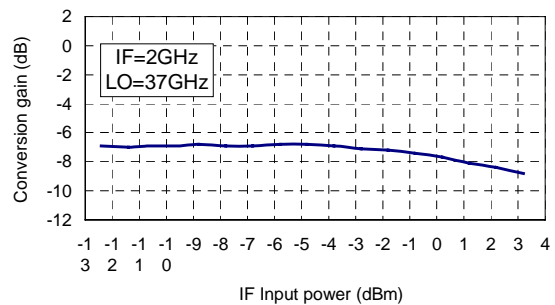


Conversion gain versus IF frequency
LO Input power= 9dBm

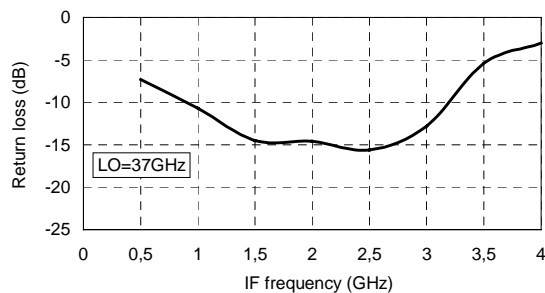
C) Compression point and Return loss



Input compression point versus RF power
LO Input power= 9dBm



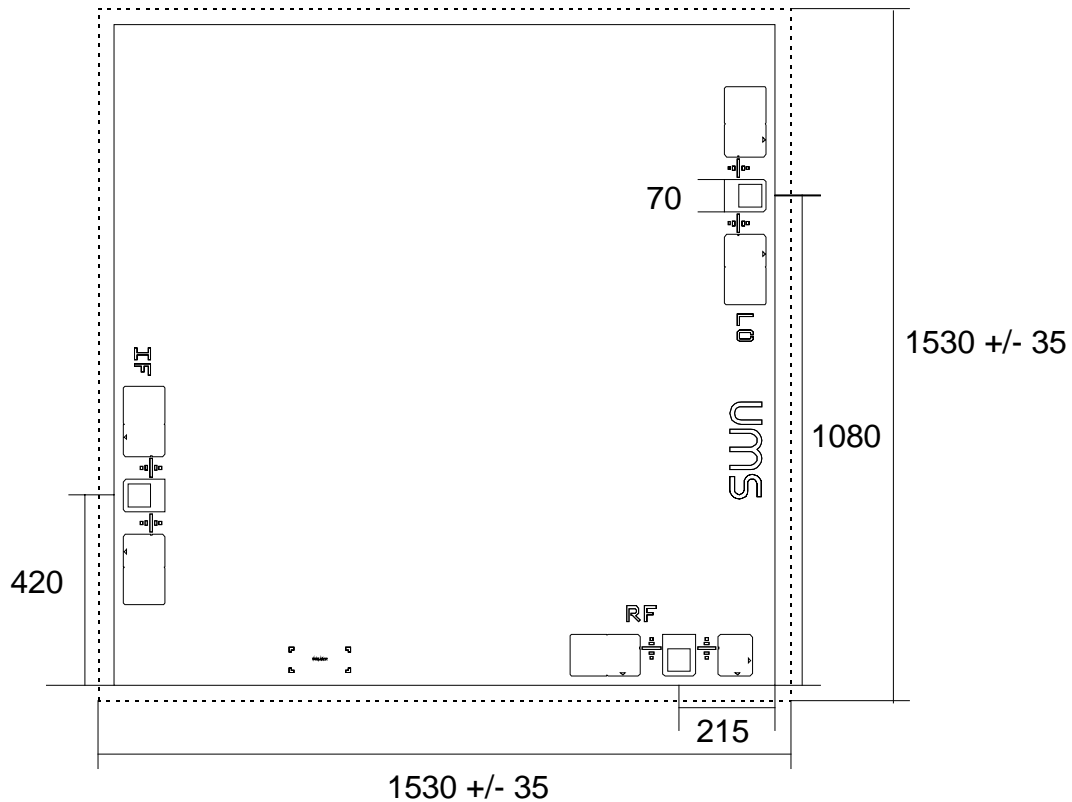
Input compression point versus IF power
LO Input power= 9dBm



IF Return loss
LO input power = 9dBm

Chip Mechanical Data

(dimensions are in μm)

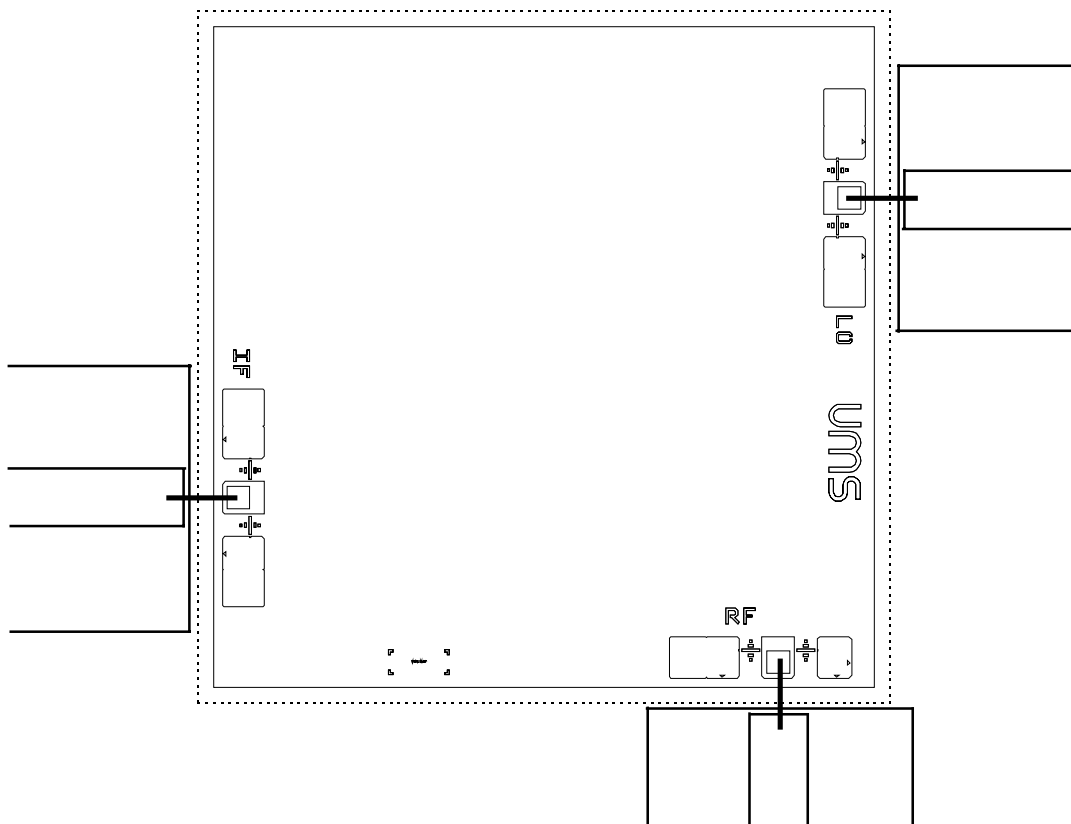


Chip size (including saw streets) : $1530 \times 1530 \pm 35 \mu\text{m}$
 Thickness: $100 \mu\text{m} \pm 10 \mu\text{m}$

Pin	Description
LO	LO input signal
RF	RF input or output signal
IF	IF input or output signal

An electrically identical chip with a mirror drawing versus the LO side is available under the part number CHM1192.

Bonding diagram



Ordering Information

Chip form : CHM1193-99F/00

Information furnished is believed to be accurate and reliable. However **United Monolithic Semiconductors S.A.S.** assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of **United Monolithic Semiconductors S.A.S.**. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. **United Monolithic Semiconductors S.A.S.** products are not authorised for use as critical components in life support devices or systems without express written approval from **United Monolithic Semiconductors S.A.S.**