

## K-Band Mixer

### GaAs Monolithic Microwave IC

*Preliminary*

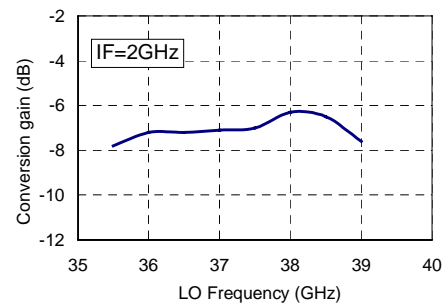
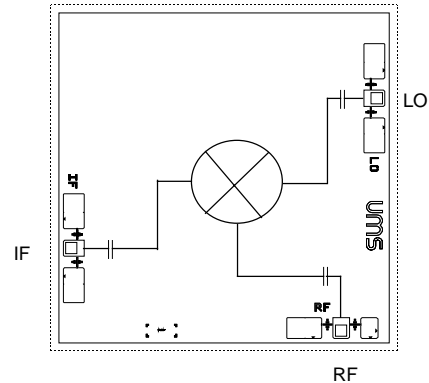
### Description

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  $\mu$ 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 Characteristics

Tamb. = 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)

Tamb = +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

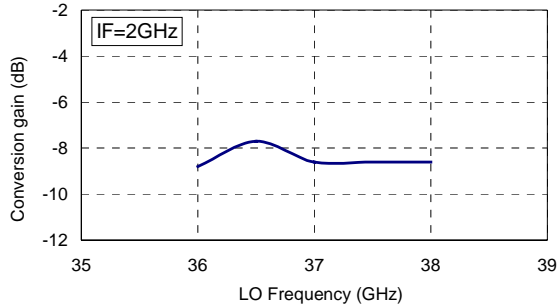
(3) Operation of this device above anyone of these parameters may cause permanent damage.

(4) Duration < 1s

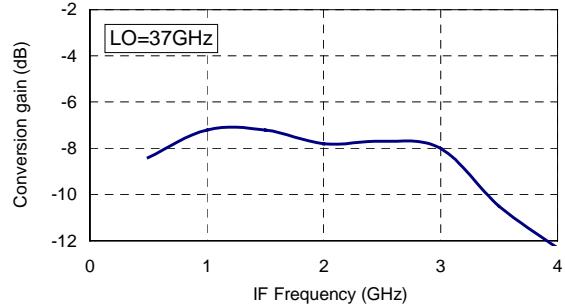
**Typical test fixture measurements**

Tamb. = 25°C

**A) Down- converter**

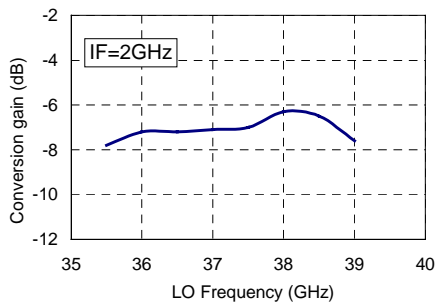


Conversion gain versus LO frequency  
LO Input power= 9dBm

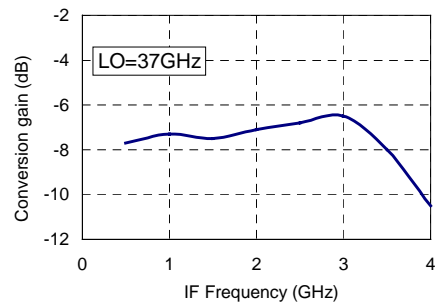


Conversion gain versus IF frequency  
LO Input power= 9dBm

**B) Up- converter**

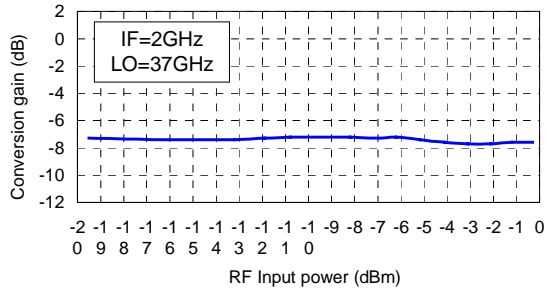


Conversion gain versus LO frequency  
LO Input power= 9dBm

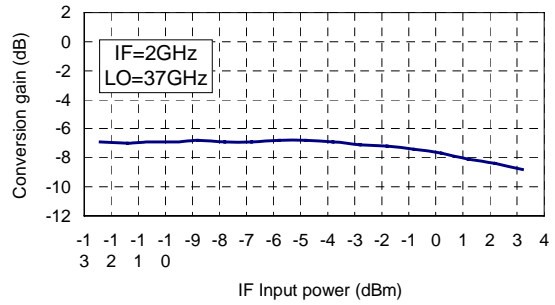


Conversion gain versus IF frequency  
LO Input power= 9dBm

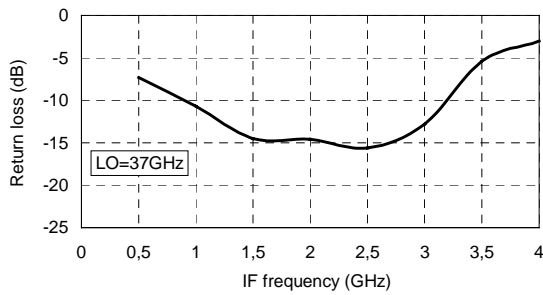
## C) Compression point and Return loss



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



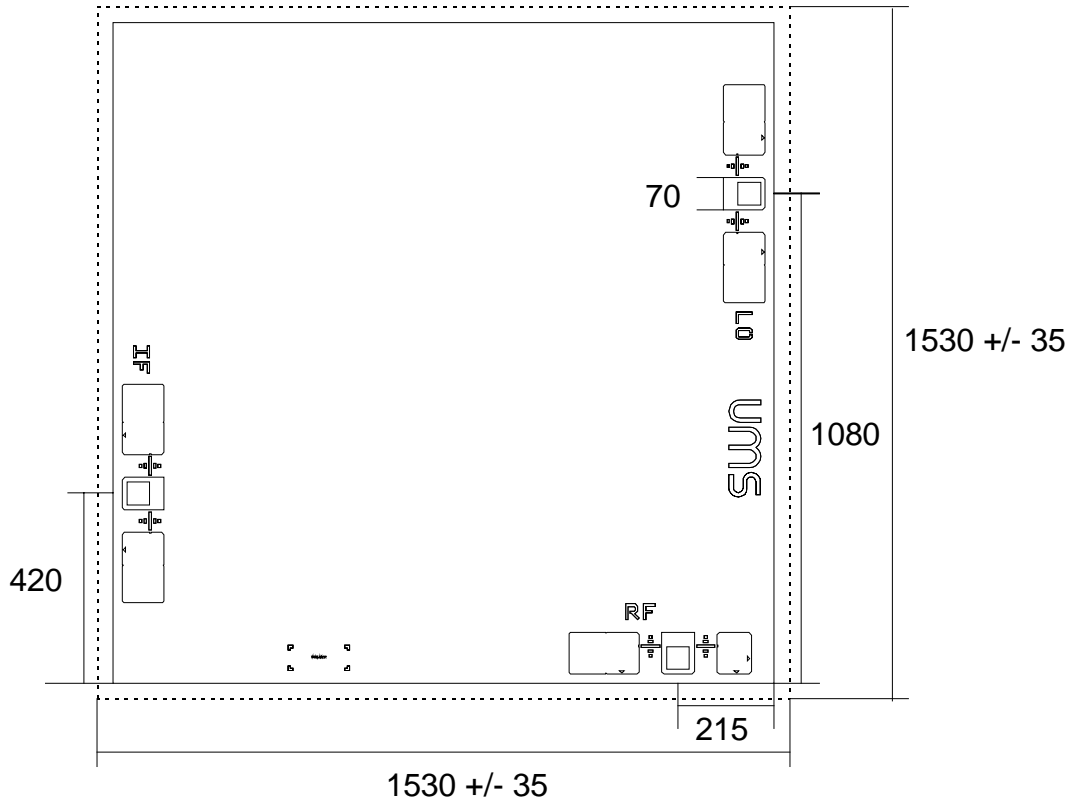
Input compression point versus IF power  
LO Input power= 9dBm



IF Return loss  
LO input power = 9dBm

**Chip Mechanical Data**

(dimensions are in  $\mu\text{m}$ )

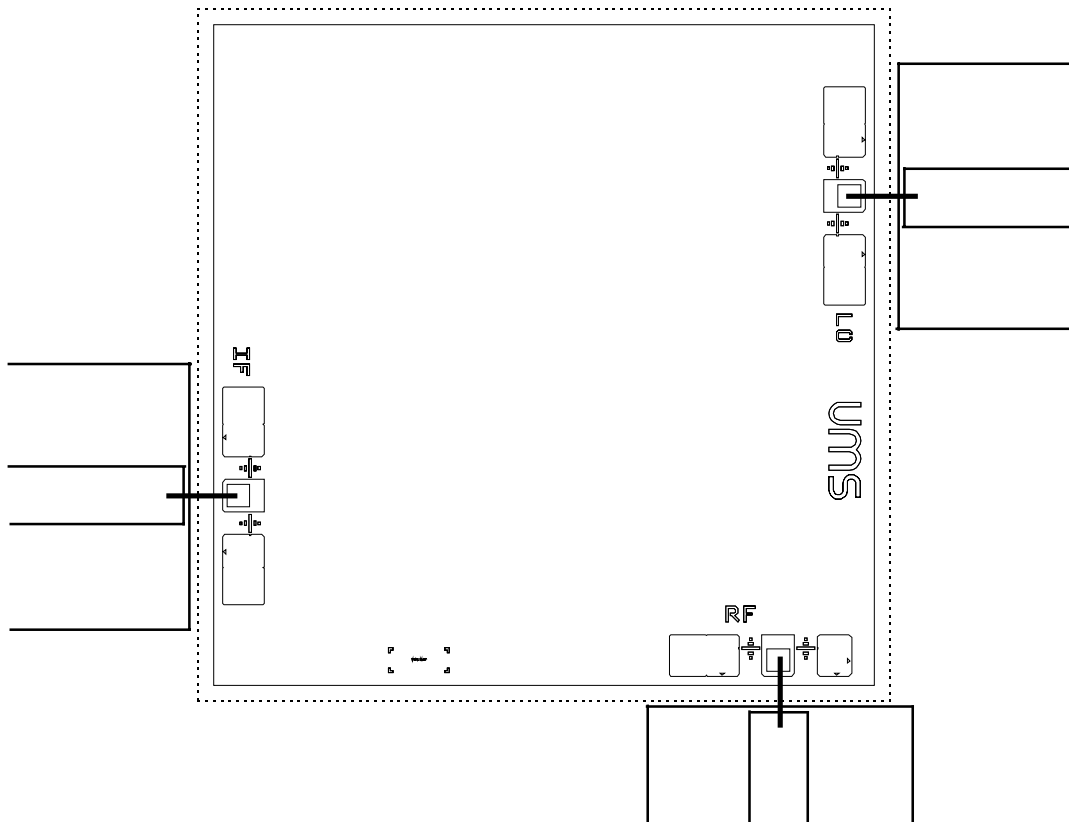


Chip size (including saw streets) :  $1530 \times 1530 \pm 35\mu\text{m}$   
 Thickness:  $100\mu\text{m} \pm 10\mu\text{m}$

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 de LO side is available under the part number CHM1192.

## Bonding diagram



## Ordering Information

Chip form : CHM1193-99F/00

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