

## 21-26.5GHz Integrated Down converter

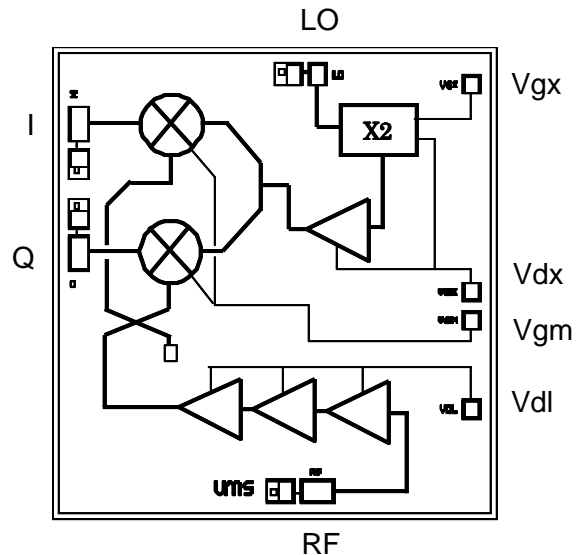
### GaAs Monolithic Microwave IC

#### Description

The CHR3693 is a multifunction chip, which integrates a balanced cold FET mixer, a time two multiplier, and a RF self biased LNA. It is designed for a wide range of applications, typically commercial communication systems. The backside of the chip is both RF and DC grounded. This helps to simplify the assembly process.

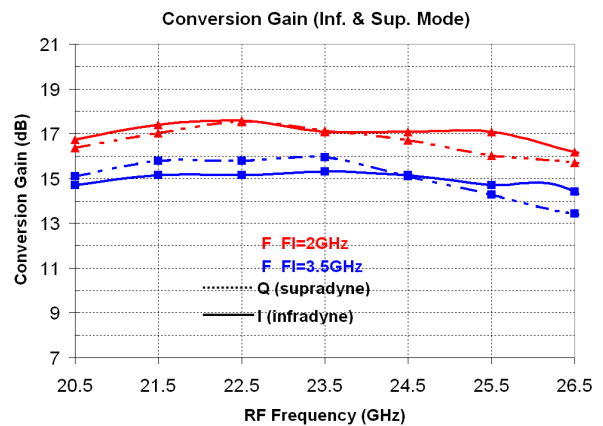
The circuit is manufactured with a pHEMT process, 0.25 $\mu$ m gate length, via holes through the substrate and air bridges.

It is supplied in chip form.



#### Main Features

- Broadband performance 21-26.5GHz
- 18dB gain
- -7dBm input IP3
- 18dB image rejection
- DC power consumption: 4V, 160mA
- Chip size: 2,45 x 2,45 x 0,1mm



#### Main Characteristics

Tamb=25°C, Vd=4V

Symbol	Parameter	Min	Typ	Max	Unit
F <sub>RF</sub>	RF frequency range	21		26.5	GHz
F <sub>LO</sub>	LO frequency range	9		14	GHz
F <sub>IF</sub>	IF frequency range	DC		3.5	GHz
G <sub>C</sub>	Conversion gain	11	15	19	dB

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

## Electrical Characteristics

Tamb=25°C, Vdx=Vdl = +4V, Vgx=-0.9V, Vgm=-0.7V  
 With external I/Q 90° hybrid coupler

Symbol	Parameter	Min	Typ	Max	Unit
F <sub>RF</sub>	RF frequency range	21		26.5	GHz
F <sub>LO</sub>	LO frequency range	9		14	GHz
F <sub>IF</sub>	IF frequency range	DC		3.5	GHz
G <sub>c</sub>	Conversion gain	11	15	19	dB
NF	Noise Figure		3.2	3.4	dB
P <sub>LO</sub>	LO Input power		2	5	dBm
Img Sup	Image Suppression	15	18		dBc
IIP3	Input IP3		-7		dBm
LO RL	LO return loss		-9.5	-7	dB
RF RL	RF return loss (21 to 24GHz)		-9.5	-7	dB
	RF return loss (24 to 26.5GHz)		-8	-6	dB
I <sub>d</sub>	Bias current (1) (I <sub>dl</sub> + I <sub>dx</sub> )	120	160	200	mA

(1) Typically, I<sub>dl</sub>= 90mA, I<sub>dx</sub>=70mA

## Absolute Maximum Ratings (1)

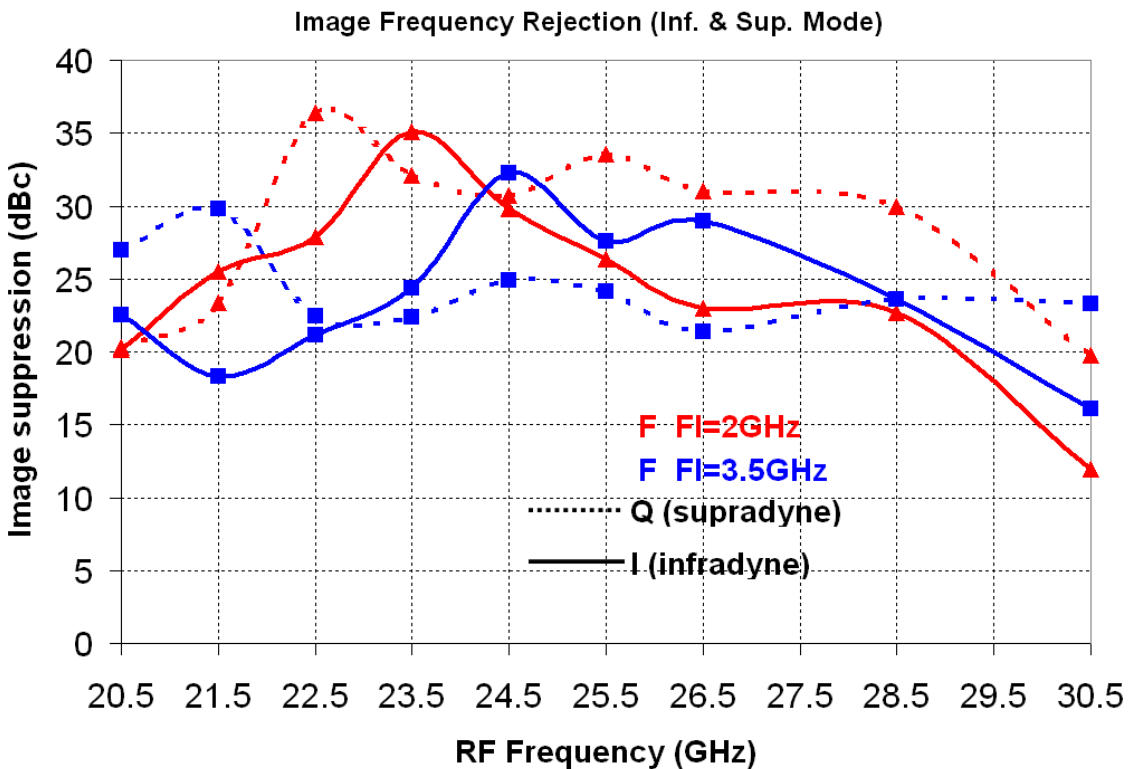
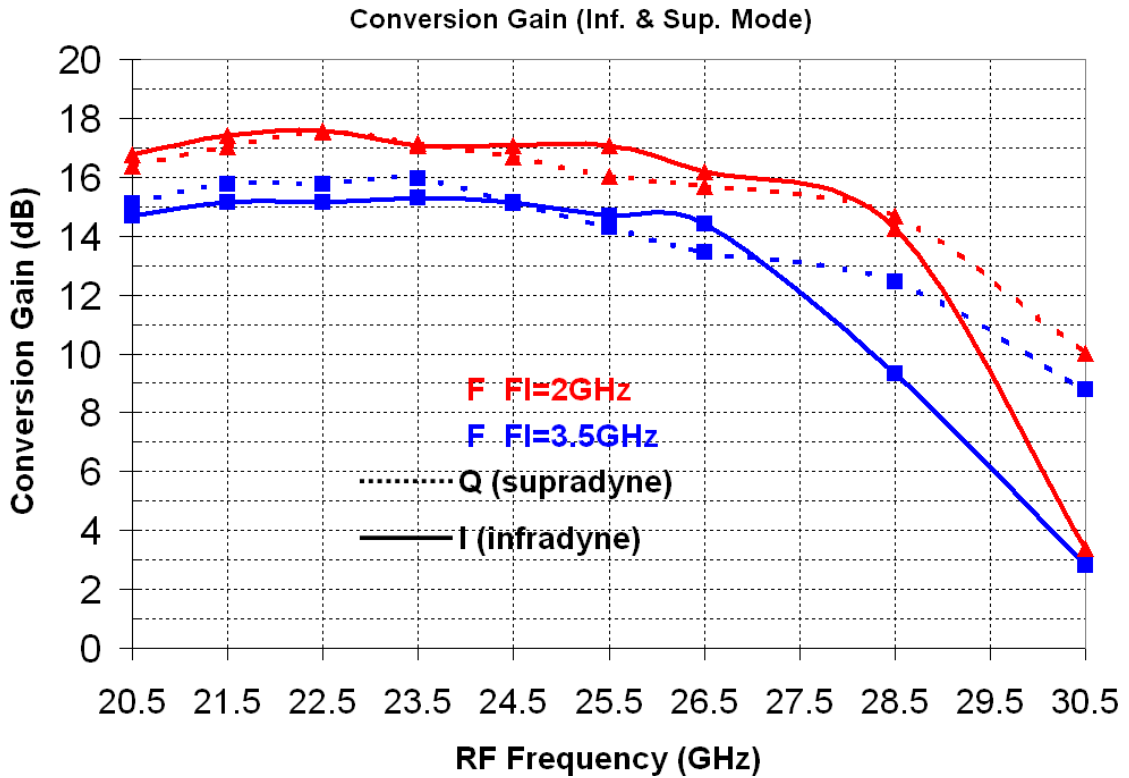
Tamb=+25°C

Symbol	Parameter	Values	Unit
V <sub>d</sub>	Maximum drain bias voltage	4.5	V
I <sub>d</sub>	Maximum drain bias current	230	mA
V <sub>g</sub>	Gate bias voltage	-2.0 to +0.4	V
P <sub>RF</sub>	Maximum RF input power	10	dBm
P <sub>LO</sub>	Maximum LO input power	10	dBm
T <sub>ch</sub>	Maximum channel temperature	175	°C
T <sub>a</sub>	Operating temperature range	-40 to +85	°C
T <sub>stg</sub>	Storage temperature range	-55 to +125	°C

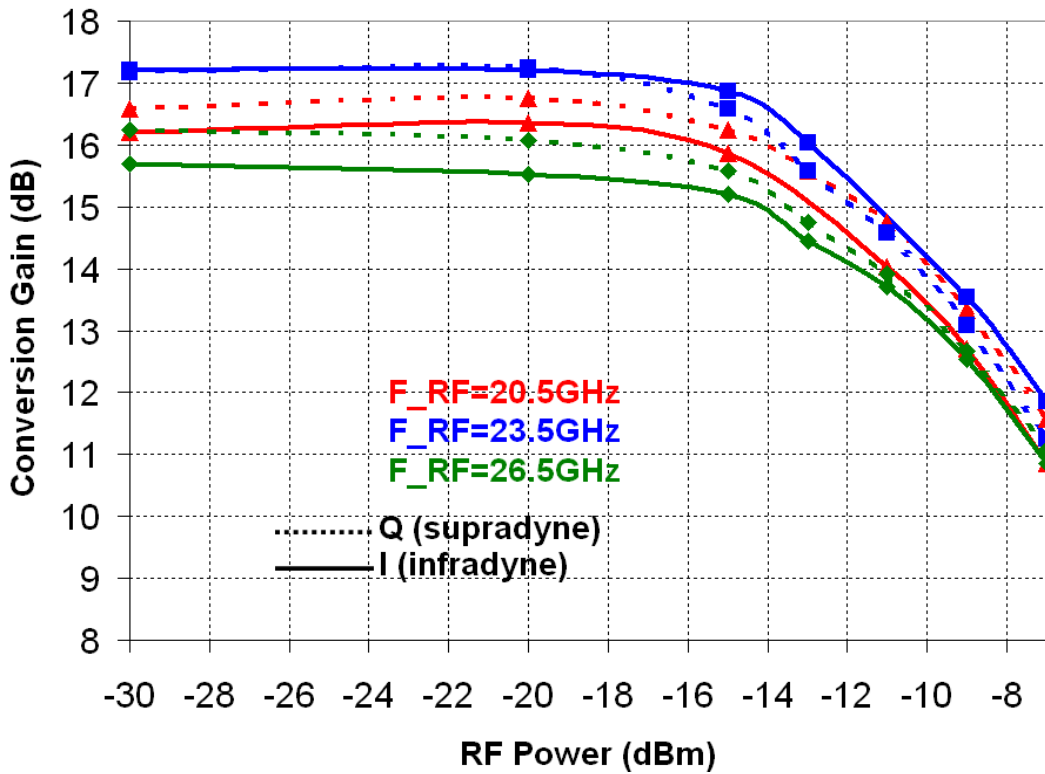
(1) Operation of this device above any one of these parameters may cause permanent damage.

Typical On-Wafer Measured Performance

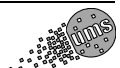
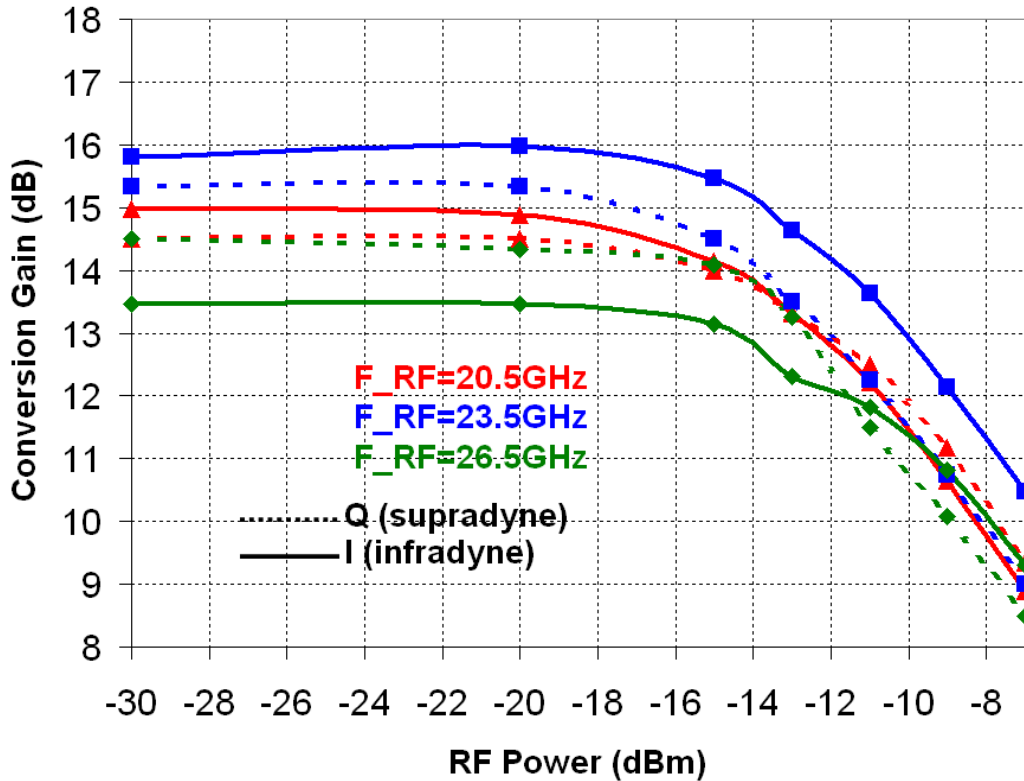
Tamb=25°C, Vdx=Vdl=4V, Typical Vgx=-0.9V & Vgm=-0.7 V



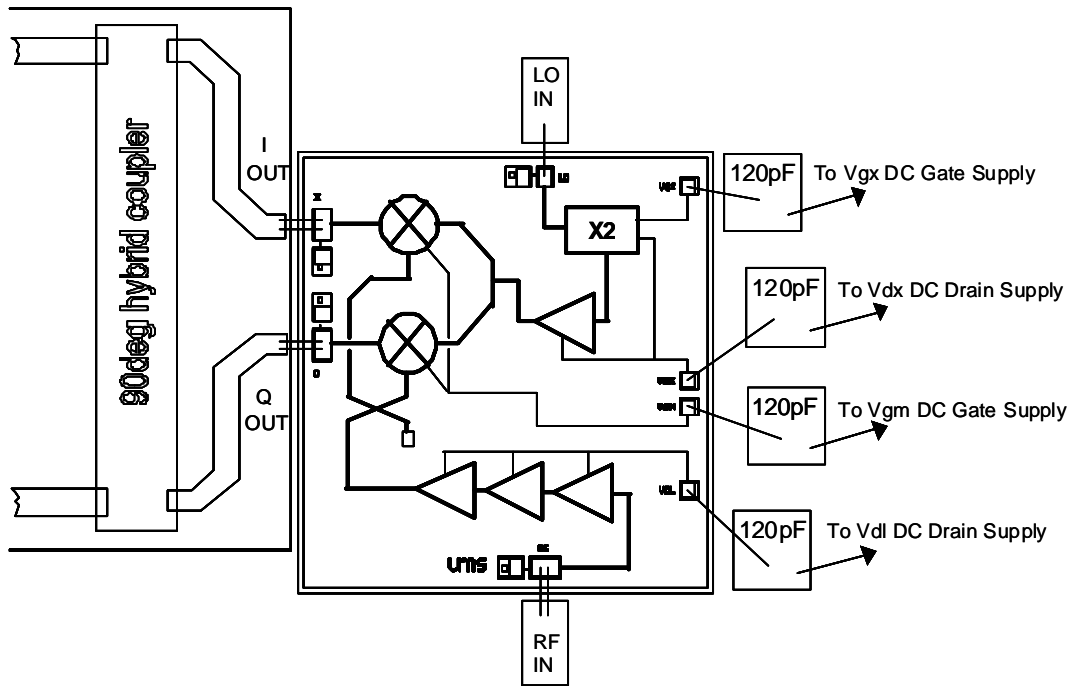
Compression vs RF Power (Inf. & Sup. Mode) @ F\_IF=2GHz



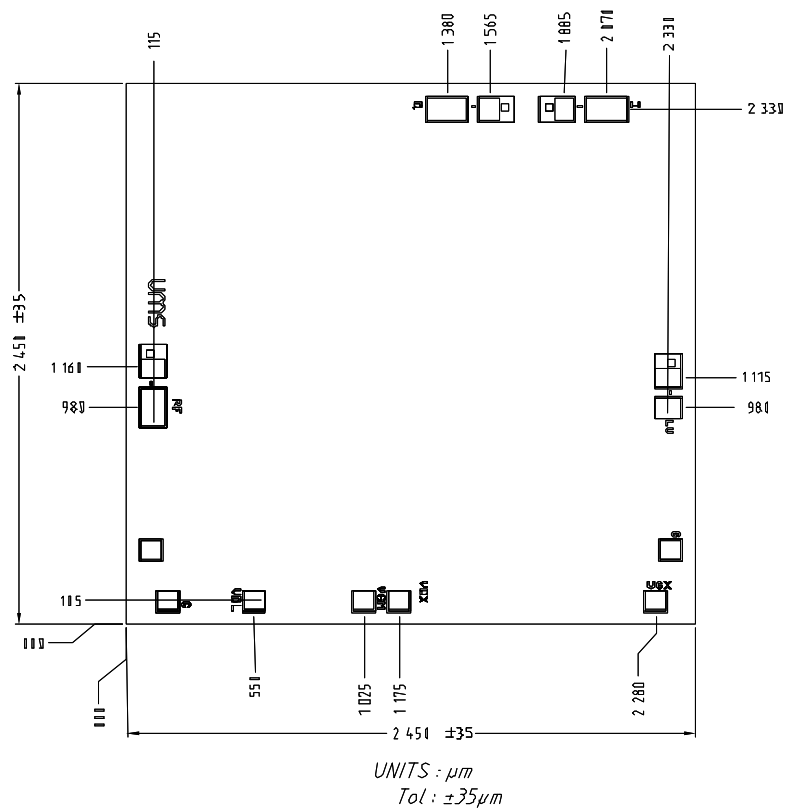
Compression vs RF Power (Inf. & Sup. Mode) @ F\_IF=3.5GHz



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)

## Ordering Information

Chip form:           CHR3693-99F/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.**