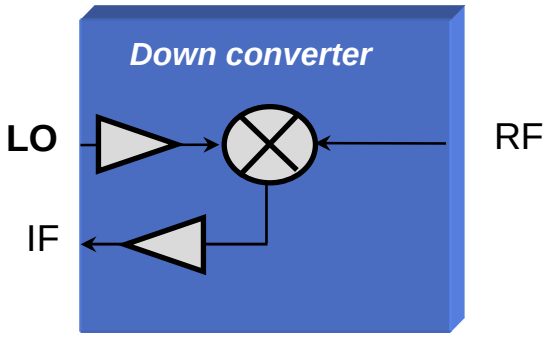
36-44GHz Multifunction Down-Converter

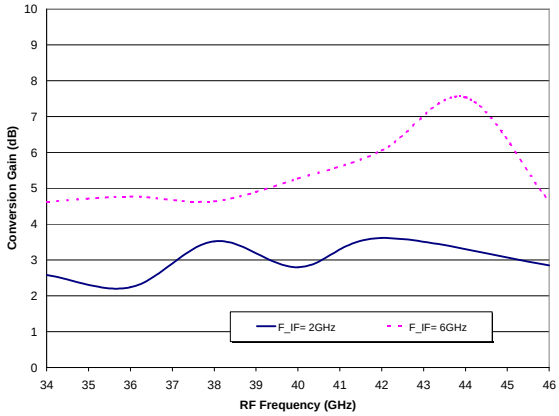
GaAs Monolithic Microwave IC

Description

The CHR2297 is a multifunction chip (MFC) which integrates a LO buffer amplifier, an IF amplifier and a single cold FET mixer. It is usable for down-conversion. It is designed for a wide range of applications, from military to commercial communication systems. The backside of the chip is both RF and DC grounds. This helps to 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.



Conversion Gain



Main Features

- Broadband performance: 36-44GHz
- 2.5dB conversion gain
- 0dBm LO input power
- +4dBm input power (1dB gain comp.)
- DC power consumption, 65mA @ 4V
- Chip size: 1.33x1.68x0.10mm

Main Characteristics

Tamb.=+25°C

Symbol	Parameter	Min	Typ	Max	Unit
F_{RF}	RF frequency range	36		44	GHz
F_{LO}	LO frequency range	30		39	GHz
F_{IF}	IF frequency range	2		6	GHz
G_c	Conversion Gain		2.5		dB

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

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Electrical Characteristics

Tamb=+25℃

Symbol	Parameter	Min	Typ	Max	Unit
F_{RF}	RF frequency range	36		44	GHz
F_{LO}	LO frequency range	30		39	GHz
F_{IF}	IF frequency range	2		6	GHz
G_c	Conversion Gain		2.5		dB
P_{LO}	LO Input power		0		dBm
LO_IF Lk	LO Leakage on IF (for P_{LO}=0dBm)		-28		dBm
LO_RF Lk	LO Leakage on RF (for P_{LO}=0dBm)		-22		dBm
RF_IF Lk	RF Leakage on IF (for P_{RF}=-5dBm)		-50		dBm
P1dB	Input power at 1dB gain compression		+4		dBm
LO Match	LO Matching (1)		2.0:1		
RF Match	RF Matching (1)		2.0:1		
IF Match	IF Matching		2.0:1		
Vd	Drain bias voltage (pads Vd1, Vd2)		4		V
Vg	Gate bias voltage (pad Vg)		-1		V
Id	Drain bias current		65		mA

(1) A wire bond of typically 0.1 to 0.15 nH will improve the input and output matching.

Absolute Maximum Ratings (1)

Tamb = +25℃

Symbol	Parameter	Values	Unit
Vd	Drain bias voltage	4.5	V
Id	Drain bias current	100	mA
P_{LO}	Maximum LO input power	5	dBm
Ta	Operating temperature range	-40 to +85	℃
Tstg	Storage temperature range	-55 to +125	℃

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

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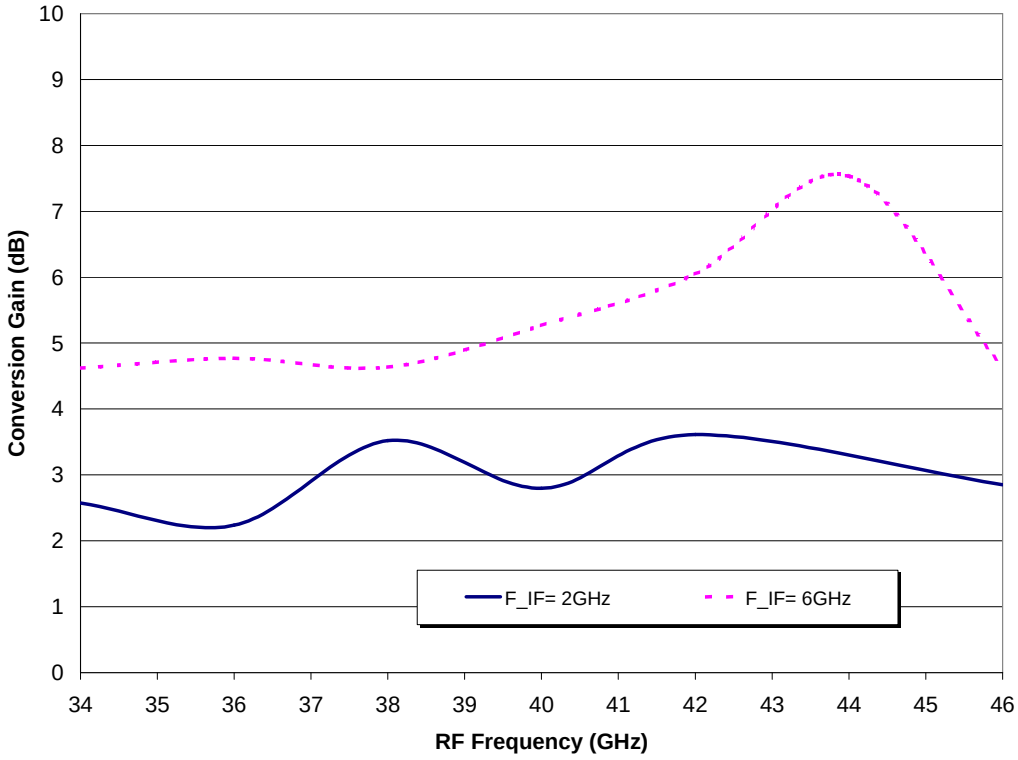
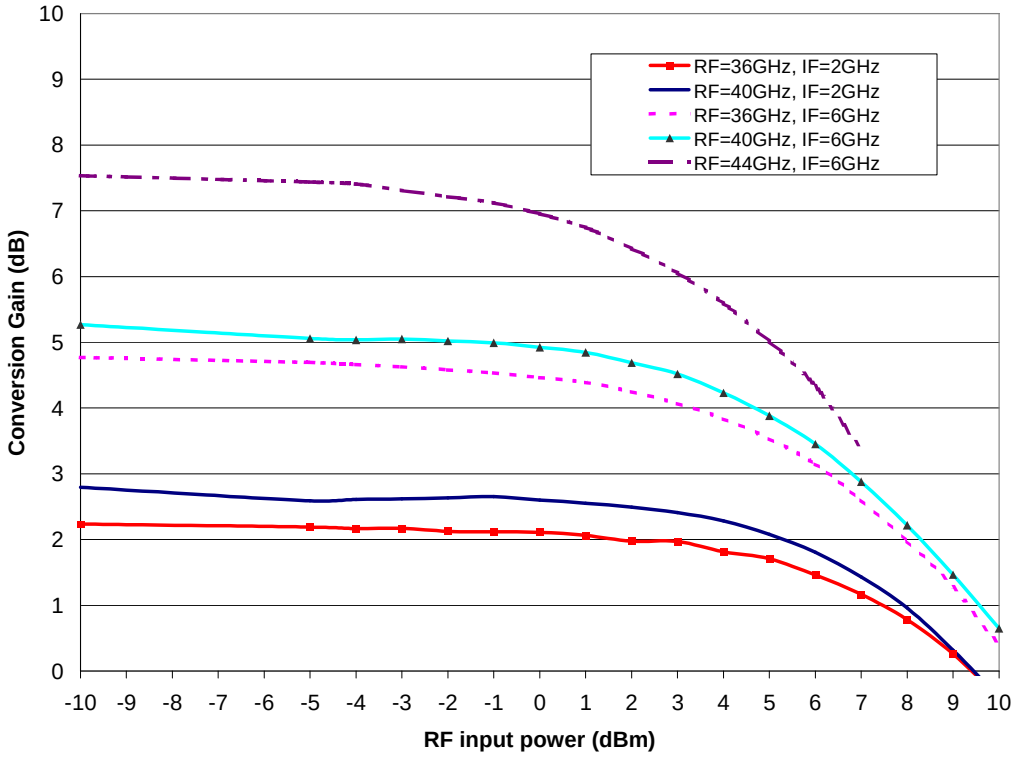
Typical on wafer measurement

Tamb: 25℃, Vd=4V, Vg= -1V, P_{LO}= 0dBm

Conversion gain versus RF frequency



Conversion gain versus RF input power



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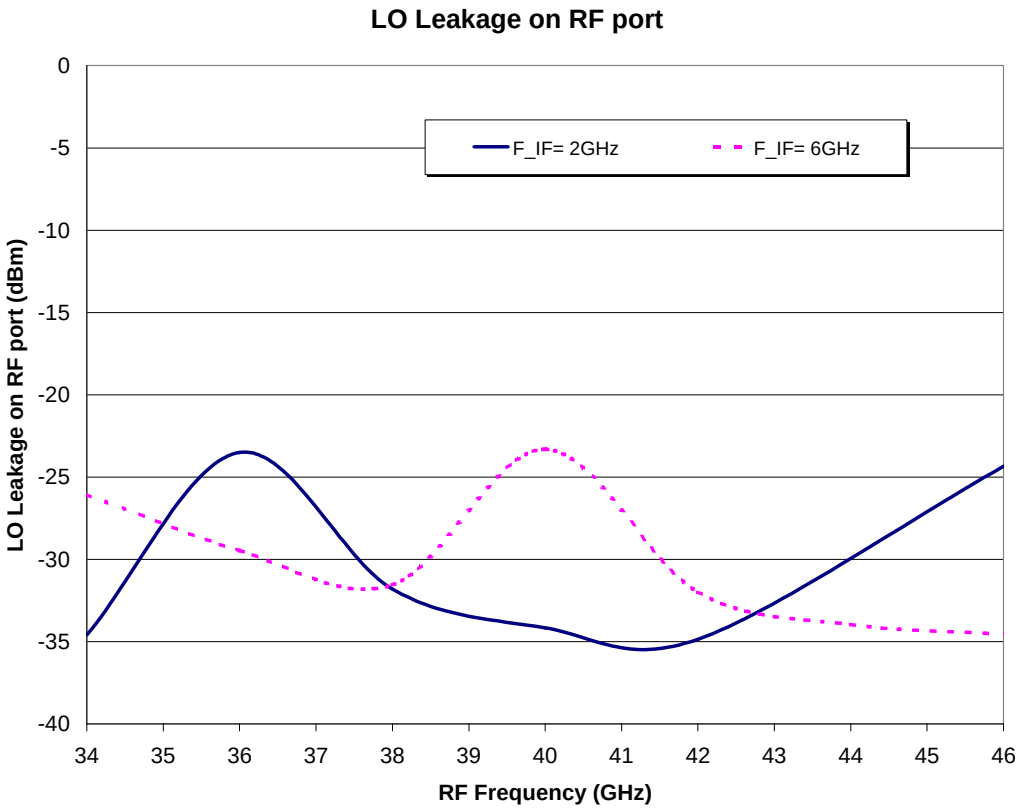

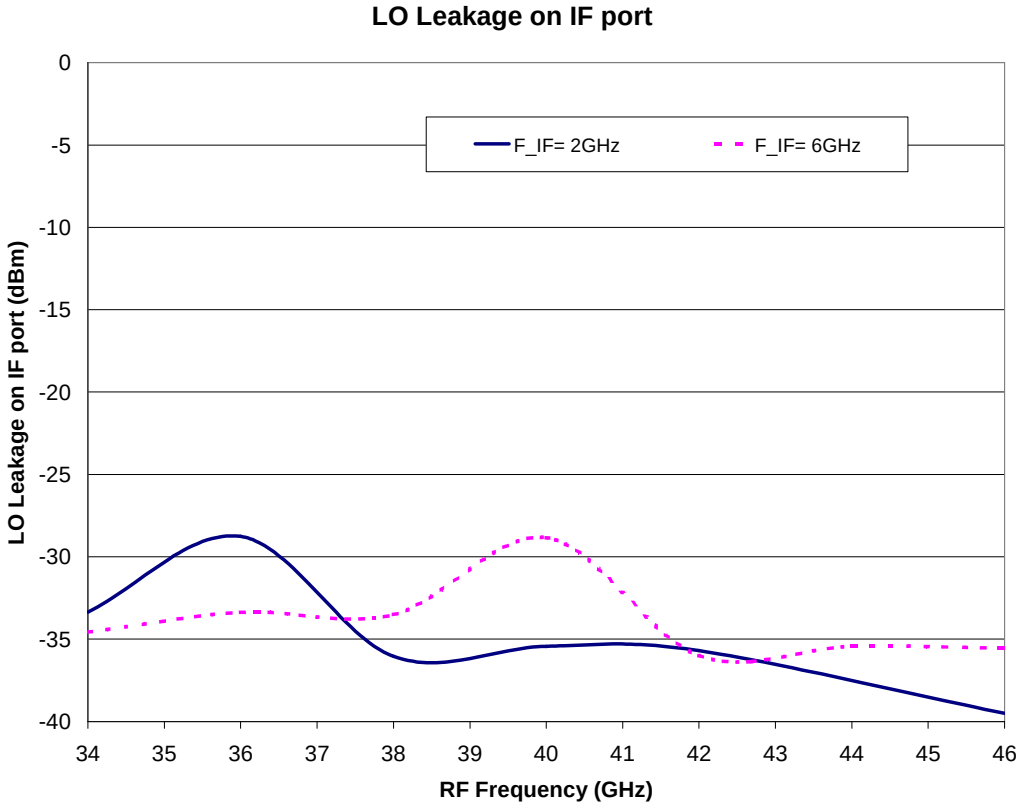

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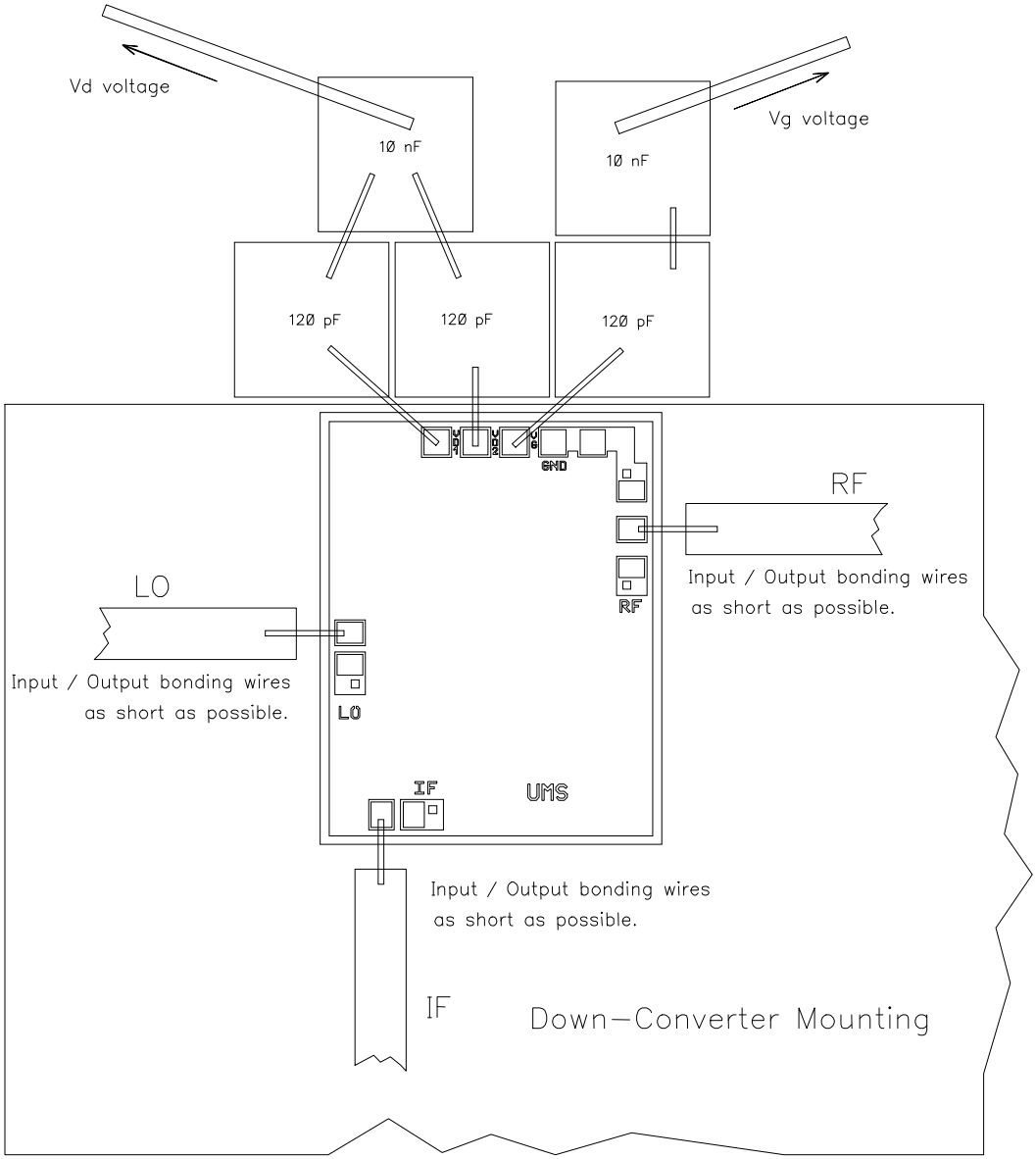
Recommanded assembly plan



25µm wedge bonding is recommended

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.

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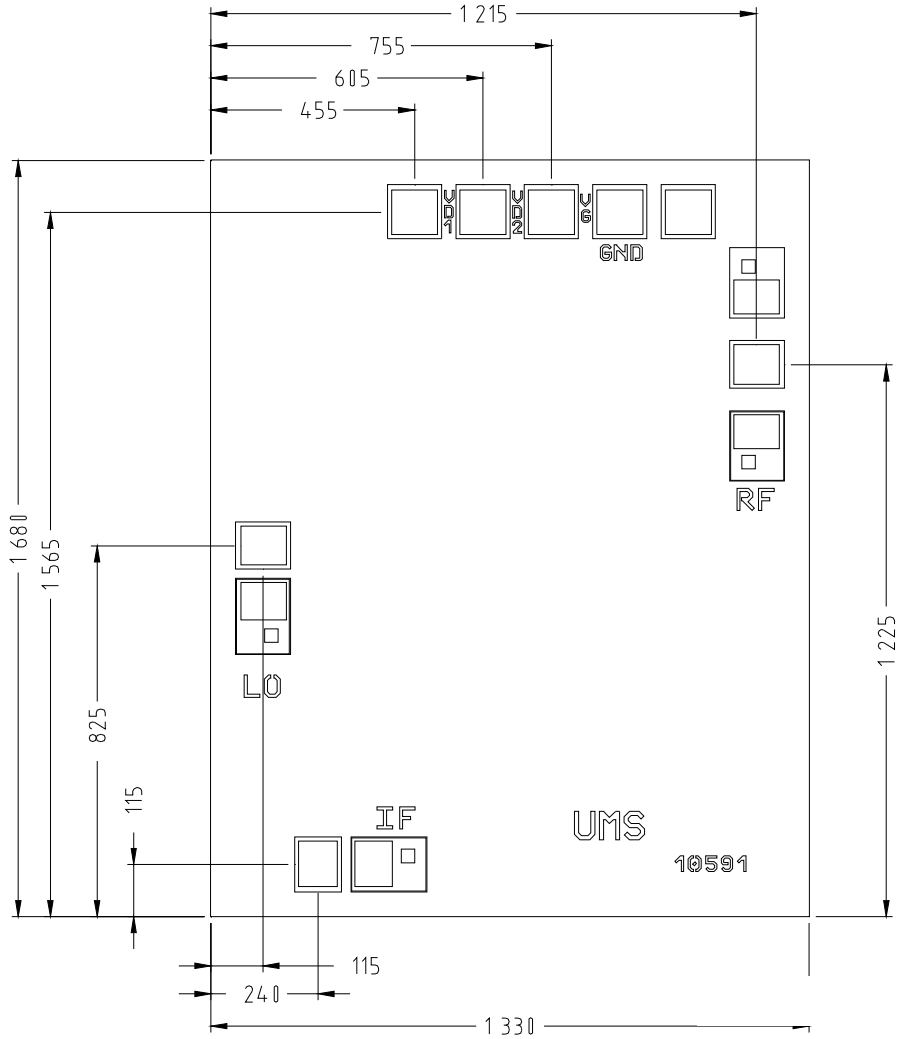
Mechanical data



Tol: ±35µm

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

Ordering Information

Chip form : CHR2297-98F/00

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