37-40GHz Integrated Down converter

Preliminary

GaAs Monolithic Microwave IC

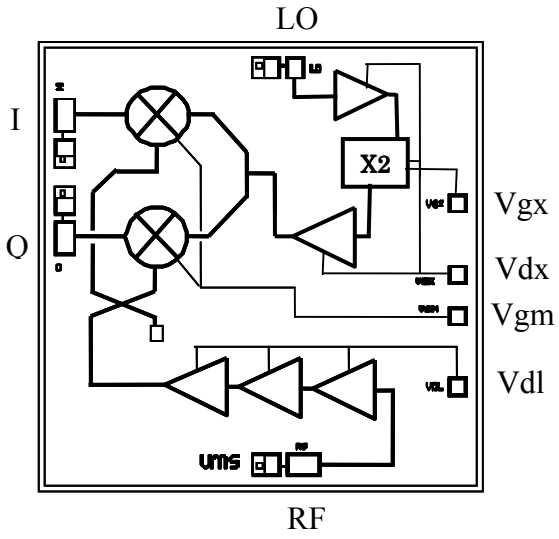
Description

The MFC-PO13811 is a multifunction chip, which integrates a balanced cold FET mixer, a time two multiplier, and a RF 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 PM-HEMT process, 0.25µm gate length, via holes through the substrate and air bridges.

It is supplied in chip form.



Main Features

- Broadband performance 37-40GHz
- 13dB gain
- 16dBc Image Frequency Rejection
- ESD protected
- DC power consumption: 4V, 140mA
- Chip size: 2,45 x 2,45 x 0,1mm

Main Characteristics

Tamb=25°C, Vd=4V

Symbol	Parameter	Min	Typ	Max	Unit
F_{RF}	RF frequency range	37		40	GHz
F_{LO}	LO frequency range	17.5		21	GHz
F_{IF}	IF frequency range	DC		3.5	GHz
G_c	Conversion gain		13		dB

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

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Electrical Characteristics

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

Symbol	Parameter	Min	Typ	Max	Unit
F_{RF}	RF frequency range	37		40	GHz
F_{LO}	LO frequency range	17.5		21	GHz
F_{IF}	IF frequency range	DC		3.5	GHz
G_c	Conversion gain		13		dB
P_{LO}	LO Input power		1		dBm
Img Sup	Image Suppression (1)		16		dBc
NF	Noise Figure		4.5		dB
IIP3	Input IP3		-5		dBm
LO VSWR	Input LO VSWR		2.0:1		
RF VSWR	Input RF VSWR		2.0:1		
Id	Bias current (2)		140		mA

(1) With external I/Q 90° hybrid coupler
(2) Typically, Idl= 60mA, Idx=80mA

Absolute Maximum Ratings (1)

Tamb=+25℃

Symbol	Parameter	Values	Unit
Vd	Maximum drain bias voltage	4.5	V
Id	Maximum drain bias current	200	mA
Vg	Gate bias voltage	-2.0 to +0.4	V
P_RF	Maximum RF input power	10	dBm
P_LO	Maximum LO input power	10	dBm
Tch	Maximum channel temperature	175	℃
Ta	Operating temperature range	-40 to +85	℃
Tstg	Storage temperature range	-55 to +125	℃

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

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Chip Assembly and Mechanical Data

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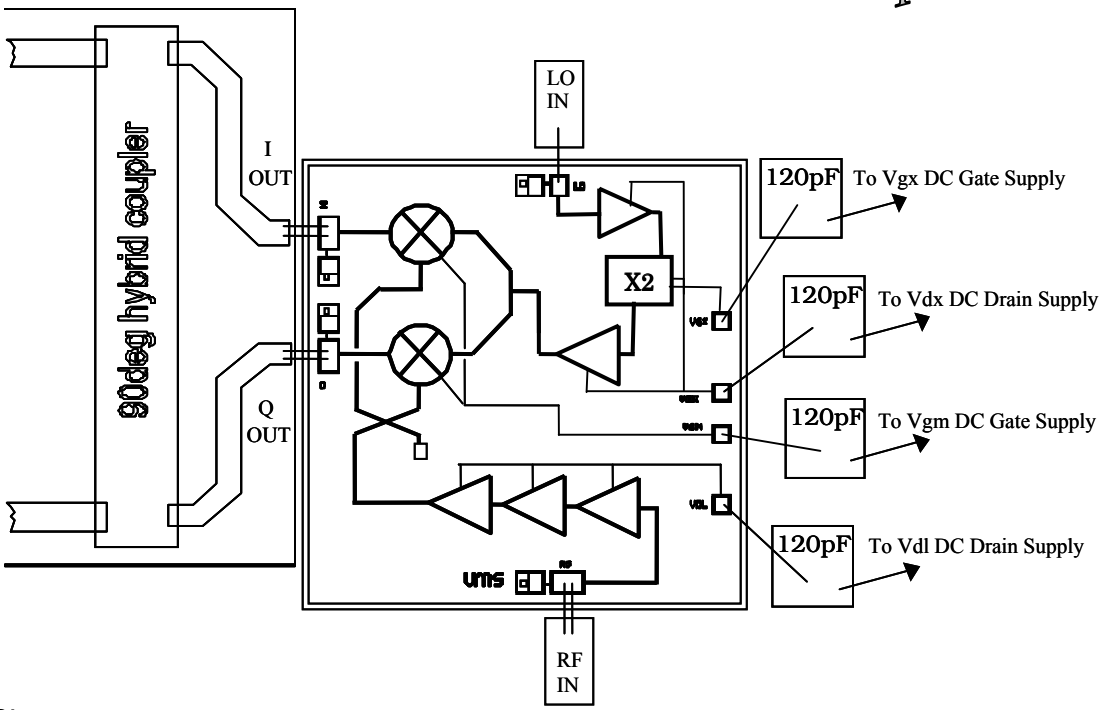
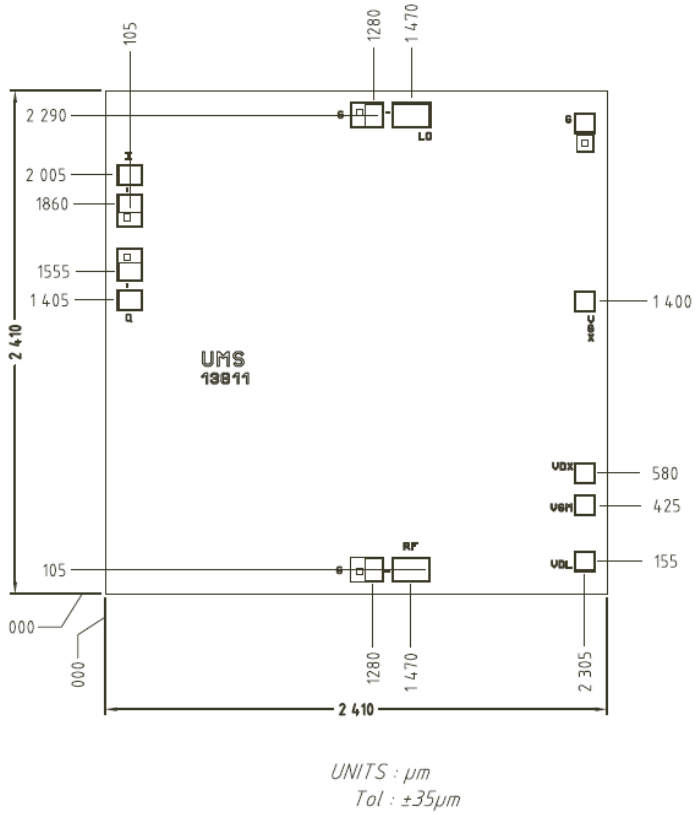


Note:
Supply feed should be capacitively bypassed. 25µm diameter gold wire is recommended.



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

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Note :

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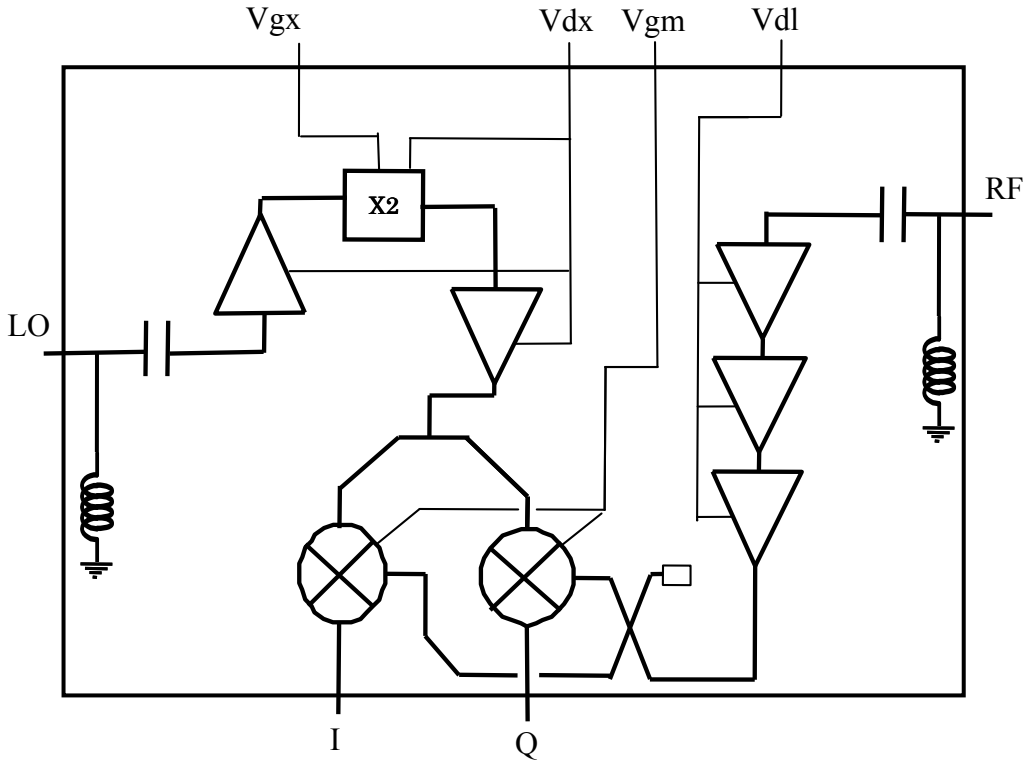
Due to ESD protection, LO and RF accesses are DC grounded, an external capacitance might be requested to isolate the product from external voltage that could be present on the RF accesses.



ESD protections are also implemented on gate accesses : Vgx and Vgm.

Ordering Information

Chip form: MFC-PO13811-99F/00

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