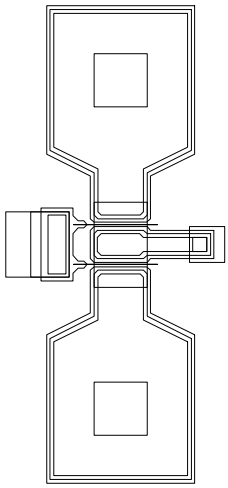
0.15µm Ultra Low Noise Process

Very Low Noise PHFET technology

Description

- "Pseudomorphic" PM-HEMT technology
- 0.15µm gate length
- GaAlAs/GaInAs/GaAs epitaxial active layer
- 3" wafer
- Spiral inductors, MIM capacitors, TaN resistors, TiWSi resistors, GaAs resistors
- Via-holes



2 x 30µm FET

Main Features

¦ Transition frequency: 120 GHz
¦ Max usable frequency: 100 GHz
¦ Noise figure: 2.0 dB @ 60 GHz with 6 dB associated gain
¦ Power density: 0.3 W/mm @ 1 dB gain comp.

Main Characteristics

Symbol	Parameter	Typ	Unit
Gmmax	Maximum transconductance	650	mS/mm
Idmax	Current associated to Gmmax	250	mA/mm
Vt	Threshold voltage	-0.55	V
Vbds	Breakdown voltage	5.5	V

United Monolithic Semiconductors S.A.S.
Route Départementale 128 - B.P.46 - 91401 Orsay Cedex France
Tel. : +33 (0)1 69 33 03 08 - Fax : +33 (0)1 69 33 03 09

Electrical Characteristics

The wafer is considered good if it is not rejected during optical inspection and if 60% of values measured for each type of test patterns are included within ranges defined in the following tables. Microwave acceptance criteria are based on a 2x75um coplanar transistor simplified equivalent circuit. The number of locations on which tests are performed is 20. The measured patterns are in a 56mm diameter circle centered in the middle of the wafer.

Static acceptance criteria

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
Vt	Threshold voltage	Vds= 2.0V , Idss/100	-1.0	-0.55	-0.3	V
Gmmax	Maximum transconductance	Vds= 2.0V	580	650		mS/mm
Idmax	Current associated to Gmmax	Vds= 2.0V	220	250		mA/mm
Vbds	Breakdown voltage	Ids= Idss/100	4.5	5.5		V
	Ohmic contact resistance		-	-	0.3	Ω.mm
RgaAs	GaAs sheet resistance		100	120	140	Ω/square
RtaN	TaN sheet resistance		26	30	34	Ω/square
RtiWSi	TiWSi sheet resistance		800	1000	1200	Ω/square
	Sheet capacitance		290	330	370	pF/mm²
	Line sheet resistance				20	mΩ/square

RF acceptance criteria (2 x 75 µm coplanar transistor)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
Cin	Input capacitance	Vds= 3.0V Vgs= 0V	80	110	140	fF
Gme	Transconductance	Vds= 3.0V Vgs= 0V	75	90	105	mS
Cf	Feedback capacitance	Vds= 3.0V Vgs= 0V	18	24	30	fF
Rout	Output resistance	Vds= 3.0V Vgs= 0V	140	170	200	Ω

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