

0.25 μ m Very Low Noise Process

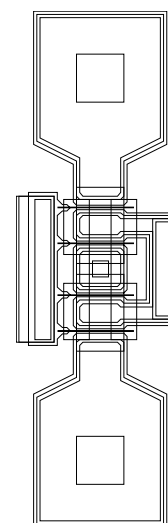
Very Low Noise and Medium Power PHFET technology

Description

- "Pseudomorphic" PM-HEMT technology
- 0.25 μ m gate length
- GaAlAs/GaNAs/GaAs epitaxial active layer
- 3" wafer
- Spiral inductors, MIM capacitors, TaN resistors, TiWSi resistors, GaAs resistors
- Via-holes

Main Features

- Transition frequency: 90 GHz
- Max usable frequency: 60 GHz
- Noise figure: 2.0 dB @ 40 GHz with 8 dB associated gain
- Power density: 0.30 W/mm @ 1 dB gain comp.



4 x 30 μ m FET

Main Characteristics

Symbol	Parameter	Typ	Unit
Idss	Saturation current	340	mA/mm
Vt	Threshold voltage	-0.75	V
Gm	Transconductance	500	mS/mm
Vbds	Breakdown voltage	5.5	V

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= 2.5V , Idss/100	-1.0	-0.75	-0.5	V
Idss	Saturation current	Vds= 2.5V Vgs= 0V	200	340	460	mA/mm
Gm	Transconductance	Vds= 2.5V Vgs= 0V	400	500		mS/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	at 1MHz	290	330	370	pF/mm ²
	Line sheet resistance				20	m Ω /square

RF acceptance criteria (2 x 75 μ m coplanar transistor)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
Cin	Input capacitance	Vds= 3.0V Vgs= 0V	130	160	190	fF
Gme	Transconductance	Vds= 3.0V Vgs= 0V	60	85	110	mS
Cf	Feedback capacitance	Vds= 3.0V Vgs= 0V	21	27	33	fF
Rout	Output resistance	Vds= 3.0V Vgs= 0V	160	220	300	Ω

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