1.2 Micron CMOS Process Family

March 1997

Features

- Double Poly/Double Metal
- 2.4 µm Poly and Metal I Pitch
- 5.5 Volts Maximum Operating Voltage
- Twin-tub process on P-type wafers
- ProToDuction™ Option for low cost prototypes

Description

The 1.2µm process provides flexibility, speed and packing density needed in mixed signal designs. The aggressive design rules on both metal layers are comparable to most 0.8µm processes. Also, the overall design rules are compatible with most other 1.2um processes making second sourcing easy.

Technology Outline

- Twin-tub technology
- Drain Engineered Structure to Ensure Reliability against Hot-Carrier Injection
- Planarization with non-etch-back SOG Processes
- State-of-the-art Metal technology :Ti/TiN/Al/TiN sandwich
- Plasma Silicon Nitride Passivation for Reliability against moisture
- Latchup Free Process on Non-Epi material achieved

Process Parameters

Process Parameters	1.2µm 5volts	Units
Metal I pitch (width/space)	1.4/1.0	µm
Metal II pitch (width/space)	1.4/1.0	µm
Poly pitch (width/space)	1.2/1.2	µm
Contact	1.2x1.2	µm
Via	1.4x1.4	µm
Gate geometry	1.2	µm
N-well junction depth	4.0	µm
P-well junction depth	4.0	µm
N+ junction depth	0.20	µm
P+ junction depth	0.31	µm
Gate oxide thickness	225	Å
Inter poly oxide thick.	390	Å

MOSFET Electrical Parameters

Electrical Parameters	1.2 MICRON - 5 volts						Units	Conditions
	N Channel			P Channel				
	min.	typ.	max.	min.	typ.	max.		
Vt (10x1.2µm)	0.55	0.70	0.85	0.55	0.70	0.85	V	saturation
Ids (10x1.2µm)		240			140		µA/µm	Vds=Vgs=5v
Gain β (10x10µm)		73			24		$\mu A/V^2$	
Body Factor (50x50µm)		0.56			0.73		$\sqrt{v}$	
Bvdss	10	15		10	12		V	Ids=20nA
Subthreshold Slope		90			90		mV/dec.	Vds=0.1v
Maximum Substrate Current (50x1.2µm)		0.20			.01		µA/µm	Vds=5.5v Vgs=2.7v
Field Threshold	10	25		10	25		V	Ids = 14µA
L Effective		1.0			0.82		µm	L drawn = 1.5µm

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Capacitances (fF/µm²)

	min.	typ.	max
Inter-poly	0.80	0.97	1.15
Gate oxide	1.4	1.5	1.6
N+ Junction		0.35	
P+ Junction		0.60	

Bipolar gain[1]

	min.	typ.	max.
NPN vertical		80	
PNP vertical		10	

[1]Test condition : Vce = 5 volts

Resistances (Ω/sq.)

	min.	typ.	max.
Nwell		520	
Pwell		2300	
N+	35	45	55
P+	80	100	120
Poly gate	15	20	25
Poly capacitor	75	100	125
Metal I		0.038	
Metal II		0.038	

FIG 1 : I-V Characteristics for a 50x1.2µm N-MOSFET

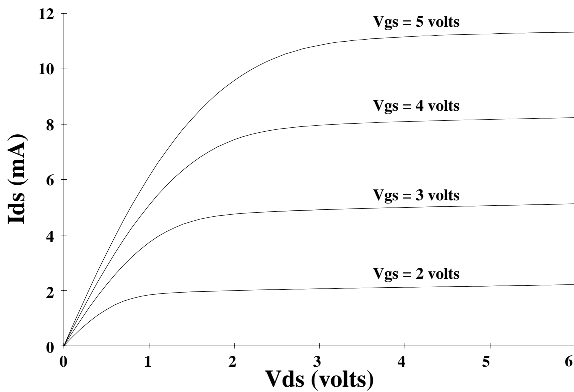


FIG 2 : I-V Characteristics for a 50x1.2µm P-MOSFET

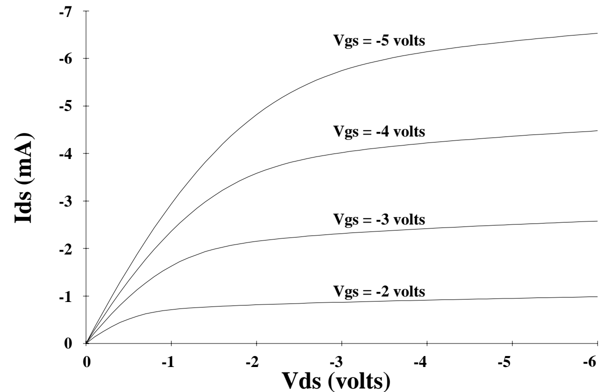


FIG 3 : Subthreshold Characteristics at Vds=0.1 volt for a 50x1.2µm N-MOSFET

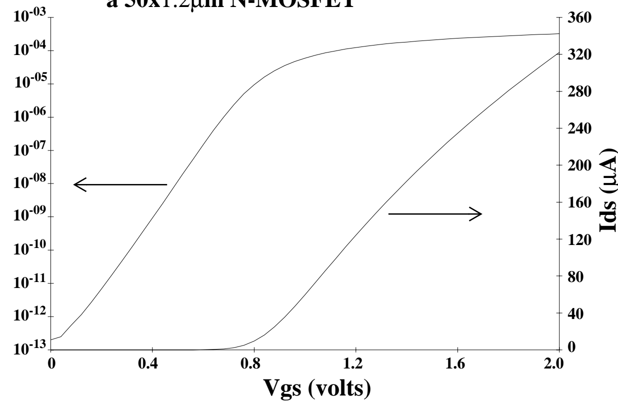
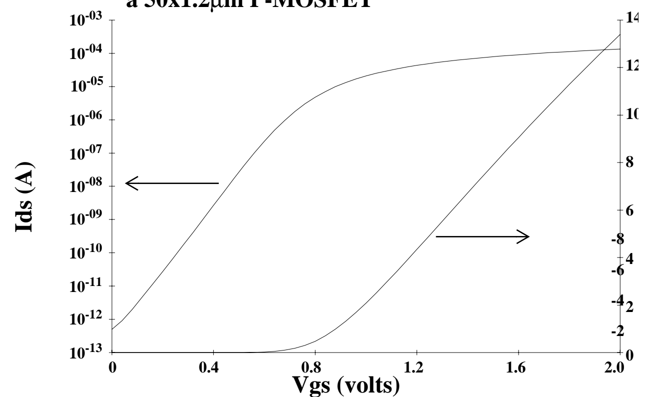


FIG 4 : Subthreshold Characteristics at Vds=-0.1 volt for a 50x1.2µm P-MOSFET



NOTE : These values are for guidance only. Many of them can be adjusted to suit customer requirements.
For full process specifications contact a Mitel sales office or representative.