1.5 Micron CMOS Process Family

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Features

- Double Poly / Double Metal
- 3 µm Poly and Metal I Pitch
- 5.5 Volts Maximum Operating Voltage
- 2.7~3.6 Volts Low Voltage Option
- 1.2 Volts Very Low Voltage Option
- Direct shrink of Mitel 2µm design rules
- Low TCR Resistor Module
- ProToDuction^{TM} Option for fast prototypes
- Standard Cells Library

Description

The 1.5µm process provides flexibility, speed and packing density needed in mixed signal designs. The aggressive design rules make it comparable to most 1.2 µm processes. A 3 volts and a 1.2 volts options are also available for low voltage applications, they offer low and matched threshold voltages for improved dynamic range. A process module can be integrated to provide high precision and very low TCR polysilicon resistors.

Technology Outline

- Drain Engineered Structure to Ensure Reliability against Hot-Carrier Injection
- Planarization with SOG Sandwich Structure
- Nitride Passivation for Reliability against Moisture
- Latchup Free Process on Non-Epi Material Achieved with Optimized I/OProtection (patent pending)

Process Parameters

Process Parameters	1.5µm 5volts & 3volts	Units
Metal I pitch (width/space)	1.5 / 1.5	µm
Metal II pitch (width/space)	2.0 / 1.8	µm
Poly pitch (width/space)	1.5 / 1.5	µm
Contact	1.5 x 1.5	µm
Via	1.8 x 1.8	µm
Gate geometry	1.5	µm
P-well junction depth	3.0	µm
N+ junction depth	0.28	µm
P+ junction depth	0.28	µm
Gate oxide thickness	270	Å
Inter poly oxide thick.	480	Å

MOSFET Electrical Parameters

Electrical Parameters	1.5 MICRON - 5 volts						Units	Conditions
	N Channel			P Channel				
	min.	typ.	max.	min.	typ.	max.		
Vt (10x1.2$_{m}$m)	0.55	0.70	0.85	0.55	0.70	0.85	V	saturation
Ids (10x1.2$_{m}$m)		262			108		µA/µm	Vds=Vgs=5v
Gain β (10x10µm)		700			200		µA/V^2	
Body Factor (50x50µm)		0.50			0.82		$\sqrt{v}$	
Bvdss	10	13		10	13		V	Ids=20nA
Subthreshold Slope		91			110		mV/dec.	Vds=0.1v
Maximum Substrate Current (50x1.2µm)		0.20			.0004		µA/µm	Vds=5.5v Vgs=2.7v
Field Threshold	10	19		10	19		V	Ids = 14µA
L Effective		1.2			1.2		µm	L drawn = 1.5µm

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Capacitances (fF/µm^2)

	1.5 µm 5 volts & 3 volts		
	min.	typ.	max.
Inter-poly	0.62	0.68	0.84
Gate oxide	1.2	1.3	1.4
N+ Junction		0.42	
P+ Junction		0.62	

Bipolar gain[1]

	1.5 µm - 5 volts		
	min.	typ.	max.
NPN vertical		180	

[1] Test condition : Vce = 5 volts

Resistances (Ω/sq.)

	1.5 µm 5 volts & 3 volts		
	min.	typ.	max.
Pwell		5700	
Pfield in Pwell	2800	3200	3600
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 10x1.5µm N-MOSFET (1.5µm 5 volts process)

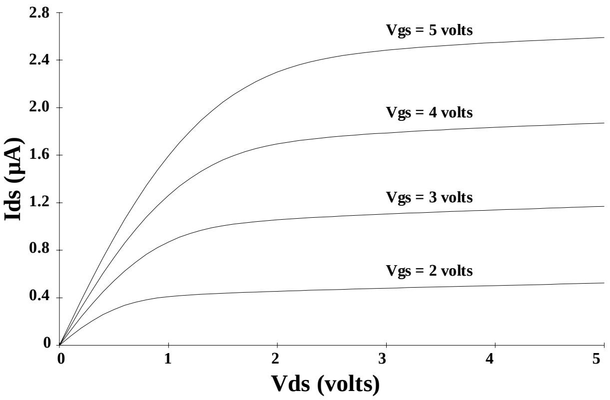


FIG 2 : I-V Characteristics for a 10x1.5µm P-MOSFET (1.5µm 5 volts process)

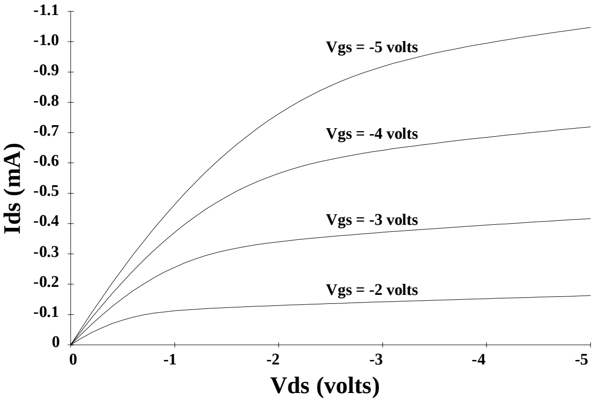


FIG 3 : Subthreshold Characteristics at Vds=0.1 volt for a 10x1.5µm N-MOSFET (1.5µm 5 volts process)

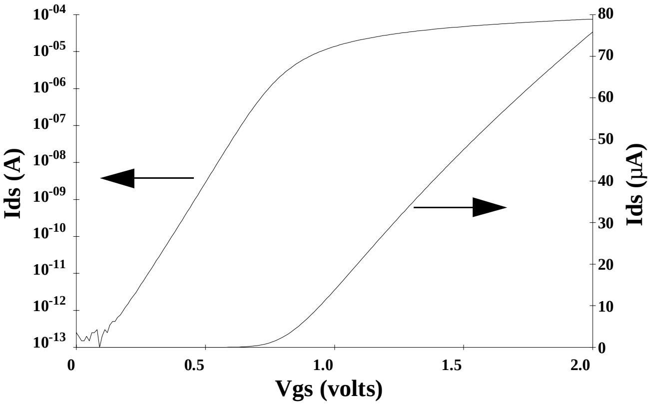
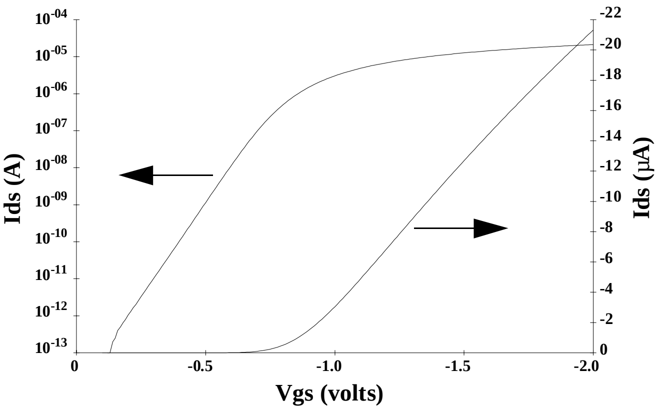


FIG 4 : Subthreshold Characteristics at Vds=-0.1 volt for a 10x1.5µm P-MOSFET (1.5µm 5 volts process)



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.