Elec 422: VLSI Design I

Additional Information on 1.2 micron MOSIS Process

MOSIS PARAMETRIC TEST RESULTS - Feb. 1998

RUN: N81X
TECHNOLOGY: SCN12

VENDOR: AMI
FEATURE SIZE: 1.2 microns

INTRODUCTION: This report contains the lot average results obtained by MOSIS from measurements of MOSIS test structures on each wafer of this fabrication lot. SPICE parameters obtained from similar measurements on a selected wafer are also attached.

COMMENTS: American Microsystems, Inc. 1.2 micron ABN.

TRANSISTOR PARAMETERS	W/L	N-CHANNEL	P-CHANNEL	UNITS
MINIMUM	1.8/1.2			
Vth		0.56	-0.95	Volts
SHORT	10.8/1.2			
Vth		0.38	-0.71	Volts
Vpt		10.0	-6.7	Volts
Vbkd		15.0	-15.0	Volts
Idss		224	-105	uA/um
WIDE	30/1.2			
Ids0		1.6	-140.9	pA/um
LARGE	10.8/10.8			
Vth		0.55	-0.75	Volts
Vjbkd		17.1	-15.6	Volts
Ijlk		-5.8	7.5	pA
Gamma		0.62	0.54	V^0.5
Delta length (L_eff = L_drawn-DL)		0.21	0.10	microns
Delta width (W_eff = W_drawn-DW)		1.25	1.31	microns
K' (Uo*Cox/2)		35.0	-11.8	uA/V^2

POLY2 TRANSISTORS	W/L	N-CHANNEL	P-CHANNEL	UNITS
MINIMUM	3.6/2.4			
Vth		0.91	-0.95	Volts
SHORT	7.2/2.4			
Vth		0.89	-0.89	Volts
LARGE	21.6/21.			

Vth	0.88	-0.88	Volts
Delta length (L_eff = L_drawn-DL)	-0.03	-0.33	microns
Delta width (W_eff = W_drawn-DW)	1.43	1.96	microns
K' (Uo*Cox/2)	23.7	-8.1	uA/V^2

FOX TRANSISTORS	GATE	N+ACTIVE	P+ACTIVE	UNITS
Vth	Poly	>15.0	<-15.0	Volts

BIPOLAR PARAMETERS	W/L	NPN	UNITS
2X1	2X1		
Beta		106	
V_early		50.4	Volts
Vce,sat		0.2	Volts
2X2	2X2		
Beta		107	
V_early		50.6	Volts
Vce,sat		0.1	Volts
2X4	2X4		
Beta		108	
V_early		50.9	Volts
Vce,sat		0.1	Volts
2X8	2X8		
Beta		109	
V_early		51.0	Volts
Vce,sat		0.1	Volts
BVceo		11.6	Volts
BVcbo		29.3	Volts
BVebo		8.0	Volts

PROCESS PARAMETERS	N+ACTV	P+ACTV	POLY	POLY2	MTL1	MTL2	N_WELL	UNITS
Sheet Resistance	56.9	79.2	40.2	24.8	0.05	0.03	1530	ohms/sq
Width Variation (measured - drawn)	-0.50	-0.67	-0.18	0.19	0.33	0.24		microns
Contact Resistance	53.2	36.2	27.6	15.2		0.05		ohms
Gate Oxide Thickness	297							angstrom

PROCESS PARAMETERS	N\PLY	UNITS
Sheet Resistance	1565	ohms/sq
Width Variation (measured - drawn)		microns
Contact Resistance		ohms

COMMENTS: N\POLY is N-well under polysilicon.

CAPACITANCE PARAMETERS	N+ACTV	P+ACTV	POLY	POLY2	METAL1	METAL2	UNITS
Area (substrate)	282	294	36		20	13	aF/um^2
Area (N+active)			1161	770	48	27	aF/um^2
Area (P+active)			1139	762			aF/um^2
Area (poly)				648	45	24	aF/um^2
Area (poly2)					45		aF/um^2
Area (metal1)						44	aF/um^2

CIRCUIT PARAMETERS			UNITS
Inverters	K		
Vinv	1.0	1.92	Volts
Vinv	1.5	2.25	Volts
Vol (100 uA)	2.0	0.55	Volts
Voh (100 uA)	2.0	4.36	Volts
Vinv	2.0	2.46	Volts
Gain	2.0	-9.28	
Ring Oscillator Freq.			
MOSIS (31-stage,5V)		70.78	MHz

N81X SPICE LEVEL3 PARAMETERS

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.MODEL CMOSN NMOS LEVEL=3 PHI=0.700000 TOX=2.9700E-08 XJ=0.200000U TPG=1
+ VTO=0.5597 DELTA=9.3220E-01 LD=6.5780E-08 KP=7.8748E-05
+ UO=677.3 THETA=1.0950E-01 RSH=2.9330E+01 GAMMA=0.5743
+ NSUB=1.3430E+16 NFS=7.1500E+11 VMAX=1.8650E+05 ETA=8.3910E-02
+ KAPPA=1.5110E-01 CGDO=1.1472E-10 CGSO=1.1472E-10
+ CGBO=3.3855E-10 CJ=2.7107E-04 MJ=5.2656E-01 CJSW=1.5072E-10
+ MJSW=1.0000E-01 PB=9.1954E-01
* Weff = Wdrawn - Delta_W
* The suggested Delta_W is 8.7580E-07
.MODEL CMOSP PMOS LEVEL=3 PHI=0.700000 TOX=2.9700E-08 XJ=0.200000U TPG=-1
+ VTO=-0.7595 DELTA=2.2970E+00 LD=1.1000E-09 KP=2.3440E-05
+ UO=201.6 THETA=1.2730E-01 RSH=8.4110E-01 GAMMA=0.3238
+ NSUB=4.2700E+15 NFS=6.4990E+11 VMAX=1.9020E+05 ETA=1.3470E-01
+ KAPPA=1.0000E+01 CGDO=5.0000E-11 CGSO=5.0000E-11
+ CGBO=3.3325E-10 CJ=2.9032E-04 MJ=4.5540E-01 CJSW=1.8518E-10
+ MJSW=1.0904E-01 PB=8.0729E-01
* Weff = Wdrawn - Delta_W
* The suggested Delta_W is 8.5120E-07
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