# MOSIS WAFER ELECTRICAL TESTS

RUN: V37P VENDOR: AMIS (ON-SEMI)
TECHNOLOGY: SCN05 FEATURE SIZE: 0.5 microns
Run type: SHR

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: SMSCN3ME06_ON-SEMI

| TRANSISTOR PARAMETERS | W/L | N-CHANNEL | P-CHANNEL | UNITS |
|---|---|---|---|---|
| MINIMUM | 3.0/0.6 | | | |
| Vth | | 0.76 | -0.90 | volts |
| SHORT | 20.0/0.6 | | | |
| Idss | | 466 | -255 | uA/um |
| Vth | | 0.65 | -0.88 | volts |
| Vpt | | 13.1 | -12.2 | volts |
| WIDE | 20.0/0.6 | | | |
| Ids0 | | < 2.5 | < 2.5 | pA/um |
| LARGE | 50/50 | | | |
| Vth | | 0.67 | -0.94 | volts |
| Vjbkd | | 10.9 | -11.8 | volts |
| Ijlk | | 242.7 | <50.0 | pA |
| Gamma | | 0.49 | 0.56 | V^0.5 |
| K' (Uo*Cox/2) | | 57.8 | -18.9 | uA/V^2 |
| Low-field Mobility | | 472.03 | 154.35 | cm^2/V*s |

COMMENTS: Poly bias varies with design technology. To account for mask bias use the appropriate value for the parameter XL in your SPICE model card.

| Design Technology | XL (um) | XW (um) |
|---|---|---|
| SCMOS_SUBM (lambda=0.30) | 0.10 | 0.00 |
| SCMOS (lambda=0.35) | 0.00 | 0.20 |

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

COMMENTS:

| PROCESS PARAMETERS | N+ | P+ | N_W | _U | POLY | PLY2_HR | POLY2 | M1 | UNITS |
|---|---|---|---|---|---|---|---|---|---|
| Sheet Resistance | 82.4 | 106.7 | 814.1 | | 23.2 | 1076 | 40.8 | 0.09 | ohms/sq |
| Contact Resistance | 59.6 | 152.5 | | | 16.0 | | 26.0 | | ohms |
| Gate Oxide Thickness | 141 | | | | | | | | angstrom |

| PROCESS PARAMETERS | M2 | M3 | N_W | UNITS |
|---|---|---|---|---|
| Sheet Resistance | 0.09 | 0.05 | 808 | ohms/sq |
| Contact Resistance | 0.84 | 0.82 | | ohms |

| CAPACITANCE PARAMETERS | N+ | P+ | POLY | POLY2 | M1 | M2 | M3 | N_W | UNITS |
|---|---|---|---|---|---|---|---|---|---|
| Area (substrate) | 416 | 710 | 86 | | 29 | 12 | 8 | 91 | aF/um^2 |
| Area (N+active) | | | 2456 | | 37 | 17 | 12 | | aF/um^2 |
| Area (P+active) | | | 2362 | | | | | | aF/um^2 |
| Area (poly) | | | | 922 | 64 | 16 | 9 | | aF/um^2 |
| Area (poly2) | | | | | 58 | | | | aF/um^2 |
| Area (metal1) | | | | | | 32 | 12 | | aF/um^2 |
| Area (metal2) | | | | | | | 32 | | aF/um^2 |
| Fringe (substrate) | 345 | 236 | | | 51 | 34 | 26 | | aF/um |
| Fringe (poly) | | | | | 70 | 39 | 28 | | aF/um |
| Fringe (metal1) | | | | | | 49 | 33 | | aF/um |
| Fringe (metal2) | | | | | | | 55 | | aF/um |
| Overlap (N+active) | | | 191 | | | | | | aF/um |
| Overlap (P+active) | | | 234 | | | | | | aF/um |

| CIRCUIT PARAMETERS | | | UNITS |
|---|---|---|---|
| Inverters | K | | |
| Vinv | 1.0 | 2.02 | volts |
| Vinv | 1.5 | 2.29 | volts |
| Vol (100 uA) | 2.0 | 0.47 | volts |
| Voh (100 uA) | 2.0 | 4.48 | volts |
| Vinv | 2.0 | 2.47 | volts |
| Gain | 2.0 | -17.59 | |
| Ring Oscillator Freq. | | | |
| DIV256 (31-stg,5.0V) | | 103.03 | MHz |
| D256_WIDE (31-stg,5.0V) | | 158.86 | MHz |
| Ring Oscillator Power | | | |
| DIV256 (31-stg,5.0V) | | 0.48 | uW/MHz/gate |
| D256_WIDE (31-stg,5.0V) | | 0.99 | uW/MHz/gate |

COMMENTS: SUBMICRON

V37P SPICE BSIM3 VERSION 3.1 PARAMETERS

SPICE 3f5 Level 8, Star-HSPICE Level 49, UTMOST Level 8

```
* DATE: Oct 17/13
* LOT: v37p                  WAF: 1003
* Temperature_parameters=Default
.MODEL CMOSN NMOS (                                LEVEL   = 49
+VERSION = 3.1            TNOM    = 27             TOX     = 1.41E-8
+XJ      = 1.5E-7         NCH     = 1.7E17         VTH0    = 0.6176544
+K1      = 0.9137986      K2      = -0.1071877     K3      = 22.288867
+K3B     = -9.7485086     W0      = 2.658488E-8    NLX     = 1E-9
+DVT0W   = 0              DVT1W   = 0              DVT2W   = 0
+DVT0    = 0.8309419      DVT1    = 0.3317542      DVT2    = -0.5
+U0      = 460.0124125    UA      = 2.759471E-13   UB      = 1.603084E-18
+UC      = 3.089014E-12   VSAT    = 1.840576E5     A0      = 0.5615191
+AGS     = 0.1204319      B0      = 1.941274E-6    B1      = 5E-6
+KETA    = -2.797385E-3   A1      = 2.420581E-5    A2      = 0.3164714
+RDSW    = 1.115544E3     PRWG    = 0.0828351      PRWB    = 0.0311852
+WR      = 1              WINT    = 2.526685E-7    LINT    = 7.469087E-8
+XL      = 1E-7           XW      = 0              DWG     = -1.032244E-8
+DWB     = 1.914595E-8    VOFF    = -6.986376E-5   NFACTOR = 0.8533219
+CIT     = 0              CDSC    = 2.4E-4         CDSCD   = 0
+CDSCB   = 0              ETA0    = 2.045973E-3    ETAB    = -3.21453E-4
+DSUB    = 0.0833302      PCLM    = 2.3615569      PDIBLC1 = 9.500103E-5
+PDIBLC2 = 1.863456E-3    PDIBLCB = 0.0644698      DROUT   = 1.39184E-3
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+PSCBE1  = 3.853855E8     PSCBE2  = 4.115782E-6    PVAG    = 0
+DELTA   = 0.01           RSH     = 82.4           MOBMOD  = 1
+PRT     = 0              UTE     = -1.5           KT1     = -0.11
+KT1L    = 0              KT2     = 0.022          UA1     = 4.31E-9
+UB1     = -7.61E-18      UC1     = -5.6E-11       AT      = 3.3E4
+WL      = 0              WLN     = 1              WW      = 0
+WWN     = 1              WWL     = 0              LL      = 0
+LLN     = 1              LW      = 0              LWN     = 1
+LWL     = 0              CAPMOD  = 2              XPART   = 0.5
+CGDO    = 1.91E-10       CGSO    = 1.91E-10       CGBO    = 1E-9
+CJ      = 4.131634E-4    PB      = 0.8399766      MJ      = 0.4305505
+CJSW    = 3.400072E-10   PBSW    = 0.809471       MJSW    = 0.1977865
+CJSWG   = 1.64E-10       PBSWG   = 0.8            MJSWG   = 0.2019414
+CF      = 0              PVTH0   = -0.028514      PRDSW   = 114.6437024
+PK2     = -0.0768747     WKETA   = -0.0138828     LKETA   = 1.62687E-3      )
*
.MODEL CMOSP PMOS (                                LEVEL   = 49
+VERSION = 3.1            TNOM    = 27             TOX     = 1.41E-8
+XJ      = 1.5E-7         NCH     = 1.7E17         VTH0    = -0.9152268
+K1      = 0.553472       K2      = 7.871921E-3    K3      = 8.5645893
+K3B     = 0.5506188      W0      = 1E-8           NLX     = 1.006451E-9
+DVT0W   = 0              DVT1W   = 0              DVT2W   = 0
+DVT0    = 0.4716221      DVT1    = 0.1854949      DVT2    = -0.3
+U0      = 201.3603195    UA      = 2.48572E-9     UB      = 1.005454E-21
+UC      = -1E-10         VSAT    = 1.578444E5     A0      = 0.8192884
+AGS     = 0.1111278      B0      = 5.743519E-7    B1      = 6.088988E-8
+KETA    = -4.865785E-3   A1      = 5.800723E-4    A2      = 0.3229711
+RDSW    = 3E3            PRWG    = -0.0219603     PRWB    = -0.0910566
+WR      = 1.01           WINT    = 2.247043E-7    LINT    = 9.979797E-8
+XL      = 1E-7           XW      = 0              DWG     = 2.080226E-9
+DWB     = -1.38669E-8    VOFF    = -0.0295318     NFACTOR = 0.5872216
+CIT     = 0              CDSC    = 2.4E-4         CDSCD   = 0
+CDSCB   = 0              ETA0    = 4.979072E-4    ETAB    = -0.2
+DSUB    = 1              PCLM    = 2.3970968      PDIBLC1 = 0.0961044
+PDIBLC2 = 4.073922E-3    PDIBLCB = -0.0315594     DROUT   = 0.2897615
+PSCBE1  = 8E10           PSCBE2  = 8.966681E-8    PVAG    = 0.0149129
+DELTA   = 0.01           RSH     = 106.7          MOBMOD  = 1
+PRT     = 0              UTE     = -1.5           KT1     = -0.11
+KT1L    = 0              KT2     = 0.022          UA1     = 4.31E-9
+UB1     = -7.61E-18      UC1     = -5.6E-11       AT      = 3.3E4
+WL      = 0              WLN     = 1              WW      = 0
+WWN     = 1              WWL     = 0              LL      = 0
+LLN     = 1              LW      = 0              LWN     = 1
+LWL     = 0              CAPMOD  = 2              XPART   = 0.5
+CGDO    = 2.34E-10       CGSO    = 2.34E-10       CGBO    = 1E-9
+CJ      = 7.086018E-4    PB      = 0.8698912      MJ      = 0.4856488
+CJSW    = 2.340641E-10   PBSW    = 0.8329387      MJSW    = 0.2034305
+CJSWG   = 6.4E-11        PBSWG   = 0.8            MJSWG   = 0.2261452
+CF      = 0              PVTH0   = 5.98016E-3     PRDSW   = 14.8598424
+PK2     = 3.73981E-3     WKETA   = 0.0120657      LKETA   = -0.0104163      )
*
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