

\* Beta Version released on 2/22/06

\* PTM 130nm NMOS

.model nmos nmos Level = 54

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+version = 4.0      binunit = 1      paramchk= 1      mobmod = 0
+capmod = 2        igcmmod = 1      igbmod = 1       geomod = 1
+diomod = 1        rdsmod = 0       rbodymod= 1     rgatemod= 1
+permod = 1        acnqsmod= 0     trnqsmod= 0

+tnom = 27         toxo = 2.25e-9     toxp = 1.6e-9    toxm = 2.25e-9
+dtox = 0.65e-9   epsrox = 3.9      wint = 5e-009   lint = 10.5e-009
+ll = 0            wl = 0            lln = 1         wln = 1
+lw = 0            ww = 0            lwn = 1         wwn = 1
+lw1 = 0           wwl = 0           xpart = 0       toxref = 2.25e-9
+xl = -60e-9      k1 = 0.4          k2 = 0.01       k3 = 0
+vth0 = 0.3782    w0 = 2.5e-006    dvt0 = 1        dvt1 = 2
+k3b = 0           dvt0w = 0        dvt1w = 0       dvt2w = 0
+dvt2 = -0.032    minv = 0.05      voffl = 0       dvtp0 = 1.2e-010
+dsup = 0.1       lpe0 = 0         lpeb = 0        xj = 3.92e-008
+dvtp1 = 0.1      ndep = 1.54e+018 nsd = 2e+020    phin = 0
+ngate = 2e+020   cdscb = 0        cdscd = 0       cit = 0
+cdsc = 0.0002    nfactor = 1.5    eta0 = 0.0092   etab = 0
+voff = -0.13     u0 = 0.05928     ua = 6e-010     ub = 1.2e-018
+vfb = -0.55      vsat = 100370    a0 = 1          ags = 1e-020
+uc = 0           a2 = 1           b0 = 0          b1 = 0
+a1 = 0           dwg = 0          dwb = 0         pclm = 0.06
+keta = 0.04      pdiblc1 = 0.001  pdiblc2 = 0.001 pdiblc3 = -0.005 drout = 0.5
+pdiblc1 = 0.001 pdiblc2 = 0.001 pdiblc3 = -0.005 drout = 0.5
+pvag = 1e-020   delta = 0.01     pscbe1 = 8.14e+008 pscbe2 = 1e-007
+fprout = 0.2    pdits = 0.08     pditsd = 0.23   pditsl = 2.3e+006
+rsh = 5         rdsd = 200       rsw = 100       rdw = 100
+rdsmin = 0      rdmin = 0        rswmin = 0      prwg = 0
+prwb = 6.8e-011 wr = 1           alpha0 = 0.074  alpha1 = 0.005
+beta0 = 30      agidl = 0.0002   bgidl = 2.1e+009 cgidl = 0.0002
+egidl = 0.8

+aigbacc = 0.012  bigbacc = 0.0028  cigbacc = 0.002  cigbinv = 0.004
+nigbacc = 1     aigbinv = 0.014  bigbinv = 0.004  bigc = 0.0028
+eigbinv = 1.1  nigbinv = 3      aigc = 0.012    bigc = 0.0028
+cigc = 0.002   aigsd = 0.012   bigsd = 0.0028  cigsd = 0.002
+nigc = 1       poxedge = 1     pigcd = 1       ntox = 1

+xrcrg1 = 12     xrcrg2 = 5       cgdo = 2.4e-010  cgdl = 2.653e-10
+cgsl = 2.653e-10 ckappas = 0.03  ckappad = 0.03  acde = 1
+moin = 15      noff = 0.9       voffcv = 0.02

+kt1 = -0.11    kt1l = 0         kt2 = 0.022     ute = -1.5
+ua1 = 4.31e-009 ub1 = 7.61e-018 uc1 = -5.6e-011 prt = 0
+at = 33000

+fnoimod = 1     tnoimod = 0

+jss = 0.0001    jsws = 1e-011    jswgs = 1e-010  njs = 1
+ijthsfwd= 0.01  ijthsrrev= 0.001 bvs = 10        xjbvs = 1
+jsd = 0.0001   jswd = 1e-011    jswgd = 1e-010  njd = 1
+ijthdfwd= 0.01  ijthdrev= 0.001 bvd = 10        xjbvd = 1
+pbs = 1         cjs = 0.0005     mjs = 0.5       pbsws = 1
+cjsws = 5e-010 mjsws = 0.33     pbswgs = 1      cjswgs = 3e-010
+mjswgs = 0.33  pbd = 1          cjd = 0.0005    mjd = 0.5
+pbswd = 1       cjswd = 5e-010  mjswd = 0.33    pbswgd = 1
+cjswgd = 5e-010 mjswgd = 0.33    tpb = 0.005     tcj = 0.001
+tpbsw = 0.005  tcjsw = 0.001   tpbswg = 0.005  tcjswg = 0.001
+xtis = 3        xtld = 3

+dmcg = 0e-006  dmci = 0e-006   dmdg = 0e-006  dmcgt = 0e-007
+dwj = 0.0e-008 xgw = 0e-007    xgl = 0e-008

+rshg = 0.4     gbmin = 1e-010  rbbp = 5        rbpd = 15
+rbps = 15     rbdb = 15       rbsb = 15      ngcon = 1

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\* PTM 130nm PMOS

.model pmos pmos Level = 54

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+version = 4.0      binunit = 1      paramchk= 1      mobmod = 0
+capmod = 2        igcmmod = 1      igbmod = 1       geomod = 1
+diomod = 1        rdsmod = 0       rbodymod= 1     rgatemod= 1
+permod = 1        acnqsmod= 0     trnqsmod= 0

+tnom = 27         toxo = 2.35e-009  toxp = 1.6e-009  toxm = 2.35e-009
+dtox = 0.75e-9   epsrox = 3.9      wint = 5e-009   lint = 10.5e-009
+ll = 0            wl = 0            lln = 1         wln = 1
+lw = 0            ww = 0            lwn = 1         wwn = 1
+lw1 = 0           wwl = 0           xpart = 0       toxref = 2.35e-009
+xl = -60e-9      k1 = 0.4          k2 = -0.01      k3 = 0
+vth0 = -0.321    w0 = 2.5e-006    dvt0 = 1        dvt1 = 2
+k3b = 0           dvt0w = 0        dvt1w = 0       dvt2w = 0
+dvt2 = -0.032    minv = 0.05      voffl = 0       dvtp0 = 1e-009
+dsup = 0.1       lpe0 = 0         lpeb = 0        xj = 3.92e-008
+dvtp1 = 0.05    ndep = 0         nsd = 0         phin = 0
+cdsc = 0.0002    nfactor = 1.5    eta0 = 0.0092   etab = 0
+voff = -0.13     u0 = 0.05928     ua = 6e-010     ub = 1.2e-018
+vfb = -0.55      vsat = 100370    a0 = 1          ags = 1e-020
+uc = 0           a2 = 1           b0 = 0          b1 = 0
+a1 = 0           dwg = 0          dwb = 0         pclm = 0.06
+keta = 0.04      pdiblc1 = 0.001  pdiblc2 = 0.001 pdiblc3 = -0.005 drout = 0.5
+pdiblc1 = 0.001 pdiblc2 = 0.001 pdiblc3 = -0.005 drout = 0.5
+pvag = 1e-020   delta = 0.01     pscbe1 = 8.14e+008 pscbe2 = 1e-007
+fprout = 0.2    pdits = 0.08     pditsd = 0.23   pditsl = 2.3e+006
+rsh = 5         rdsd = 200       rsw = 100       rdw = 100
+rdsmin = 0      rdmin = 0        rswmin = 0      prwg = 0
+prwb = 6.8e-011 wr = 1           alpha0 = 0.074  alpha1 = 0.005
+beta0 = 30      agidl = 0.0002   bgidl = 2.1e+009 cgidl = 0.0002
+egidl = 0.8

+aigbacc = 0.012  bigbacc = 0.0028  cigbacc = 0.002  cigbinv = 0.004
+nigbacc = 1     aigbinv = 0.014  bigbinv = 0.004  bigc = 0.0028
+eigbinv = 1.1  nigbinv = 3      aigc = 0.012    bigc = 0.0028
+cigc = 0.002   aigsd = 0.012   bigsd = 0.0028  cigsd = 0.002
+nigc = 1       poxedge = 1     pigcd = 1       ntox = 1

+xrcrg1 = 12     xrcrg2 = 5       cgdo = 2.4e-010  cgdl = 2.653e-10
+cgsl = 2.653e-10 ckappas = 0.03  ckappad = 0.03  acde = 1
+moin = 15      noff = 0.9       voffcv = 0.02

+kt1 = -0.11    kt1l = 0         kt2 = 0.022     ute = -1.5
+ua1 = 4.31e-009 ub1 = 7.61e-018 uc1 = -5.6e-011 prt = 0
+at = 33000

+fnoimod = 1     tnoimod = 0

+jss = 0.0001    jsws = 1e-011    jswgs = 1e-010  njs = 1
+ijthsfwd= 0.01  ijthsrrev= 0.001 bvs = 10        xjbvs = 1
+jsd = 0.0001   jswd = 1e-011    jswgd = 1e-010  njd = 1
+ijthdfwd= 0.01  ijthdrev= 0.001 bvd = 10        xjbvd = 1
+pbs = 1         cjs = 0.0005     mjs = 0.5       pbsws = 1
+cjsws = 5e-010 mjsws = 0.33     pbswgs = 1      cjswgs = 3e-010
+mjswgs = 0.33  pbd = 1          cjd = 0.0005    mjd = 0.5
+pbswd = 1       cjswd = 5e-010  mjswd = 0.33    pbswgd = 1
+cjswgd = 5e-010 mjswgd = 0.33    tpb = 0.005     tcj = 0.001
+tpbsw = 0.005  tcjsw = 0.001   tpbswg = 0.005  tcjswg = 0.001
+xtis = 3        xtld = 3

+dmcg = 0e-006  dmci = 0e-006   dmdg = 0e-006  dmcgt = 0e-007
+dwj = 0.0e-008 xgw = 0e-007    xgl = 0e-008

+rshg = 0.4     gbmin = 1e-010  rbbp = 5        rbpd = 15
+rbps = 15     rbdb = 15       rbsb = 15      ngcon = 1

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+ngate = 2e+020      ndep = 1.14e+018      nsd = 2e+020      phin = 0
+cdsc = 0.000258    cdsdc = 0                cdsdc = 6.1e-008  cit = 0
+voff = -0.126      nfactor = 1.5            eta0 = 0.0092     etab = 0
+vfb = 0.55         u0 = 0.00835            ua = 2.0e-009    ub = 0.5e-018
+uc = -3e-011       vsat = 70000            a0 = 1.0         ags = 1e-020
+a1 = 0             a2 = 1                   b0 = -1e-020    b1 = 0
+keta = -0.047      dwg = 0                 dwb = 0          pclm = 0.12
+pdiblc1 = 0.001    pdiblc2 = 0.001         pdiblc3 = 3.4e-008  drout = 0.56
+pvag = 1e-020     delta = 0.01            psbbe1 = 8.14e+008  psbbe2 = 9.58e-007
+fprout = 0.2       pdits = 0.08            pditsd = 0.23     pditsl = 2.3e+006
+rsh = 5            rds = 240               rsw = 120        rdw = 120
+rdsmin = 0         rdsw = 0                rswmin = 0       prwg = 3.22e-008
+prwb = 6.8e-011   wr = 1                   alpha0 = 0.074    alpha1 = 0.005
+beta0 = 30         agidl = 0.0002          bgidl = 2.1e+009  cgidl = 0.0002
+egidl = 0.8

+aigbacc = 0.012    bigbacc = 0.0028        cigbacc = 0.002
+nigbacc = 1        aigbinv = 0.014         bigbinv = 0.004    cigbinv = 0.004
+eigbinv = 1.1     nigbinv = 3             aigc = 0.69       bigc = 0.0012
+cigc = 0.0008     aigsd = 0.0087         bigsd = 0.0012    cigsd = 0.0008
+nigc = 1          poxedge = 1            pigcd = 1         ntox = 1

+xrcrg1 = 12        xrcrg2 = 5              cgbo = 2.56e-011  cgd1 = 2.653e-10
+cgs0 = 2.4e-010   cgdo = 2.4e-010        ckappas = 0.03    ckappad = 0.03    acde = 1
+cgs1 = 2.653e-10  ckappas = 0.03         voffcv = 0.02
+motn = 15         noff = 0.9

+kt1 = -0.11       kt1l = 0                kt2 = 0.022       ute = -1.5
+ua1 = 4.31e-009   ub1 = 7.61e-018        uc1 = -5.6e-011  prt = 0
+at = 33000

+fnoimod = 1       tnoimod = 0

+jss = 0.0001      jsws = 1e-011          jswgs = 1e-010    njs = 1
+ijthsfwd = 0.01   ijthsrev = 0.001        bvs = 10          xjbvs = 1
+jsd = 0.0001      jswd = 1e-011          jswgd = 1e-010   njd = 1
+ijthdfwd = 0.01   ijthdrev = 0.001        bvd = 10         xjbvd = 1
+pbs = 1           cjs = 0.0005           mjs = 0.5         pbsws = 1
+cjsws = 5e-010    mjsws = 0.33           pbswgs = 1        cjswgs = 3e-010
+mjswgs = 0.33     pbd = 1                 cjd = 0.0005     mjd = 0.5
+pbswd = 1         cjswd = 5e-010         mjswd = 0.33     pbswd = 1
+cjswgd = 5e-010  mjswd = 0.33           tpb = 0.005      tcj = 0.001
+tpbsw = 0.005     tcjsw = 0.001          tpbw = 0.005     tcjsw = 0.001
+xtis = 3          xtld = 3

+dmcg = 0e-006     dmci = 0e-006          dmdg = 0e-006    dmcgt = 0e-007
+dwj = 0.0e-008    xgw = 0e-007           xgl = 0e-008

+rshg = 0.4        gbmin = 1e-010         rpbp = 5          rbpd = 15
+rbps = 15         rbdb = 15              rbsb = 15         ngcon = 1

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=====130nm\_bulk.txt=====

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*
* Predictive Technology Model Beta Version
* 130nm NMOS SPICE Parametersv (normal one)
*

.model NMOS NMOS
+Level = 49

+Lint = 2.5e-08 Tox = 3.3e-09
+Vth0 = 0.332 Rds = 200

+lmin=1.3e-7 lmax=1.3e-7 wmin=1.3e-7 wmax=1.0e-4 Tref=27.0 version =3.1
+Xj= 4.500000E-08      Nch= 5.600000E+17
+lln= 1.0000000      lwn= 0.00          wln= 0.00
+wwn= 1.0000000      ll= 0.00          wint= 0.00
+lw= 0.00           lwl= 0.00         wwl= 0.00
+wl= 0.00           ww= 0.00          xl= 0
+Mobmod= 1          binunit= 2
+xw= 0              binflag= 0
+Dwg= 0.00         Dwb= 0.00

+K1= 0.3661500      K2= 0.00
+K3= 0.00           Dvt0= 8.7500000    Dvt1= 0.7000000
+Dvt2= 5.000000E-02  Dvt0w= 0.00       Dvt1w= 0.00
+Dvt2w= 0.00       Nlx= 3.550000E-07  W0= 0.00
+K3b= 0.00         Ngate= 5.000000E+20

+Vsat= 1.350000E+05  Ua= -1.800000E-09  Ub= 2.200000E-18
+Uc= -2.999999E-11  Prwb= 0.00         U0= 1.340000E-02
+Prwg= 0.00         Wr= 1.0000000     A1= 0.00
+A0= 2.1199999     Keta= 4.000000E-02  B0= 0.00
+A2= 0.9900000     Ags= -0.1000000

+Voff= -7.980000E-02  NFactor= 1.1000000  Cit= 0.00
+Cdsc= 0.00         Cdscb= 0.00        Cdscl= 0.00
+Eta0= 4.000000E-02  Etab= 0.00         Dsub= 0.5200000

+Pclm= 0.1000000     Pdiblc1= 1.200000E-02  Pdiblc2= 7.500000E-03
+Pdiblc3= -1.350000E-02  Drout= 0.2800000    Psbbe1= 8.660000E+08

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+Pscbe2= 1.000000E-20 Pvag= -0.280000 Delta= 1.010000E-02  
+Alpha0= 0.00 Beta0= 30.0000000  
  
+kt1= -0.340000 kt2= -5.270000E-02 At= 0.00  
+Ute= -1.230000 Ua1= -8.630000E-10 Ub1= 2.000000E-18  
+Uc1= 0.00 Kt1l= 4.000000E-09 Prt= 0.00  
  
+Cj= 0.0015 Mj= 0.717551 Pb= 1.24859  
+Cjsw= 2E-10 Mjsw= 0.3706993 Php= 0.7731149  
+Cta= 9.290391E-04 Ctp= 7.456211E-04 Pta= 1.527748E-03  
+Ptp= 1.56325E-03 JS=2.50E-08 JSW=4.00E-13  
+N=1.0 Xti=3.0 Cgdo=2.75E-10  
+Cgso=2.75E-10 Cgbo=0.0E+00 Capmod= 2  
+NQSMOD= 0 Elm= 5 Xpart= 1  
+Cgs1= 1.1155E-10 Cgd1= 1.1155E-10 Ckappa= 0.8912  
+Cf= 1.113e-10 Clc= 5.475E-08 Cle= 6.46  
+D1c= 2E-08 Dwc= 0 Vfbcv= -1

\*  
\* Predictive Technology Model Beta Version  
\* 130nm PMOS SPICE Parametersv (normal one)  
\*

.model PMOS PMOS  
+Level = 49

+Lint = 2.e-08 Tox = 3.3e-09  
+Vth0 = -0.3499 RdsW = 400

+lmin=1.3e-7 lmax=1.3e-7 wmin=1.3e-7 wmax=1.0e-4 Tref=27.0 version =3.1  
+Xj= 4.500000E-08 Nch= 6.850000E+18  
+lln= 0.00 lwn= 0.00 wln= 0.00  
+wwn= 0.00 ll= 0.00  
+lw= 0.00 lwl= 0.00 wint= 0.00  
+wl= 0.00 ww= 0.00 wwl= 0.00  
+Mobmod= 1 binunit= 2 xl= 0  
+xw= 0 binflag= 0  
+Dwg= 0.00 Dwb= 0.00

+K1= 0.4087000 K2= 0.00  
+K3= 0.00 Dvt0= 5.000000 Dvt1= 0.2600000  
+Dvt2= -1.000000E-02 Dvt0w= 0.00 Dvt1w= 0.00  
+Dvt2w= 0.00 Nlx= 1.650000E-07 W0= 0.00  
+K3b= 0.00 Ngate= 5.000000E+20

+Vsats= 1.050000E+05 Ua= -1.400000E-09 Ub= 1.949999E-18  
+Uc= -2.999999E-11 Prwb= 0.00  
+Prwg= 0.00 Wr= 1.000000 U0= 5.200000E-03  
+A0= 2.1199999 Keta= 3.030000E-02 A1= 0.00  
+A2= 0.4000000 Ags= 0.1000000 B0= 0.00  
+B1= 0.00

+Voff= -9.1000000E-02 NFactor= 0.1250000 Cit= 2.799999E-03  
+Cdsc= 0.00 Cdscb= 0.00 Cdscd= 0.00  
+Eta0= 80.0000000 Etab= 0.00 Dsub= 1.8500000

+Pclm= 2.5000000 Pdblcl= 4.800000E-02 Pdblcl2= 5.000000E-05  
+Pdblcb= 0.1432509 Drout= 9.000000E-02 Pscbe1= 1.000000E-20  
+Pscbe2= 1.000000E-20 Pvag= -6.000000E-02 Delta= 1.010000E-02  
+Alpha0= 0.00 Beta0= 30.0000000

+kt1= -0.340000 kt2= -5.270000E-02 At= 0.00  
+Ute= -1.230000 Ua1= -8.630000E-10 Ub1= 2.000000E-18  
+Uc1= 0.00 Kt1l= 4.000000E-09 Prt= 0.00

+Cj= 0.0015 Mj= 0.717551 Pb= 1.24859  
+Cjsw= 2E-10 Mjsw= 0.3706993 Php= 0.7731149  
+Cta= 9.290391E-04 Ctp= 7.456211E-04 Pta= 1.527748E-03  
+Ptp= 1.56325E-03 JS=2.50E-08 JSW=4.00E-13  
+N=1.0 Xti=3.0 Cgdo=2.75E-10  
+Cgso=2.75E-10 Cgbo=0.0E+00 Capmod= 2  
+NQSMOD= 0 Elm= 5 Xpart= 1  
+Cgs1= 1.1155E-10 Cgd1= 1.1155E-10 Ckappa= 0.8912  
+Cf= 1.113e-10 Clc= 5.475E-08 Cle= 6.46  
+D1c= 2E-08 Dwc= 0 Vfbcv= -1

=====180nm\_bulk.txt=====

\*  
\* Predictive Technology Model Beta Version  
\* 180nm NMOS SPICE Parametersv (normal one)  
\*

.model NMOS NMOS  
+Level = 49

+Lint = 4.e-08 Tox = 4.e-09  
+Vth0 = 0.3999 RdsW = 250

+lmin=1.8e-7 lmax=1.8e-7 wmin=1.8e-7 wmax=1.0e-4 Tref=27.0 version =3.1  
+Xj= 6.000000E-08 Nch= 5.950000E+17  
+lln= 1.0000000 lwn= 1.0000000 wln= 0.00  
+wwn= 0.00 ll= 0.00  
+lw= 0.00 lwl= 0.00 wint= 0.00  
+wl= 0.00 ww= 0.00 wwl= 0.00

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+Mobmod= 1          binunit= 2          xl= 0
+XW= 0              binflag= 0
+Dwg= 0.00          Dwb= 0.00

+K1= 0.5613000      K2= 1.0000000E-02
+K3= 0.00           Dvt0= 8.0000000
+Dvt2= 8.0000000E-03 Dvt0w= 0.00
+Dvt2w= 0.00       Nlx= 1.6500000E-07
+K3b= 0.00         Ngate= 5.0000000E+20

+Vsat= 1.3800000E+05 Ua= -7.0000000E-10 Ub= 3.5000000E-18
+Uc= -5.2500000E-11 Prwb= 0.00
+Prwg= 0.00        Wr= 1.0000000
+A0= 1.1000000     Keta= 4.0000000E-02 U0= 3.5000000E-02
+A2= 1.0000000     Ags= -1.0000000E-02 A1= 0.00
+B1= 0.00          B0= 0.00

+Voff= -0.12350000 NFactor= 0.9000000 Cit= 0.00
+Cdsc= 0.00        Cdscb= 0.00      Cdscd= 0.00
+Eta0= 0.2200000  Etab= 0.00      Dsub= 0.8000000

+Pclm= 5.0000000E-02 Pdblc1= 1.2000000E-02 Pdblc2= 7.5000000E-03
+Pdblc1cb= -1.3500000E-02 DROUT= 1.7999999E-02 Pscbe1= 8.6600000E+08
+Pscbe2= 1.0000000E-20 Pvag= -0.2800000 Delta= 1.0000000E-02
+Alpha0= 0.00     Beta0= 30.0000000

+kt1= -0.3700000   kt2= -4.0000000E-02 At= 5.5000000E+04
+Ute= -1.4800000   Ua1= 9.5829000E-10 Ub1= -3.3473000E-19
+Uc1= 0.00        Kt11= 4.0000000E-09 Prt= 0.00

+Cj= 0.00365       Mj= 0.54         Pb= 0.982
+Cjsw= 7.9E-10     Mjsw= 0.31       Php= 0.841
+Cta= 0            Ctp= 0           Pta= 0
+Ptp= 0           JS=1.50E-08      JSW=2.50E-13
+N=1.0            Xti=3.0          Cgdo=2.786E-10
+Cgso=2.786E-10   Cgbo=0.0E+00     Capmod= 2
+NQSMOD= 0        Elm= 5           Xpart= 1
+Cgs1= 1.6E-10    Cgd1= 1.6E-10    Ckappa= 2.886
+Cf= 1.069e-10    Clc= 0.0000001  Cle= 0.6
+Dlc= 4E-08       Dwc= 0           Vfbcv= -1

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*
* Predictive Technology Model Beta Version
* 180nm PMOS SPICE Parametersv (normal one)
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.model PMOS PMOS
+Level = 49

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+Lint = 3.e-08 Tox = 4.2e-09
+Vth0 = -0.42 RdsW = 450

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+Lmin=1.8e-7 lmax=1.8e-7 wmin=1.8e-7 wmax=1.0e-4 Tref=27.0 version =3.1

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+Xj= 7.0000000E-08 Nch= 5.9200000E+17
+lln= 1.0000000     lwn= 1.0000000   wln= 0.00
+wwn= 0.00         ll= 0.00
+lw= 0.00          lwl= 0.00        wint= 0.00
+wl= 0.00          ww= 0.00         wwl= 0.00
+Mobmod= 1          binunit= 2          xl= 0.00
+XW= 0.00
+binflag= 0         Dwg= 0.00         Dwb= 0.00

```

```

+ACM= 0            ldif=0.00        hdif=0.00
+rsh= 0            rd= 0           rs= 0
+rsc= 0            rdc= 0

```

```

+K1= 0.5560000     K2= 0.00
+K3= 0.00          Dvt0= 11.2000000 Dvt1= 0.7200000
+Dvt2= -1.0000000E-02 Dvt0w= 0.00      Dvt1w= 0.00
+Dvt2w= 0.00      Nlx= 9.5000000E-08 W0= 0.00
+K3b= 0.00        Ngate= 5.0000000E+20

```

```

+Vsat= 1.0500000E+05 Ua= -1.2000000E-10 Ub= 1.0000000E-18
+Uc= -2.9999999E-11 Prwb= 0.00
+Prwg= 0.00        Wr= 1.0000000
+A0= 2.1199999     Keta= 2.9999999E-02 U0= 8.0000000E-03
+A2= 0.4000000     Ags= -0.1000000  A1= 0.00
+B1= 0.00          B0= 0.00

```

```

+Voff= -6.4000000E-02 NFactor= 1.4000000 Cit= 0.00
+Cdsc= 0.00        Cdscb= 0.00      Cdscd= 0.00
+Eta0= 8.5000000  Etab= 0.00      Dsub= 2.8000000

```

```

+Pclm= 2.0000000   Pdblc1= 0.1200000 Pdblc2= 8.0000000E-05
+Pdblc1cb= 0.1450000 DROUT= 5.0000000E-02 Pscbe1= 1.0000000E-20
+Pscbe2= 1.0000000E-20 Pvag= -6.0000000E-02 Delta= 1.0000000E-02
+Alpha0= 0.00     Beta0= 30.0000000

```

```

+kt1= -0.3700000   kt2= -4.0000000E-02 At= 5.5000000E+04
+Ute= -1.4800000   Ua1= 9.5829000E-10 Ub1= -3.3473000E-19
+Uc1= 0.00        Kt11= 4.0000000E-09 Prt= 0.00

```

```

+Cj= 0.00138       Mj= 1.05         Pb= 1.24
+Cjsw= 1.44E-09   Mjsw= 0.43      Php= 0.841
+Cta= 0.00093     Ctp= 0           Pta= 0.00153
+Ptp= 0           JS=1.50E-08     JSW=2.50E-13

```

```

+N=1.0           Xti=3.0           Cgdo=2.786E-10
+Cgso=2.786E-10 Cgbo=0.0E+00          Capmod= 2
+NQSMOD= 0       Elm= 5           Xpart= 1
+Cgsl= 1.6E-10  Cgd1= 1.6E-10        Ckappa= 2.886
+Cf= 1.058e-10  Clc= 0.0000001      Cle= 0.6
+D1c= 3E-08     Dwc= 0           Vfbcv= -1

```

=====22nm\_bulk.pm=====

\* Beta Version

\* PTM 22nm NMOS

.model nmos nmos level = 54

```

+version = 4.0      binunit = 1      paramchk= 1      mobmod = 0
+capmod = 2        igcmmod = 1      igbmod = 1      geomod = 1
+diomod = 1        rdsmod = 0      rbodymod= 1      rgatemod= 1
+permod = 1        acnqsmod= 0     trnqsmod= 0

+tnom = 27         toxo = 1.2e-9      toxp = 0.9e-9   toxm = 1.2e-9
+dtox = 0.3e-9    epsrox = 3.9      wint = 5e-009   lint = 2.0e-009
+ll = 0           wl = 0           lln = 1         wln = 1
+lw = 0           ww = 0           lwn = 1         wwn = 1
+lwl = 0          wwl = 0          xpart = 0       toxref = 1.2e-9
+xl = -9e-9
+vth0 = 0.5118    k1 = 0.4         k2 = 0.0        k3 = 0
+k3b = 0          w0 = 2.5e-006   dvt0 = 1        dvt1 = 2
+dvt2 = 0         dvt0w = 0       dvt1w = 0       dvt2w = 0
+dsb = 0.078     minv = 0.05     voffl = 0       dvtp0 = 1.0e-011
+dvtp1 = 0.1     lpe0 = 0        lpeb = 0        xj = 7.2e-009
+ngate = 2e+020   ndep = 12e+018  nsd = 2e+020    phin = 0
+cdsc = 0.000    cdscb = 0       cdscd = 0       cit = 0
+voff = -0.13    nfactor = 2.3   eta0 = 0.0045   etab = 0
+vfb = -1.058    u0 = 0.0181    ua = -5e-010    ub = 1.7e-018
+uc = 0          vsat = 200000   a0 = 1.0        ags = 0
+a1 = 0          a2 = 1.0        b0 = 0          b1 = 0
+keta = 0.04     dwg = 0         dwb = 0         pclm = 0.06
+pdiblc1 = 0.001 pdiblc2 = 0.001 pdiblc3 = -0.005 pdiblc4 = 0.5
+pvag = 1e-020   delta = 0.01    pscb1 = 8.14e+008 pscb2 = 1e-007
+fprout = 0.2    pdits = 0.01   pditsd = 0.23  pditsl = 2.3e+006
+rsh = 5         rdsw = 130     rsw = 75        rdw = 75
+rdsmin = 0      rdwmin = 0     rswmin = 0      prwg = 0
+prwb = 0        wr = 1         alpha0 = 0.074  alpha1 = 0.005
+beta0 = 30     agidl = 0.0002 bgidl = 2.1e+009 cgidl = 0.0002
+egidl = 0.8

+aigbacc = 0.012  bigbacc = 0.0028 cigbacc = 0.002  cigbinv = 0.004
+nigbacc = 1      aigbinv = 0.014 bigbinv = 0.004  bigc = 0.0028
+eigbinv = 1.1   nigbinv = 3     aigc = 0.012   bigc = 0.0028
+ctgc = 0.002    aigsd = 0.012  bigsd = 0.0028  cigsd = 0.002
+nigc = 1        poxedg = 1     pigcd = 1       ntox = 1

+xrcrg1 = 12      xrcrg2 = 5      cgbo = 2.56e-011 cgdl = 2.653e-10
+cgso = 0.65e-010 ckappas = 0.03  ckappad = 0.03  acde = 1
+cgsl = 2.653e-10 ckappa = 0.03  voffcv = 0.02
+moin = 15

+kt1 = -0.11     kt1l = 0        kt2 = 0.022     ute = -1.5
+ua1 = 4.31e-009 ub1 = 7.61e-018 uc1 = -5.6e-011 prt = 0
+at = 33000

+fnoimod = 1     tnoimod = 0

+jss = 0.0001    jsws = 1e-011   jswgs = 1e-010  njs = 1
+ijthsfwd= 0.01 ijthsrev= 0.001 bvs = 10        xjbvs = 1
+jsd = 0.0001   jswd = 1e-011   jswgd = 1e-010  njd = 1
+ijthdfwd= 0.01 ijthdrev= 0.001 bvd = 10        xjbvd = 1
+pbs = 1        cjs = 0.0005    mjjs = 0.5       pbsws = 1
+cjsws = 5e-010 mjsws = 0.33    pbswgs = 1       cjswgs = 3e-010
+mjswgs = 0.33 pbd = 1         cjd = 0.0005    mjd = 0.5
+pbswd = 1      cjswd = 5e-010 mjswd = 0.33    pbswd = 1
+cjswgd = 5e-010 mjswd = 0.33    tpb = 0.005     tcj = 0.001
+tpbsw = 0.005 tcjsw = 0.001  tpbswg = 0.005  tcjswg = 0.001
+xtis = 3       xtis = 3

+dmcg = 0e-006   dmci = 0e-006   dmdg = 0e-006   dmcgt = 0e-007
+dwj = 0.0e-008 xgw = 0e-007    xgl = 0e-008

+rshg = 0.4      gbmin = 1e-010  rbpb = 5        rbpd = 15
+rbps = 15       rbdb = 15       rbsb = 15       ngcon = 1

```

\* PTM 22nm PMOS

.model pmos pmos level = 54

```

+version = 4.0      binunit = 1      paramchk= 1      mobmod = 0
+capmod = 2        igcmmod = 1      igbmod = 1      geomod = 1
+diomod = 1        rdsmod = 0      rbodymod= 1      rgatemod= 1
+permod = 1        acnqsmod= 0     trnqsmod= 0

+tnom = 27         toxo = 1.2e-009  toxp = 0.9e-009 toxm = 1.2e-009
+dtox = 0.3e-9    epsrox = 3.9     wint = 5e-009   lint = 2.0e-009
+ll = 0           wl = 0           lln = 1         wln = 1

```

```

+lw = 0          ww = 0          lwn = 1          wwn = 1
+lw1 = 0         wwl = 0         xpart = 0        toxref = 1.2e-009
+xl = -9e-9
+vth0 = -0.372   k1 = 0.4          k2 = -0.01       k3 = 0
+k3b = 0         w0 = 2.5e-006    dvt0 = 1         dvt1 = 2
+dvt2 = -0.032  dvt0w = 0        dvt1w = 0        dvt2w = 0
+dsub = 0.1      minv = 0.05      voffl = 0        dvtp0 = 1e-011
+dvtpl = 0.05   lpe0 = 0         lpeb = 0         xj = 7.2e-009
+ngate = 2e+020  ndep = 4.40e+018 nsd = 2e+020     phin = 0
+cdsc = 0.000   cdsccb = 0       cdsd = 0         cit = 0
+voff = -0.13   nfactor = 2.3    eta0 = 0.0037    etab = 0
+vfb = -1.058   u0 = 0.00230    ua = -0.5e-009   ub = 1.6e-018
+uc = 0         vsat = 78000     a0 = 1.0         ags = 1e-020
+a1 = 0         a2 = 1           b0 = 0           b1 = 0
+keta = -0.047  dwg = 0          dwb = 0          pclm = 0.1
+pdiblc1 = 0.001 pdiblc2 = 0.001 pdiblc3 = 3.4e-008 drout = 0.6
+pvag = 1e-020  delta = 0.01     pscbe1 = 8.14e+008 pscbe2 = 9.58e-007
+fprout = 0.2   pdits = 0.08     pditsd = 0.23    pditsl = 2.3e+006
+rsh = 5        rdsw = 130       rsw = 65         rdw = 65
+rdsmin = 0     rdmin = 0        rswmin = 0       prwg = 0
+prwb = 0       wr = 1           alpha0 = 0.074   alpha1 = 0.005
+beta0 = 30     agidl = 0.0002   bgidl = 2.1e+009 cgidl = 0.0002
+egidl = 0.8

+aigbacc = 0.012  bigbacc = 0.0028  cigbacc = 0.002  cigbinv = 0.004
+nigbacc = 1     aigbinv = 0.014  bigbinv = 0.004  bigc = 0.0012
+eigbinv = 1.1   nigbinv = 3      aigc = 0.69     bigsd = 0.0012  cigsd = 0.0008
+cigc = 0.0008   aigsd = 0.0087  bigcd = 1        pigcd = 1        ntox = 1
+nigc = 1

+xrcrg1 = 12     xrcrg2 = 5
+cgso = 0.65e-010 cgdo = 0.65e-010 cgbo = 2.56e-011  cgdl = 2.653e-10
+cgsl = 2.653e-10 ckappas = 0.03   ckappad = 0.03   ckappad = 0.03   acde = 1
+moin = 15      noff = 0.9       voffcv = 0.02

+kt1 = -0.11    kt1l = 0         kt2 = 0.022     ute = -1.5
+ua1 = 4.31e-009 ub1 = 7.61e-018 uc1 = -5.6e-011 prt = 0
+at = 33000

+fnoimod = 1     tnoimod = 0

+jss = 0.0001   jsws = 1e-011    jswgs = 1e-010  njs = 1
+ijthsfwd = 0.01  ijthsrrev = 0.001  bvs = 10        xjbvs = 1
+jsd = 0.0001  jsd = 1e-011     jswgd = 1e-010  njd = 1
+ijthdfwd = 0.01  ijthdrev = 0.001  bvd = 10        xjbvd = 1
+pbs = 1        cjs = 0.0005     mjs = 0.5        pbsws = 1
+cjsws = 5e-010  mjsws = 0.33     pbswgs = 1       cjswgs = 5e-010
+mjswgs = 0.33  pbd = 1          cjd = 0.0005    mjd = 0.5
+pbswd = 1      cjswd = 5e-010  mjswd = 0.33    pbswgd = 1
+cjswgd = 5e-010  mjswgd = 0.33   tpb = 0.005     tcj = 0.001
+tpbsw = 0.005  tcjsw = 0.001   tpbswg = 0.005  tcjswg = 0.001
+xtis = 3       xtld = 3

+dmcg = 0e-006  dmci = 0e-006   dmdg = 0e-006   dmcgt = 0e-007
+dwj = 0.0e-008  xgw = 0e-007    xgl = 0e-008

+rshg = 0.4     gbmin = 1e-010  rbpb = 5         rbpd = 15
+rbps = 15     rbdb = 15       rbsb = 15       ngcon = 1

```

=====32nm\_bulk.pm=====

\* Beta Version released on 2/22/06

\* PTM 32nm NMOS

.model nmos nmos level = 54

```

+version = 4.0    binunit = 1      paramchk = 1     mobmod = 0
+capmod = 2      igcmmod = 1     igbmod = 1       geomod = 1
+diomod = 1      rdsmmod = 0     rbodmod = 1     rgatemod = 1
+permod = 1      acnqsmmod = 0   trnqsmmod = 0

+tnom = 27       toxo = 1.65e-9   toxp = 1.0e-9   toxm = 1.65e-9
+dttox = 0.65e-9 epsrox = 3.9     wint = 5e-009   lint = 2.7e-009
+l1 = 0          wl = 0           lln = 1          wln = 1
+lw = 0          ww = 0           lwn = 1          wwn = 1
+lw1 = 0         wwl = 0         xpart = 0        toxref = 1.65e-9
+xl = -14e-9
+vth0 = 0.5088   k1 = 0.4          k2 = 0.0         k3 = 0
+k3b = 0         w0 = 2.5e-006    dvt0 = 1         dvt1 = 2
+dvt2 = 0        dvt0w = 0        dvt1w = 0        dvt2w = 0
+dsub = 0.1      minv = 0.05      voffl = 0        dvtp0 = 1.0e-011
+dvtpl = 0.1     lpe0 = 0         lpeb = 0         xj = 1.0e-008
+ngate = 2e+020  ndep = 4.12e+018 nsd = 2e+020     phin = 0
+cdsc = 0.000   cdsccb = 0       cdsd = 0         cit = 0
+voff = -0.13   nfactor = 2.3    eta0 = 0.0042    etab = 0
+vfb = -0.55    u0 = 0.0389     ua = 6e-010      ub = 1.2e-018
+uc = 0         vsat = 178470    a0 = 1.0         ags = 0
+a1 = 0         a2 = 1.0        b0 = 0           b1 = 0
+keta = 0.04     dwg = 0          dwb = 0          pclm = 0.02
+pdiblc1 = 0.001 pdiblc2 = 0.001 pdiblc3 = -0.005 drout = 0.5
+pvag = 1e-020  delta = 0.01     pscbe1 = 8.14e+008 pscbe2 = 1e-007
+fprout = 0.2   pdits = 0.01     pditsd = 0.23    pditsl = 2.3e+006

```

```

+rsh = 5          rdsw = 150        rsw = 75         rdw = 75
+rdsmin = 0       rdmin = 0         rswmin = 0       prwg = 0
+prwb = 0         wr = 1           alpha0 = 0.074   alpha1 = 0.005
+beta0 = 30       agidl = 0.0002    bgidl = 2.1e+009  cgidl = 0.0002
+egidl = 0.8

+aigbacc = 0.012  bigbacc = 0.0028  cigbacc = 0.002  cigbinv = 0.004
+nigbacc = 1      aigbinv = 0.014  bigbinv = 0.004  bigc = 0.0028
+eigbinv = 1.1    nigbinv = 3       aigc = 0.012    bigsd = 0.0028  cigsd = 0.002
+cigc = 0.002     aigsd = 0.012    pigcd = 1        ntox = 1
+nigc = 1         poxedg = 1

+xrcrg1 = 12      xrcrg2 = 5        cgdo = 0.85e-010  cgbo = 2.56e-011  cgdl = 2.653e-10
+cgso = 0.85e-010  cgdo = 0.85e-010  ckappas = 0.03    ckappad = 0.03    acde = 1
+cgsl = 2.653e-10  ckappas = 0.03    voffcv = 0.02     voffcv = 0.02
+moin = 15        noff = 0.9

+kt1 = -0.11     kt1l = 0          kt2 = 0.022       ute = -1.5
+ua1 = 4.31e-009  ub1 = 7.61e-018  uc1 = -5.6e-011   prt = 0
+at = 33000

+fnoimod = 1      tnoimod = 0

+jss = 0.0001     jsws = 1e-011     jswgs = 1e-010   njs = 1
+ijthsfwd= 0.01   ijthsrev= 0.001   bvs = 10         xjbvs = 1
+jsd = 0.0001     jswd = 1e-011     jswgd = 1e-010   njd = 1
+ijthd fwd= 0.01  ijthdrev= 0.001   bvd = 10         xjbvd = 1
+pbs = 1          cjs = 0.0005      mjs = 0.5        pbsws = 1
+cjsws = 5e-010  mjsws = 0.33      pbswgs = 1       cjswgs = 3e-010
+mjswgs = 0.33   pbd = 1           cjd = 0.0005     mjd = 0.5
+pbswd = 1        cjswd = 5e-010   mjswd = 0.33     pbswd = 1
+cjswgd = 5e-010  mjswgd = 0.33    tpb = 0.005      tcj = 0.001
+tpbsw = 0.005   tcjsw = 0.001     tpbswg = 0.005   tcjswg = 0.001
+xtis = 3         xtld = 3

+dmcg = 0e-006    dmci = 0e-006     dmdg = 0e-006    dmcgt = 0e-007
+dwj = 0.0e-008  xgw = 0e-007      xgl = 0e-008

+rshg = 0.4       gbmin = 1e-010    rbpb = 5         rbpd = 15
+rbps = 15        rbdb = 15         rbsb = 15        ngcon = 1

* PTM 32nm PMOS

.model pmos pmos level = 54

+version = 4.0     binunit = 1        paramchk= 1       mobmod = 0
+capmod = 2        igcmmod = 1        igbmod = 1        geomod = 1
+diomod = 1        rdsmod = 0         rbodymod= 1       rgatemod= 1
+permod = 1        acnqsmod= 0        trnqsmod= 0

+tnom = 27        toxo = 1.75e-009   toxp = 1.0e-009   toxm = 1.75e-009
+dtax = 0.75e-9   epsrox = 3.9       wint = 5e-009     lint = 2.7e-009
+ll = 0           wl = 0             lln = 1           wln = 1
+lw = 0           ww = 0             lwn = 1           wwn = 1
+lwl = 0          wwl = 0           xpart = 0         toxref = 1.75e-009
+x1 = -14e-9
+vtth0 = -0.450   k1 = 0.4           k2 = -0.01        k3 = 0
+k3b = 0           w0 = 2.5e-006     dvt0 = 1          dvt1 = 2
+dvt2 = -0.032    dvt0w = 0          dvt1w = 0         dvt2w = 0
+dsub = 0.1       minv = 0.05        voffl = 0         dvtp0 = 1e-011
+dvtp1 = 0.05     lpe0 = 0           lpeb = 0          xj = 1.0e-008
+ngate = 2e+020   ndep = 3.07e+018  nsd = 2e+020      phin = 0
+cpsc = 0.000     cdscb = 0          cdscd = 0         cit = 0
+voff = -0.126    nfactor = 2.3      eta0 = 0.0042     etab = 0
+vfb = 0.55       u0 = 0.00355       ua = 2.0e-009     ub = 0.5e-018
+uc = 0           vsat = 70000       a0 = 1.0          ags = 1e-020
+a1 = 0           a2 = 1             b0 = 0            b1 = 0
+keta = -0.047     dwg = 0            dwb = 0           pclm = 0.1
+pdiblc1 = 0.001  pdiblc2 = 0.001   pdiblc3 = 3.4e-008  drout = 0.6
+pvag = 1e-020    delta = 0.01       psceb1 = 8.14e+008  psceb2 = 9.58e-007
+fprou = 0.2      pdits = 0.08       pditsd = 0.23     pditsl = 2.3e+006
+rsh = 5          rdsw = 150        rsw = 75         rdw = 75
+rdsmin = 0       rdmin = 0         rswmin = 0       prwg = 0
+prwb = 0         wr = 1           alpha0 = 0.074   alpha1 = 0.005
+beta0 = 30       agidl = 0.0002    bgidl = 2.1e+009  cgidl = 0.0002
+egidl = 0.8

+aigbacc = 0.012  bigbacc = 0.0028  cigbacc = 0.002  cigbinv = 0.004
+nigbacc = 1      aigbinv = 0.014  bigbinv = 0.004  bigc = 0.0012
+eigbinv = 1.1    nigbinv = 3       aigc = 0.069     bigsd = 0.0012  cigsd = 0.0008
+cigc = 0.0008    aigsd = 0.0087   pigcd = 1        ntox = 1
+nigc = 1         poxedg = 1

+xrcrg1 = 12      xrcrg2 = 5        cgdo = 0.85e-010  cgbo = 2.56e-011  cgdl = 2.653e-10
+cgso = 0.85e-010  cgdo = 0.85e-010  ckappas = 0.03    ckappad = 0.03    acde = 1
+cgsl = 2.653e-10  ckappas = 0.03    voffcv = 0.02     voffcv = 0.02
+moin = 15        noff = 0.9

+kt1 = -0.11     kt1l = 0          kt2 = 0.022       ute = -1.5
+ua1 = 4.31e-009  ub1 = 7.61e-018  uc1 = -5.6e-011   prt = 0
+at = 33000

+fnoimod = 1      tnoimod = 0

+jss = 0.0001     jsws = 1e-011     jswgs = 1e-010   njs = 1
+ijthsfwd= 0.01   ijthsrev= 0.001   bvs = 10         xjbvs = 1
+jsd = 0.0001     jswd = 1e-011     jswgd = 1e-010   njd = 1

```

```

+ijthd fwd= 0.01      ijthdrev= 0.001      bvd = 10      xjbvd = 1
+pbs = 1              cjs = 0.0005      mjs = 0.5     pbsws = 1
+cjsws = 5e-010      mjsws = 0.33      pbswgs = 1    cjswgs = 3e-010
+mjswgs = 0.33       pbd = 1           cjd = 0.0005  mjd = 0.5
+pbswd = 1           cjswd = 5e-010   mjswd = 0.33  pbswd = 1
+cjswgd = 5e-010    njswd = 0.33     tpb = 0.005   tcj = 0.001
+tpbsw = 0.005      tcjsw = 0.001    tpbswg = 0.005 tcjswg = 0.001
+xtis = 3           xtis = 3
+dmcg = 0e-006      dmci = 0e-006    dmdg = 0e-006 dmcgt = 0e-007
+dwj = 0.0e-008     xgw = 0e-007     xgl = 0e-008
+rshg = 0.4         gbmin = 1e-010   rbpb = 5      rbpd = 15
+rbps = 15          rbdb = 15        rbsb = 15     ngcon = 1

```

=====45nm\_bulk.pm=====

\* Beta Version released on 2/22/06

\* PTM 45nm NMOS

.model nmos nmos level = 54

```

+version = 4.0        binunit = 1        paramchk= 1      mobmod = 0
+capmod = 2          igcmmod = 1        igbmod = 1        geomod = 1
+diomod = 1          rdsmod = 0         rbodymod= 1      rgatemod= 1
+permod = 1          acnqsmod= 0       trnqsmod= 0
+tnom = 27           toxex = 1.75e-9    toxp = 1.1e-9    toxm = 1.75e-9
+dtox = 0.65e-9     epsrox = 3.9       wint = 5e-009    lint = 3.75e-009
+ll = 0              wl = 0             lln = 1           wln = 1
+lw = 0              ww = 0             lwn = 1           wwn = 1
+lw1 = 0             wwl = 0           xpart = 0         toxref = 1.75e-9
+xl = -20e-9
+vth0 = 0.466        k1 = 0.4           k2 = 0.0          k3 = 0
+k3b = 0             w0 = 2.5e-006     dvt0 = 1          dvt1 = 2
+dvt2 = 0            dvt0w = 0          dvt1w = 0         dvt2w = 0
+dsub = 0.1          minv = 0.05        voffl = 0         dvtp0 = 1.0e-010
+dvtpl = 0.1         lpe0 = 0           lpeb = 0          xj = 1.4e-008
+ngate = 2e+020      ndep = 3.24e+018  nsd = 2e+020     phin = 0
+cdsc = 0.000        cdscl = 0          cdscl = 0         cit = 0
+voff = -0.13        nfactor = 2.1      eta0 = 0.0049     etab = 0
+vfb = -0.55         u0 = 0.04398       ua = 6e-010       ub = 1.2e-018
+uc = 0              vsat = 147390      a0 = 1.0          ags = 0
+a1 = 0              a2 = 1.0           b0 = 0            b1 = 0
+keta = 0.04         dwg = 0            dwb = 0           pclm = 0.02
+pdiblc1 = 0.001     pdiblc2 = 0.001    pdiblc3 = -0.005 droul = 0.5
+pvag = 1e-020       delta = 0.01        pscl = 8.14e+008 pscl2 = 1e-007
+fprout = 0.2        pdits = 0.08       pditsd = 0.23     pditsl = 2.3e+006
+rsh = 5             rds = 155          rsw = 80          rdw = 80
+rdsmin = 0          rdswmin = 0        rswmin = 0        prwg = 0
+prwb = 0            wr = 1             alpha0 = 0.074    alpha1 = 0.005
+beta0 = 30          agidl = 0.0002     bgidl = 2.1e+009  cgidl = 0.0002
+egidl = 0.8
+aignbacc = 0.012    bigbacc = 0.0028   cigbacc = 0.002   cigbinv = 0.004
+aignbacc = 1        aignbinv = 0.014   bigbinv = 0.004   bigc = 0.0028
+aignbinv = 1.1      aignbinv = 3       aignbinv = 3       bigc = 0.0028
+cigc = 0.002        aignsd = 0.012    bigsd = 0.0028   cigsd = 0.002
+aignc = 1           poxedg = 1         pigcd = 1         ntox = 1
+xrcrg1 = 12         xrcrg2 = 5         cgbo = 2.56e-011  cgdl = 2.653e-10
+cgso = 1.1e-010    cgdo = 1.1e-010   ckappas = 0.03    ckappad = 0.03
+cgsl = 2.653e-10   ckappas = 0.03    ckappad = 0.03    ckappad = 0.03
+moin = 15           noff = 0.9         voffcv = 0.02
+kt1 = -0.11        kt1l = 0           kt2 = 0.022       ute = -1.5
+ua1 = 4.31e-009    ub1 = 7.61e-018   uc1 = -5.6e-011   prt = 0
+at = 33000
+fnoimod = 1        tnoimod = 0
+jss = 0.0001        jsws = 1e-011      jswgs = 1e-010   njs = 1
+ijths fwd= 0.01    ijthsrev= 0.001    bvs = 10          xjbvs = 1
+jsd = 0.0001        jswd = 1e-011     jswgd = 1e-010   njd = 1
+ijthd fwd= 0.01    ijthdrev= 0.001    bvd = 10          xjbvd = 1
+pbs = 1              cjs = 0.0005      mjs = 0.5         pbsws = 1
+cjsws = 5e-010     mjsws = 0.33      pbswgs = 1        cjswgs = 3e-010
+mjswgs = 0.33      pbd = 1           cjd = 0.0005     mjd = 0.5
+pbswd = 1           cjswd = 5e-010   mjswd = 0.33     pbswd = 1
+cjswgd = 5e-010   njswd = 0.33     tpb = 0.005      tcj = 0.001
+tpbsw = 0.005     tcjsw = 0.001    tpbswg = 0.005   tcjswg = 0.001
+xtis = 3           xtis = 3
+dmcg = 0e-006      dmci = 0e-006    dmdg = 0e-006    dmcgt = 0e-007
+dwj = 0.0e-008     xgw = 0e-007     xgl = 0e-008
+rshg = 0.4         gbmin = 1e-010   rbpb = 5          rbpd = 15
+rbps = 15          rbdb = 15        rbsb = 15         ngcon = 1

```

\* PTM 45nm PMOS

.model pmos pmos level = 54



```

+version = 4.0      binunit = 1      paramchk= 1      mobmod = 0
+capmod = 2        igcmmod = 1      igbmod = 1       geomod = 1
+diomod = 1        rdsmmod = 0      rbodymod= 1     rgatemod= 1
+permod = 1        acnqsmod= 0     trnqsmod= 0

+tnom = 27         toxo = 1.85e-009  toxp = 1.1e-009  toxm = 1.85e-009
+dtox = 0.75e-9   epsrox = 3.9     wint = 5e-009   lint = 3.75e-009
+ll = 0           wl = 0           lln = 1         wln = 1
+lw = 0           ww = 0           lwn = 1         wwn = 1
+lwl = 0          wwl = 0          xpart = 0       toxref = 1.85e-009
+xl = -20e-9
+vth0 = -0.4118   k1 = 0.4         k2 = -0.01      k3 = 0
+k3b = 0          w0 = 2.5e-006   dvt0 = 1        dvt1 = 2
+dvt2 = -0.032   dvt0w = 0       dvt1w = 0       dvt2w = 0
+dsub = 0.1       minv = 0.05     voffl = 0       dvtp0 = 1e-011
+dvtpl = 0.05    lpe0 = 0        lpeb = 0        xj = 1.4e-008
+ngate = 2e+020  ndep = 2.44e+018 nsd = 2e+020    phin = 0
+cjsc = 0.000    cdsccb = 0      cdsd = 0        cit = 0
+voff = -0.126   nfactor = 2.1   eta0 = 0.0049   etab = 0
+vfb = 0.55      u0 = 0.00440    ua = 2.0e-009   ub = 0.5e-018
+uc = 0          vsat = 70000    a0 = 1.0        ags = 1e-020
+a1 = 0          a2 = 1          b0 = 0          b1 = 0
+keta = -0.047   dwg = 0         dwb = 0         pclm = 0.12
+pdiblc1 = 0.001 pdiblc2 = 0.001 pdiblc3 = 3.4e-008 drout = 0.56
+pvag = 1e-020   delta = 0.01    pscbe1 = 8.14e+008 pscbe2 = 9.58e-007
+fprout = 0.2    pdits = 0.08    pditsd = 0.23   pditsl = 2.3e+006
+rsh = 5         rdsw = 155      rsw = 75        rdw = 75
+rdsmin = 0      rdwmin = 0     rswmin = 0      prwg = 0
+prwb = 0        wr = 1          alpha0 = 0.074  alpha1 = 0.005
+beta0 = 30      agidl = 0.0002  bgidl = 2.1e+009 cgidl = 0.0002
+egidl = 0.8

+aigbacc = 0.012  bigbacc = 0.0028 cigbacc = 0.002  cigbinv = 0.004
+nigbacc = 1     aigbinv = 0.014 bigbinv = 0.004  bigc = 0.0012
+eigbinv = 1.1   nigbinv = 3     aigc = 0.69     cigsd = 0.0008
+cigc = 0.0008   aigsd = 0.0087 bigsd = 0.0012  ntoc = 1
+nigc = 1        poxedge = 1    pigcd = 1

+xrcrg1 = 12      xrcrg2 = 5      cgdo = 2.56e-011 cgdl = 2.653e-10
+cgs0 = 1.1e-010 cgsl = 2.653e-10 ckappas = 0.03  voffcv = 0.02  acde = 1
+moim = 15       noff = 0.9

+kt1 = -0.11     kt1l = 0        kt2 = 0.022     ute = -1.5
+ua1 = 4.31e-009 ub1 = 7.61e-018 uc1 = -5.6e-011 prt = 0
+at = 33000

+fnoimod = 1     tnoimod = 0

+jss = 0.0001    jsws = 1e-011   jswgs = 1e-010  njs = 1
+ijthsfwd= 0.01  ijthsrrev= 0.001 bvs = 10        xjbvs = 1
+jsd = 0.0001   jsd = 1e-011   jswgd = 1e-010  njd = 1
+ijthdfwd= 0.01  ijthdrev= 0.001 bvd = 10        xjbvd = 1
+pbs = 1         cjs = 0.0005    mjs = 0.5       pbsws = 1
+cjsws = 5e-010 mjsws = 0.33    pbswgs = 1      cjswgs = 1e-010
+mjswgs = 0.33  pbd = 1         cjd = 0.0005    mjd = 0.5
+pbswd = 1       cjswd = 5e-010 mjswd = 0.33    pbswd = 1
+cjswgd = 5e-010 mjswgd = 0.33  tpb = 0.005     tcj = 0.001
+tpbsw = 0.005  tcjsw = 0.001  tpbswg = 0.005  tcjswg = 0.001
+xtis = 3        xtis = 3

+dmcg = 0e-006   dmci = 0e-006   dmdg = 0e-006   dmcgt = 0e-007
+dwj = 0.0e-008 xgw = 0e-007    xgl = 0e-008

+rshg = 0.4      gbmin = 1e-010  rbpb = 5        rbpd = 15
+rbps = 15       rbdb = 15       rbsb = 15       ngcon = 1

```

=====45nm\_bulk.txt=====

\* BPTM 45nm NMOS

.model nmos nmos level = 54

```

+version = 4.0      binunit = 1      paramchk= 1      mobmod = 0
+capmod = 2        igcmmod = 1      igbmod = 1       geomod = 1
+diomod = 1        rdsmmod = 0      rbodymod= 1     rgatemod= 1
+permod = 1        acnqsmod= 0     trnqsmod= 0

+tnom = 27         toxo = 1.4e-009  toxp = 7e-010   toxm = 1.4e-009
+dtox = 0          epsrox = 3.9     wint = 5e-009   lint = 1.2e-008
+ll = 0           wl = 0           lln = 1         wln = 1
+lw = 0           ww = 0           lwn = 1         wwn = 1
+lwl = 0          wwl = 0          xpart = 0       toxref = 1.4e-009

+vth0 = 0.22     k1 = 0.35       k2 = 0.05       k3 = 0
+k3b = 0          w0 = 2.5e-006   dvt0 = 2.8     dvt1 = 0.52
+dvt2 = -0.032   dvt0w = 0       dvt1w = 0       dvt2w = 0
+dsub = 2         minv = 0.05     voffl = 0       dvtp0 = 1e-007
+dvtpl = 0.05    lpe0 = 5.75e-008 lpeb = 2.3e-010 xj = 2e-008
+ngate = 5e+020  ndep = 2.8e+018 nsd = 1e+020    phin = 0
+cjsc = 0.0002  cdsccb = 0      cdsd = 0        cit = 0
+voff = -0.15   nfactor = 1.2   eta0 = 0.15     etab = 0

```

+vfb = -0.55 u0 = 0.032 ua = 1.6e-010 ub = 1.1e-017  
+uc = -3e-011 vsat = 1.1e+005 a0 = 2 ags = 1e-020  
+a1 = 0 a2 = 1 b0 = -1e-020 b1 = 0  
+keta = 0.04 dwg = 0 dwb = 0 pclm = 0.18  
+pdiblc1 = 0.028 pdiblc2 = 0.022 pdiblc3 = -0.005 drout = 0.45  
+pvag = 1e-020 delta = 0.01 pscbe1 = 8.14e+008 pscbe2 = 1e-007  
+fprout = 0.2 pdits = 0.2 pditsd = 0.23 pditsl = 2.3e+006  
+rsh = 3 rdsw = 150 rsw = 150 rdw = 150  
+rdswmin = 0 rdwmin = 0 rswmin = 0 prwg = 0  
+prwb = 6.8e-011 wr = 1 alpha0 = 0.074 alpha1 = 0.005  
+beta0 = 30 agidl = 0.0002 bgidl = 2.1e+009 cgidl = 0.0002  
+egidl = 0.8

+aigbacc = 0.012 bigbacc = 0.0028 cigbacc = 0.002  
+nigbacc = 1 aigbinv = 0.014 bigbinv = 0.004 cigbinv = 0.004  
+eigbinv = 1.1 nigbinv = 3 aigc = 0.012 bigc = 0.0028 bigc = 0.0028  
+cigc = 0.002 aigsd = 0.012 bigsd = 0.0028 cigsd = 0.002  
+nigc = 1 poxedg = 1 pigcd = 1 ntox = 1

+xrcrg1 = 12 xrcrg2 = 5  
+cgso = 6.238e-010 cgdo = 6.238e-010 cgbo = 2.56e-011 cgdl = 2.495e-10  
+cgsl = 2.495e-10 ckappas = 0.01 ckappad = 0.01 acde = 1  
+moin = 15 noff = 0.9 voffcv = 0.02

+kt1 = -0.37 kt1l = 0 kt2 = -0.042 ute = -1.5  
+ua1 = 1e-009 ub1 = -3.5e-019 uc1 = 0 prt = 0  
+at = 53000

+fnoimod = 1 tnoimod = 0

+jss = 0.0001 jsws = 1e-011 jswgs = 1e-010 njs = 1  
+ijthsfwd = 0.01 ijthsrev = 0.001 bvs = 10 xjbvs = 1  
+jtd = 0.0001 jswd = 1e-011 jswgd = 1e-010 njd = 1  
+ijthdfwd = 0.01 ijthdrev = 0.001 bvd = 10 xjbvd = 1  
+pbs = 1 cjs = 0.0005 mjs = 0.5 pbsws = 1  
+cjsws = 5e-010 mjsws = 0.33 pbswgs = 1 cjswgs = 3e-010  
+mjswgs = 0.33 pbd = 1 cjd = 0.0005 mjd = 0.5  
+pbswd = 1 cjswd = 5e-010 mjswd = 0.33 pbswd = 1  
+cjswd = 5e-010 mjswgd = 0.33 tpb = 0.005 tcj = 0.001  
+tpbsw = 0.005 tcjsw = 0.001 tpbswg = 0.005 tcjswg = 0.001  
+xtis = 3 xtld = 3

+dmcg = 0e-006 dmci = 0e-006 dmdg = 0e-006 dmcgt = 0e-007  
+dwj = 0.0e-008 xgw = 0e-007 xgl = 0e-008

+rshg = 0.4 gbmin = 1e-010 rbbp = 5 rbpd = 15  
+rbps = 15 rbdb = 15 rbsb = 15 ngcon = 1

\* BPTM 45nm PMOS

.model pmos pmos level = 54

+version = 4.0 binunit = 1 paramchk = 1 mobmod = 0  
+capmod = 2 igcmod = 1 igbmod = 1 geomod = 1  
+diomod = 1 rdsmod = 0 rbodymod = 1 rgatemod = 1  
+permod = 1 acnqsmod = 0 trnqsmod = 0

+tnom = 27 toxo = 1.4e-009 toxp = 7e-010 toxm = 1.4e-009  
+dtax = 0 epsrox = 3.9 wint = 5e-009 lint = 1.2e-008  
+ll = 0 wl = 0 llm = 1 wln = 1  
+lw = 0 ww = 0 lwn = 1 wwn = 1  
+lwl = 0 wwl = 0 xpart = 0 toxref = 1.4e-009

+vth0 = -0.22 k1 = 0.39 k2 = 0.05 k3 = 0  
+k3b = 0 w0 = 2.5e-006 dvt0 = 3.9 dvt1 = 0.635  
+dvt2 = -0.032 dvt0w = 0 dvt1w = 0 dvt2w = 0  
+dsb = 0.7 minv = 0.05 voffl = 0 dvtp0 = 0.5e-008  
+dvtpl = 0.05 lpe0 = 5.75e-008 lpeb = 2.3e-010 xj = 2e-008  
+ngate = 5e+020 ndep = 2.8e+018 nsd = 1e+020 phin = 0  
+cdsc = 0.000258 cdsdb = 0 cdsd = 6.1e-008 cit = 0  
+voff = -0.15 nfactor = 2 eta0 = 0.15 etab = 0  
+vfb = 0.55 u0 = 0.0095 ua = 1.6e-009 ub = 8e-018  
+uc = 4.6e-013 vsat = 90000 a0 = 1.2 ags = 1e-020  
+a1 = 0 a2 = 1 b0 = -1e-020 b1 = 0  
+keta = -0.047 dwg = 0 dwb = 0 pclm = 0.55  
+pdiblc1 = 0.03 pdiblc2 = 0.0055 pdiblc3 = 3.4e-008 drout = 0.56  
+pvag = 1e-020 delta = 0.014 pscbe1 = 8.14e+008 pscbe2 = 9.58e-007  
+fprout = 0.2 pdits = 0.2 pditsd = 0.23 pditsl = 2.3e+006  
+rsh = 3 rdsw = 250 rsw = 160 rdw = 160  
+rdswmin = 0 rdwmin = 0 rswmin = 0 prwg = 3.22e-008  
+prwb = 6.8e-011 wr = 1 alpha0 = 0.074 alpha1 = 0.005  
+beta0 = 30 agidl = 0.0002 bgidl = 2.1e+009 cgidl = 0.0002  
+egidl = 0.8

+aigbacc = 0.012 bigbacc = 0.0028 cigbacc = 0.002  
+nigbacc = 1 aigbinv = 0.014 bigbinv = 0.004 cigbinv = 0.004  
+eigbinv = 1.1 nigbinv = 3 aigc = 0.69 bigc = 0.0012 bigc = 0.0012  
+cigc = 0.0008 aigsd = 0.0087 bigsd = 0.0012 cigsd = 0.0008  
+nigc = 1 poxedg = 1 pigcd = 1 ntox = 1

+xrcrg1 = 12 xrcrg2 = 5  
+cgso = 7.43e-010 cgdo = 7.43e-010 cgbo = 2.56e-011 cgdl = 1e-014  
+cgsl = 1e-014 ckappas = 0.5 ckappad = 0.5 acde = 1  
+motn = 15 noff = 0.9 voffcv = 0.02

+kt1 = -0.34 kt1l = 0 kt2 = -0.052 ute = -1.5  
+ua1 = -1e-009 ub1 = 2e-018 uc1 = 0 prt = 0

```

+at      = 33000

+fnoimod = 1      tnoimod = 0

+jss     = 0.0001  jsws    = 1e-011  jswgs   = 1e-010  njs     = 1
+ijthsfwd= 0.01   ijthsrev= 0.001  bvs     = 10     xjbvs   = 1
+jsd     = 0.0001  jswd    = 1e-011  jswgd   = 1e-010  njd     = 1
+ijthdfwd= 0.01  ijthdrev= 0.001  bvd     = 10     xjbvd   = 1
+pbs     = 1       cjs     = 0.0005  mjs     = 0.5     pbsws   = 1
+cjsws   = 5e-010 mjsws   = 0.33   pbswgs  = 1     cjswgs  = 3e-010
+mjswgs  = 0.33   pbd     = 1     cjd     = 0.0005  mjd     = 0.5
+pbswd   = 1     cjswd   = 5e-010 mjswd   = 0.33  pbswd   = 1
+cjswgd  = 5e-010 mjswgd  = 0.33   tpb     = 0.005  tcj     = 0.001
+tpbsw   = 0.005 tcjsw   = 0.001 tpbswg  = 0.005  tcjswg  = 0.001
+xtis    = 3     xtids   = 3

+dmcg    = 5e-006  dmci    = 5e-006  dmdg    = 5e-006  dmcgt   = 6e-007
+dwj     = 0e-008  xgw     = 3e-007  xgl     = 4e-008

+rshg    = 0.4    gbmin   = 1e-010  rpbp    = 5     rbpd    = 15
+rbps    = 15    rbdb    = 15    rbsb    = 15    ngcon   = 1

```

=====65nm\_bulk.pm=====

\* Beta Version released on 2/22/06

\* PTM 65nm NMOS

.model nmos nmos level = 54

```

+version = 4.0      binunit = 1      paramchk= 1      mobmod = 0
+capmod  = 2       igcmmod = 1      igbmod = 1      geomod = 1
+diamod  = 1       rdsmod = 0       rbodymod= 1     rgatemod= 1
+permod  = 1       acnqsmod= 0     trnqsmod= 0

+tnom    = 27      tox     = 1.85e-9  toxp    = 1.2e-9  toxm    = 1.85e-9
+dtox    = 0.65e-9 epsrox  = 3.9       wint    = 5e-009  lint    = 5.25e-009
+ll       = 0      wl      = 0         lln     = 1         wln     = 1
+lw       = 0      ww      = 0         lwn     = 1         wwn     = 1
+lw1     = 0      ww1     = 0       xpart   = 0       toxref  = 1.85e-9
+xl       = -30e-9

+vth0    = 0.423   k1      = 0.4     k2      = 0.01    k3      = 0
+k3b     = 0       w0      = 2.5e-006 dvt0    = 1     dvt1    = 2
+dvt2    = -0.032 dvt0w  = 0       dvt1w  = 0       dvt2w  = 0
+dsub    = 0.1    minv    = 0.05   voffl   = 0       dvtp0  = 1.0e-009
+dvtp1   = 0.1    lpe0    = 0       lpeb    = 0       xj      = 1.96e-008
+ngate   = 2e+020 ndep    = 2.54e+018 nsd     = 2e+020  phin    = 0
+cjsc    = 0.000  cdsccb  = 0       cdsccd  = 0       cit     = 0
+voff    = -0.13  nfactor = 1.9     eta0    = 0.0058  etab    = 0
+vfb     = -0.55  u0      = 0.0491  ua      = 6e-010  ub      = 1.2e-018
+uc      = 0      vsat    = 124340 a0      = 1.0     ags     = 1e-020
+a1      = 0      a2      = 1.0     b0      = 0       b1      = 0
+keta    = 0.04   dwg     = 0       dwb     = 0       pclm    = 0.04
+pdiblc1 = 0.001  pdiblc2 = 0.001  pdiblc3 = -0.005  drout   = 0.5
+pvag    = 1e-020 delta    = 0.01  psbbe1  = 8.14e+008 psbbe2  = 1e-007
+fprout  = 0.2    pdits   = 0.08  pditsd  = 0.23   pditsl  = 2.3e+006
+rsh     = 5      rdsw    = 165   rsw     = 85     rdw     = 85
+rdsmin  = 0      rdwmin  = 0       rswmin  = 0       prwg    = 0
+prwb   = 6.8e-011 wr       = 1     alpha0  = 0.074   alpha1  = 0.005
+beta0   = 30    agidl   = 0.0002 bgidl   = 2.1e+009  cgidl   = 0.0002
+egidl   = 0.8

+aigbacc = 0.012  bigbacc = 0.0028  cigbacc = 0.002      cigbinv = 0.004
+nigbacc = 1     aigbinv = 0.014  bigbinv = 0.004      bigc    = 0.0028
+eigbinv = 1.1   nigbinv = 3     aigc    = 0.012     cigsd   = 0.002
+cigc    = 0.002 aigsd   = 0.012  bigsd   = 0.0028    cigsd   = 0.002
+nigc    = 1     poxedg  = 1     pigcd   = 1         ntox    = 1

+xrcrg1  = 12     xrcrg2  = 5       cgbo    = 2.56e-011  cgdl    = 2.653e-10
+cgs0    = 1.5e-010 cgdo    = 1.5e-010  ckappad = 0.03     acde    = 1
+cgs1    = 2.653e-10 ckappas = 0.03     voffcv  = 0.02

+kt1     = -0.11  kt1l    = 0       kt2     = 0.022   ute     = -1.5
+ua1     = 4.31e-009 ub1     = 7.61e-018 uc1     = -5.6e-011  prt     = 0
+at      = 33000

+fnoimod = 1      tnoimod = 0

+jss     = 0.0001  jsws    = 1e-011  jswgs   = 1e-010  njs     = 1
+ijthsfwd= 0.01   ijthsrev= 0.001  bvs     = 10     xjbvs   = 1
+jsd     = 0.0001  jswd    = 1e-011  jswgd   = 1e-010  njd     = 1
+ijthdfwd= 0.01  ijthdrev= 0.001  bvd     = 10     xjbvd   = 1
+pbs     = 1       cjs     = 0.0005  mjs     = 0.5     pbsws   = 1
+cjsws   = 5e-010 mjsws   = 0.33   pbswgs  = 1     cjswgs  = 3e-010
+mjswgs  = 0.33   pbd     = 1     cjd     = 0.0005  mjd     = 0.5
+pbswd   = 1     cjswd   = 5e-010 mjswd   = 0.33  pbswd   = 1
+cjswgd  = 5e-010 mjswgd  = 0.33   tpb     = 0.005  tcj     = 0.001
+tpbsw   = 0.005 tcjsw   = 0.001 tpbswg  = 0.005  tcjswg  = 0.001
+xtis    = 3     xtids   = 3

+dmcg    = 0e-006  dmci    = 0e-006  dmdg    = 0e-006  dmcgt   = 0e-007
+dwj     = 0.0e-008  xgw     = 0e-007  xgl     = 0e-008

```

+rshg = 0.4            gmin = 1e-010        rpbp = 5            rbpd = 15  
+rbps = 15            rbdb = 15            rbsb = 15            ngcon = 1

\* PTM 65nm PMOS

.model pmos pmos level = 54

+version = 4.0        binunit = 1            paramchk= 1            mobmod = 0  
+capmod = 2           igmod = 1            igbmod = 1            geomod = 1  
+diomod = 1           rdsmod = 0           rbodymod= 1           rgatemod= 1  
+permod = 1           acnqsmod= 0           trnqsmod= 0

+tnom = 27            toxo = 1.95e-009        toxp = 1.2e-009        toxm = 1.95e-009  
+dtox = 0.75e-9       epsrox = 3.9            wint = 5e-009           lint = 5.25e-009  
+ll = 0                wl = 0                lln = 1                wln = 1  
+lw = 0                ww = 0                lwn = 1                wwn = 1  
+lwl = 0                wwl = 0                xpart = 0              toxref = 1.95e-009  
+xl = -30e-9  
+vth0 = -0.365        k1 = 0.4                k2 = -0.01              k3 = 0  
+k3b = 0                w0 = 2.5e-006            dvt0 = 1                dvt1 = 2  
+dvt2 = -0.032        dvt0w = 0                dvt1w = 0                dvt2w = 0  
+dsd = 0.1            minv = 0.05              voffl = 0                dvtp0 = 1e-009  
+dvtp1 = 0.05        lpe0 = 0                lpeb = 0                xj = 1.96e-008  
+ngate = 2e+020       ndep = 1.87e+018        nsd = 2e+020            phin = 0  
+cdsc = 0.000        cdsd = 0                cdsd = 0                cit = 0  
+voff = -0.126        nfactor = 1.9            eta0 = 0.0058           etab = 0  
+vfb = 0.55            u0 = 0.00574            ua = 2.0e-009            ub = 0.5e-018  
+uc = 0                vsat = 70000            a0 = 1.0                ags = 1e-020  
+a1 = 0                a2 = 1                b0 = -1e-020            b1 = 0  
+keta = -0.047        dwg = 0                dwb = 0                pclm = 0.12  
+pdiblc1 = 0.001       pdiblc2 = 0.001           pdiblc3 = 3.4e-008        drout = 0.56  
+pvag = 1e-020        delta = 0.01            psbe1 = 8.14e+008        psbe2 = 9.58e-007  
+fpout = 0.2           pdits = 0.08            pditsd = 0.23            pditsl = 2.3e+006  
+rsh = 5                rdsd = 165              rsw = 85                rdw = 85  
+rdsmin = 0            rdmin = 0                rswmin = 0              prwg = 3.22e-008  
+prwb = 6.8e-011       wr = 1                alpha0 = 0.074           alpha1 = 0.005  
+beta0 = 30            agidl = 0.0002           bgidl = 2.1e+009           cgidl = 0.0002  
+egidl = 0.8

+aigbacc = 0.012        bigbacc = 0.0028        cigbacc = 0.002            cigbinv = 0.004  
+nigbacc = 1            aigbinv = 0.014            bigbinv = 0.004            bigc = 0.0012  
+eigbinv = 1.1           nigbinv = 3              aigc = 0.69              bigsd = 0.0012            cigsd = 0.0008  
+cigc = 0.0008        aigsd = 0.0087            bigsd = 0.0012            pigcd = 1                ntox = 1  
+nigc = 1                poxedge = 1

+xrcrg1 = 12            xrcrg2 = 5                cgdo = 2.56e-011        cgdl = 2.653e-10  
+cgso = 1.5e-010        cgdo = 1.5e-010            ckappas = 0.03            ckappad = 0.03            acde = 1  
+cgs1 = 2.653e-10        ckappas = 0.03            voffcv = 0.02

+kt1 = -0.11            kt1l = 0                kt2 = 0.022              ute = -1.5  
+ua1 = 4.31e-009        ub1 = 7.61e-018            uc1 = -5.6e-011            prt = 0  
+at = 33000

+fnoimod = 1            trnoimod = 0

+jss = 0.0001            jsws = 1e-011            jswgs = 1e-010            njs = 1  
+ijthsfwd= 0.01        ijthsrev= 0.001            bvs = 10                xjbvs = 1  
+jtd = 0.0001            jswd = 1e-011            jswgd = 1e-010            njd = 1  
+ijthdfwd= 0.01        ijthdrev= 0.001            bvd = 10                xjbvd = 1  
+pbs = 1                cjs = 0.0005            mjs = 0.5                pbsws = 1  
+cjsws = 5e-010        mjsws = 0.33            pbswgs = 1                cjswgs = 3e-010  
+mjswgs = 0.33        pbd = 1                cjd = 0.0005            mjd = 0.5  
+pbswd = 1            cjswd = 5e-010            mjswd = 0.33            pbswd = 1  
+cjswd = 5e-010        mjswd = 0.33            tpb = 0.005            tcj = 0.001  
+tpbsw = 0.005        tcjsw = 0.001            tpbswg = 0.005            tcjswg = 0.001  
+xtis = 3                xtis = 3

+dmcg = 0e-006        dmci = 0e-006            dmdg = 0e-006            dmcgt = 0e-007  
+dwj = 0.0e-008        xgw = 0e-007            xgl = 0e-008

+rshg = 0.4            gmin = 1e-010        rpbp = 5            rbpd = 15  
+rbps = 15            rbdb = 15            rbsb = 15            ngcon = 1

=====65nm\_bulk.txt=====

\* BPTM 65nm NMOS

.model nmos nmos level = 54

+version = 4.0        binunit = 1            paramchk= 1            mobmod = 0  
+capmod = 2           igmod = 1            igbmod = 1            geomod = 1  
+diomod = 1           rdsmod = 0           rbodymod= 1           rgatemod= 1  
+permod = 1           acnqsmod= 0           trnqsmod= 0

+tnom = 27            toxo = 1.7e-9            toxp = 1e-9              toxm = 1.7e-9  
+dtox = 0               epsrox = 3.9            wint = 5e-009            lint = 1.6e-008  
+ll = 0                wl = 0                lln = 1                wln = 1  
+lw = 0                ww = 0                lwn = 1                wwn = 1  
+lwl = 0                wwl = 0                xpart = 0              toxref = 1.7e-9

+vth0 = 0.22            k1 = 0.43                k2 = 0.01                k3 = 0  
+k3b = 0                w0 = 2.5e-006            dvt0 = 3.5                dvt1 = 0.55

```

+dvt2 = -0.032      dvt0w = 0          dvt1w = 0          dvt2w = 0
+dsb = 1            minv = 0.05         voffl = 0          dvtp0 = 1.2e-008
+dvtp1 = 0.1        lpe0 = 5.75e-008   lpeb = 2.3e-010   xj = 2.5e-008
+ngate = 5e+020     ndep = 2.6e+018    nsd = 1e+020      phin = 0
+cdsc = 0.0002      cdscb = 0          cdsd = 0           cit = 0
+voff = -0.15       nfactor = 2        eta0 = 0.24       etab = 0
+vfb = -0.55        u0 = 0.06          ua = 1e-010       ub = 1e-017
+uc = -3e-011       vsat = 1.2e+005    a0 = 1.5           ags = 1e-020
+a1 = 0              a2 = 1             b0 = -1e-020      b1 = 0
+keta = 0.04        dwg = 0            dwb = 0            pclm = 0.12
+pdiblc1 = 0.02     pdiblc2 = 0.02     pdiblc3 = -0.005  drout = 0.5
+pvag = 1e-020      delta = 0.01        psb1 = 8.14e+008  psb2 = 1e-007
+fprout = 0.2        pdits = 0.2         pditsd = 0.23     pditsl = 2.3e+006
+rsh = 5             rds = 160          rsw = 150          rdw = 150
+rdsmin = 0          rdmin = 0           rswmin = 0         prwg = 0
+prwb = 6.8e-011    wr = 1              alpha0 = 0.074     alpha1 = 0.005
+beta0 = 30          agidl = 0.0002      bgidl = 2.1e+009   cgidl = 0.0002
+egidl = 0.8

```

```

+aigbacc = 0.012     bigbacc = 0.0028    cigbacc = 0.002    cigbinv = 0.004
+nigbacc = 1         aigbinv = 0.014     bigbinv = 0.004     bigc = 0.0028
+eigbinv = 1.1       nigbinv = 3          aigc = 0.012        bigsd = 0.0028
+cigc = 0.002        aigsd = 0.012       bigsd = 0.0028     cigsd = 0.002
+nigc = 1            pokedge = 1         pigcd = 1           ntox = 1

```

```

+xrcrg1 = 12         xrcrg2 = 5          cgbo = 2.56e-011   cgdl = 2.653e-10
+cgso = 5.458e-010  cgdo = 5.458e-010  ckappas = 0.03     ckappad = 0.03
+cgsl = 2.653e-10   ckappas = 0.03     voffcv = 0.02      acde = 1
+moin = 15

```

```

+kt1 = -0.11        kt1l = 0            kt2 = 0.022         ute = -1.5
+ua1 = 4.31e-009    ub1 = 7.61e-018    uc1 = -5.6e-011    prt = 0
+at = 33000

```

```

+fnoimod = 1        tnoimod = 0
+jss = 0.0001       jsws = 1e-011      jswgs = 1e-010     njs = 1
+ijthsfwd = 0.01    ijthsrev = 0.001    bvs = 10            xjbvs = 1
+jsd = 0.0001       jswd = 1e-011      jswgd = 1e-010     njd = 1
+ijthdfwd = 0.01    ijthdrev = 0.001    bvd = 10            xjbvd = 1
+pbs = 1             cjs = 0.0005       mjs = 0.5           pbsws = 1
+cjsws = 5e-010     mjsws = 0.33       pbswgs = 1          cjswgs = 3e-010
+mjswgs = 0.33      pbd = 1             cjd = 0.0005        mjd = 0.5
+pbswd = 1          cjswd = 5e-010     mjswd = 0.33       pbswd = 1
+cjswgd = 5e-010   mjswd = 0.33       tpb = 0.005         tcj = 0.001
+tpbsw = 0.005     tcjsw = 0.001      tpbswg = 0.005     tcjswg = 0.001
+xtis = 3           xtid = 3

```

```

+dmcg = 0e-006      dmci = 0e-006      dmdg = 0e-006      dmcgt = 0e-007
+dwj = 0.0e-008     xgw = 0e-007       xgl = 0e-008

```

```

+rshg = 0.4         gbmin = 1e-010     rbpb = 5            rbpd = 15
+rbps = 15          rbdb = 15          rbsb = 15           ngcon = 1

```

\* BPTM 65nm PMOS

```
.model pmos pmos level = 54
```

```

+version = 4.0       binunit = 1         paramchk = 1        mobmod = 0
+capmod = 2          igcm = 1            igbmod = 1          geomod = 1
+diomod = 1          rdsmod = 0          rbodymod = 1        rgatemod = 1
+permod = 1          acnqsm = 0          trnqsm = 0

```

```

+tnom = 27          tox = 1.7e-009     toxp = 1e-009      toxm = 1.7e-009
+dtax = 0           epsrox = 3.9        wint = 5e-009      lint = 1.6e-008
+ll = 0             wl = 0              lln = 1             wln = 1
+lw = 0             ww = 0              lwn = 1             wwn = 1
+lwl = 0           wwl = 0             xpart = 0           toxref = 1.7e-009

```

```

+vth0 = -0.22       k1 = 0.43           k2 = -0.01          k3 = 0
+k3b = 0            w0 = 2.5e-006       dvt0 = 3.68         dvt1 = 0.53
+dvt2 = -0.032     dvt0w = 0           dvt1w = 0           dvt2w = 0
+dsb = 0.8         minv = 0.05         voffl = 0           dvtp0 = 1e-008
+dvtp1 = 0.05      lpe0 = 5.75e-008   lpeb = 2.3e-010    xj = 2.5e-008
+ngate = 5e+020     ndep = 2.6e+018    nsd = 1e+020        phin = 0
+cdsc = 0.000258   cdscb = 0           cdsd = 6.1e-008     cit = 0
+voff = -0.15       nfactor = 2         eta0 = 0.2          etab = 0
+vfb = 0.55        u0 = 0.014          ua = 1.8e-009       ub = 6e-018
+uc = -3e-011       vsat = 90000        a0 = 1.2            ags = 1e-020
+a1 = 0             a2 = 1              b0 = -1e-020        b1 = 0
+keta = -0.047      dwg = 0             dwb = 0             pclm = 0.55
+pdiblc1 = 0.12     pdiblc2 = 0.0075    pdiblc3 = 3.4e-008  drout = 0.56
+pvag = 1e-020      delta = 0.014        psb1 = 8.14e+008    psb2 = 9.58e-007
+fprout = 0.2        pdits = 0.2         pditsd = 0.23       pditsl = 2.3e+006
+rsh = 5            rds = 280           rsw = 160           rdw = 160
+rdsmin = 0         rdmin = 0           rswmin = 0          prwg = 3.22e-008
+prwb = 6.8e-011    wr = 1              alpha0 = 0.074      alpha1 = 0.005
+beta0 = 30         agidl = 0.0002      bgidl = 2.1e+009    cgidl = 0.0002
+egidl = 0.8

```

```

+aigbacc = 0.012     bigbacc = 0.0028    cigbacc = 0.002    cigbinv = 0.004
+nigbacc = 1         aigbinv = 0.014     bigbinv = 0.004     bigc = 0.0012
+eigbinv = 1.1       nigbinv = 3          aigc = 0.069        bigsd = 0.0012
+cigc = 0.0008      aigsd = 0.0087     bigsd = 0.0012     cigsd = 0.0008
+nigc = 1            pokedge = 1         pigcd = 1           ntox = 1

```

```
+xrcrg1 = 12        xrcrg2 = 5
```

```

+cgso = 5.458e-010  cgdo = 5.458e-010  cgbo = 2.56e-011  cgdl = 2.653e-10
+cgsl = 2.653e-10   ckappas = 0.03      ckappad = 0.03   acde = 1
+moin = 15         noff = 0.9        voffcv = 0.02

+kt1 = -0.11       kt1l = 0          kt2 = 0.022     ute = -1.5
+ual = 4.31e-009  ub1 = 7.61e-018  uc1 = -5.6e-011 prt = 0
+at = 33000

+fnoimod = 1      tnoimod = 0

+jss = 0.0001      jsws = 1e-011    jswgs = 1e-010  njs = 1
+ijthsfwd= 0.01   ijthsrev= 0.001  bvs = 10        xjbvs = 1
+jsd = 0.0001     jswd = 1e-011    jswgd = 1e-010  njd = 1
+ijthd fwd= 0.01  ijthdrev= 0.001  bvd = 10        xjbvd = 1
+pbs = 1          cjs = 0.0005     mjs = 0.5       pbsws = 1
+cjsws = 5e-010  mjsws = 0.33     pbswgs = 1      cjswgs = 3e-010
+mjswgs = 0.33   pbd = 1          cjd = 0.0005    mjd = 0.5
+pbswd = 1       cjswd = 5e-010  mjswd = 0.33    pbswgd = 1
+cjswgd = 5e-010 mjswgd = 0.33   tpb = 0.005     tcj = 0.001
+tpbsw = 0.005   tcjsw = 0.001    tpbswg = 0.005  tcjswg = 0.001
+xtis = 3        xtld = 3

+dmcg = 0e-006    dmci = 0e-006    dmdg = 0e-006   dmcgt = 0e-007
+dwj = 0.0e-008  xgw = 0e-007     xgl = 0e-008

+rshg = 0.4       gbmin = 1e-010   rbbp = 5         rbpd = 15
+rbps = 15       rbdb = 15        rbsb = 15        ngcon = 1

```

=====90nm\_bulk.pm=====

\* Beta Version released on 2/22/06

\* PTM 90nm NMOS

.model nmos nmos level = 54

```

+version = 4.0      binunit = 1      paramchk= 1      mobmod = 0
+capmod = 2        igcmmod = 1     igbmod = 1       geomod = 1
+diomod = 1       rdsmod = 0      rbodymod= 1     rgatemod= 1
+permod = 1       acnqsmod= 0    trnqsmod= 0

+tnom = 27        toxo = 2.05e-9  toxp = 1.4e-9   toxm = 2.05e-9
+dtom = 0.65e-9  epsrox = 3.9    wint = 5e-009   lint = 7.5e-009
+ll = 0           wl = 0          lln = 1         wln = 1
+lw = 0           ww = 0          lwn = 1         wwn = 1
+lwl = 0          wwl = 0        xpart = 0       toxref = 2.05e-9
+xl = -40e-9     vth0 = 0.397    k1 = 0.4        k2 = 0.01       k3 = 0
+vdth0 = 0.397   w0 = 2.5e-006  dvt0 = 1        dvt1 = 2        dvt2 = 0
+k3b = 0          dvt2 = -0.032  minv = 0.05     voffl = 0       dvtp0 = 1.2e-009
+dsb = 0.1       lpe0 = 0        lpeb = 0        nsd = 2e+020    phin = 0
+dvtp1 = 0.1     ndep = 1.94e+018 cdsd = 0         cdscd = 0       eta0 = 0.0074   ua = 6e-010     ub = 1.2e-018
+ngate = 2e+020  cdsdcb = 0      nfactor = 1.7   a0 = 1.0        ags = 1e-020    b1 = 0
+cdsc = 0.0002  u0 = 0.0547    vsat = 113760  b0 = -1e-020   dwb = 0         pclm = 0.06     drout = 0.5
+voff = -0.13    a1 = 0          a2 = 1          dwg = 0         pdiblc1 = 0.001 pdiblc2 = 0.001 pdiblc3 = -0.005 pscbe1 = 8.14e+008 pscbe2 = 1e-007
+vfb = -0.55     u0 = 0.0547    vsat = 113760  a0 = 1.0        ags = 1e-020    b1 = 0         pclm = 0.06     drout = 0.5
+uc = -3e-011   a1 = 0          a2 = 1          dwg = 0         pdiblc1 = 0.001 pdiblc2 = 0.001 pdiblc3 = -0.005 pscbe1 = 8.14e+008 pscbe2 = 1e-007
+pdiblc1 = 0.001 pdiblc2 = 0.001 pdiblc3 = -0.005 pscbe1 = 8.14e+008 pscbe2 = 1e-007
+pvag = 1e-020  pdits = 0.08   rdsw = 180     rdswmin = 0     rdw = 90        prwg = 0
+fprout = 0.2   rdsw = 180     rdswmin = 0     rdw = 90        prwg = 0
+rsh = 5         rdswmin = 0    wr = 1         alpha0 = 0.074  alpha1 = 0.005  alpha2 = 0.005
+rdswmin = 0    wr = 1         alpha0 = 0.074  alpha1 = 0.005  alpha2 = 0.005
+prwb = 6.8e-011 wr = 1         alpha0 = 0.074  alpha1 = 0.005  alpha2 = 0.005
+beta0 = 30     agidl = 0.0002 bgidl = 2.1e+009 cgidl = 0.0002
+egidl = 0.8

+aigbacc = 0.012  bigbacc = 0.0028 cigbacc = 0.002  cigbinv = 0.004
+nigbacc = 1     aigbinv = 0.014 bigbinv = 0.004  bigc = 0.0028  bigc = 0.0028
+eigbinv = 1.1   nigbinv = 3     aigc = 0.012   bigsd = 0.0028 cigsd = 0.002
+cigc = 0.002    aigsd = 0.012  pigcd = 1      ntox = 1
+nigc = 1        poxedg = 1

+xrcrg1 = 12      xrcrg2 = 5
+cgso = 1.9e-010 cgdo = 1.9e-010 cgbo = 2.56e-011 cgdl = 2.653e-10
+cgsl = 2.653e-10 ckappas = 0.03 ckappad = 0.03 acde = 1
+moin = 15       noff = 0.9     voffcv = 0.02

+kt1 = -0.11     kt1l = 0       kt2 = 0.022     ute = -1.5
+ual = 4.31e-009 ub1 = 7.61e-018 uc1 = -5.6e-011 prt = 0
+at = 33000

+fnoimod = 1      tnoimod = 0

+jss = 0.0001      jsws = 1e-011    jswgs = 1e-010  njs = 1
+ijthsfwd= 0.01   ijthsrev= 0.001  bvs = 10        xjbvs = 1
+jsd = 0.0001     jswd = 1e-011    jswgd = 1e-010  njd = 1
+ijthd fwd= 0.01  ijthdrev= 0.001  bvd = 10        xjbvd = 1
+pbs = 1          cjs = 0.0005     mjs = 0.5       pbsws = 1
+cjsws = 5e-010  mjsws = 0.33     pbswgs = 1      cjswgs = 3e-010
+mjswgs = 0.33   pbd = 1          cjd = 0.0005    mjd = 0.5
+pbswd = 1       cjswd = 5e-010  mjswd = 0.33    pbswgd = 1
+cjswgd = 5e-010 mjswgd = 0.33   tpb = 0.005     tcj = 0.001

```

```

+tpbsw = 0.005      tcjsw = 0.001      tpbswg = 0.005      tcjswg = 0.001
+xtis = 3

+dmcg = 0e-006      dmci = 0e-006      dmdg = 0e-006      dmcgt = 0e-007
+dwj = 0.0e-008     xgw = 0e-007      xgl = 0e-008

+rshg = 0.4         gbmin = 1e-010     rbpb = 5           rbpd = 15
+rbps = 15          rbdb = 15          rbsb = 15          ngcon = 1

* PTM 90nm PMOS

.model pmos pmos level = 54

+version = 4.0      binunit = 1        paramchk= 1        mobmod = 0
+capmod = 2        igcmmod = 1        igbmod = 1        geomod = 1
+diomod = 1        rdsmmod = 0        rbodmod= 1        rgatemod= 1
+permod = 1        acnqsmod= 0       trnqsmod= 0

+tnom = 27         toxo = 2.15e-009   toxp = 1.4e-009   toxm = 2.15e-009
+dtoc = 0.75e-9   epsrox = 3.9       wint = 5e-009     lint = 7.5e-009
+ll = 0            wl = 0             lln = 1           wln = 1
+lw = 0            ww = 0             lwn = 1           wwn = 1
+lw1 = 0           wwl = 0           xpart = 0         toxref = 2.15e-009
+xl = -40e-9
+vth0 = -0.339     k1 = 0.4           k2 = -0.01        k3 = 0
+k3b = 0           w0 = 2.5e-006     dvt0 = 1          dvt1 = 2
+dvt2 = -0.032    dvt0w = 0          dvt1w = 0         dvt2w = 0
+dsub = 0.1       minv = 0.05        voffl = 0         dvtp0 = 1e-009
+dvtpl = 0.05     lpe0 = 0           lpeb = 0          xj = 2.8e-008
+ngate = 2e+020    ndep = 1.43e+018  nsd = 2e+020      phin = 0
+cdsc = 0.000258  cdsccb = 0         cdsd = 6.1e-008   cit = 0
+voff = -0.126    nfactor = 1.7      eta0 = 0.0074     etab = 0
+vfb = 0.55       u0 = 0.00711       ua = 2.0e-009     ub = 0.5e-018
+uc = -3e-011     vsat = 70000       a0 = 1.0          ags = 1e-020
+a1 = 0           a2 = 1             b0 = 0            b1 = 0
+keta = -0.047    dwg = 0            dwb = 0           pclm = 0.12
+pdiblc1 = 0.001  pdiblc2 = 0.001   pdiblc3 = 3.4e-008  drout = 0.56
+pvag = 1e-020    delta = 0.01       psce1 = 8.14e+008  psce2 = 9.58e-007
+fprout = 0.2     pdits = 0.08       pditsd = 0.23     pditsl = 2.3e+006
+rsh = 5          rdsw = 200         rsw = 100         rdw = 100
+rdsmin = 0       rdwmin = 0         rswmin = 0        prwg = 3.22e-008
+prwb = 6.8e-011 wr = 1             alpha0 = 0.074     alpha1 = 0.005
+beta0 = 30       agidl = 0.0002     bgidl = 2.1e+009   cgidl = 0.0002
+egidl = 0.8

+aigbacc = 0.012   bigbacc = 0.0028   cigbacc = 0.002   bigbinv = 0.004
+nigbacc = 1       aigbinv = 0.014   bigbinv = 0.004   bigbinv = 0.004
+eigbinv = 1.1    nigbinv = 3        aigc = 0.69       bigc = 0.0012
+cigc = 0.0008    aigsd = 0.0087   bigsd = 0.0012    cigsd = 0.0008
+nigc = 1         poxedge = 1       pigcd = 1         ntox = 1

+xrcrg1 = 12       xrcrg2 = 5         cgbo = 2.56e-011  cgdl = 2.653e-10
+cgso = 1.8e-010  cgdo = 1.8e-010   ckappad = 0.03    acde = 1
+cgsl = 2.653e-10 ckappas = 0.03    voffcv = 0.02
+motn = 15        noff = 0.9

+kt1 = -0.11      kt1l = 0           kt2 = 0.022       ute = -1.5
+ua1 = 4.31e-009 ub1 = 7.61e-018   uc1 = -5.6e-011   prt = 0
+at = 33000

+fnoimod = 1      tnoimod = 0

+jss = 0.0001     jsws = 1e-011     jswgs = 1e-010    njs = 1
+ijthsfwd= 0.01   ijthsrev= 0.001   bvs = 10          xjbvs = 1
+jsd = 0.0001     jswd = 1e-011     jswgd = 1e-010    njd = 1
+ijthdfwd= 0.01  ijthdrev= 0.001   bvd = 10         xjbvd = 1
+pbs = 1          cjs = 0.0005      mjs = 0.5         pbsws = 1
+cjsws = 5e-010  mjsws = 0.33      pbswgs = 1        cjswgs = 3e-010
+mjswgs = 0.33   pbd = 1           cjd = 0.0005      mjd = 0.5
+pbswd = 1        cjswd = 5e-010   mjswd = 0.33      pbswgd = 1
+cjswgd = 5e-010 mjswgd = 0.33     tpb = 0.005       tcj = 0.001
+tpbsw = 0.005   tcjsw = 0.001     tpbswg = 0.005    tcjswg = 0.001
+xtis = 3         xtid = 3

+dmcg = 0e-006    dmci = 0e-006     dmdg = 0e-006     dmcgt = 0e-007
+dwj = 0.0e-008  xgw = 0e-007      xgl = 0e-008

+rshg = 0.4       gbmin = 1e-010    rbpb = 5           rbpd = 15
+rbps = 15        rbdb = 15         rbsb = 15         ngcon = 1

```

=====90nm\_bulk.txt=====

```

*
* Predictive Technology Model Beta Version
* 90nm NMOS SPICE Parametersv (normal one)
*

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```

.model NMOS NMOS
+Level = 49

+Lint = 1.5e-08 Tox = 2.5e-09
+Vth0 = 0.2607 Rds = 180

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+Lmin=1.0e-7 lmax=1.0e-7 wmin=1.0e-7 wmax=1.0e-4
+Tref=27.0 version =3.1
+Xj= 4.000000E-08 Nch= 9.700000E+17 wln= 0.00
+l1n= 1.0000000 lwn= 1.0000000 wl= 0.00
+wmn= 0.00 ll= 0.00 wint= 0.00
+lw= 0.00 lwl= 0.00 ww= 0.00 wwl= 0.00
+wL= 0.00 wwl= 0.00
+Mobmod= 1 binunit= 2 xl= 0.00
+xw= 0.00 binflag= 0
+Dwg= 0.00 Dwb= 0.00

+ACM= 0 ldif=0.00 hdif=0.00
+rsh= 7 rd= 0 rs= 0
+rsc= 0 rdc= 0

+K1= 0.3950000 K2= 1.000000E-02 K3= 0.00
+Dvt0= 1.0000000 Dvt1= 0.4000000 Dvt2= 0.1500000
+Dvt0w= 0.00 Dvt1w= 0.00 Dvt2w= 0.00
+Nlx= 4.800000E-08 W0= 0.00 K3b= 0.00
+Ngate= 5.000000E+20

+Vsat= 1.100000E+05 Ua= -6.000000E-10 Ub= 8.000000E-19
+Uc= -2.999999E-11 Prwg= 0.00 Wr= 1.0000000
+Prwb= 0.00 A0= 1.1000000 Keta= 4.000000E-02
+U0= 1.799999E-02 A2= 1.0000000 Ags= -1.000000E-02
+A1= 0.00 B1= 0.00
+B0= 0.00

+Voff= -2.999999E-02 NFactor= 1.5000000 Cit= 0.00
+Cdsc= 0.00 Cdscb= 0.00 Cdscd= 0.00
+Eta0= 0.1500000 Etab= 0.00 Dsub= 0.6000000

+Pclm= 0.1000000 Pdblc1= 1.200000E-02 Pdblc2= 7.500000E-03
+Pdblc1b= -1.350000E-02 Drout= 2.0000000 Pscbe1= 8.660000E+08
+Pscbe2= 1.000000E-20 Pvag= -0.2800000 Delta= 1.000000E-02
+Alpha0= 0.00 Beta0= 30.0000000

+kt1= -0.3700000 kt2= -4.000000E-02 At= 5.500000E+04
+Ute= -1.4800000 Ua1= 9.582900E-10 Ub1= -3.347300E-19
+Uc1= 0.00 Kt1l= 4.000000E-09 Prt= 0.00

+Cj= 0.0015 Mj= 0.72 Pb= 1.25
+Cjsw= 2E-10 Mjsw= 0.37 Php= 0.773
+Cjgate= 2E-14 Cta= 0 Ctp= 0
+Pta= 0 Ptp= 0 JS=1.50E-08
+JSW=2.50E-13 N=1.0 Xti=3.0
+Cgdo=3.493E-10 Cgs=3.493E-10 Cgbo=0.0E+00
+Capmod= 2 NQSMOD= 0 Elm= 5
+Xpart= 1 cgs1= 0.582E-10 cgd1= 0.582E-10
+ckappa= 0.28 cf= 1.177e-10 clc= 1.000000E-07
+cLe= 0.6000000 Dlc= 2E-08 Dwc= 0

*
* Predictive Technology Model Beta Version
* 90nm PMOS SPICE Parametersv (normal one)
*

.model PMOS PMOS
+Level = 49

+Lint = 1.5e-08 Tox = 2.5e-09
+Vth0 = -0.303 Rds = 300

+Lmin=1.0e-7 lmax=1.0e-7 wmin=1.0e-7 wmax=1.0e-4
+Tref=27.0 version =3.1
+Xj= 4.000000E-08 Nch= 1.040000E+18 wln= 0.00
+l1n= 1.0000000 lwn= 0.00 lw= 0.00
+wmn= 1.0000000 ll= 0.00 wint= 0.00
+lwl= 0.00 wwl= 0.00 wl= 0.00
+ww= 0.00 wwl= 0.00 Mobmod= 1
+binunit= 2 xl= 0.00 xw= 0.00
+binflag= 0 Dwg= 0.00 Dwb= 0.00

+ACM= 0 ldif=0.00 hdif=0.00
+rsh= 7 rd= 0 rs= 0
+rsc= 0 rdc= 0

+K1= 0.3910000 K2= 1.000000E-02 K3= 0.00
+Dvt0= 2.6700001 Dvt1= 0.5300000 Dvt2= 5.000000E-02
+Dvt0w= 0.00 Dvt1w= 0.00 Dvt2w= 0.00
+Nlx= 7.500000E-08 W0= 0.00 K3b= 0.00
+Ngate= 5.000000E+20

+Vsat= 1.050000E+05 Ua= -5.000000E-10 Ub= 1.500000E-18
+Uc= -2.999999E-11 Prwg= 0.00 Wr= 1.0000000
+Prwb= 0.00 A0= 2.0000000 Keta= 4.000000E-02
+U0= 5.500000E-03 A2= 0.9900000 Ags= -0.1000000
+A1= 0.00 B1= 0.00
+B0= 0.00

+Voff= -7.000000E-02 NFactor= 1.5000000 Cit= 0.00
+Cdsc= 0.00 Cdscb= 0.00 Cdscd= 0.00
+Eta0= 0.2500000 Etab= 0.00 Dsub= 0.8000000

+Pclm= 0.1000000 Pdblc1= 1.200000E-02 Pdblc2= 7.500000E-03
+Pdblc1b= -1.350000E-02 Drout= 0.9000000 Pscbe1= 8.660000E+08
+Pscbe2= 1.000000E-20 Pvag= -0.2800000 Delta= 1.010000E-02

```



+Alpha0= 0.00	Beta0= 30.0000000	
+kt1= -0.3400000	kt2= -5.2700000E-02	At= 0.00
+Ute= -1.2300000	Ua1= -8.6300000E-10	Ub1= 2.0000001E-18
+Uc1= 0.00	Kt11= 4.0000000E-09	Prt= 0.00
+Cj= 0.0015	Mj= 0.7175511	Pb= 1.24859
+Cjsw= 2E-10	Mjsw= 0.3706993	Php= 0.7731149
+Cjgate= 2E-14	Cta= 9.290391E-04	Ctp= 7.456211E-04
+Pta= 1.527748E-03	Ptp= 1.56325E-03	JS=2.50E-08
+JSW=4.00E-13	N=1.0	Xti=3.0
+Cgdo=3.49E-10	Cgso=3.49E-10	Cgbo=0.0E+00
+Capmod= 2	NQSMOD= 0	Elm= 5
+Xpart= 1	cgs1= 0.582E-10	cgdl= 0.582E-10
+ckappa= 0.28	cf= 1.177e-10	clc= 5.4750000E-08
+cle= 6.4600000	Dlc= 2E-08	Dwc= 0