```
*** Standard SPICE model file         ***
***   using Alpha Power Law           ***
***   Parameters are based on ITRS'99 ***
*** This model was made in Sakurai Lab.
*** Ver 0.9 2000/10/02 by K. Inagaki  ***
*** Ver 1.0 2000/10/05 by K. Inagaki  ***
*          Official Release
*** Ver 1.1 2000/11/15 by K. Inagaki  ***
*          GAMMA Parameter added


**  0.25um MOS MODEL
**   Ex.
**      Vdd = 2.0v
**      .lib mospar.lib m1
**      MP    3 2 1 1 P L=0.25u W=1.0u AD=0.40p AS=0.40p PD=2.8u PS=2.8u
**      MN    3 2 0 0 N L=0.25u W=0.6u AD=0.24p AS=0.24p PD=2.0u PS=2.0u
.lib m1
 .MODEL N NMOS
 + LEVEL = 3
 + VTO = 0.45
 + TOX = 2.5E-09
 + NSUB = 1.0E+18
 + NFS = 8.5E+12
 + XJ = 7.5E-8
 + LD = 1.25e-8
 + UO = 255
 + VMAX = 1.7E+05
 + THETA = 0.29
 + ETA = 0.9E-02
 + KAPPA = 0.08
 + GAMMA = 0.40
 + RSH = 500
 + CGSO = 3.86872e-10
 + CGDO = 3.86872e-10
 + CGBO = 0.0
 + CJ = 4.09573e-3
 + CJSW = 2.45744e-10


 .MODEL P PMOS
 + LEVEL = 3
 + VTO = -0.45
 + TOX = 2.5E-09
 + NSUB = 1.0E+18
 + NFS = 8.5E+12
 + XJ = 7.5E-8
 + LD = 1.25e-8
 + UO = 118
 + VMAX = 8.5E+04
 + THETA = 0.29
 + ETA = 0.9E-02
 + KAPPA = 0.08
 + GAMMA = 0.40
 + RSH = 500
 + CGSO = 3.86872e-10
 + CGDO = 3.86872e-10
 + CGBO = 0.0
 + CJ = 4.09573e-3
 + CJSW = 2.45744e-10
.endl
```

```
**  0.18um MOS MODEL
**   Ex.
**      Vdd = 1.5v
**      .lib mospar.lib m2
**      MP    3 2 1 1 P L=0.18u W=1.0u AD=0.25p AS=0.25p PD=2.5u PS=2.5u
**      MN    3 2 0 0 N L=0.18u W=0.6u AD=0.15p AS=0.15p PD=1.7u PS=1.7u
.lib m2
 .MODEL N NMOS
 + LEVEL = 3
 + VTO = 0.41
 + TOX = 2.2E-09
 + NSUB = 2.0E+18
 + NFS = 6.0E+12
 + XJ = 6E-8
 + LD = 9e-9
 + UO = 390
 + VMAX = 2.2E+05
 + THETA = 0.80
 + ETA = 2.8E-03
 + KAPPA = 0.2
 + GAMMA = 0.40
 + RSH = 500
 + CGSO = 3.33449e-10
 + CGDO = 3.33449e-10
 + CGBO = 0.0
 + CJ = 4.96491e-3
 + CJSW = 2.45744e-10


 .MODEL P PMOS
 + LEVEL = 3
 + VTO = -0.41
 + TOX = 2.2E-09
 + NSUB = 2.0E+18
 + NFS = 6.0E+12
 + XJ = 6E-8
 + LD = 9e-9
 + UO = 175
 + VMAX = 1.1E+05
 + THETA = 0.80
 + ETA = 2.8E-03
 + KAPPA = 0.2
 + GAMMA = 0.40
 + RSH = 500
 + CGSO = 3.33449e-10
 + CGDO = 3.33449e-10
 + CGBO = 0.0
 + CJ = 4.96491e-3
 + CJSW = 2.45744e-10
.endl


**  0.13um MOS MODEL
**   Ex.
**      Vdd = 1.2v
**      .lib mospar.lib m3
**      MP    3 2 1 1 P L=0.13u W=1.0u AD=0.18p AS=0.18p PD=2.3u PS=2.3u
**      MN    3 2 0 0 N L=0.13u W=0.6u AD=0.11p AS=0.11p PD=1.6u PS=1.6u
.lib m3
 .MODEL N NMOS
 + LEVEL = 3
 + VTO = 0.39
```

```
 + TOX = 1.7E-09
 + NSUB = 3.0E+18
 + NFS = 6.5E+12
 + XJ = 4E-8
 + LD = 6.5e-9
 + UO = 390
 + VMAX = 2.7e5
 + THETA = 1.30
 + ETA = 6.0E-04
 + KAPPA = 0.4
 + GAMMA = 0.41
 + RSH = 455
 + CGSO = 3.13263e-10
 + CGDO = 3.13263e-10
 + CGBO = 0.0
 + CJ   = 4.9e-3
 + CJSW = 1.9e-10


 .MODEL P PMOS
 + LEVEL = 3
 + VTO = -0.39
 + TOX = 1.7E-09
 + NSUB = 3.0E+18
 + NFS = 6.5E+12
 + XJ = 4E-8
 + LD = 6.5e-9
 + UO = 175
 + VMAX = 1.3e5
 + THETA = 1.30
 + ETA = 6.0E-04
 + KAPPA = 0.4
 + GAMMA = 0.41
 + RSH = 455
 + CGSO = 3.13263e-10
 + CGDO = 3.13263e-10
 + CGBO = 0.0
 + CJ   = 4.9e-3
 + CJSW = 1.9e-10
.endl


**  0.10um MOS MODEL
**   Ex.
**      Vdd = 0.9v
**      .lib mospar.lib m4
**      MP    3 2 1 1 P L=0.10u W=1.0u AD=0.14p AS=0.14p PD=2.2u PS=2.2u
**      MN    3 2 0 0 N L=0.10u W=0.6u AD=0.09p AS=0.09p PD=1.5u PS=1.5u
.lib m4
 .MODEL N NMOS
 + LEVEL = 3
 + VTO = 0.338
 + TOX = 1.25E-09
 + NSUB = 4.0E+18
 + NFS = 7.0E+12
 + XJ = 3e-8
 + LD = 5e-9
 + UO = 335
 + VMAX = 3.2e5
 + THETA = 1.3
 + ETA = 3.0e-4
 + KAPPA = 0.4
 + GAMMA = 0.43
```

```
 + RSH = 412.5
 + CGSO = 3.23411e-10
 + CGDO = 3.23411e-10
 + CGBO = 0.0
 + CJ = 5.69202e-3
 + CJSW = 1.70761e-10


 .MODEL P PMOS
 + LEVEL = 3
 + VTO = -0.338
 + TOX = 1.25E-09
 + NSUB = 4.0E+18
 + NFS = 7.0E+12
 + XJ = 3e-8
 + LD = 5e-9
 + UO = 153
 + VMAX = 1.6e5
 + THETA = 1.3
 + ETA = 3.0e-4
 + KAPPA = 0.4
 + GAMMA = 0.43
 + RSH = 412.5
 + CGSO = 3.23411e-10
 + CGDO = 3.23411e-10
 + CGBO = 0.0
 + CJ = 5.69202e-3
 + CJSW = 1.70761e-10
.endl


**  0.07um MOS MODEL
**   Ex.
**      Vdd = 0.6v
**      .lib mospar.lib m5
**      MP    3 2 1 1 P L=0.07u W=1.0u AD=0.10p AS=0.10p PD=2.2u PS=2.2u
**      MN    3 2 0 0 N L=0.07u W=0.6u AD=0.06p AS=0.06p PD=1.4u PS=1.4u
.lib m5
.MODEL N NMOS
 + LEVEL = 3
 + VTO = 0.28
 + TOX = 1e-9
 + NSUB = 8.0e18
 + NFS = 5.0e11
 + XJ = 2.2e-8
 + LD = 3.5e-9
 + UO = 380
 + VMAX = 5.0e5
 + THETA = 1.5
 + ETA = 2.0e-4
 + KAPPA = 0.4
 + GAMMA = 0.43
 + RSH = 337
 + CGSO = 2.93842e-10
 + CGDO = 2.93842e-10
 + CGBO = 0.0
 + CJ = 7.91512e-3
 + CJSW = 1.74133e-10


.MODEL P PMOS
 + LEVEL = 3
 + VTO = -0.28
```

```
 + TOX = 1e-9
 + NSUB = 8.0e18
 + NFS = 5.0e11
 + XJ = 2.2e-8
 + LD = 3.5e-9
 + UO = 180
 + VMAX = 2.5e5
 + THETA = 1.5
 + ETA = 2.0e-4
 + KAPPA = 0.4
 + GAMMA = 0.43
 + RSH = 337
 + CGSO = 2.93842e-10
 + CGDO = 2.93842e-10
 + CGBO = 0.0
 + CJ = 7.91512e-3
 + CJSW = 1.74133e-10
.endl


**  0.05um MOS MODEL
**   Ex.
**      Vdd = 0.5v
**      .lib mospar.lib m6
**      MP    3 2 1 1 P L=0.05u W=1.0u AD=0.07p AS=0.07p PD=2.2u PS=2.2u
**      MN    3 2 0 0 N L=0.05u W=0.6u AD=0.04p AS=0.04p PD=1.4u PS=1.4u
.lib m6
 .MODEL N NMOS
 + LEVEL = 3
 + VTO = 0.253
 + TOX = 7.0E-10
 + NSUB = 1.4E+19
 + NFS = 5.0E+11
 + XJ = 1.7e-8
 + LD = 2.5e-9
 + UO = 200
 + VMAX = 5.0e5
 + THETA = 0.7
 + ETA = 3.0e-5
 + KAPPA = 0.4
 + GAMMA = 0.47
 + RSH = 285
 + CGSO = 2.97936e-10
 + CGDO = 2.97936e-10
 + CGBO = 0.0
 + CJ = 1.03333e-2
 + CJSW = 1.75666e-10


 .MODEL P PMOS
 + LEVEL = 3
 + VTO = -0.253
 + TOX = 7.0E-10
 + NSUB = 1.4E+19
 + NFS = 5.0E+11
 + XJ = 1.7e-8
 + LD = 2.5e-9
 + UO = 85
 + VMAX = 2.5e5
 + THETA = 0.3
 + ETA = 3.0e-5
 + KAPPA = 0.4
 + GAMMA = 0.47
```

```
 + RSH = 285
 + CGSO = 2.97936e-10
 + CGDO = 2.97936e-10
 + CGBO = 0.0
 + CJ = 1.03333e-2
 + CJSW = 1.75666e-10
.endl


**  0.035um MOS MODEL
**   Ex.
**      Vdd = 0.3v
**      .lib mospar.lib m7
**      MP    3 2 1 1 P L=0.035u W=1.0u AD=0.05p AS=0.05p PD=2.2u PS=2.2u
**      MN    3 2 0 0 N L=0.035u W=0.6u AD=0.03p AS=0.03p PD=1.4u PS=1.4u
.lib m7
 .MODEL N NMOS
 + LEVEL = 3
 + VTO = 0.230
 + TOX = 5.0E-10
 + NSUB = 3.0E+19
 + NFS = 1.0E+11
 + XJ = 1.2e-8
 + LD = 1.75e-9
 + UO = 390
 + VMAX = 1.2e6
 + THETA = 1.5
 + ETA = 2.0e-5
 + KAPPA = 0.4
 + GAMMA = 0.49
 + RSH = 250
 + CGSO = 2.74456e-10
 + CGDO = 2.74456e-10
 + CGBO = 0.0
 + CJ = 1.48647e-2
 + CJSW = 1.78377e-10


 .MODEL P PMOS
 + LEVEL = 3
 + VTO = -0.230
 + TOX = 5.0E-10
 + NSUB = 3.0E+19
 + NFS = 1.0E+11
 + XJ = 1.2e-8
 + LD = 1.75e-9
 + UO = 185
 + VMAX = 6.0e5
 + THETA = 1.8
 + ETA = 2.0e-5
 + KAPPA = 0.4
 + GAMMA = 0.49
 + RSH = 250
 + CGSO = 2.74456e-10
 + CGDO = 2.74456e-10
 + CGBO = 0.0
 + CJ = 1.48647e-2
 + CJSW = 1.78377e-10
.endl
```