```
Using: /bin/time /share/instsww/synopsys/C-2009.09/hspice/sparcOS5/hspice CMOS2.sp
 ****** HSPICE -- C-2009.09 32-BIT (Aug 24 2009) sunos ******
  Copyright (C) 2009 Synopsys, Inc. All Rights Reserved.
  Unpublished-rights reserved under US copyright laws.
  This program is protected by law and is subject to the
  terms and conditions of the license agreement from Synopsys.
  Use of this program is your acceptance to be bound by the
  license agreement. HSPICE is the trademark of Synopsys, Inc.
  Input File: CMOS2.sp
 lic:
 lic: FLEXlm: v8.5b
 lic: USER:   ee140-cw             HOSTNAME: quasar
 lic: HOSTID: 83846a81             PID:      29407
 lic: Using FLEXlm license file:
 lic: 27005@license-srv.eecs.berkeley.edu
 lic: Checkout 1 hspice
 lic: License/Maintenance for hspice will expire on 25-oct-2013/2012.06
 lic: FLOATING license(s) on SERVER license-srv.eecs.berkeley.edu
 lic:
 Init: read install configuration file: /share/instsww/synopsys/C-2009.09/hspice/meta.cfg
1****** HSPICE -- C-2009.09 32-BIT (Aug 24 2009) sunos ******
 ******
 b1;2c** ee140 lab3 : cmos operational amplifier design **

  ******  circuit name directory
 circuit number to circuit name directory
   number circuitname                     definition         multiplier
        0 main circuit
        1 x7.                            pmos               1.00
        2 x3.                            pmos               1.00
        3 x5.                            pmos               1.00
        4 x2.                            nmos               1.00
        5 x4.                            nmos               1.00
        6 x6.                            nmos               1.00
        7 x9.                            pmos               1.00
        8 xr.                            nmos               1.00
        9 x1.                            pmos               1.00
  **warning** (model_ee140_1.sp:14) both nodes of element x2.csubn defined in subckt nmos            are connected together.


 **diagnostic** set option symb=1 internally to help for convergence.
 ******************************************************************
 ******  option summary
 ******
 runlvl  = 3         bypass  = 2
  Opening plot unit= 15
 file=CMOS2.pa0

1****** HSPICE -- C-2009.09 32-BIT (Aug 24 2009) sunos ******
 ******
 b1;2c** ee140 lab3 : cmos operational amplifier design **

  ******  operating point information tnom=  25.000 temp=  25.000 *****
 ***** operating point status is all       simulation time is     0.
    node    =voltage      node    =voltage      node    =voltage

 +0:cm      = 950.0000m 0:drain_m2= 401.9613m 0:gate_m3 = 950.0000m
 +0:gate_m5 = 950.0000m 0:node    = 401.9613m 0:out_1   = 401.9613m
 +0:out_2   = 933.4493m 0:tail    =   1.3126  0:vbias   =   1.1236
 +0:vdd     =   1.5000


 ****  voltage sources

 subckt
 element  0:v1       0:vcm      0:vid1     0:vid2
  volts      1.5000   950.0000m    0.         0.
  current -980.3783u    0.         0.         0.
  power      1.4706m    0.         0.         0.

     total voltage source power dissipation=    1.4706m       watts



 **** resistors

 subckt
 element  0:rbias
  r value    6.0000k
  v drop     1.1236
  current  187.2650u
  power    210.4092u
```

**** mosfets

subckt	x7	x3	x5	x2	x4	x6
element	1:m0	2:m0	3:m0	4:m0	5:m0	6:m0
model	1:pmos_int	2:pmos_int	3:pmos_int	4:nmos_int	5:nmos_int	6:nmos_int
region	Saturati	Saturati	Saturati	Saturati	Saturati	Saturati
id	-384.6046u	-192.3023u	-192.3023u	192.3023u	192.3023u	408.5087u
ibs	0.	1.8741f	1.8741f	0.	0.	0.
ibd	1.8741f	10.9804f	10.9804f	-4.0196f	-4.0196f	-9.3345f
vgs	-376.4098m	-362.5871m	-362.5871m	401.9613m	401.9613m	401.9613m
vds	-187.4129m	-910.6258m	-910.6258m	401.9613m	401.9613m	933.4493m
vbs	0.	187.4129m	187.4129m	0.	0.	0.
vth	-300.0000m	-322.5532m	-322.5532m	300.0000m	300.0000m	300.0000m
vdsat	-67.8811m	-36.0201m	-36.0201m	90.6678m	90.6678m	90.6678m
vod	-76.4098m	-40.0339m	-40.0339m	101.9613m	101.9613m	101.9613m
beta	148.4499m	266.8115m	266.8115m	41.6572m	41.6572m	88.4927m
gam eff	200.0000m	200.0000m	200.0000m	200.0000m	200.0000m	200.0000m
gm	10.0769m	9.6106m	9.6106m	3.7770m	3.7770m	8.0234m
gds	59.3594u	32.7517u	32.7517u	41.8227u	41.8227u	87.7737u
gmb	1.2661m	1.0709m	1.0709m	470.4566u	470.4566u	999.3933u
cdtot	52.2643f	74.0037f	74.0037f	5.3447f	5.3447f	9.4365f
cgtot	119.2690f	190.4558f	190.4558f	12.6673f	12.6673f	23.9073f
cstot	116.1417f	181.7564f	181.7564f	12.3389f	12.3389f	23.2838f
cbtot	49.1370f	65.3043f	65.3043f	5.0163f	5.0163f	8.8129f
cgs	90.4137f	144.3779f	144.3779f	9.6027f	9.6027f	18.1233f
cgd	28.8553f	46.0779f	46.0779f	3.0647f	3.0647f	5.7840f

subckt	x9	xr	x1
element	7:m0	8:m0	9:m0
model	7:pmos_int	8:nmos_int	9:pmos_int
region	Saturati	Linear	Saturati
id	-408.5087u	0.	-187.2650u
ibs	0.	0.	0.
ibd	5.6655f	3.609e-25	3.7641f
vgs	-376.4098m	1.0980	-376.4098m
vds	-566.5507m	-927.1472f	-376.4098m
vbs	0.	0.	0.
vth	-300.0000m	300.0000m	-300.0000m
vdsat	-67.8811m	722.9214m	-67.8811m
vod	-76.4098m	798.0387m	-76.4098m
beta	157.6764m	4.3164m	72.2807m
gam eff	200.0000m	200.0000m	200.0000m
gm	10.7032m	0.	4.9065m
gds	66.9674u	3.4447m	29.7707u
gmb	1.3448m	0.	616.4566u
cdtot	49.0984f	1.2098f	23.8729f
cgtot	119.2690f	1.7956f	56.3785f
cstot	116.1417f	1.2098f	54.9024f
cbtot	45.9711f	624.0000a	22.3969f
cgs	90.4137f	897.8202a	42.7386f
cgd	28.8553f	897.8202a	13.6399f

**** small-signal transfer characteristics

v(out_2)/vid1		=	6.6453k
input resistance at	vid1	=	1.000e+20
output resistance at v(out_2)		=	6.4624k

***** job concluded

1****** HSPICE -- C-2009.09 32-BIT (Aug 24 2009) sunos ******

******

b1;2c** ee140 lab3 : cmos operational amplifier design **

****** job statistics summary tnom= 25.000 temp= 25.000 *****

****** HSPICE Threads Information ******

Command Line Threads Count	:	1
Available CPU Count	:	4

```
Actual Model Evaluation(Load) Threads Count :     1
Actual Solver Threads Count                :     1


******  Circuit Statistics  ******
# nodes       =      11 # elements   =      22
# resistors   =       1 # capacitors =       8 # inductors   =       0
# mutual_inds =       0 # vccs       =       0 # vcvs        =       0
# cccs        =       0 # ccvs       =       0 # volt_srcs   =       4
# curr_srcs   =       0 # diodes     =       0 # bjts        =       0
# jfets       =       0 # mosfets    =       9 # U elements  =       0
# T elements  =       0 # W elements =       0 # B elements  =       0
# S elements  =       0 # P elements =       0 # va device   =       0


******  Runtime Statistics (seconds)  ******

analysis           time    # points   tot. iter  conv.iter
op point           0.02           1           7
readin             0.04
errchk             0.01
setup              0.00
output             0.00


          total memory used          168  kbytes
          total cpu time            0.06 seconds
          total elapsed time        0.21 seconds
          job started at     02:48:24 05/05/2013
          job ended   at     02:48:24 05/05/2013


    lic: Release hspice token(s)
```