

Command line:

```
/cad/IC5_latest/tools.lnx86/spectre/bin/32bit/spectre -env \  
  artist5.1.0 +escchars +log ../psf/spectre.out +inter=mpsc \  
  +mpssession=spectre2_8820_27 -format sst2 -raw ../psf \  
  +lqtimeout 900 input.scs  
spectre pid = 14764
```

```
Loading /cad/IC5_latest/tools.lnx86/cmi/lib/4.0/libinfineon_sh.so ...  
Loading /cad/IC5_latest/tools.lnx86/cmi/lib/4.0/libnortel_sh.so ...  
Loading /cad/IC5_latest/tools.lnx86/cmi/lib/4.0/libphilips_sh.so ...  
Loading /cad/IC5_latest/tools.lnx86/cmi/lib/4.0/libsparm_sh.so ...  
Loading /cad/IC5_latest/tools.lnx86/cmi/lib/4.0/libstmodels_sh.so ...  
spectre (ver. 5.10.41.122707 -- 27 Dec 2007).  
Includes RSA BSAFE(R) Cryptographic or Security Protocol Software from RSA  
  Security, Inc.
```

Simulating `input.scs' on cad-umc90.stanford.edu at 7:47:16 PM, Wed Feb 18,  
 2009.

\*\*\*\*\*

Periodic Steady-State Analysis `pss': guessed fund = 15 GHz

\*\*\*\*\*

Warning from spectre during IC analysis, during periodic steady state analysis  
 `pss':

Inconsistent initial condition of 0 V between nodes Out and 0 ignored.

Notice from spectre during IC analysis, during periodic steady state analysis  
 `pss':

I0.C0: Initial condition computed between nodes Out and Outb is in error by  
 32.0485 mV.

Initial condition computed for node Outb is in error by 69.0057 mV (9.85795  
 %).

To reduce error in computed initial conditions, decrease `rforce'.

However, setting rforce too small may result in convergence  
 difficulties or in the matrix becoming singular.

```
=====  
`pss': time = (20 ns -> 120.333 ns)
```

```
=====  
Important parameter values in tstab integration:
```

```
  start = 20 ns  
  outputstart = 20 ns  
  stop = 120.333 ns  
  period = 66.6667 ps  
  step = 100.067 ps
```

maxstep = 2.66667 ps  
ic = all  
skipdc = no  
reitol = 1e-03  
abstol(I) = 1 pA  
abstol(V) = 1 uV  
temp = 27 C  
tnom = 27 C  
tempeffects = all  
method = gear2only  
lteratio = 3.5  
relref = sigglobal  
cmin = 0 F  
gmin = 1 pS  
maxrsd = 0 Ohm  
mos\_method = s  
mos\_vres = 50 mV

pss: time = 22.51 ns	(2.5 %)	step = 2.087 ps	(2.08 m%)
pss: time = 27.53 ns	(7.5 %)	step = 2.409 ps	(2.4 m%)
pss: time = 32.54 ns	(12.5 %)	step = 2.117 ps	(2.11 m%)
pss: time = 37.56 ns	(17.5 %)	step = 1.778 ps	(1.77 m%)
pss: time = 42.58 ns	(22.5 %)	step = 2.573 ps	(2.56 m%)
pss: time = 47.59 ns	(27.5 %)	step = 1.596 ps	(1.59 m%)
pss: time = 52.61 ns	(32.5 %)	step = 2.075 ps	(2.07 m%)
pss: time = 57.63 ns	(37.5 %)	step = 2.667 ps	(2.66 m%)
pss: time = 62.64 ns	(42.5 %)	step = 2.278 ps	(2.27 m%)
pss: time = 67.66 ns	(47.5 %)	step = 2.126 ps	(2.12 m%)
pss: time = 72.68 ns	(52.5 %)	step = 2.506 ps	(2.5 m%)
pss: time = 77.69 ns	(57.5 %)	step = 1.84 ps	(1.83 m%)
pss: time = 82.71 ns	(62.5 %)	step = 1.955 ps	(1.95 m%)
pss: time = 87.73 ns	(67.5 %)	step = 2.105 ps	(2.1 m%)
pss: time = 92.74 ns	(72.5 %)	step = 1.86 ps	(1.85 m%)
pss: time = 97.76 ns	(77.5 %)	step = 2.667 ps	(2.66 m%)
pss: time = 102.8 ns	(82.5 %)	step = 2.667 ps	(2.66 m%)
pss: time = 107.8 ns	(87.5 %)	step = 2.087 ps	(2.08 m%)
pss: time = 112.8 ns	(92.5 %)	step = 2.409 ps	(2.4 m%)
pss: time = 117.8 ns	(97.5 %)	step = 2.117 ps	(2.11 m%)

The Estimated Oscillating Frequency from Tstab Tran is = 1.392581e+10 (Hz).  
Conv norm = 597, max dl(I0.I4.L0:1) = 48.1456 mA, took 6.18 s.

Important parameter values in pss iteration:

start = 120.333 ns  
outputstart = 20 ns  
stop = 120.405 ns  
period = 71.8091 ps

steadyratio = 100e-03  
step = 100.067 ps  
maxstep = 179.523 fs  
ic = all  
skipdc = no  
reltol = 10e-06  
abstol(I) = 1 pA  
abstol(V) = 1 uV  
temp = 27 C  
tnom = 27 C  
tempeffects = all  
errpreset = conservative  
method = gear2only  
lteratio = 10  
relref = alllocal  
cmin = 0 F  
gmin = 1 pS  
maxrsd = 0 Ohm  
mos\_method = s  
mos\_vres = 50 mV

=====  
`pss': time = (120.333 ns -> 120.405 ns)  
=====

pss: time = 120.3 ns	(2.56 %)	step = 44.88 fs	(62.5 m%)
pss: time = 120.3 ns	(7.56 %)	step = 44.88 fs	(62.5 m%)
pss: time = 120.3 ns	(12.6 %)	step = 44.88 fs	(62.5 m%)
pss: time = 120.3 ns	(17.6 %)	step = 44.88 fs	(62.5 m%)
pss: time = 120.3 ns	(22.6 %)	step = 44.88 fs	(62.5 m%)
pss: time = 120.4 ns	(27.5 %)	step = 44.88 fs	(62.5 m%)
pss: time = 120.4 ns	(32.5 %)	step = 44.88 fs	(62.5 m%)
pss: time = 120.4 ns	(37.5 %)	step = 44.88 fs	(62.5 m%)
pss: time = 120.4 ns	(42.5 %)	step = 44.88 fs	(62.5 m%)
pss: time = 120.4 ns	(47.5 %)	step = 44.88 fs	(62.5 m%)
pss: time = 120.4 ns	(52.5 %)	step = 44.88 fs	(62.5 m%)
pss: time = 120.4 ns	(57.5 %)	step = 44.88 fs	(62.5 m%)
pss: time = 120.4 ns	(62.5 %)	step = 44.88 fs	(62.5 m%)
pss: time = 120.4 ns	(67.5 %)	step = 44.88 fs	(62.5 m%)
pss: time = 120.4 ns	(72.5 %)	step = 44.88 fs	(62.5 m%)
pss: time = 120.4 ns	(77.5 %)	step = 44.88 fs	(62.5 m%)
pss: time = 120.4 ns	(82.5 %)	step = 44.88 fs	(62.5 m%)
pss: time = 120.4 ns	(87.5 %)	step = 44.88 fs	(62.5 m%)
pss: time = 120.4 ns	(92.5 %)	step = 44.88 fs	(62.5 m%)
pss: time = 120.4 ns	(97.5 %)	step = 44.88 fs	(62.5 m%)

Conv norm = 134, max dV(I0.Osc.M0:int\_d) = -3.83577 mV, took 240 ms.

=====  
`pss': time = (120.333 ns -> 120.405 ns)  
=====

pss: time = 120.3 ns (2.56 %), step = 44.88 fs (62.4 m%)  
pss: time = 120.3 ns (7.55 %), step = 44.88 fs (62.4 m%)  
pss: time = 120.3 ns (12.5 %), step = 44.88 fs (62.4 m%)  
pss: time = 120.3 ns (17.5 %), step = 44.88 fs (62.4 m%)  
pss: time = 120.3 ns (22.5 %), step = 44.88 fs (62.4 m%)  
pss: time = 120.4 ns (27.5 %), step = 44.88 fs (62.4 m%)  
pss: time = 120.4 ns (32.5 %), step = 44.88 fs (62.4 m%)  
pss: time = 120.4 ns (37.5 %), step = 44.88 fs (62.4 m%)  
pss: time = 120.4 ns (42.5 %), step = 44.88 fs (62.4 m%)  
pss: time = 120.4 ns (47.5 %), step = 44.88 fs (62.4 m%)  
pss: time = 120.4 ns (52.5 %), step = 44.88 fs (62.4 m%)  
pss: time = 120.4 ns (57.6 %), step = 44.88 fs (62.4 m%)  
pss: time = 120.4 ns (62.6 %), step = 44.88 fs (62.4 m%)  
pss: time = 120.4 ns (67.5 %), step = 44.88 fs (62.4 m%)  
pss: time = 120.4 ns (72.5 %), step = 44.88 fs (62.4 m%)  
pss: time = 120.4 ns (77.5 %), step = 44.88 fs (62.4 m%)  
pss: time = 120.4 ns (82.5 %), step = 44.88 fs (62.4 m%)  
pss: time = 120.4 ns (87.5 %), step = 44.88 fs (62.4 m%)  
pss: time = 120.4 ns (92.5 %), step = 44.88 fs (62.4 m%)  
pss: time = 120.4 ns (97.5 %), step = 44.88 fs (62.4 m%)

Conv norm = 1.57, max dV(I0.Osc.M0:int\_d) = -44.9019 uV, took 260 ms.

=====  
`pss': time = (120.333 ns -> 120.405 ns)  
=====

pss: time = 120.3 ns (2.56 %), step = 44.88 fs (62.4 m%)  
pss: time = 120.3 ns (7.55 %), step = 44.88 fs (62.4 m%)  
pss: time = 120.3 ns (12.5 %), step = 44.88 fs (62.4 m%)  
pss: time = 120.3 ns (17.5 %), step = 44.88 fs (62.4 m%)  
pss: time = 120.3 ns (22.5 %), step = 44.88 fs (62.4 m%)  
pss: time = 120.4 ns (27.5 %), step = 44.88 fs (62.4 m%)  
pss: time = 120.4 ns (32.5 %), step = 44.88 fs (62.4 m%)  
pss: time = 120.4 ns (37.5 %), step = 44.88 fs (62.4 m%)  
pss: time = 120.4 ns (42.5 %), step = 44.88 fs (62.4 m%)  
pss: time = 120.4 ns (47.5 %), step = 44.88 fs (62.4 m%)  
pss: time = 120.4 ns (52.5 %), step = 44.88 fs (62.4 m%)  
pss: time = 120.4 ns (57.6 %), step = 44.88 fs (62.4 m%)  
pss: time = 120.4 ns (62.6 %), step = 44.88 fs (62.4 m%)  
pss: time = 120.4 ns (67.5 %), step = 44.88 fs (62.4 m%)  
pss: time = 120.4 ns (72.5 %), step = 44.88 fs (62.4 m%)

pss: time = 120.4 ns (77.5 %), step = 44.88 fs (62.4 m%)  
pss: time = 120.4 ns (82.5 %), step = 44.88 fs (62.4 m%)  
pss: time = 120.4 ns (87.5 %), step = 44.88 fs (62.4 m%)  
pss: time = 120.4 ns (92.5 %), step = 44.88 fs (62.4 m%)  
pss: time = 120.4 ns (97.5 %), step = 44.88 fs (62.4 m%)  
Conv norm = 145e-03, max dV(I0.Osc.M0:int\_d) = -4.14788 uV, took 300 ms.

Fundamental frequency is 13.9102 GHz.

pss: The steady-state solution was achieved in 4 iterations.

Number of accepted pss steps = 1603.

Total time required for pss analysis `pss' was 7.09 s.

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Periodic Noise Analysis `pnoise': freq = 13.9102 GHz + (10 kHz -> 100 MHz)

\*\*\*\*\*

Using the operating-point information generated by PSS analysis `pss'!

pnoise: freq = 12.59 kHz (2.5 %), step = 1.369 kHz (1.25 %)  
pnoise: freq = 19.95 kHz (7.5 %), step = 2.17 kHz (1.25 %)  
pnoise: freq = 31.62 kHz (12.5 %), step = 3.439 kHz (1.25 %)  
pnoise: freq = 50.12 kHz (17.5 %), step = 5.45 kHz (1.25 %)  
pnoise: freq = 79.43 kHz (22.5 %), step = 8.638 kHz (1.25 %)  
pnoise: freq = 125.9 kHz (27.5 %), step = 13.69 kHz (1.25 %)  
pnoise: freq = 199.5 kHz (32.5 %), step = 21.7 kHz (1.25 %)  
pnoise: freq = 316.2 kHz (37.5 %), step = 34.39 kHz (1.25 %)  
pnoise: freq = 501.2 kHz (42.5 %), step = 54.5 kHz (1.25 %)  
pnoise: freq = 794.3 kHz (47.5 %), step = 86.38 kHz (1.25 %)  
pnoise: freq = 1.259 MHz (52.5 %), step = 136.9 kHz (1.25 %)  
pnoise: freq = 1.995 MHz (57.5 %), step = 217 kHz (1.25 %)  
pnoise: freq = 3.162 MHz (62.5 %), step = 343.9 kHz (1.25 %)  
pnoise: freq = 5.012 MHz (67.5 %), step = 545 kHz (1.25 %)  
pnoise: freq = 7.943 MHz (72.5 %), step = 863.8 kHz (1.25 %)  
pnoise: freq = 12.59 MHz (77.5 %), step = 1.369 MHz (1.25 %)  
pnoise: freq = 19.95 MHz (82.5 %), step = 2.17 MHz (1.25 %)  
pnoise: freq = 31.62 MHz (87.5 %), step = 3.439 MHz (1.25 %)  
pnoise: freq = 50.12 MHz (92.5 %), step = 5.45 MHz (1.25 %)  
pnoise: freq = 79.43 MHz (97.5 %), step = 8.638 MHz (1.25 %)

Total time required for pnoise analysis `pnoise' was 26.08 s.

modelParameter: writing model parameter values to rawfile.

element: writing instance parameter values to rawfile.

outputParameter: writing output parameter values to rawfile.

designParamVals: writing netlist parameters to rawfile.

primitives: writing primitives to rawfile.

subckts: writing subcircuits to rawfile.

\*\*\*\*\*

Periodic Steady-State Analysis `pss': guessed fund = 15 GHz

\*\*\*\*\*

Warning from spectre during IC analysis, during periodic steady state analysis  
`pss':

Inconsistent initial condition of 0 V between nodes Out and 0 ignored.

Notice from spectre during IC analysis, during periodic steady state analysis  
`pss':

I0.C0: Initial condition computed between nodes Out and Outb is in error by  
32.0485 mV.

Initial condition computed for node Outb is in error by 69.0057 mV (9.85795  
%).

To reduce error in computed initial conditions, decrease `rforce'.

However, setting rforce too small may result in convergence  
difficulties or in the matrix becoming singular.

=====

`pss': time = (20 ns -> 120.333 ns)

=====

Important parameter values in tstab integration:

start = 20 ns

outputstart = 20 ns

stop = 120.333 ns

period = 66.6667 ps

step = 100.067 ps

maxstep = 2.66667 ps

ic = all

skipdc = no

reftol = 1e-03

abstol(I) = 1 pA

abstol(V) = 1 uV

temp = 27 C

tnom = 27 C

tempeffects = all

method = gear2only

lteratio = 10

relref = sigglobal

cmin = 0 F

gmin = 1 pS

maxrsd = 0 Ohm

mos\_method = s

mos\_vres = 50 mV

pss: time = 22.51 ns (2.5 %), step = 2.667 ps (2.66 m%)

pss: time = 27.53 ns (7.5 %), step = 2.667 ps (2.66 m%)  
 pss: time = 32.54 ns (12.5 %), step = 2.628 ps (2.62 m%)  
 pss: time = 37.56 ns (17.5 %), step = 2.667 ps (2.66 m%)  
 pss: time = 42.58 ns (22.5 %), step = 2.667 ps (2.66 m%)  
 pss: time = 47.59 ns (27.5 %), step = 2.614 ps (2.61 m%)  
 pss: time = 52.61 ns (32.5 %), step = 2.667 ps (2.66 m%)  
 pss: time = 57.63 ns (37.5 %), step = 2.617 ps (2.61 m%)  
 pss: time = 62.64 ns (42.5 %), step = 2.667 ps (2.66 m%)  
 pss: time = 67.66 ns (47.5 %), step = 2.667 ps (2.66 m%)  
 pss: time = 72.68 ns (52.5 %), step = 2.564 ps (2.56 m%)  
 pss: time = 77.69 ns (57.5 %), step = 2.667 ps (2.66 m%)  
 pss: time = 82.71 ns (62.5 %), step = 2.617 ps (2.61 m%)  
 pss: time = 87.73 ns (67.5 %), step = 2.667 ps (2.66 m%)  
 pss: time = 92.74 ns (72.5 %), step = 2.667 ps (2.66 m%)  
 pss: time = 97.76 ns (77.5 %), step = 2.517 ps (2.51 m%)  
 pss: time = 102.8 ns (82.5 %), step = 2.667 ps (2.66 m%)  
 pss: time = 107.8 ns (87.5 %), step = 2.623 ps (2.61 m%)  
 pss: time = 112.8 ns (92.5 %), step = 2.667 ps (2.66 m%)  
 pss: time = 117.8 ns (97.5 %), step = 2.667 ps (2.66 m%)

The Estimated Oscillating Frequency from Tstab Tran is = 1.392530e+10 (Hz).  
 Conv norm = 235, max dl(V0:p) = 75.2446 mA, took 5.25 s.

Important parameter values in pss iteration:

start = 120.333 ns  
 outputstart = 20 ns  
 stop = 120.405 ns  
 period = 71.8118 ps  
 steadyratio = 100e-03  
 step = 100.067 ps  
 maxstep = 179.529 fs  
 ic = all  
 skipdc = no  
 reltol = 10e-06  
 abstol(I) = 1 pA  
 abstol(V) = 1 uV  
 temp = 27 C  
 tnom = 27 C  
 tempeffects = all  
 errpreset = conservative  
 method = gear2only  
 lteratio = 10  
 relref = alllocal  
 cmin = 0 F  
 gmin = 1 pS  
 maxrsd = 0 Ohm  
 mos\_method = s

mos\_vres = 50 mV

=====  
`pss': time = (120.333 ns -> 120.405 ns)

=====  
pss: time = 120.3 ns (2.56 %), step = 44.88 fs (62.5 m%)  
pss: time = 120.3 ns (7.56 %), step = 44.88 fs (62.5 m%)  
pss: time = 120.3 ns (12.6 %), step = 44.88 fs (62.5 m%)  
pss: time = 120.3 ns (17.6 %), step = 44.88 fs (62.5 m%)  
pss: time = 120.3 ns (22.6 %), step = 44.88 fs (62.5 m%)  
pss: time = 120.4 ns (27.6 %), step = 44.88 fs (62.5 m%)  
pss: time = 120.4 ns (32.6 %), step = 44.88 fs (62.5 m%)  
pss: time = 120.4 ns (37.6 %), step = 44.88 fs (62.5 m%)  
pss: time = 120.4 ns (42.6 %), step = 44.88 fs (62.5 m%)  
pss: time = 120.4 ns (47.6 %), step = 44.88 fs (62.5 m%)  
pss: time = 120.4 ns (52.6 %), step = 44.88 fs (62.5 m%)  
pss: time = 120.4 ns (57.6 %), step = 44.88 fs (62.5 m%)  
pss: time = 120.4 ns (62.6 %), step = 44.88 fs (62.5 m%)  
pss: time = 120.4 ns (67.6 %), step = 44.88 fs (62.5 m%)  
pss: time = 120.4 ns (72.6 %), step = 44.88 fs (62.5 m%)  
pss: time = 120.4 ns (77.6 %), step = 44.88 fs (62.5 m%)  
pss: time = 120.4 ns (82.6 %), step = 44.88 fs (62.5 m%)  
pss: time = 120.4 ns (87.6 %), step = 44.88 fs (62.5 m%)  
pss: time = 120.4 ns (92.6 %), step = 44.88 fs (62.5 m%)  
pss: time = 120.4 ns (97.6 %), step = 44.88 fs (62.5 m%)  
Conv norm = 46.6, max dl(I0.I4.L1:1) = 89.6328 uA, took 240 ms.

=====  
`pss': time = (120.333 ns -> 120.405 ns)

=====  
pss: time = 120.3 ns (2.56 %), step = 44.88 fs (62.4 m%)  
pss: time = 120.3 ns (7.55 %), step = 44.88 fs (62.4 m%)  
pss: time = 120.3 ns (12.5 %), step = 44.88 fs (62.4 m%)  
pss: time = 120.3 ns (17.5 %), step = 44.88 fs (62.4 m%)  
pss: time = 120.3 ns (22.5 %), step = 44.88 fs (62.4 m%)  
pss: time = 120.4 ns (27.5 %), step = 44.88 fs (62.4 m%)  
pss: time = 120.4 ns (32.5 %), step = 44.88 fs (62.4 m%)  
pss: time = 120.4 ns (37.5 %), step = 44.88 fs (62.4 m%)  
pss: time = 120.4 ns (42.5 %), step = 44.88 fs (62.4 m%)  
pss: time = 120.4 ns (47.5 %), step = 44.88 fs (62.4 m%)  
pss: time = 120.4 ns (52.5 %), step = 44.88 fs (62.4 m%)  
pss: time = 120.4 ns (57.6 %), step = 44.88 fs (62.4 m%)  
pss: time = 120.4 ns (62.6 %), step = 44.88 fs (62.4 m%)  
pss: time = 120.4 ns (67.6 %), step = 44.88 fs (62.4 m%)



pss: time = 120.4 ns (72.5 %), step = 44.88 fs (62.4 m%)  
pss: time = 120.4 ns (77.5 %), step = 44.88 fs (62.4 m%)  
pss: time = 120.4 ns (82.5 %), step = 44.88 fs (62.4 m%)  
pss: time = 120.4 ns (87.5 %), step = 44.88 fs (62.4 m%)  
pss: time = 120.4 ns (92.5 %), step = 44.88 fs (62.4 m%)  
pss: time = 120.4 ns (97.5 %), step = 44.88 fs (62.4 m%)  
Conv norm = 586e-03, max dV(I0.net19) = 51.2326 uV, took 270 ms.

Fundamental frequency is 13.9101 GHz.  
pss: The steady-state solution was achieved in 3 iterations.  
Number of accepted pss steps = 1602.  
Total time required for pss analysis `pss' was 5.84 s.

\*\*\*\*\*  
Periodic Noise Analysis `pnoise': freq = 13.9101 GHz + (10 kHz -> 100 MHz)  
\*\*\*\*\*

Using the operating-point information generated by PSS analysis `pss'.

pnoise: freq = 12.59 kHz (2.5 %), step = 1.369 kHz (1.25 %)  
pnoise: freq = 19.95 kHz (7.5 %), step = 2.17 kHz (1.25 %)  
pnoise: freq = 31.62 kHz (12.5 %), step = 3.439 kHz (1.25 %)  
pnoise: freq = 50.12 kHz (17.5 %), step = 5.45 kHz (52.1 %)  
pnoise: freq = 79.43 kHz (22.5 %), step = 8.638 kHz (1.25 %)  
pnoise: freq = 125.9 kHz (27.5 %), step = 13.69 kHz (1.25 %)  
pnoise: freq = 199.5 kHz (32.5 %), step = 21.7 kHz (1.25 %)  
pnoise: freq = 316.2 kHz (37.5 %), step = 34.39 kHz (1.25 %)  
pnoise: freq = 501.2 kHz (42.5 %), step = 54.5 kHz (1.25 %)  
pnoise: freq = 794.3 kHz (47.5 %), step = 86.38 kHz (1.25 %)  
pnoise: freq = 1.259 MHz (52.5 %), step = 136.9 kHz (1.25 %)  
pnoise: freq = 1.995 MHz (57.5 %), step = 217 kHz (1.25 %)  
pnoise: freq = 3.162 MHz (62.5 %), step = 343.9 kHz (1.25 %)  
pnoise: freq = 5.012 MHz (67.5 %), step = 545 kHz (1.25 %)  
pnoise: freq = 7.943 MHz (72.5 %), step = 863.8 kHz (1.25 %)  
pnoise: freq = 12.59 MHz (77.5 %), step = 1.369 MHz (1.25 %)  
pnoise: freq = 19.95 MHz (82.5 %), step = 2.17 MHz (1.25 %)  
pnoise: freq = 31.62 MHz (87.5 %), step = 3.439 MHz (1.25 %)  
pnoise: freq = 50.12 MHz (92.5 %), step = 5.45 MHz (1.25 %)  
pnoise: freq = 79.43 MHz (97.5 %), step = 8.638 MHz (1.25 %)

Total time required for pnoise analysis `pnoise' was 25.61 s.

modelParameter: writing model parameter values to rawfile.  
element: writing instance parameter values to rawfile.  
outputParameter: writing output parameter values to rawfile.  
designParamVals: writing netlist parameters to rawfile.  
primitives: writing primitives to rawfile.  
subckts: writing subcircuits to rawfile.

Warning from spectre.

I0.Osc.MT: `Acde' = 280.8 mm/v is unusually small.

I0.Osc.MT: `Acde' = 280.8 mm/v is unusually small.

I0.Osc.MB: `Acde' = 280.8 mm/v is unusually small.

I0.Osc.M1: `Acde' = 280.8 mm/v is unusually small.

Further occurrences of this warning will be suppressed.

I0.Osc.M0: `Acde' = 280.8 mm/v is unusually small.

Further occurrences of this warning will be suppressed.

\*\*\*\*\*

Periodic Steady-State Analysis `pss': guessed fund = 15 GHz

\*\*\*\*\*

Warning from spectre during IC analysis, during periodic steady state analysis  
`pss'.

Inconsistent initial condition of 0 V between nodes Out and 0 ignored.

Notice from spectre during IC analysis, during periodic steady state analysis  
`pss'.

I0.C0: Initial condition computed between nodes Out and Outb is in error by  
55.9807 mV.

Initial condition computed for node Outb is in error by 143.32 mV (20.4743  
%).

To reduce error in computed initial conditions, decrease `rforce'.

However, setting rforce too small may result in convergence  
difficulties or in the matrix becoming singular.

=====

`pss': time = (20 ns -> 120.333 ns)

=====

Important parameter values in tstab integration:

start = 20 ns

outputstart = 20 ns

stop = 120.333 ns

period = 66.6667 ps

step = 100.067 ps

maxstep = 2.66667 ps

ic = all

skipdc = no

reitol = 1e-03

abstol(I) = 1 pA

abstol(V) = 1 uV

temp = 27 C

tnom = 27 C

tempeffects = all  
method = gear2only  
lteratio = 10  
relref = sigglobal  
cmin = 0 F  
gmin = 1 pS  
maxrsd = 0 Ohm  
mos\_method = s  
mos\_vres = 50 mV

Warning from spectre at time = 20.0028 ns during periodic steady state analysis  
`pss'.

I0.Osc.MT: Vgd has exceeded the oxide breakdown voltage of `vbox' = 2.25 V.

Notice from spectre at time = 20.0126 ns during periodic steady state analysis  
`pss'.

I0.Osc.MT: Device leaves the gate-drain oxide breakdown region.

Warning from spectre at time = 20.0136 ns during periodic steady state analysis  
`pss'.

I0.Osc.M0: Vgs has exceeded the oxide breakdown voltage of `vbox' = 2.25 V.

Warning from spectre at time = 20.0146 ns during periodic steady state analysis  
`pss'.

I0.Osc.M1: The bulk-drain junction current exceeds `imelt'. The results computed by Virtuoso(R) Spectre(R) are now incorrect because the junction current model has been linearized.

I0.Osc.M1: The bulk-drain junction current exceeds `imax'.

Notice from spectre at time = 20.0156 ns during periodic steady state analysis  
`pss'.

I0.Osc.M0: Device leaves the gate-source oxide breakdown region.

Warning from spectre at time = 20.0196 ns during periodic steady state analysis  
`pss'.

I0.Osc.M0: The bulk-drain junction current exceeds `imelt'. The results computed by Virtuoso(R) Spectre(R) are now incorrect because the junction current model has been linearized.

Notice from spectre at time = 20.0199 ns during periodic steady state analysis  
`pss'.

I0.Osc.M0: The bulk-drain junction leaves the linearized region.

Notice from spectre at time = 20.0252 ns during periodic steady state analysis  
`pss'.

I0.Osc.M1: The bulk-drain junction leaves the linearized region.

I0.Osc.M1: The bulk-drain junction current no longer exceeds `imax'.

Warning from spectre at time = 20.4955 ns during periodic steady state analysis  
`pss'.

I0.Osc.M0: Vgs has exceeded the oxide breakdown voltage of `vbox' = 2.25

V.

Warning from spectre at time = 20.4982 ns during periodic steady state analysis  
'pss'.

I0.Osc.M1: Vgd has exceeded the oxide breakdown voltage of 'vbox' = 2.25

V.

I0.Osc.M0: Vgd has exceeded the oxide breakdown voltage of 'vbox' = 2.25

V.

Notice from spectre at time = 20.5008 ns during periodic steady state analysis  
'pss'.

I0.Osc.M1: Device leaves the gate-drain oxide breakdown region.

I0.Osc.M0: Device leaves the gate-source oxide breakdown region.

I0.Osc.M0: Device leaves the gate-drain oxide breakdown region.

Warning from spectre at time = 20.5295 ns during periodic steady state analysis  
'pss'.

I0.Osc.M1: Vgs has exceeded the oxide breakdown voltage of 'vbox' = 2.25

V.

Warning from spectre at time = 20.5321 ns during periodic steady state analysis  
'pss'.

I0.Osc.M1: Vgd has exceeded the oxide breakdown voltage of 'vbox' = 2.25

V.

Further occurrences of this warning will be suppressed.

I0.Osc.M0: Vgd has exceeded the oxide breakdown voltage of 'vbox' = 2.25

V.

Further occurrences of this warning will be suppressed.

Notice from spectre at time = 20.5375 ns during periodic steady state analysis  
'pss'.

I0.Osc.M1: Device leaves the gate-source oxide breakdown region.

I0.Osc.M1: Device leaves the gate-drain oxide breakdown region.

I0.Osc.M0: Device leaves the gate-drain oxide breakdown region.

Further occurrences of this notice will be suppressed.

Warning from spectre at time = 20.5655 ns during periodic steady state analysis  
'pss'.

I0.Osc.M0: Vgs has exceeded the oxide breakdown voltage of 'vbox' = 2.25

V.

Notice from spectre at time = 20.5735 ns during periodic steady state analysis  
'pss'.

I0.Osc.M0: Device leaves the gate-source oxide breakdown region.

Warning from spectre at time = 20.5993 ns during periodic steady state analysis  
'pss'.

I0.Osc.M1: Vgs has exceeded the oxide breakdown voltage of 'vbox' = 2.25

V.

Further occurrences of this warning will be suppressed.

Notice from spectre at time = 20.6073 ns during periodic steady state analysis  
'pss'.

I0.Osc.M1: Device leaves the gate-source oxide breakdown region.

Further occurrences of this notice will be suppressed.

pss: time = 22.51 ns (2.5 %), step = 2.234 ps (2.23 m%)  
 pss: time = 27.53 ns (7.5 %), step = 2.296 ps (2.29 m%)  
 pss: time = 32.54 ns (12.5 %), step = 2.667 ps (2.66 m%)  
 pss: time = 37.56 ns (17.5 %), step = 2.667 ps (2.66 m%)  
 pss: time = 42.58 ns (22.5 %), step = 2.667 ps (2.66 m%)  
 pss: time = 47.59 ns (27.5 %), step = 2.667 ps (2.66 m%)  
 pss: time = 52.61 ns (32.5 %), step = 2.667 ps (2.66 m%)  
 pss: time = 57.63 ns (37.5 %), step = 2.667 ps (2.66 m%)  
 pss: time = 62.64 ns (42.5 %), step = 1.333 ps (1.33 m%)  
 pss: time = 67.66 ns (47.5 %), step = 2.536 ps (2.53 m%)  
 pss: time = 72.68 ns (52.5 %), step = 2.667 ps (2.66 m%)  
 pss: time = 77.69 ns (57.5 %), step = 2.667 ps (2.66 m%)  
 pss: time = 82.71 ns (62.5 %), step = 2.667 ps (2.66 m%)  
 pss: time = 87.73 ns (67.5 %), step = 2.667 ps (2.66 m%)  
 pss: time = 92.74 ns (72.5 %), step = 2.475 ps (2.47 m%)  
 pss: time = 97.76 ns (77.5 %), step = 1.933 ps (1.93 m%)  
 pss: time = 102.8 ns (82.5 %), step = 2.421 ps (2.41 m%)  
 pss: time = 107.8 ns (87.5 %), step = 2.667 ps (2.66 m%)  
 pss: time = 112.8 ns (92.5 %), step = 2.667 ps (2.66 m%)  
 pss: time = 117.8 ns (97.5 %), step = 2.667 ps (2.66 m%)

The Estimated Oscillating Frequency from Tstab Tran is = 1.437059e+10 (Hz).  
 Conv norm = 241, max dl(V0:p) = 148.373 mA, took 7.66 s.

Important parameter values in pss iteration:

start = 120.333 ns  
 outputstart = 20 ns  
 stop = 120.403 ns  
 period = 69.5866 ps  
 steadyratio = 100e-03  
 step = 100.067 ps  
 maxstep = 173.966 fs  
 ic = all  
 skipdc = no  
 reltol = 10e-06  
 abstol(I) = 1 pA  
 abstol(V) = 1 uV  
 temp = 27 C  
 tnom = 27 C  
 tempeffects = all  
 errpreset = conservative  
 method = gear2only  
 lteratio = 10  
 relref = alllocal  
 cmin = 0 F  
 gmin = 1 pS

maxrsd = 0 Ohm  
mos\_method = s  
mos\_vres = 50 mV

Warning from spectre during periodic steady state analysis `pss'.  
8422 warnings suppressed.

=====  
`pss': time = (120.333 ns -> 120.403 ns)  
=====

Warning from spectre at time = 120.333 ns during periodic steady state analysis  
`pss'.

- I0.Osc.M1: Vgs has exceeded the oxide breakdown voltage of `vbox' = 2.25 V.
- I0.Osc.M1: Vgd has exceeded the oxide breakdown voltage of `vbox' = 2.25 V.
- I0.Osc.M0: Vgd has exceeded the oxide breakdown voltage of `vbox' = 2.25 V.

pss: time = 120.3 ns (2.56 %), step = 43.49 fs (62.5 m%)  
pss: time = 120.3 ns (7.56 %), step = 43.49 fs (62.5 m%)  
pss: time = 120.3 ns (12.6 %), step = 43.49 fs (62.5 m%)  
pss: time = 120.3 ns (17.6 %), step = 43.49 fs (62.5 m%)  
pss: time = 120.3 ns (22.5 %), step = 43.49 fs (62.5 m%)  
pss: time = 120.4 ns (27.5 %), step = 43.49 fs (62.5 m%)  
pss: time = 120.4 ns (32.5 %), step = 43.49 fs (62.5 m%)  
pss: time = 120.4 ns (37.5 %), step = 43.49 fs (62.5 m%)  
pss: time = 120.4 ns (42.5 %), step = 43.49 fs (62.5 m%)

Warning from spectre at time = 120.364 ns during periodic steady state analysis  
`pss'.

- I0.Osc.M0: Vgs has exceeded the oxide breakdown voltage of `vbox' = 2.25 V.

Warning from spectre at time = 120.365 ns during periodic steady state analysis  
`pss'.

- I0.Osc.M1: Vgd has exceeded the oxide breakdown voltage of `vbox' = 2.25 V.
- I0.Osc.M0: Vgd has exceeded the oxide breakdown voltage of `vbox' = 2.25 V.

pss: time = 120.4 ns (47.5 %), step = 43.49 fs (62.5 m%)  
pss: time = 120.4 ns (52.5 %), step = 43.49 fs (62.5 m%)  
pss: time = 120.4 ns (57.5 %), step = 43.49 fs (62.5 m%)

pss: time = 120.4 ns (62.5 %), step = 43.49 fs (62.5 m%)  
pss: time = 120.4 ns (67.5 %), step = 43.49 fs (62.5 m%)  
pss: time = 120.4 ns (72.5 %), step = 43.49 fs (62.5 m%)  
pss: time = 120.4 ns (77.5 %), step = 43.49 fs (62.5 m%)  
pss: time = 120.4 ns (82.5 %), step = 43.49 fs (62.5 m%)  
pss: time = 120.4 ns (87.5 %), step = 43.49 fs (62.5 m%)  
pss: time = 120.4 ns (92.5 %), step = 43.49 fs (62.5 m%)

Warning from spectre at time = 120.399 ns during periodic steady state analysis  
`pss'.

I0.Osc.M1: Vgs has exceeded the oxide breakdown voltage of `vbox' = 2.25  
V.

Further occurrences of this warning will be suppressed.

Warning from spectre at time = 120.4 ns during periodic steady state analysis  
`pss'.

I0.Osc.M1: Vgd has exceeded the oxide breakdown voltage of `vbox' = 2.25  
V.

Further occurrences of this warning will be suppressed.

pss: time = 120.4 ns (97.5 %), step = 43.49 fs (62.5 m%)  
Conv norm = 28.3, max dl(I0.I4.L1:1) = 89.5964 uA, took 260 ms.

Warning from spectre during periodic steady state analysis `pss'.  
1 warning suppressed.

=====  
`pss': time = (120.333 ns -> 120.403 ns)  
=====

Warning from spectre at time = 120.333 ns during periodic steady state analysis  
`pss'.

I0.Osc.M1: Vgs has exceeded the oxide breakdown voltage of `vbox' = 2.25  
V.

I0.Osc.M1: Vgd has exceeded the oxide breakdown voltage of `vbox' = 2.25  
V.

I0.Osc.M0: Vgd has exceeded the oxide breakdown voltage of `vbox' = 2.25  
V.

pss: time = 120.3 ns (2.5 %), step = 43.49 fs (62.5 m%)  
pss: time = 120.3 ns (7.5 %), step = 43.49 fs (62.5 m%)  
pss: time = 120.3 ns (12.5 %), step = 43.49 fs (62.5 m%)  
pss: time = 120.3 ns (17.5 %), step = 43.49 fs (62.5 m%)  
pss: time = 120.3 ns (22.5 %), step = 43.49 fs (62.5 m%)  
pss: time = 120.4 ns (27.5 %), step = 43.49 fs (62.5 m%)

pss: time = 120.4 ns (32.5 %), step = 43.49 fs (62.5 m%)  
pss: time = 120.4 ns (37.5 %), step = 43.49 fs (62.5 m%)  
pss: time = 120.4 ns (42.5 %), step = 43.49 fs (62.5 m%)

Warning from spectre at time = 120.364 ns during periodic steady state analysis  
`pss'.

I0.Osc.M0: Vgs has exceeded the oxide breakdown voltage of `vbox' = 2.25  
V.

Warning from spectre at time = 120.365 ns during periodic steady state analysis  
`pss'.

I0.Osc.M1: Vgd has exceeded the oxide breakdown voltage of `vbox' = 2.25  
V.

I0.Osc.M0: Vgd has exceeded the oxide breakdown voltage of `vbox' = 2.25  
V.

pss: time = 120.4 ns (47.5 %), step = 43.49 fs (62.5 m%)  
pss: time = 120.4 ns (52.5 %), step = 43.49 fs (62.5 m%)  
pss: time = 120.4 ns (57.5 %), step = 43.49 fs (62.5 m%)  
pss: time = 120.4 ns (62.5 %), step = 43.49 fs (62.5 m%)  
pss: time = 120.4 ns (67.5 %), step = 43.49 fs (62.5 m%)  
pss: time = 120.4 ns (72.5 %), step = 43.49 fs (62.5 m%)  
pss: time = 120.4 ns (77.5 %), step = 43.49 fs (62.5 m%)  
pss: time = 120.4 ns (82.5 %), step = 43.49 fs (62.5 m%)  
pss: time = 120.4 ns (87.5 %), step = 43.49 fs (62.5 m%)  
pss: time = 120.4 ns (92.5 %), step = 43.49 fs (62.5 m%)

Warning from spectre at time = 120.399 ns during periodic steady state analysis  
`pss'.

I0.Osc.M1: Vgs has exceeded the oxide breakdown voltage of `vbox' = 2.25  
V.

Further occurrences of this warning will be suppressed.

Warning from spectre at time = 120.4 ns during periodic steady state analysis  
`pss'.

I0.Osc.M1: Vgd has exceeded the oxide breakdown voltage of `vbox' = 2.25  
V.

Further occurrences of this warning will be suppressed.

pss: time = 120.4 ns (97.5 %), step = 43.49 fs (62.5 m%)  
Conv norm = 17.5e-03, max dV(I0.Osc.M0:int\_d) = -3.51053 uV, took 240 ms.

Fundamental frequency is 14.3745 GHz.

pss: The steady-state solution was achieved in 3 iterations.

Number of accepted pss steps = 1600.

Total time required for pss analysis `pss' was 8.25 s.



Warning from spectre.  
1 warning suppressed.

\*\*\*\*\*  
Periodic Noise Analysis `pnoise': freq = 14.3745 GHz + (10 kHz -> 100 MHz)  
\*\*\*\*\*

Using the operating-point information generated by PSS analysis `pss'.

Warning from spectre during PNoise analysis `pnoise'.

I0.Osc.M1: Vgs has exceeded the oxide breakdown voltage of `vbox' = 2.25 V.

I0.Osc.M1: Vgd has exceeded the oxide breakdown voltage of `vbox' = 2.25 V.

I0.Osc.M0: Vgd has exceeded the oxide breakdown voltage of `vbox' = 2.25 V.

I0.Osc.M0: Vgs has exceeded the oxide breakdown voltage of `vbox' = 2.25 V.

I0.Osc.M1: Vgd has exceeded the oxide breakdown voltage of `vbox' = 2.25 V.

I0.Osc.M0: Vgd has exceeded the oxide breakdown voltage of `vbox' = 2.25 V.

I0.Osc.M1: Vgs has exceeded the oxide breakdown voltage of `vbox' = 2.25 V.

Further occurrences of this warning will be suppressed.

I0.Osc.M1: Vgd has exceeded the oxide breakdown voltage of `vbox' = 2.25 V.

Further occurrences of this warning will be suppressed.

PSS analysis may be insufficiently accurate for PNOISE analysis. Consider tightening simulation tolerance

PSS analysis may be insufficiently accurate for PNOISE analysis. Consider tightening simulation tolerance

pnoise: freq = 12.59 kHz (2.5 %), step = 1.369 kHz (1.25 %)  
pnoise: freq = 19.95 kHz (7.5 %), step = 2.17 kHz (1.25 %)  
pnoise: freq = 31.62 kHz (12.5 %), step = 3.439 kHz (1.25 %)  
pnoise: freq = 50.12 kHz (17.5 %), step = 5.45 kHz (1.25 %)  
pnoise: freq = 79.43 kHz (22.5 %), step = 8.638 kHz (1.25 %)  
pnoise: freq = 125.9 kHz (27.5 %), step = 13.69 kHz (1.25 %)  
pnoise: freq = 199.5 kHz (32.5 %), step = 21.7 kHz (1.25 %)  
pnoise: freq = 316.2 kHz (37.5 %), step = 34.39 kHz (1.25 %)  
pnoise: freq = 501.2 kHz (42.5 %), step = 54.5 kHz (1.25 %)  
pnoise: freq = 794.3 kHz (47.5 %), step = 86.38 kHz (1.25 %)  
pnoise: freq = 1.259 MHz (52.5 %), step = 136.9 kHz (1.25 %)  
pnoise: freq = 1.995 MHz (57.5 %), step = 217 kHz (1.25 %)  
pnoise: freq = 3.162 MHz (62.5 %), step = 343.9 kHz (1.25 %)

pnoise: freq = 5.012 MHz (67.5 %), step = 545 kHz (1.25 %)  
pnoise: freq = 7.943 MHz (72.5 %), step = 863.8 kHz (1.25 %)  
pnoise: freq = 12.59 MHz (77.5 %), step = 1.369 MHz (1.25 %)  
pnoise: freq = 19.95 MHz (82.5 %), step = 2.17 MHz (1.25 %)  
pnoise: freq = 31.62 MHz (87.5 %), step = 3.439 MHz (1.25 %)  
pnoise: freq = 50.12 MHz (92.5 %), step = 5.45 MHz (1.25 %)  
pnoise: freq = 79.43 MHz (97.5 %), step = 8.638 MHz (1.25 %)  
Total time required for pnoise analysis `pnoise' was 25.59 s.

Warning from spectre.

1 warning suppressed.

modelParameter: writing model parameter values to rawfile.  
element: writing instance parameter values to rawfile.  
outputParameter: writing output parameter values to rawfile.  
designParamVals: writing netlist parameters to rawfile.  
primitives: writing primitives to rawfile.  
subckts: writing subcircuits to rawfile.