

Report-14

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TABLE II: Effect of Trojan model II

Q	T1	T2	Data on Bus	Outcome	Remarks
0	0	0	0	Stored Value	Read 0, Same
0	0	1	0	Stored Value	Read 0, Same
0	1	0	0	Stored Value	Read 0, Same
0	1	1	0	Stored Value	Read 0, Same
1	0	0	1	Stored Value	Read 1, Same
1	0	1	No charge loss from BL and BLb	Read Error	Read Error, But Discharge from both BL and BLb
1	1	0	Discharge from both BL and BLb	Read Error	Read 1, Not same
1	1	1	0	Trojan Effected	Read 0, Same

In below I show the deference Trojan Effected stage and without Trojan stage.

Show Dference Between Without Trojan and with Trojan Circuit

1. Job statistics summary

No	Without Trojan	With Trojan
01	tnom= 25.000	tnom= 25.000
02	temp= 25.000	temp= 25.000

2. HSPICE Threads Information

No	Without Trojan	With Trojan
01	Command Line Threads Count :1	Command Line Threads Count :1
02	Available CPU Count :8	Available CPU Count :8
03	Actual Threads Count :1	Actual Threads Count :1

3. Circuit Statistics

No	Without Trojan	With Trojan
01	nodes = 31	nodes = 42
02	elements = 8	elements = 10
03	mosfets = 6	mosfets = 8
04	volt_srcs = 2	volt_srcs = 2

4. Without Trojan:

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

analysis	time	# points	tot. iter	conv.iter
op point	0.00	1	23	
transient	0.01	201	655	125 rev= 13
readin	0.03			
errchk	0.01			
setup	0.00			
output	0.00			
peak memory used			48.61 megabytes	
total cpu time			0.02 seconds	
total elapsed time			0.21 seconds	

With Trojan:

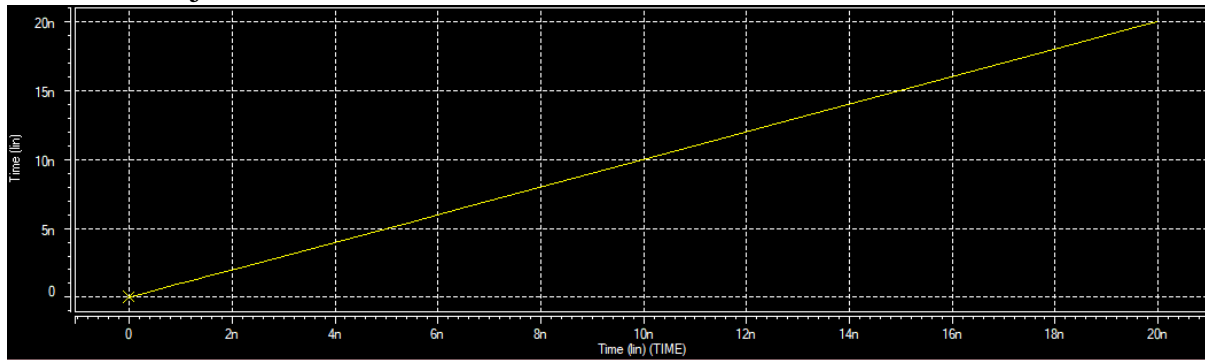
***** Runtime Statistics (seconds) *****

analysis	time	# points	tot. iter	conv.iter
op point	0.00	1	25	
transient	0.02	201	892	166 rev= 18
readin	0.01			
errchk	0.00			
setup	0.00			
output	0.00			
peak memory used			48.69 megabytes	
total cpu time			0.04 seconds	
total elapsed time			0.21 seconds	

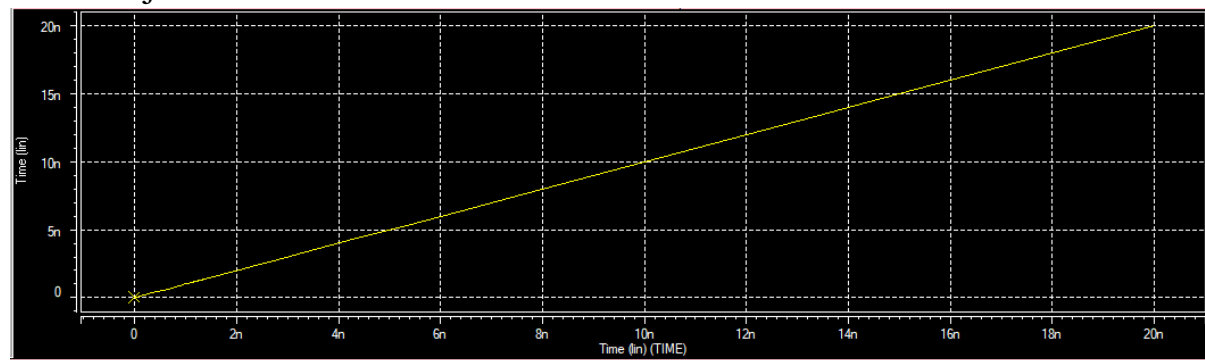
Graph Difference

1. Time

Without Trojan:



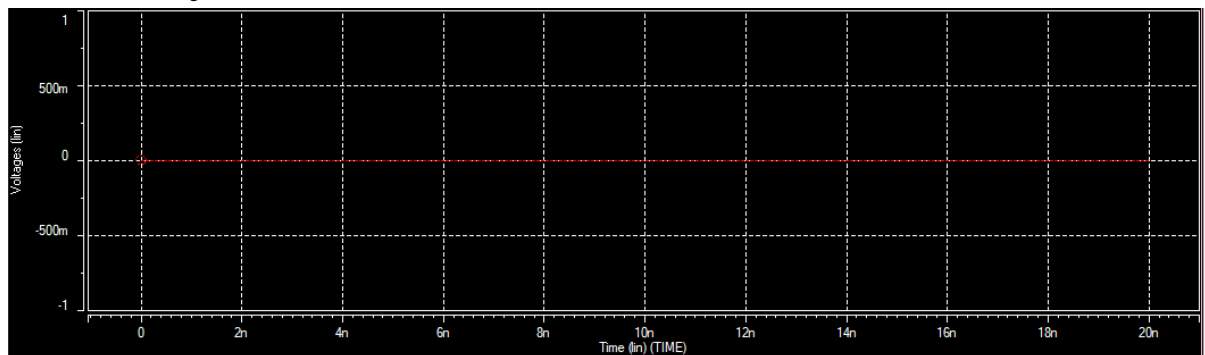
With Trojan:



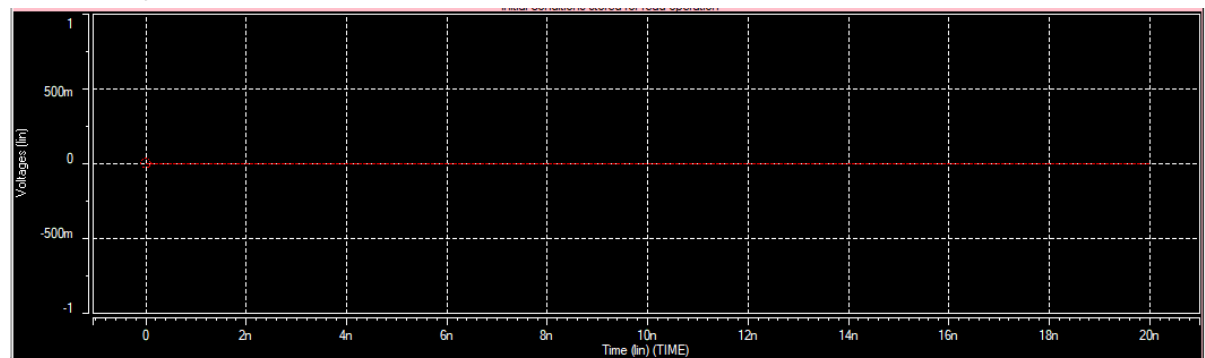
Remarks: Same

2. Voltage [v(0)]

Without Trojan:



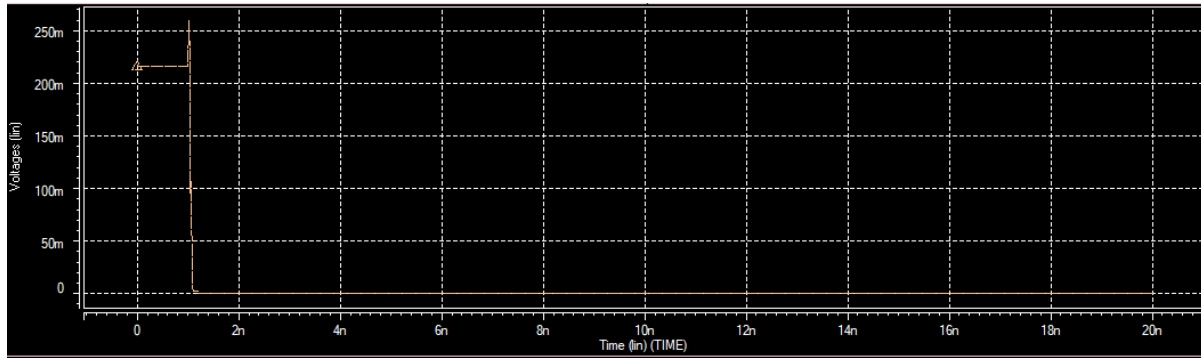
With Trojan:



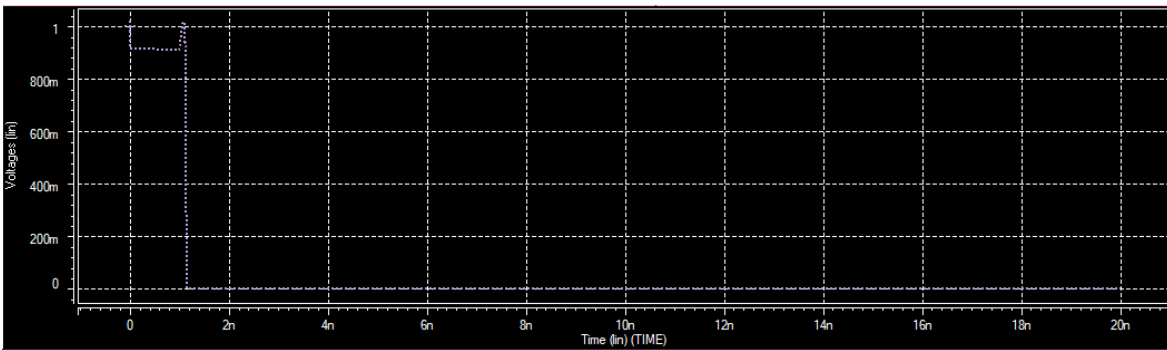
Remarks: Same

3. Voltage [v(bl)]

Without Trojan:



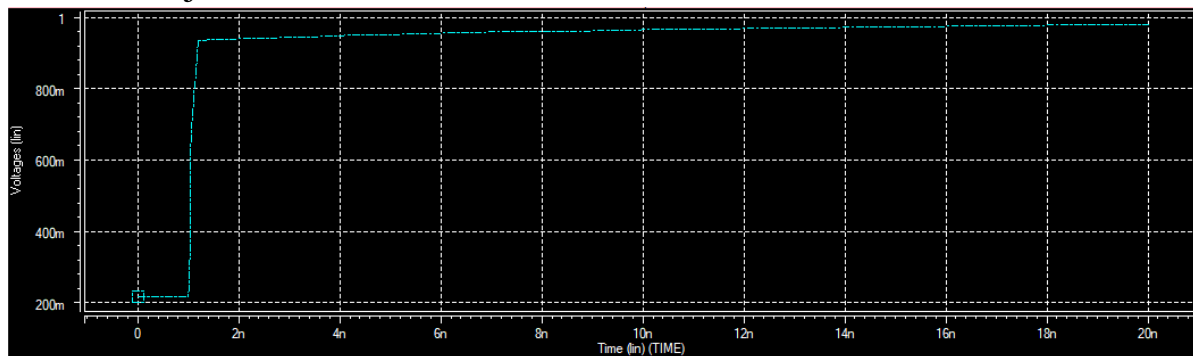
With Trojan:



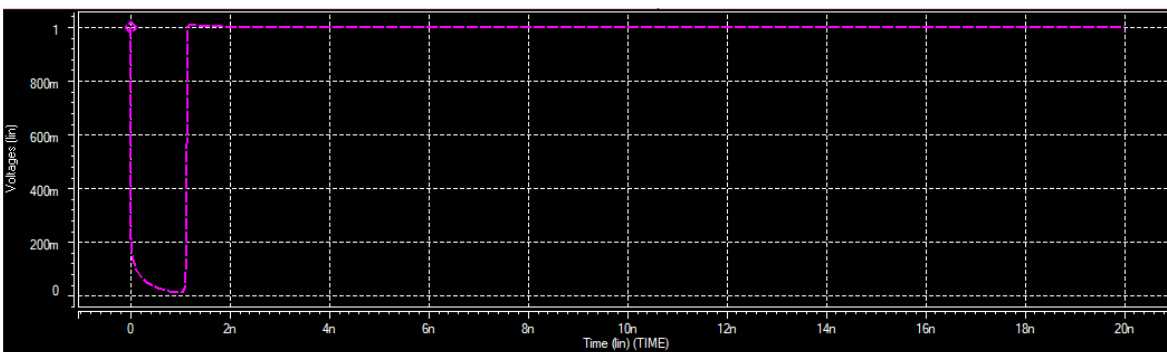
Remarks: Same

4. Voltage [v(blbb)]

Without Trojan:



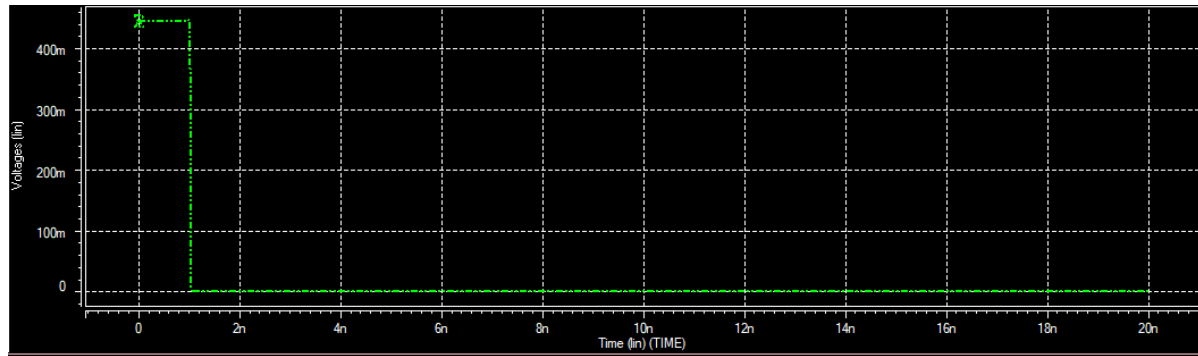
With Trojan:



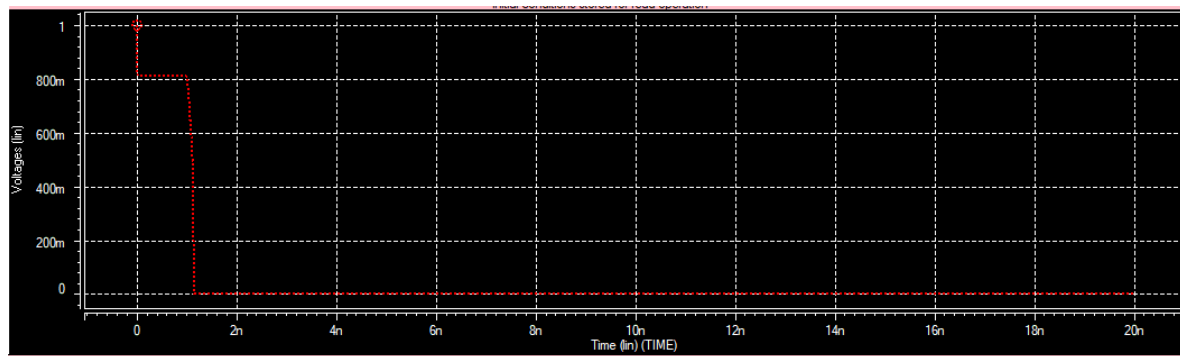
Remarks: Not Same

5. Voltage [v(q)]

Without Trojan:



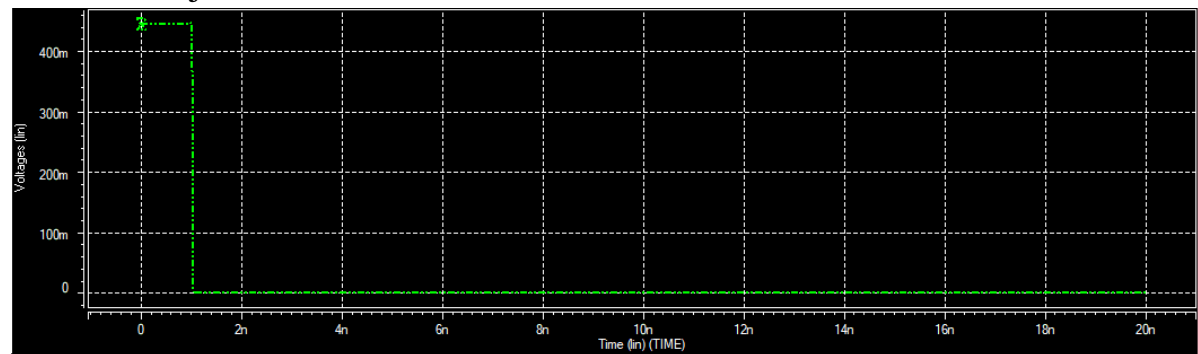
With Trojan:



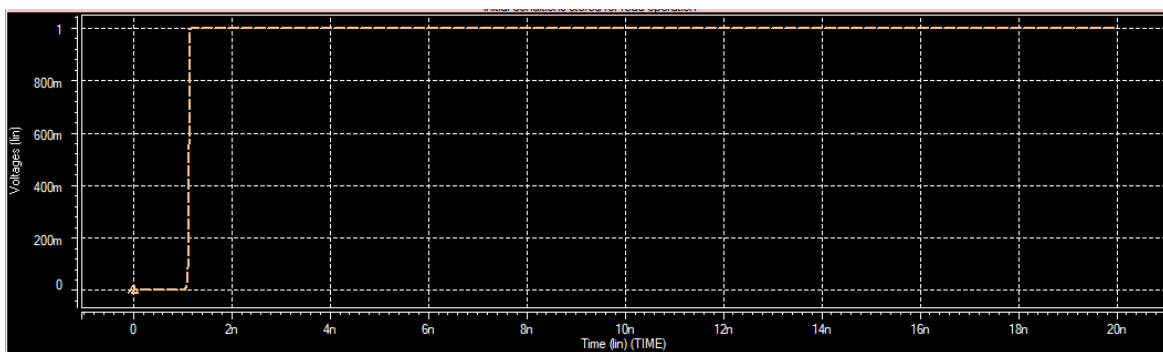
Remarks: Same

6. Voltage [v(qr)]

Without Trojan:



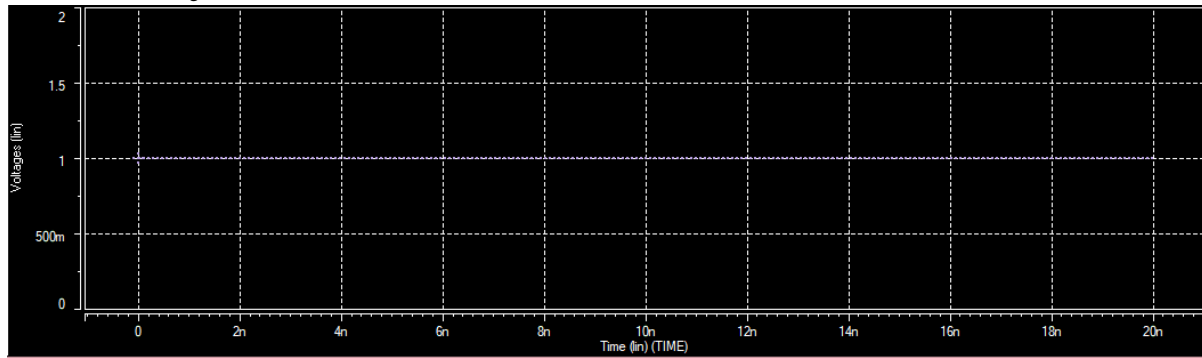
With Trojan:



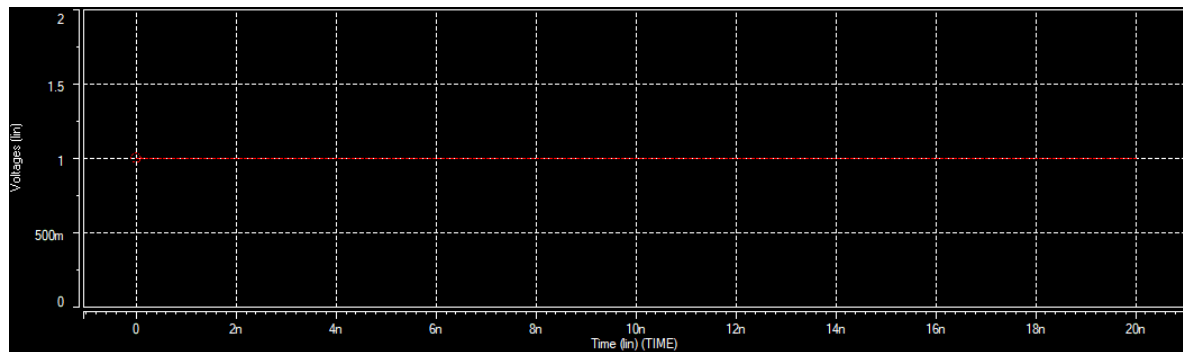
Remarks: Not Same

7. Voltage [v(vdd)]

Without Trojan:



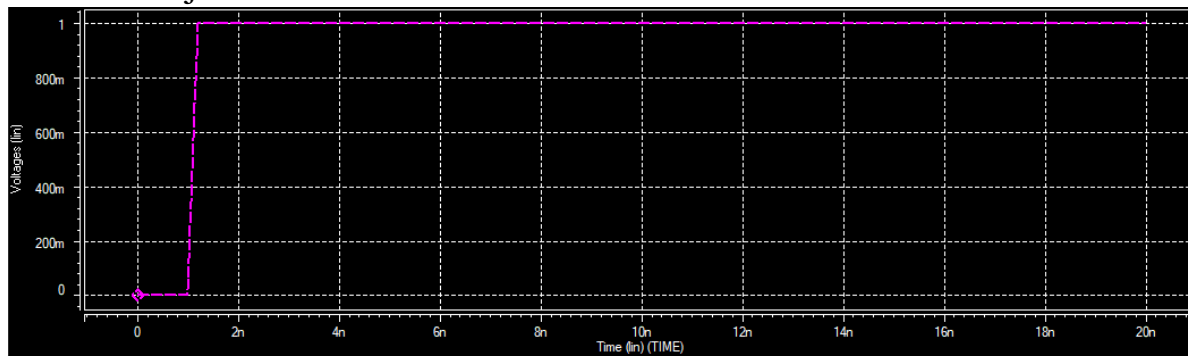
With Trojan:



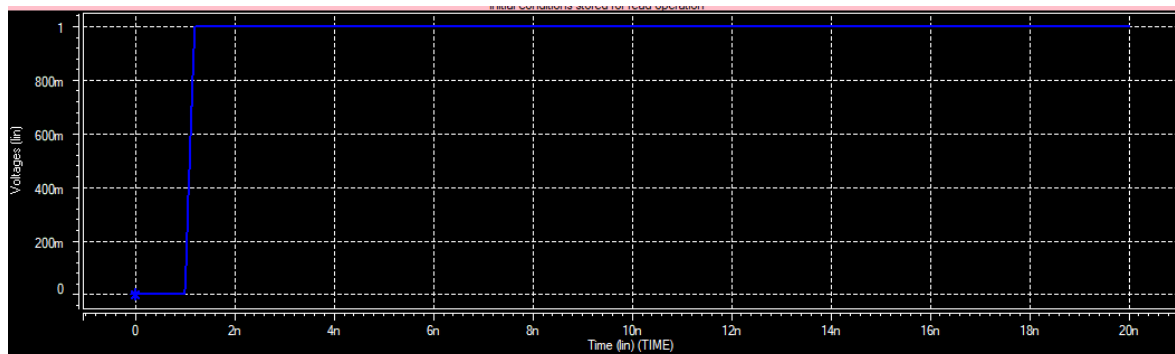
Remarks: Same

8. Voltage [v(wl)]

Without Trojan:



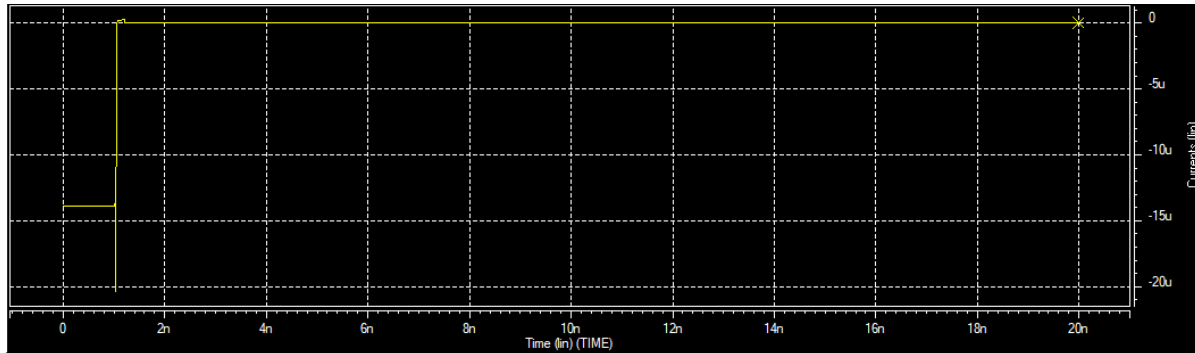
With Trojan:



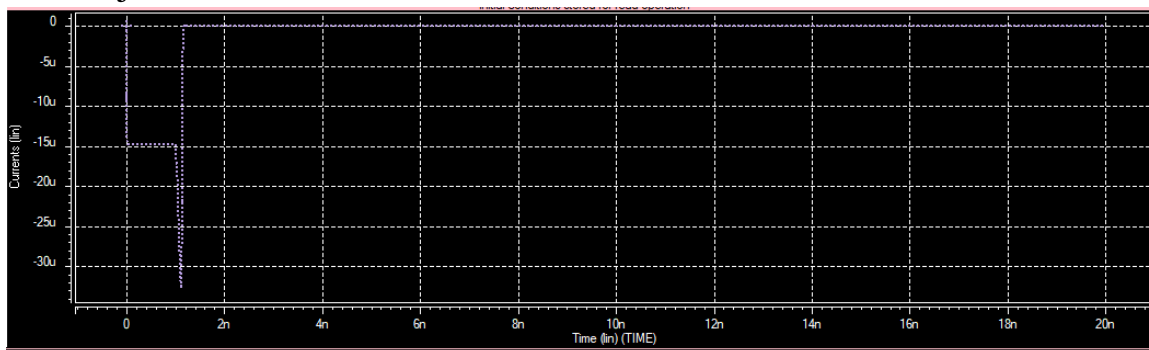
Remarks: Same

9. Current [i(vvdd)]

Without Trojan:



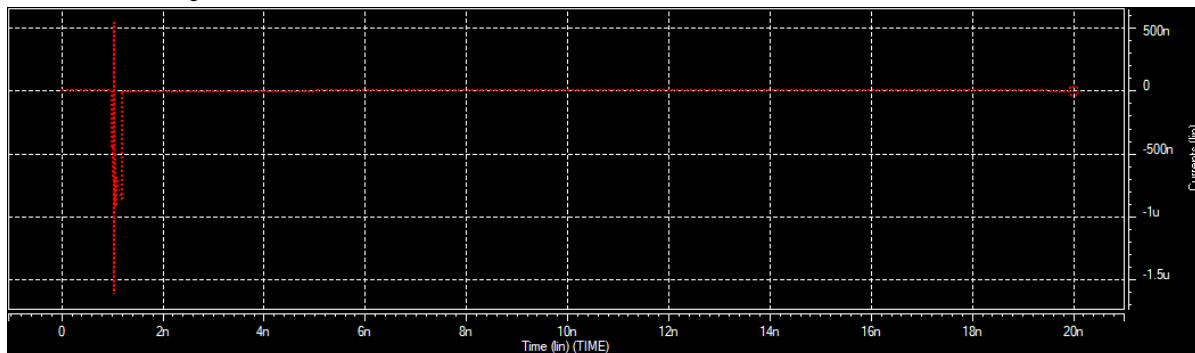
With Trojan:



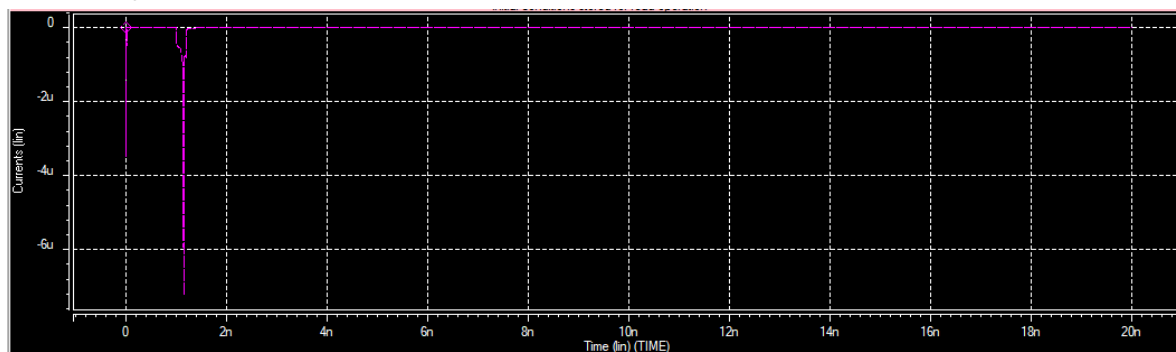
Remarks: Same

10. Current [i(vwl)]

Without Trojan:



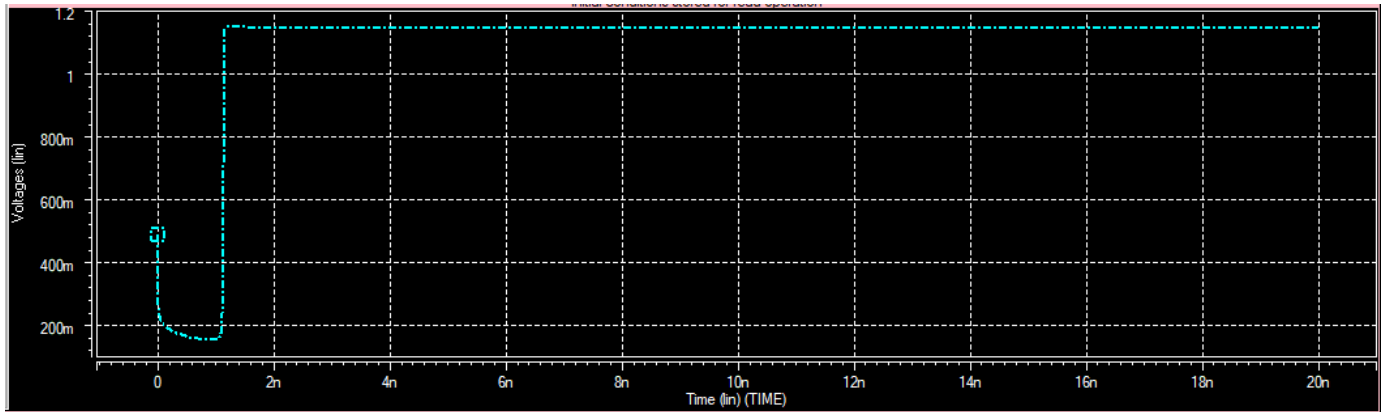
With Trojan:



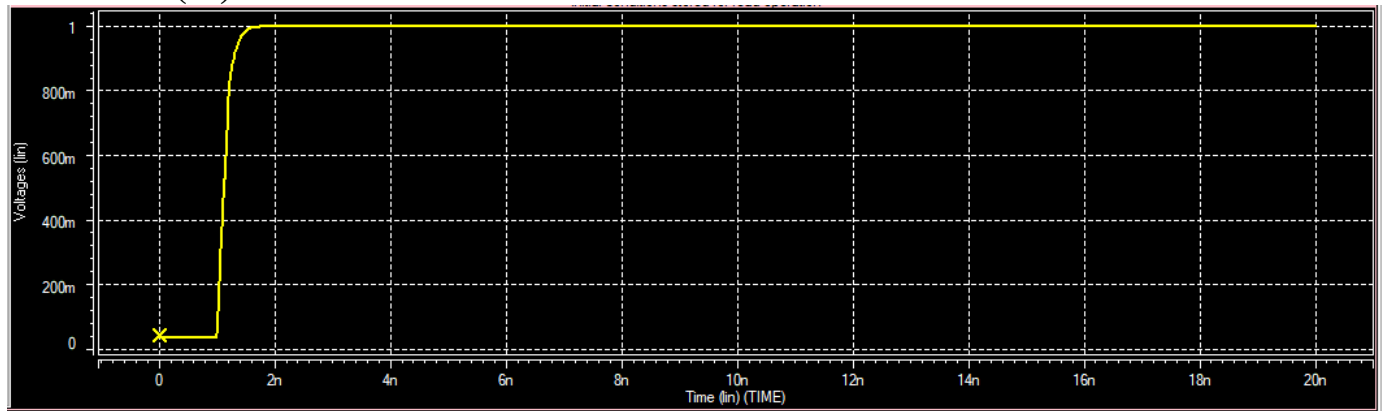
Remarks: Same

Some voltage which show only with Trojan SRAM

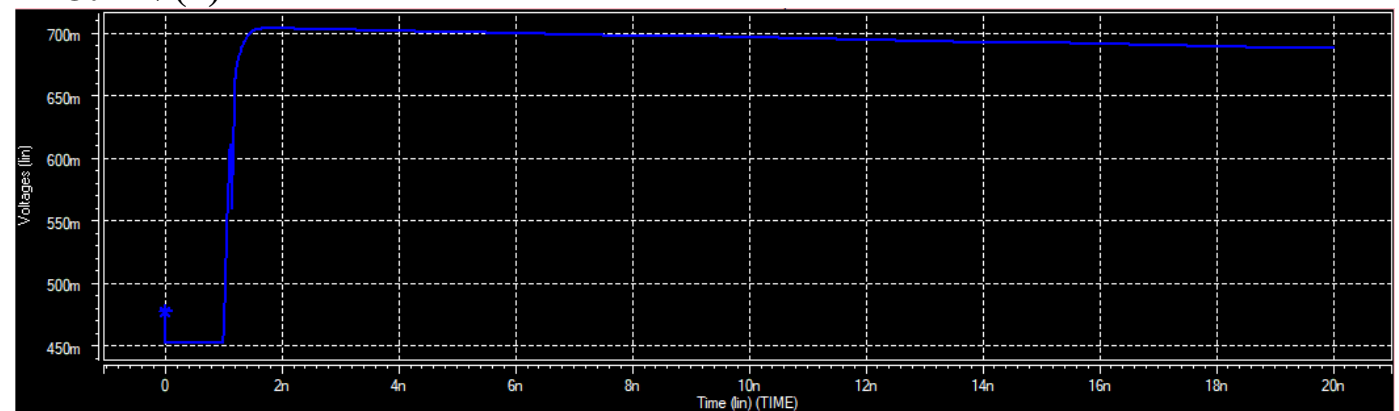
11. $V(t)$



12. $V(i6)$



13. $V(1)$



Netlist Without Trojan

```
*initial conditions stored for read operation
.ic v(Q)=1
.ic v(QR)=0
*data control
.ic v(bl)=1
.ic v(blb)=1
** SRAM without trojen
M1 Q QR 0 0 nmos w=90n l=45n
M2 Q QR vdd vdd pmos w=90n l=45n
M3 QR Q 0 0 nmos w=90n l=45n
M4 QR Q vdd vdd pmos w=90n l=45n
M5 Q wl bl bl nmos w=90n l=45n
Mi6 blb wl QR blb nmos w=90n l=45n
** Voltage source
Vvdd vdd 0 1
**Access Control
Vwl wl 0 pwl(0 0 1n 0 1.2n 1 5n 1)
.tran 0.1n 20n
.model nmos nmos 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  acnqsmode= 0  trnqsmode= 0
* parameters related to the technology node
+tnom = 27  epsrox = 3.9
+eta0 = 0.0049  nfactor = 2.1  wint = 5e-09
+cgso = 1.1e-10  cgdo = 1.1e-10  xl = -2e-08
* parameters customized by the user
+toxe = 1.75e-09  toxp = 1.1e-09  toxm = 1.75e-09  toxref = 1.75e-09
+dtox = 6.5e-10  lint = 3.75e-09
+vth0 = 0.469  k1 = 0.528  u0 = 0.04372  vsat = 147390
```

+rdsw = 155 ndep = 3.28e+18 xj = 1.4e-08

* secondary parameters

+ll = 0 wl = 0 lln = 1 wln = 1

+lw = 0 ww = 0 lwn = 1 wwn = 1

+lwl = 0 ww1 = 0 xpart = 0

+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

+ngate = 2e+020 nsd = 2e+020 phin = 0

+cdsc = 0.000 cdscb = 0 cdsd = 0 cit = 0

+voff = -0.13 etab = 0

+vfb = -0.55 ua = 6e-010 ub = 1.2e-018

+uc = 0 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 pscbe1 = 8.14e+008 pscbe2 = 1e-007

+fprout = 0.2 pdits = 0.08 pditsd = 0.23 pditsl = 2.3e+006

+rsh = 5 rsw = 85 rdw = 85

+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

+cigc = 0.002 aigsd = 0.012 bigsd = 0.0028 cigsd = 0.002

+nigc = 1 poxedg = 1 pigcd = 1 ntox = 1

+xrcreg1 = 12 xrcreg2 = 5

+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
+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        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      gbmin  = 1e-010   rbpb   = 5        rbpd   = 15
+rbps   = 15       rbdb   = 15       rbsb   = 15       ngcon  = 1
.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     acnqsmode = 0   trnqsmode = 0
* parameters related to the technology node
+tnom = 27     epsrox = 3.9
+eta0 = 0.0049   nfactor = 2.1   wint = 5e-09
+cgso = 1.1e-10   cgdo = 1.1e-10   xl = -2e-08
* parameters customized by the user
+toxe = 1.85e-09   toxp = 1.1e-09   toxm = 1.85e-09   toxref = 1.85e-09
+dtox = 7.5e-10   lint = 3.75e-09
+vth0 = -0.418   k1 = 0.488   u0 = 0.00439   vsat = 70000

```

+rdsw = 155 ndep = 2.5e+18 xj = 1.4e-08

*secondary parameters

+ll = 0 wl = 0 lln = 1 wln = 1

+lw = 0 ww = 0 lwn = 1 wwn = 1

+lwl = 0 ww1 = 0 xpart = 0

+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

+dvtp1 = 0.05 lpe0 = 0 lpeb = 0

+ngate = 2e+020 nsd = 2e+020 phin = 0

+cdsc = 0.000 cdsb = 0 cdsd = 0 cit = 0

+voff = -0.126 etab = 0

+vfb = 0.55 ua = 2.0e-009 ub = 0.5e-018

+uc = 0 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 pscbe1 = 8.14e+008 pscbe2 = 9.58e-007

+fprout = 0.2 pdits = 0.08 pditsd = 0.23 pditsl = 2.3e+006

+rsh = 5 rsw = 85 rdw = 85

+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

+cigc = 0.0008 aigsd = 0.0087 bigsd = 0.0012 cigsd = 0.0008

+nigc = 1 poxedg = 1 pigcd = 1 ntox = 1

+xrarg1 = 12 xrarg2 = 5

+cgbo = 2.56e-011 cgd1 = 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   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        xtids  = 3
+dmcgs  = 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
.options POST=2
.options AUTOSTOP
.options INGOLD=2 DCON=1
.options GSHUNT=1e-12 RMIN=1e-15
.options ABSTOL=1e-5 ABSVDC=1e-4
.options RELTOL=1e-2 RELVDC=1e-2
.options NUMDGT=4 PIVOT=13
.options runlvl=6
.end

```

Netlist with Trojan

*initial conditions stored for read operation

.ic v(Q)=1

.ic v(QR)=0

*data control

.ic v(bl)=1

.ic v(blb)=1

** SRAM with trojan

M1 Q QR 0 0 nmos w=90n l=45n

M2 Q QR vdd vdd pmos w=90n l=45n

M3 QR Q 0 0 nmos w=90n l=45n

M4 QR Q vdd vdd pmos w=90n l=45n

M5 Q wl bl bl nmos w=90n l=45n

Mi6 blb T QR blb nmos w=90n l=45n

MT i6 1 wl wl pmos w=90n l=45n

MTi Q 1 0 0 nmos w=90n l=45n

** Voltage source

Vvdd vdd 0 1

**Access Control

Vwl wl 0 pwl(0 0 1n 0 1.2n 1 5n 1)

.tran 0.1n 20n

.model nmos nmos 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 acnqsmode = 0 trnqsmode = 0

* parameters related to the technology node

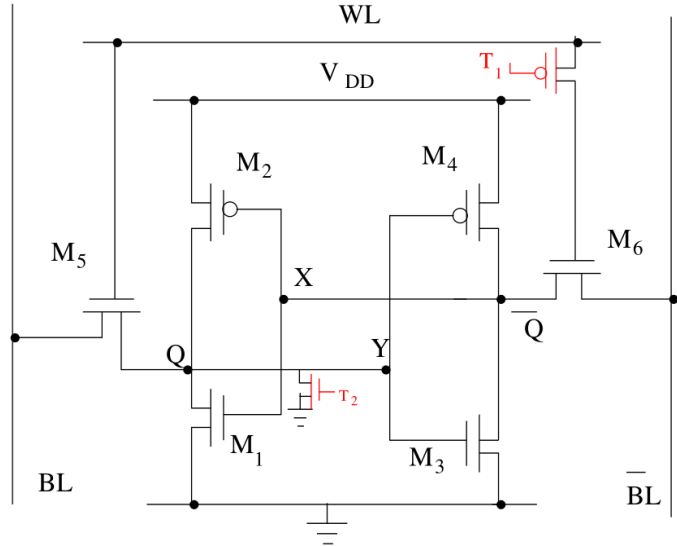
+tnom = 27 epsrox = 3.9

+eta0 = 0.0049 nfactor = 2.1 wint = 5e-09

+cgso = 1.1e-10 cgdo = 1.1e-10 xl = -2e-08

* parameters customized by the user

+toxe = 1.75e-09 toxp = 1.1e-09 toxm = 1.75e-09 toxref = 1.75e-09



```

+dtox = 6.5e-10  lint = 3.75e-09

+vth0 = 0.469  k1 = 0.528  u0 = 0.04372  vsat = 147390

+rdsw = 155  ndep = 3.28e+18  xj = 1.4e-08

* secondary parameters

+ll  = 0      wl  = 0      lln  = 1      wln  = 1

+lw  = 0      ww  = 0      lwn  = 1      wwn  = 1

+lwl  = 0      ww1  = 0      xpart  = 0

+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

+ngate  = 2e+020  nsd  = 2e+020  phin  = 0

+cdsc  = 0.000  cdsb  = 0      cdscd  = 0      cit  = 0

+voff  = -0.13  etab  = 0

+vfb  = -0.55  ua  = 6e-010  ub  = 1.2e-018

+uc  = 0      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  pscbe1 = 8.14e+008  pscbe2 = 1e-007

+fprout = 0.2    pdits  = 0.08  pditsd = 0.23  pditsl = 2.3e+006

+rsh  = 5      rsw  = 85      rdw  = 85

+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

+cigc  = 0.002  aigsd  = 0.012  bigsd  = 0.0028  cigsd  = 0.002

+nigc  = 1      poxedg  = 1      pigcd  = 1      ntox  = 1

```

```

+xcrcg1 = 12      xcrcg2 = 5
+cgbo  = 2.56e-011  cgd1  = 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    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
.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      acnqsmode= 0    trnqsmode= 0
* parameters related to the technology node
+tnom = 27      epsrox = 3.9
+eta0 = 0.0049    nfactor = 2.1    wint = 5e-09
+cgso = 1.1e-10    cgdo = 1.1e-10    xl = -2e-08

```


* parameters customized by the user

+toxe = 1.85e-09 toxp = 1.1e-09 toxm = 1.85e-09 toxref = 1.85e-09

+dtox = 7.5e-10 lint = 3.75e-09

+vth0 = -0.418 k1 = 0.488 u0 = 0.00439 vsat = 70000

+rdswh = 155 ndep = 2.5e+18 xj = 1.4e-08

*secondary parameters

+ll = 0 wl = 0 lln = 1 wln = 1

+lw = 0 ww = 0 lwn = 1 wwn = 1

+lwl = 0 ww1 = 0 xpart = 0

+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

+dvtp1 = 0.05 lpe0 = 0 lpeb = 0

+ngate = 2e+020 nsd = 2e+020 phin = 0

+cdsc = 0.000 cdscb = 0 cdscd = 0 cit = 0

+voff = -0.126 etab = 0

+vfb = 0.55 ua = 2.0e-009 ub = 0.5e-018

+uc = 0 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 pscbe1 = 8.14e+008 pscbe2 = 9.58e-007

+fprout = 0.2 pdits = 0.08 pditsd = 0.23 pditsl = 2.3e+006

+rsh = 5 rsw = 85 rdw = 85

+rdswhmin = 0 rdwhmin = 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  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  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
.options POST=2
.options AUTOSTOP
.options INGOLD=2 DCON=1
.options GSHUNT=1e-12 RMIN=1e-15
.options ABSTOL=1e-5 ABSVDC=1e-4
.options RELTOL=1e-2 RELVDC=1e-2
.options NUMDGT=4 PIVOT=13

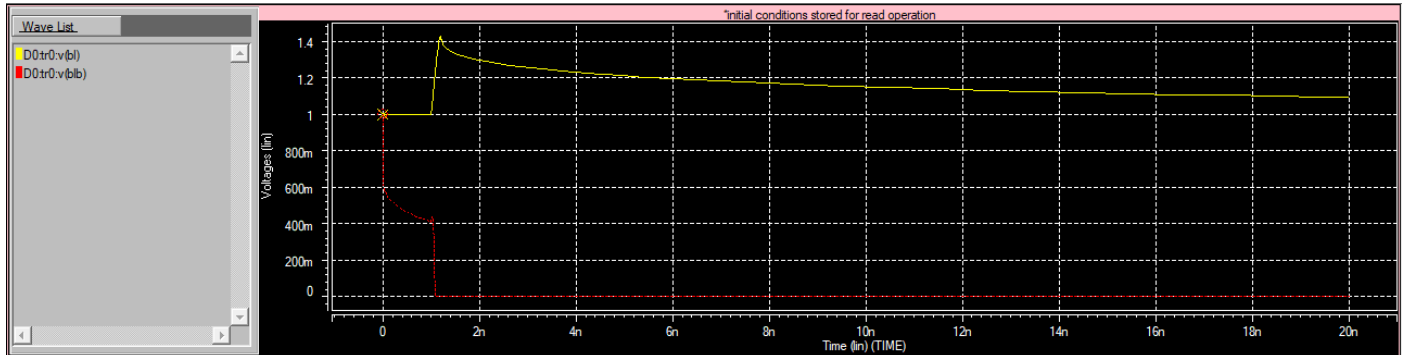
```

```
.options runlvl=6
```

```
.end
```

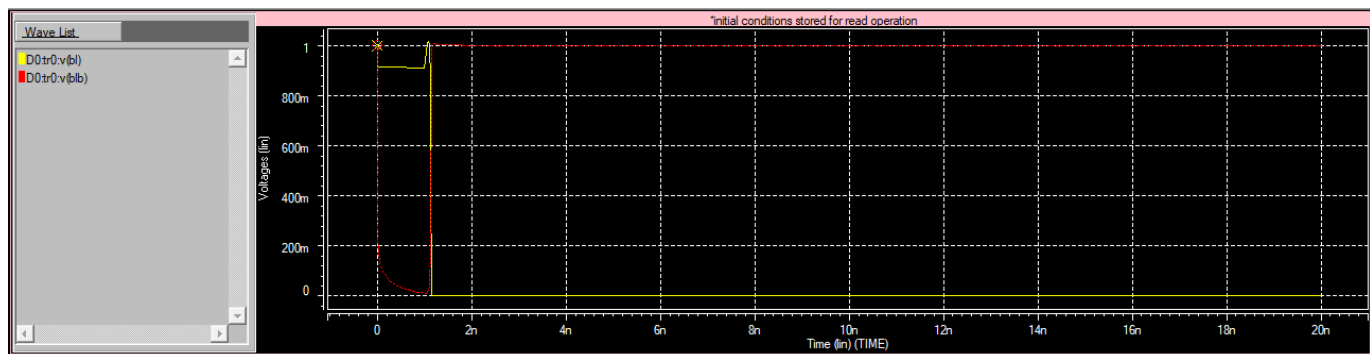
Result for read

Without Trojan:



Remark: Successfully read 1.

With Trojan:



Remark: Successfully read 1.

THE END