

## Report-12

Shantonu Debnath  
Department of CST,  
IEST, Shibpur

TABLE I: Effect of Trojan model I

Q	T1	T2	Data on bus	Outcome	File name	Remark
0	0	0	0	Stored Value	First.sp	Read 0, Same
0	0	1	Discharge from both BL and BLb	Read Error	Second.sp	Read Error, Same
0	1	0	No charge loss from BL and BLb	Read Error	Third.sp	Read 0, Not Same
<b>0</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>Trojan Effected</b>	<b>Four.sp</b>	Read 1, Same
1	0	0	1	Stored Value	Five.sp	Read 1, Same
1	0	1	1	Stored Value	Six.sp	Read 1, Same
1	1	0	1	Stored Value	Seven.sp	Read 1, Same
1	1	1	1	Stored Value	Eight.sp	Read 1, 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	23	
transient	0.02	201	2104	313 rev= 103
readin	0.01			
errchk	0.00			
setup	0.00			
output	0.00			

peak memory used 48.68 megabytes

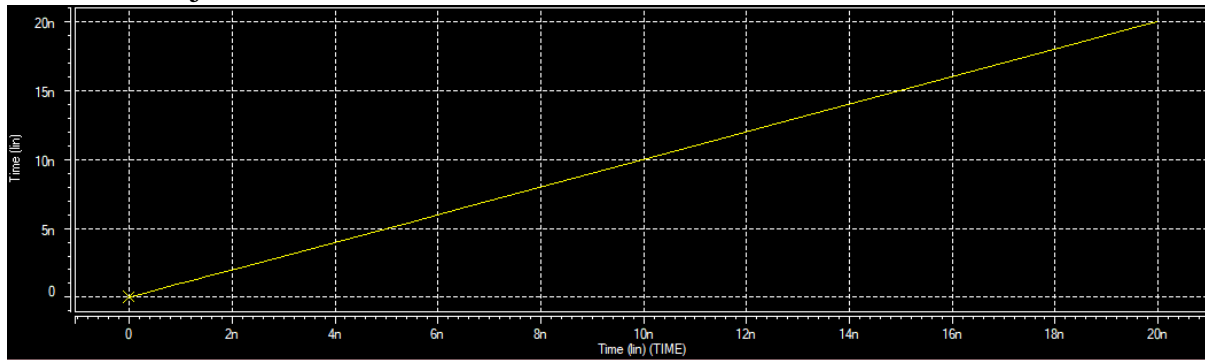
total cpu time 0.07 seconds

total elapsed time 0.29 seconds

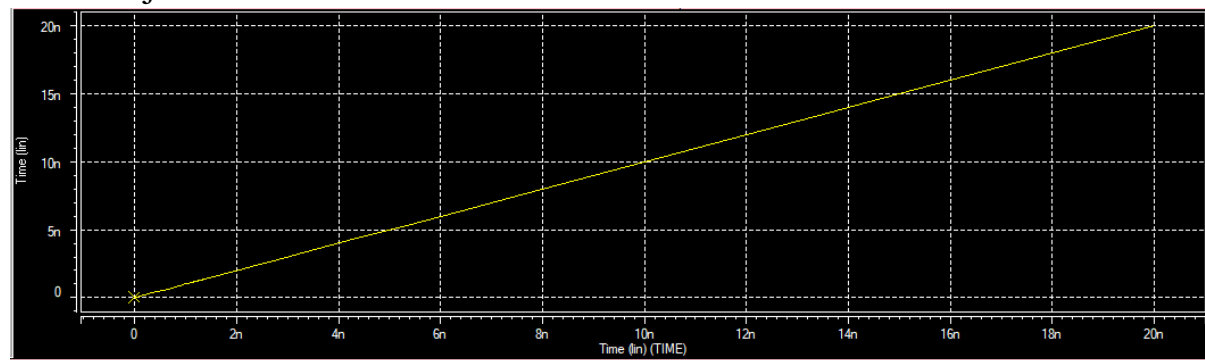
# Graph Difference

## 1. Time

Without Trojan:



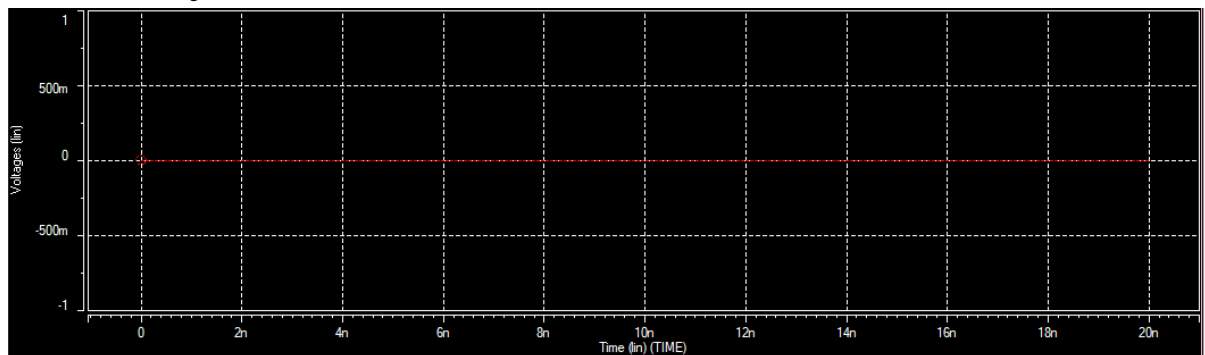
With Trojan:



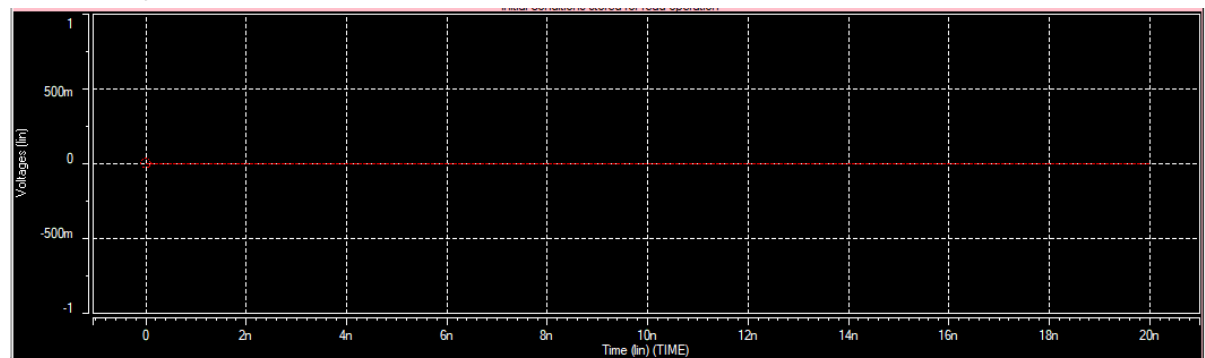
Remarks: Same

## 2. Voltage [v(0)]

Without Trojan:



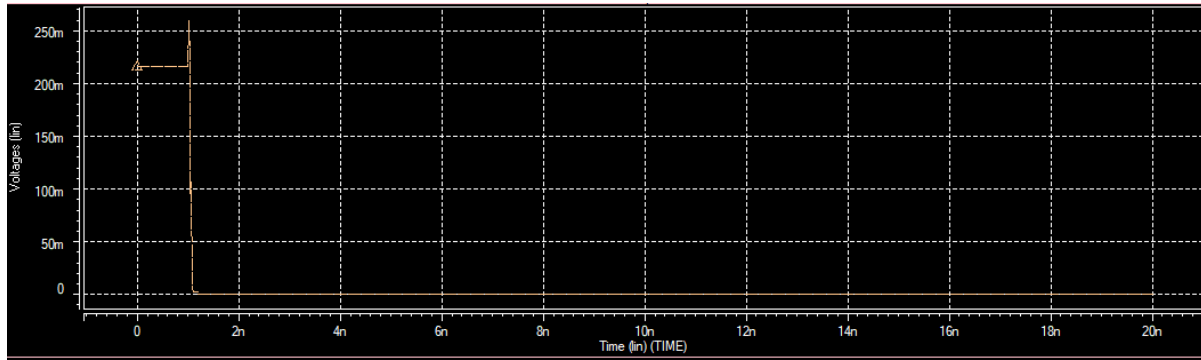
With Trojan:



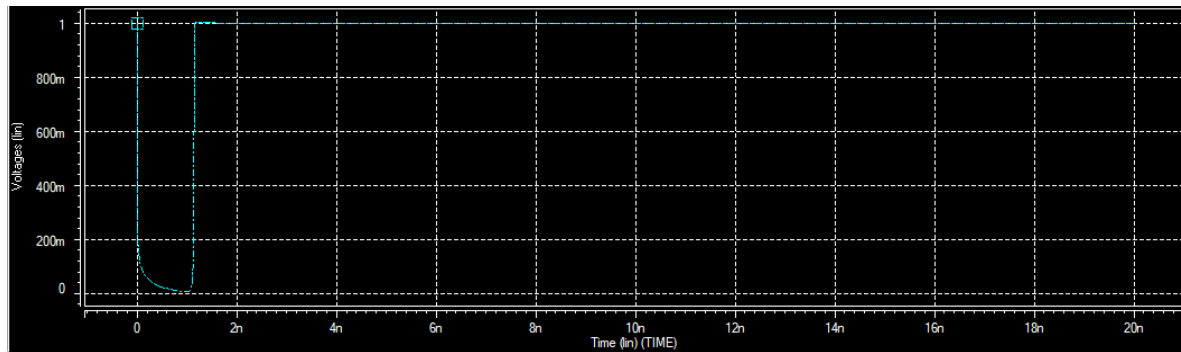
Remarks: Same

### 3. Voltage [v(bl)]

Without Trojan:



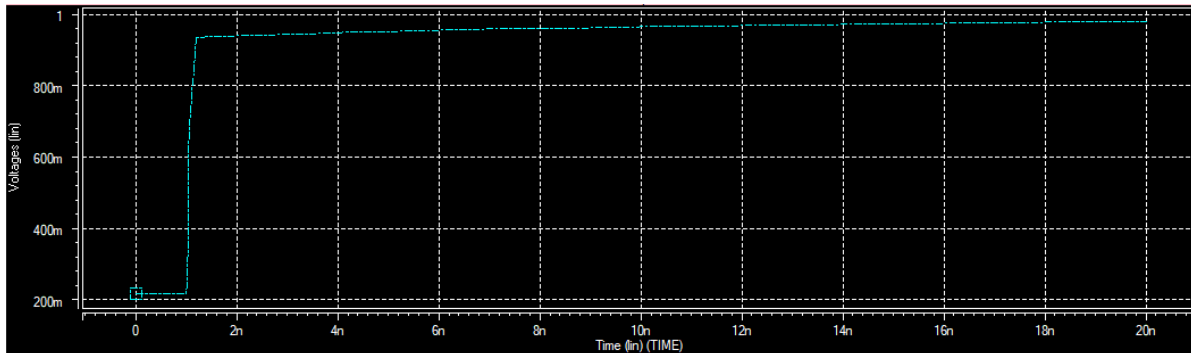
With Trojan:



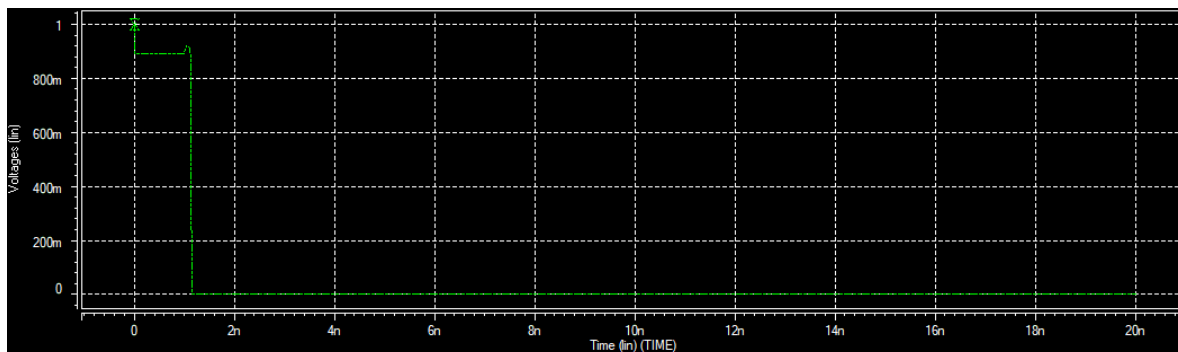
Remarks: Not Same

### 4. Voltage [v(bl\_b)]

Without Trojan:



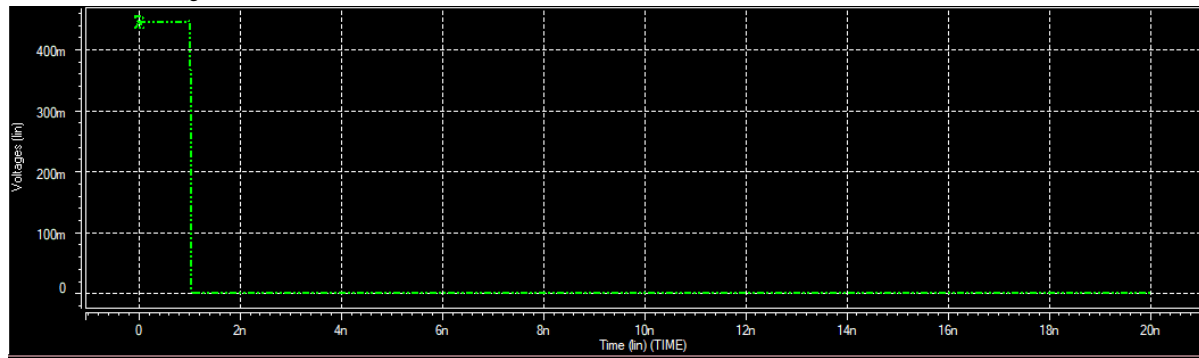
With Trojan:



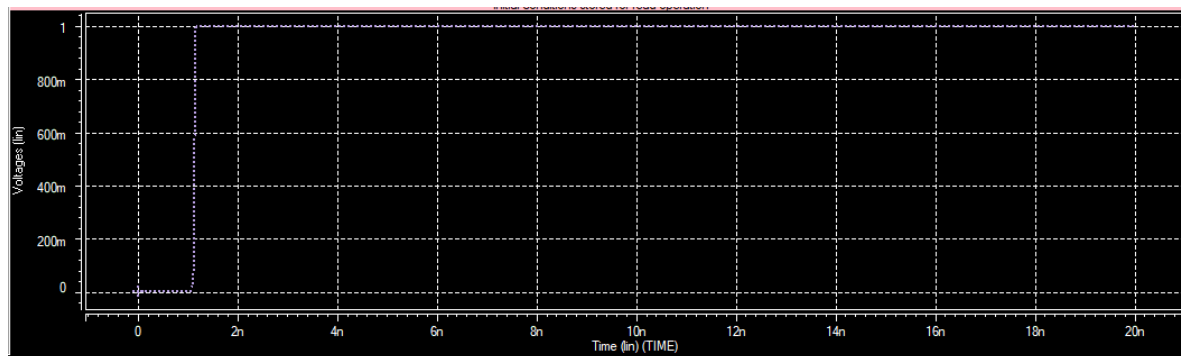
Remarks: Not Same

## 5. Voltage [v(q)]

Without Trojan:



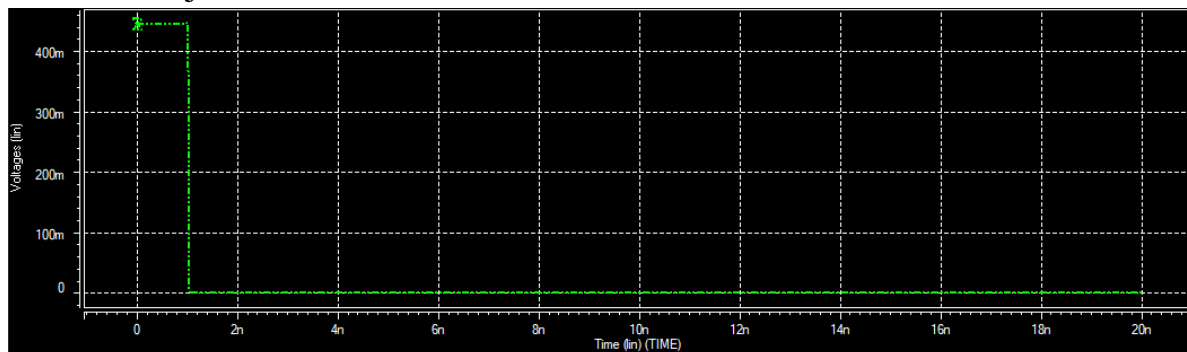
With Trojan:



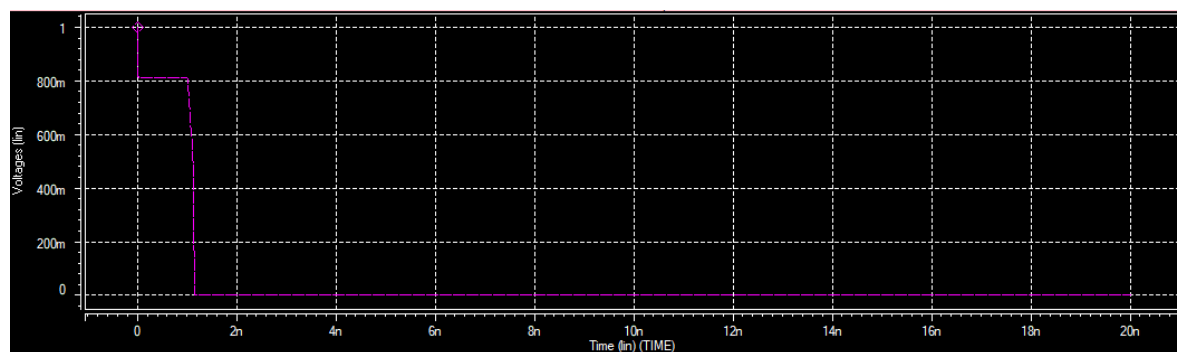
Remarks: Not Same

## 6. Voltage [v(qr)]

Without Trojan:



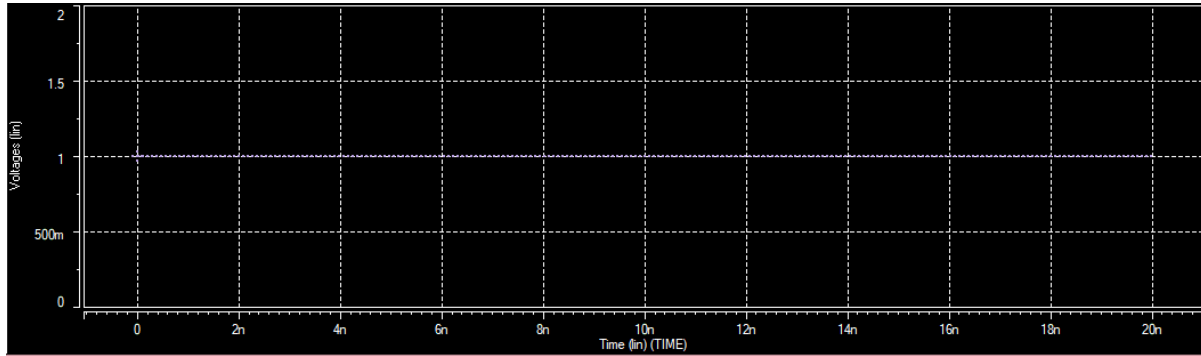
With Trojan:



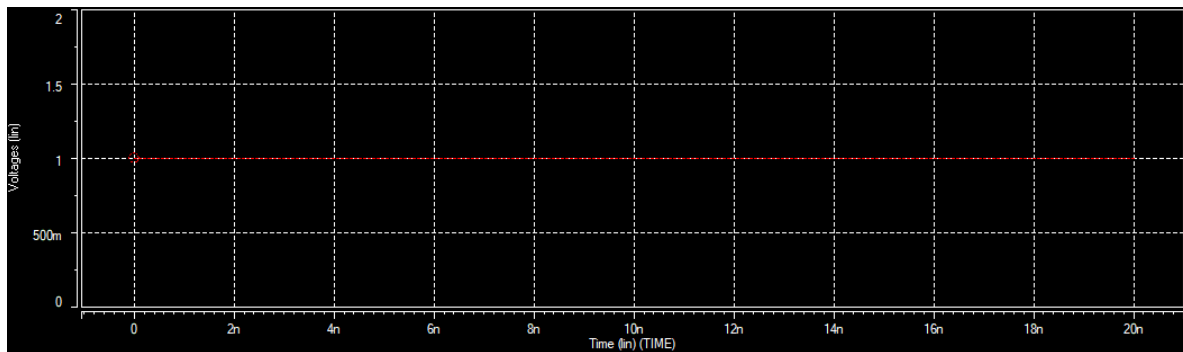
Remarks: Same

## 7. Voltage [v(vdd)]

Without Trojan:



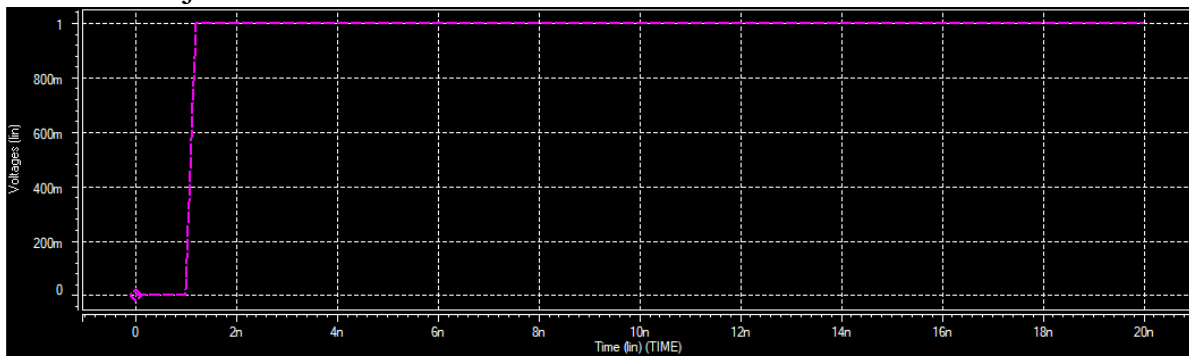
With Trojan:



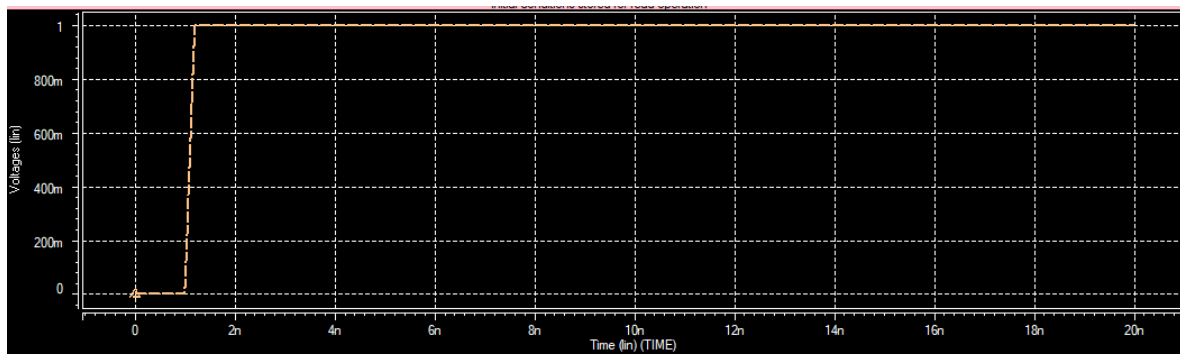
Remarks: Same

## 8. Voltage [v(wl)]

Without Trojan:



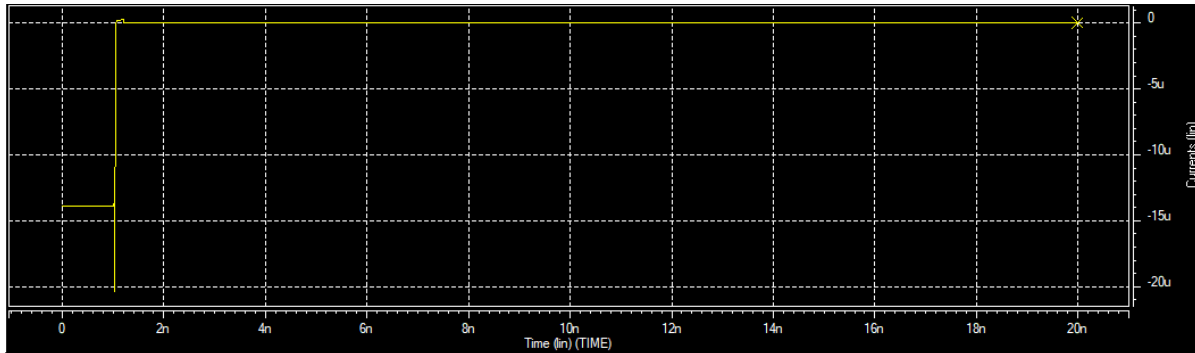
With Trojan:



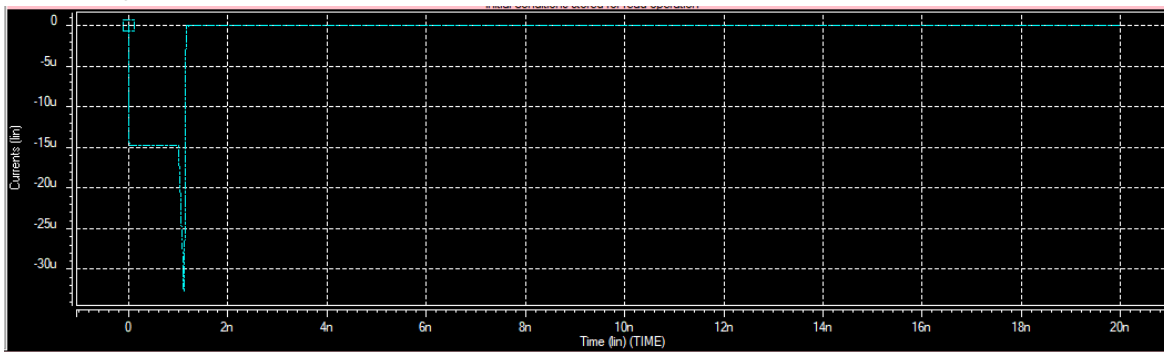
Remarks: Same

## 9. Current [i(vvdd)]

Without Trojan:



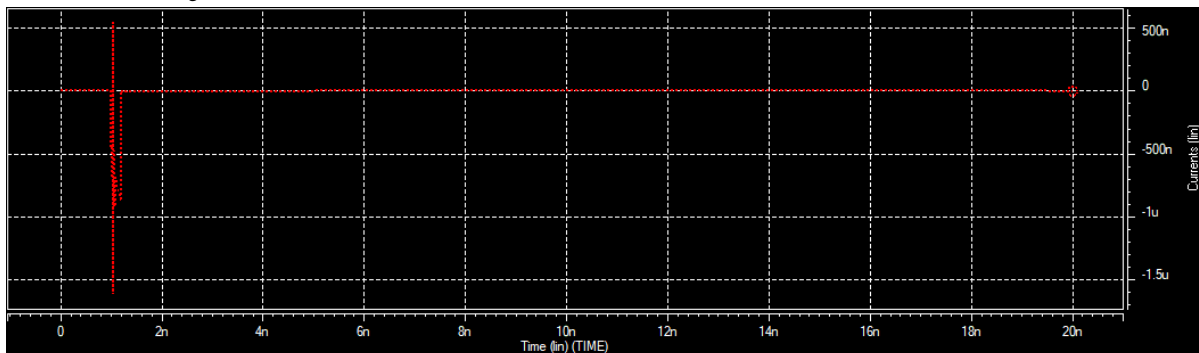
With Trojan:



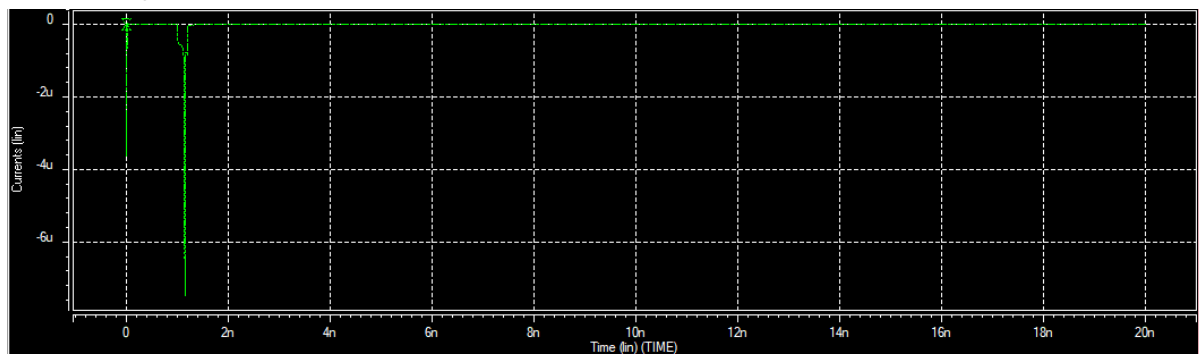
Remarks: Same

## 10. Current [i(vwl)]

Without Trojan:



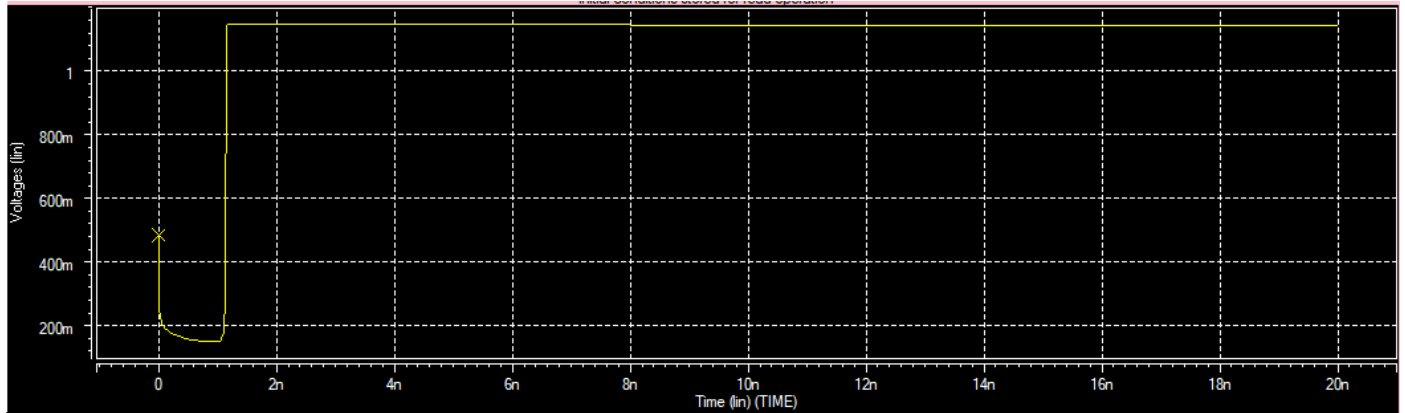
With Trojan:



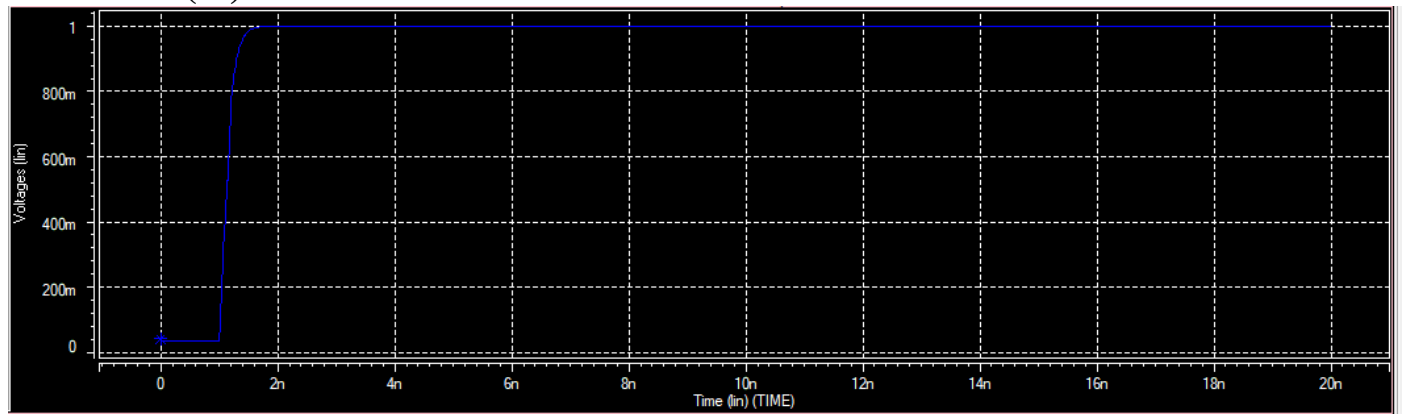
Remarks: Same

## Some voltage which show only with Trojan SRAM

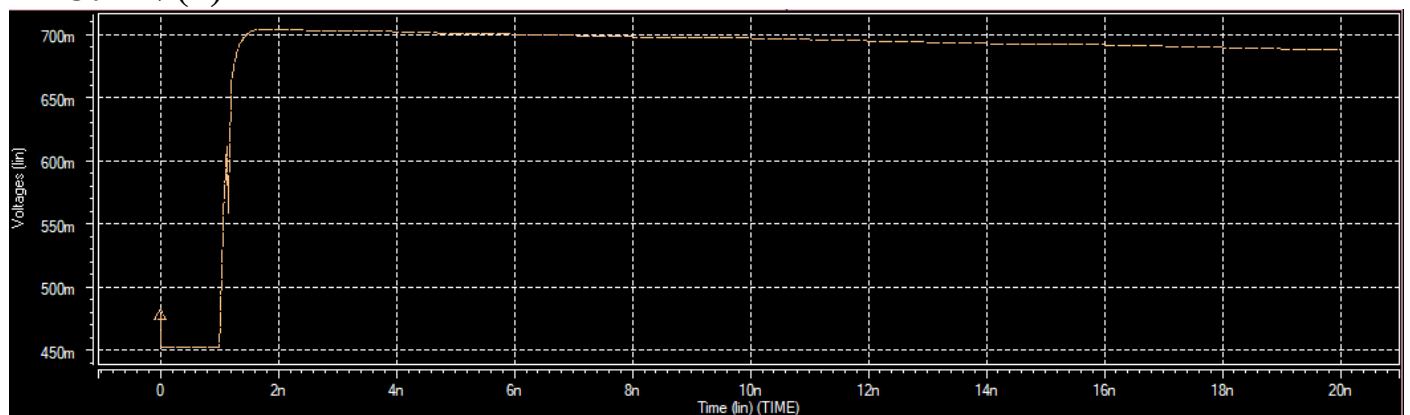
### 11. $V(t)$



### 12. $V(i5)$



### 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
Mi5 Q wl bl bl nmos w=90n l=45n
M6 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        poxedge = 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

+xrcrg1 = 12        xrcrg2 = 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
+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

```

## Netlist with Trojan

\*initial conditions stored for read operation

.ic v(Q)=0

.ic v(QR)=1

\*data control

.ic v(bl)=1

.ic v(blb)=1

\*\* SRAM with 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

Mi5 Q T bl bl nmos w=90n l=45n

M6 blb wl QR blb nmos w=90n l=45n

MT i5 1 wl wl pmos w=90n l=45n

MTr QR 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

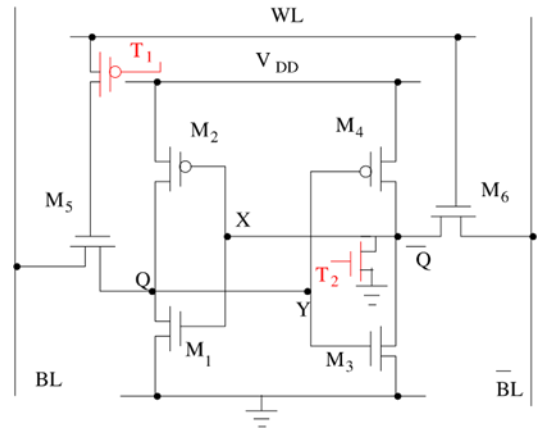
\* parameters related to the technology node

+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

+dttox = 6.5e-10   lint = 3.75e-09

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

+rdswh = 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        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

+rdswhmin = 0     rdwhmin = 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      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
.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

```

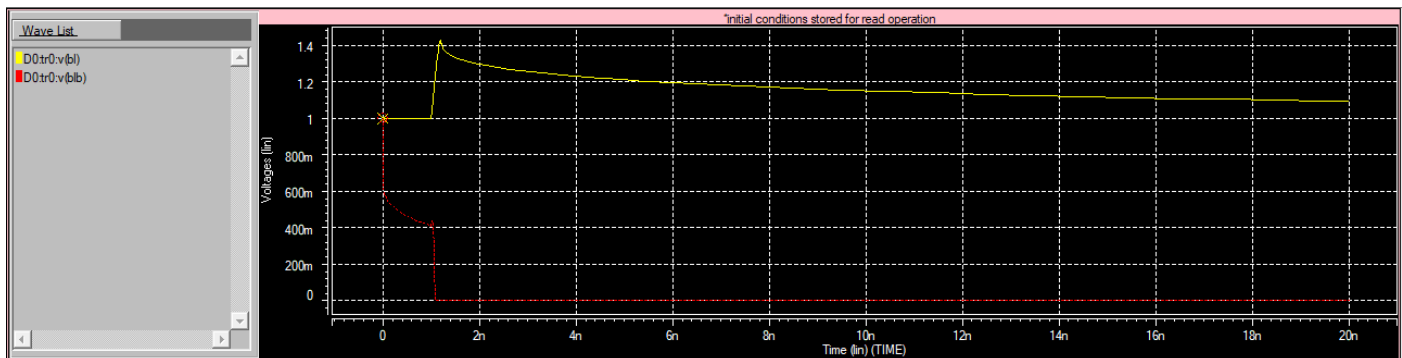
```
.options NUMDGT=4 PIVOT=13
```

```
.options runlvl=6
```

```
.end
```

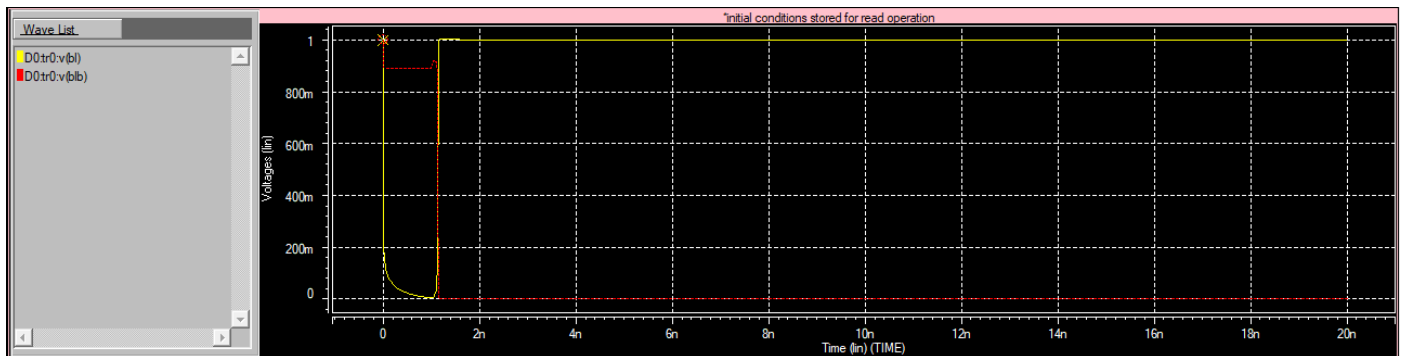
## Result for read

Without Trojan:



**Remark: Successfully read 1.**

With Trojan:



**Remark: Successfully read 1.**

# THE END