

## Report- 13

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**Show Deference 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 = 43
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	21	
transient	0.02	201	946	162 rev= 49
readin	0.01			
errchk	0.00			
setup	0.00			
output	0.00			
peak memory used			48.68 megabytes	
total cpu time			0.03 seconds	
total elapsed time			0.20 seconds	

### With Trojan:

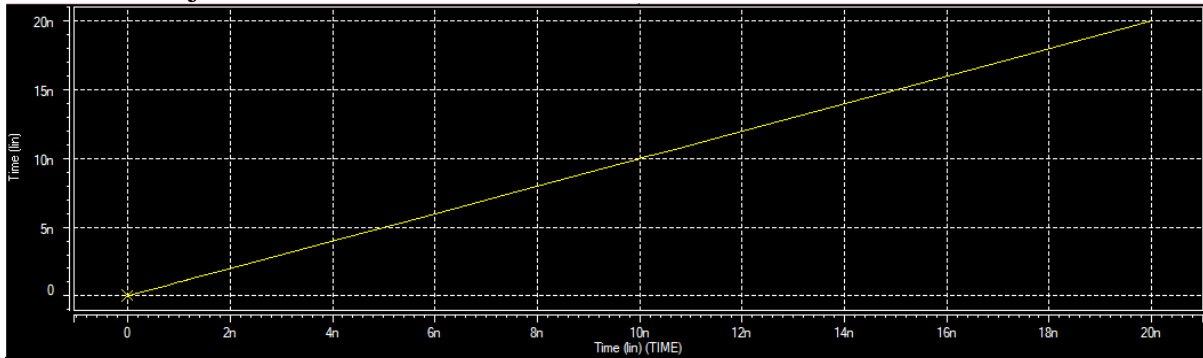
\*\*\*\*\* Runtime Statistics (seconds) \*\*\*\*\*

analysis	time	# points	tot. iter	conv.iter
op point	0.00	1	20	
transient	0.01	201	325	92 rev= 13
readin	0.01			
errchk	0.00			
setup	0.00			
output	0.00			
peak memory used			48.66 megabytes	
total cpu time			0.02 seconds	
total elapsed time			0.17 seconds	

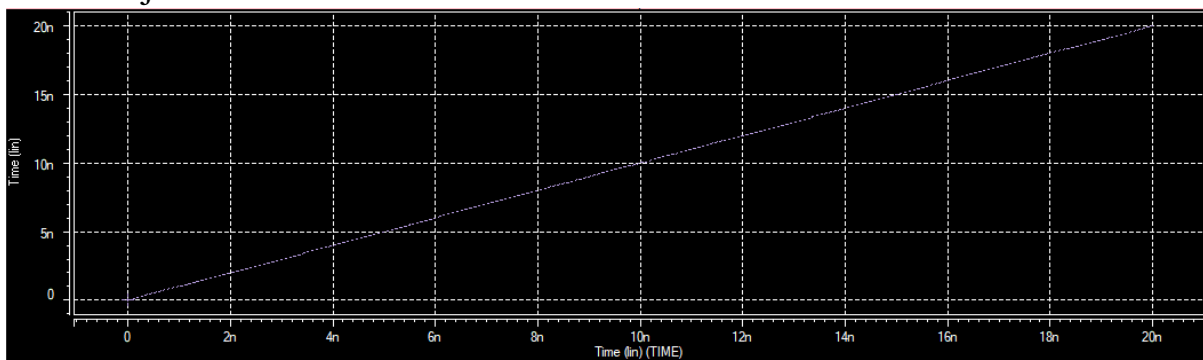
# Graph Difference

## 1. Time

Without Trojan:



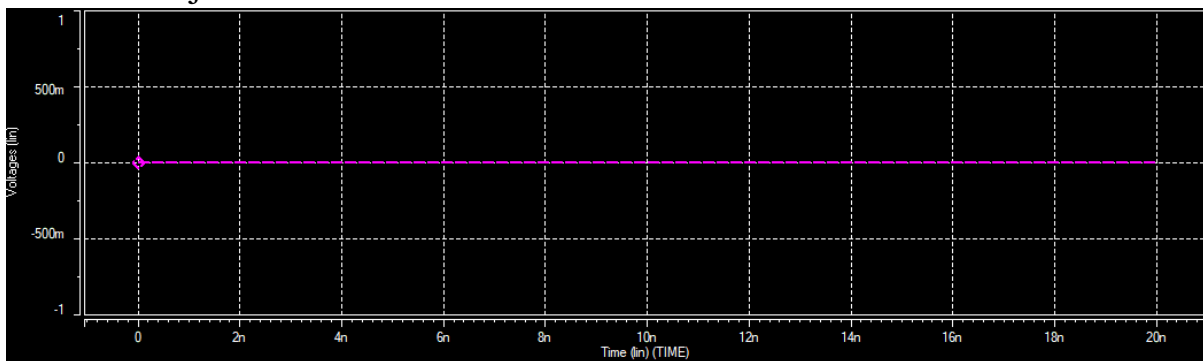
With Trojan:



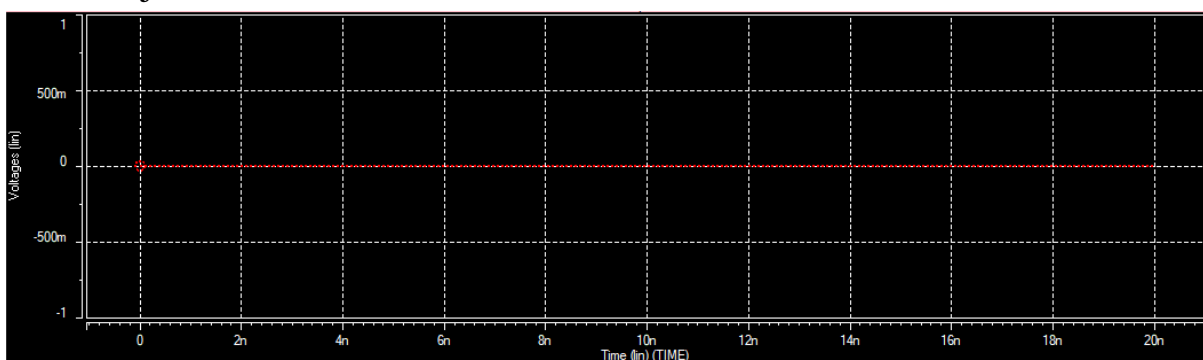
Remarks: Same

## 2. Voltage [v(0)]

Without Trojan:



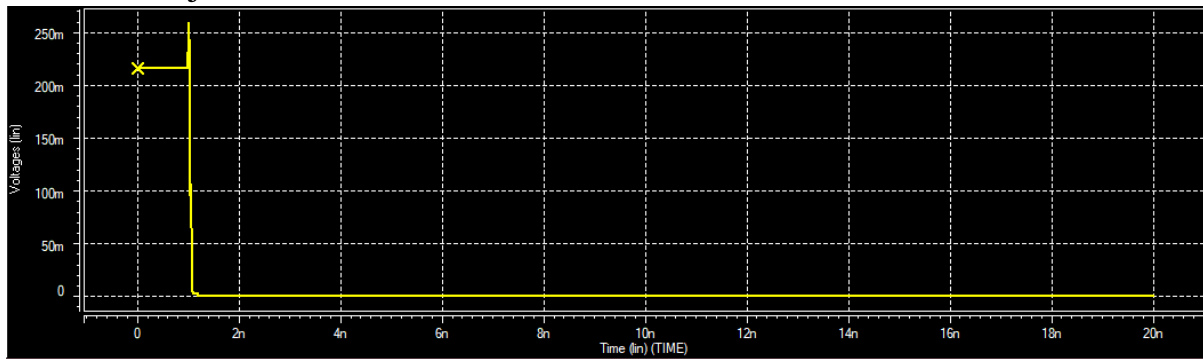
With Trojan:



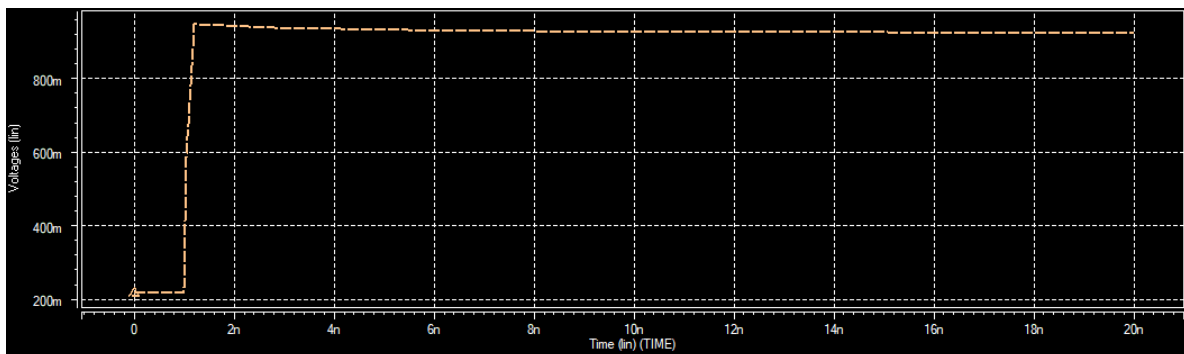
Remarks: Same

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

Without Trojan:



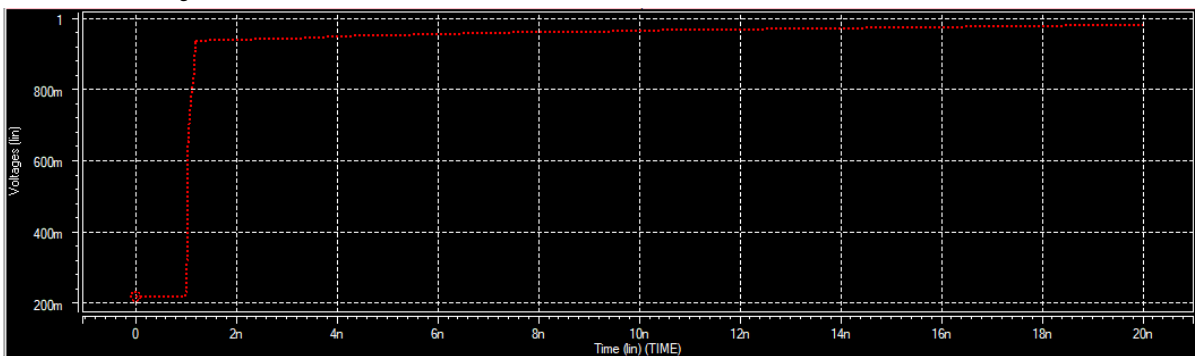
With Trojan:



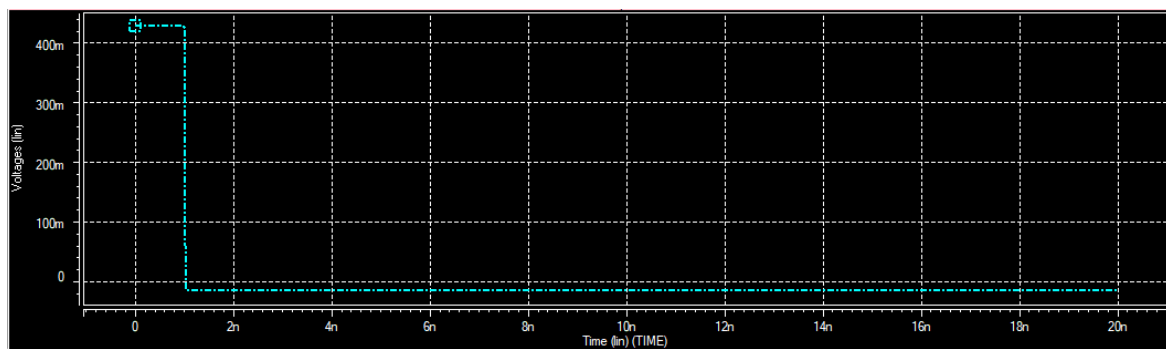
Remarks: Not Same

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

Without Trojan:



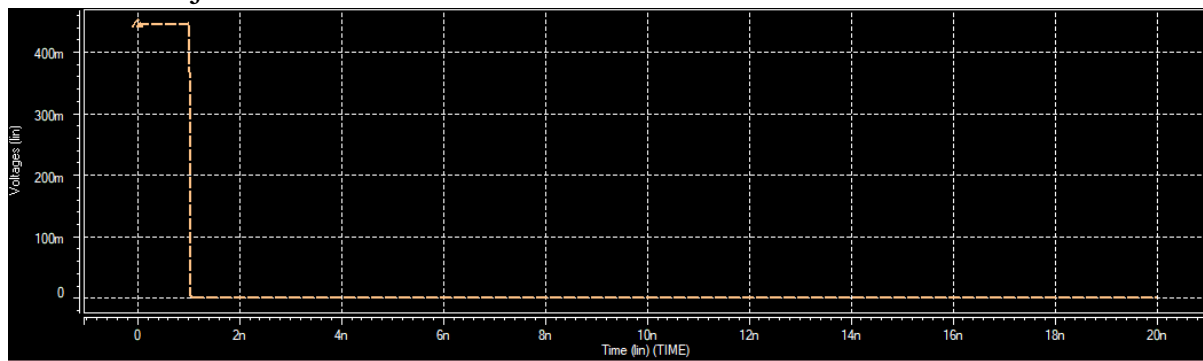
With Trojan:



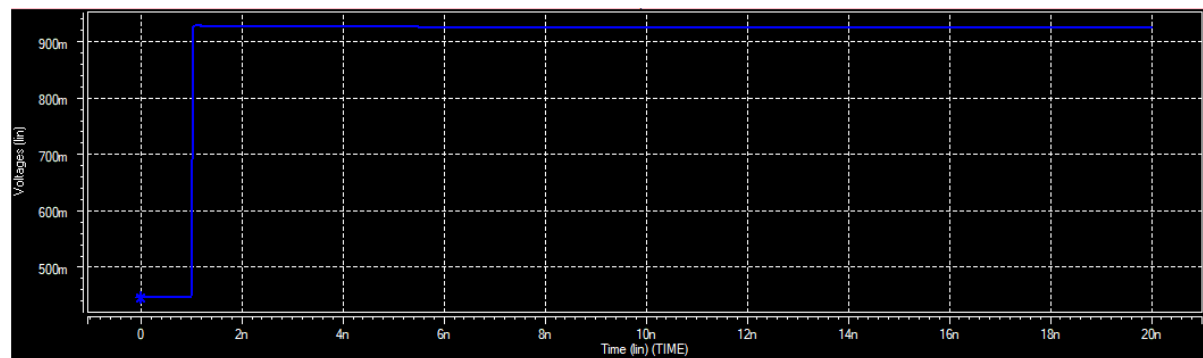
Remarks: Not Same

## 5. Voltage $[v(q)]$

Without Trojan:



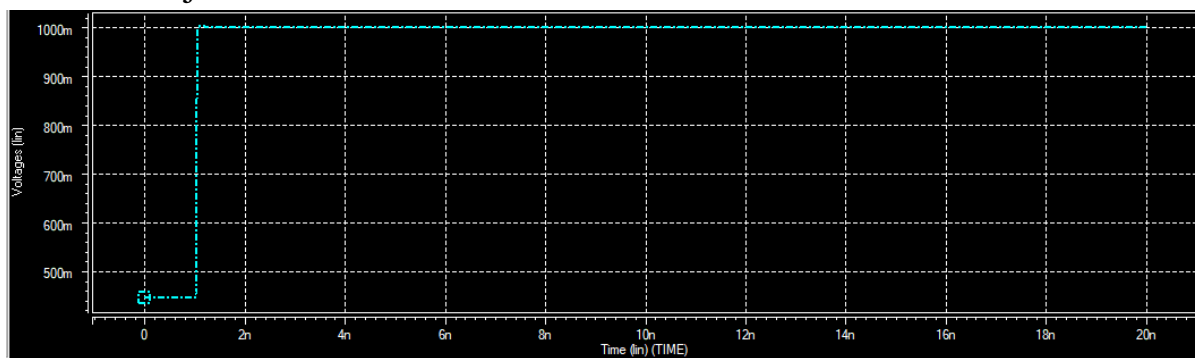
With Trojan:



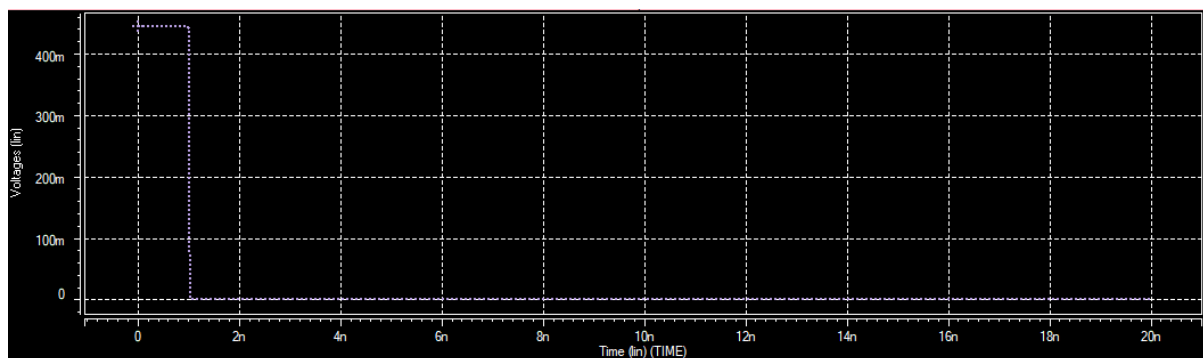
Remarks: Not Same

## 6. Voltage $[v(qr)]$

Without Trojan:



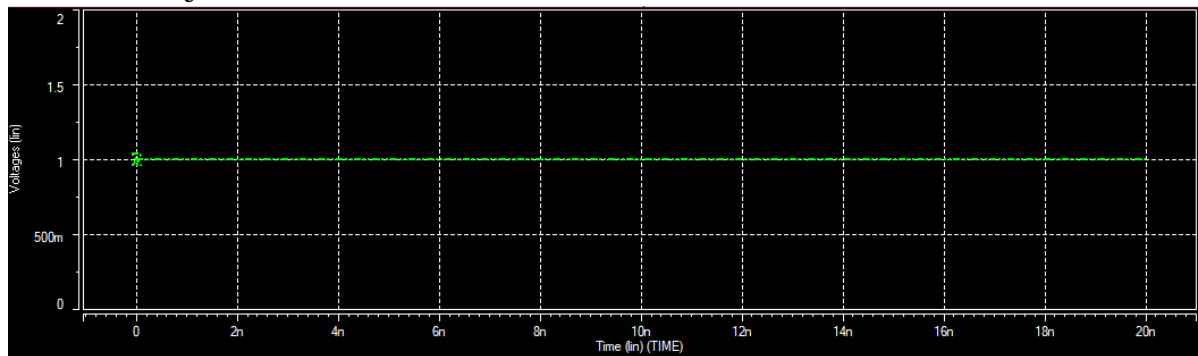
With Trojan:



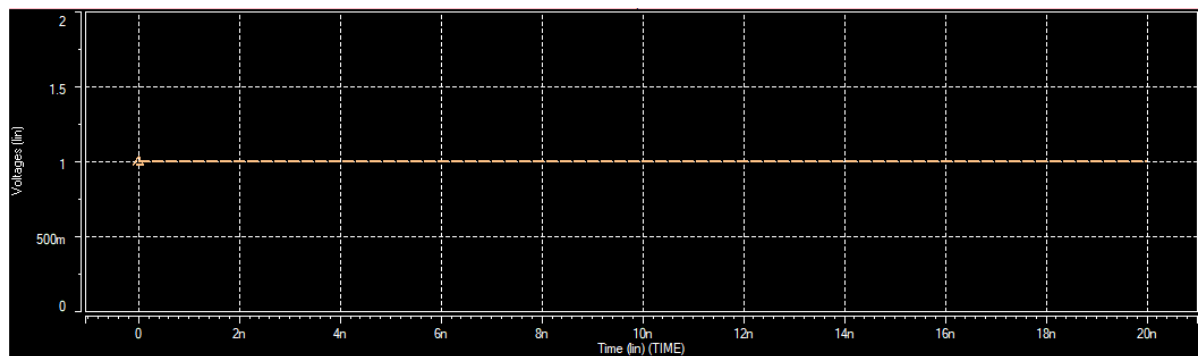
Remarks: Not Same

## 7. Voltage [v(vdd)]

Without Trojan:



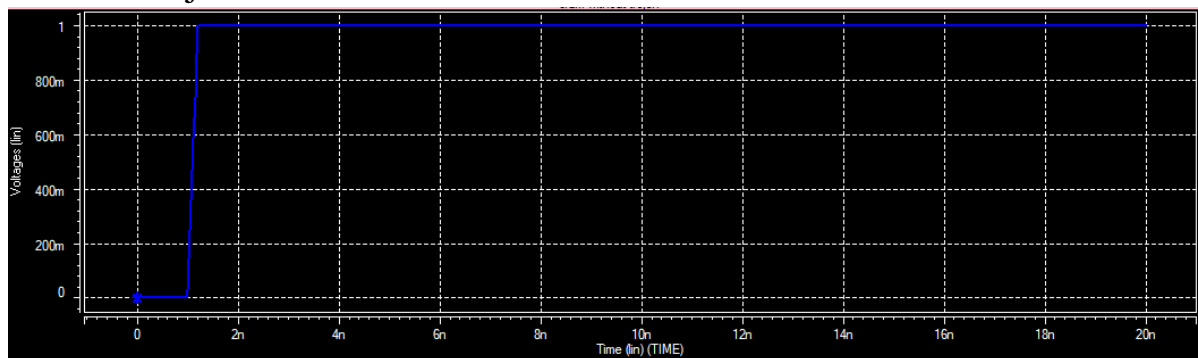
With Trojan:



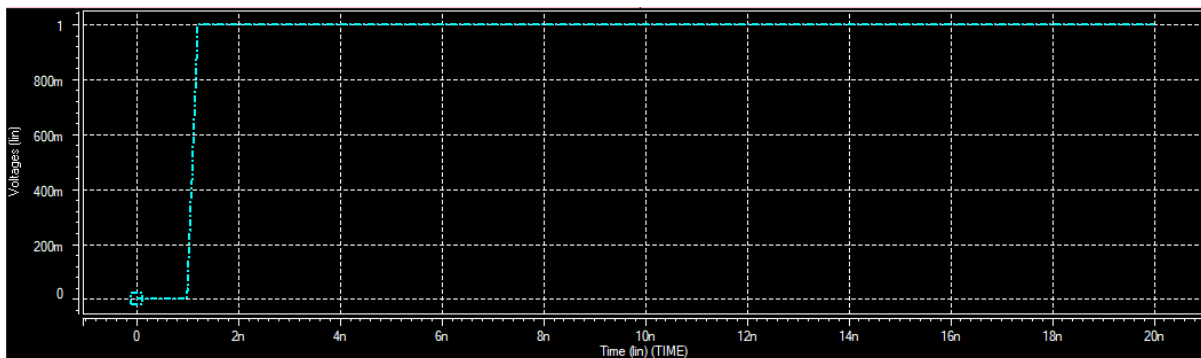
Remarks: Same

## 8. Voltage [v(wl)]

Without Trojan:



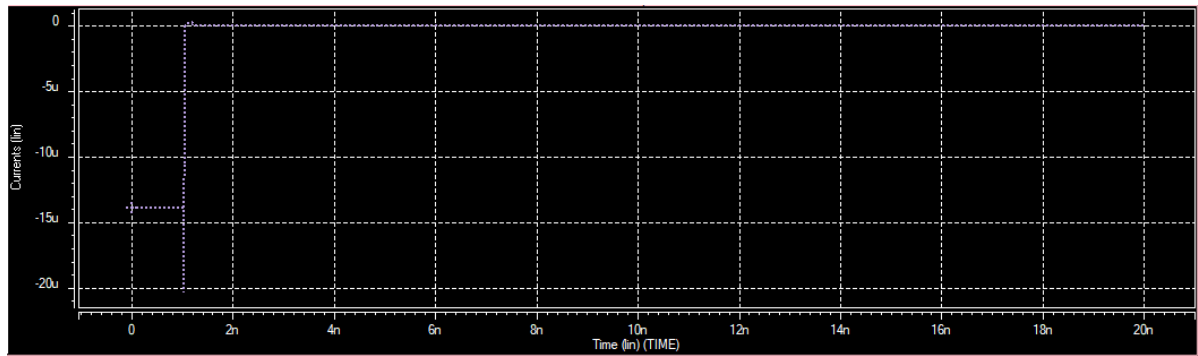
With Trojan:



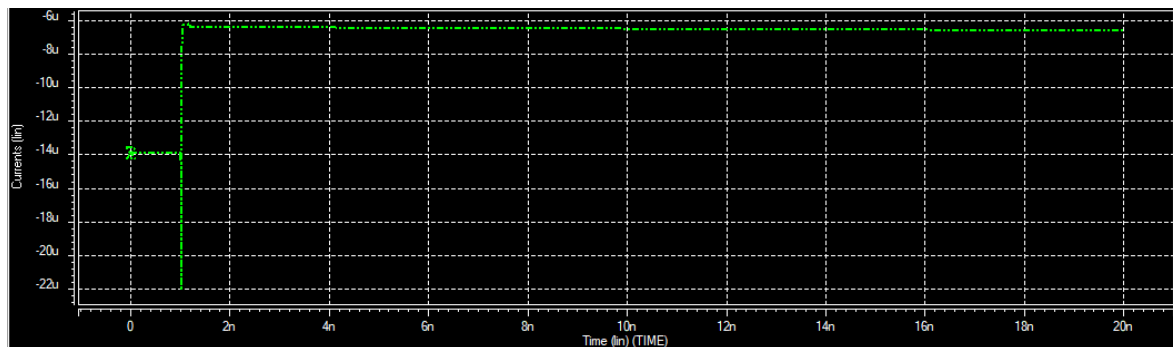
Remarks: Same

## 9. Current [i(vvdd)]

Without Trojan:



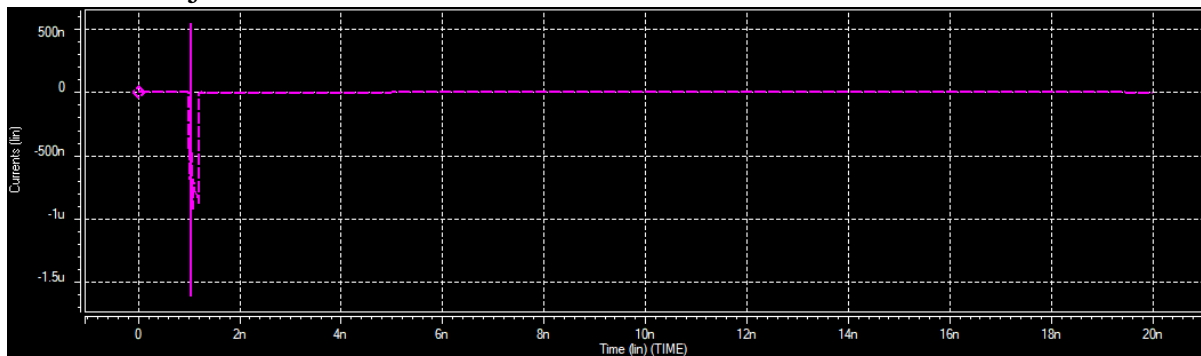
With Trojan:



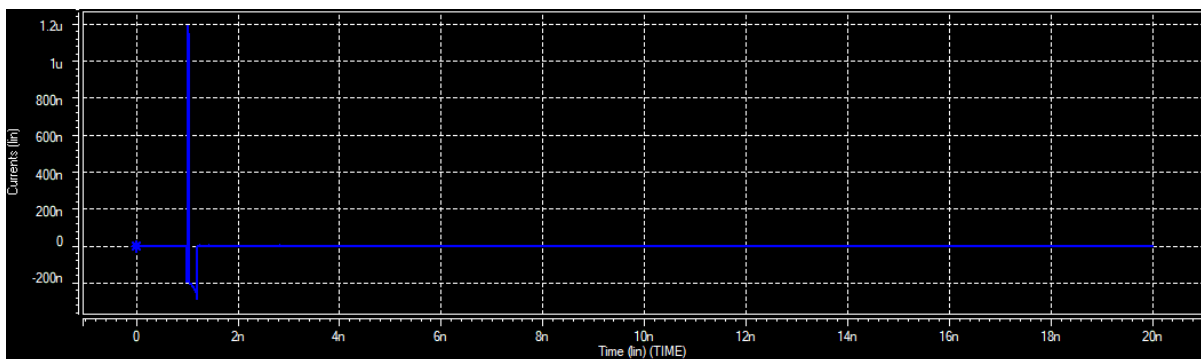
Remarks: Not Same

## 10. Current [i(vwl)]

Without Trojan:



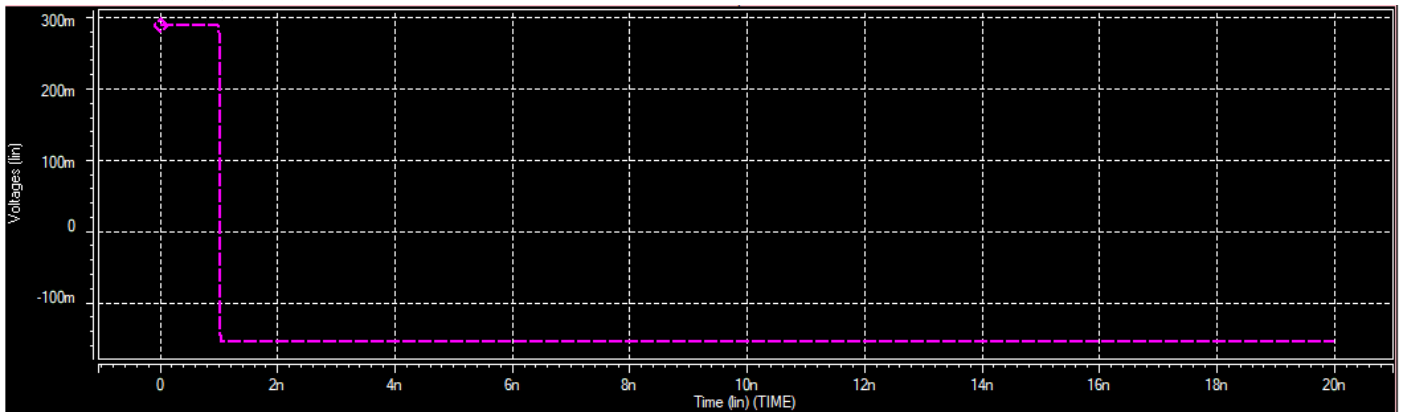
With Trojan:



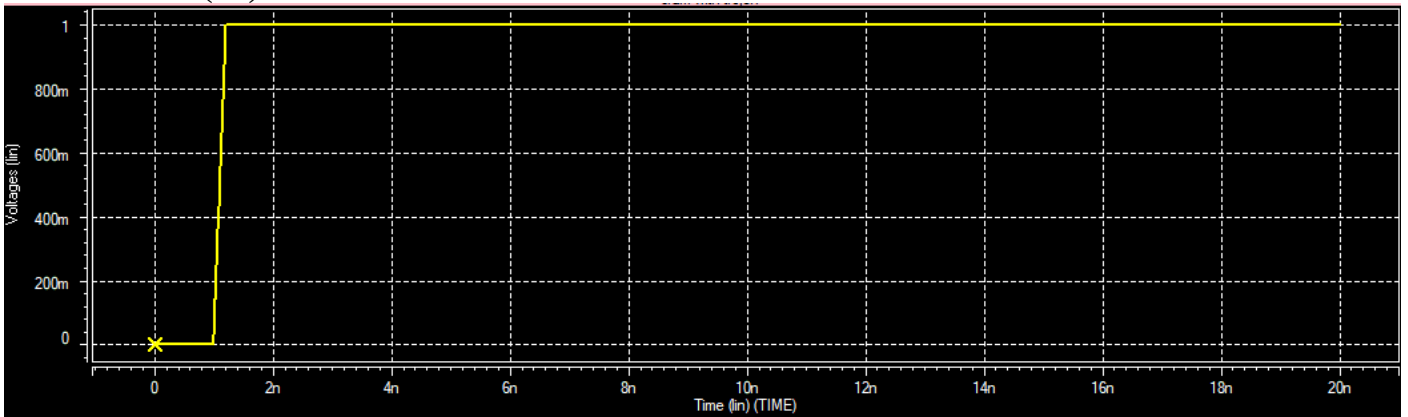
Remarks: Same

## Some voltage which show only with Trojan SRAM

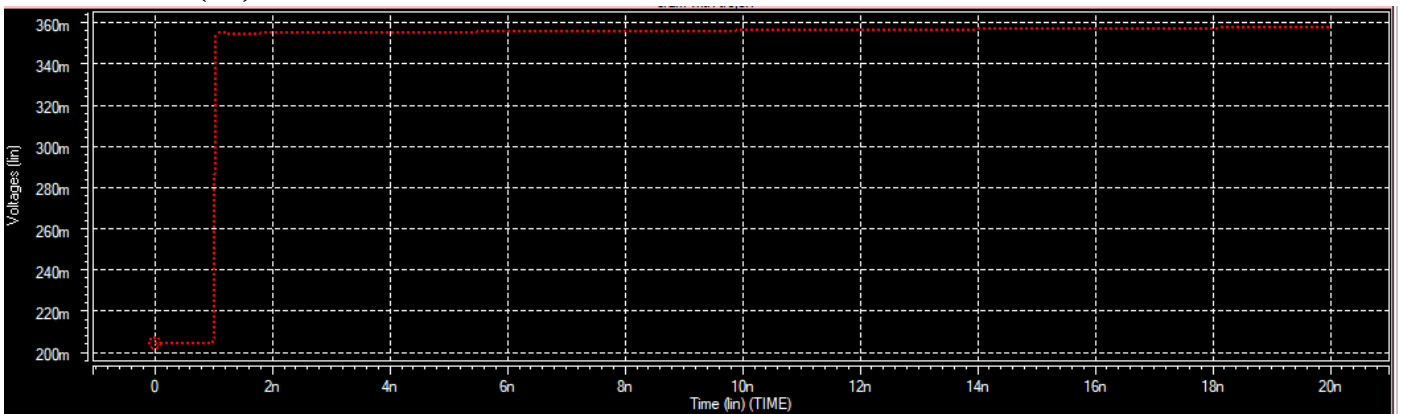
11.  $V(t)$



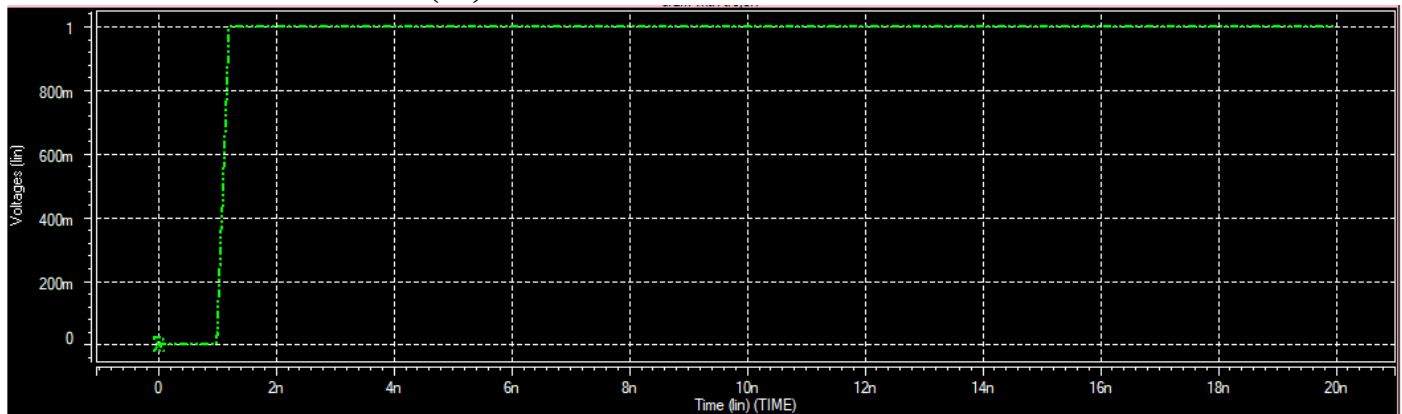
12.  $V(t1)$



13.  $V(t2)$

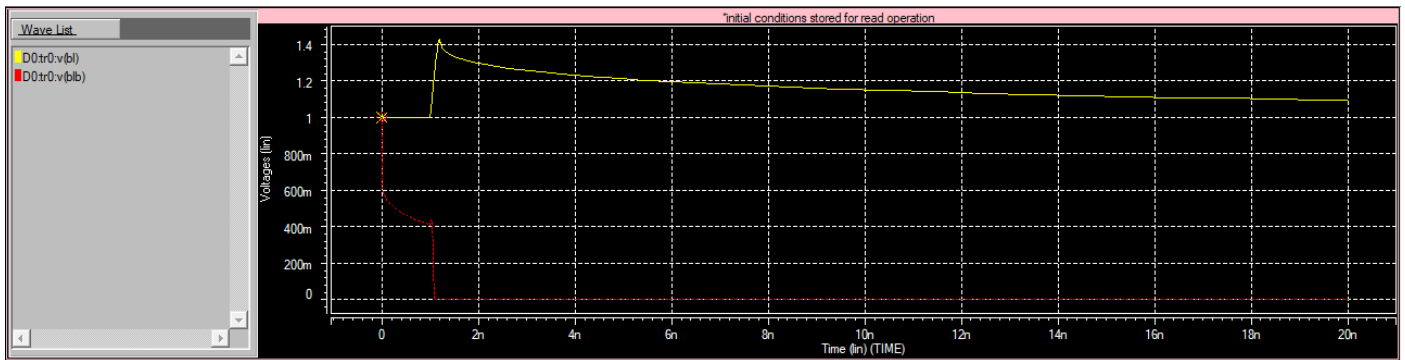


14.  $V(i6)$



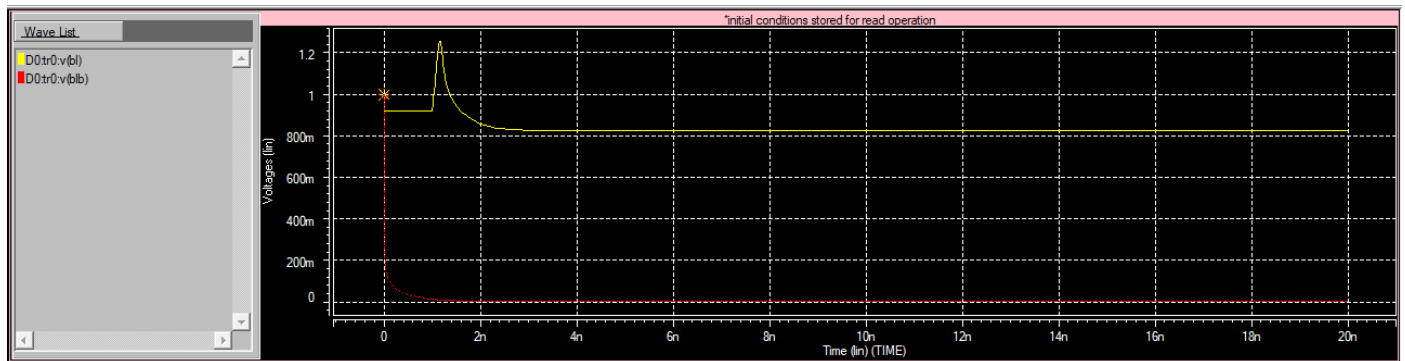
# Read Operation

## Without Trojan:



**Remarks: Successfully read 1.**

## With Trojan:



**Remarks: Successfully read 1.**



## Netlist without Trojan

\*\* 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 rbodmod= 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            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

+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        xtld   = 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

```

+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        poxedge = 1        pigcd   = 1        ntox   = 1

+xrerg1 = 12        xrerg2 = 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
.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

```

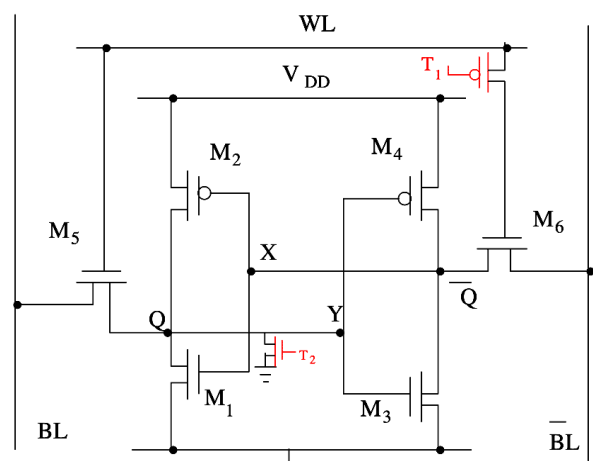
## Netlist with Trojan

\*\* 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 T1 wl wl pmos w=90n l=45n

MTi Q T2 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 rbodmod = 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 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

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+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     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

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+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      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      xtld = 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

**THE END**