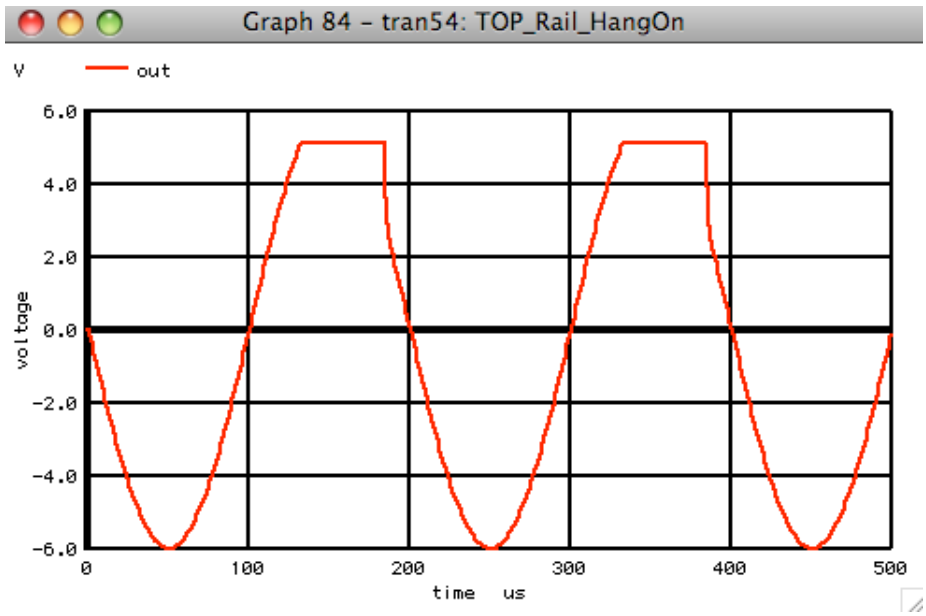
TOP_Rail_HangOn

```
* dsauersanjose@aol.com  8/15/08
* www.idea2ic.com
*
*
*                              R2   100k
*                            _/\  /\  /\_____________________________
*                           |   \/  \/                              |
*                           |                                 VC ^  |
*                           |                                   /_\ |
*                           |                                    |  |
*                           |                          ___________|  |
*                           |                         |           |  |
*                           |                  QP3  <-     <-       |
*                           |                    _|'_____|'QP4       |
*                           |                   |`_     |`_         |
*                           |                   |_____|   |         |
*                           |                  _|_      |         |
*                           |                 /   \    _____|_      |
*          R1 1K            |                 \_/ \_/  |     |  _   |
*                           |                 /\_/\    |_|'QN1 |_|'QN2
*    ___                    |                 \___/      |`->   |`->
*   |IN |_/\  /\  /\_|INN|__|                  _|_       |     |  |
*   |___|   \/  \/   |___|  |\                 \ /      <-     |  |____|_|OUT|_____
*    _|_                   |-\                 V      _|'QP1    <-     |___|     |
*   /VIN\    ^ VC   ^ VE   |  \_____________       |`_      _|'QP2              |
*   \___/    /_\    /_\    |  /             |      |___|__|_|`_          RL  8  |
*     |     _|_    _|_     |+/              |        VPB     |        _/\  /\  /\__|
*    ///   /VCC\  /VEE\    |/               |                |        |  \/  \/   |
*          \___/  \___/                      |                |       _|_         |
*            |      |                       _|_              \ /     |           |
*           ///    ///                     ///            VE V     ///          ///
*
```

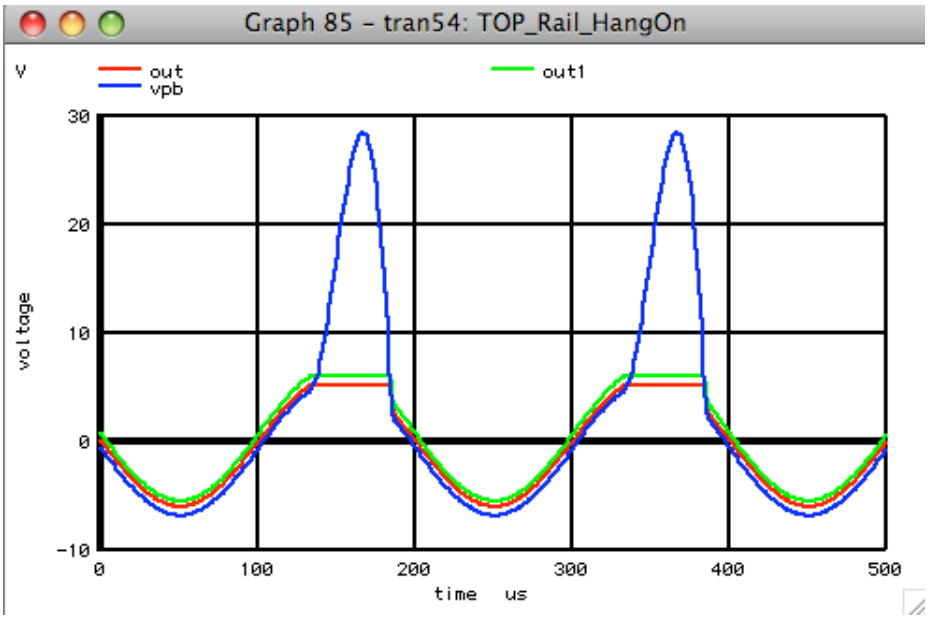
```
VCC     VC      0     DC     6
VEE     VE      0     DC     -6
VIN     IN      0     DC     0    SIN( 0 60m 5k 1n )
R1      IN      INN   1k
R2      INN     OUT   100k
RL      OUT     0     8
X_OPA   INN     0     VPB     OP_AMP
QN2     VC      OUT1  OUT     NPNP 100
QP2     VE      VPB   OUT     PNPP 100
QN1     OUT1    OUT1  VEM     NPNP
QP1     VPB     VPB   VEM     PNPP
QP3     VB1     VB1   VC      PNPP
QP4     OUT1    VB1   VC      PNPP
I1      VB1     0     20u

.tran    1u   .5m    0      1u


.control
run
set     pensize = 2
plot    out
plot    out  out1 vpb


alter  R1  resistance = 10000G
run
*plot    -vcc#branch  ylimit 0 1m
.endc


.SUBCKT  OP_AMP INN   INP  OUT
EGBUF    VDIFF  0     INN  INP  1
RGM      VDIFF  VGND2 1k
CBW      OUT    VGND2 8p
EGOUT    OUT    0     VGND2 0    -100000000
```

```
.ENDS     OP_AMP

*
*                          CBW _|____|                 .SUBCKT OP_AMP INN INP OUT
*                  VDIFF        ____  |_____|OUT|
*                        /\    ____|  _|_                      |\
*      |INN|__    _|___    \/    |_ /   \                |INN|__| \
*      |___|  |_ /   \ RGM VGND |EGOUT|                   |___|   \
*            +|EGBUF|          __|      |                        OPA\_|OUT|
*             __|     |        |  \____/                  ___      /  |___|
*      |INP|__|  \___/         |__    |  GAIN=-1M        |INP|__   /
*      |___|      |  GAIN=1   ///   __|                  |___|    /
*                __|                 ///                          |/
*                ///                     ODB = 20MHz
*
.model    NPNP   NPN(   BF=210000  )
.model    PNPP   PNP(   BF=210000  )

.end
```

======TOP_Rail_HangOn==========



Whenever a transistor saturates, the power amplifier will go open loop and there will be a resulting recovery time.



***#1==========WinSpiceVersion==========**

```
TOP_Rail_HangOn
* dsauersanjose@aol.com  8/15/08
* www.idea2ic.com
*
*
*                                  R2   100k
*                              _/\  /\  /\_____________________________
*                             |   \/  \/                              |
*                             |                                       |
*                             |                                 VC ^  |
*                             |                                   /_\ |
*                             |                                     _ |
*                             |                                    |  |
*                             |                                    |  |
*                             |                 QP3  <-     <-     |  |
*                             |                   _|'_____|'QP4     |  |
*                             |                  |  |`_   |`_       |  |
*                             |                  |  |_|   |         |  |
*                             |                  |____|            |  |
*                             |                 _|_               |  |
*                             |                /_ _\   _____|_|    |  |
*          R1 1K              |                \/_\/   |  _|'QN1 |_|'QN2
*                             |                /\_/\    |_|`->  |_|`->
*    ___                      |                \___/      |      |  |
*   |IN |_/\  /\  /\_|INN|___|                 _|_/        |      |  |____|_|OUT|_____
*   |___|   \/  \/   |___|   |\                \ /       <-      |       |___|      |
*    _|_                     |-\                V     _|'QP1    <-                  |
*   /VIN\    ^ VC   ^ VE     |  \_____________|  |`_   |_|'QP2                    |
*   \___/   /_\    /_\       |  /             |____|__|  |`_                 RL  8 |
*    _|_    _|_    _|_       |+/                  VPB     |              _/\  /\  /\__|
*    ///   /VCC\  /VEE\   ___|/                            |_|              \/  \/
*          \___/  \___/   |                                \ /    |_|
*            |      |    _|_                              VE V    ///
*            |      |    ///
*           _|_    _|_
*           ///    ///
*

VCC     VC      0     DC     6
VEE     VE      0     DC     -6
VIN     IN      0     DC     0    SIN( 0 60m 5k 1n )
R1      IN      INN   1k
R2      INN     OUT   100k
RL      OUT     0     8
X_OPA   INN     0     VPB    OP_AMP
QN2     VC      OUT1  OUT    NPNP 100
QP2     VE      VPB   OUT    PNPP 100
```

```
QN1     OUT1    OUT1  VEM     NPNP
QP1     VPB     VPB   VEM     PNPP
QP3     VB1     VB1   VC      PNPP
QP4     OUT1    VB1   VC      PNPP
I1      VB1     0     20u

.tran    1u   .5m    0      1u


.control
run
set     pensize = 2
plot    out
plot    out  out1 vpb


alter  R1  resistance = 10000G
run
*plot    -vcc#branch  ylimit 0 1m
.endc


.SUBCKT  OP_AMP INN   INP  OUT
EGBUF    VDIFF  0     INN  INP  1
RGM      VDIFF  VGND2 1k
CBW      OUT    VGND2 8p
EGOUT    OUT    0     VGND2 0    -100000000
.ENDS    OP_AMP

*
*                        ____                    .SUBCKT OP_AMP INN INP OUT
*                   CBW _|_   |        ___
*                 VDIFF      ___   |_____|OUT|
*                   ___/\   ___|   _|_|   ___        ___   |\
*      |___|__  _|_    \/   |_ /   \      |___|__|  \
*      |___|_ /   \ RGM VGND |EGOUT|      |___|  \
*             +|EGBUF|       __|    |              OPA\_|___|
*             __|   \___/       \___/                  /|___|
*      |___|__|  \___/        _|_   GAIN=-1M   |___|__|  /
*      |___|     | GAIN=1  ///  _|_             |___|  /
*                _|_                ///                |/
*                ///                   ODB = 20MHz
*
.model    NPNP   NPN(   BF=210000 )
.model    PNPP   PNP(   BF=210000 )

.end
```