Quiet line experiment

IBIS Open Forum Teleconference

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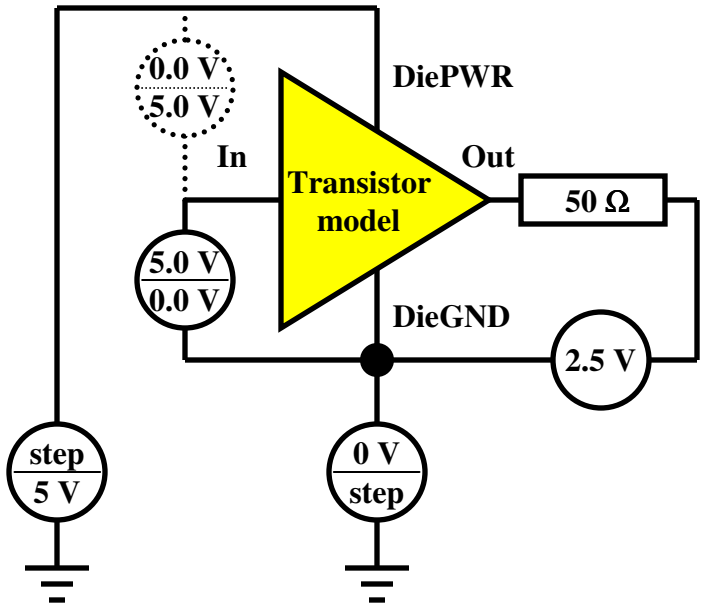
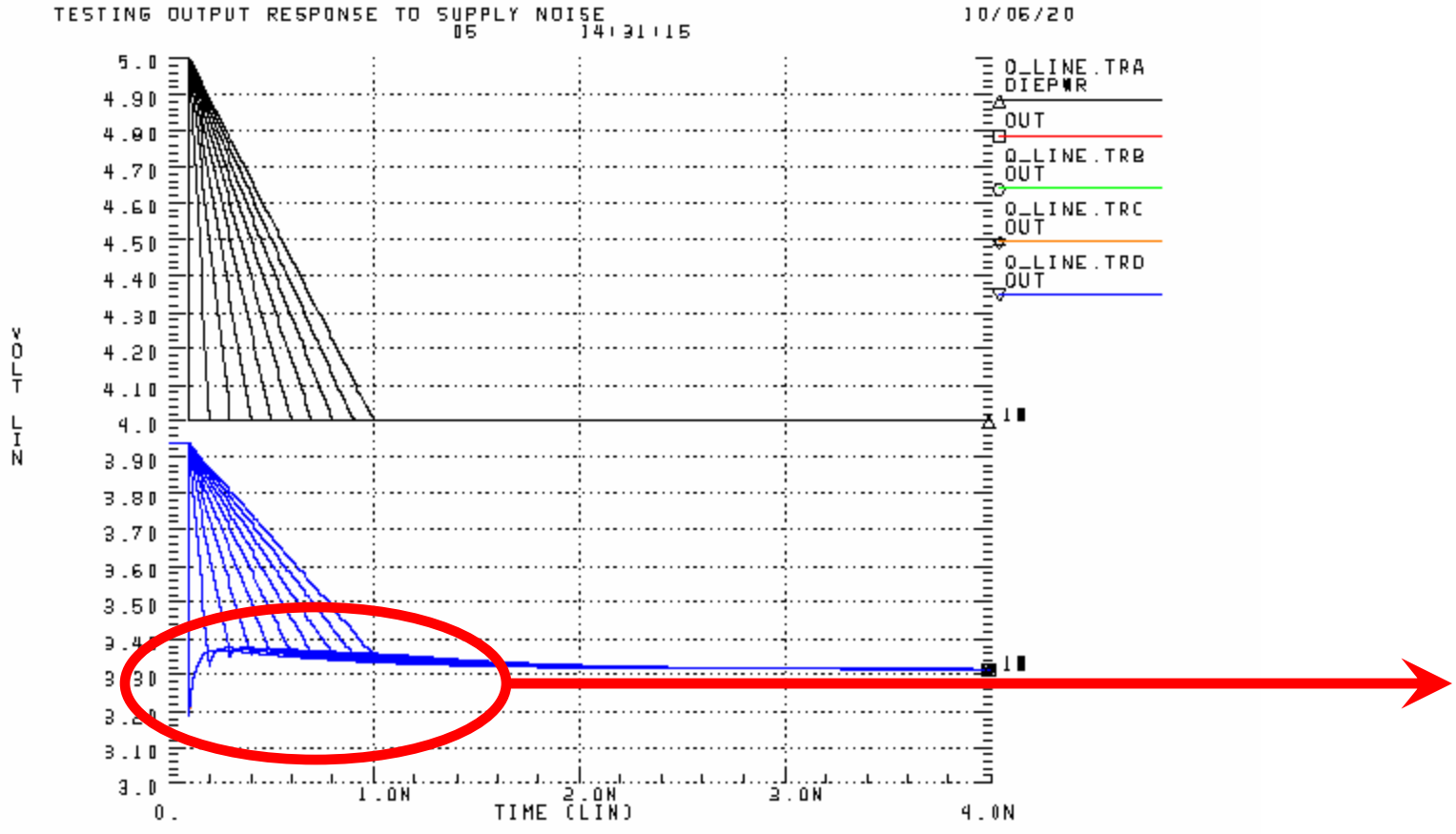
Simulation circuit using “IBIS class” transistor model



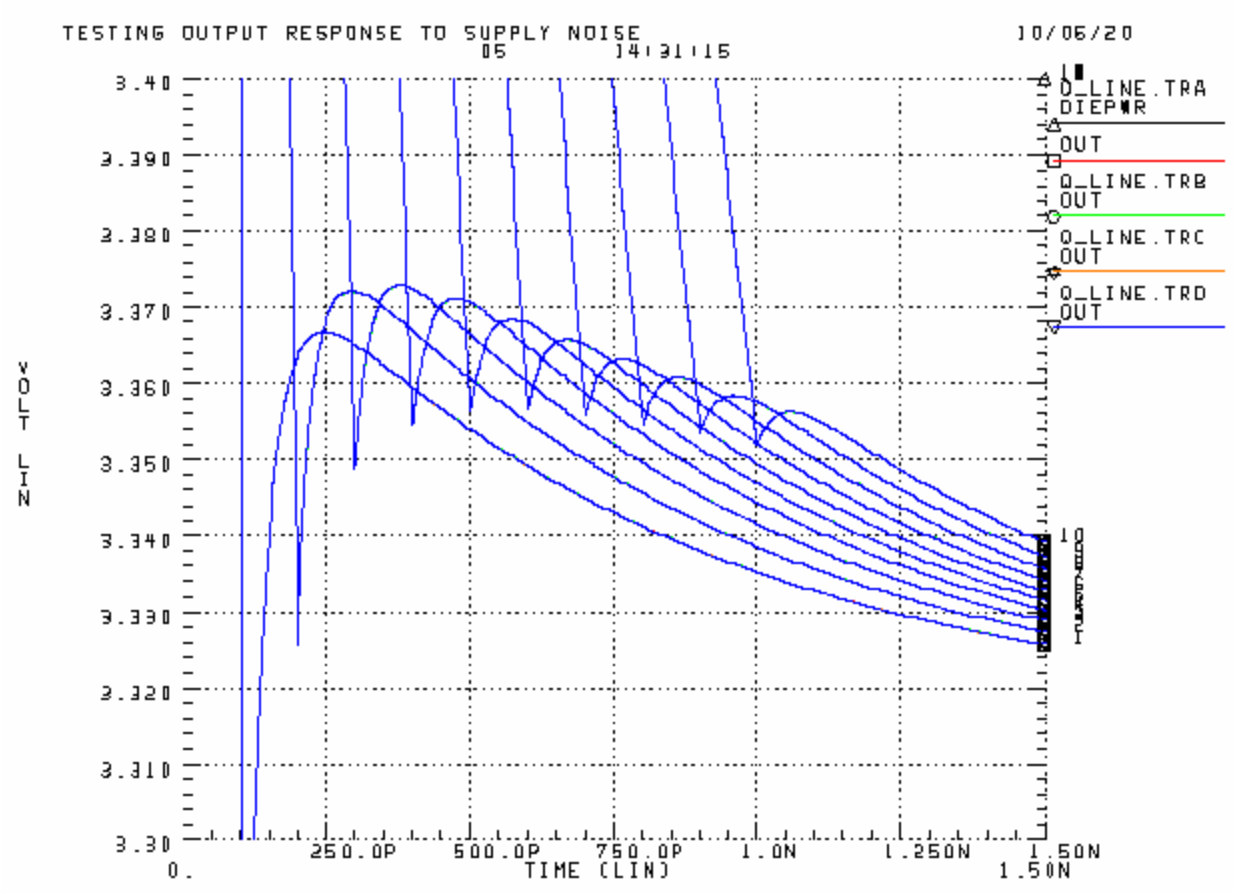
HSPICE simulation file

```
Testing Output Response to Supply Noise
*********************************************************************
.OPTIONS POST=1 POST_VERSION=9007 PROBE  ACCURATE  RMAX=0.5
.TRAN 1.0ps  4.0ns  SWEEP  Tpoint  LIN  10  101e-12 1001e-12
.LIB  'Process.lib'  Typ
*********************************************************************
.PROBE
+ DiePWR = V(DiePWR,DieGND)
+ DieGND = V(DieGND)
+ Out    = V(Out,DieGND)
*********************************************************************
.param Tpoint = 101ps
*
*Vvcc  DiePWR  0  DC= 5.0
Vvcc  DiePWR  0  PWL
+  0.0        5.0
+  0.1ns      5.0
+  Tpoint     4.0
+ 10.0ns      4.0
*
Vgnd  DieGND  0   DC= 0.0
*Vgnd  DieGND  0   PWL
*+  0.0        0.0
*+  0.1ns      0.0
*+  Tpoint     1.0
*+ 10.0ns      1.0
*
Vin   In      DieGND  DC= 5.0
*Vin   DiePWR  In      DC= 0.0
*********************************************************************
X0  In  Out  DiePWR  DiePWR  DieGND  DieGND  DieGND  IO_buf
*   in  out   pu      pc      pd      gc      en
*
Rload  Out  Vtt     R=  50.0
Vload  Vtt  DieGND  DC=  2.5
*********************************************************************
.END
*********************************************************************
```

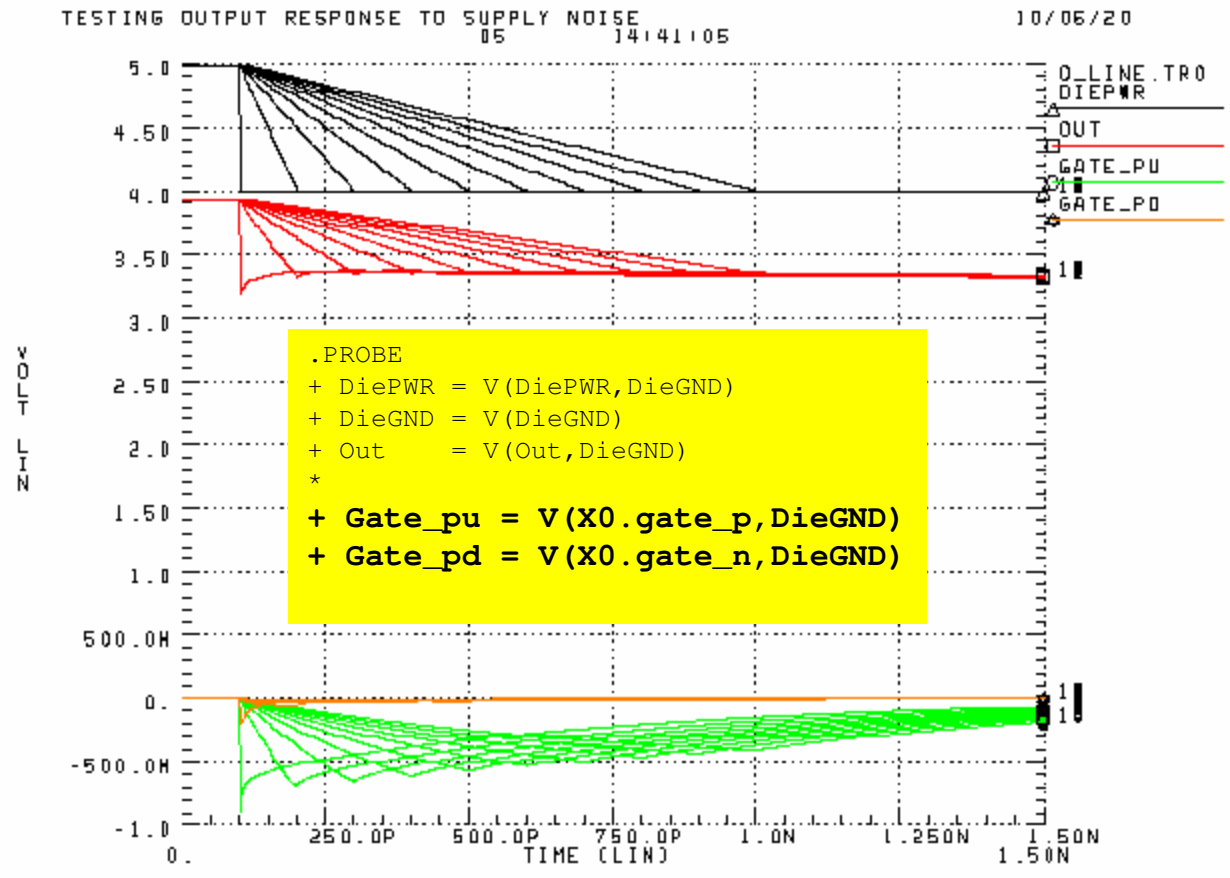
The four configurations give identical results (high state)



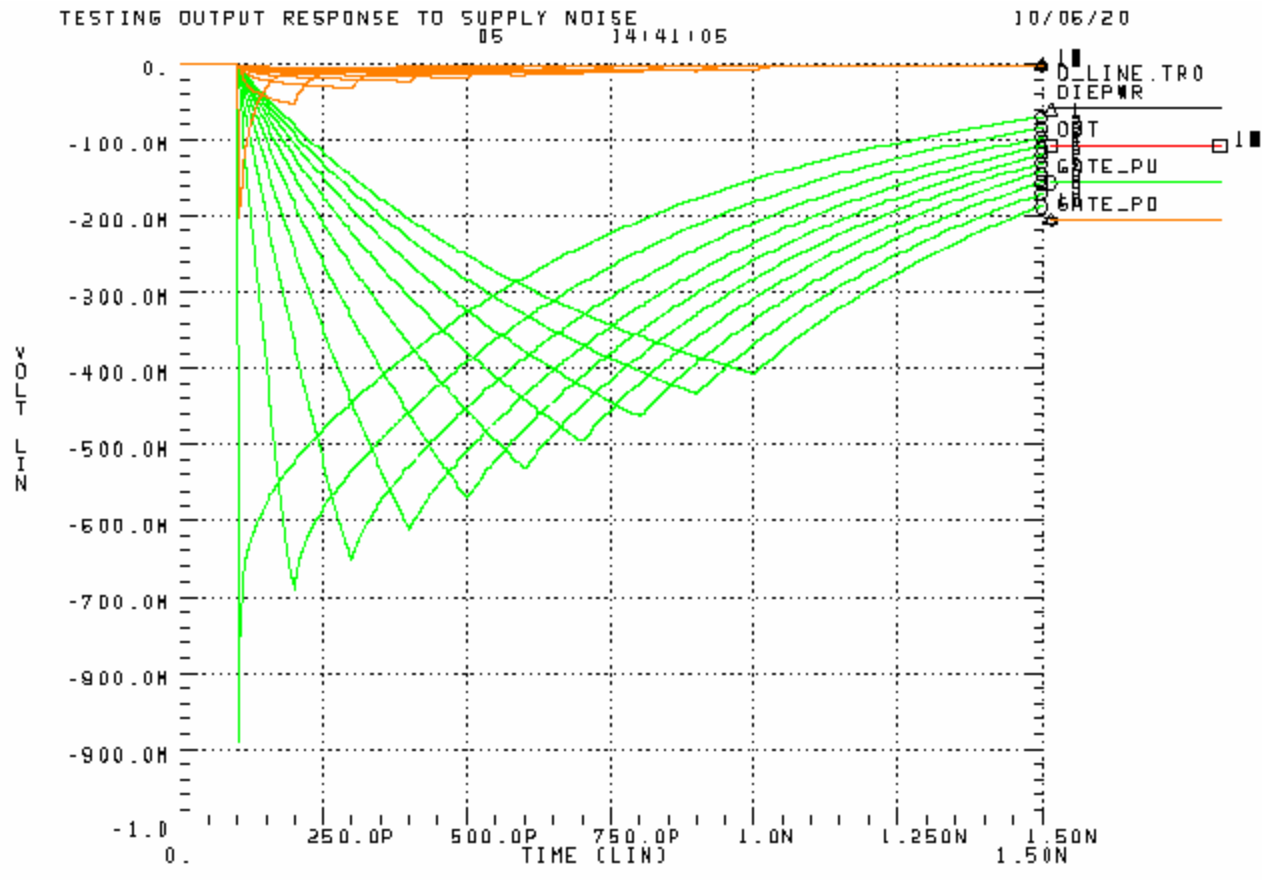
Zooming in to see the details…



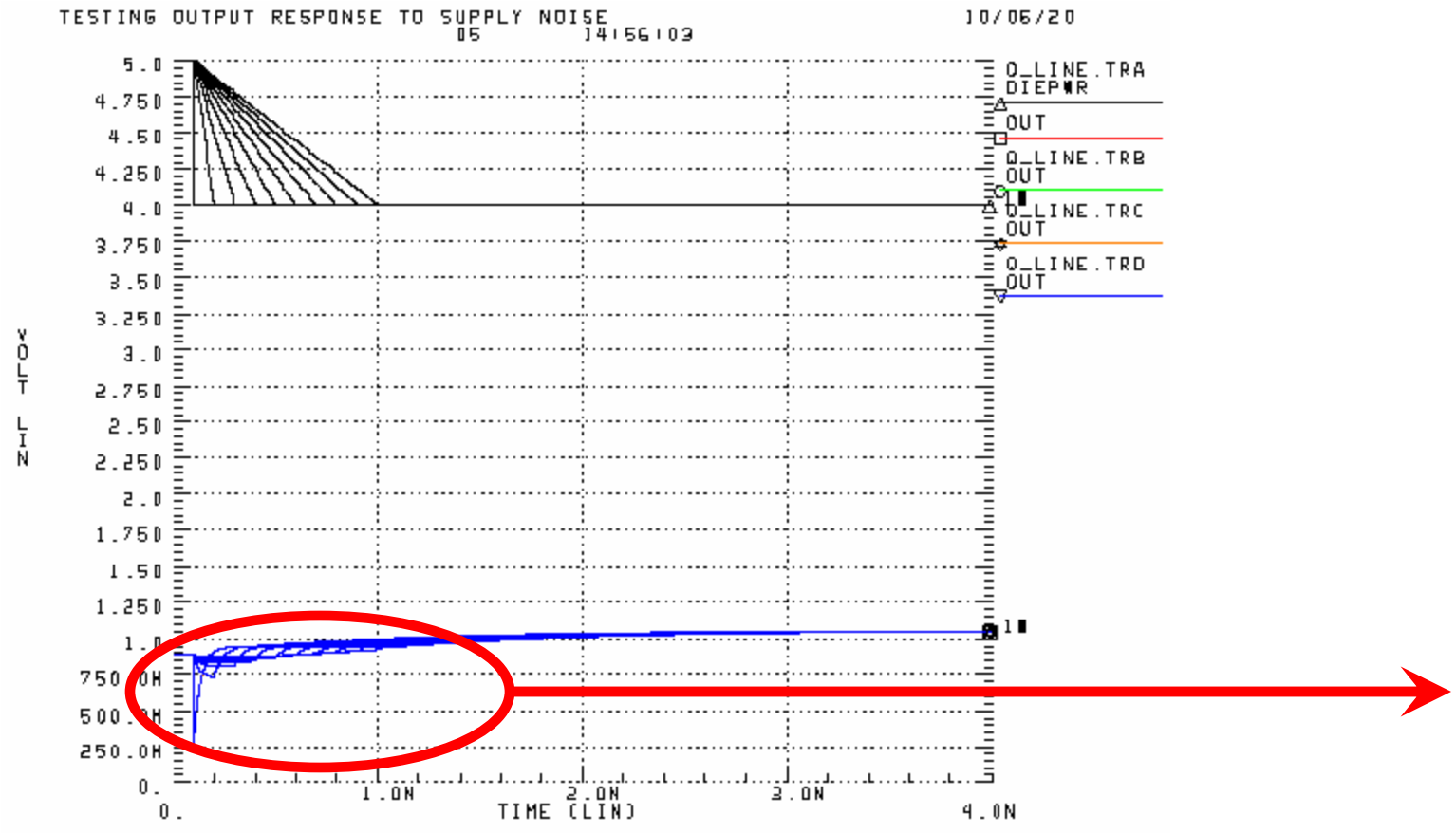
Gate voltage of the output transistors



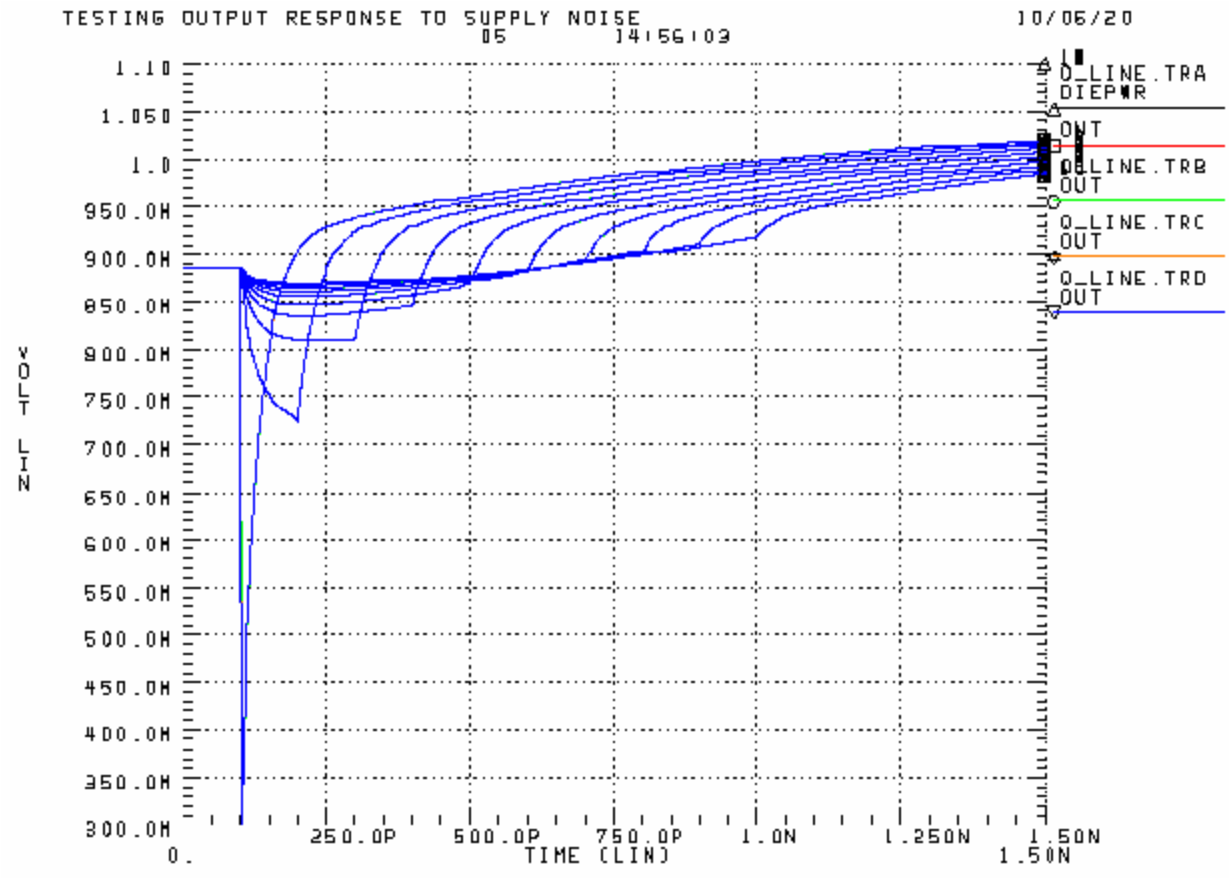
Zooming in to see the details…



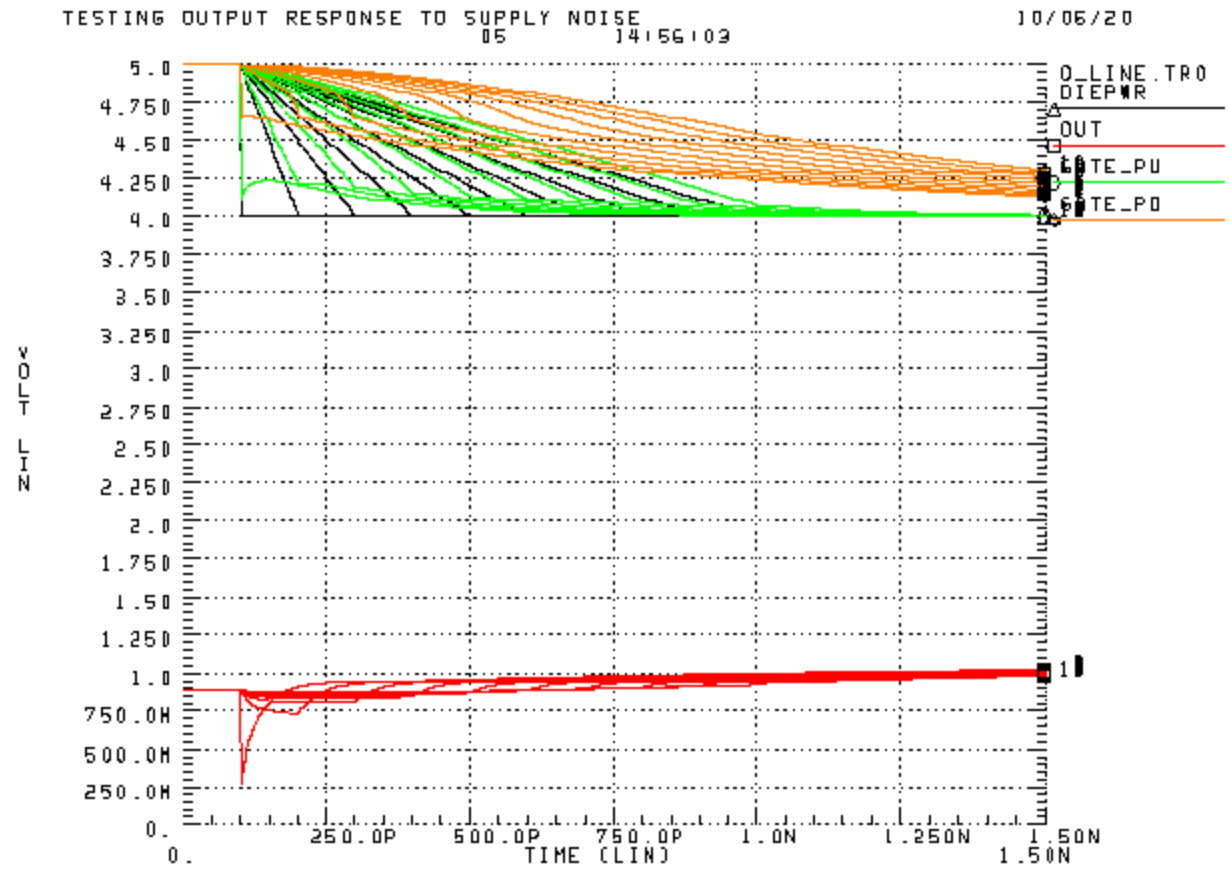
The four configurations give identical results (low state)



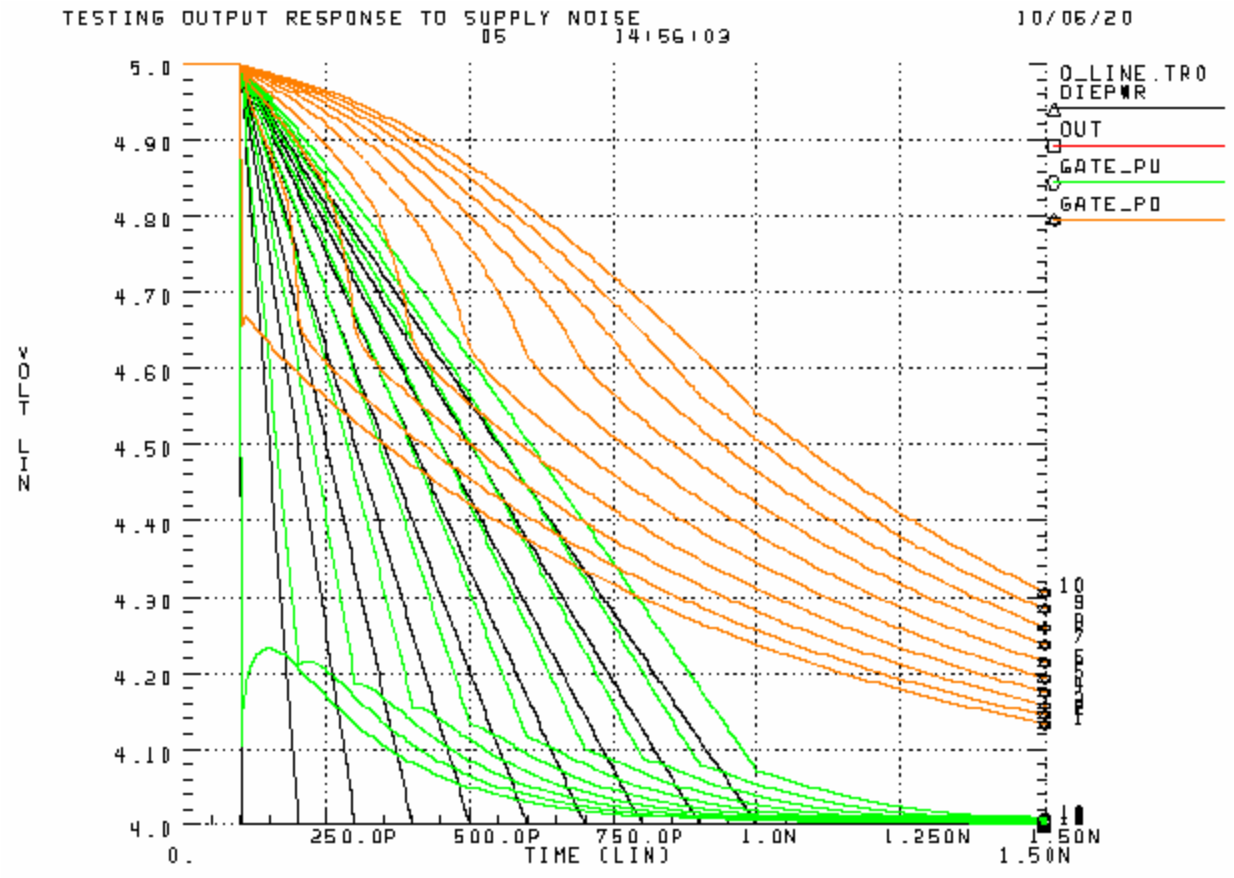
Zooming in to see the details…



Gate voltage of the output transistors



Zooming in to see the details…



Conclusions

- **Whether we are modulating the top or bottom supply voltage *DOES NOT MATTER***
- **Due to internal RC effects the gate voltage of the output transistors will not be able to follow rapid supply voltage variations instantaneously**
- **The gate modulation effect cannot be modeled by DC measurements alone**
- **We have to find a good way to describe these AC effects in a general way before BIRD97/98 can be completed**