Preethis ROIC analysis

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1 setup

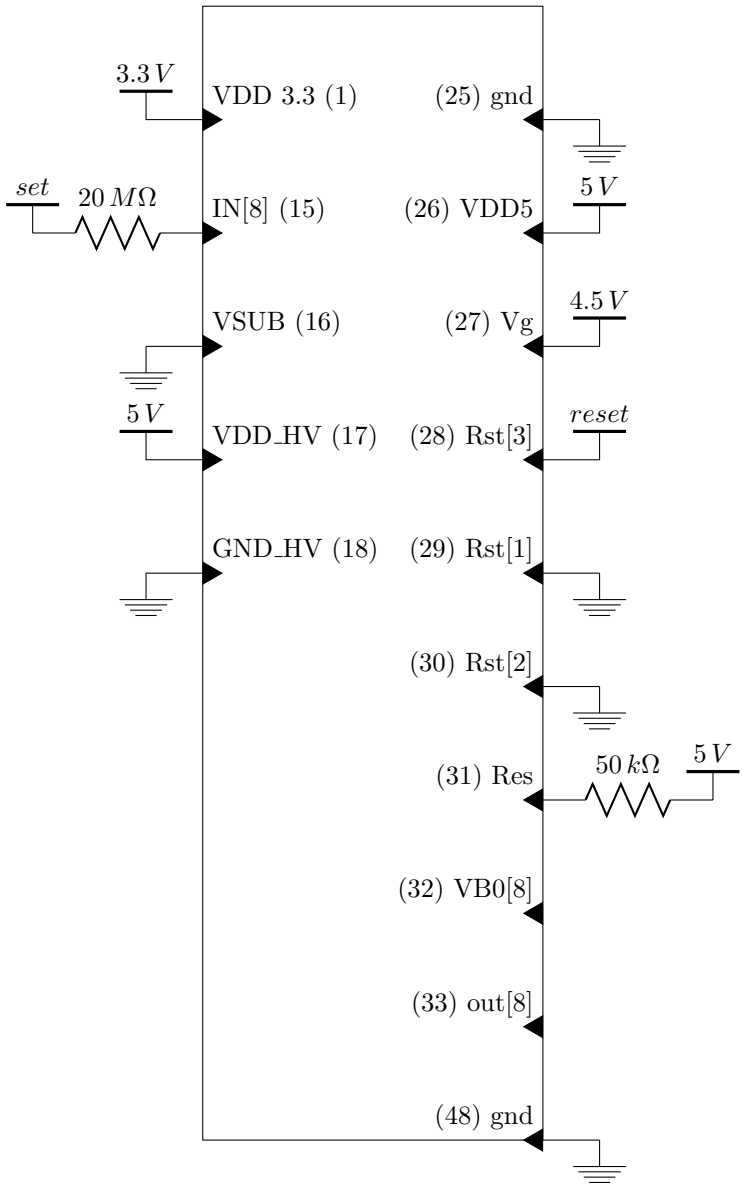

Figure 1: Schematic of breadbord

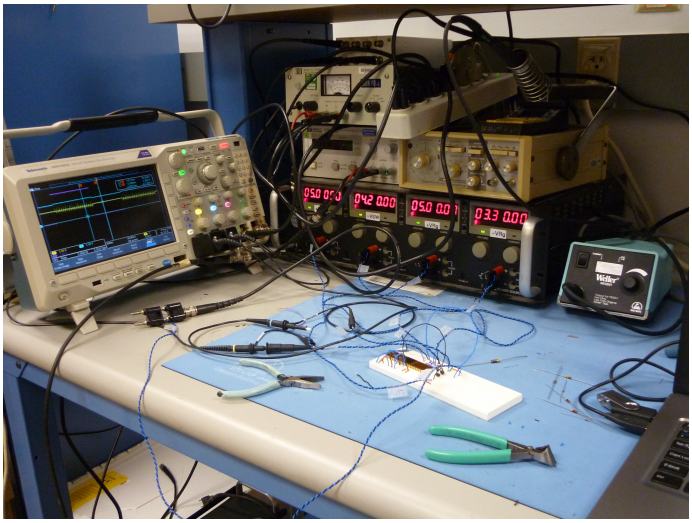

Figure 2: setup overview

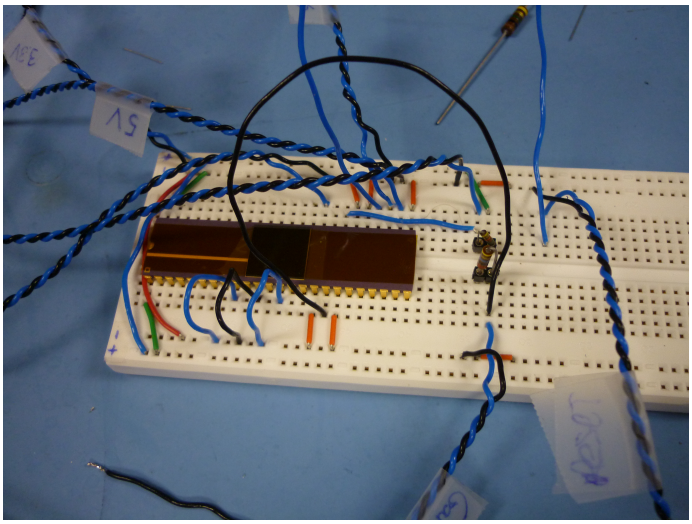

Figure 3: close-up

2 grounded versus floating

This test addresses the effect of a grounded input versus a floating input. Rst1=Rst2=0. The behavior of the floating channel changes dramatically based on the voltage used to power VDD_HV. When the input is grounded, the output is not affected by the voltage on the VDD_HV. This is illustrated below.

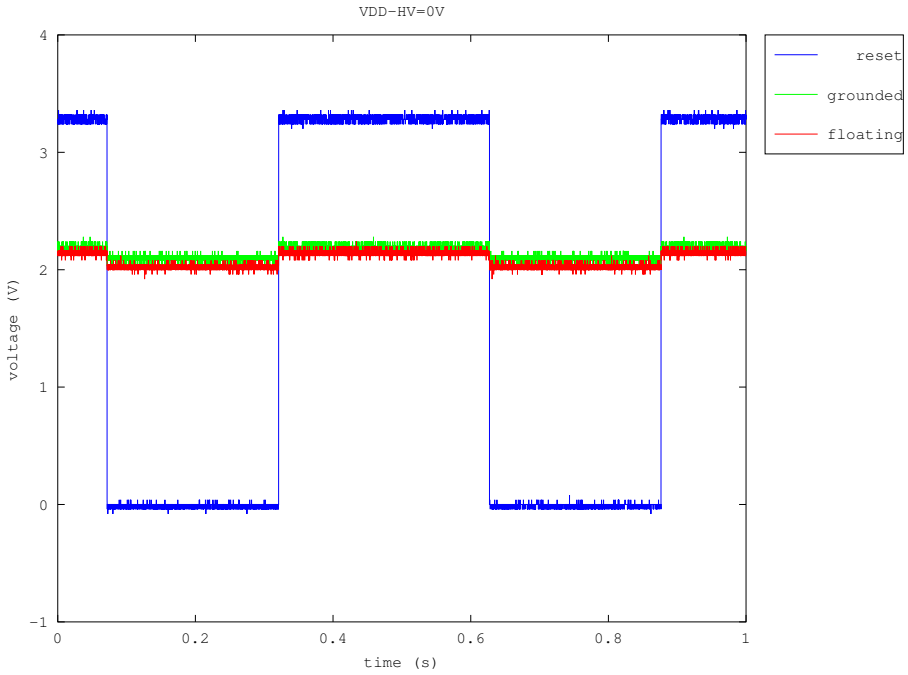

Figure 4: floating versus grounded. $VDD\_HV = 0\,V$

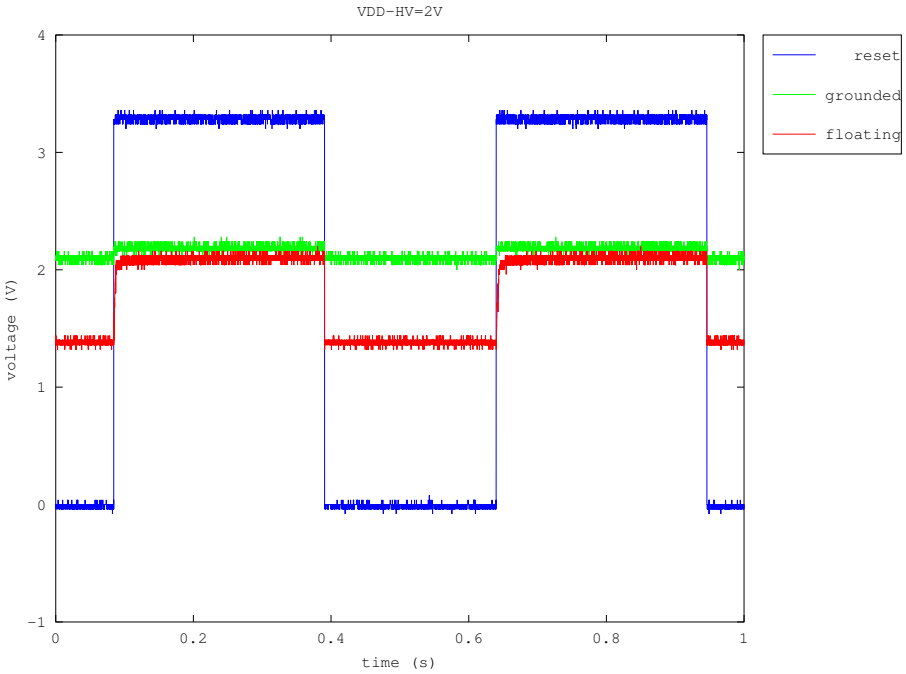

Figure 5: floating versus grounded. $VDD\_HV = 2\,V$

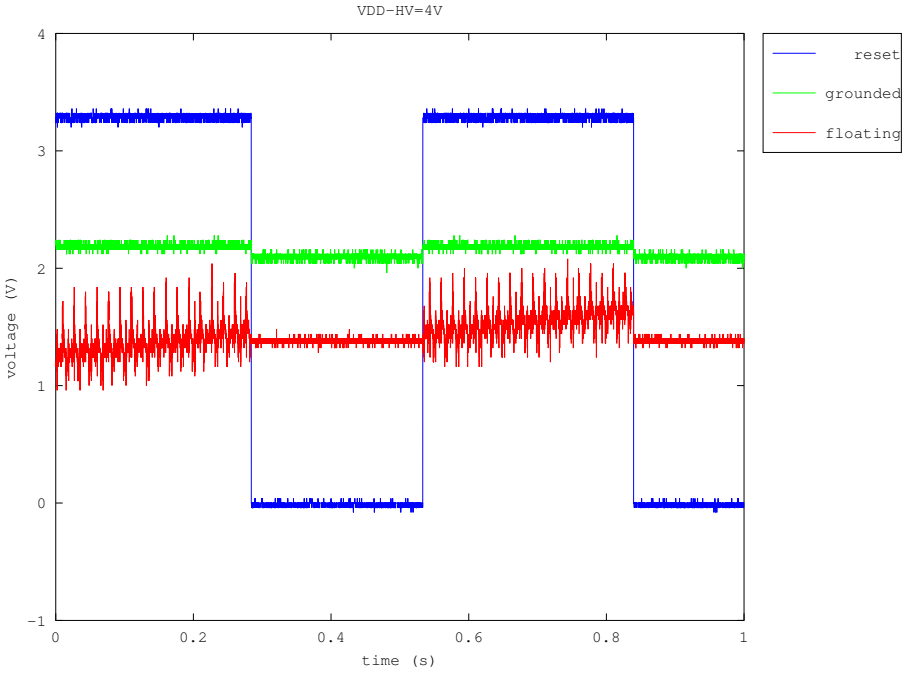

Figure 6: floating versus grounded. $VDD\_HV = 4\,V$

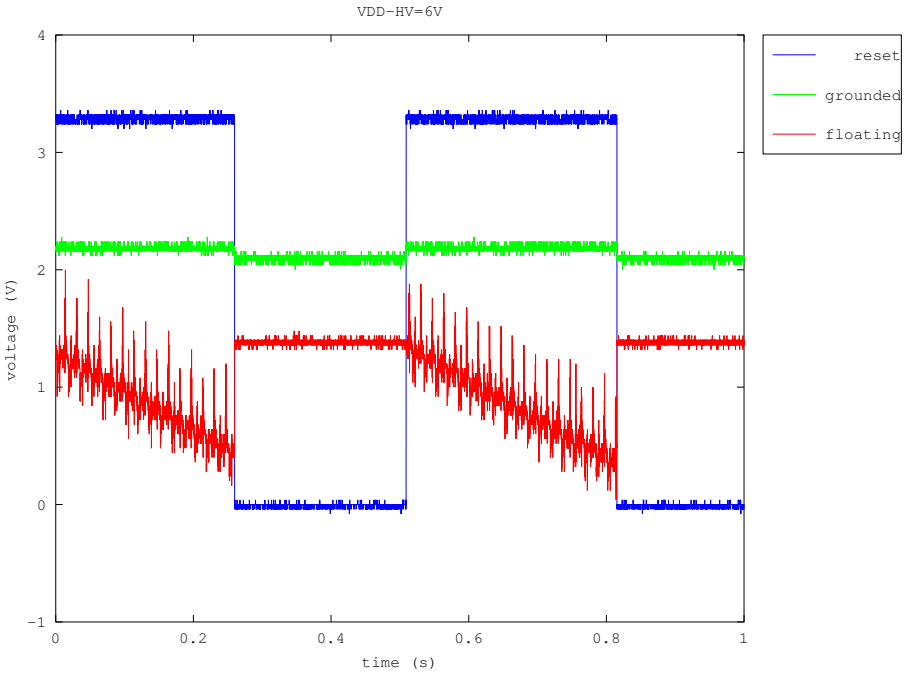

Figure 7: floating versus grounded. $VDD\_HV = 6\,V$

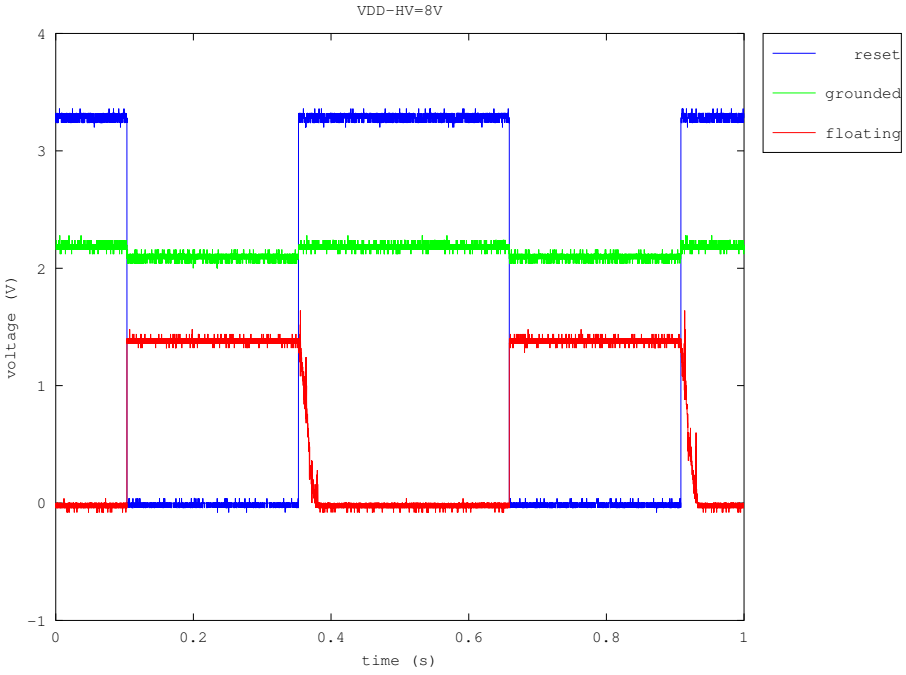

Figure 8: floating versus grounded. $VDD\_HV = 8\,V$

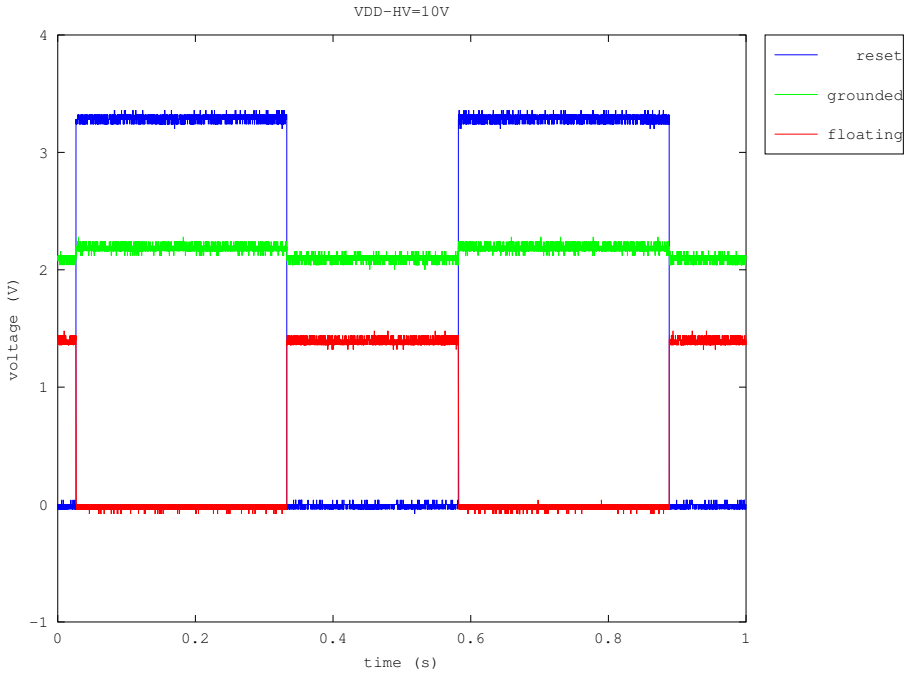

Figure 9: floating versus grounded. $VDD\_HV = 10\,V$

3 input vs output

This test addresses the relationship between input and output. Rst1=Rst2=0 V. The input is a voltage source in series with a transistor of $20\,M\Omega$. The VDD_HV $= 4.5\,V$. In this particular set-up the relationship between the input and output does not behave as (I) expected. There is no difference in performance for the input voltage $< 2.2\,V$ and $> 2.6\,V$. The performance of the input voltage between 2.2 and $2.6\,V$ are shown below.

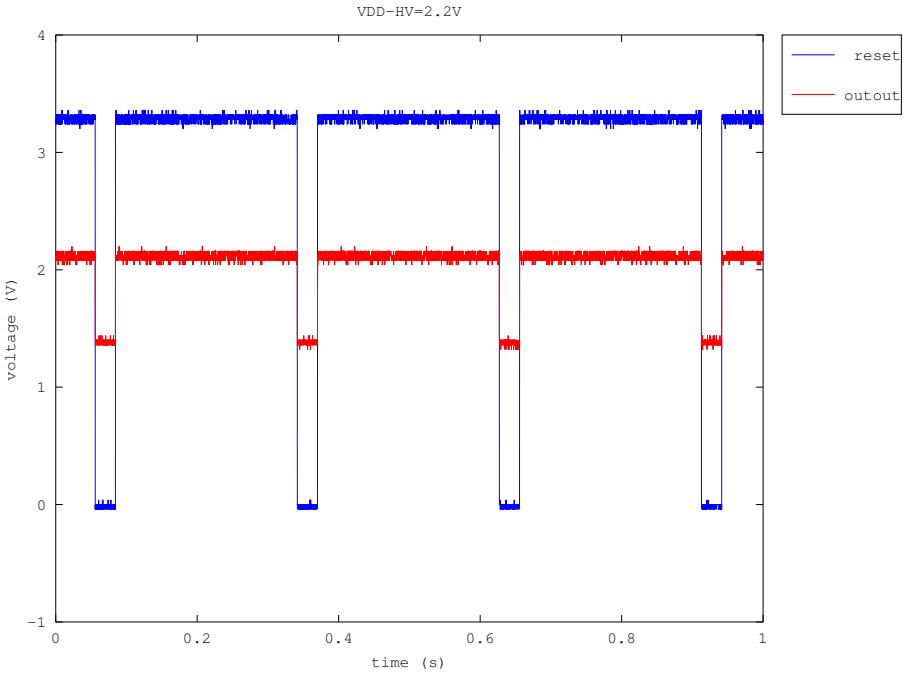

Figure 10: output of channel with constant input current. $VDD\_HV = 2.2\,V$

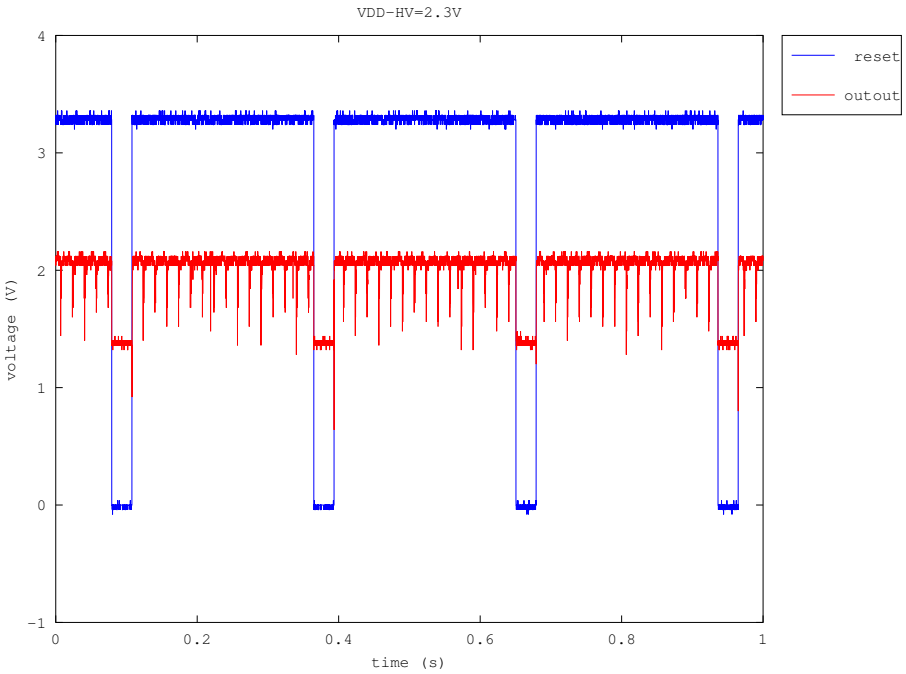

Figure 11: output of channel with constant input current. $VDD\_HV = 2.3\,V$

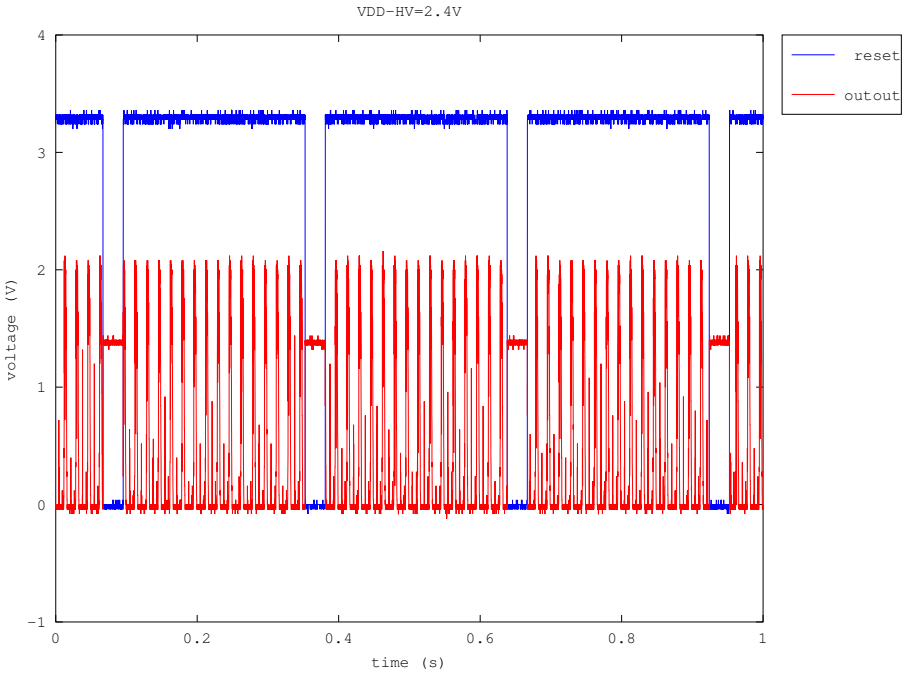

Figure 12: output of channel with constant input current. $VDD\_HV = 2.4\,V$

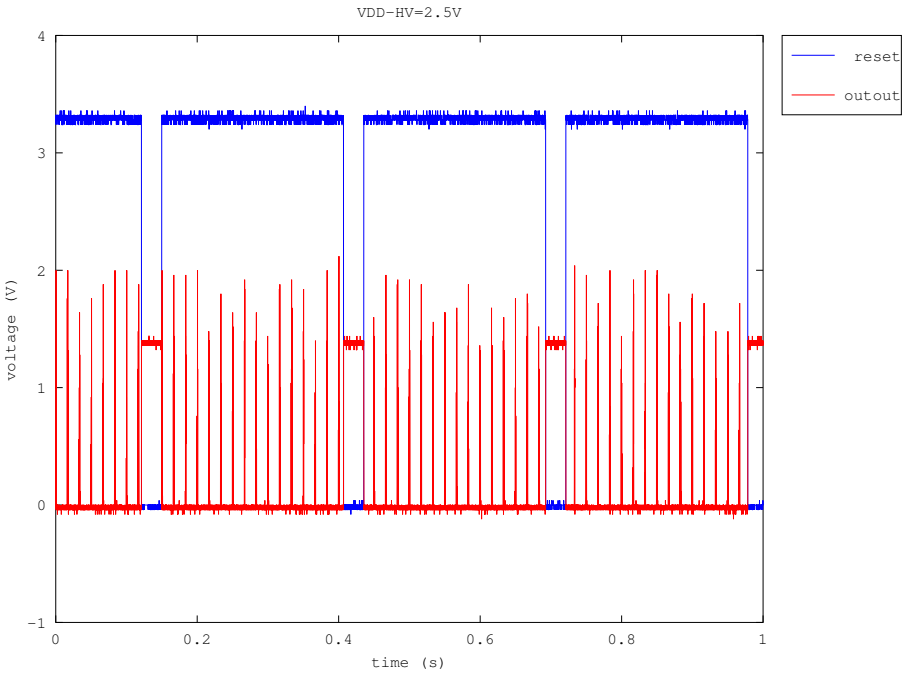

Figure 13: output of channel with constant input current. $VDD\_HV = 2.5\,V$

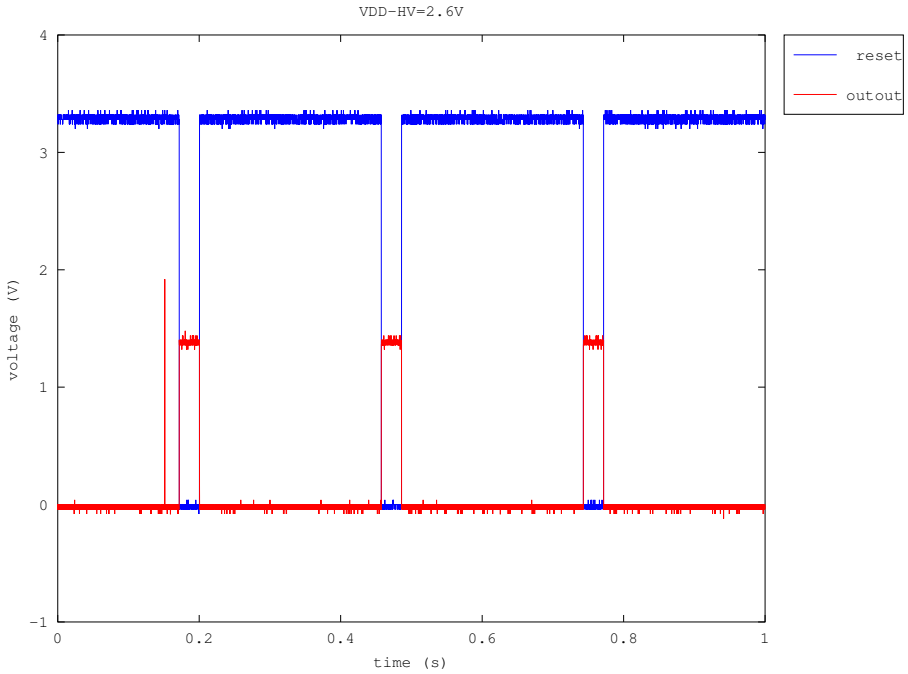

Figure 14: output of channel with constant input current. $VDD\_HV = 2.6\,V$

4 VB

This test addresses the effect of the voltage limiter. Both the output and VB of a channel are observed under varying input voltages. The test results show that the VB rises to approximately $2\,V$ and then stops rising.

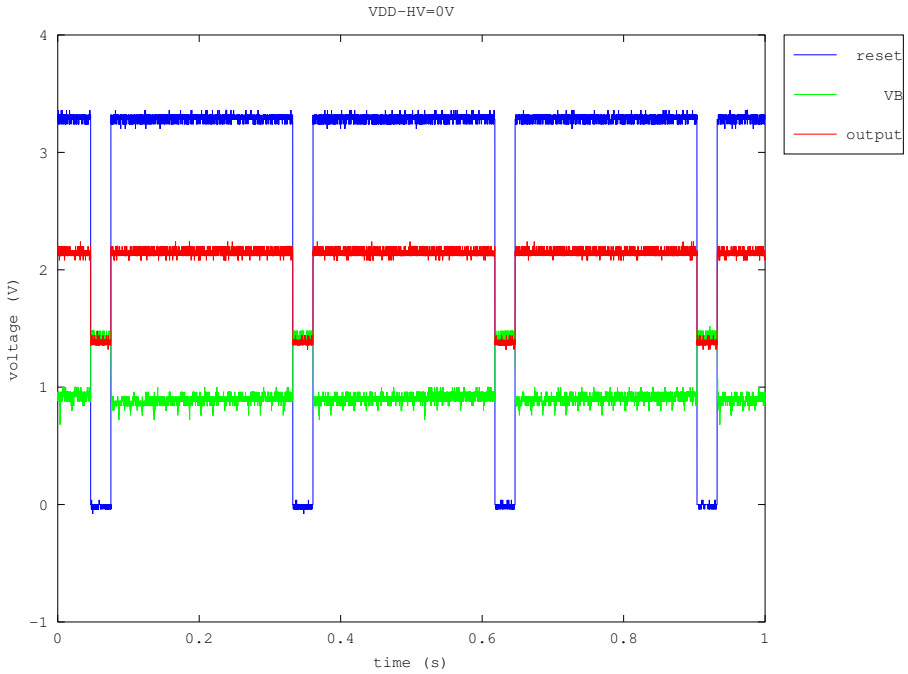

Figure 15: VB and output for $VDD\_HV = 0\,V$

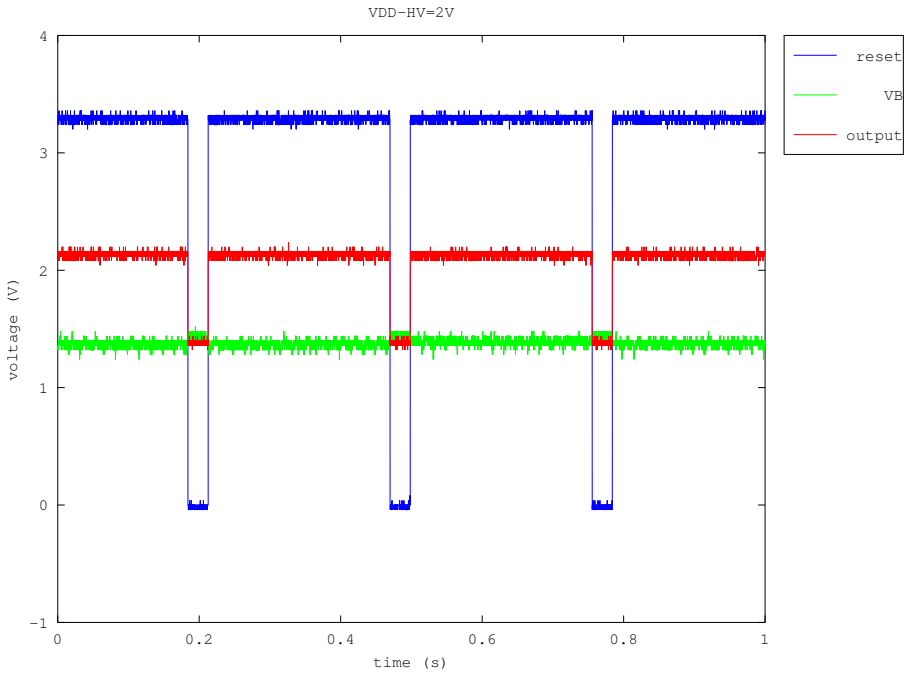

Figure 16: VB and output for $VDD\_HV = 2\,V$

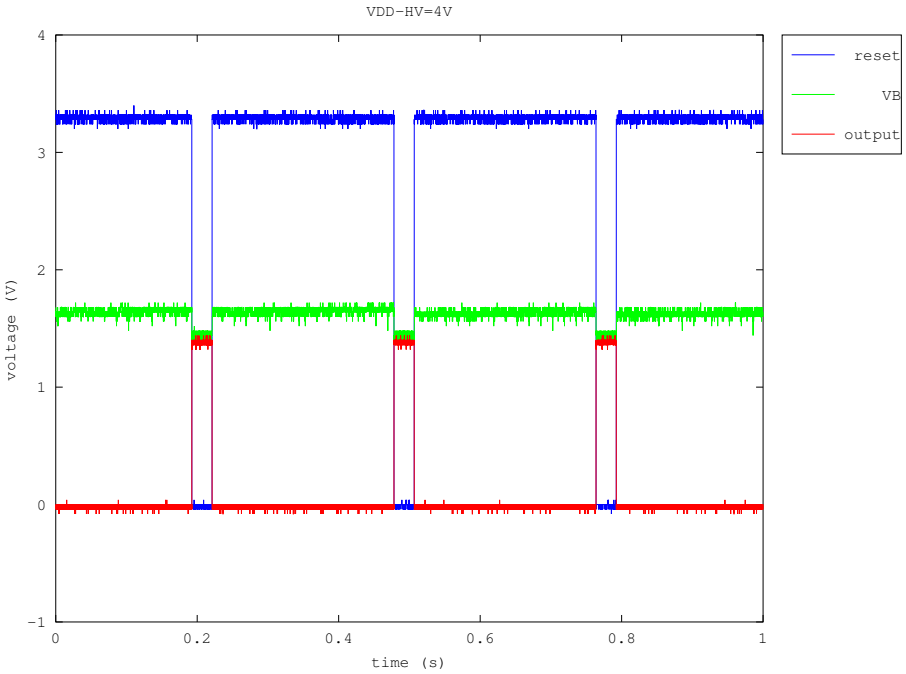

Figure 17: VB and output for $VDD\_HV = 4\,V$

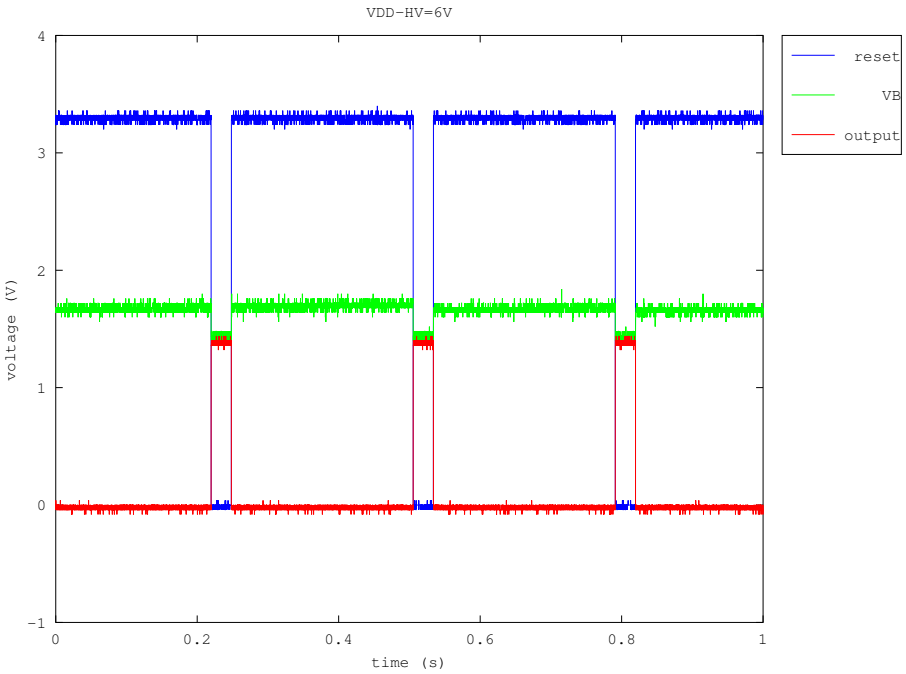

Figure 18: VB and output for $VDD\_HV = 6\,V$

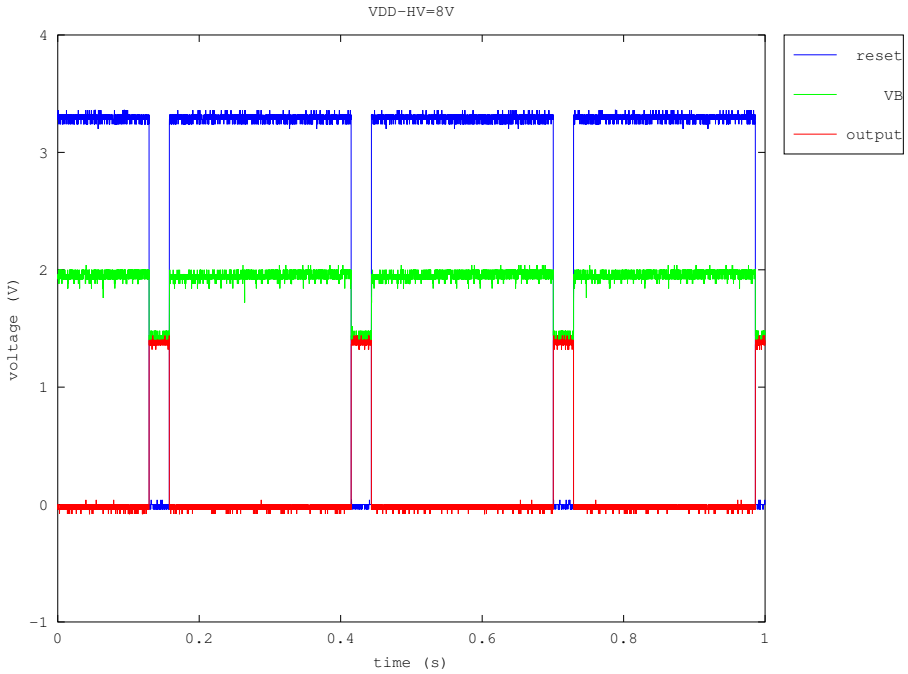

Figure 19: VB and output for $VDD\_HV = 8\,V$

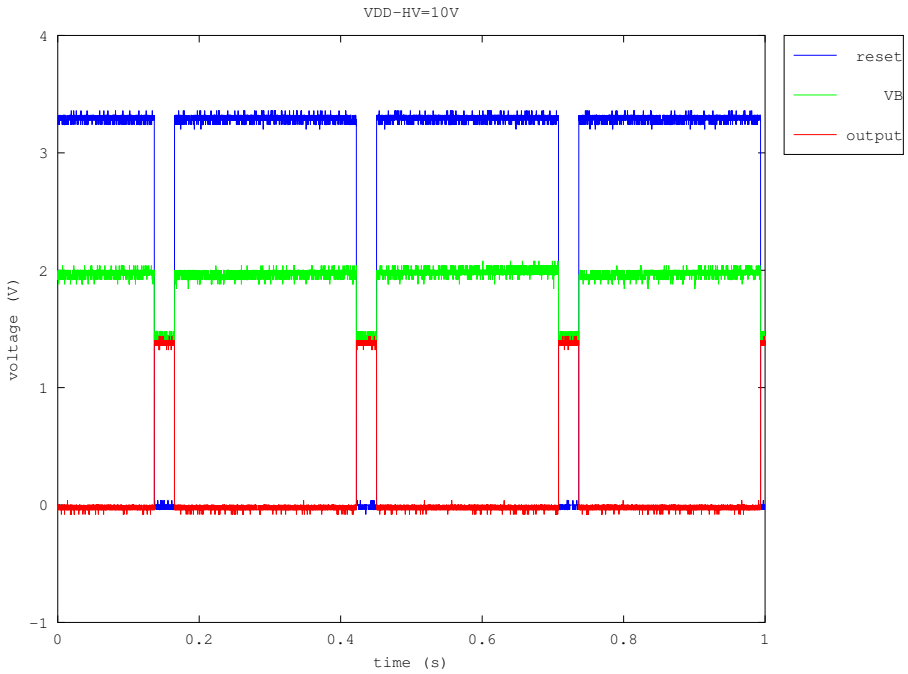

Figure 20: VB and output for $VDD\_HV = 10\,V$

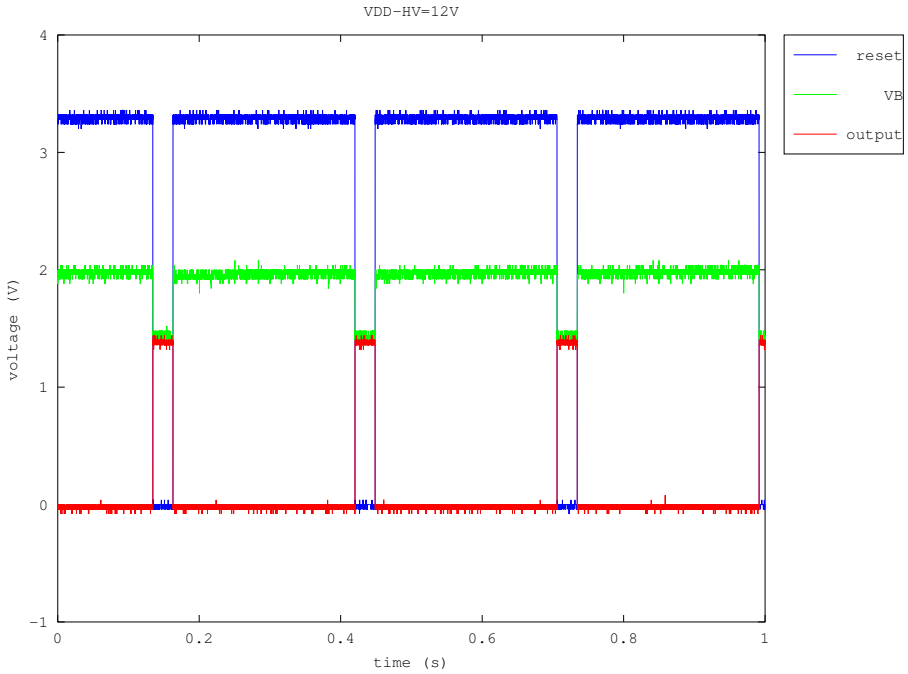

Figure 21: VB and output for $VDD\_HV = 12\,V$

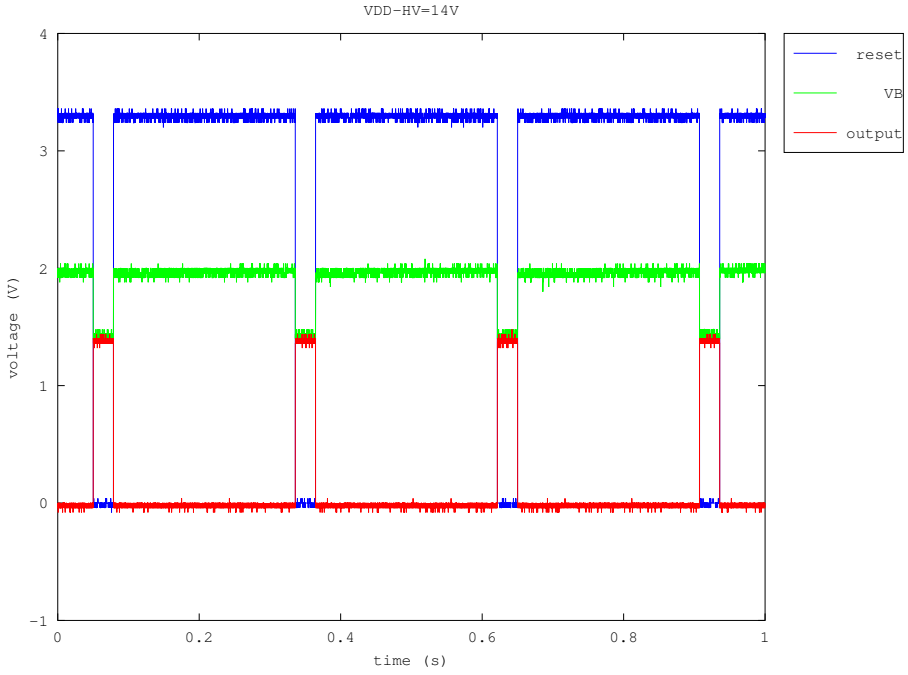

Figure 22: VB and output for $VDD\_HV = 14\,V$