

# LTspice Model SN75ALS181 Differential Driver and Receiver Pair

## Model Information

<b>Model</b>	A macro model
<b>Call Name</b>	MDC_SN75ALS181_LT
<b>Pin Assign</b>	1:NC 2:R 3:_RE 4:DE 5:D 6:GND 7:GND 8:NC 9:Y 10:Z 11:B 12:A 13:VCC 14:VCC
<b>File List</b>	Model Library MDC_SN75ALS181_LT01.lib Model Report MDC_SN75ALS181_LT.pdf(this file)
<b>Verified Simulator Version</b>	LTspice version 17.1.8

### Note

### References

The information which was used for modeling is as follow:

#### [Data Sheet]

- Date/Version SLLS152 - Revision E - October 2022
- Product name SN75ALS181
- Company name Texas Instruments Incorporated

#### [Characteristics listed]

- Characteristics Driver Input clamp voltage
- Driver Output voltage, Differential output voltage (VOD1)
- Driver Differential output voltage (VOD2, VOD3)
- Driver Common mode output voltage
- Driver Change in magnitude of differential output voltage
- Driver Change in magnitude of common-mode output voltage
- Driver High-impedance-state output current
- Driver High-level input current, Low-level input current
- Driver Short circuit output current
- Driver Differential-Output Delay and Transition Times (tdDH, tdDL, tr, tf, tskp)
- Driver Enable and Disable Times (tPZH, tPHZ, tPZL, tPLZ)
- Receiver Input clamp voltage, RE
- Receiver High-level output voltage, Low-level output voltage
- Receiver High-impedance-state output current
- Receiver Line input current
- Receiver Short circuit output current
- Receiver Propagation-Delay Times (tPLH, tPHL, tskp)
- Receiver Output Enable and Disable Times (tPZH, tPZL, tPHZ, tPLZ)
- Positive-going and Negative-going threshold voltage, differential input
- Differential-input line receiver, Input hysteresis

### Simulation Condition

This table shows the range of evaluated simulation range that was not occurs any convergence problems in this area.

Item	Condition	Unit
VCC	4.75~5.25	V
Temperature	25	deg C

**Model Functions Table**

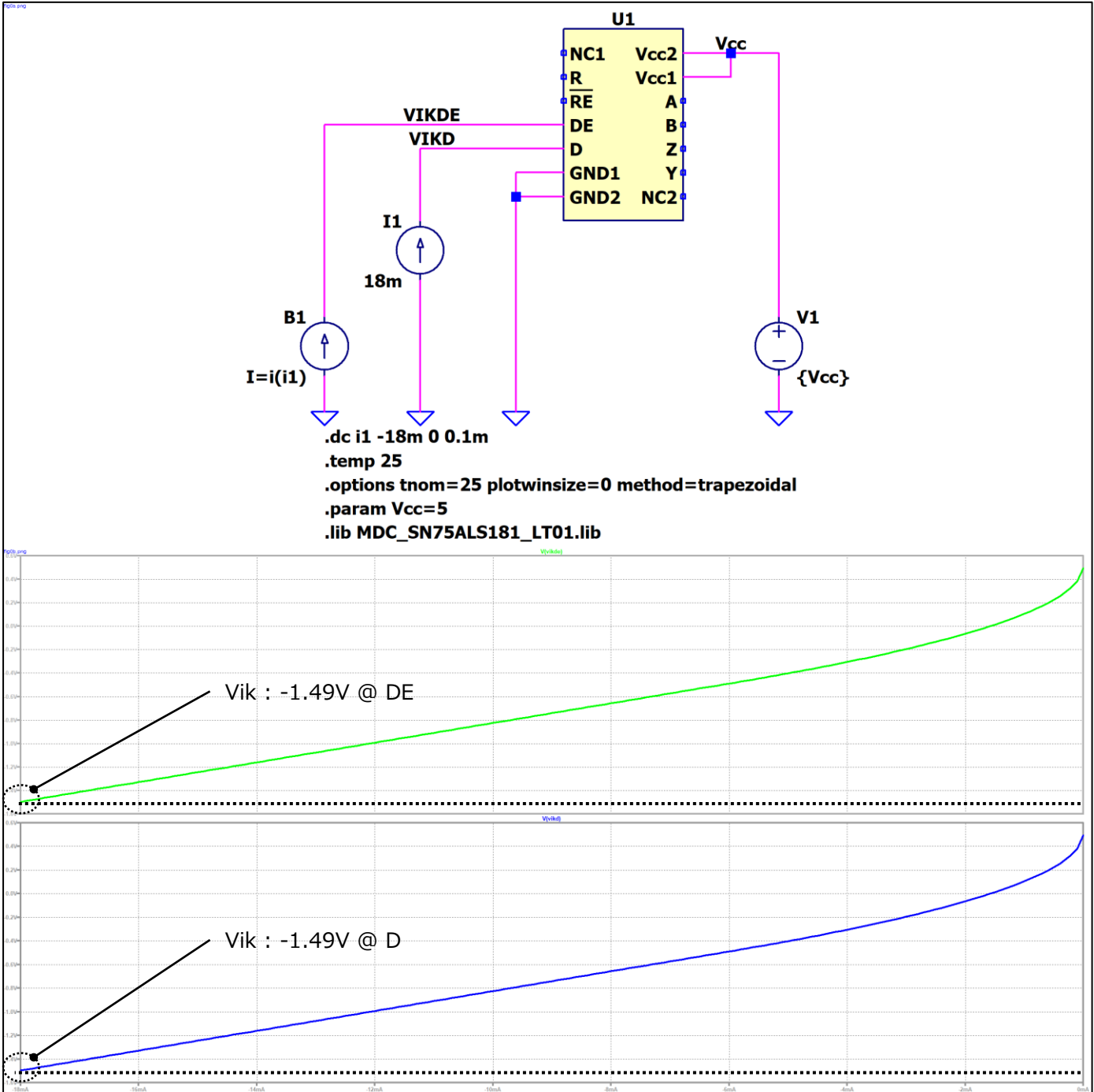
○ : Implemented  
 × : Not Implemented  
 — : Not applicable

Functions	Implemented
Driver Input clamp voltage	○
Driver Output voltage and Differential output voltage (VOD1)	○
Driver Differential output voltage (VOD2, VOD3)	※1
Driver Common mode output voltage	○
Driver Change in magnitude of differential output voltage	○
Driver Change in magnitude of common-mode output voltage	○
Driver High-impedance-state output current	○
Driver High-level and Low-level input current	○
Driver Short circuit output current	○
Driver Differential-Output Delay and Transition Times (tdDH, tdDL, tr, tf, tskp)	○
Driver Enable and Disable Times (tPZH, tPHZ, tPZL, tPLZ)	○
Differential line driver	○
Receiver Input clamp voltage, RE	○
Receiver High-level and Low-level output voltage	○
Receiver High-impedance-state output current	○
Receiver Line input current	○
Receiver High-level input current, RE	○
Receiver Low-level input current, RE	※2
Receiver Short circuit output current	○
Receiver Propagation-Delay Times (tPLH, tPHL, tskp)	○
Receiver Output Enable and Disable Times (tPZH, tPZL, tPHZ, tPLZ)	○
Positive-going and Negative-going threshold voltage, differential input	○
Differential-input line receiver, Input hysteresis	○

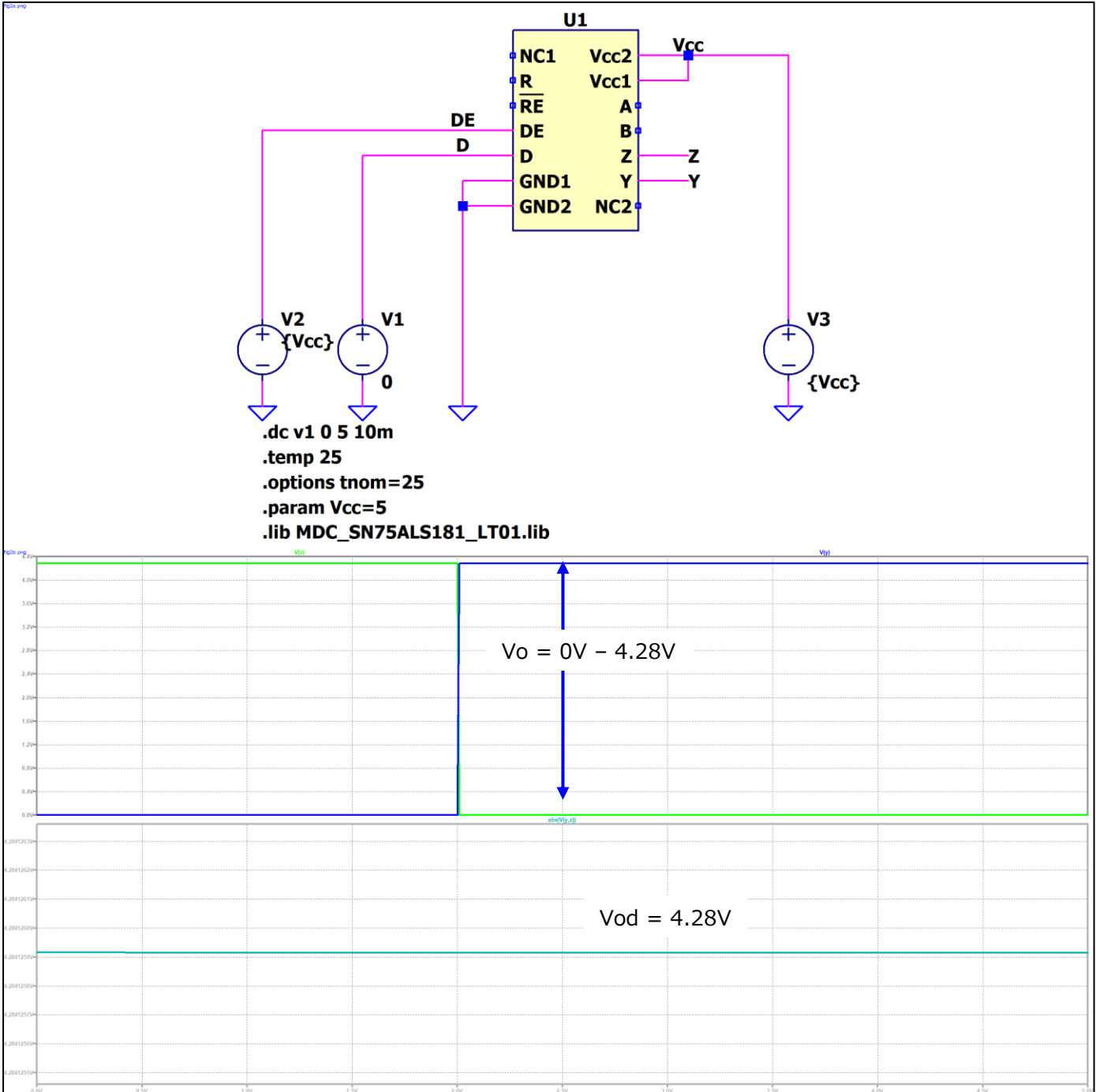
※1 VOD2: RL=100Ω時は非対応

※2 TEST CONDITIONをTTL入力レベルに基づき、VIL=0.4Vとして測定

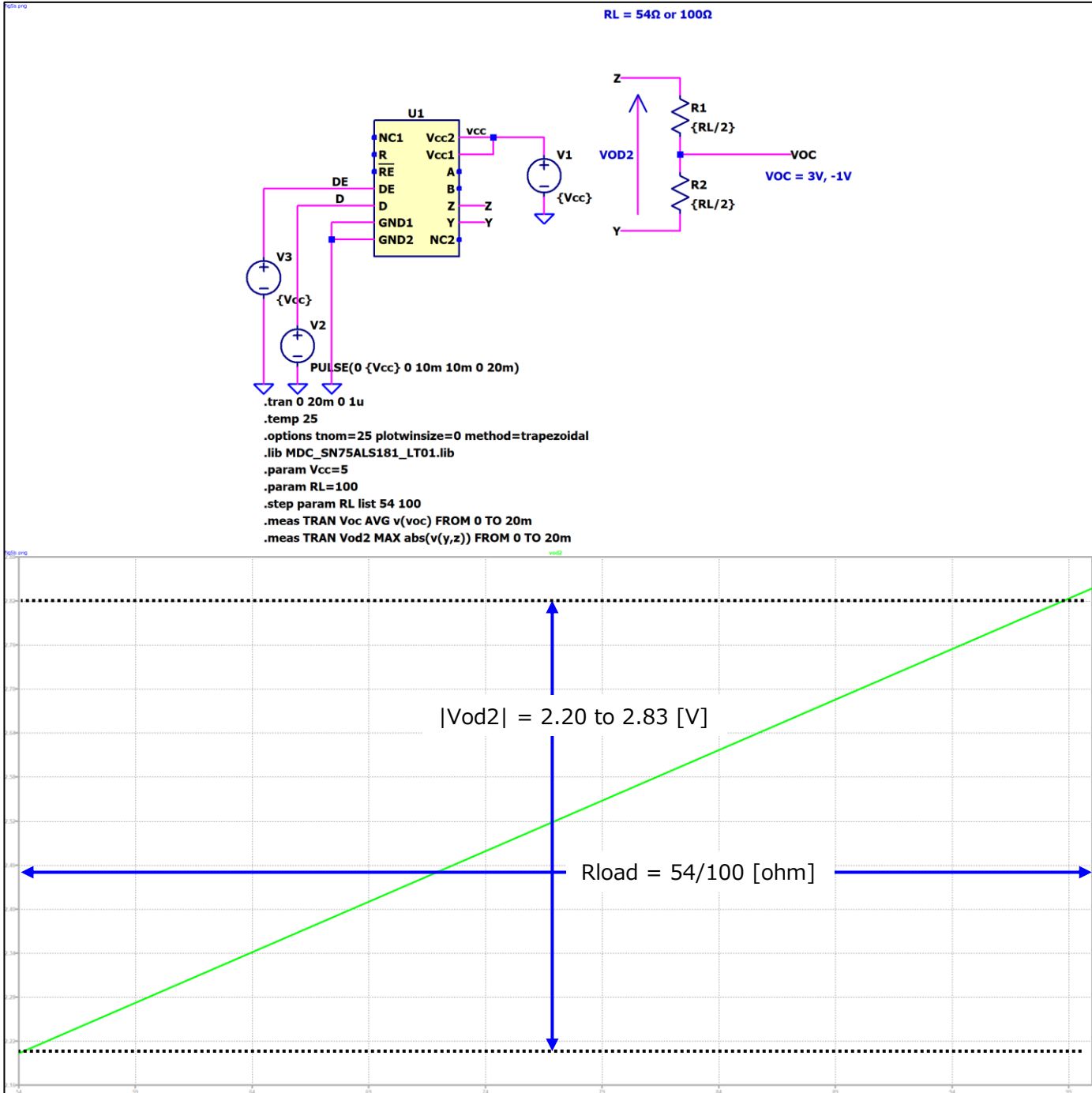
Driver Input clamp voltage ( $V_{cc} = 5V$ )



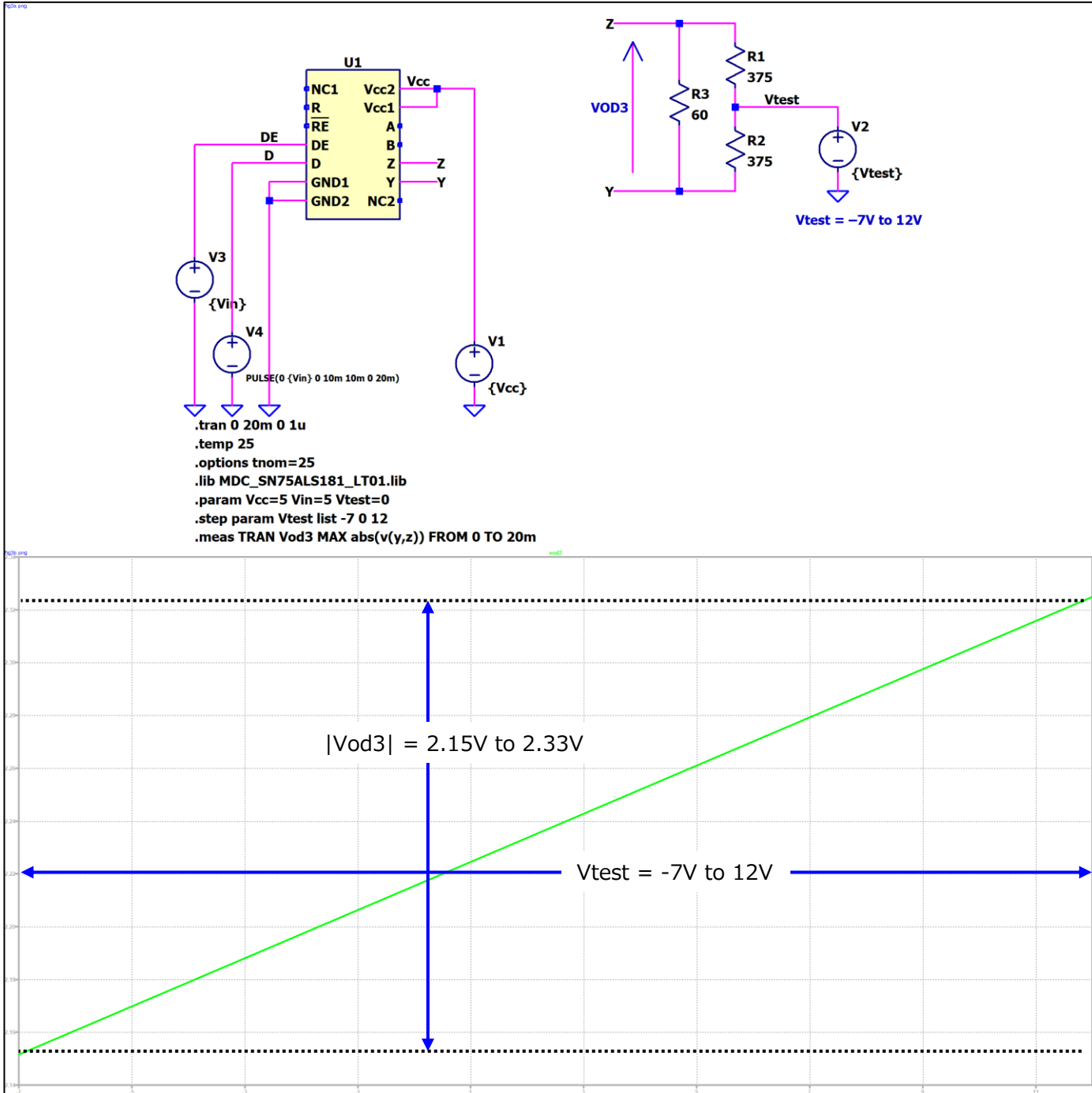
Driver Output voltage and Differential output voltage ( $V_o$ ,  $|V_{od1}|$ ,  $V_{cc} = 5V$ )



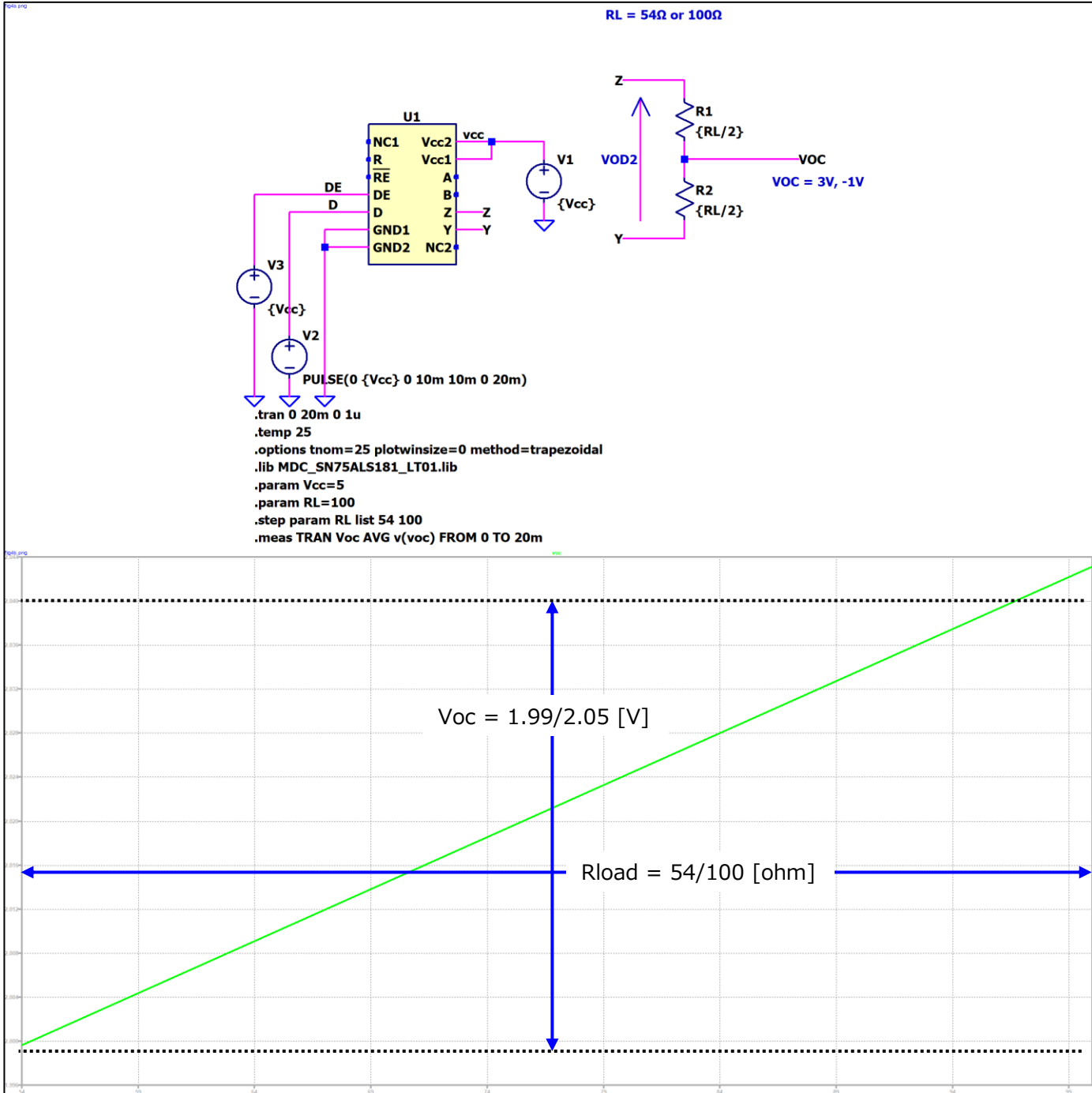
Driver Differential output voltage (Vod2, Vcc=5[V], RL=100/54[ohm])



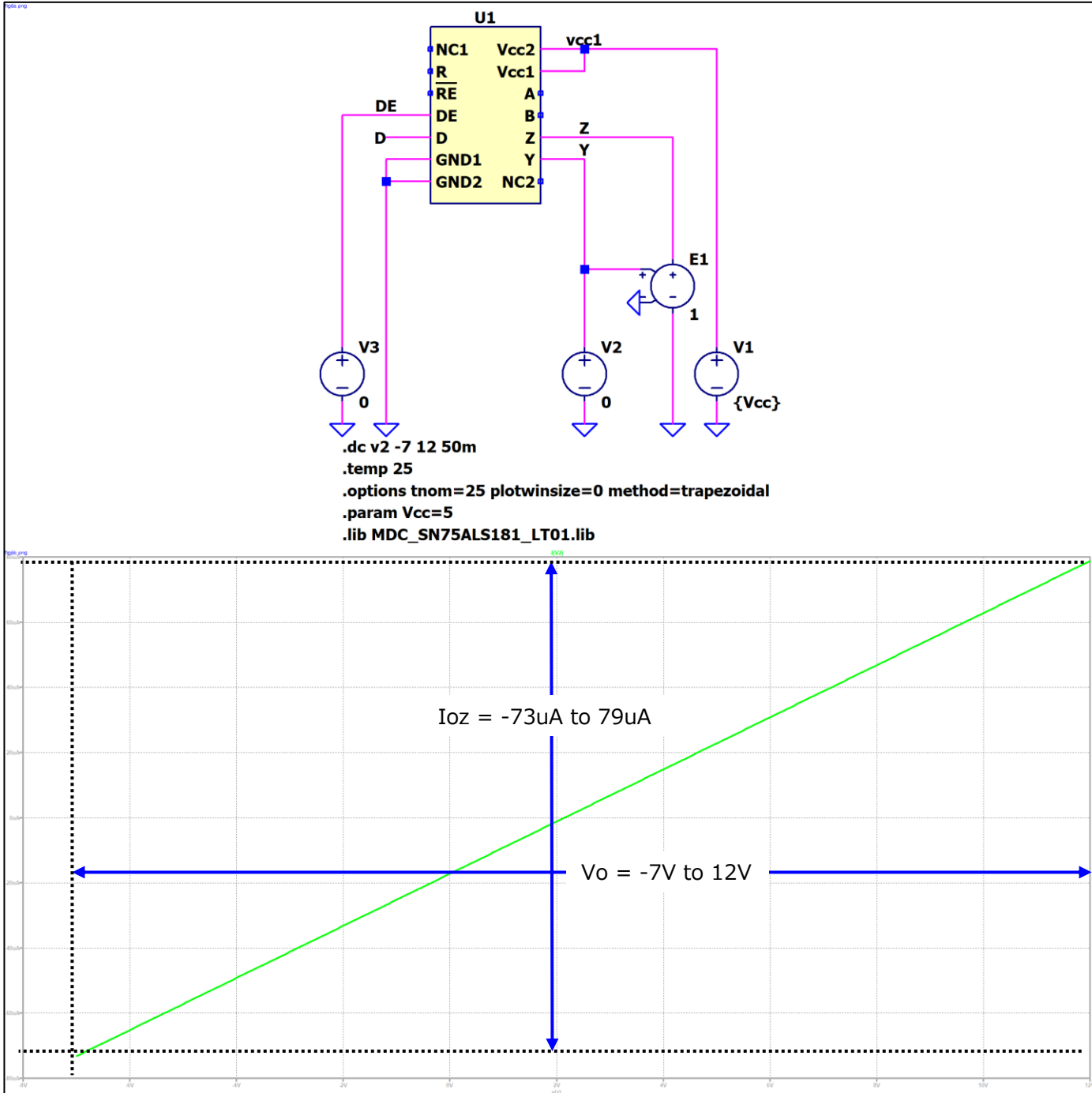
Driver Differential output voltage (VOD3, Vcc=5V)



Driver Common mode output voltage ( $V_{cc}=5V$ ,  $V_{in}=0V$  to  $5V$ )

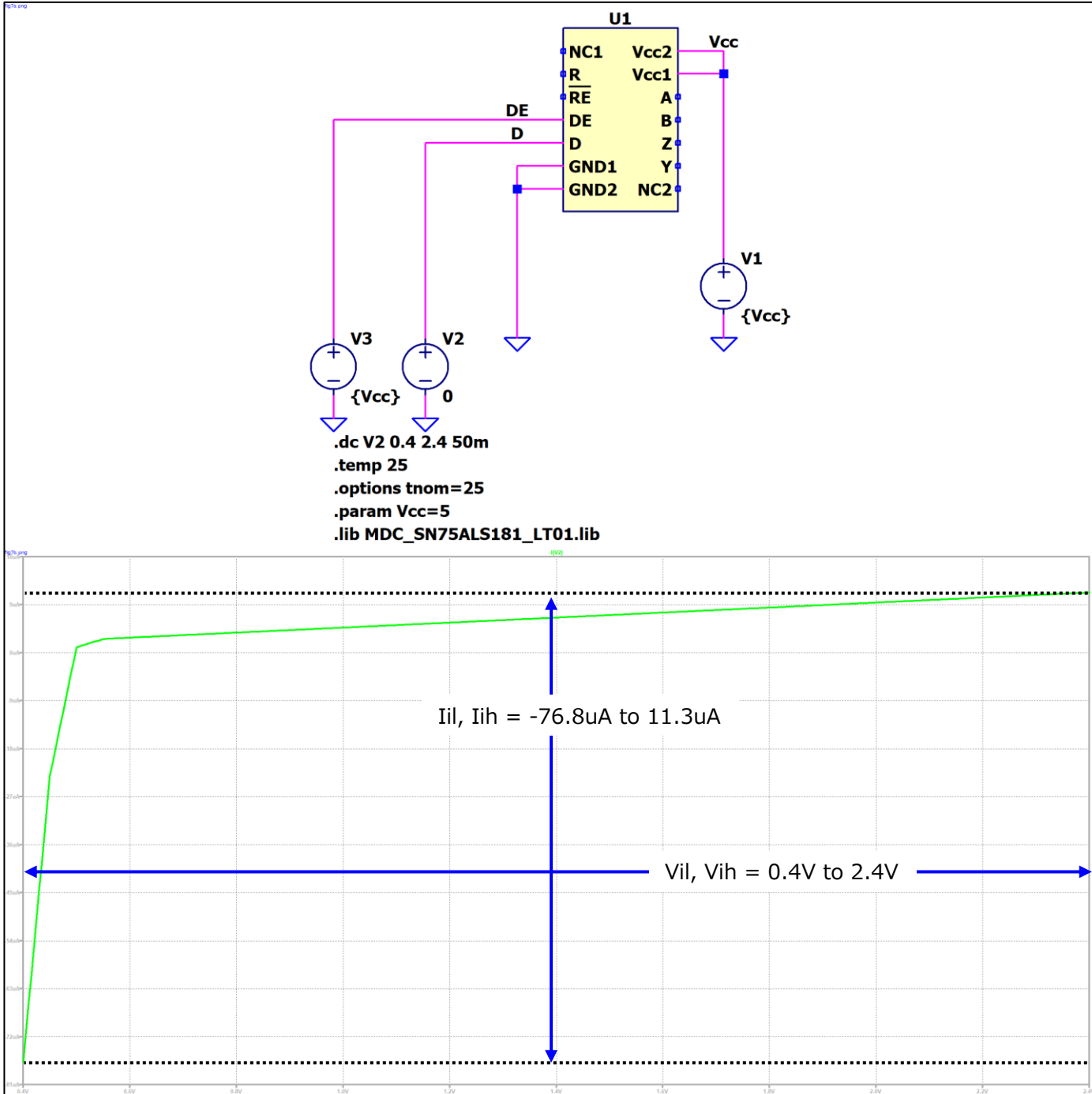


Driver High-impedance-state output current ( $V_{cc} = 5V$ ,  $DE = 5V$ ,  $D=Open$ )

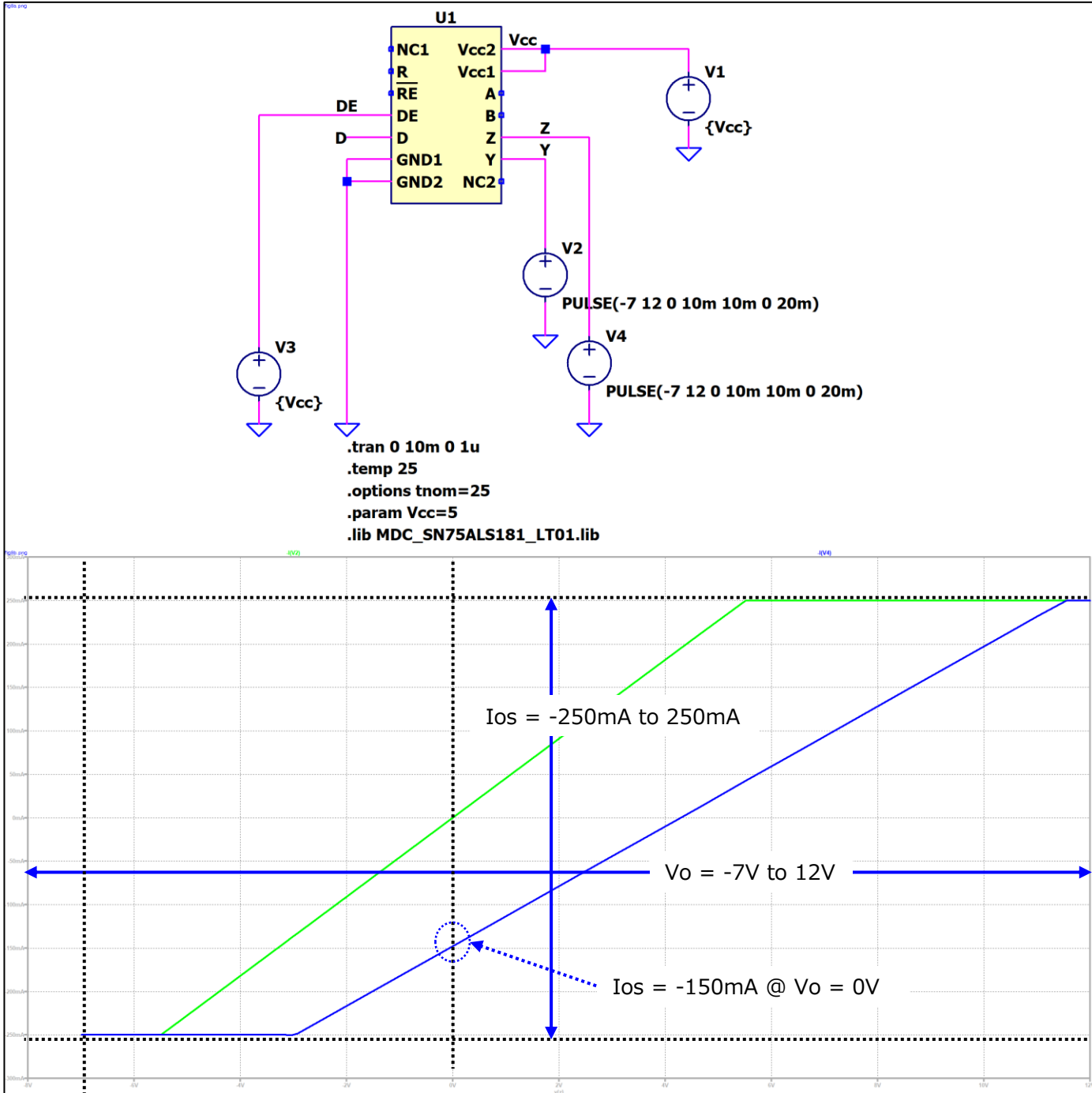




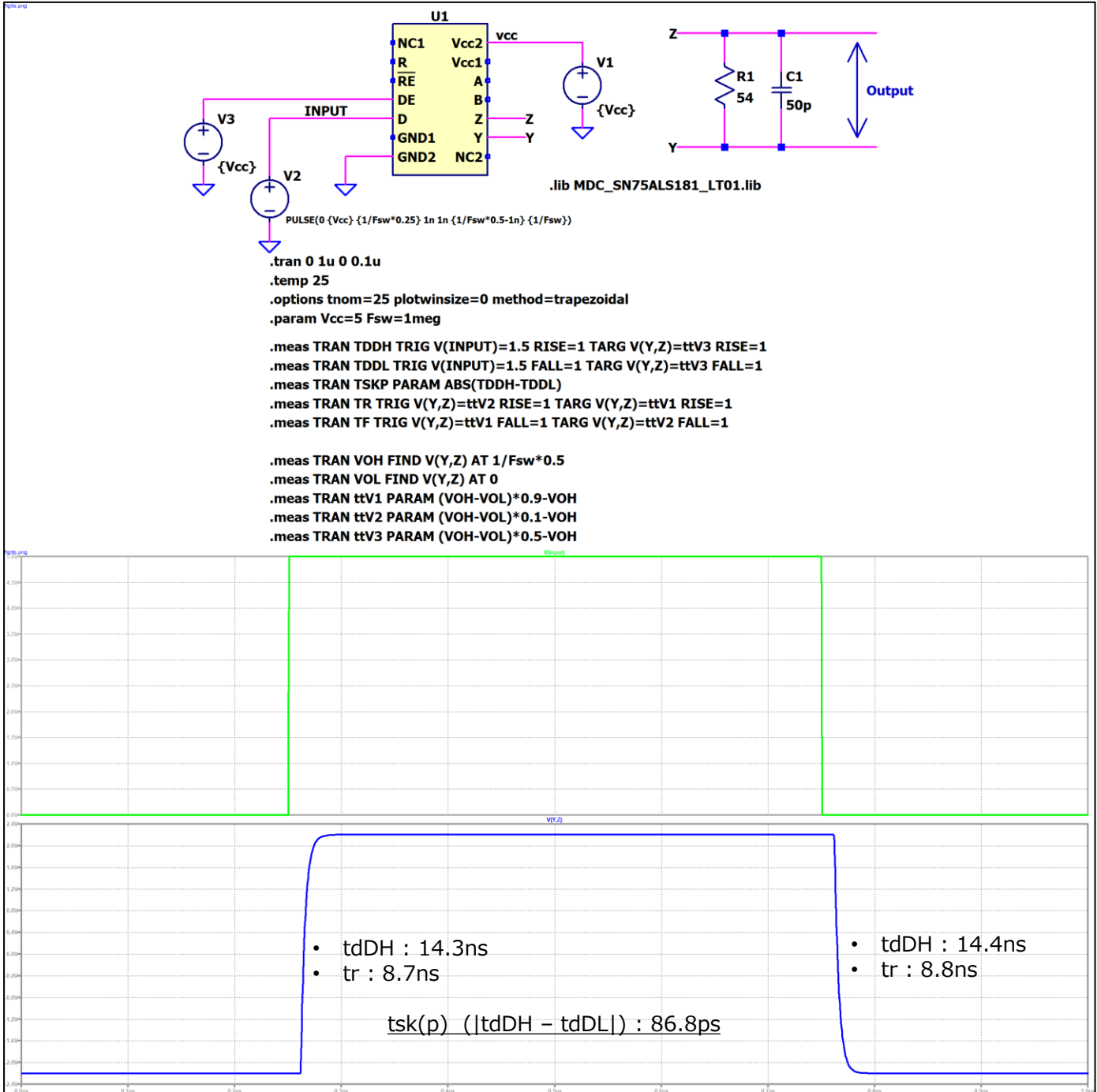
Driver High-level and Low-level input current ( $V_{cc} = 5V$ ,  $DE = 5V$ )



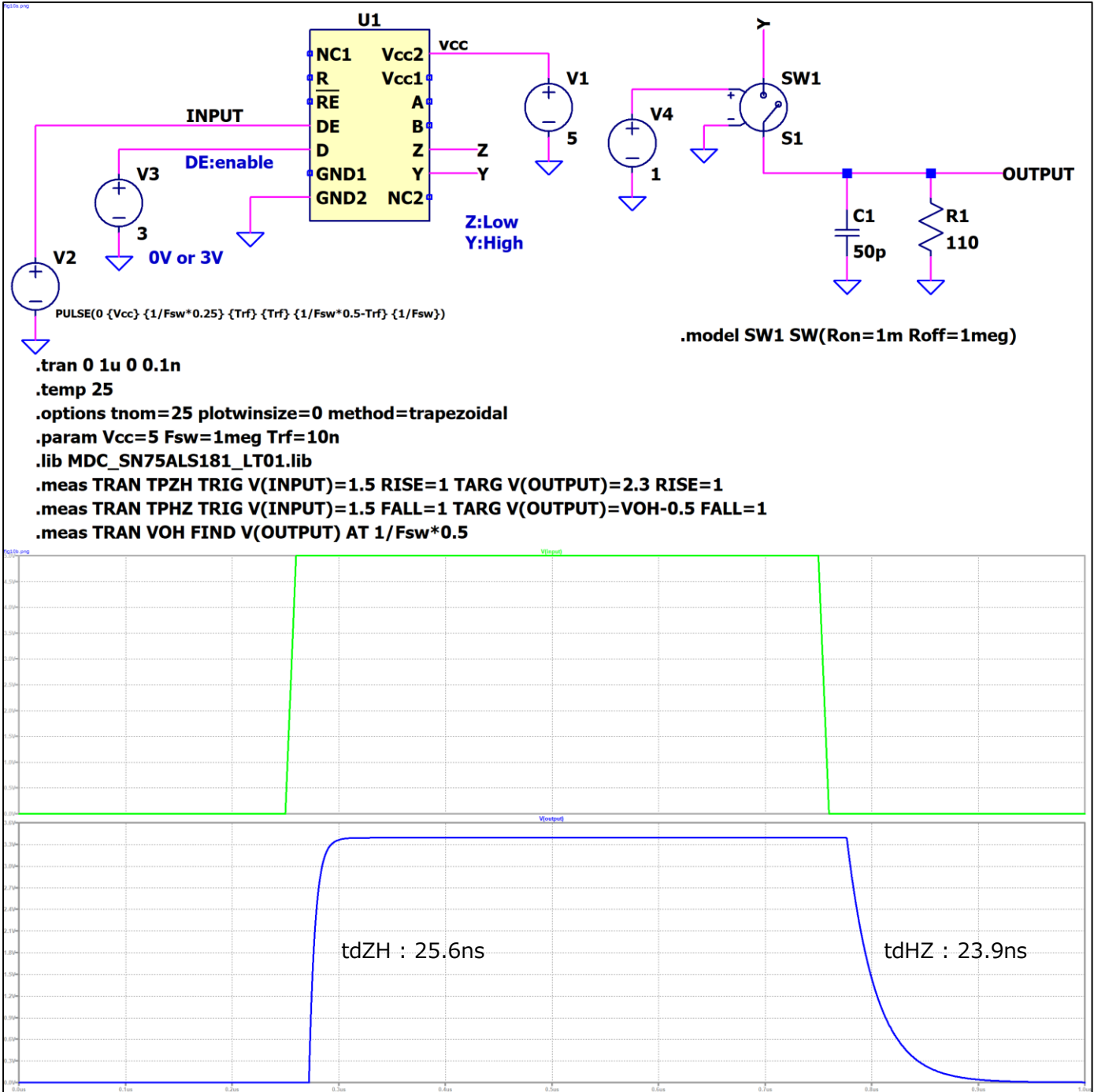
Driver Short circuit output current (Vcc = 5V, DE = 5V, D = Open)



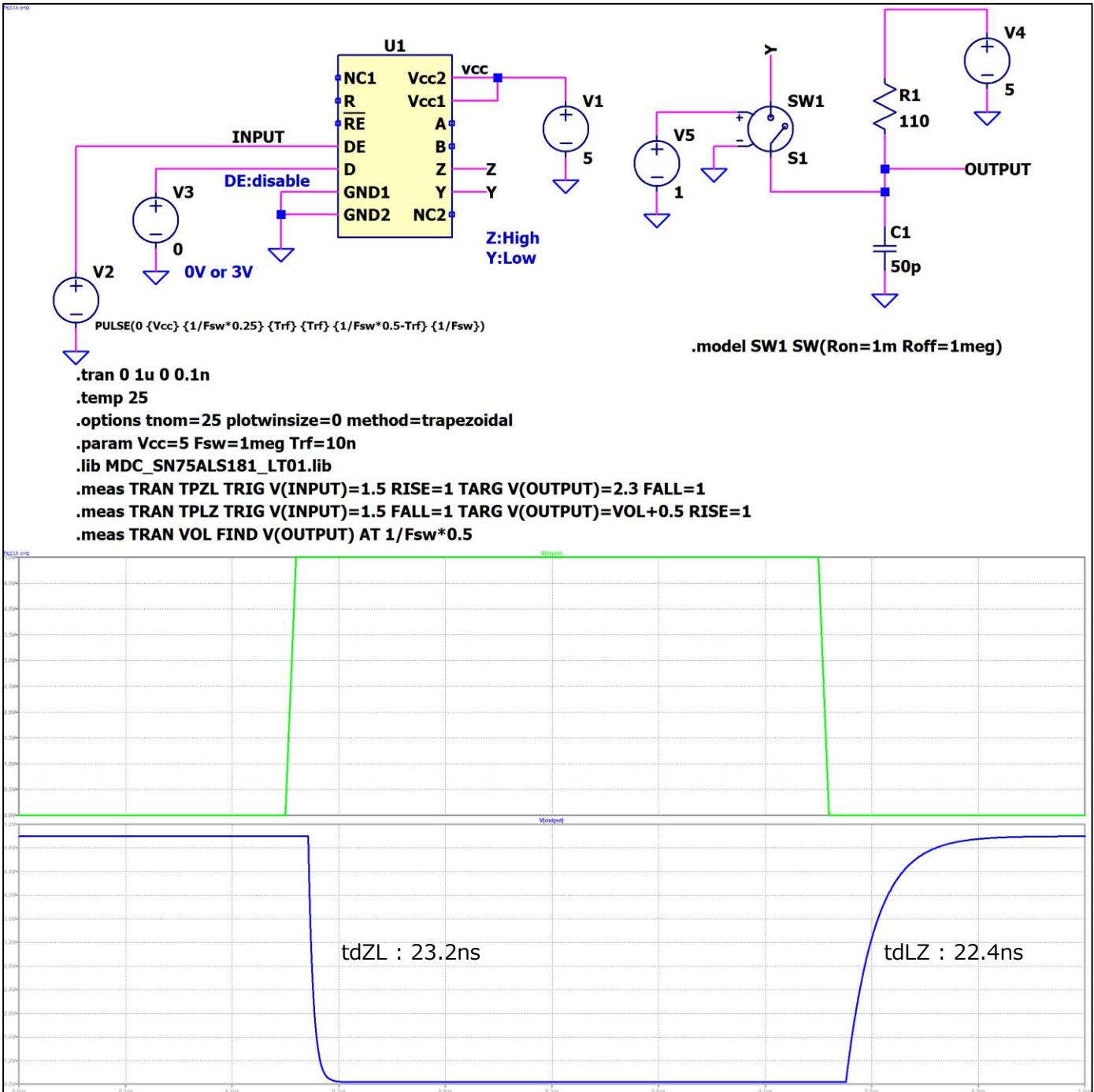
Driver Differential-Output Delay and Transition Times (tdDH, tdDL, tr, tf, tskp, Vcc = 5V)



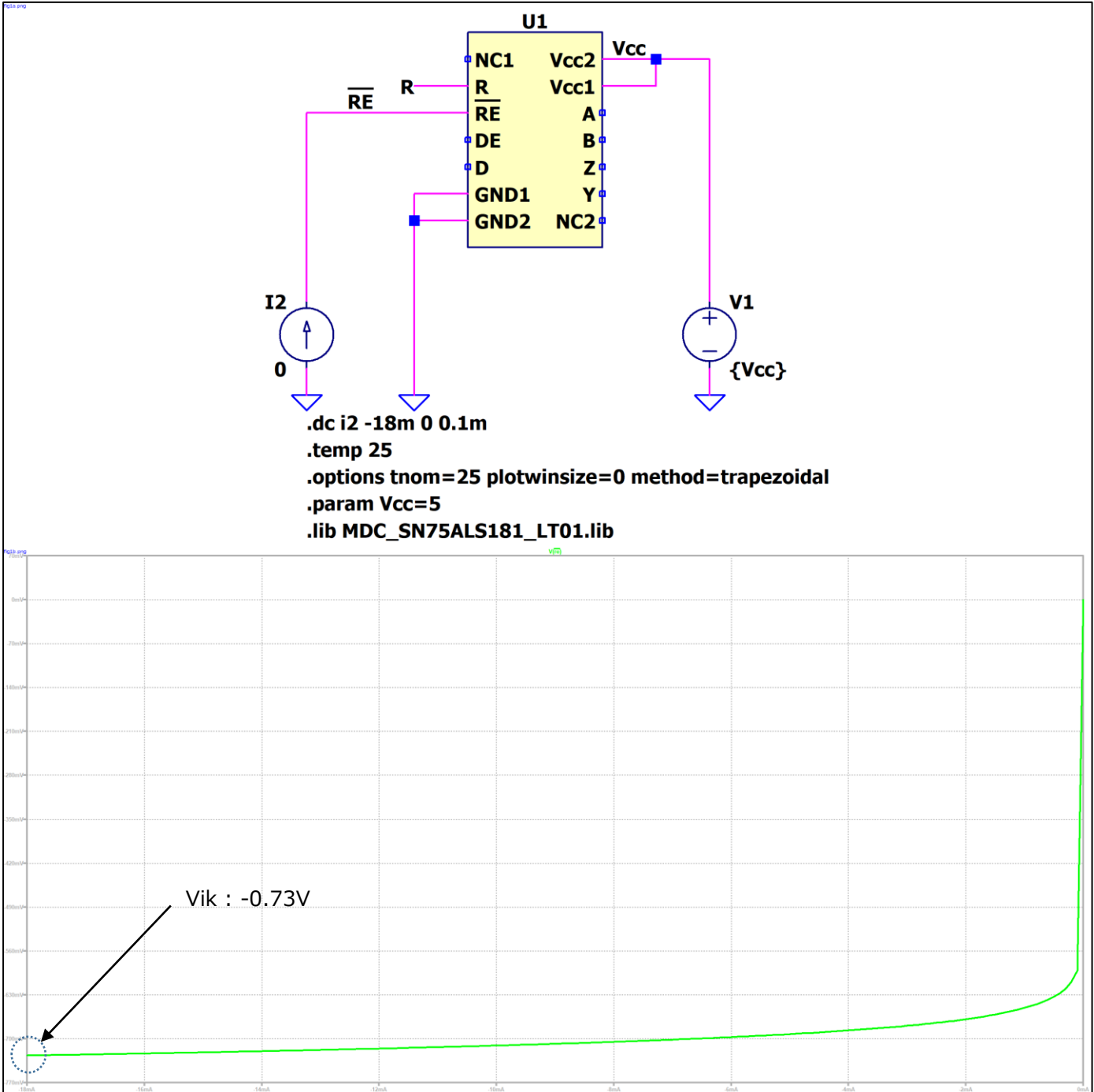
Driver Enable and Disable Times ( $t_{PZH}$ ,  $t_{PHZ}$ ,  $V_{cc} = 5V$ )



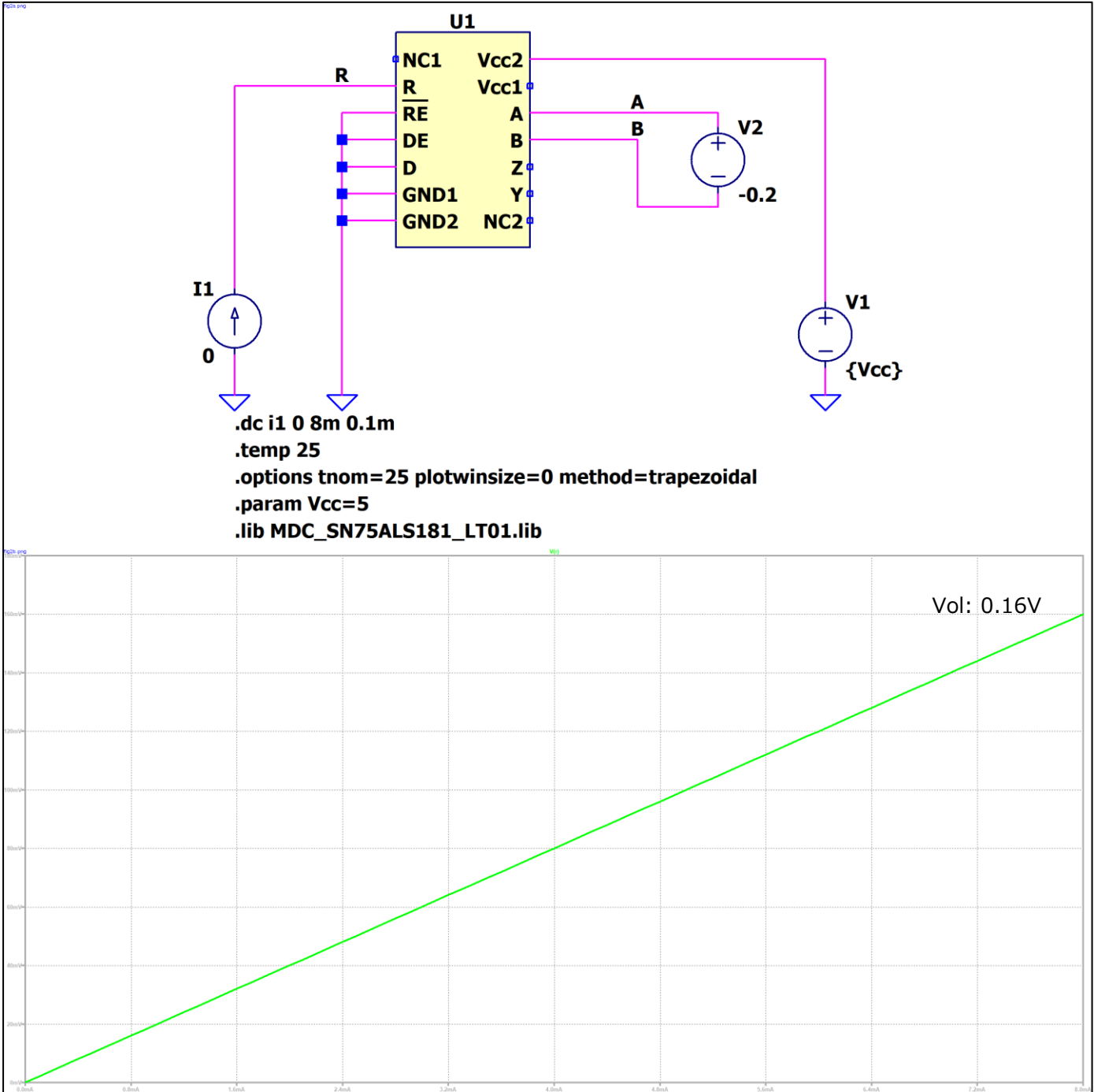
Driver Enable and Disable Times (tPZL, tPLZ, Vcc = 5V)



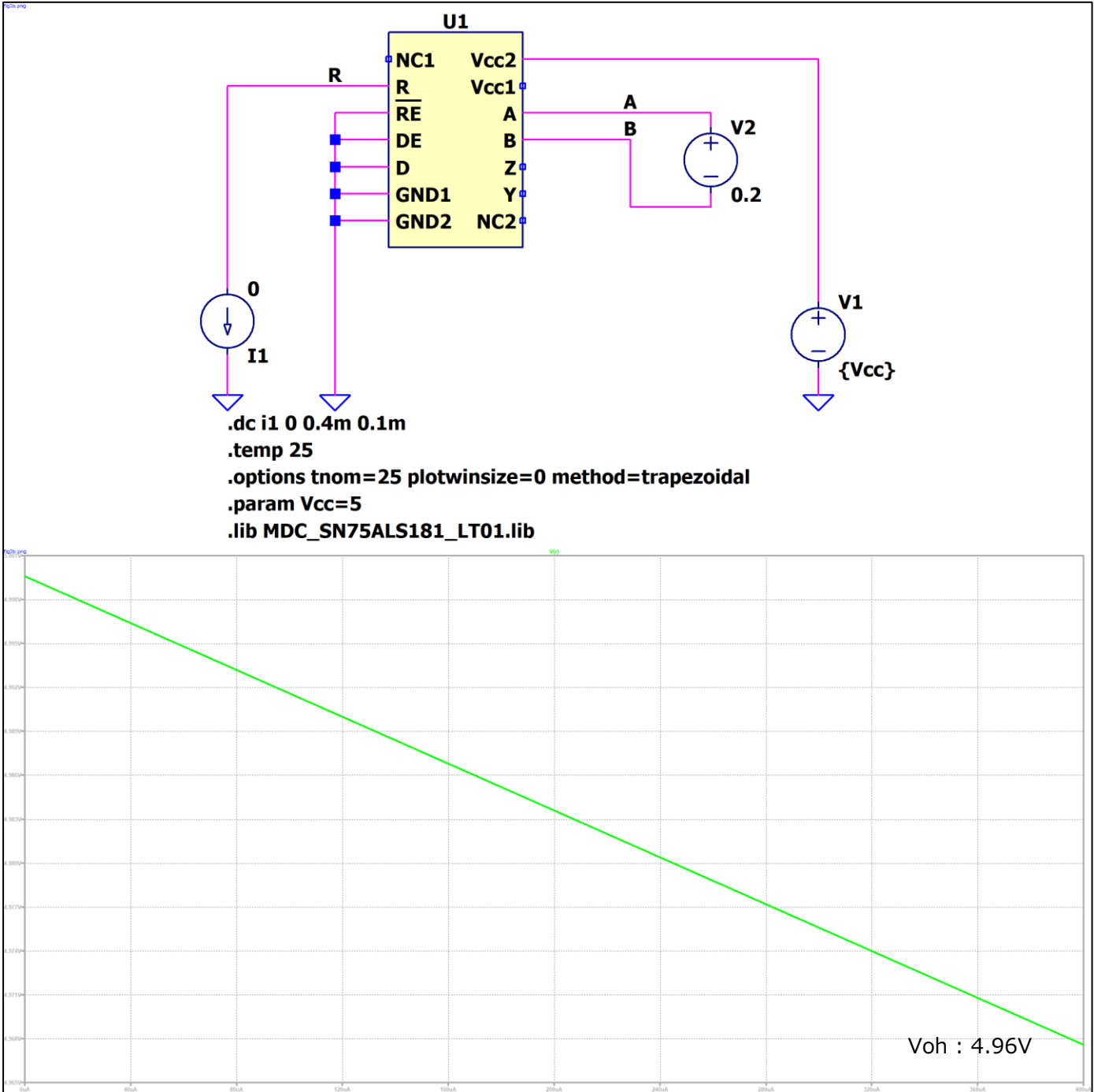
Receiver Input clamp voltage, RE (Vcc = 5V)



Receiver High-level and Low-level output voltage ( $V_{cc} = 5V$ ,  $V_{id} = -0.2V$ )

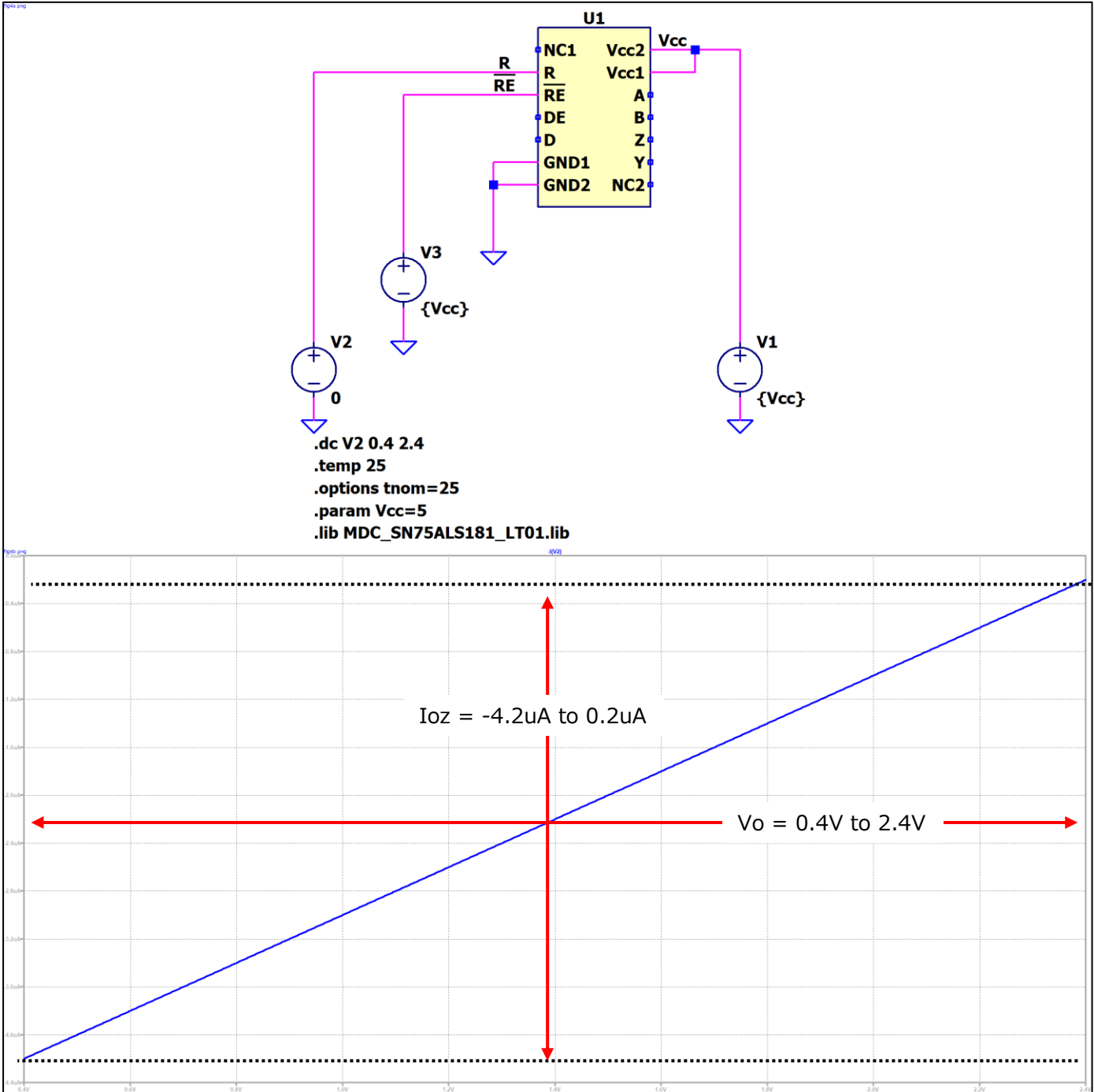


Receiver High-level and Low-level output voltage ( $V_{cc} = 5V$ ,  $V_{id} = 0.2V$ )

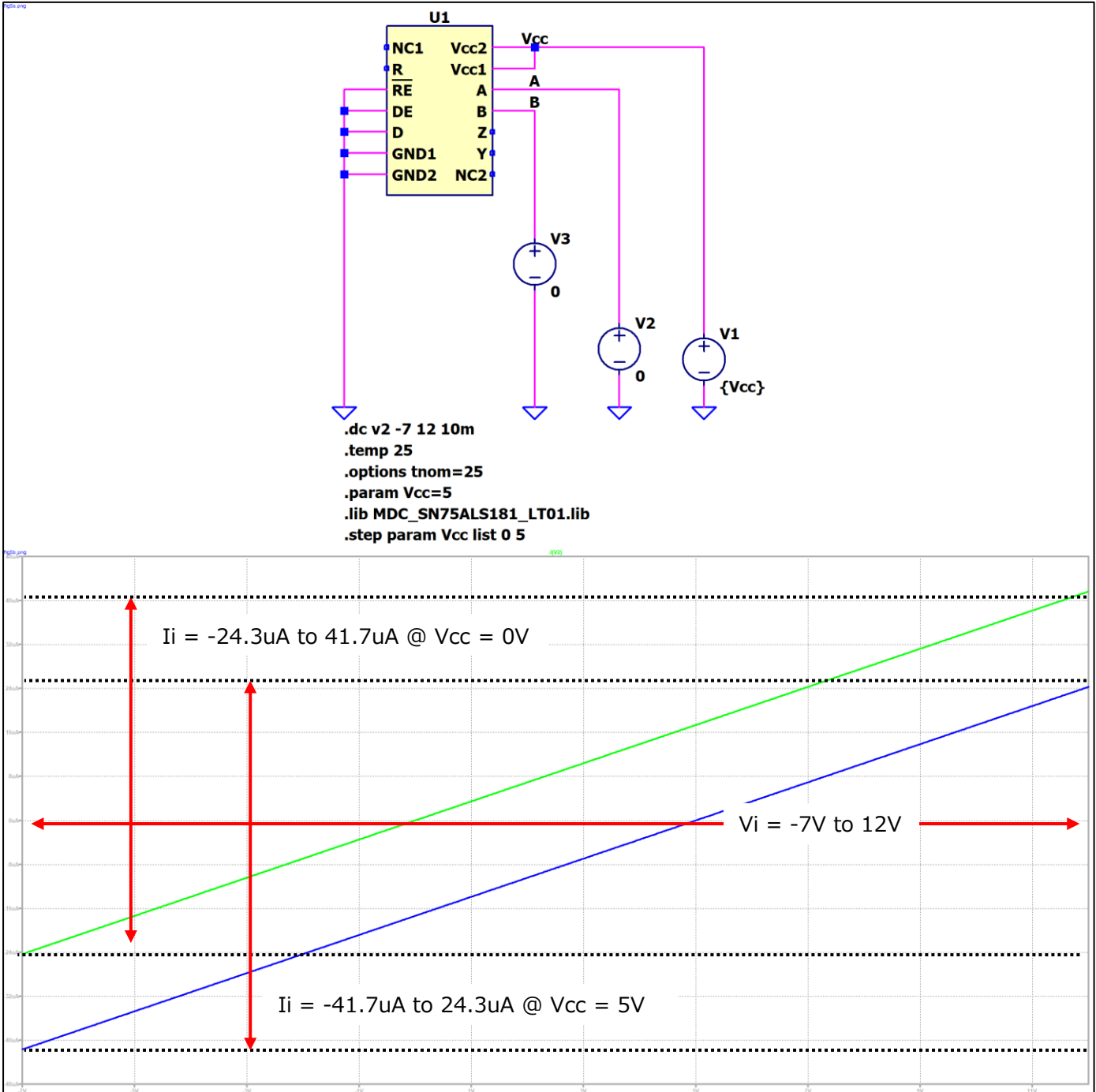




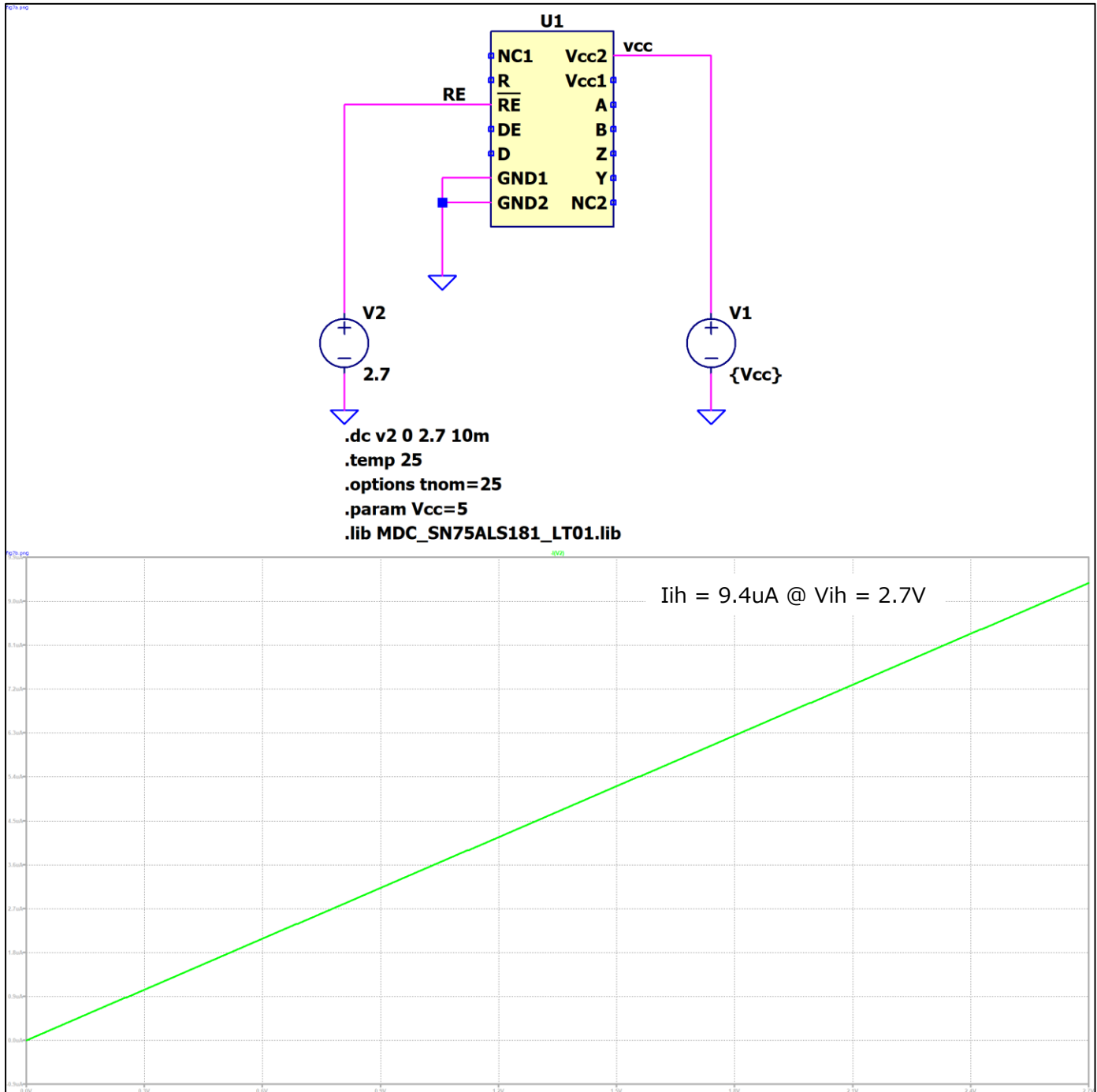
Receiver High-impedance-state output current ( $V_{cc} = 5V$ )



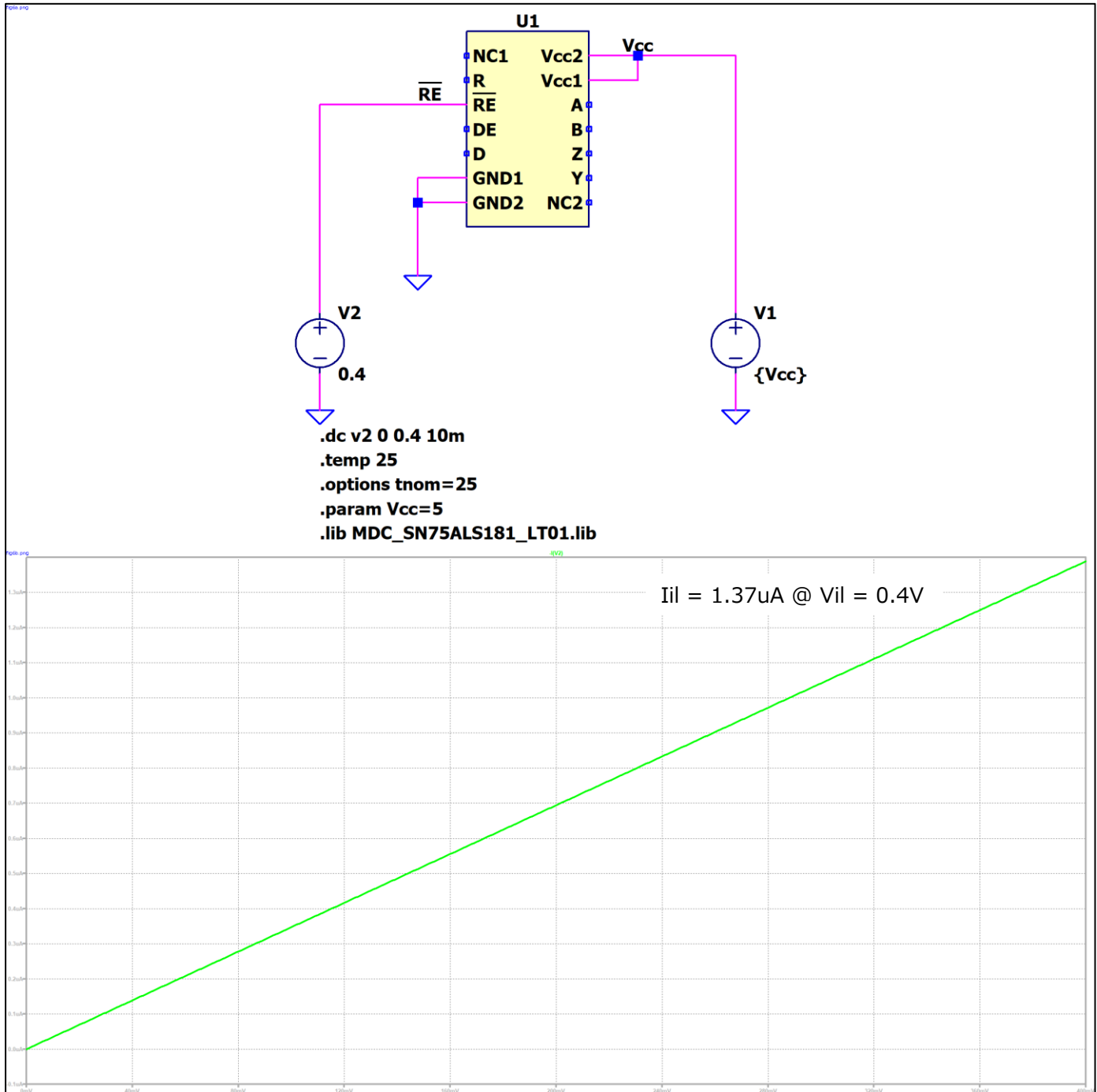
Receiver Line input current ( $V_{cc} = 5V/0V$ ,  $A = -7V$  to  $12V$ ,  $B = 0V$ )



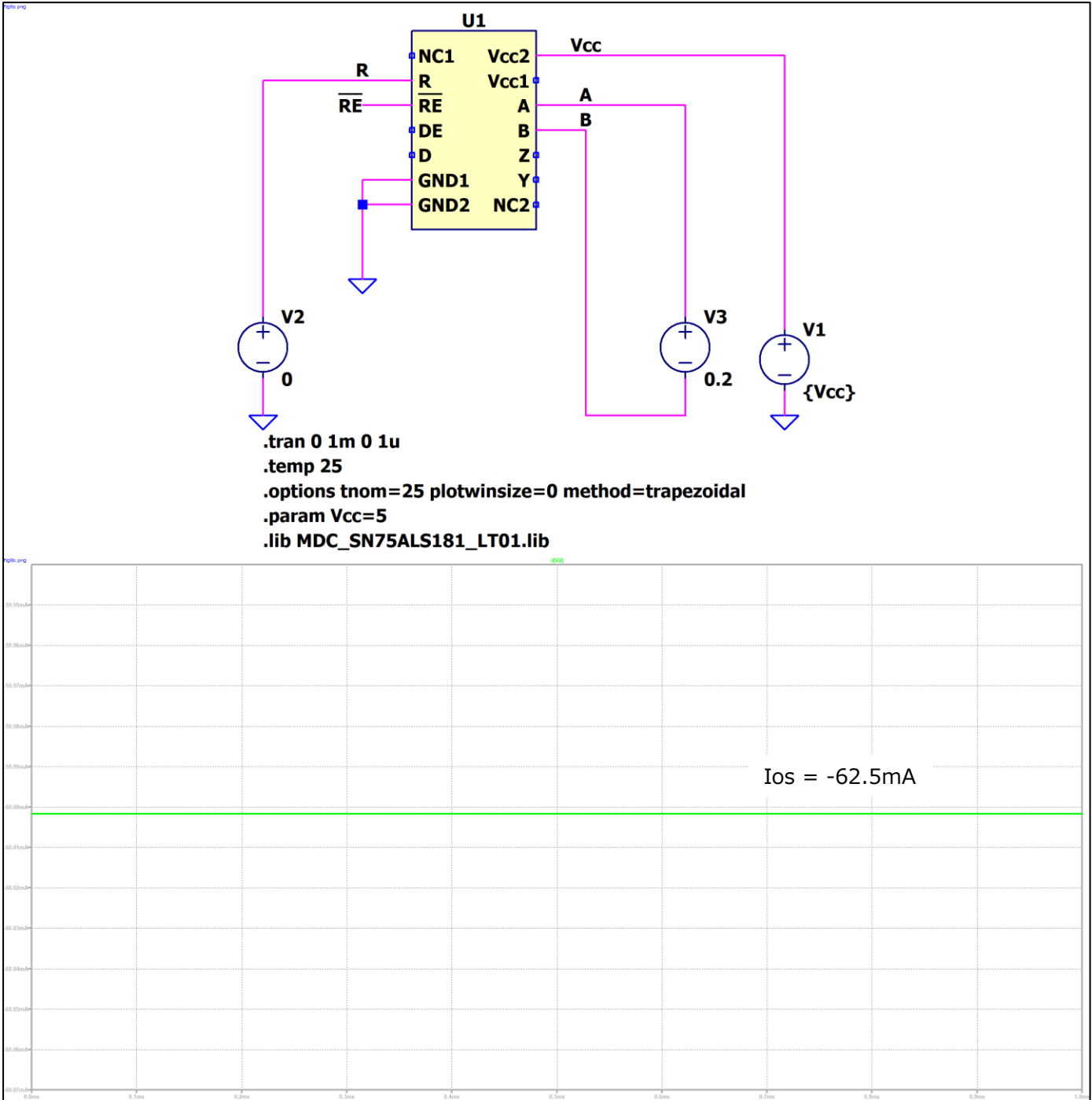
Receiver High-level input current, RE ( $V_{cc} = 5V$ ,  $V_{ih} = 2.7V$ )



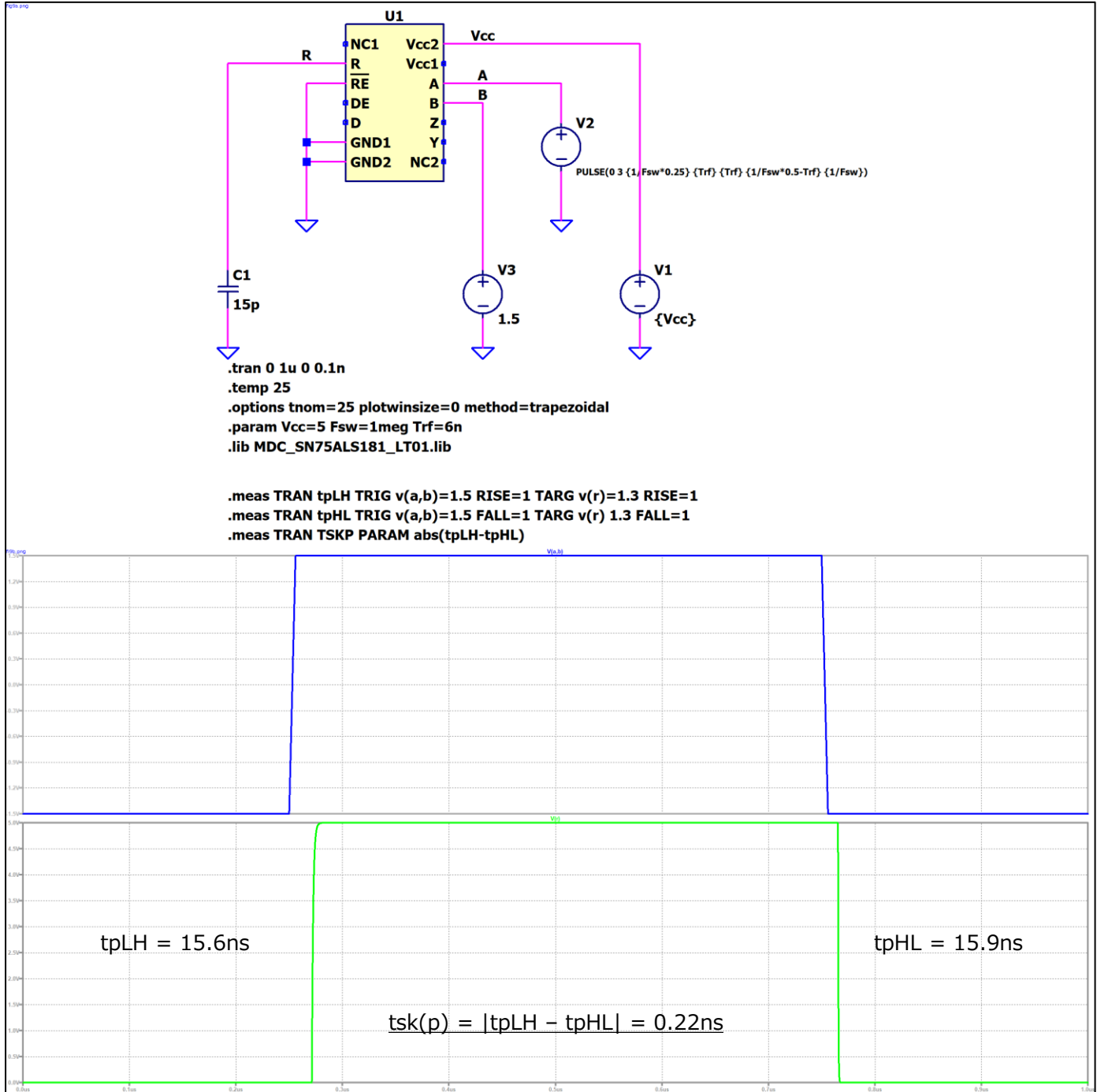
Receiver Low-level input current, RE ( $V_{cc} = 5V$ ,  $V_{il} = 0.4V$ )



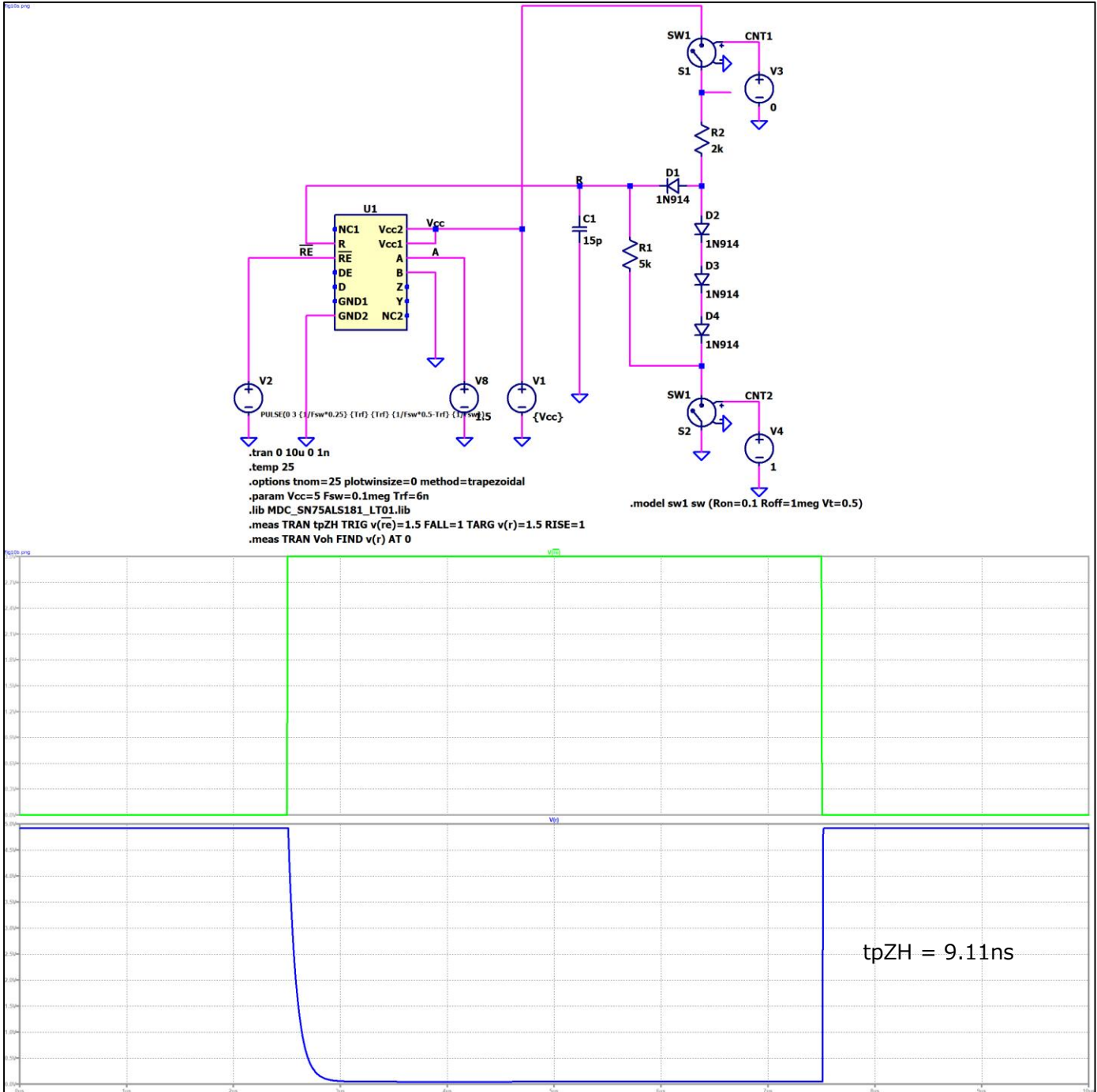
Receiver Short circuit output current ( $V_{cc} = 5V, V_o = 0V$ )



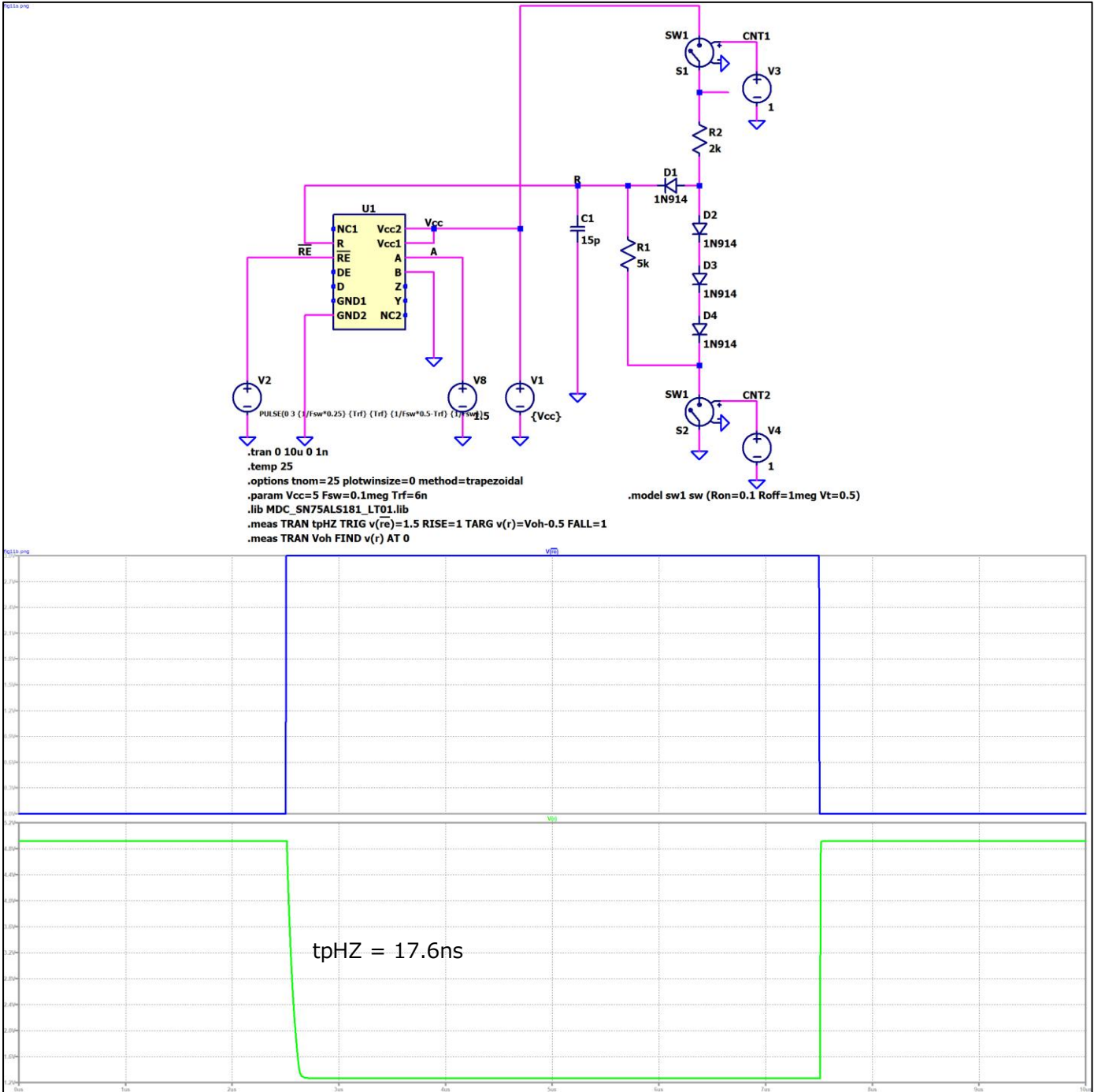
Receiver Propagation-Delay Times (tPLH, tPHL, tskp)



Receiver Output Enable and Disable Times (tPZH, Vcc = 5V, Vi = 1.5V)

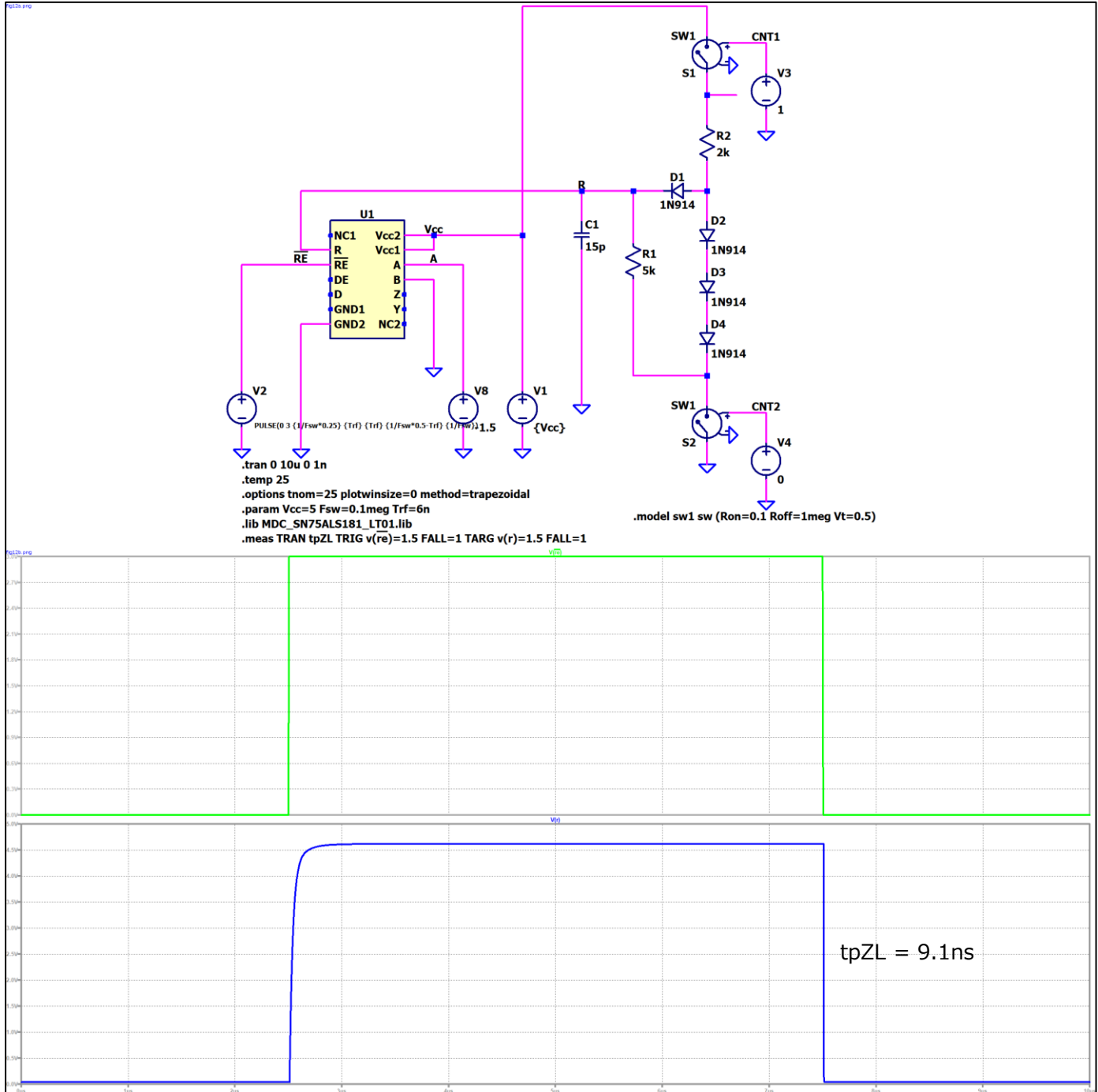


Receiver Output Enable and Disable Times (tPHZ, Vcc = 5V, Vi = 1.5V)

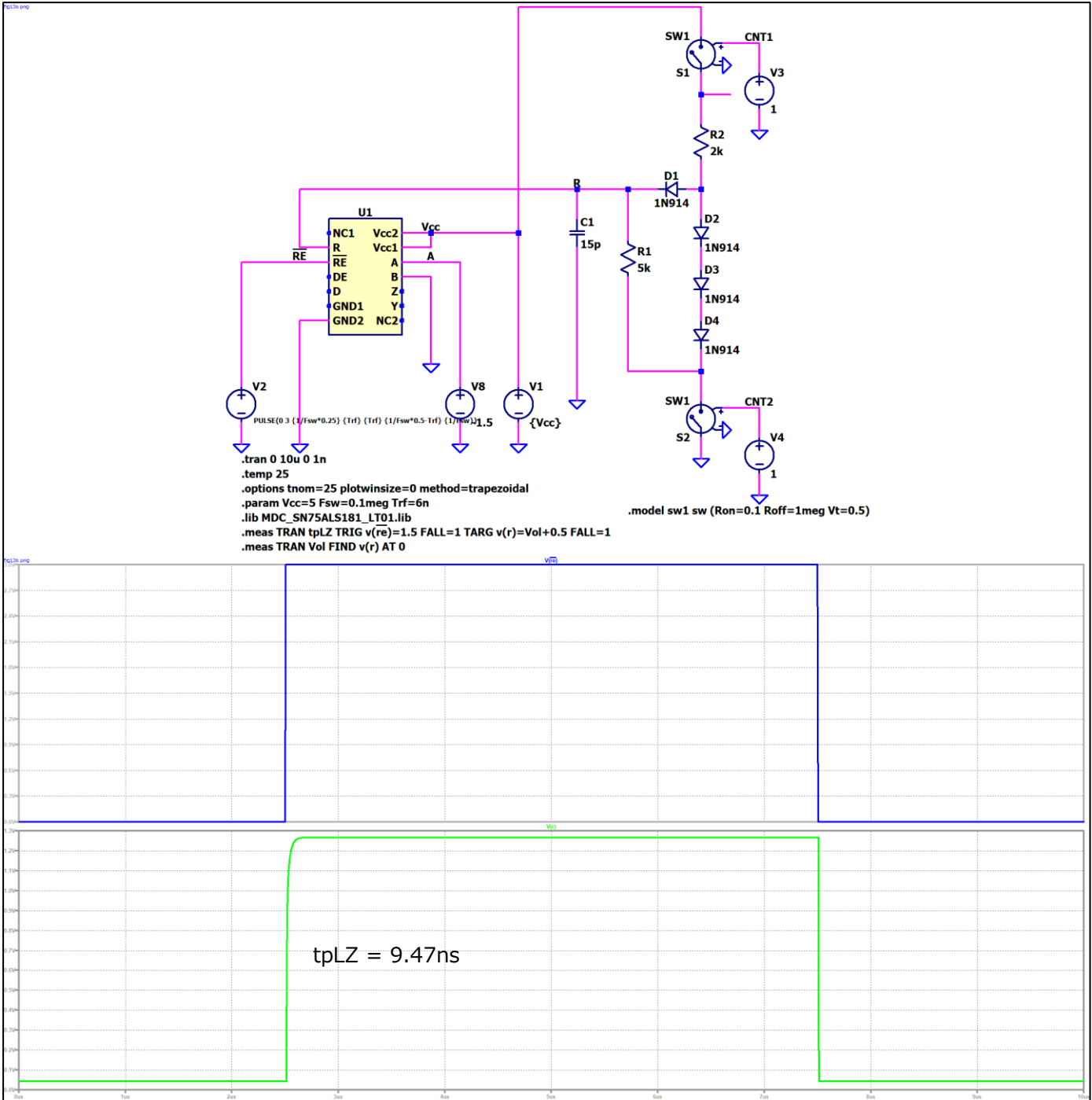




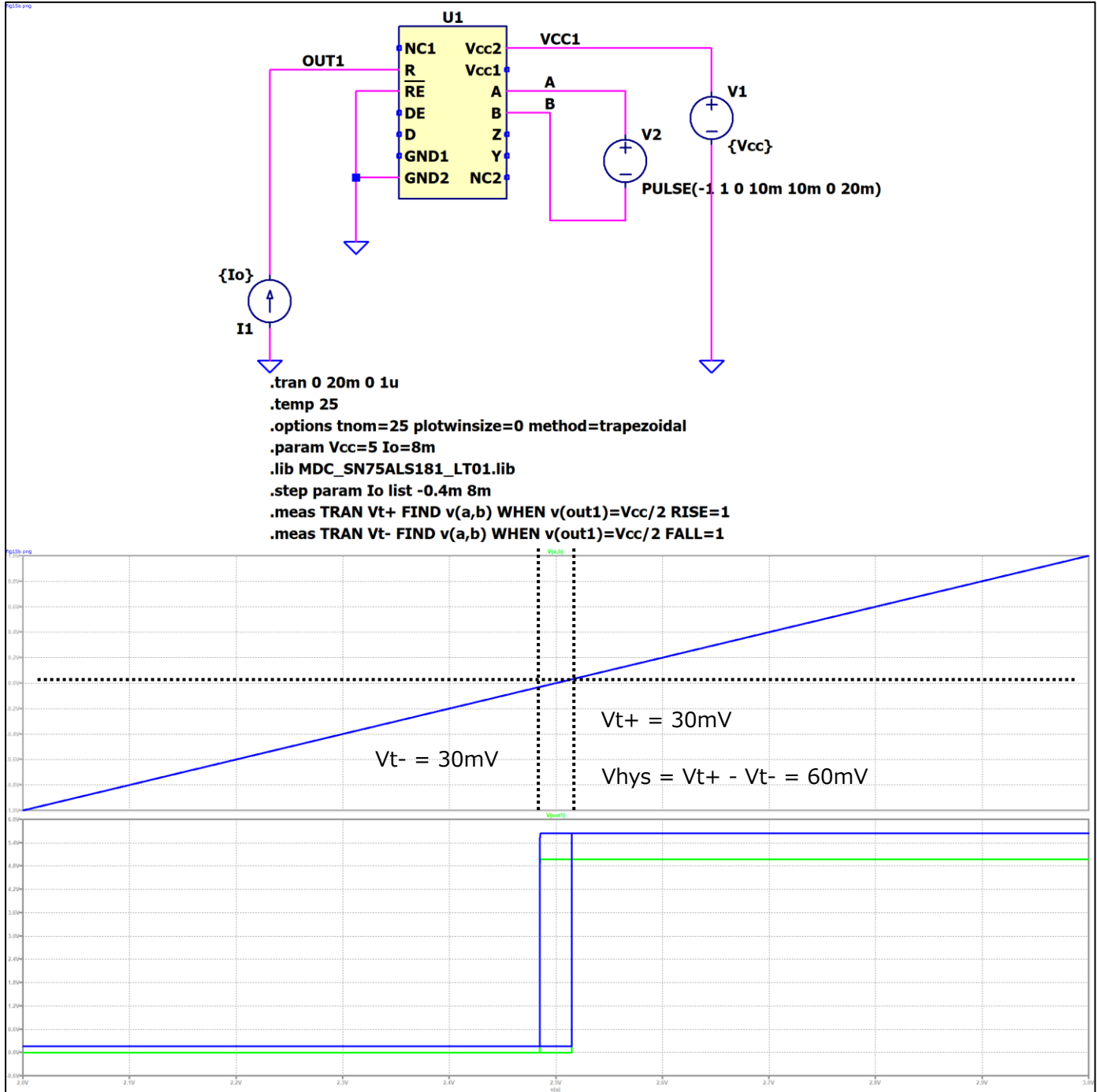
Receiver Output Enable and Disable Times (tpZL, Vcc = 5V, Vi = -1.5V)



Receiver Output Enable and Disable Times (tPLZ, Vcc = 5V, Vi = -1.5V)



Positive-going and Negative-going threshold voltage, differential input ( $V_{cc} = 5V$ ,  $I_o = -0.4/8mA$ )



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