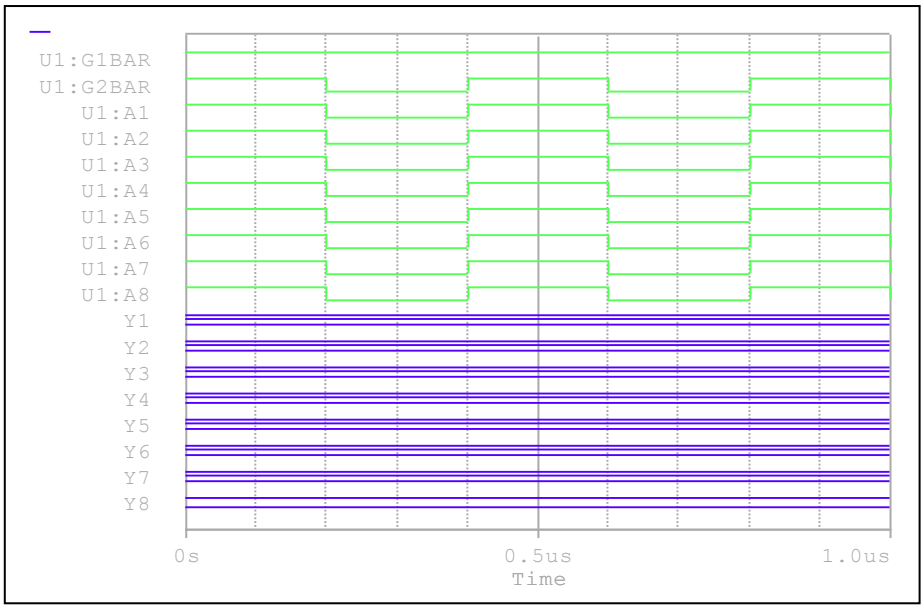
Device Modeling Report

COMPONENTS : CMOS DIGITAL INTEGRATED CIRCUIT
PART NUMBER : TC74VHC540F
MANUFACTURER : TOSHIBA

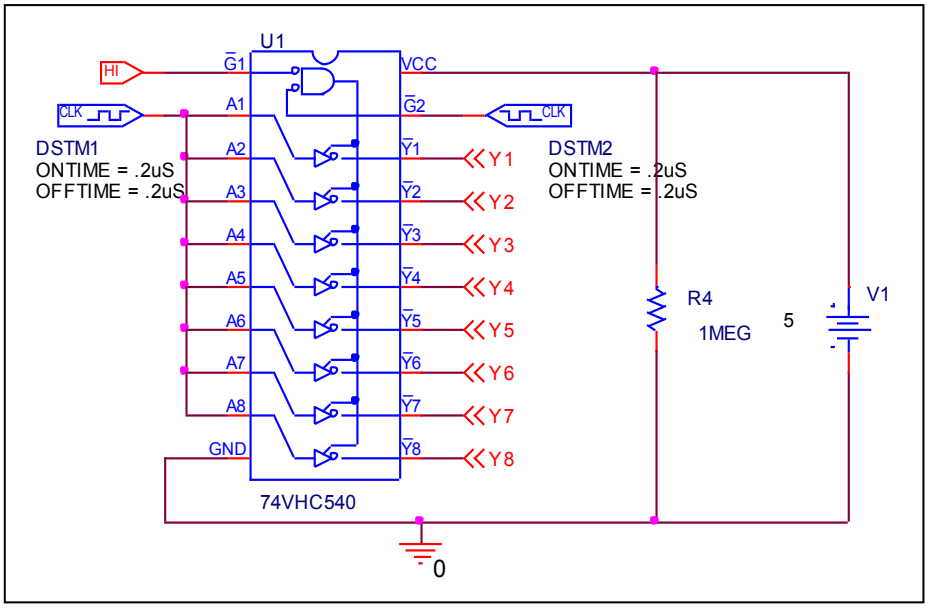
Bee Technologies Inc.

Truth Table

Circuit simulation result



Evaluation circuit

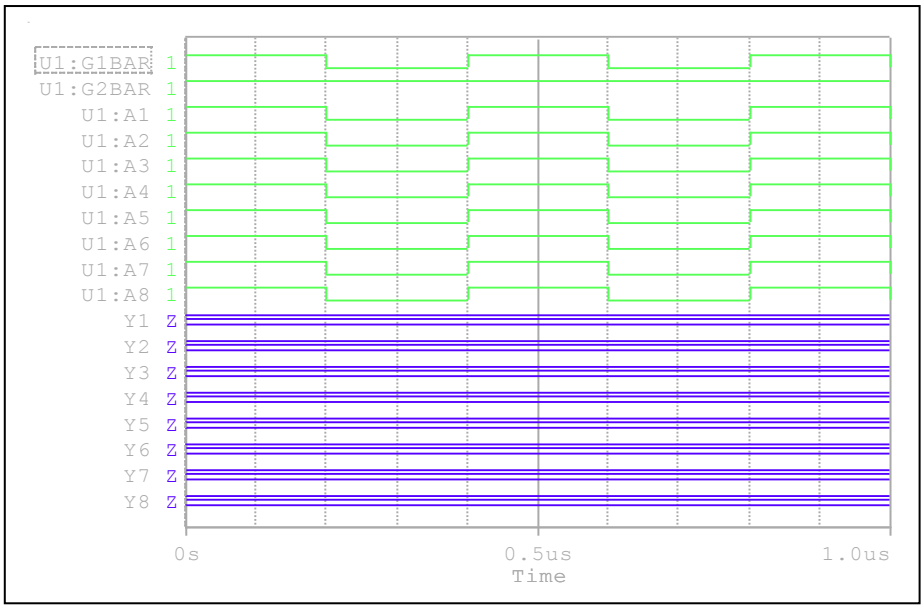


Comparison table

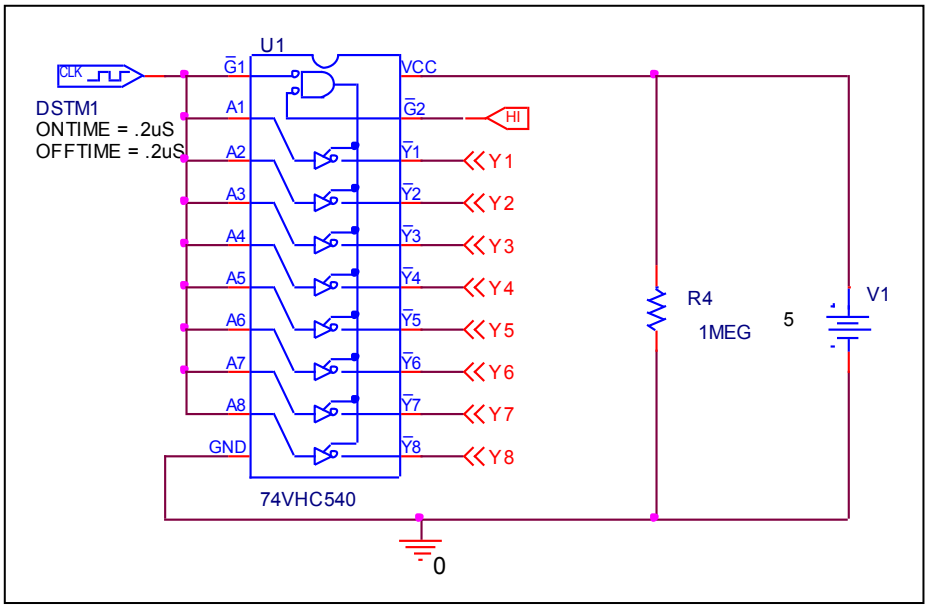
Input			Output		%Error
$\overline{G1}$	$\overline{G2}$	An	$\overline{Yn}$ (Measurement)	$\overline{Yn}$ (Simulation)	
H	X	X	Z	Z	0

Truth Table

Circuit simulation result



Evaluation circuit

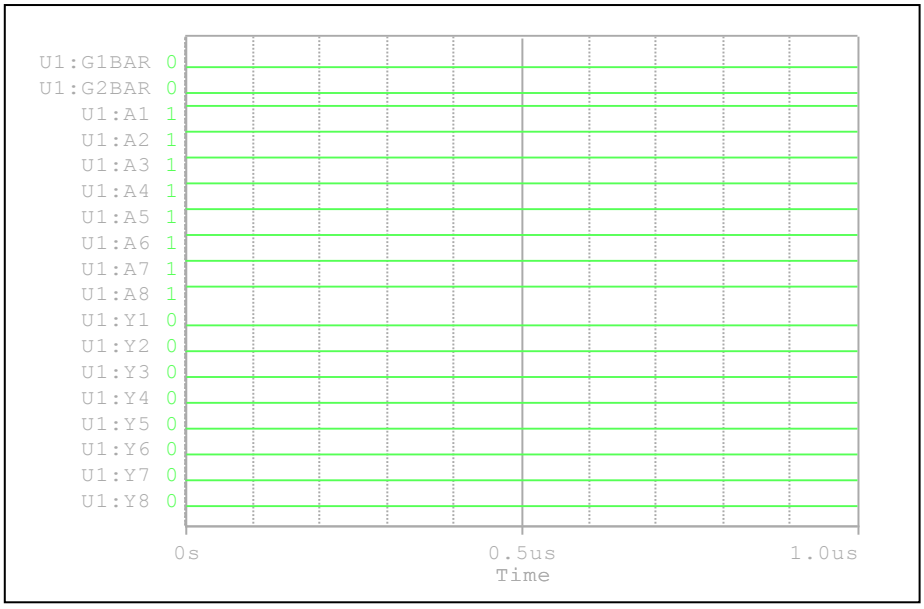


Comparison table

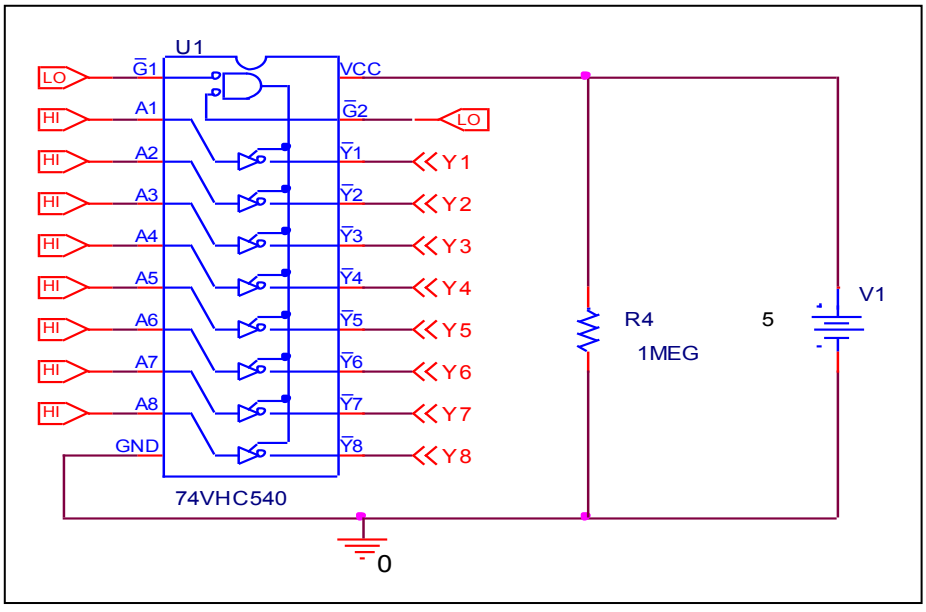
Input			Output		%Error
$\overline{G1}$	$\overline{G2}$	An	$\overline{Yn}$ (Measurement)	$\overline{Yn}$ (Simulation)	
X	H	X	Z	Z	0

Truth Table

Circuit simulation result



Evaluation circuit

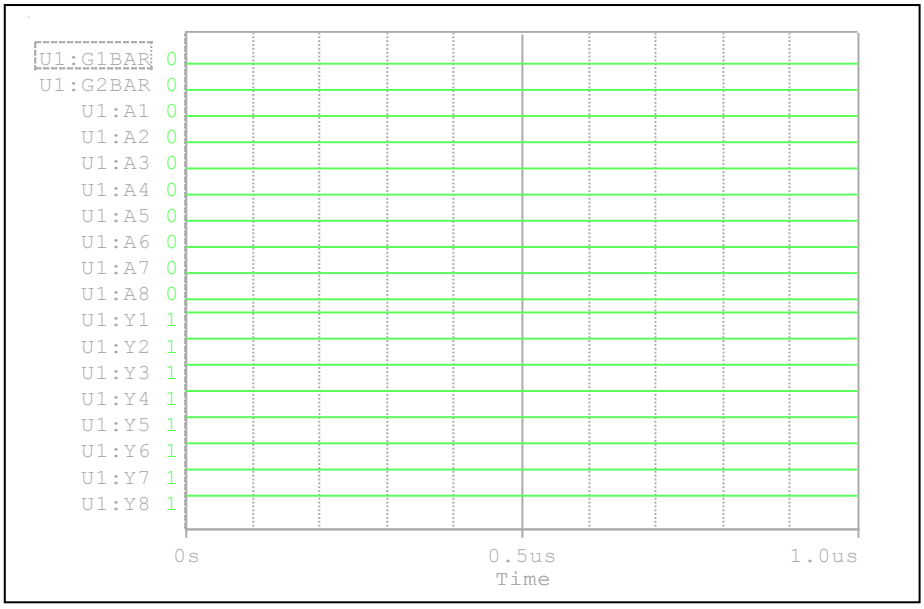


Comparison table

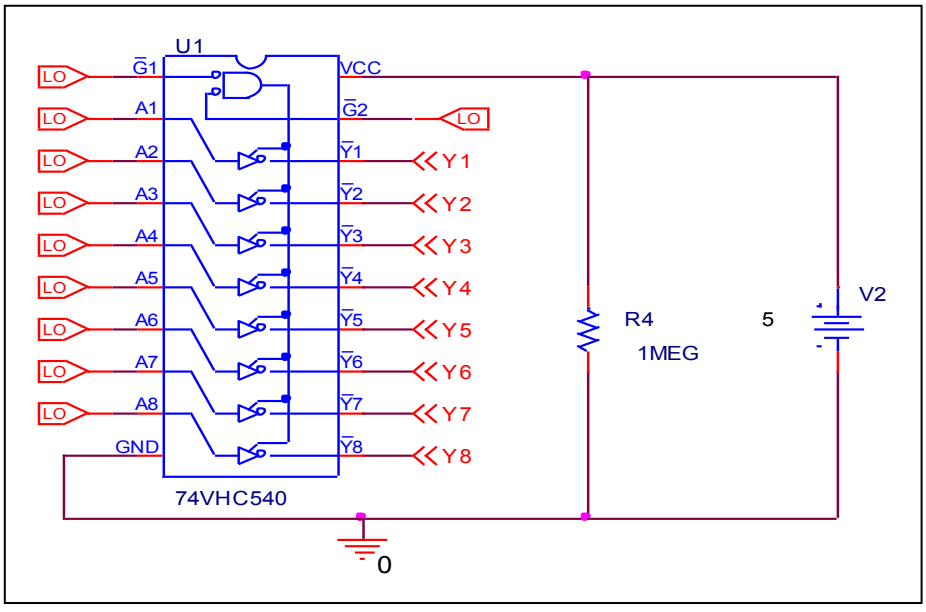
Input			Output		%Error
$\overline{G1}$	$\overline{G2}$	An	$\overline{Yn}$ (Measurement)	$\overline{Yn}$ (Simulation)	
L	L	H	L	L	0

Truth Table

Circuit simulation result



Evaluation circuit

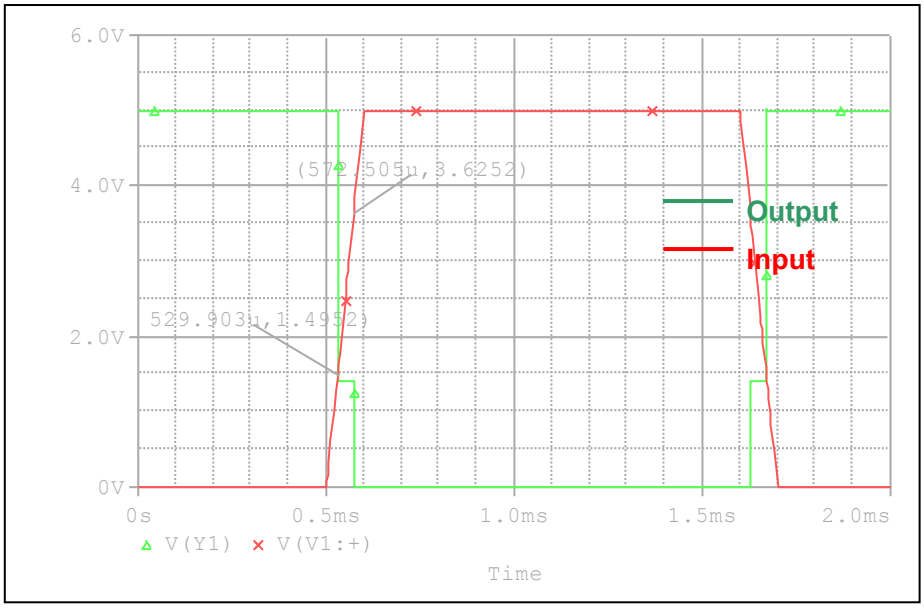


Comparison table

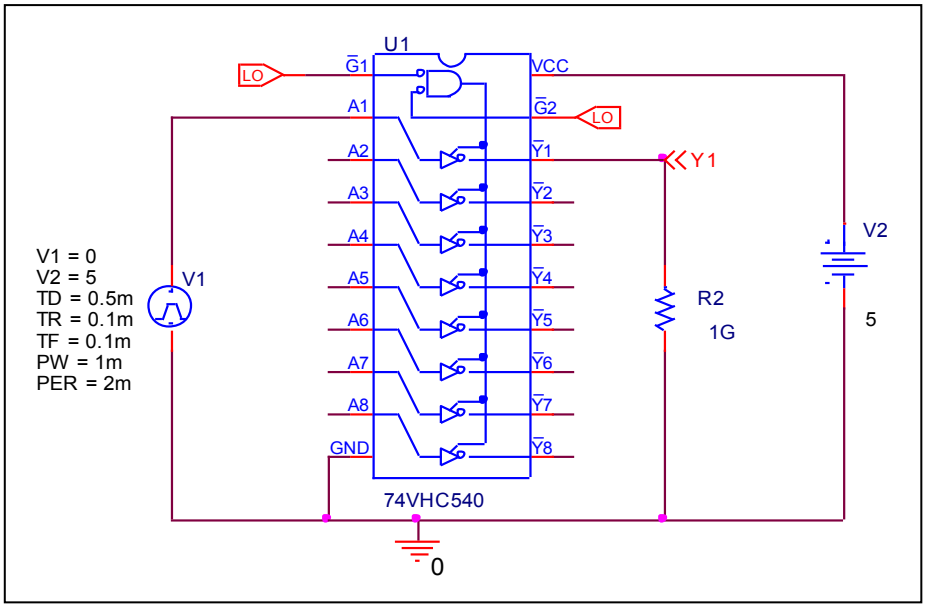
Input			Output		%Error
$\overline{G1}$	$\overline{G2}$	An	$\overline{Yn}$ (Measurement)	$\overline{Yn}$ (Simulation)	
L	L	L	H	H	0

High Level and Low Level Input Voltage

Circuit simulation result



Evaluation circuit

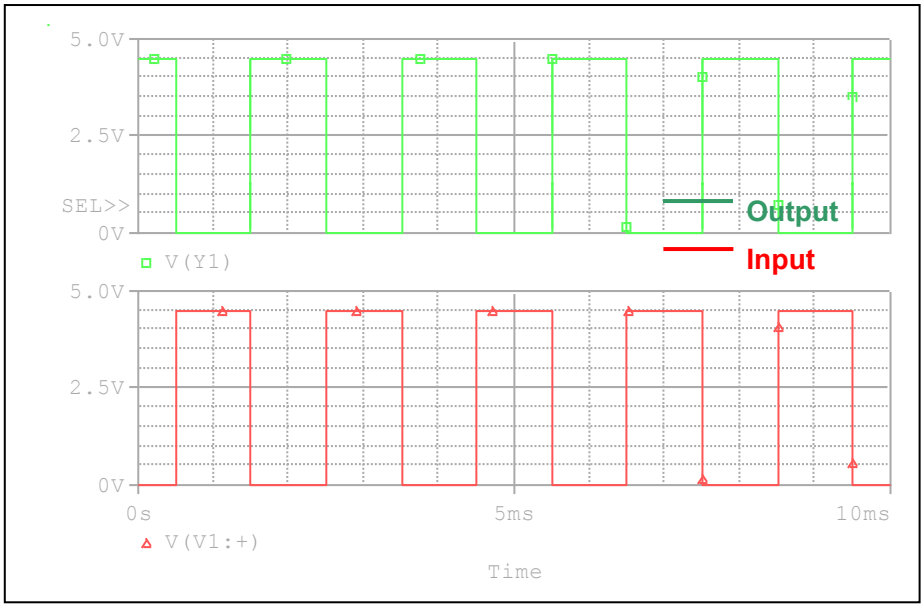


Comparison table

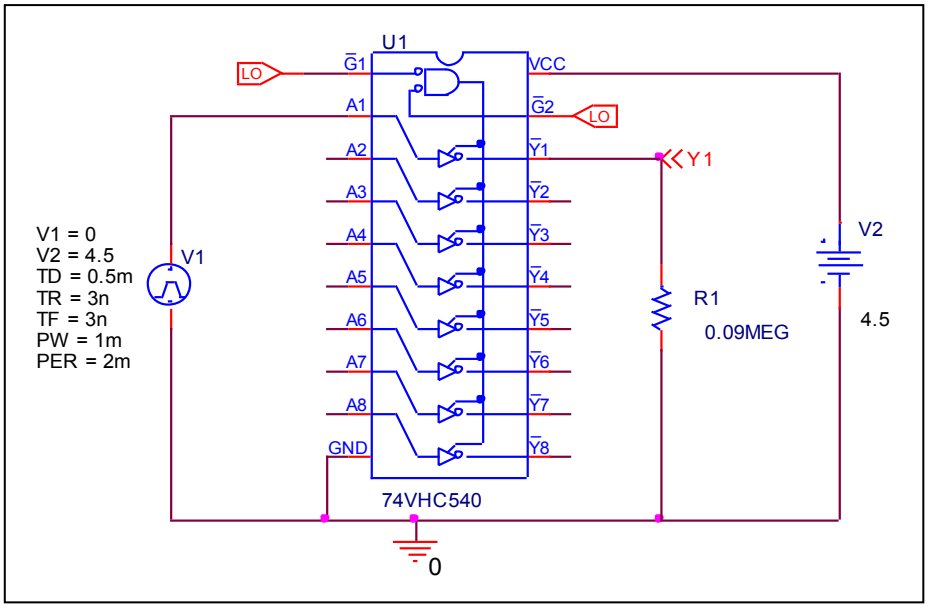
V_{CC} = 5V	Measurement	Simulation	%Error
Min V_{IH} = (V_{CC}*0.7) (V)	3.5	3.6252	3.577
Min V_{IL} = (V_{CC}*0.3) (V)	1.5	1.4952	-0.320

High Level and Low Level Output Voltage

Circuit simulation result



Evaluation circuit

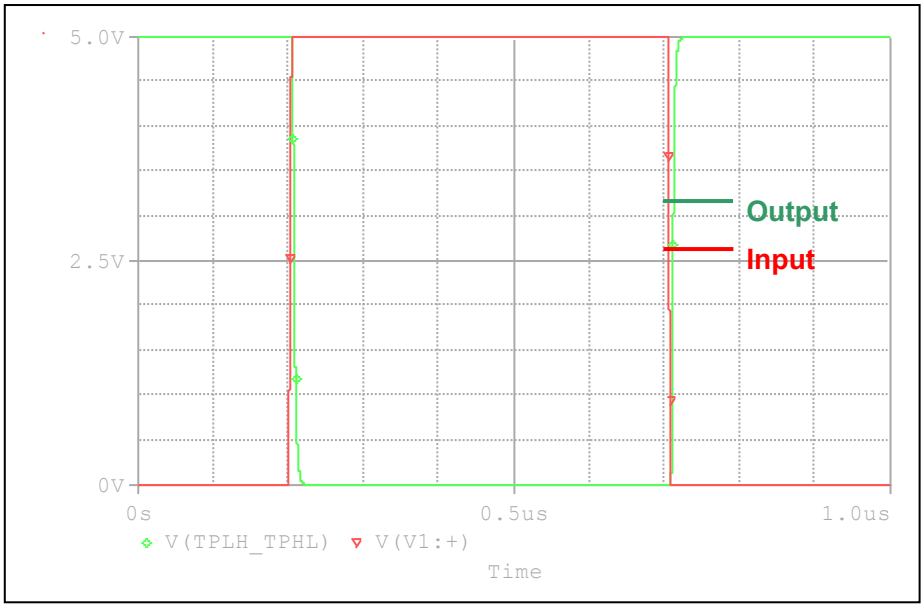


Comparison table

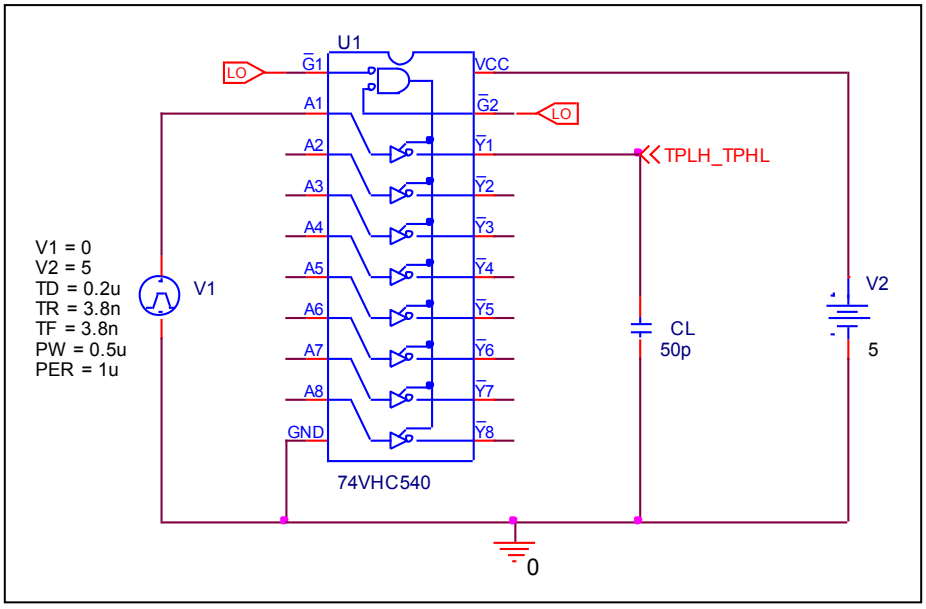
V_{CC} = 4.5V	Measurement	Simulation	%Error
V_{OH} (V)	4.5	4.4978	-0.049
V_{OL} (V)	0	0	0

Propagation Delay Time

Circuit simulation result



Evaluation circuit

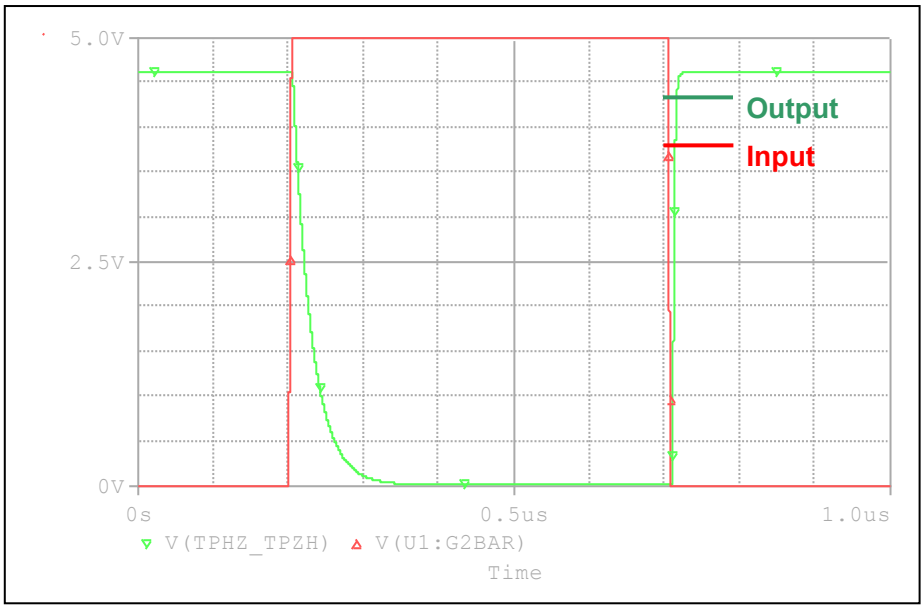


Comparison table C_L = 50 pF

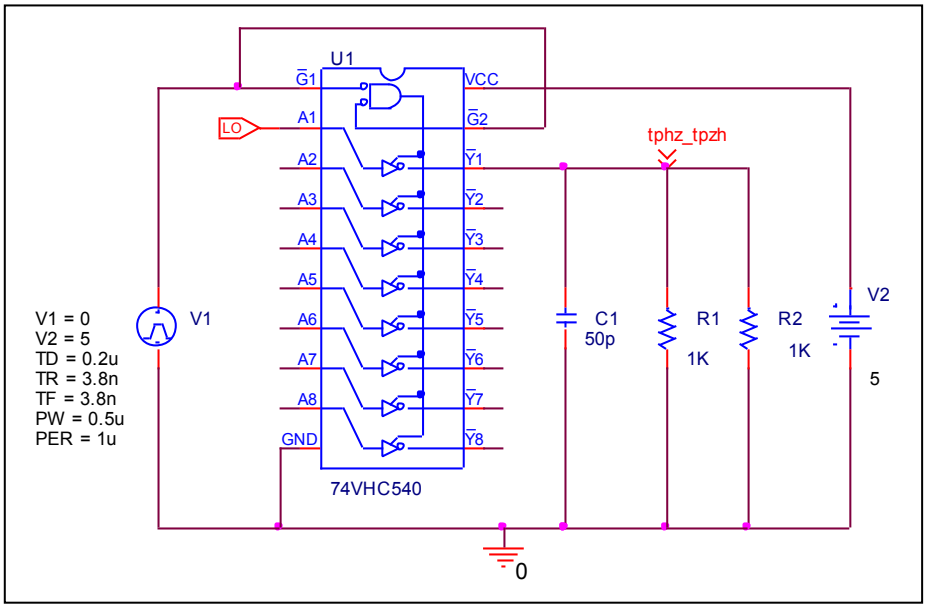
V_{CC} = 5 V, $t_r = t_f$ = 3 ns	Measurement	Simulation	%Error
t_{pLH} (ns)	5.2	5.2479	0.921
t_{pHL} (ns)	5.2	5.2837	1.610

Output enable time, high impedance (off) to high output (t_{PZH})
Output disable time, high to high impedance (off) output (t_{PHZ})

Circuit simulation result



Evaluation circuit

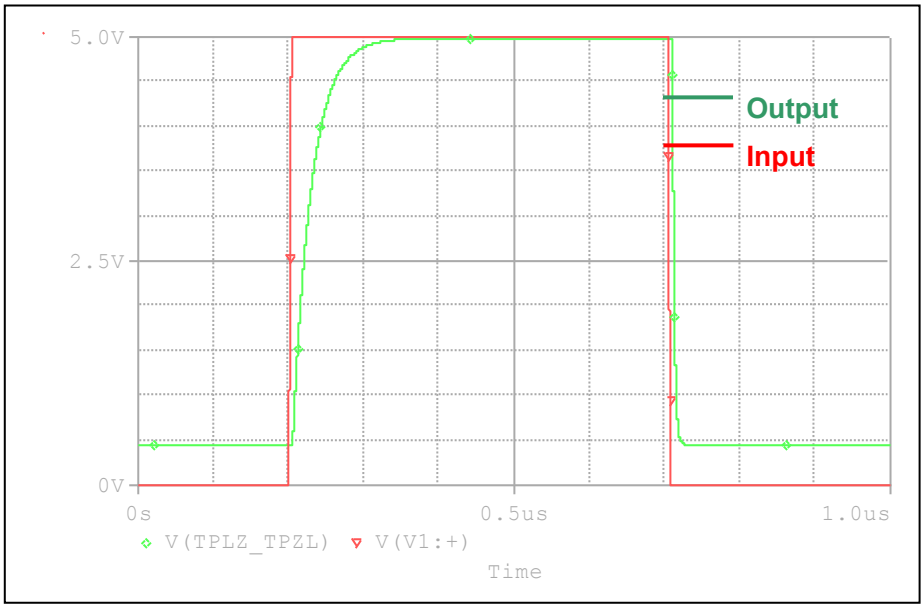


Comparison table C_L = 50 pF, R_L = 1 KΩ

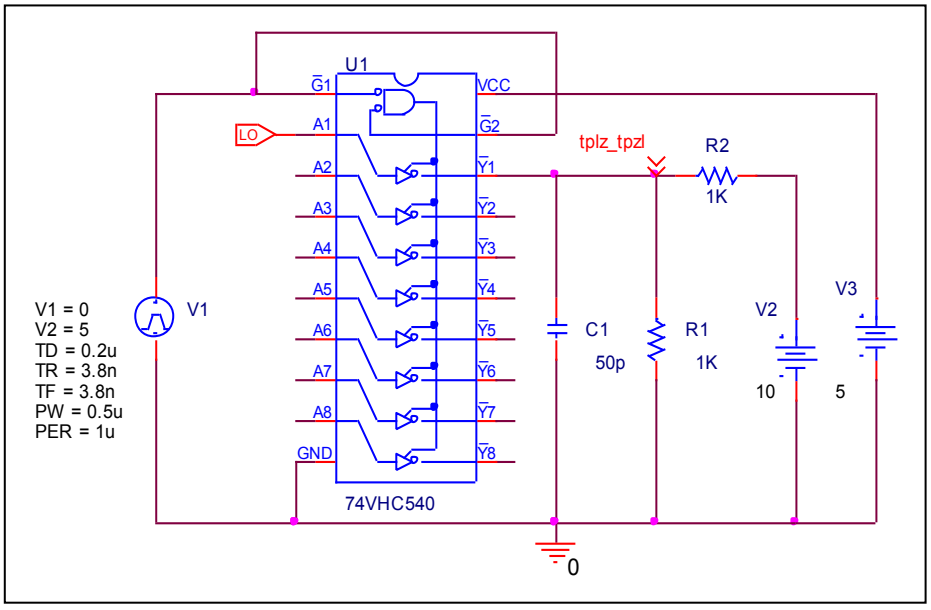
V_{CC} = 5 V, t_r = t_f = 3 ns	Measurement	Simulation	%Error
t_{PHZ} (ns)	6	6.0537	0.895
t_{pZH} (ns)	6.2	6.2423	0.682

Output enable time, high impedance (off) to low output (t_{PZL})
Output disable time, low to high impedance (off) output (t_{PLZ})

Circuit simulation result



Evaluation circuit



Comparison table C_L = 50 pF, R_L = 1 KΩ

V_{CC} = 5 V, $t_r = t_f$ = 3 ns	Measurement	Simulation	%Error
t_{PLZ} (ns)	6	6.0557	0.928
t_{pZL} (ns)	6.2	6.2378	0.610