

Device Modeling Report

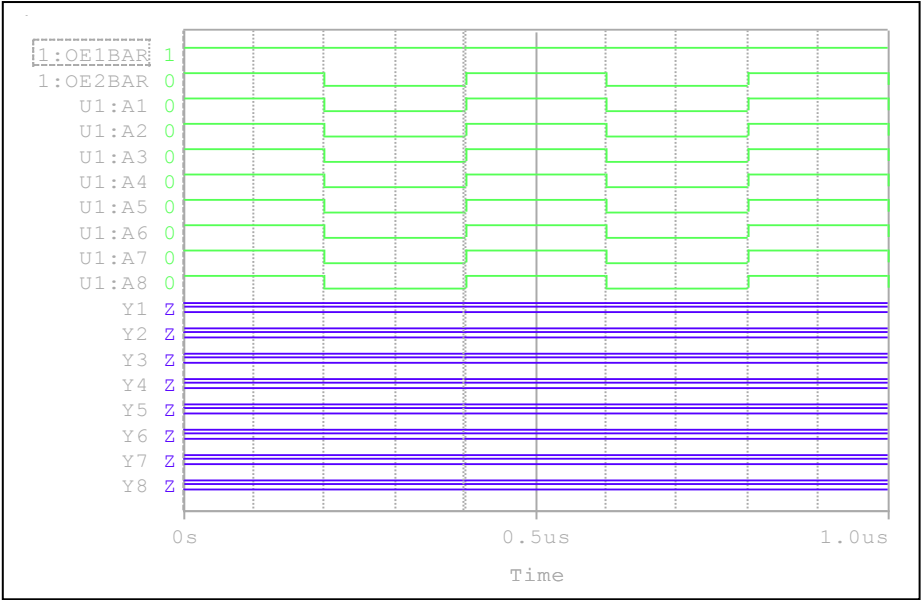
COMPONENTS : CMOS DIGITAL INTEGRATED CIRCUIT
PART NUMBER : TC74ACT541F
MANUFACTURER : TOSHIBA



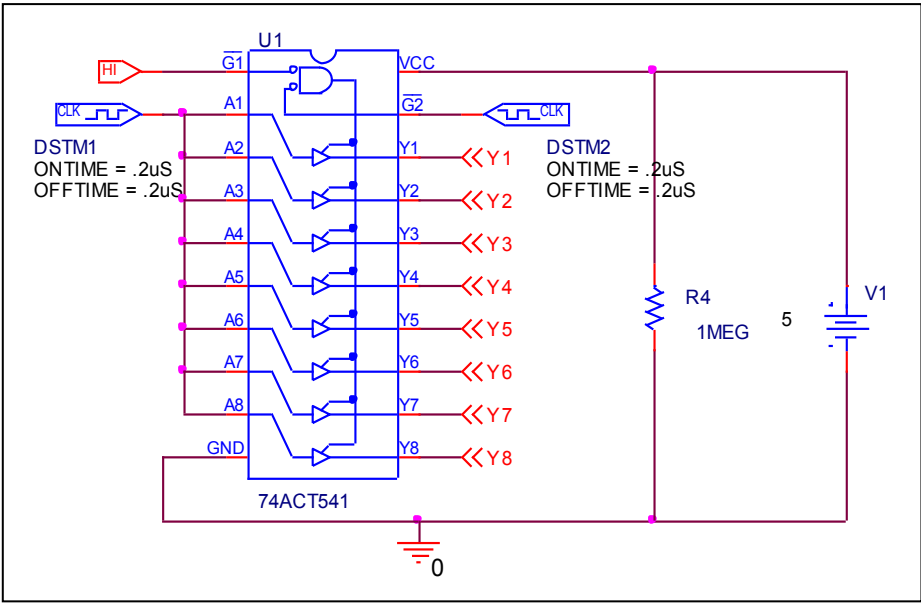
Bee Technologies Inc.

Truth Table

Circuit simulation result



Evaluation circuit

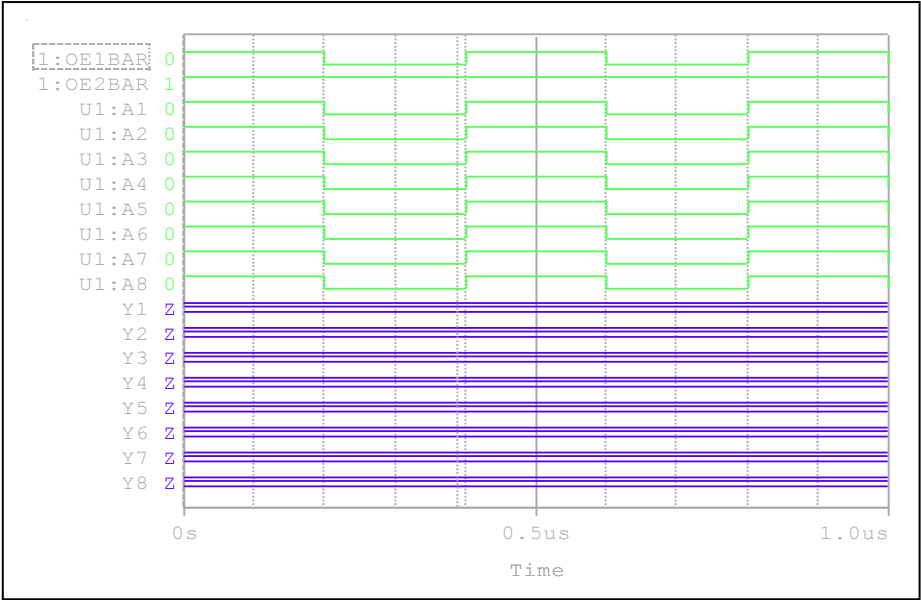


Comparison table

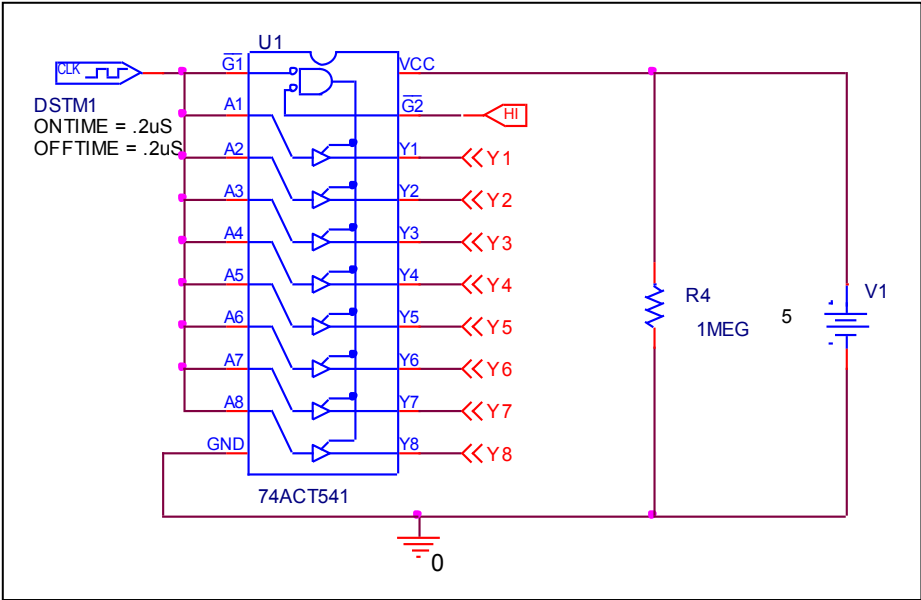
Input			Output		%Error
G1	G2	An	Yn (Measurement)	Yn (Simulation)	
H	X	X	Z	Z	0

Truth Table

Circuit simulation result



Evaluation circuit

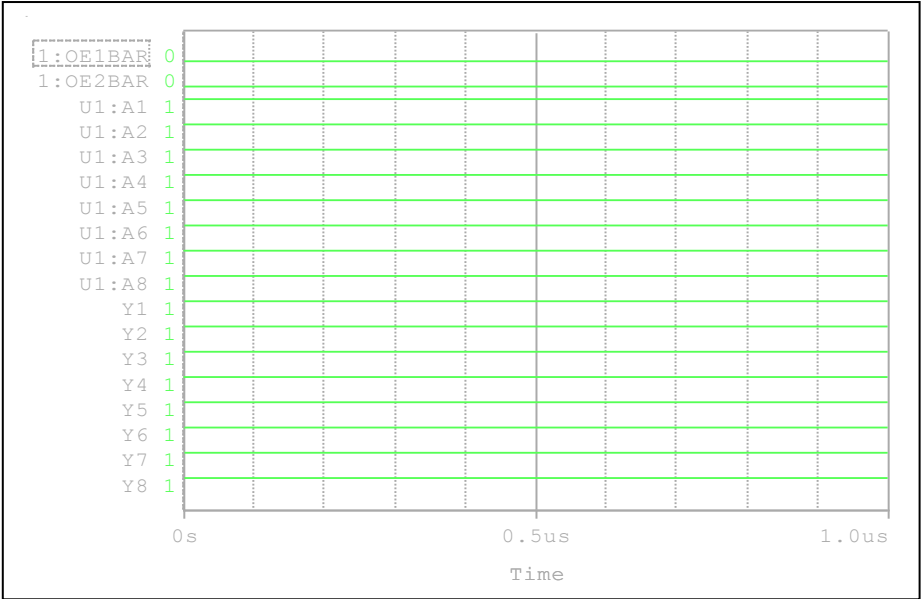


Comparison table

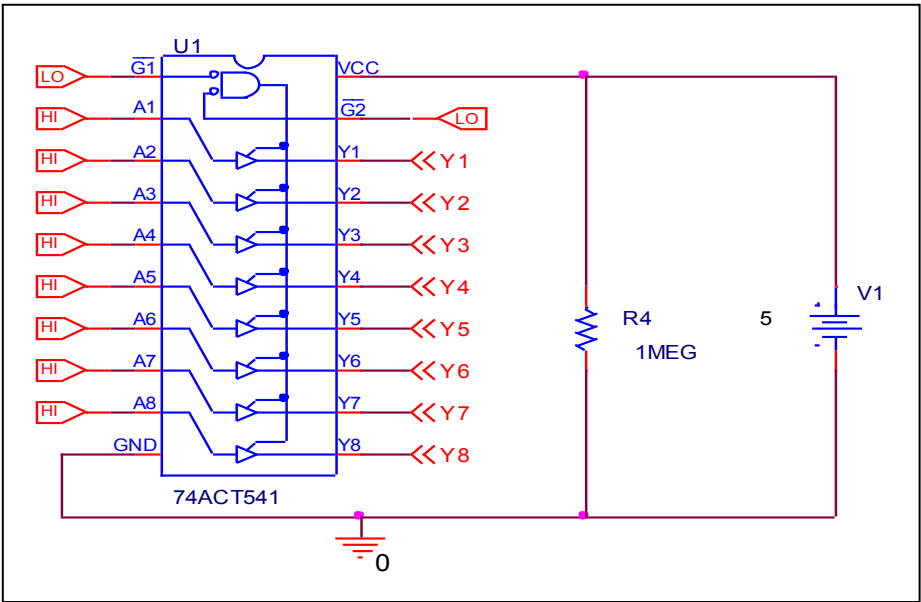
Input			Output		%Error
G1	G2	An	Yn (Measurement)	Yn (Simulation)	
X	H	X	Z	Z	0

Truth Table

Circuit simulation result



Evaluation circuit

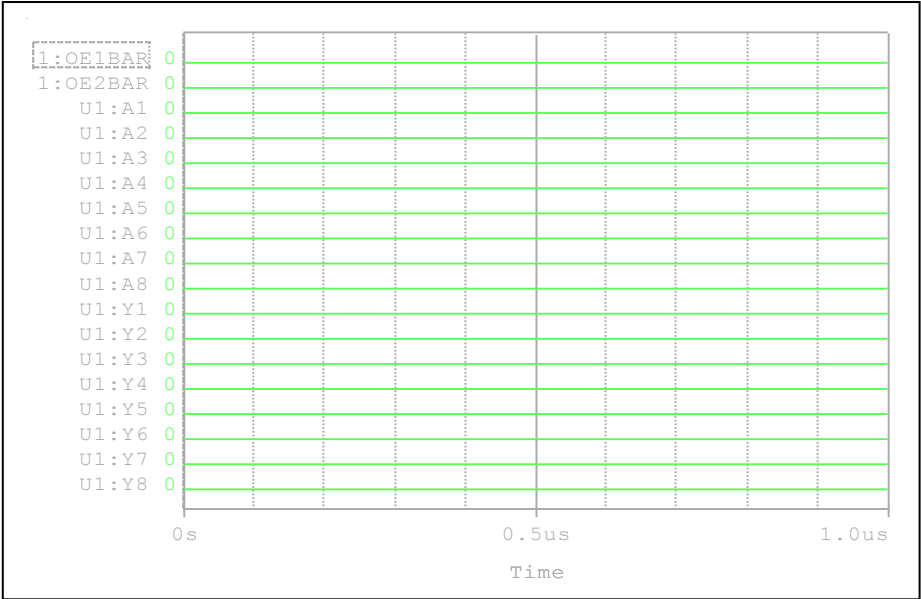


Comparison table

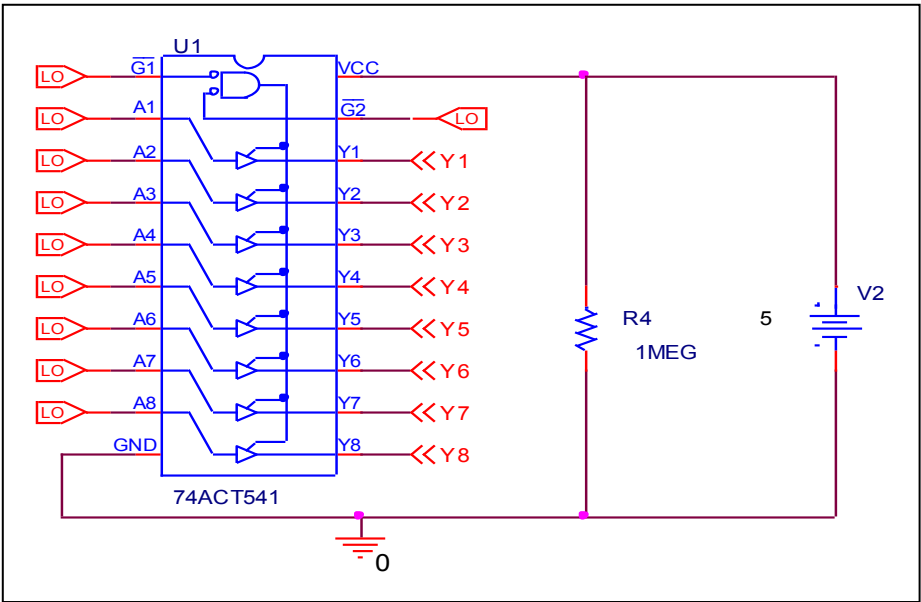
Input			Output		%Error
G1	G2	An	Yn (Measurement)	Yn (Simulation)	
L	L	H	H	H	0

Truth Table

Circuit simulation result



Evaluation circuit

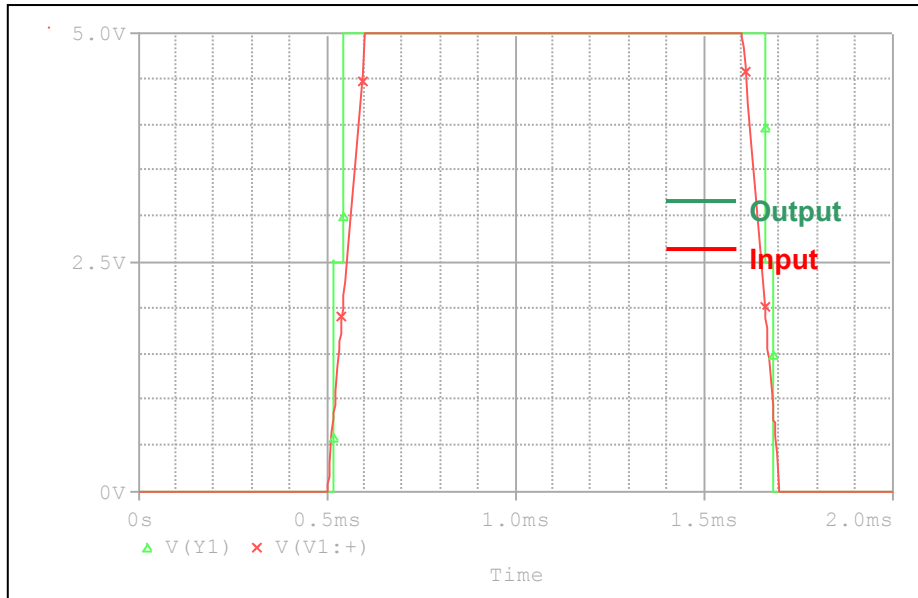


Comparison table

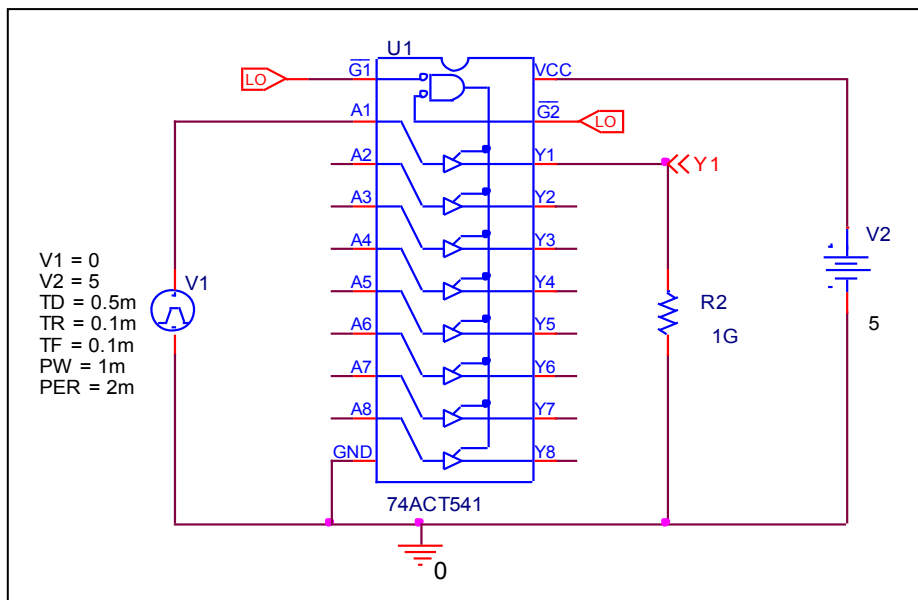
Input			Output		%Error
G1	G2	An	Yn (Measurement)	Yn (Simulation)	
L	L	L	L	L	0

High Level and Low Level Input Voltage

Circuit simulation result



Evaluation circuit

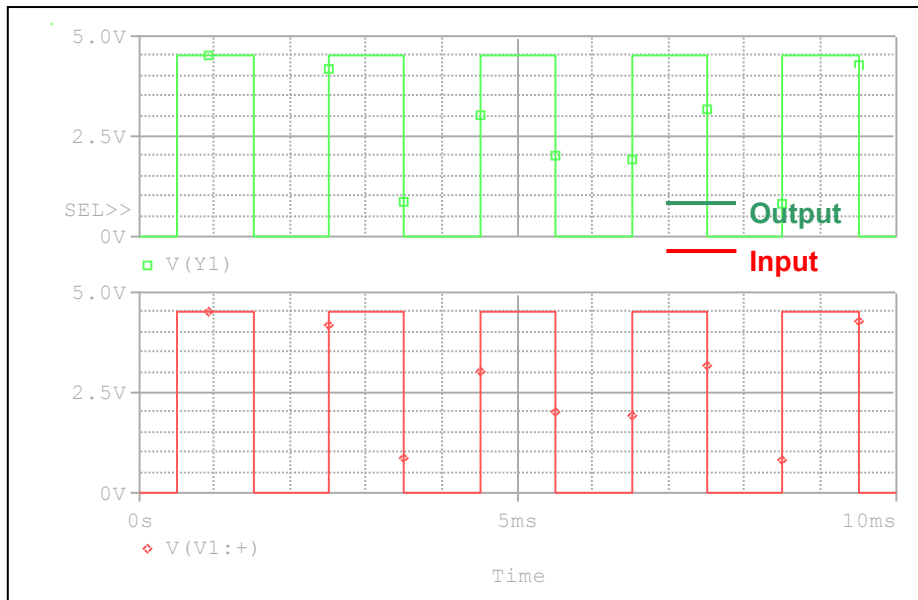


Comparison table

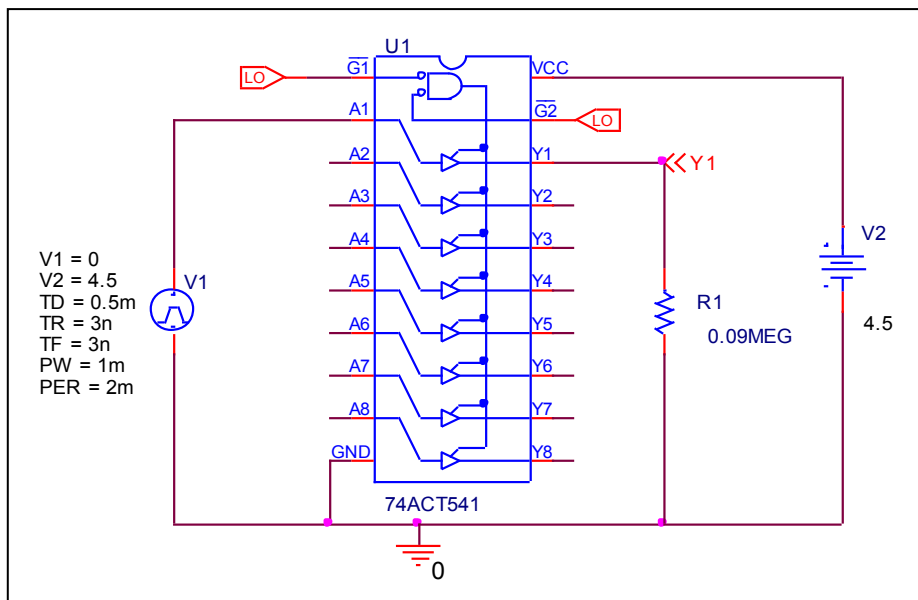
$V_{CC} = 5V$	Measurement	Simulation	%Error
$V_{IH} (V)$	2	2	0
$V_{IL} (V)$	0.8	0.799220	-0.098

High Level and Low Level Output Voltage

Circuit simulation result



Evaluation circuit

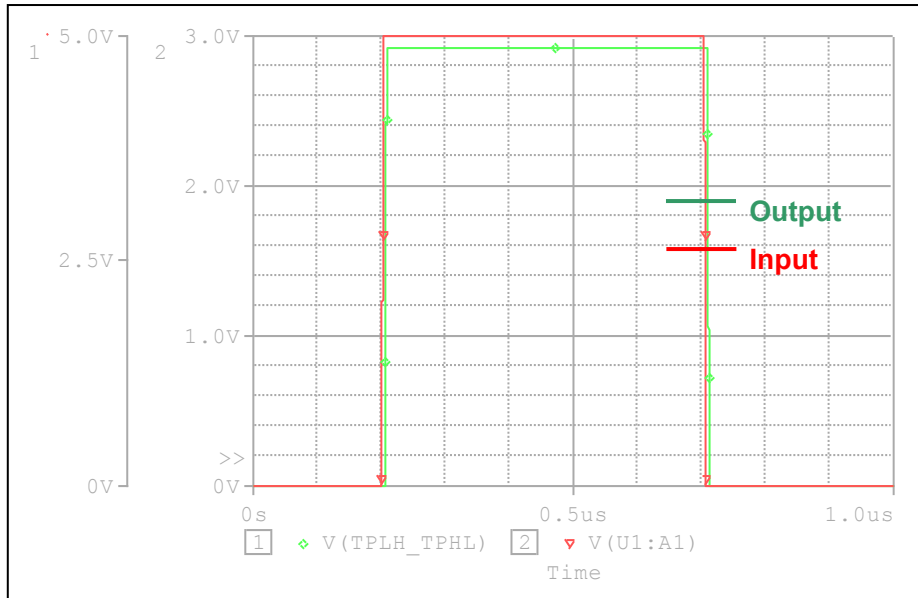


Comparison table

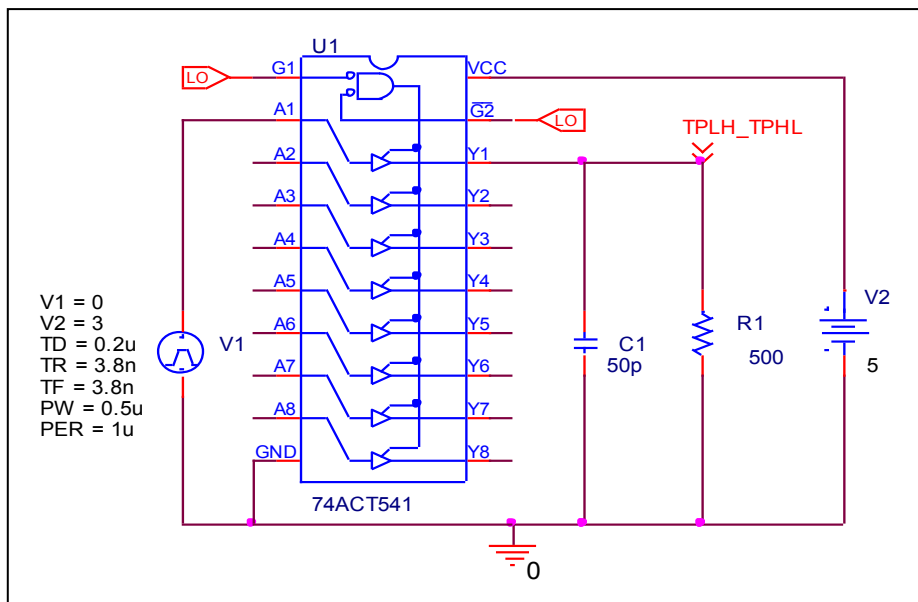
V_{CC} = 4.5V	Measurement	Simulation	%Error
V_{OH} (V)	4.5	4.4988	-0.027
V_{OL} (V)	0	0	0

Propagation Delay Time

Circuit simulation result



Evaluation circuit

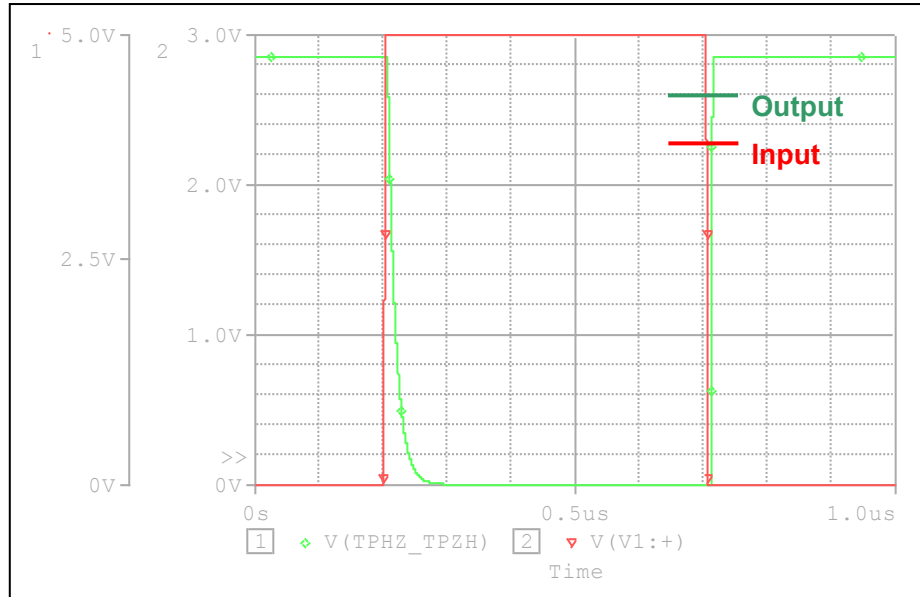


Comparison table $C_L = 50 \text{ pF}$, $R_L = 500 \Omega$

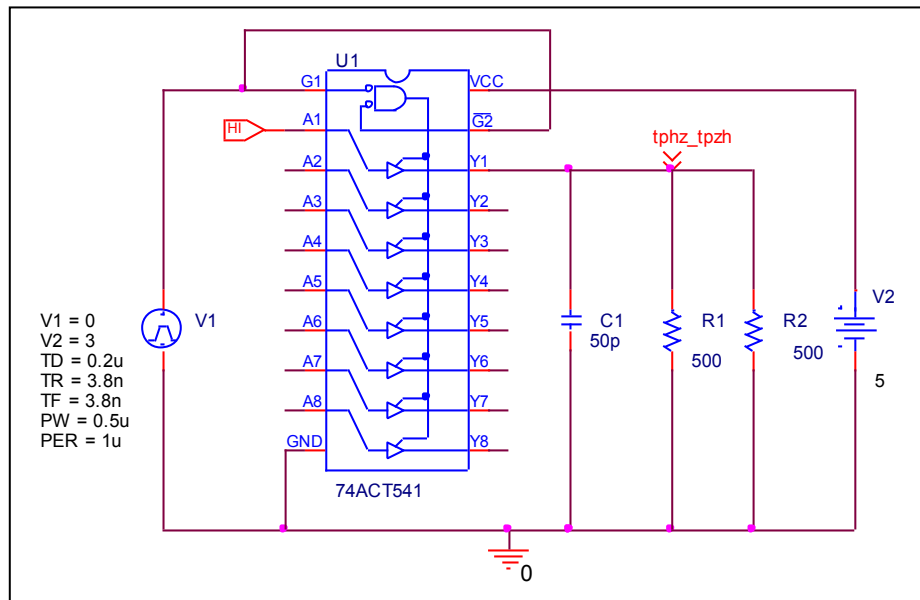
$t_r = t_f = 3 \text{ ns}$	Measurement	Simulation	%Error
$t_{PLH} \text{ (ns)}$	5	5.0227	0.454
$t_{PHL} \text{ (ns)}$	5	5.0282	0.564

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

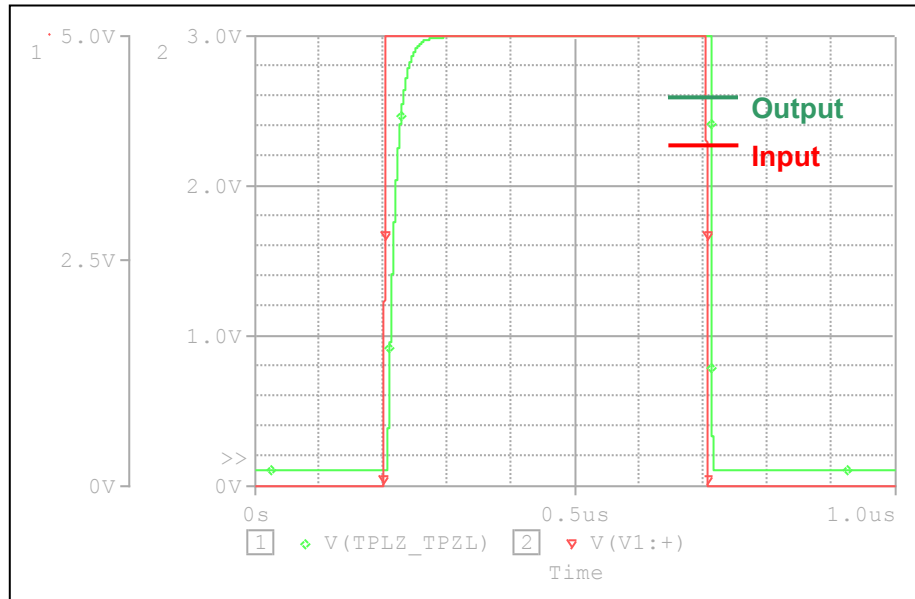


Comparison table $C_L = 50 \text{ pF}$, $R_L = 500 \Omega$

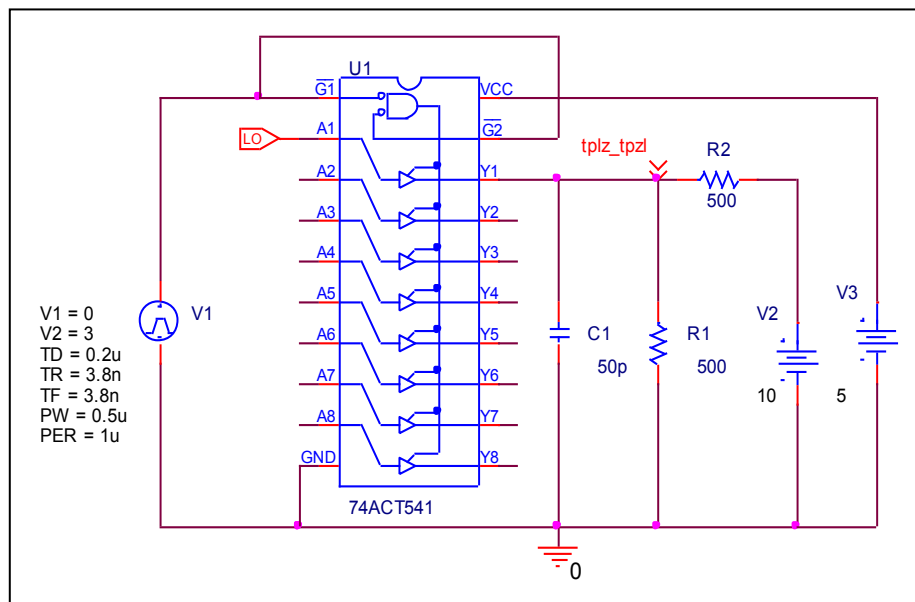
$t_r = t_f = 3 \text{ ns}$	Measurement	Simulation	%Error
$t_{PHZ} \text{ (ns)}$	5.9	5.9846	1.434
$t_{pZH} \text{ (ns)}$	7.3	7.3133	0.182

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 $C_L = 50 \text{ pF}$, $R_L = 500 \Omega$

$t_r = t_f = 3 \text{ ns}$	Measurement	Simulation	%Error
$t_{pLZ} \text{ (ns)}$	5.9	5.9705	1.195
$t_{pZL} \text{ (ns)}$	7.3	7.3962	1.318