

Device Modeling Report

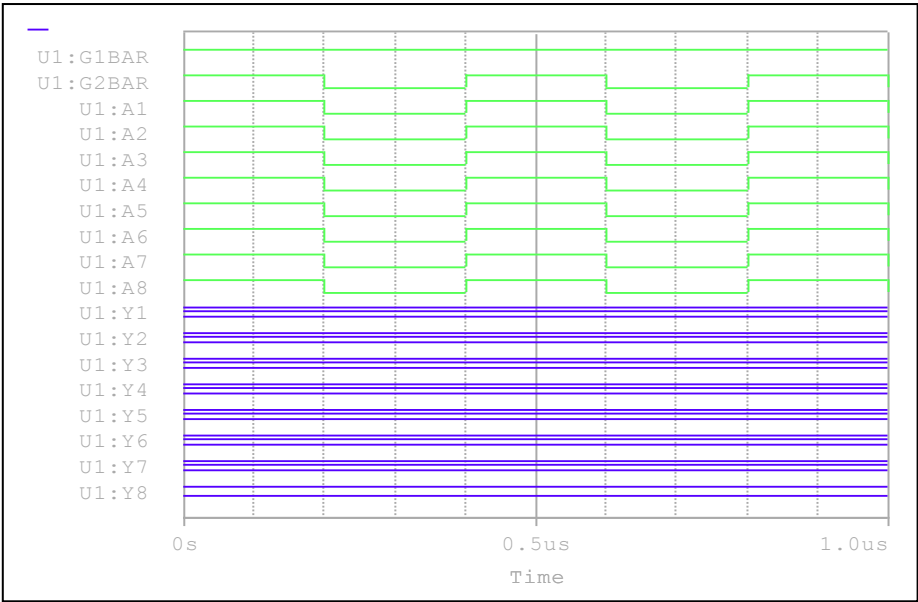
COMPONENTS : CMOS DIGITAL INTEGRATED CIRCUIT
PART NUMBER : TC74VHCT540AFT
MANUFACTURER : TOSHIBA



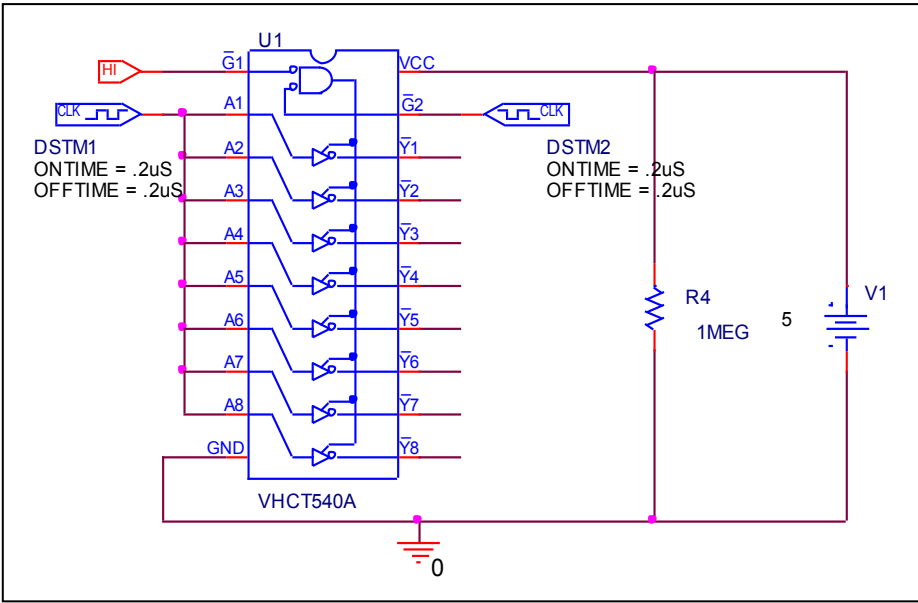
Bee Technologies Inc.

Truth Table

Circuit simulation result



Evaluation circuit

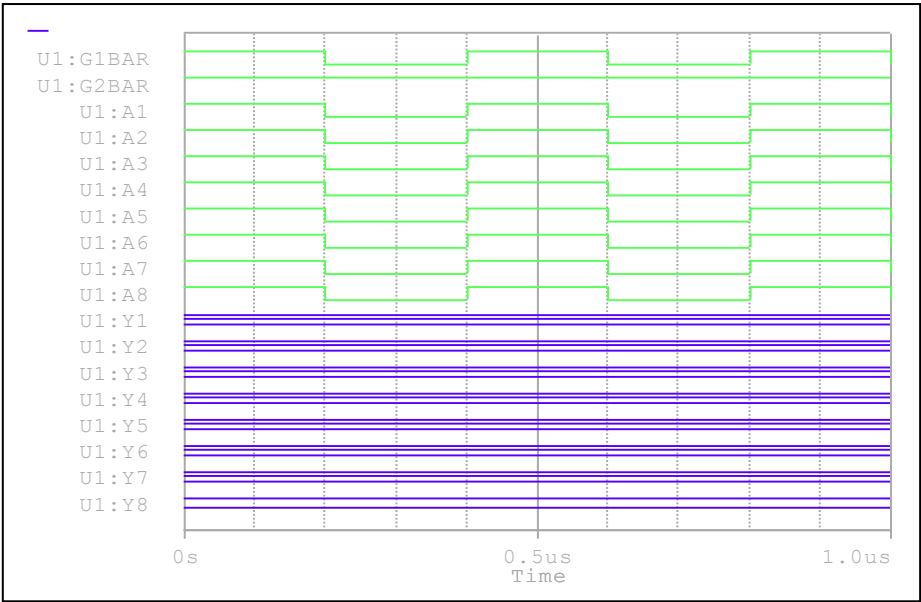


Comparison table

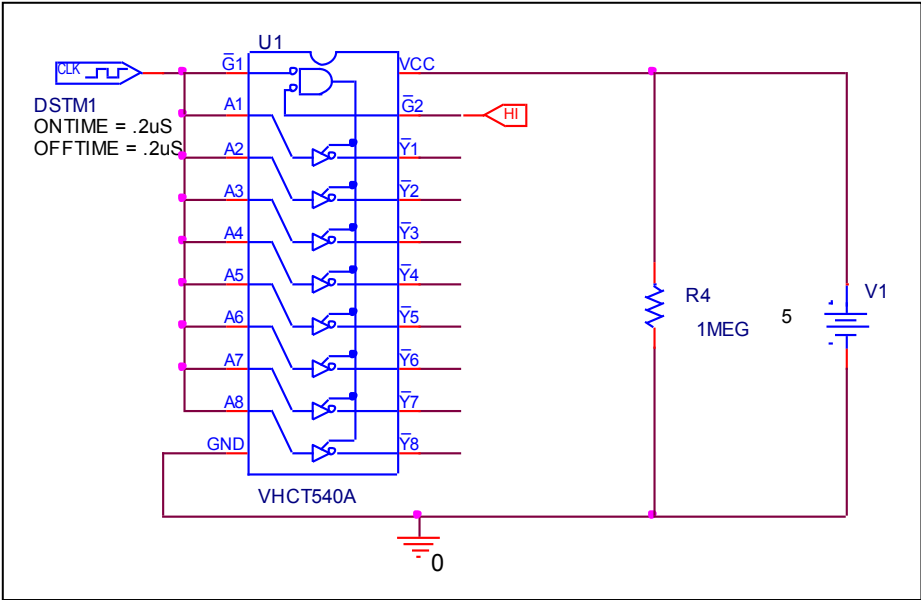
Input			Output		%Error
G1	G2	An	Yn (Measurement)	Yn (Simulation)	
H	X	X	Z	Z	0

Truth Table

Circuit simulation result



Evaluation circuit

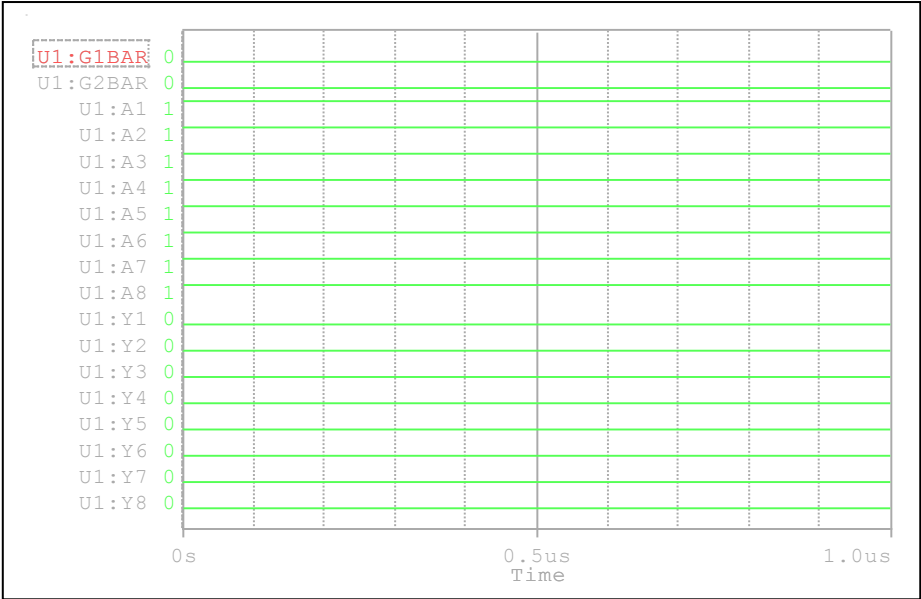


Comparison table

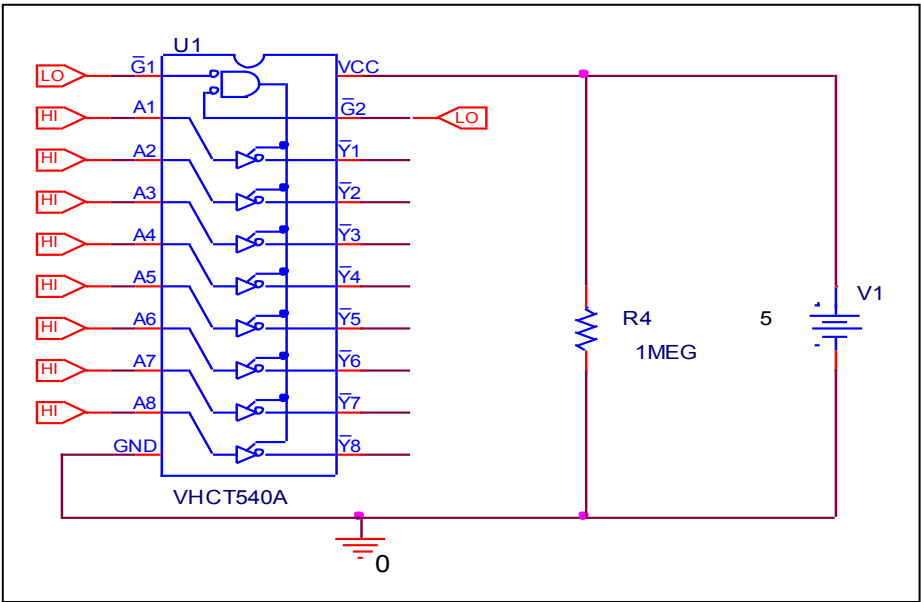
Input			Output		%Error
G1	G2	An	Yn (Measurement)	Yn (Simulation)	
X	H	X	Z	Z	0

Truth Table

Circuit simulation result



Evaluation circuit

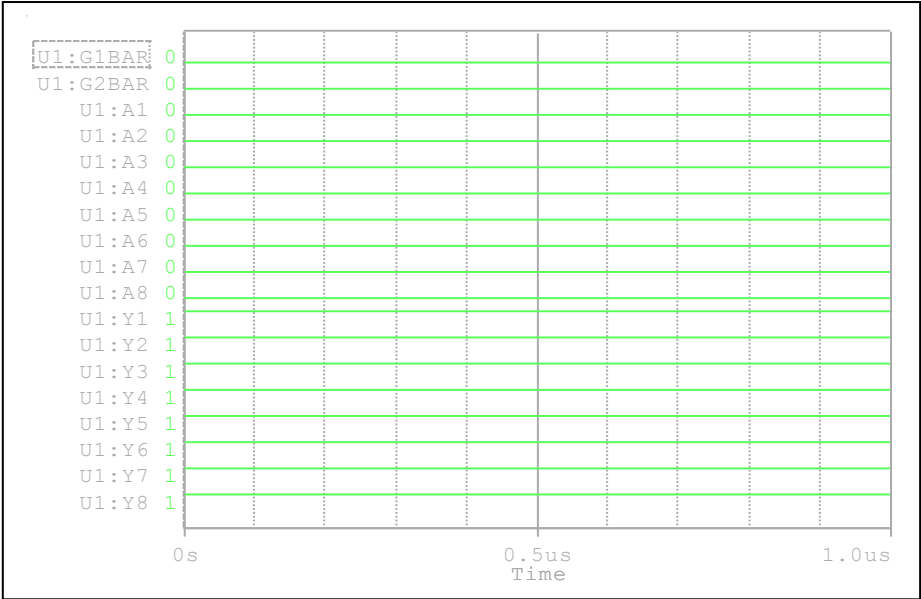


Comparison table

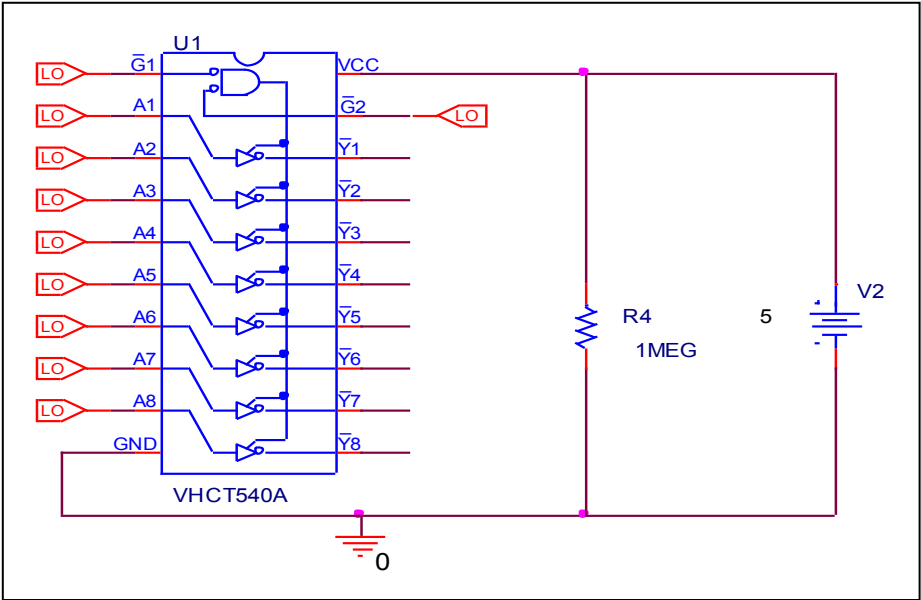
Input			Output		%Error
$\bar{G}1$	$\bar{G}2$	A_n	$\bar{Y}_n$ (Measurement)	$\bar{Y}_n$ (Simulation)	
L	L	H	L	L	0

Truth Table

Circuit simulation result



Evaluation circuit

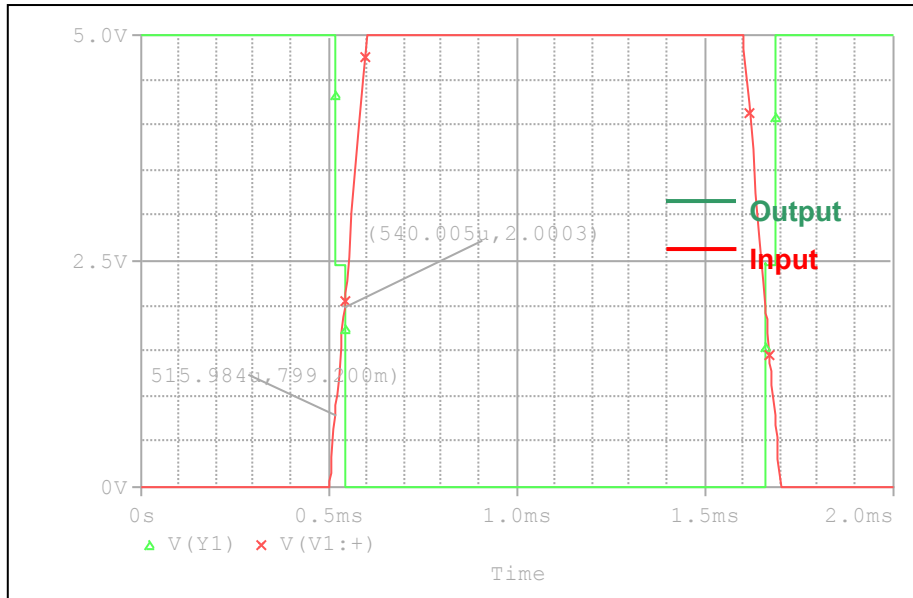


Comparison table

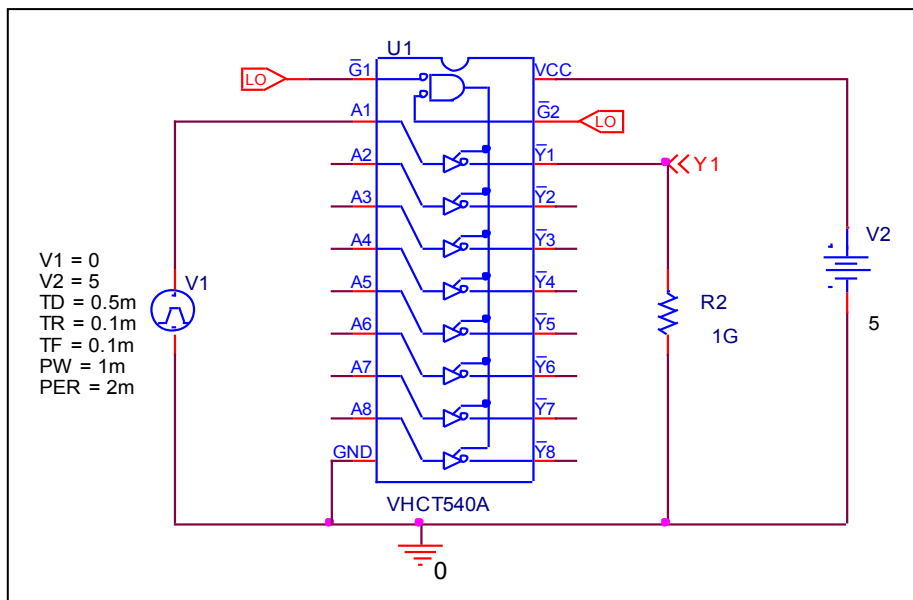
Input			Output		%Error
G1	G2	An	Yn (Measurement)	Yn (Simulation)	
L	L	L	H	H	0

High Level and Low Level Input Voltage

Circuit simulation result



Evaluation circuit

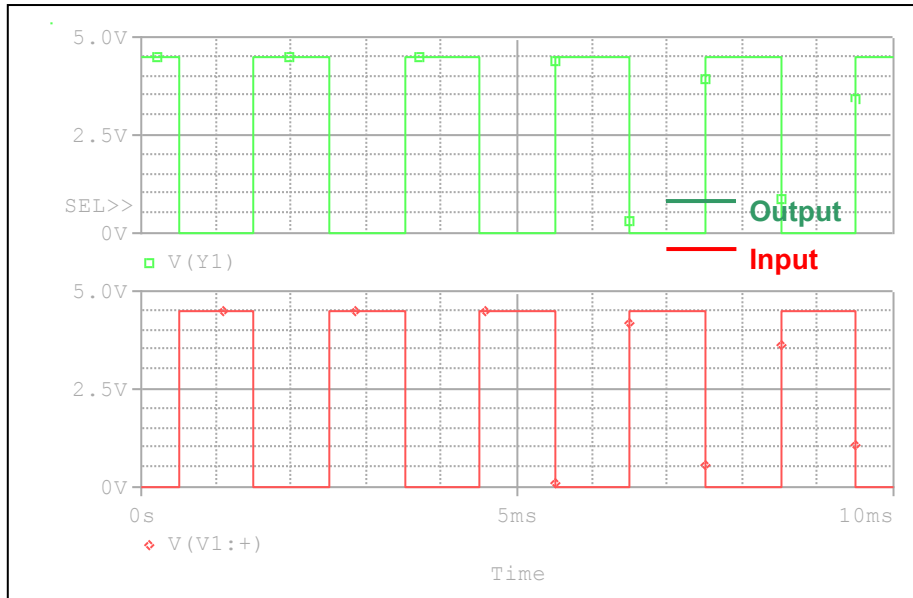


Comparison table

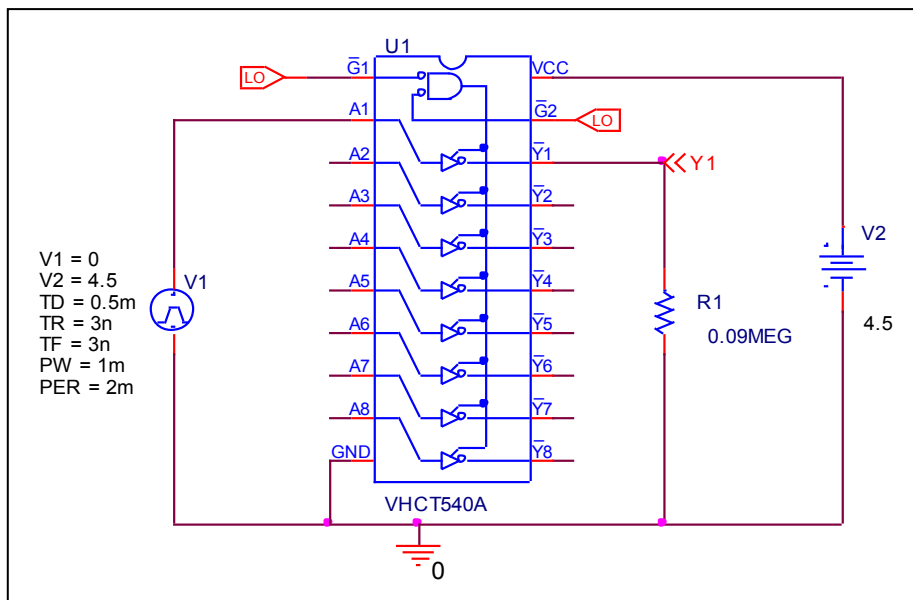
$V_{CC} = 5V$	Measurement	Simulation	%Error
$V_{IH} (V)$	2	2.0003	0.015
$V_{IL} (V)$	0.8	0.7992	-0.100

High Level and Low Level Output Voltage

Circuit simulation result



Evaluation circuit

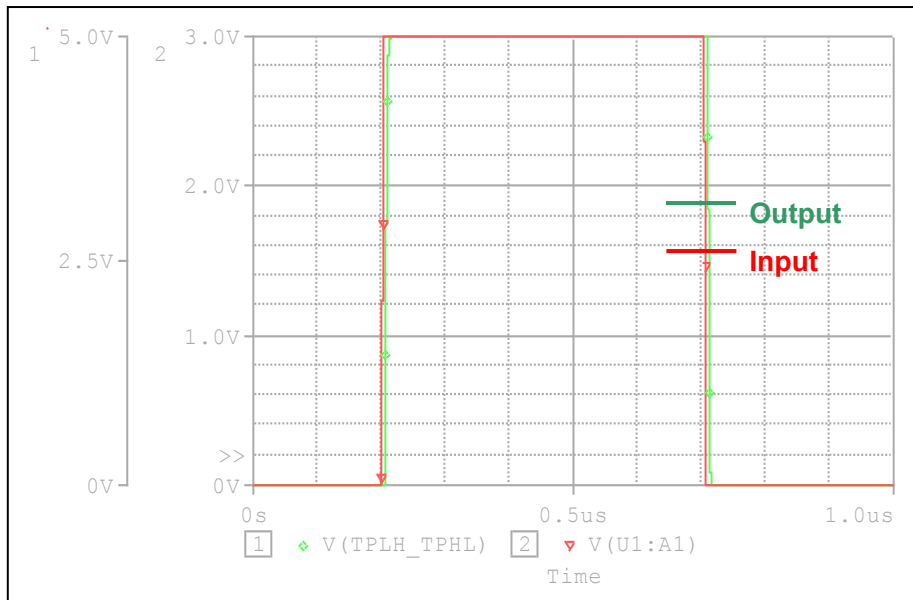


Comparison table

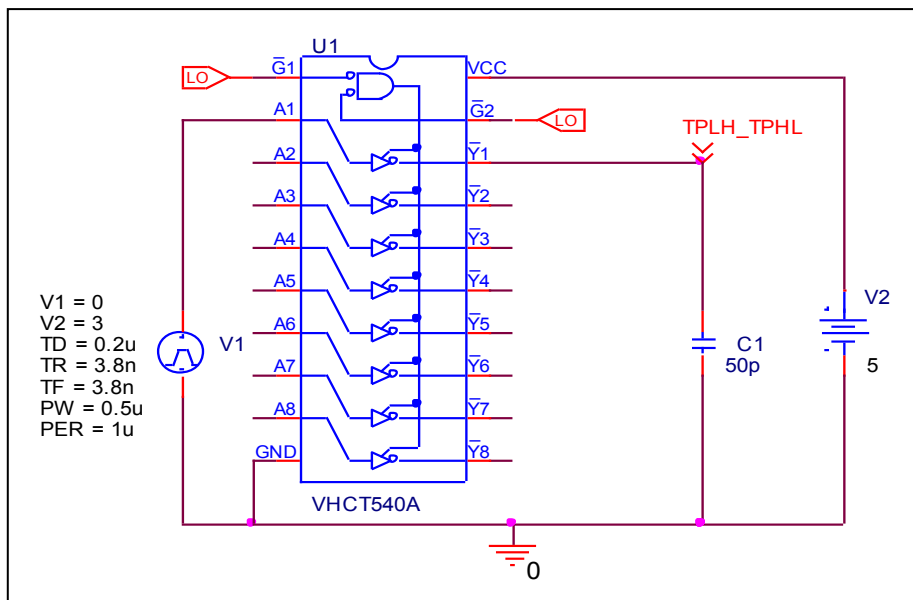
$V_{CC} = 4.5V$	Measurement	Simulation	%Error
$V_{OH} (V)$	4.5	4.4986	-0.031
$V_{OL} (V)$	0	0	0

Propagation Delay Time

Circuit simulation result



Evaluation circuit

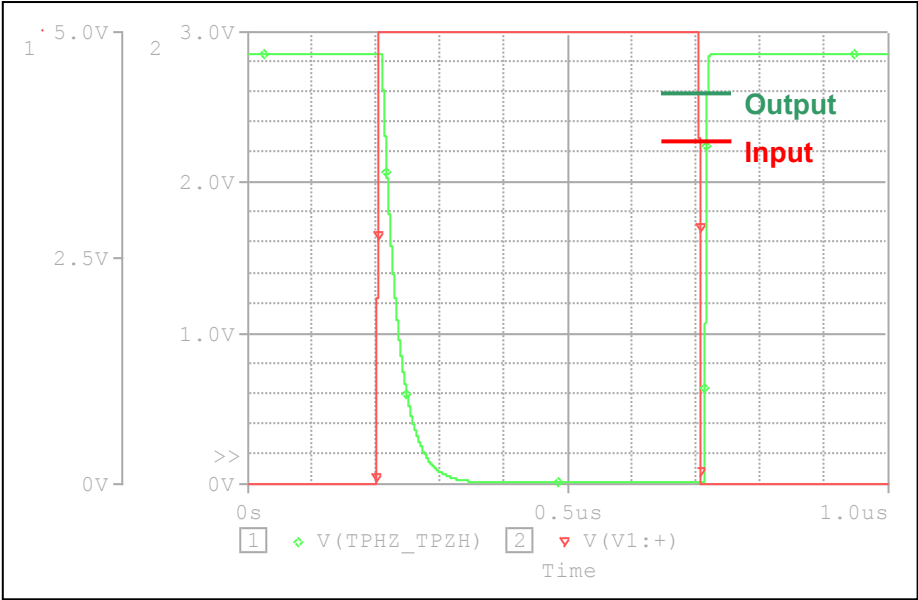


Comparison table $C_L = 50 \text{ pF}$

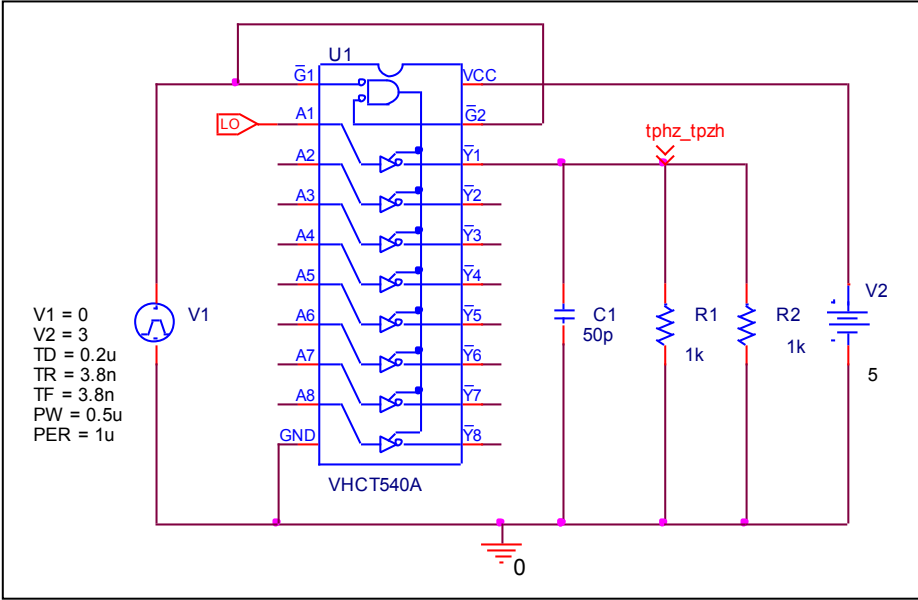
V_{CC} = 5 V, t_r = t_f = 3 ns	Measurement	Simulation	%Error
t_{pLH} (ns)	5.9	5.9777	1.317
t_{pHL} (ns)	5.9	5.9779	1.320

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

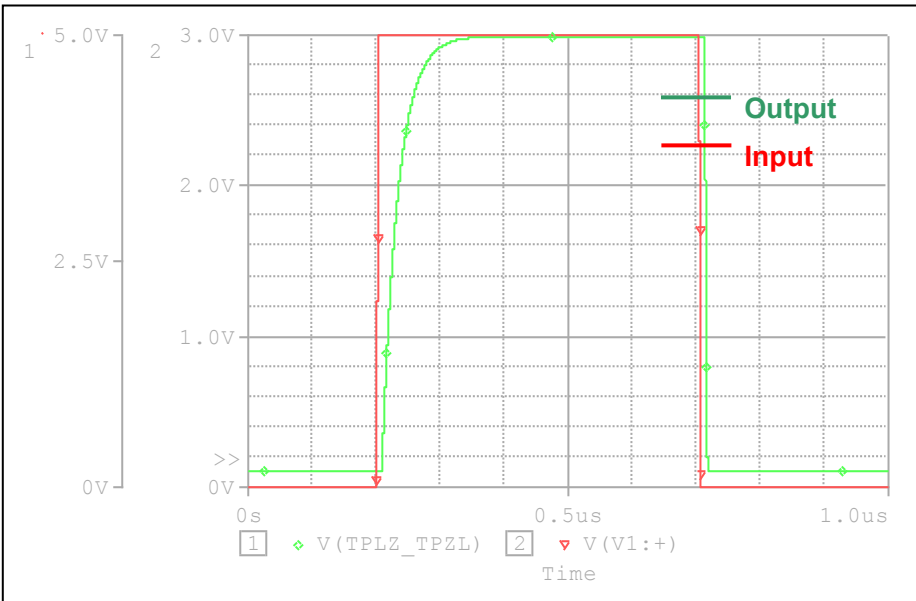


Comparison table $C_L = 50 \text{ pF}$, $R_L = 1 \text{ K}\Omega$

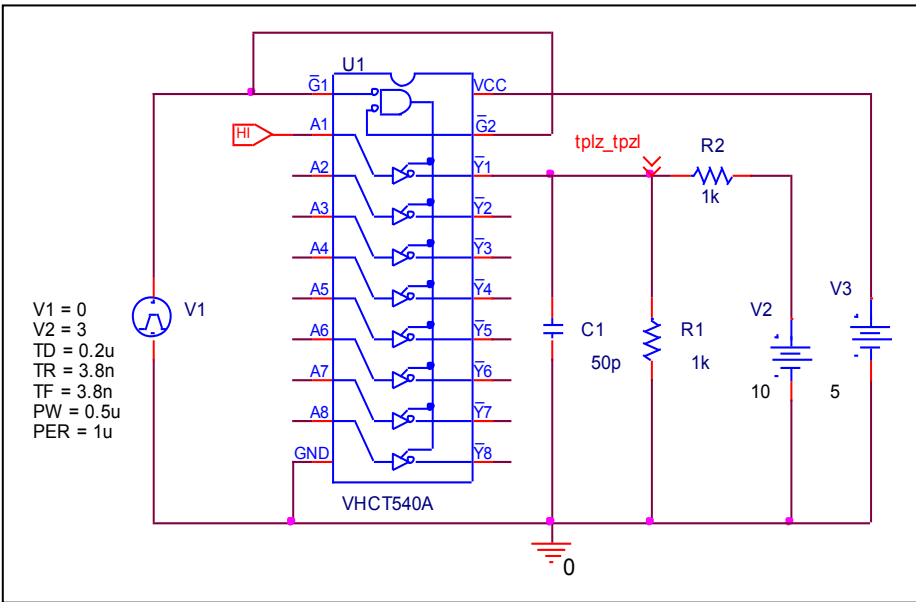
$V_{CC} = 5 \text{ V}$, $t_r = t_f = 3 \text{ ns}$	Measurement	Simulation	%Error
$t_{PHZ} \text{ (ns)}$	9.4	9.4881	0.937
$t_{pZH} \text{ (ns)}$	8.8	8.8358	0.407

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 $C_L = 50 \text{ pF}$, $R_L = 1 \text{ K}\Omega$

$V_{CC} = 5 \text{ V}$, $t_r = t_f = 3 \text{ ns}$	Measurement	Simulation	%Error
$t_{PLZ} \text{ (ns)}$	9.4	9.4062	0.066
$t_{PZL} \text{ (ns)}$	8.8	8.8674	0.766