

Device Modeling Report

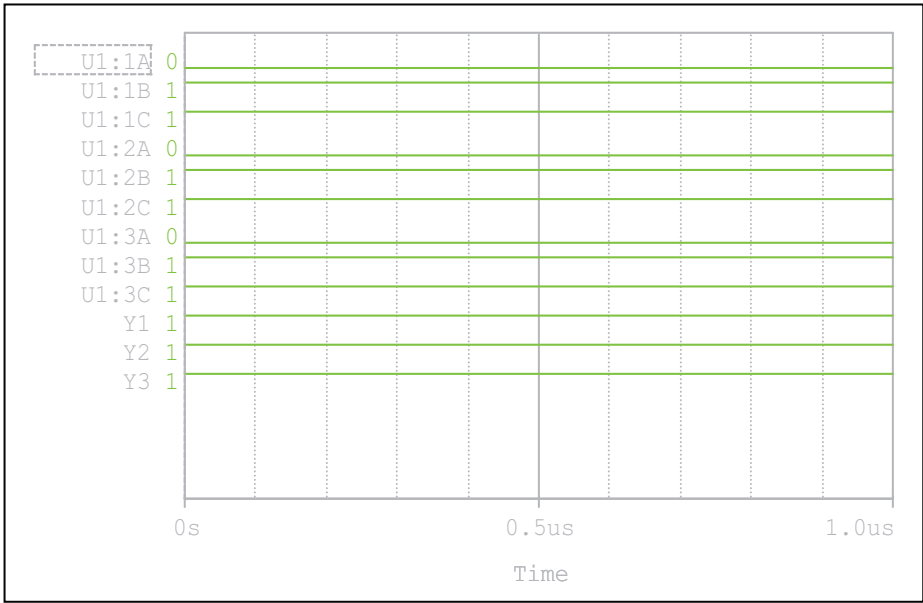
COMPONENTS : CMOS DIGITAL INTEGRATED CIRCUIT
PART NUMBER : TC74HC10AP
MANUFACTURER : TOSHIBA



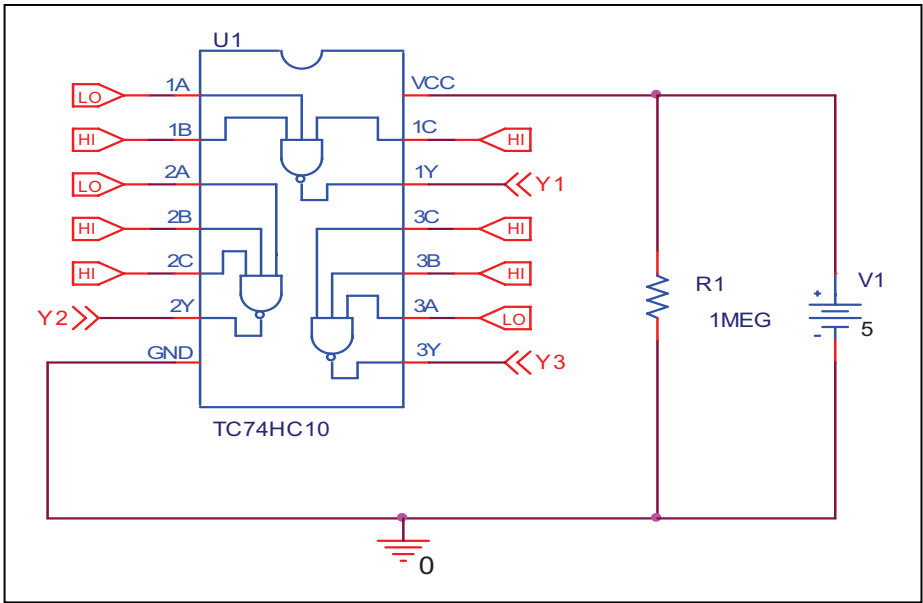
Bee Technologies Inc.

Truth Table

Circuit simulation result



Evaluation circuit

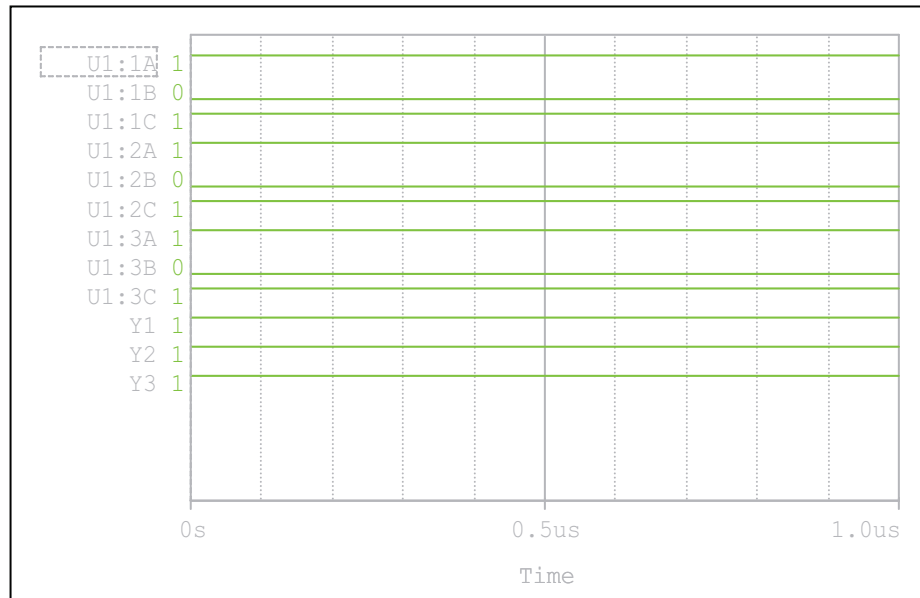


Comparison table

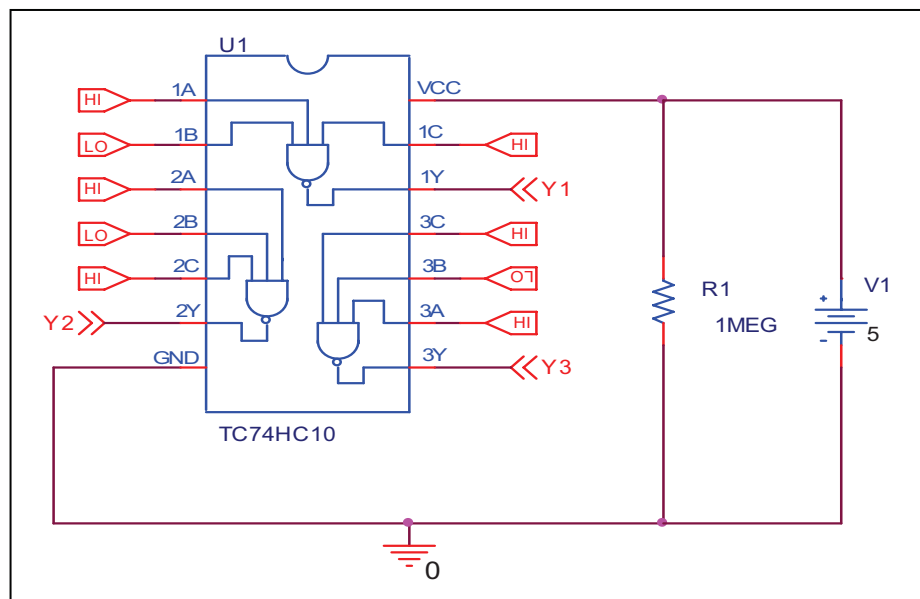
Input			Output		%Error
An	Bn	Cn	Yn (Measurement)	Yn (Simulation)	
L	X	X	H	H	0

Truth Table

Circuit simulation result



Evaluation circuit

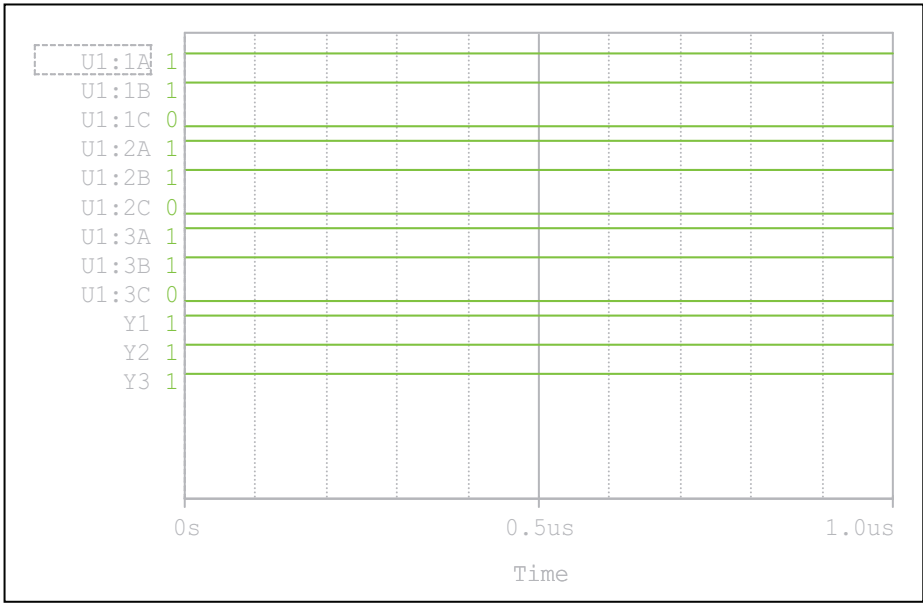


Comparison table

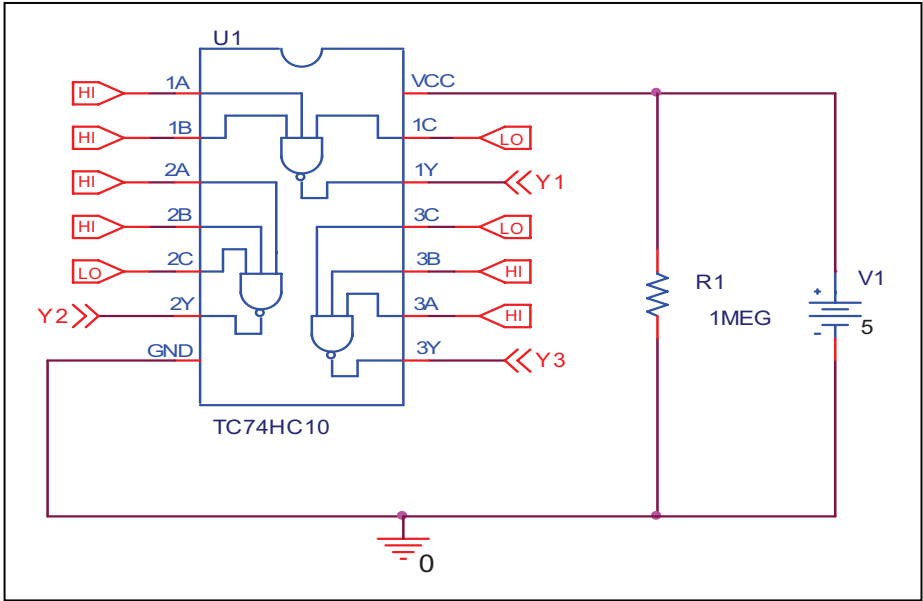
Input			Output		%Error
An	Bn	Cn	Yn (Measurement)	Yn (Simulation)	
X	L	X	H	H	0

Truth Table

Circuit simulation result



Evaluation circuit

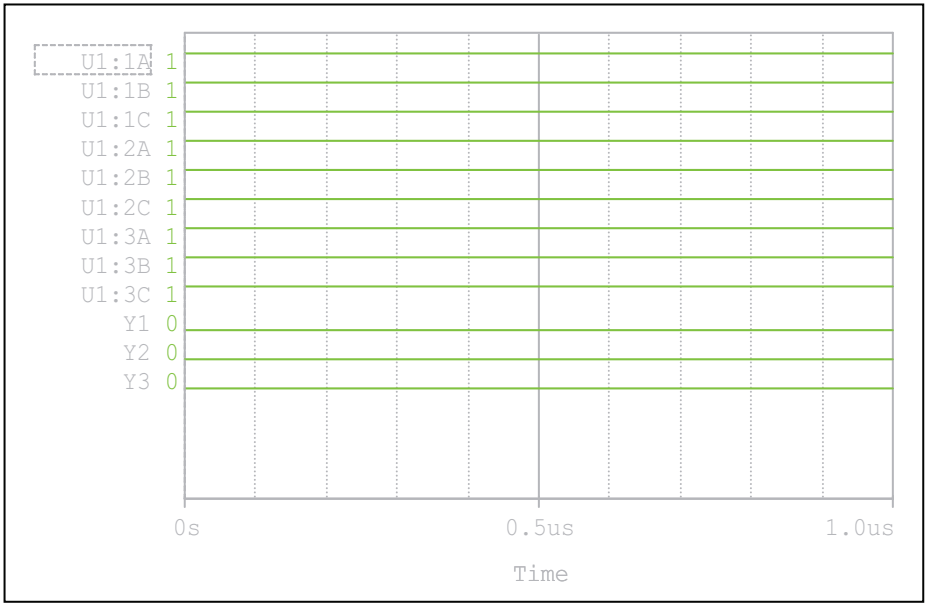


Comparison table

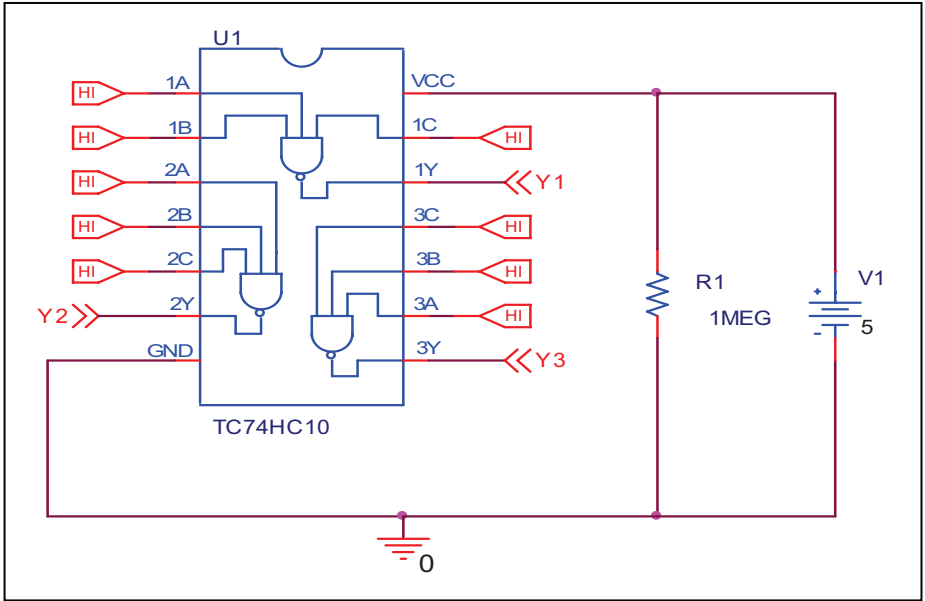
Input			Output		%Error
An	Bn	Cn	Yn (Measurement)	Yn (Simulation)	
X	X	L	H	H	0

Truth Table

Circuit simulation result



Evaluation circuit

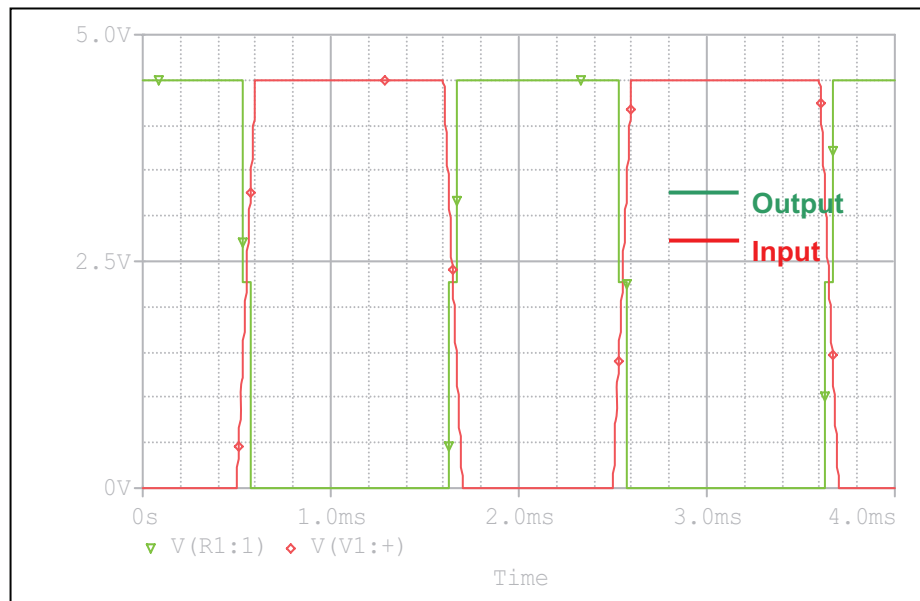


Comparison table

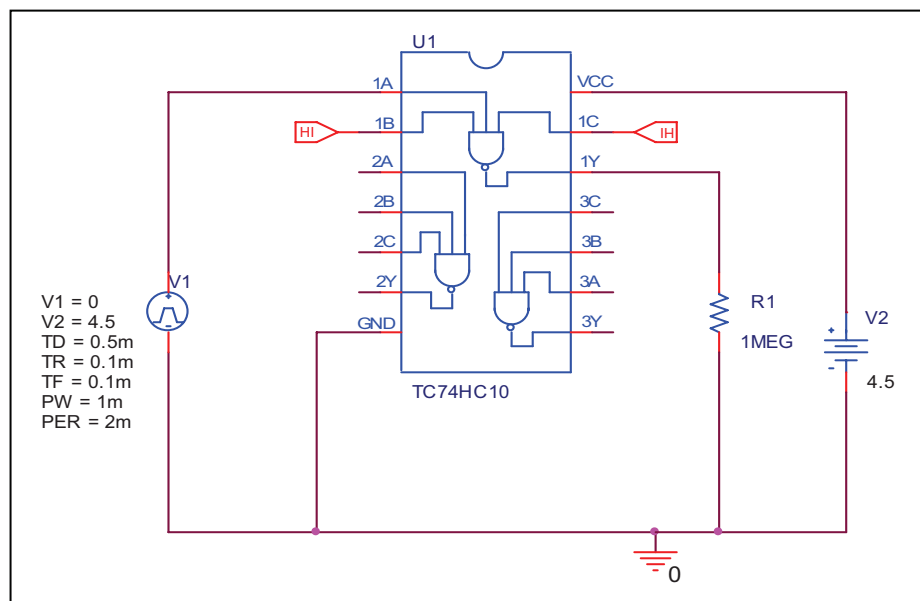
Input			Output		%Error
An	Bn	Cn	Yn (Measurement)	Yn (Simulation)	
H	H	H	L	L	0

High Level and Low Level Input Voltage

Circuit simulation result



Evaluation circuit

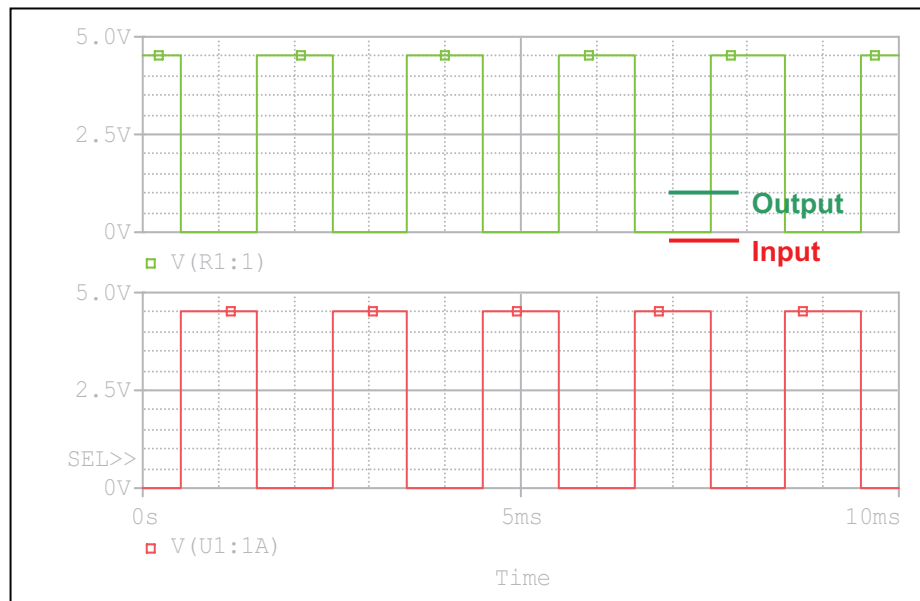


Comparison table

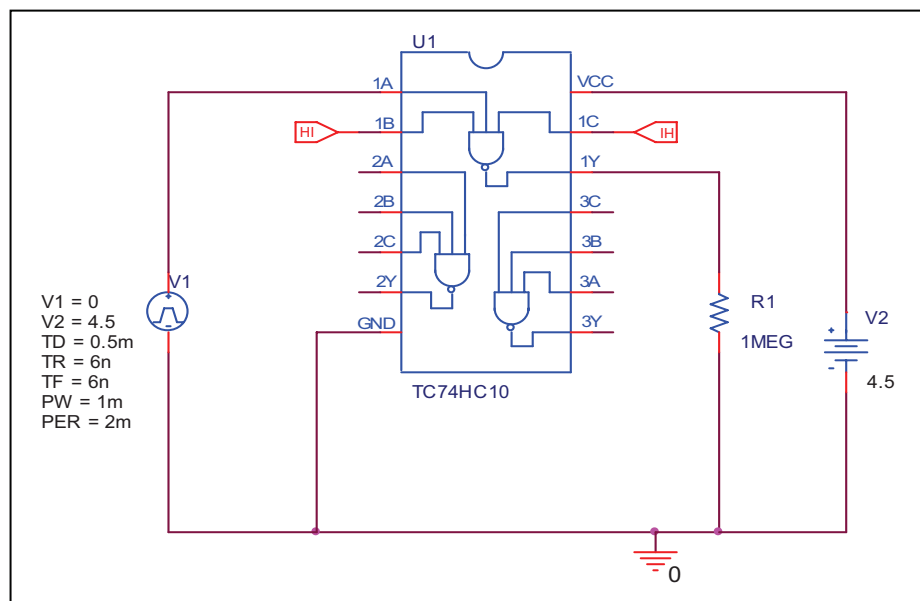
$V_{CC} = 4.5V$	Measurement	Simulation	%Error
$V_{IH} (V)$	3.15	3.1506	0.019
$V_{IL} (V)$	1.35	1.3456	-0.326

High Level and Low Level Output Voltage

Circuit simulation result



Evaluation circuit

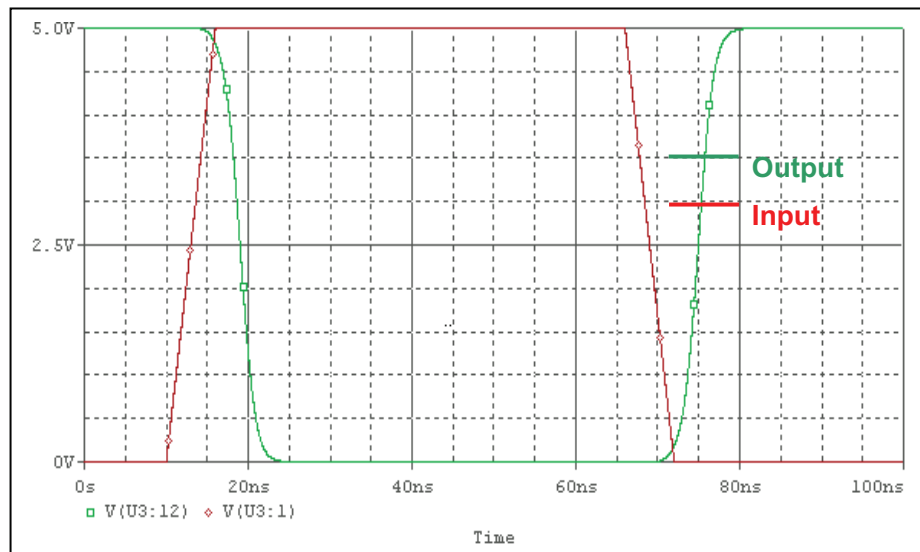


Comparison table

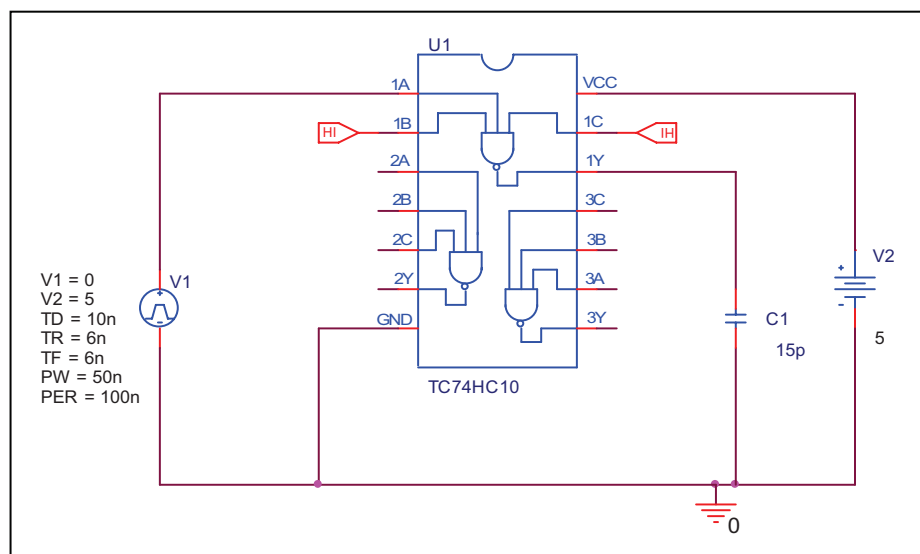
$V_{CC} = 4.5V$	Measurement	Simulation	%Error
$V_{OH} (V)$	4.5	4.4975	-0.056
$V_{OL} (V)$	0	0	0

Propagation Delay Time

Circuit simulation result



Evaluation circuit



Comparison table

$C_L=15\text{pF}, V_{CC} = 5\text{V}, t_r=t_f=6\text{ns}$	Measurement	Simulation	%Error
$t_{TLH} \text{ (ns)}$	4	3.9923	-0.192
$t_{THL} \text{ (ns)}$	4	3.9859	-0.353
$T_{pLH} \text{ (ns)}$	6	5.9484	-0.860
$T_{pHL} \text{ (ns)}$	6	6.0081	0.135