

Device Modeling Report

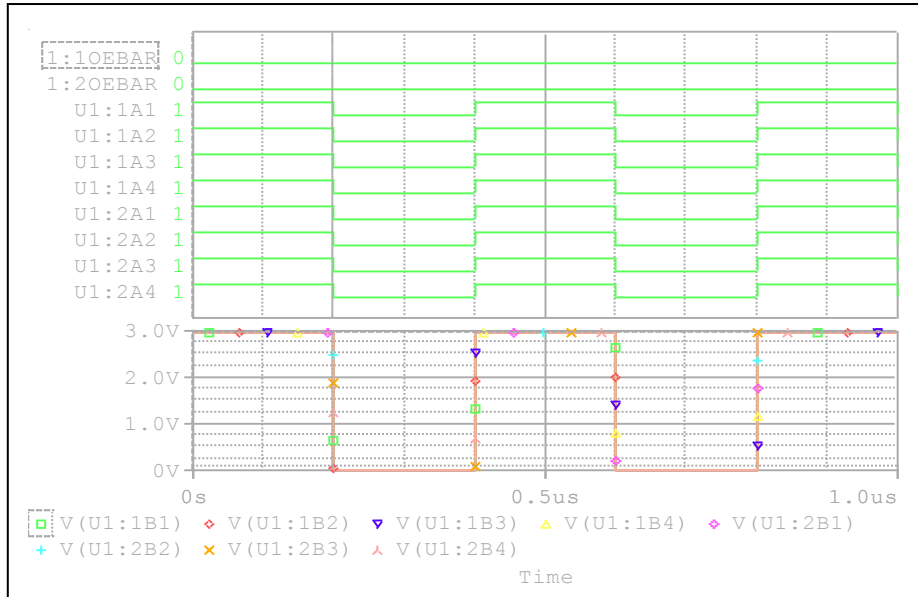
COMPONENTS : CMOS DIGITAL INTEGRATED CIRCUIT
PART NUMBER : TC7MBD3244AFK
MANUFACTURER : TOSHIBA



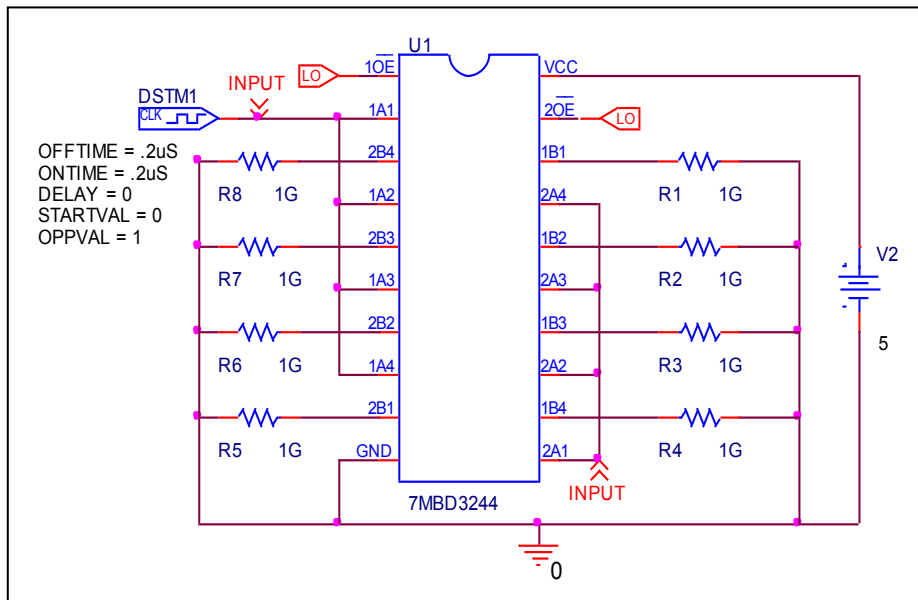
Bee Technologies Inc.

Truth Table

Circuit simulation result



Evaluation circuit



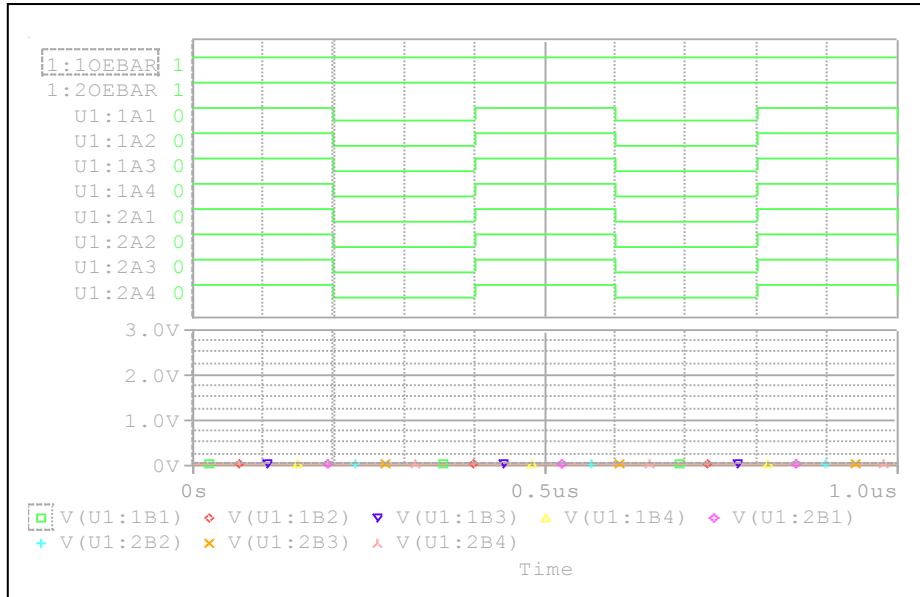
Comparison table

Function : A port = B port

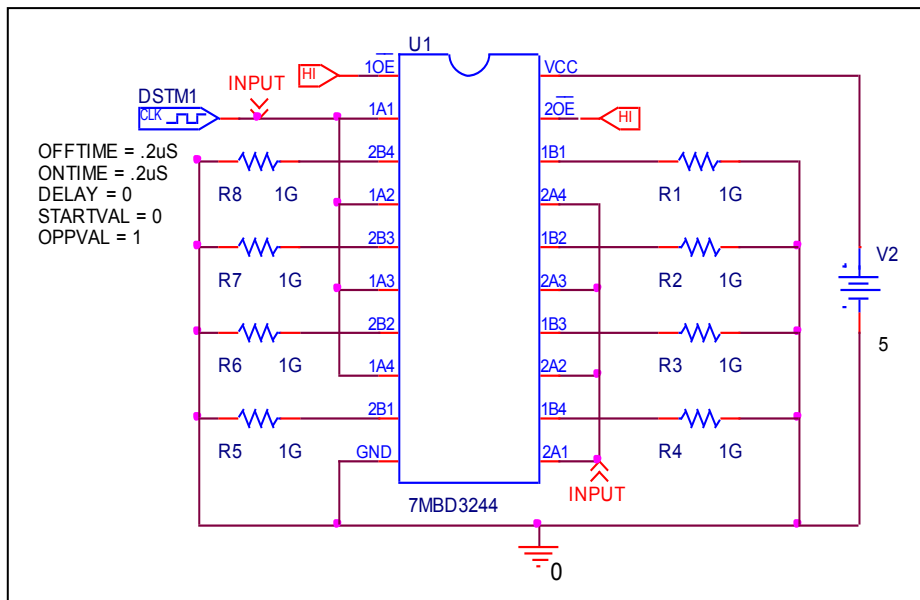
Input	Output		%Error
	Measurement	Simulation	
OE			
L	A=B	A=B	0

Truth Table

Circuit simulation result



Evaluation circuit



Comparison table

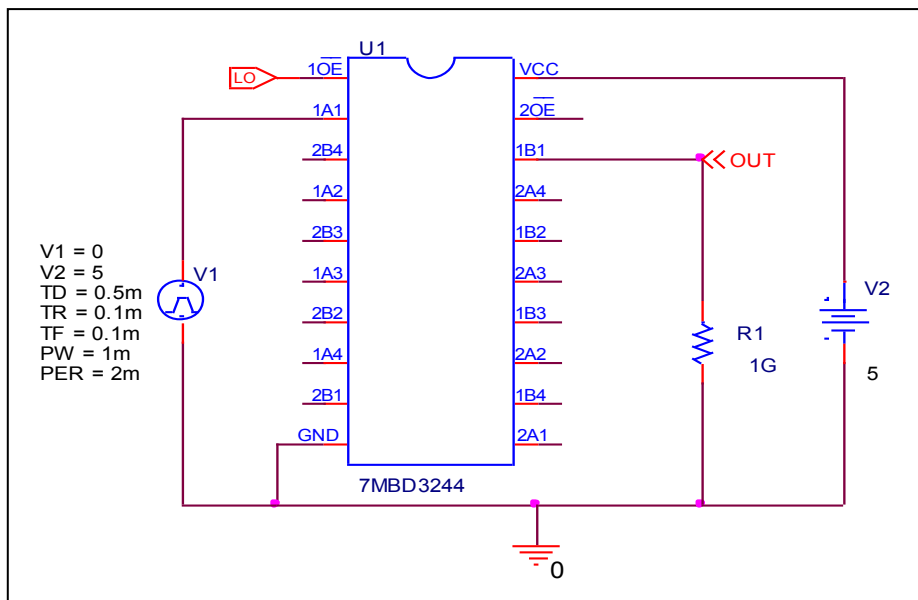
Input	Output		%Error
	Measurement	Simulation	
OE			
H	Disconnect	Disconnect	0

High Level and Low Level Input Voltage

Circuit simulation result



Evaluation circuit

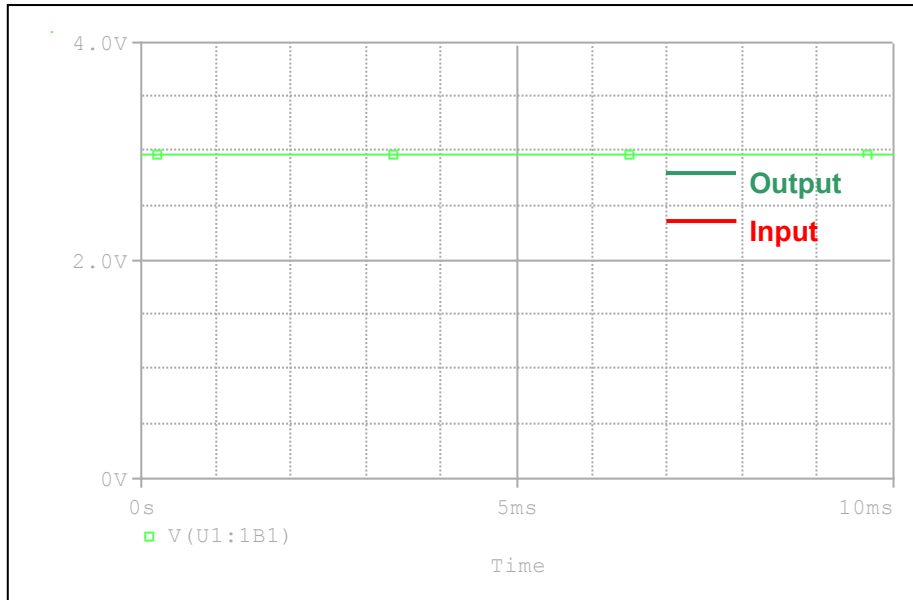


Comparison table

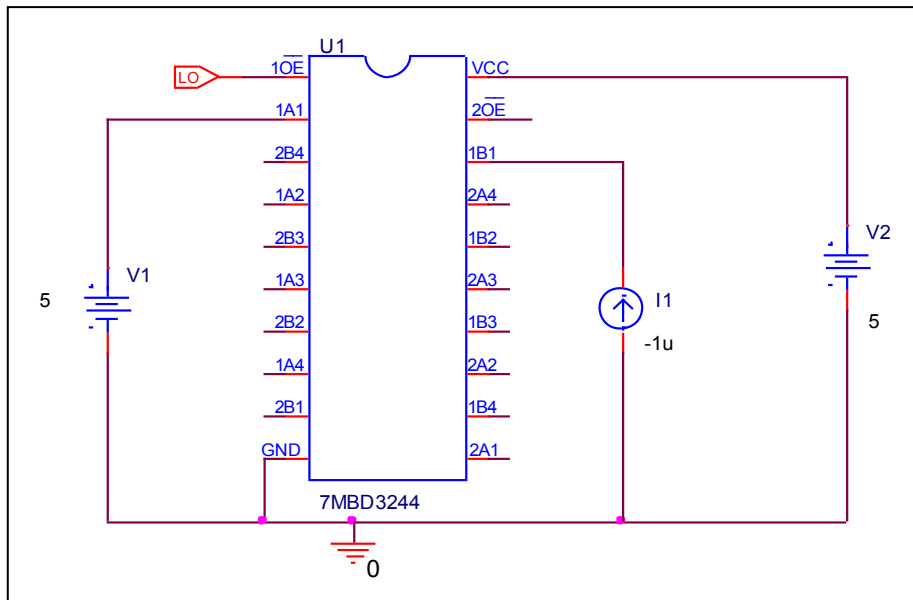
$V_{CC} = 5\text{ V}$	Measurement	Simulation	%Error
$V_{IH} (V)$	2	1.9	-5.000
$V_{IL} (V)$	0.8	0.799	-0.125

High Level Output Voltage

Circuit simulation result



Evaluation circuit

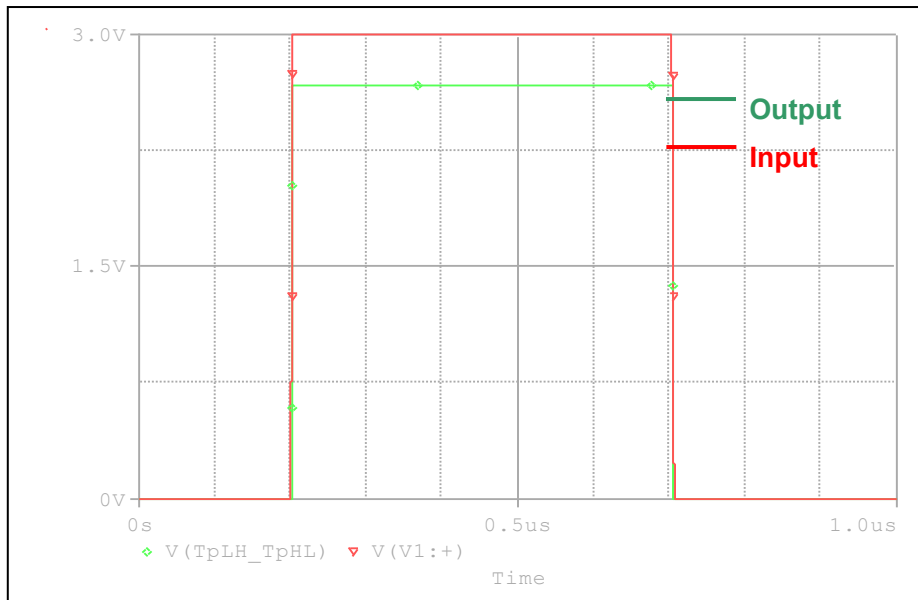


Comparison table

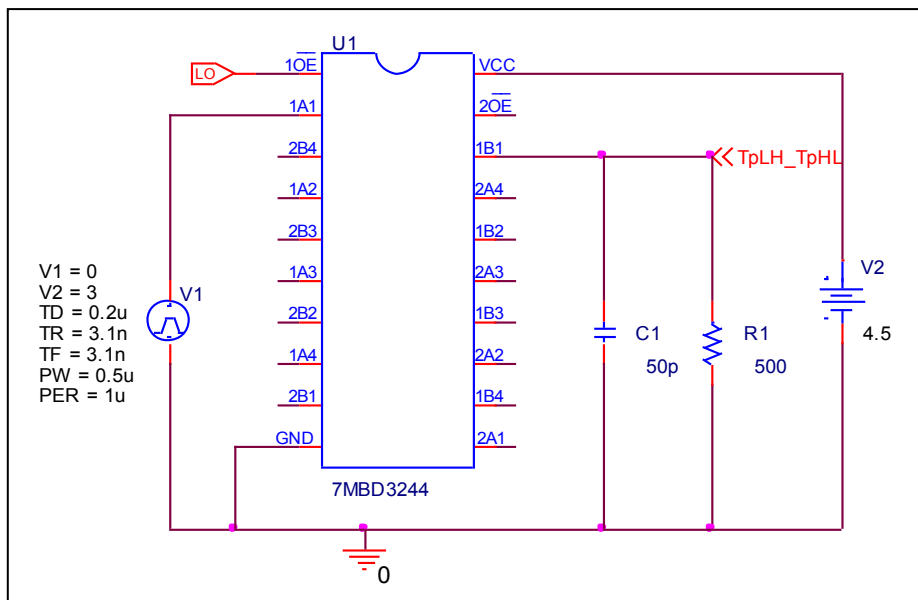
V_{CC} = 5V	Measurement	Simulation	%Error
V_{OH} (V)	3	2.9762	-0.793

Propagation Delay Time

Circuit simulation result



Evaluation circuit

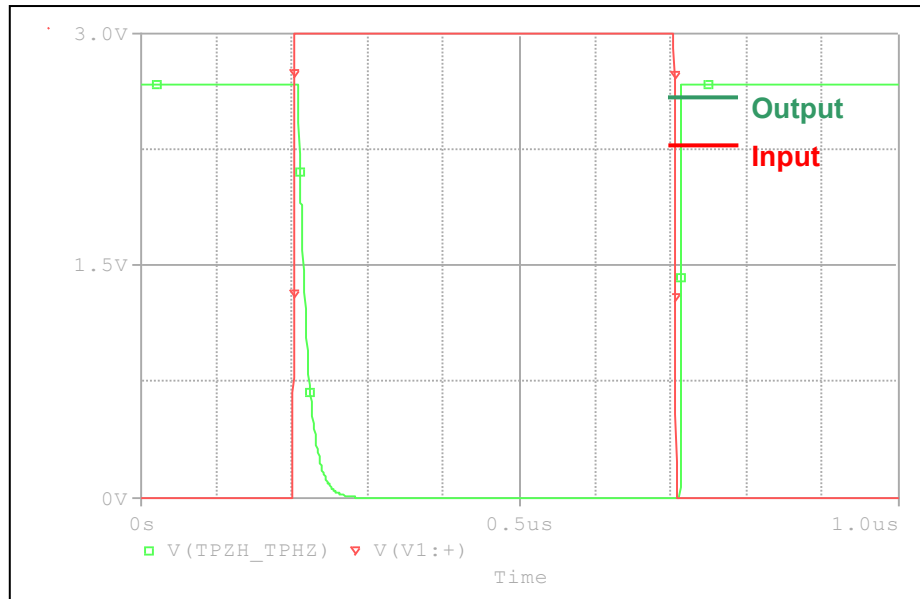


Comparison table $C_L = 50 \text{ pF}$, $R_L = 500 \Omega$

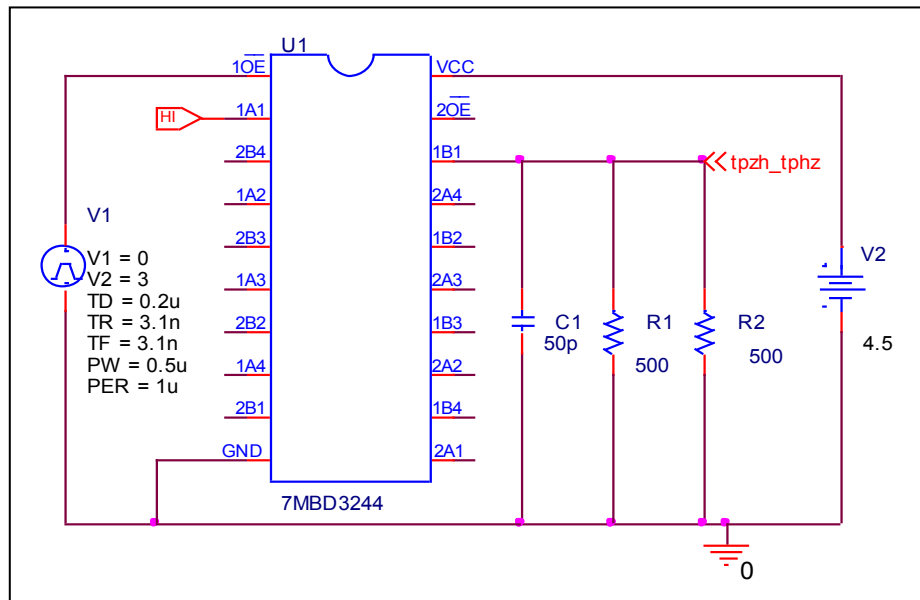
$t_r = t_f = 2.5\text{ns}$	Measurement	Simulation	%Error
$t_{pLH} \text{ (ns)}$	0.32	0.322209	0.690
$t_{pHL} \text{ (ns)}$	0.32	0.319941	-0.018

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

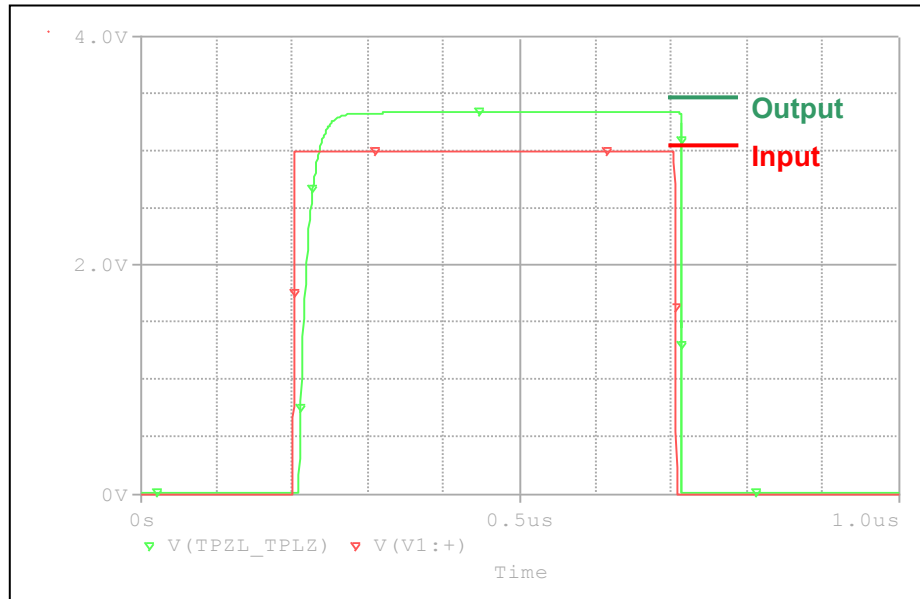


Comparison table $C_L = 50 \text{ pF}$, $R_L = 500 \Omega$

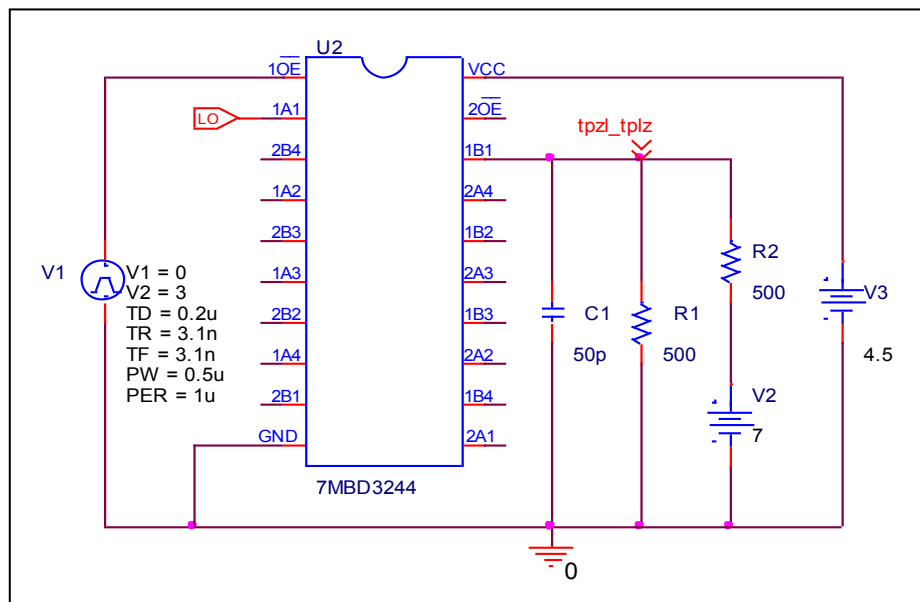
$t_r = t_f = 2.5 \text{ ns}$	Measurement	Simulation	%Error
$t_{PZH} \text{ (ns)}$	7	6.9501	-0.713
$t_{PHZ} \text{ (ns)}$	7	6.9467	-0.761

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

$t_r = t_f = 2.5\text{ns}$	Measurement	Simulation	%Error
$t_{PZL} \text{ (ns)}$	7	7.0501	0.716
$t_{PLZ} \text{ (ns)}$	7	6.9453	-0.781