



U74LVC4T3144

Preliminary

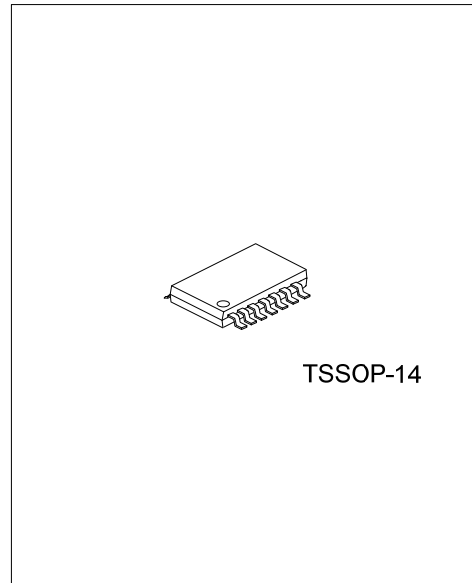
CMOS IC

4-BIT DUAL SUPPLY LEVEL TRANSLATING BUFFER; 3-STATE

DESCRIPTION

The **U74LVC4T3144** is a 4-bit, dual-supply level translating buffer with 3-state outputs. It features four data inputs (An and B4), four data outputs (YBn and YA4), and an output enable input (\overline{OE}). The device is configured to translate three inputs from V_{CCA} to V_{CCB} and one input from V_{CCB} to V_{CCA} . \overline{OE} , An and YA4 are referenced to V_{CCA} and YBn and B4 are referenced to V_{CCB} . A HIGH on \overline{OE} causes the outputs to assume a high-impedance OFF-state.

The device is fully specified for partial power-down applications using I_{OFF} . The I_{OFF} circuitry disables outputs, preventing any damaging backflow current through the device when it is powered down. In suspend mode when either V_{CCA} or V_{CCB} are at GND level, all outputs are in the high-impedance OFF-state.



FEATURES

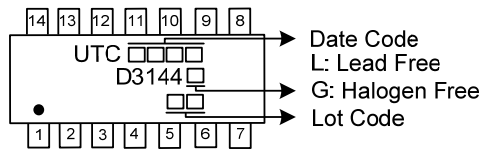
- * Wide supply voltage range:
 V_{CCA} : 1.2V to 5.5V and V_{CCB} : 1.2V to 5.5V
- * Inputs accept voltages up to 5.5V
- * Low power consumption: 30 μ A maximum I_{CC}
- * ± 24 mA Output Drive at 3V
- * I_{OFF} Supports Partial-Power-Down Mode Operation

ORDERING INFORMATION

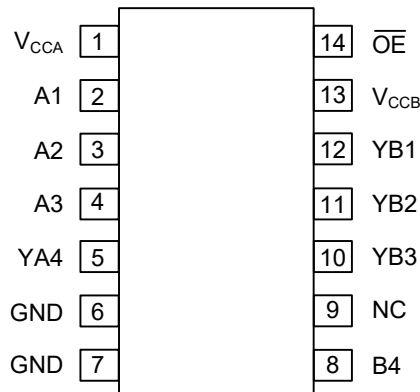
Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74LVC4T3144L-P14-R	U74LVC4T3144G-P14-R	TSSOP-14	Tape Reel

<p>U74LVC4T3144G-P14-R</p> <p>(1) Packing Type (2) Package Type (3) Green Package</p>	<p>(1) R: Tape Reel (2) P14: TSSOP-14 (3) G: Halogen Free and Lead Free, L: Lead Free</p>
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MARKING



PIN CONFIGURATION



PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	V _{CCA}	Supply voltage A (An inputs, YA4 output and \overline{OE} input are referenced to V _{CCA})
2, 3, 4	A1, A2, A3	Data input
5	YA4	Data output
6, 7	GND	Ground (0V)
8	B4	Data input
9	NC	Not connected
10, 11, 12	YB1, YB2, YB3	Data output
13	V _{CCB}	Supply voltage B (YBn outputs and B4 input are referenced to V _{CCB})
14	\overline{OE}	Output enable input (active LOW)

FUNCTION TABLE (each gate)

SUPPLY VOLTAGE (V _{CCA} , V _{CCB})	CONTROL (\overline{OE})	INPUT(A _n , B ₄)	OUTPUT(YB _n , YA ₄)
1.2V to 5.5V	L	L	L
1.2V to 5.5V	L	H	H
1.2V to 5.5V	H	X	Z
GND	X	X	Z

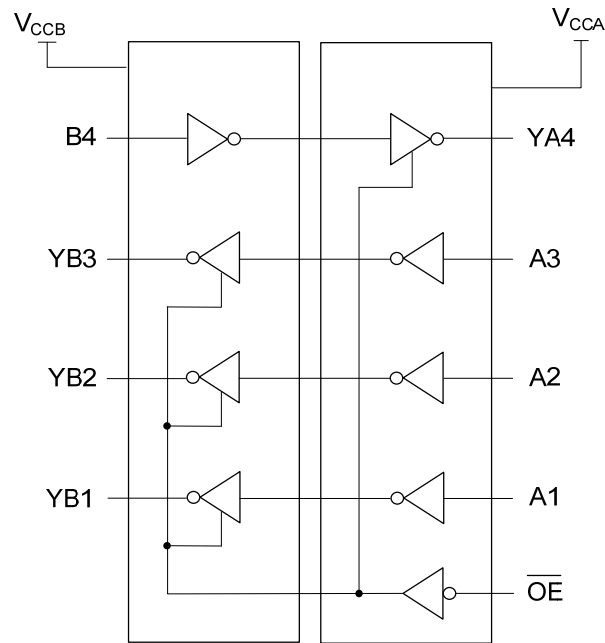
Notes: 1. H = HIGH voltage level; L = LOW voltage level; X = don't care; Z = high-impedance OFF-state.

2. The A_n inputs, YA₄ output and OE input are referenced to V_{CCA}.

The YB_n outputs and B₄ input are referenced to V_{CCB}.

3. If at least one of V_{CCA} or V_{CCB} is at GND level, the device goes into suspend mode.

■ LOGIC DIAGRAM (LOGIC SYMBOL)



■ ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	TEST CONDITIONS	RATINGS	UNIT
Supply Voltage	V_{CCA}		-0.5 ~ 6.5	V
Supply Voltage	V_{CCB}		-0.5 ~ 6.5	V
Input Voltage (Note 2)	V_{IN}	A Port	-0.5 ~ 6.5	V
		B Port	-0.5 ~ 6.5	V
		Control Input	-0.5 ~ 6.5	V
Voltage applied to any output in the high-impedance or power off state (Note 2)	V_{OUT}	A Port	-0.5 ~ 6.5	V
		B Port	-0.5 ~ 6.5	V
Voltage applied to any output in the high or low state (Note 2, 3, 4)	V_{OUT}	A Port	-0.5 ~ $V_{CCA}+0.5$	V
		B Port	-0.5 ~ $V_{CCB}+0.5$	V
Continuous Output Current (Note 2)	I_{OUT}	$V_{OUT}=0V$ to V_{CCO}	±50	mA
Supply Current	I_{CC}	I_{CCA} or I_{CCB} , per V_{CC} Pin	100	mA
Ground Current	I_{GND}	Per V_{CC} Pin	-100	mA
Input Clamp Current	I_{IK}	$V_{IN}<0V$	-50	mA
Output Clamp Current	I_{OK}	$V_{OUT}<0V$	-50	mA
Power Dissipation	P_D		500	mW
Storage Temperature Range	T_{STG}		-65 ~ +150	°C

Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Absolute maximum ratings are stress ratings only and functional device operation is not implied.

2. The input negative-voltage and output voltage ratings may be exceeded if the input and output current ratings are observed.

3. V_{CCO} is the supply voltage associated with the output port.

4. $V_{CCO} + 0.5V$ should not exceed 6.5V

■ RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	V_{CCA}		1.2		5.5	V
Supply Voltage	V_{CCB}		1.2		5.5	V
Input Voltage	V_{IN}		0		5.5	V
Output Voltage	V_{OUT}	Active mode (Note 1)	0		V_{CCO}	V
		Suspend or 3-state mode	0		5.5	V
Input Transition Rise or Fall Rate	$\Delta t/\Delta v$	$V_{CCI}=1.2V$ (Note 2)			20	ns/V
		$V_{CCI}=1.4V\sim 1.95V$			20	ns/V
		$V_{CCI}=2.3V\sim 2.7V$			20	ns/V
		$V_{CCI}=3V\sim 3.6V$			10	ns/V
		$V_{CCI}=4.5V\sim 5.5V$			5	ns/V
Operating Temperature	T_A		-40		+125	°C

Notes: 1. V_{CCO} is the supply voltage associated with the output port.

2. V_{CCI} is the supply voltage associated with the input port.

■ ELECTRICAL CHARACTERISTICS (Unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	T _A =25°C			T _A =-40°C~+125°C			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
High-Level Input Voltage	Data Inputs (Note 1)	V _{CCI} =1.2V	V _{CCI} × 0.8			V _{CCI} × 0.8			V
		V _{CCI} =1.4V~1.95V	V _{CCI} × 0.65			V _{CCI} × 0.65			V
		V _{CCI} =2.3V~2.7V	1.7			1.7			V
		V _{CCI} =3V~3.6V	2			2			V
		V _{CCI} =4.5V~5.5V	V _{CCI} × 0.7			V _{CCI} × 0.7			V
	$\overline{\text{OE}}$ input	V _{CCI} =1.2V	V _{CCA} × 0.8			V _{CCA} × 0.8			V
		V _{CCI} =1.4V~1.95V	V _{CCA} × 0.65			V _{CCA} × 0.65			V
		V _{CCI} =2.3V~2.7V	1.7			1.7			V
		V _{CCI} =3V~3.6V	2			2			V
		V _{CCI} =4.5V~5.5V	V _{CCA} × 0.7			V _{CCA} × 0.7			V
Low-Level Input Voltage	Data Inputs (Note 1)	V _{CCI} =1.2V			V _{CCI} × 0.2			V _{CCI} × 0.2	V
		V _{CCI} =1.65V~1.95V			V _{CCI} × 0.35			V _{CCI} × 0.35	V
		V _{CCI} =2.3V~2.7V			0.7			0.7	V
		V _{CCI} =3V~3.6V			0.8			0.8	V
		V _{CCI} =4.5V~5.5V			V _{CCI} × 0.3			V _{CCI} × 0.3	V
	$\overline{\text{OE}}$ input	V _{CCI} =1.2V			V _{CCA} × 0.2			V _{CCA} × 0.2	V
		V _{CCI} =1.65V~1.95V			V _{CCA} × 0.35			V _{CCA} × 0.35	V
		V _{CCI} =2.3V~2.7V			0.7			0.7	V
		V _{CCI} =3V~3.6V			0.8			0.8	V
		V _{CCI} =4.5V~5.5V			V _{CCA} × 0.3			V _{CCA} × 0.3	V
Output High Voltage	YBn, YA4	V _{OH}	V _I =V _{IH}	I _O =-100μA, V _{CCO} =1.2V~4.5V	V _{CCO} -0.1		V _{CCO} -0.1		V
				I _O =-6mA, V _{CCO} =1.4V	1.0		1.0		V
				I _O =-8mA, V _{CCO} =1.65V	1.2		1.2		V
				I _O =-12mA, V _{CCO} =2.3V	1.9		1.9		V
				I _O =-24mA, V _{CCO} =3.0V	2.4		2.4		V
				I _O =-24mA, V _{CCO} =4.5V	3.85		3.85		V
				I _O =-32mA, V _{CCO} =4.5V	3.8		3.8		V
Output Low Voltage	YBn, YA4	V _{OL}	V _I =V _{IL}	I _O =100μA, V _{CCO} =1.2V~4.5V		0.1		0.1	V
				I _O =6mA, V _{CCO} =1.4V		0.3		0.3	V
				I _O =8mA, V _{CCO} =1.65V		0.45		0.45	V
				I _O =12mA, V _{CCO} =2.3V		0.3		0.3	V
				I _O =24mA, V _{CCO} =3.0V		0.55		0.55	V
				I _O =24mA, V _{CCO} =4.5V		0.5		0.5	V
				I _O =32mA, V _{CCO} =4.5V		0.55		0.55	V

■ ELECTRICAL CHARACTERISTICS (Cont.)

PARAMETER	SYMBOL	TEST CONDITIONS	T _A =25°C			T _A =-40°C~+125°C			UNIT				
			MIN	TYP	MAX	MIN	TYP	MAX					
Input Leakage Current	An, B4 and \overline{OE} input	$I_{I(LEAK)}$	$V_{IN}=0V\sim 5.5V, V_{CCI}=1.2V\sim 5.5V$					±1			±10	μA	
Output OFF-State Current	YBn, YA4	I_{OZ}	$V_O=0V$ or $V_{CCO}, V_{CCO}=1.2V\sim 5.5V$					±1			±10	μA	
	YBn, YA4		Suspend Mode $V_O=0V$ or V_{CCO} $V_{CCA}=5.5V, V_{CCB}=0V$					±1			±10	μA	
	YBn, YA4		Suspend Mode $V_O=0V$ or V_{CCO} $V_{CCA}=0V, V_{CCB}=5.5V$					±1			±10	μA	
Power OFF Leakage Current	A Port	I_{OFF}	V_{IN} or $V_{OUT}=0\sim 5.5V, V_{CCA}=0V, V_{CCB}=1.2V\sim 5.5V$					±1			±10	μA	
	B Port		V_{IN} or $V_{OUT}=0\sim 5.5V, V_{CCA}=1.2V\sim 5.5V, V_{CCB}=0V$					±1			±10	μA	
Supply A Current	A Port	I_{CCA}	$V_{IN}=0$ or $V_{CCI}, I_O=0A$	$V_{CCA}=1.2V\sim 5.5V, V_{CCB}=1.2V\sim 5.5V$					15			20	μA
				$V_{CCA}=5.5V, V_{CCB}=0V$					15			20	μA
				$V_{CCA}=0V, V_{CCB}=5.5V$			-2			-4			μA
Supply B Current	B Port	I_{CCB}	$V_{IN}=0$ or $V_{CCI}, I_O=0A$	$V_{CCA}=1.2V\sim 5.5V, V_{CCB}=1.2V\sim 5.5V$					15			20	μA
				$V_{CCA}=5.5V, V_{CCB}=0V$			-2			-4			μA
				$V_{CCA}=0V, V_{CCB}=5.5V$					15			20	μA
Supply A or B Current	A or B Port	$I_{CCA}+I_{CCB}$	$V_{IN}=0$ or $V_{CCI}, I_O=0A$	$V_{CCA}=1.2V\sim 5.5V, V_{CCB}=1.2V\sim 5.5V$					25		30	μA	
Additional Supply Current	\overline{OE} Input	ΔI_{CCA}	Per Input $V_{CCA}=V_{CCB}=3.0V\sim 5.5V$	\overline{OE} Input at $V_{CCA}=0.6A$ A Port at V_{CCA} or GND B Port=OPEN					50			100	μA
Supply Current	A Port			A Port at $V_{CCA}=0.6A$ B Port=OPEN					50			100	μA
Supply Current	B Port			ΔI_{CCB}	B Port at $V_{CCA}=0.6A$ A Port=OPEN					50			100

Notes: 1. V_{CCI} is the supply voltage associated with the input port.

2. V_{CCO} is the supply voltage associated with the output port.

■ SWITCHING CHARACTERISTICS (Unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	T _A =25°C			T _A =-40°C~+125°C			UNIT	
			MIN	TYP	MAX	MIN	TYP	MAX		
Propagation Delay From Input (An) to Output (YBn)	t _{PD}	V _{CCA} =1.5V ±0.1V	V _{CCB} =1.5V±0.1V	1.7		20.7	1.7		22	ns
			V _{CCB} =1.8V±0.15V	1.6		17.1	1.6		18.3	ns
			V _{CCB} =2.5V±0.2V	1.3		12.9	1.3		14	ns
			V _{CCB} =3.3V±0.3V	1.1		11.1	1.1		12.2	ns
			V _{CCB} =5V±0.5V	1.0		9.5	1.0		10.5	ns
		V _{CCA} =1.8V ±0.15V	V _{CCB} =1.5V±0.1V	1.6		19.8	1.6		21	ns
			V _{CCB} =1.8V±0.15V	1.4		16.2	1.4		17.4	ns
			V _{CCB} =2.5V±0.2V	1.2		11.9	1.2		13	ns
			V _{CCB} =3.3V±0.3V	1.0		10.2	1.0		11.2	ns
			V _{CCB} =5V±0.5V	0.9		8.5	0.9		9.3	ns
		V _{CCA} =2.5V ±0.2V	V _{CCB} =1.5V±0.1V	1.6		19	1.6		20.1	ns
			V _{CCB} =1.8V±0.15V	1.3		15.3	1.3		16.4	ns
			V _{CCB} =2.5V±0.2V	1.0		11	1.0		11.9	ns
			V _{CCB} =3.3V±0.3V	0.9		9.1	0.9		9.9	ns
			V _{CCB} =5V±0.5V	0.7		7.2	0.7		7.9	ns
		V _{CCA} =3.3V ±0.3V	V _{CCB} =1.5V±0.1V	1.5		18.5	1.5		19.5	ns
			V _{CCB} =1.8V±0.15V	1.2		14.9	1.2		16	ns
			V _{CCB} =2.5V±0.2V	0.9		10.6	0.9		11.5	ns
			V _{CCB} =3.3V±0.3V	0.8		8.5	0.8		9.3	ns
			V _{CCB} =5V±0.5V	0.7		6.6	0.7		7.3	ns
V _{CCA} =5V ±0.5V	V _{CCB} =1.5V±0.1V	1.5		18.3	1.5		19.4	ns		
	V _{CCB} =1.8V±0.15V	1.2		14.5	1.2		15.6	ns		
	V _{CCB} =2.5V±0.2V	0.9		10.2	0.9		11.1	ns		
	V _{CCB} =3.3V±0.3V	0.7		8.1	0.7		8.8	ns		
	V _{CCB} =5V±0.5V	0.6		6.3	0.6		6.8	ns		
Propagation Delay From Input (B4) to Output (YA4)	t _{PD}	V _{CCA} =1.5V ±0.1V	V _{CCB} =1.5V±0.1V	1.7		20.7	1.7		22	ns
			V _{CCB} =1.8V±0.15V	1.6		19.8	1.6		21	ns
			V _{CCB} =2.5V±0.2V	1.6		19	1.6		20.1	ns
			V _{CCB} =3.3V±0.3V	1.5		18.5	1.5		19.5	ns
			V _{CCB} =5V±0.5V	1.5		18.3	1.5		19.4	ns
		V _{CCA} =1.8V ±0.15V	V _{CCB} =1.5V±0.1V	1.6		17.1	1.6		18.3	ns
			V _{CCB} =1.8V±0.15V	1.4		16.2	1.4		17.4	ns
			V _{CCB} =2.5V±0.2V	1.3		15.3	1.3		16.4	ns
			V _{CCB} =3.3V±0.3V	1.2		14.9	1.2		16	ns
			V _{CCB} =5V±0.5V	1.2		14.5	1.2		15.6	ns
		V _{CCA} =2.5V ±0.2V	V _{CCB} =1.5V±0.1V	1.3		12.9	1.3		14	ns
			V _{CCB} =1.8V±0.15V	1.2		11.9	1.2		13	ns
			V _{CCB} =2.5V±0.2V	1.0		11	1.0		11.9	ns
			V _{CCB} =3.3V±0.3V	0.9		10.6	0.9		11.5	ns
			V _{CCB} =5V±0.5V	0.9		10.2	0.9		11.1	ns
		V _{CCA} =3.3V ±0.3V	V _{CCB} =1.5V±0.1V	1.1		11.1	1.1		12.2	ns
			V _{CCB} =1.8V±0.15V	1.0		10.2	1.0		11.2	ns
			V _{CCB} =2.5V±0.2V	0.9		9.1	0.9		9.9	ns
			V _{CCB} =3.3V±0.3V	0.8		8.5	0.8		9.3	ns
			V _{CCB} =5V±0.5V	0.7		8.1	0.7		8.8	ns
V _{CCA} =5V ±0.5V	V _{CCB} =1.5V±0.1V	1.0		9.5	1.0		10.5	ns		
	V _{CCB} =1.8V±0.15V	0.9		8.5	0.9		9.3	ns		
	V _{CCB} =2.5V±0.2V	0.7		7.2	0.7		7.9	ns		
	V _{CCB} =3.3V±0.3V	0.7		6.6	0.7		7.3	ns		
	V _{CCB} =5V±0.5V	0.6		6.3	0.6		6.8	ns		

SWITCHING CHARACTERISTICS (Cont.)

PARAMETER	SYMBOL	TEST CONDITIONS	T _A =25°C			T _A =-40°C~+125°C			UNIT	
			MIN	TYP	MAX	MIN	TYP	MAX		
Disable Time From Input (OE) to Output (YA4)	t _{dis}	V _{CCA} =1.5V ±0.1V	V _{CCB} =1.5V±0.1V	1.3		11.6	1.3		12.8	ns
			V _{CCB} =1.8V±0.15V	1.3		11.6	1.3		12.8	ns
			V _{CCB} =2.5V±0.2V	1.3		11.6	1.3		12.8	ns
			V _{CCB} =3.3V±0.3V	1.3		11.6	1.3		12.8	ns
			V _{CCB} =5V±0.5V	1.3		11.6	1.3		12.8	ns
		V _{CCA} =1.8V ±0.15V	V _{CCB} =1.5V±0.1V	1.4		10.1	1.4		11.2	ns
			V _{CCB} =1.8V±0.15V	1.4		10.1	1.4		11.2	ns
			V _{CCB} =2.5V±0.2V	1.4		10.1	1.4		11.2	ns
			V _{CCB} =3.3V±0.3V	1.4		10.1	1.4		11.2	ns
			V _{CCB} =5V±0.5V	1.4		10.1	1.4		11.2	ns
		V _{CCA} =2.5V ±0.2V	V _{CCB} =1.5V±0.1V	0.9		7.2	0.9		8.0	ns
			V _{CCB} =1.8V±0.15V	0.9		7.2	0.9		8.0	ns
			V _{CCB} =2.5V±0.2V	0.9		7.2	0.9		8.0	ns
			V _{CCB} =3.3V±0.3V	0.9		7.2	0.9		8.0	ns
			V _{CCB} =5V±0.5V	0.9		7.2	0.9		8.0	ns
		V _{CCA} =3.3V ±0.3V	V _{CCB} =1.5V±0.1V	1.1		7.2	1.1		7.8	ns
			V _{CCB} =1.8V±0.15V	1.1		7.2	1.1		7.8	ns
			V _{CCB} =2.5V±0.2V	1.1		7.2	1.1		7.8	ns
			V _{CCB} =3.3V±0.3V	1.1		7.2	1.1		7.8	ns
			V _{CCB} =5V±0.5V	1.1		7.2	1.1		7.8	ns
V _{CCA} =5V ±0.5V	V _{CCB} =1.5V±0.1V	0.7		5.3	0.7		5.7	ns		
	V _{CCB} =1.8V±0.15V	0.7		5.3	0.7		5.7	ns		
	V _{CCB} =2.5V±0.2V	0.7		5.3	0.7		5.7	ns		
	V _{CCB} =3.3V±0.3V	0.7		5.3	0.7		5.7	ns		
	V _{CCB} =5V±0.5V	0.7		5.3	0.7		5.7	ns		
Disable Time From Input (OE) to Output (YBn)	t _{dis}	V _{CCA} =1.5V ±0.1V	V _{CCB} =1.5V±0.1V	1.5		14.4	1.5		15.8	ns
			V _{CCB} =1.8V±0.15V	1.6		13.2	1.6		14.5	ns
			V _{CCB} =2.5V±0.2V	1.3		10.4	1.3		11.5	ns
			V _{CCB} =3.3V±0.3V	1.5		10.7	1.5		11.1	ns
			V _{CCB} =5V±0.5V	1.2		9.4	1.2		9.7	ns
		V _{CCA} =1.8V ±0.15V	V _{CCB} =1.5V±0.1V	1.4		13.7	1.4		15.2	ns
			V _{CCB} =1.8V±0.15V	1.5		12.3	1.5		13.5	ns
			V _{CCB} =2.5V±0.2V	1.2		9.5	1.2		10.5	ns
			V _{CCB} =3.3V±0.3V	1.4		9.7	1.4		10	ns
			V _{CCB} =5V±0.5V	1.1		8.2	1.1		8.5	ns
		V _{CCA} =2.5V ±0.2V	V _{CCB} =1.5V±0.1V	1.3		12.8	1.3		14	ns
			V _{CCB} =1.8V±0.15V	1.4		11.3	1.4		12.5	ns
			V _{CCB} =2.5V±0.2V	1.1		8.4	1.1		9.3	ns
			V _{CCB} =3.3V±0.3V	1.3		8.5	1.3		9.3	ns
			V _{CCB} =5V±0.5V	1.0		6.9	1.0		7.5	ns
		V _{CCA} =3.3V ±0.3V	V _{CCB} =1.5V±0.1V	1.2		12.3	1.2		13.6	ns
			V _{CCB} =1.8V±0.15V	1.3		10.9	1.3		12.1	ns
			V _{CCB} =2.5V±0.2V	1.0		8.0	1.0		8.8	ns
			V _{CCB} =3.3V±0.3V	1.2		8.0	1.2		8.3	ns
			V _{CCB} =5V±0.5V	0.9		6.3	0.9		6.5	ns
V _{CCA} =5V ±0.5V	V _{CCB} =1.5V±0.1V	1.2		12	1.2		13.3	ns		
	V _{CCB} =1.8V±0.15V	1.3		10.5	1.3		11.7	ns		
	V _{CCB} =2.5V±0.2V	0.9		7.6	0.9		8.4	ns		
	V _{CCB} =3.3V±0.3V	1.2		7.6	1.2		7.9	ns		
	V _{CCB} =5V±0.5V	0.8		5.8	0.8		6.0	ns		

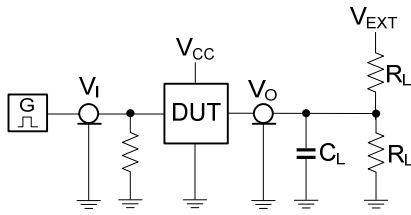
■ SWITCHING CHARACTERISTICS (Unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	T _A =25°C			T _A =-40°C~+125°C			UNIT	
			MIN	TYP	MAX	MIN	TYP	MAX		
Enable Time From Input (OE) to Output (YA4)	t _{en}	V _{CCA} =1.5V ±0.1V	V _{CCB} =1.5V±0.1V	2.1		21.8	2.1		23.2	ns
			V _{CCB} =1.8V±0.15V	2.1		21.8	2.1		23.2	ns
			V _{CCB} =2.5V±0.2V	2.1		21.8	2.1		23.2	ns
			V _{CCB} =3.3V±0.3V	2.1		21.8	2.1		23.2	ns
			V _{CCB} =5V±0.5V	2.1		21.8	2.1		23.2	ns
		V _{CCA} =1.8V ±0.15V	V _{CCB} =1.5V±0.1V	1.8		17.2	1.8		18.4	ns
			V _{CCB} =1.8V±0.15V	1.8		17.2	1.8		18.4	ns
			V _{CCB} =2.5V±0.2V	1.8		17.2	1.8		18.4	ns
			V _{CCB} =3.3V±0.3V	1.8		17.2	1.8		18.4	ns
			V _{CCB} =5V±0.5V	1.8		17.2	1.8		18.4	ns
		V _{CCA} =2.5V ±0.2V	V _{CCB} =1.5V±0.1V	1.4		11.7	1.4		12.7	ns
			V _{CCB} =1.8V±0.15V	1.4		11.7	1.4		12.7	ns
			V _{CCB} =2.5V±0.2V	1.4		11.7	1.4		12.7	ns
			V _{CCB} =3.3V±0.3V	1.4		11.7	1.4		12.7	ns
			V _{CCB} =5V±0.5V	1.4		11.7	1.4		12.7	ns
		V _{CCA} =3.3V ±0.3V	V _{CCB} =1.5V±0.1V	1.2		9.3	1.2		10.1	ns
			V _{CCB} =1.8V±0.15V	1.2		9.3	1.2		10.1	ns
			V _{CCB} =2.5V±0.2V	1.2		9.3	1.2		10.1	ns
			V _{CCB} =3.3V±0.3V	1.2		9.3	1.2		10.1	ns
			V _{CCB} =5V±0.5V	1.2		9.3	1.2		10.1	ns
V _{CCA} =5V ±0.5V	V _{CCB} =1.5V±0.1V	1.1		7.0	1.1		7.7	ns		
	V _{CCB} =1.8V±0.15V	1.1		7.0	1.1		7.7	ns		
	V _{CCB} =2.5V±0.2V	1.1		7.0	1.1		7.7	ns		
	V _{CCB} =3.3V±0.3V	1.1		7.0	1.1		7.7	ns		
	V _{CCB} =5V±0.5V	1.1		7.0	1.1		7.7	ns		
Enable Time From Input (OE) to Output (YBn)	t _{en}	V _{CCA} =1.5V ±0.1V	V _{CCB} =1.5V±0.1V	2.1		22.2	2.1		23.6	ns
			V _{CCB} =1.8V±0.15V	1.8		18.4	1.8		19.6	ns
			V _{CCB} =2.5V±0.2V	1.5		14.2	1.5		15.4	ns
			V _{CCB} =3.3V±0.3V	1.3		12.5	1.3		13.7	ns
			V _{CCB} =5V±0.5V	1.2		11.4	1.2		12.6	ns
		V _{CCA} =1.8V ±0.15V	V _{CCB} =1.5V±0.1V	2.0		21.4	2.0		22.7	ns
			V _{CCB} =1.8V±0.15V	1.7		17.4	1.7		18.7	ns
			V _{CCB} =2.5V±0.2V	1.4		12.9	1.4		14.1	ns
			V _{CCB} =3.3V±0.3V	1.2		11.1	1.2		12.2	ns
			V _{CCB} =5V±0.5V	1.1		9.8	1.1		10.8	ns
		V _{CCA} =2.5V ±0.2V	V _{CCB} =1.5V±0.1V	2.0		20.8	2.0		22	ns
			V _{CCB} =1.8V±0.15V	1.6		16.6	1.6		17.9	ns
			V _{CCB} =2.5V±0.2V	1.3		11.9	1.3		13	ns
			V _{CCB} =3.3V±0.3V	1.2		9.9	1.2		10.8	ns
			V _{CCB} =5V±0.5V	1.0		8.2	1.0		9.0	ns
		V _{CCA} =3.3V ±0.3V	V _{CCB} =1.5V±0.1V	2.0		20.4	2.0		21.6	ns
			V _{CCB} =1.8V±0.15V	1.7		16.5	1.7		17.5	ns
			V _{CCB} =2.5V±0.2V	1.4		11.5	1.4		12.6	ns
			V _{CCB} =3.3V±0.3V	1.2		9.4	1.2		10.3	ns
			V _{CCB} =5V±0.5V	1.0		7.5	1.0		8.3	ns
V _{CCA} =5V ±0.5V	V _{CCB} =1.5V±0.1V	2.0		20.5	2.0		21.7	ns		
	V _{CCB} =1.8V±0.15V	1.7		16.4	1.7		17.4	ns		
	V _{CCB} =2.5V±0.2V	1.4		11.4	1.4		12.5	ns		
	V _{CCB} =3.3V±0.3V	1.2		9.2	1.2		10.1	ns		
	V _{CCB} =5V±0.5V	1.0		7.2	1.0		7.9	ns		

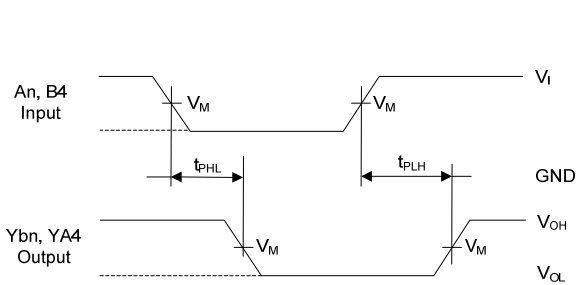
■ OPERATING CHARACTERISTICS ($V_{CCA}=V_{CCB}$, $T_A=25^\circ\text{C}$, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
Input Capacitance	An, B4 and $\overline{\text{OE}}$ Input	C_{IN}	$V_i=0\text{V}$ or 3.3V , $V_{CCA/B}=3.3\text{V}$		3.0		pF	
Output Capacitance	YBn, YA4 Output	C_{IO}	$V_o=0\text{V}$ or 3.3V , $\overline{\text{OE}}$ Input= 3.3V $V_{CCA/B}=3.3\text{V}$		6.5		pF	
Power Dissipation Capacitance	An, B4 Input	C_{PD}	$C_L=0$ $f=1\text{MHz}$ $V_i=\text{GND to } V_{CC}$	$V_{CCB}=1.2\text{V}$		1		pF
				$V_{CCB}=1.5\text{V}$		1		pF
				$V_{CCB}=1.8\text{V}$		1		pF
				$V_{CCB}=2.5\text{V}$		1.5		pF
				$V_{CCB}=3.3\text{V}$		1.5		pF
				$V_{CCB}=5.0\text{V}$		1.7		pF
	YBn, YA4 Output			$V_{CCB}=1.2\text{V}$		12		pF
				$V_{CCB}=1.5\text{V}$		12		pF
				$V_{CCB}=1.8\text{V}$		12		pF
				$V_{CCB}=2.5\text{V}$		12		pF
				$V_{CCB}=3.3\text{V}$		12		pF
				$V_{CCB}=5.0\text{V}$		12		pF

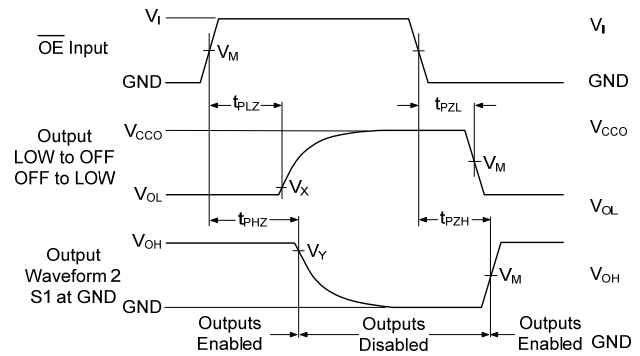
■ TEST CIRCUIT AND WAVEFORMS



LOAD CIRCUIT



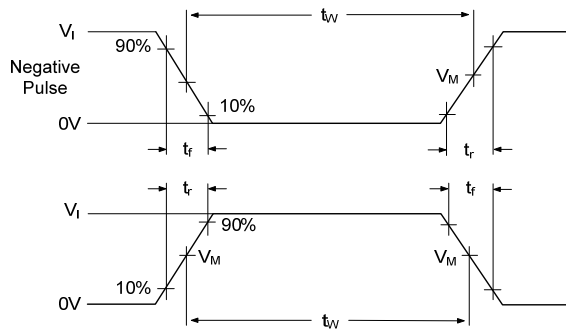
PROPAGATION DELAY TIMES



ENABLE AND DISABLE TIMES

Supply Voltage	Input (Note 1)	Output (Note 2)		
V_{CCA}, V_{CCB}	V_M	V_M	V_X	V_Y
1.2V to 1.6V	$0.5 \times V_{CCI}$	$0.5 \times V_{CCO}$	$V_{OL} + 0.1V$	$V_{OH} + 0.1V$
1.65V to 2.7V	$0.5 \times V_{CCI}$	$0.5 \times V_{CCO}$	$V_{OL} + 0.15V$	$V_{OH} + 0.15V$
3.0V to 5.5V	$0.5 \times V_{CCI}$	$0.5 \times V_{CCO}$	$V_{OL} + 0.3V$	$V_{OH} + 0.3V$

Notes: 1. V_{CCI} is the supply voltage associated with the input port.
 2. V_{CCO} is the supply voltage associated with the output port.



MEASURING SWITCHING TIMES

Supply Voltage	Input		Load		V_{EXT}		
V_{CCA}, V_{CCB}	V_I	$\Delta t/\Delta V$	C_L	R_L	t_{PLH}, t_{PHL}	t_{PZH}, t_{PHZ}	t_{PZL}, t_{PLZ}
1.2V to 5.5V	V_{CCI}	$\leq 1.0 \text{ ns/V}$	15pF	2k Ω	OPEN	GND	$2 \times V_{CCO}$

Notes: 1. V_{CCI} is the supply voltage associated with the input port.
 2. $dV/dt \geq 1.0 \text{ V/ns}$.
 3. V_{CCO} is the supply voltage associated with the output port.

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