

Quadruple 2-Input NAND Gates

General Description

The ET74LVC00A contains four independent 2-input NAND gates operating from a 1.65 to 5.5 V supply.

Features

- Wide Operating Voltage Range:1.65 V to 5.5 V
- 24 mA Balanced Output Sink and Source Capability
- Latch-up performance exceeds 250 mA per JESD 78, Class II
- ESD Protection exceeds JESD 22
 - 2000 V Human-Body Model (A114-A)
 - 1000 V Charged-Device Model (C101)

Device Information

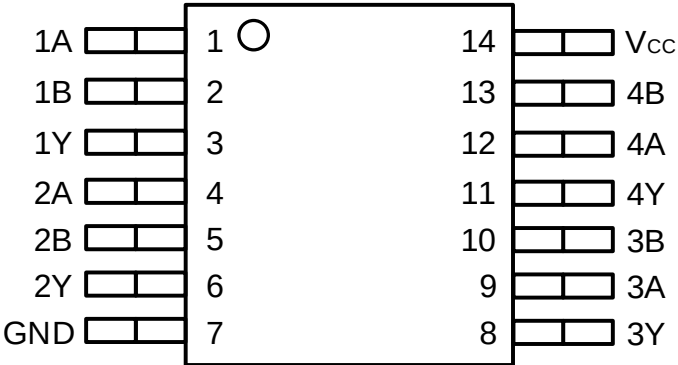
Part No.	Package	Size
ET74LVC00AM14	SOP14	8.65*6mm
ET74LVC00AV	TSSOP14	4.96*6.4mm

Applications

- Mobile Device

ET74LVC00A

Pin Configuration



ET74LVC00AM14
ET74LVC00AV
Figure1. Top View

Pin Function

Pin		I/O	Description
Name	No.		
1A	1	Input	Channel 1, Input A
1B	2	Input	Channel 1, Input B
1Y	3	Output	Channel 1, Output Y
2A	4	Input	Channel 2, Input A
2B	5	Input	Channel 2, Input B
2Y	6	Output	Channel 2, Output Y
GND	7	—	Ground
3Y	8	Output	Channel 3, Output Y
3A	9	Input	Channel 3, Input A
3B	10	Input	Channel 3, Input B
4Y	11	Output	Channel 4, Output Y
4A	12	Input	Channel 4, Input A
4B	13	Input	Channel 4, Input B
V _{CC}	14	—	Positive Supply

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Block Diagram

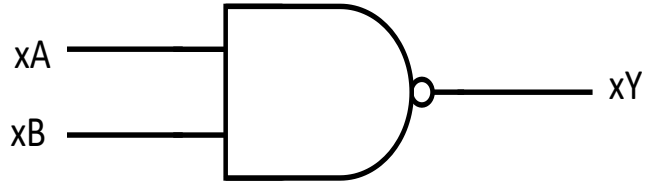


Figure2. Logic Symbol

Functional Description

Function Table

Input		Output
xA	xB	xY
L	L	H
L	H	H
H	L	H
H	H	L

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Absolute Maximum Ratings

Over operating free-air temperature range (unless otherwise noted)

Symbol	Parameter		Value	Unit
V_{CC}	Supply Voltage		-0.5 to 6.5	V
V_I	Input Voltage		-0.5 to 6.5	V
V_O	Output Voltage		-0.5 to $V_{CC}+0.5$	V
I_{IK}	Input Clamp Current ⁽¹⁾	$V_I < -0.5V$	-50	mA
I_{OK}	Output Clamp Current ⁽¹⁾	$V_O < -0.5V$	-50	mA
I_O	Continuous Output Current	$V_O > -0.5V$ or $V_O < V_{CC} + 0.5V$	± 50	mA
I_{CC}	Continuous Current through V_{CC} or GND		± 100	mA
T_J	Max Junction Temperature		150	°C
T_{LEAD}	Lead Temperature (Soldering 10s)		300	°C
T_{STG}	Storage Temperature		-65 to 150	°C
V_{ESD}	Human Body Model (EIA/JESD22-A114-A)		± 2000	V
	Charged Device Model (EIA/JESD22-C101-A)		± 1000	
I_{LU}	Max Latch up Current Above V_{CC} and GND at 125°C (EIA/JESD78)		± 250	mA

Note1: The input and output voltage ratings may be exceeded if the input and output current ratings are observed.

Thermal Characteristics

Symbol	Package	Ratings	Value	Unit
$R_{\theta JA}$	SOP14	Thermal Characteristics, Thermal Resistance, Junction-to-Air		°C/W
	TSSOP14			
P_D	SOP14	Power Dissipation in Still Air at 85°C		mW
	TSSOP14			

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Recommended Operating Conditions

Symbol	Parameter	Conditions	Min	Max	Unit
V_{CC}	Supply Voltage	Operating	1.65	5.5	V
		Data retention only	1.5		V
V_{IH}	High-level Input Voltage	$V_{CC} = 1.65V$ to $1.95V$	$0.65 \times V_{CC}$		V
		$V_{CC} = 2.3V$ to $2.7V$	1.7		V
		$V_{CC} = 2.7V$ to $3.6V$	2		V
		$V_{CC} = 3.6V$ to $5.5V$	2		V
V_{IL}	Low-level Input Voltage	$V_{CC} = 1.65V$ to $1.95V$		$0.35 \times V_{CC}$	V
		$V_{CC} = 2.3V$ to $2.7V$		0.7	V
		$V_{CC} = 2.7V$ to $3.6V$		0.8	V
		$V_{CC} = 3.6V$ to $5.5V$		0.8	V
I_{OH}	High-level Output Current	$V_{CC} = 1.65V$	-4		mA
		$V_{CC} = 2.3V$	-8		mA
		$V_{CC} = 2.7V$	-12		mA
		$V_{CC} = 3V$	-24		mA
		$V_{CC} = 5.5V$	-24		mA
I_{OL}	Low-level Output Current	$V_{CC} = 1.65V$		4	mA
		$V_{CC} = 2.3V$		8	mA
		$V_{CC} = 2.7V$		12	mA
		$V_{CC} = 3V$		24	mA
		$V_{CC} = 5.5V$		24	mA
T_A	Ambient Temperature	Operating in Free Air	-40	125	°C

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Electrical Characteristics

DC Electrical Characteristics

Over operating free-air temperature range; typical values measured at $T_A = 25^\circ \text{C}$ (unless otherwise noted)

Symbol	Parameter	Condition		V _{CC}	Operating Free-air Temperature (T _A)						Unit
					T _A =25°C		-40°C≤T _A ≤85°C		-40°C≤T _A ≤125°C		
					Min	Max	Min	Max	Min	Max	
V _{OH}	High-level Output Voltage	V _I = V _{IH} or V _{IL}	I _{OH} = -100μA	1.65V to 5.5V	V _{CC} - 0.2		V _{CC} - 0.2		V _{CC} - 0.2		V
			I _{OH} = -4mA	1.65V	1.29		1.2		1.05		
			I _{OH} = -8mA	2.3V	1.9		1.7		1.55		
			I _{OH} = -12mA	2.7V	2.2		2.2		2.05		
				3V	2.4		2.4		2.25		
			I _{OH} = -24mA	3V	2.3		2.2		2		
				5.5V	4.8		4.7		4.5		
V _{OL}	Low-level Output Voltage	V _I = V _{IH} or V _{IL}	I _{OL} = 100μA	1.65V to 5.5V		0.1		0.2		0.3	V
			I _{OL} = 4mA	1.65V		0.24		0.45		0.6	
			I _{OL} = 8mA	2.3V		0.3		0.7		0.85	
			I _{OL} = 12mA	2.7V		0.4		0.4		0.6	
			I _{OL} = 24mA	3V		0.55		0.55		0.8	
				5.5V		0.55		0.55		0.8	
			I _I	Input Leakage Current	V _I = V _{CC} or 0		5.5V		±1		
I _{CC}	Supply Current	V _I = V _{CC} or 0	I _O = 0	5.5V		1		10		40	μA
ΔI _{CC}		One Input at V _{CC} - 0.6V, Other Inputs at V _{CC} or GND		1.65V to 5.5V		500		500		5000	μA
C _I	Input Capacitance	V _I = V _{CC} or 0		5.5V		5					pF

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Electrical Characteristics(Continued)

Switching Characteristics

Over operating free-air temperature range; typical values measured at $T_A = 25^\circ\text{C}$ (unless otherwise noted)

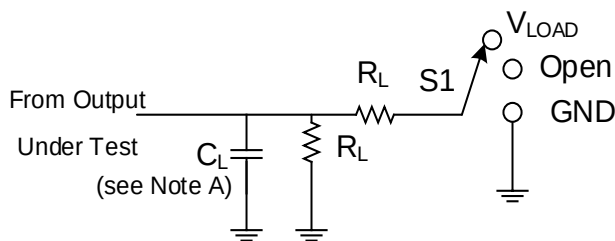
Symbol	Parameter	From	To	V _{CC}	Operating Free-air Temperature (T _A)							Unit
					T _A =25°C			-40°C≤T _A ≤85°C		-40°C≤T _A ≤125°C		
					Min	Typ	Max	Min	Max	Min	Max	
t _{PD}	Propagation Delay	A or B	Y	1.8V ± 0.15V	1	9	13	1	15	1	15.5	ns
				2.5V ± 0.2V	1	5.5	7	1	8	1	8.5	
				2.7V	1	6	7.5	1	9	1	9.5	
				3.3V ± 0.3V	1	4.5	5	1	6	1	6.5	
				5.5V		3.5	4.5		5		5.5	
T _{sk(o)}				3.3V ± 0.3V					1		1	ns

Operating Characteristics

Over operating free-air temperature range; typical values measured at $T_A = 25^\circ\text{C}$ (unless otherwise noted)

Symbol	Parameter	Condition	V_{CC}	Min	Typ	Max	Unit
C_{PD}	Power Dissipation Capacitance Gate	No Load	1.8V		18		pF
			2.5V		18		pF
			3.3V		19		pF
			5.5V		19		pF

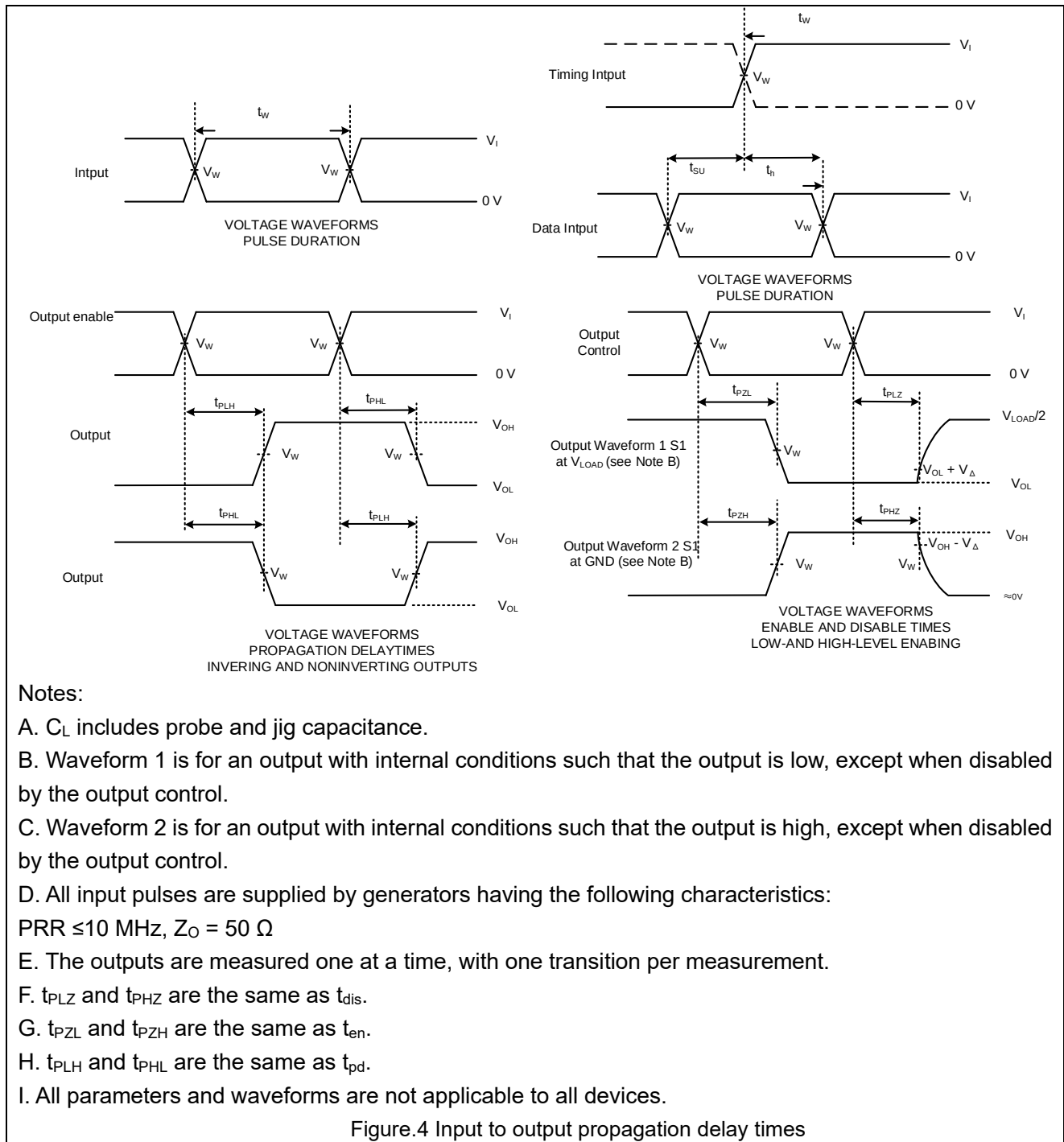
Parameter measurement information



TEST	S1
t_{PLH}/t_{PHL}	V_{LOAD}
t_{PLZ}/t_{PZL}	V_{LOAD}
t_{PHZ}/t_{PZH}	GND

Figure.3 Test circuit for measuring switching times

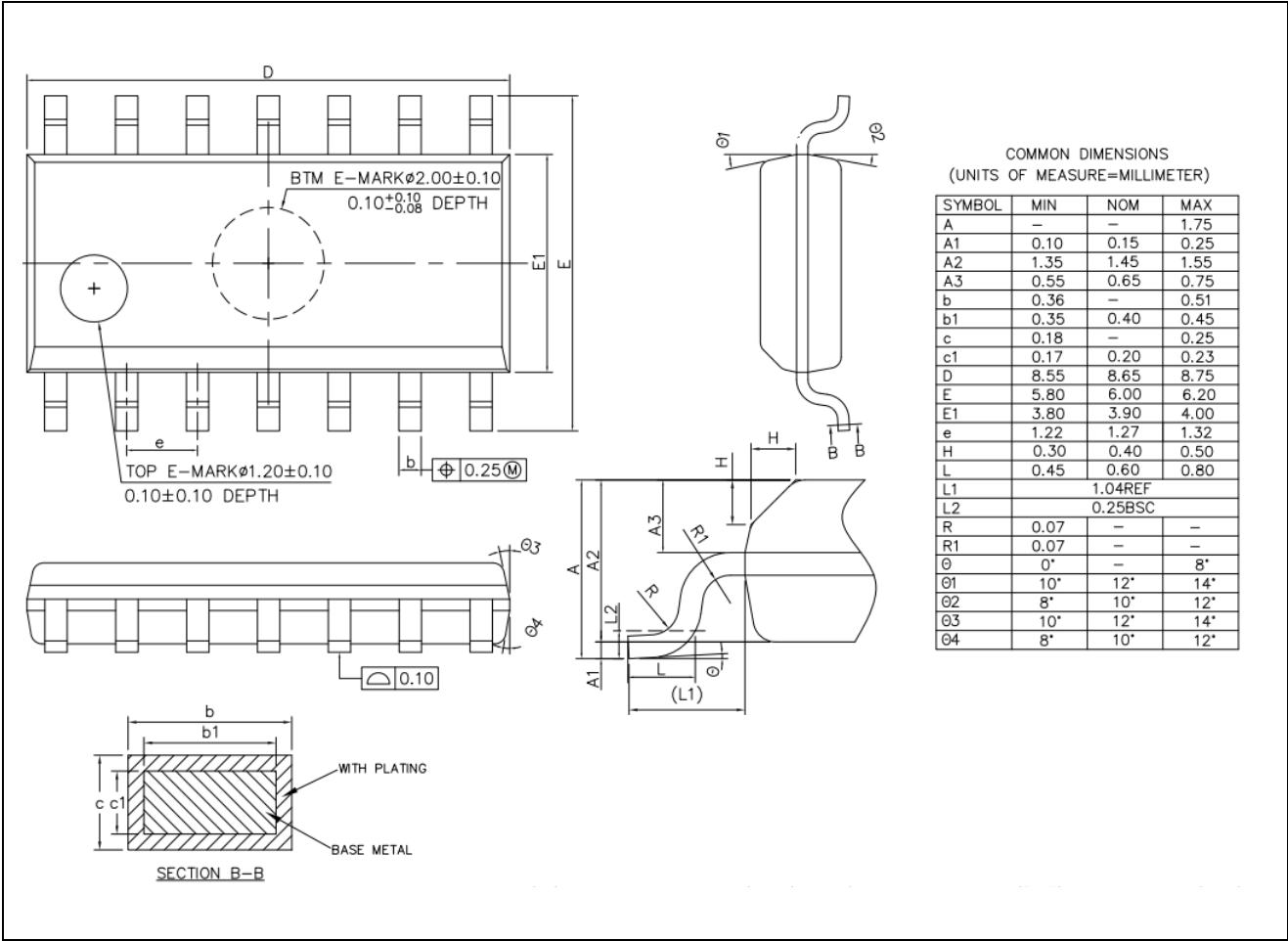
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V_{CC}	Input		V_M	V_{LOAD}	C_L	R_L	V_{Δ}
	V_I	t_r/t_f					
$1.8V \pm 0.15V$	V_{CC}	$\leq 2ns$	$V_{CC}/2$	$2 \times V_{CC}$	30pF	1k Ω	0.15V
$2.5V \pm 0.2V$	V_{CC}	$\leq 2ns$	$V_{CC}/2$	$2 \times V_{CC}$	30pF	500 Ω	0.15V
2.7V	2.7V	$\leq 2.5ns$	1.5V	6V	50pF	500 Ω	0.3V
$3.3V \pm 0.3V$	2.7V	$\leq 2.5ns$	1.5V	6V	50pF	500 Ω	0.3V
5.5V	V_{CC}	$\leq 2.5ns$	$V_{CC}/2$	$2 \times V_{CC}$	50pF	500 Ω	0.3V

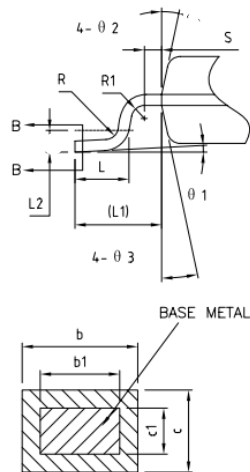
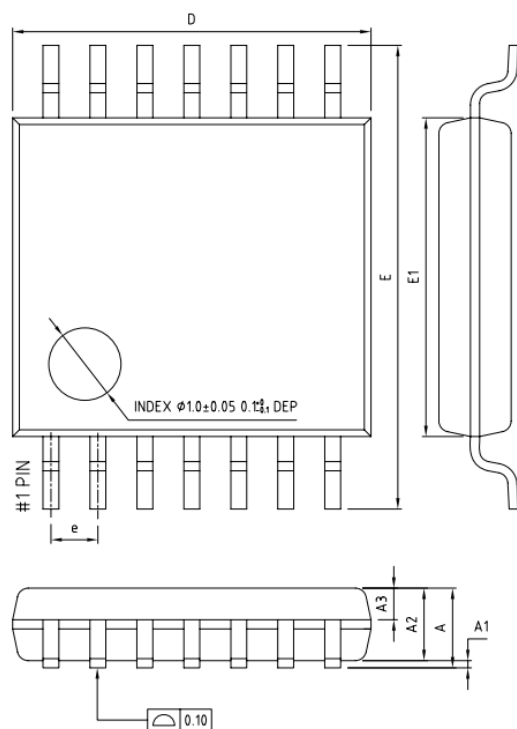
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Package Dimension SOP14



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TSSOP14



COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	—	—	1.20
A1	0.05	—	0.15
A2	0.90	1.00	1.05
A3	0.34	0.44	0.54
b	0.20	—	0.28
b1	0.20	0.22	0.24
c	0.10	—	0.19
c1	0.10	0.13	0.15
D	4.86	4.96	5.06
E	6.20	6.40	6.60
E1	4.30	4.40	4.50
e	0.65BSC		
L	0.45	0.60	0.75
L1	1.00REF		
L2	0.25BSC		
R	0.09	—	—
R1	0.09	—	—
S	0.20	—	—
$\theta 1$	0°	—	8°
$\theta 2$	10°	12°	14°
$\theta 3$	10°	12°	14°

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Revision History and Checking Table

Version	Date	Revision Item	Modifier	Function & Spec Checking	Package & Tape Checking
0.0	2025-02-13	Preliminary Version	Wangar	Tugz	Liujiy