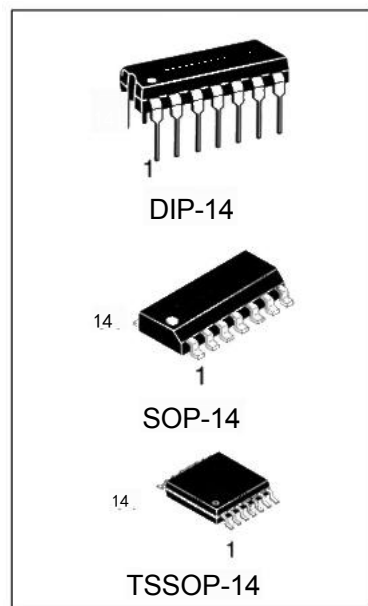


General Description

The 74LVC00 provides four 2-input NAND gates. Inputs can be driven from either 3.3V or 5V devices. This feature allows the use of these devices as translators in mixed 3.3V and 5V applications.

Features

- 5V tolerant inputs for interfacing with 5V logic
- Wide supply voltage range from 1.2V to 3.6V
- CMOS low-power consumption
- Direct interface with TTL levels
- Specified from -40°C to +105°C
- Packaging information: DIP-14/SOP-14/TSSOP-14



Order Information

DEVICE	Package Type	MARKING	Packing	Packing Qty
74LVCOON	DIP-14	74LVC00	TUBE	1000pcs/box
74LVC00MTR	SOP-14	74LVC00	REEL	2500pcs/reel
74LVCOOMT/TR	TSSOP-14	LVC00	REEL	2500pcs/reel

Block Diagram

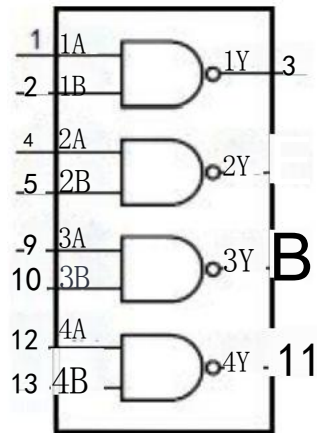


Figure 1.Logic symbol

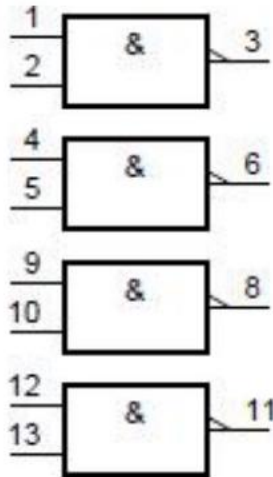


Figure 2.IEC logic symbol

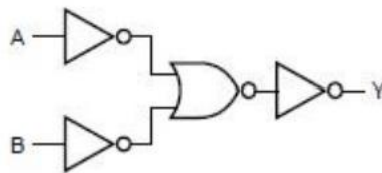
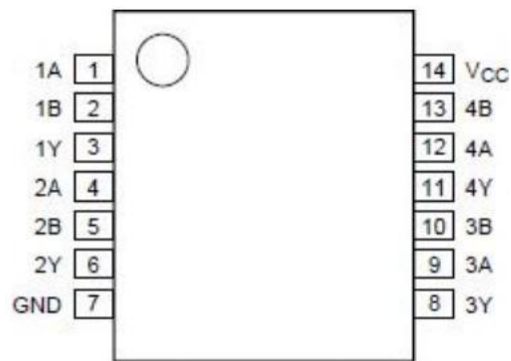


Figure 3.Logic diagram for one gate

Pin Configurations



Pin Description

Pin No	Pin Name	Description
1	1A	data input
2	1B	data input
3	1Y	data output
4	2A	data input
5	2B	data input
6	2Y	data output
7	GND	ground (0V)
8	3Y	data output
9	3A	data input
10	3B	data input
11	4Y	data output
12	4A	data input
13	4B	data input
14	Vcc	supply voltage

Function Table

Input		Output
nA	nB	nY
L	X	H
X	L	H
H	H	L

Note: H=HIGH voltage level;L=LOW voltage level;X=don't care.

Absolute Maximum Ratings

(Voltages are referenced to GND(ground=0V), unless otherwise specified.)

Parameter	Symbol	Conditions	Min.	Max	Unit
supply voltage	Vcc		-0.5	+6.5	V
nput clamping current	Ik	$V_i < 0V$	-50		mA
nput voltage	V_i		-0.5	+6.5	V
output clamping current	Iok	$V_o > V_{cc}$ or $V_o < 0V$		± 50	mA
output voltage	V_o	output in HIGH or LOW-state	-0.5	$V_{cc} + 0.5$	V
output current	I_o	$V_o = 0V$ to V_{cc}		± 50	mA
supply current	Icc			100	mA
ground curren	IGND		-100		mA
total power dissipation	Ptot			500	mW
storage temperature	Tstg		-65	+150	°C
Soldering temperature	TL	10s	DIP	245	°C
			SOP	245	

Note:1、Absolute Maximum Ratings indicate limits beyond which damage to the device may occur. Operating Ratings indicate conditions for which the device is intended to be functional, but specific performance is not ensured.

2、 For DIP14 packages: above 70°C the value of Ptot derates linearly with 12mW/K.

3、 For SOP14 packages: above 70°C the value of Pot derates linearly with 8mW/K.

4、 For (T)SSOP14 packages: above 60°C the value of Ptot derates linearly with 5.5mW/K

Recommended Operating Conditions

Parameter	Symbol	Conditions	Min.	Typ.	Max	Unit
supply voltage	Vcc		1.65		3.6	V
		functional	1.2			V
input voltage	V_i		0		5.5	V
output voltage	V_o	output HIGH or LOW state	0		Vcc	V
ambient temperature	Tamb		-40		+105	°C
input transition rise and fall rate	$\Delta t / \Delta V$	$V_{cc} = 1.65V$ to $2.7V$			20	ns/V
		$V_{cc} = 2.7V$ to $3.6V$			10	ns/N

Electrical Characteristics

DC Characteristics 1

(Tamb=-40°C to +85°C, voltages are referenced to GND(ground=0V), unless otherwise specified.)

Parameter	Symbol	Conditions	Min.	typ.	Max	Unit	
HIGH-level input voltage	VIH	VCC=1.2V	1.08			V	
		VCC=1.65V to 1.95V	$0.65 \times VCC$			V	
		VCC=2.3V to 2.7V	1.7			V	
		VCC=2.7V to 3.6V	2.0			V	
LOW-level input voltage	VIL	VCC=1.2V			0.12	V	
		VCC=1.65V to 1.95V		—	$0.35 \times VCC$	V	
		VCC=2.3V to 2.7V			0.7	V	
		VCC=2.7V to 3.6V			0.8	V	
HIGH-level output voltage	VOH	VI=VIH or VIL	IO=-100uA; VCC=1.65V to 3.6V	VCC-0.2			V
			O=-4mA;VCC=1.65V	1.2			V
			IO=-8mA;VCC=2.3V	1.8			V
			O=-12mA;VCC=2.7V	2.2			V
			O=-18mA;VCC=3.0V	2.4			V
			IO=-24mA;VCC=3.0V	2.2		—	V
LOW-level output voltage	VOL	VI=VIH or VIL	IO=100uA; VCC=1.65V to 3.6V			0.20	V
			IO=4mA;VCC=1.65V			0.45	V
			IO=8mA;VCC=2.3V			0.6	V
			IO=12mA;VCC=2.7V			0.4	V
			IO=24mA;VCC=3.0V			0.55	V
input leakage current	II	VI=5.5V or GND; VCC=3.6V		±0.1	±5	uA	
supply current	ICC	VI=VCC or GND;IO=0A; VCC=3.6V		1.5	15	uA	
additional supply current	ΔICC	per input pin;VI=VCC-0.6V IO=0A;VCC=2.7V to 3.6V		5	500	uA	
input capacitance	CI	VCC=0V to 3.6V;VI=GND to VCC		4.0		pF	

Note:All typical values are measured at Vcc=3.3V(unless stated otherwise)and Tamb=25°C

DC Characteristics 2

(Tamb=-40°C to+105°C, voltages are referenced to GND (ground=0V), unless otherwise specified.

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	
HIGH-level input voltage	ViH	Vcc=1.2V	1.08			V	
		Vcc=1.65V to 1.95V	0.65× Vcc			V	
		Vcc=2.3V to 2.7V	1.7			V	
		Vcc=2.7V to 3.6V	2.0			V	
LOW-level input voltage	VL	Vcc=1.2V	—		0.12	V	
		Vcc=1.65V to 1.95V			0.35× Vcc	V	
		Vcc=2.3V to 2.7V			0.7	V	
		Vcc=2.7V to 3.6V			0.8	V	
HIGH-level output voltage	VoH	Vi=Vih or VL	Io=-100uA; Vcc=1.65V to 3.6V	Vcc- 0.3			V
			Io=-4mA;Vcc=1.65V	1.05			V
			Io=-8mA;Vcc=2.3V	1.65			V
			Io=-12mA;Vcc=2.7V	2.05			V
			Io=-18mA;Vcc=3.0V	2.25			V
			Io=-24mA;Vcc=3.0V	2.0			V
LOW-level output voltage	Vol	Vi=ViH or VL	Io=100uA;Vcc=1.65V to 3.6V			0.30	V
			Io=4mA;Vcc=1.65V			0.65	V
			Io=8mA;Vcc=2.3V			0.8	V
			Io=12mA;Vcc=2.7V			0.6	V
			Io=24mA;Vcc=3.0V			0.8	V
input leakage current	Ii	V=5.5V or GND; Vcc=3.6V			±20	uA	
supply current	Icc	V=Vcc or GND;Io=0A;Vcc=3.6V			40	uA	
additional supply current	ΔIcc	per input pin;Vi=Vcc-0.6V; Io=0A;Vcc=2.7V to 3.6V			5000	uA	

Note:All typical values are measured at Vcc=3.3V(unless stated otherwise)and Tamb=25°C.

AC Characteristics 1

(Tamb=-40°C to +85°C, voltages are referenced to GND (ground=0V), unless otherwise specified.)

Parameter	Symbo	Conditions	Min.	Typ.	Max.	Unit	
nA,nB to nY propagation delay	tpd	see Figure 5	Vcc=1.2V		12		NS
			Vcc=1.65V to 1.95V	0.3	3.8	8.4	nS
			Vcc=2.3V to 2.7V	1.0	2.2	4.8	ns
			VCC=2.7V	1.0	2.3	5.1	nS
			Vcc=3.0V to 3.6V	0.5	2.0	4.3	ns
output skew time	tsk(o)	Vcc=3.0V to 3.6V				1.0	nS
Power dissipation capacitance	CPD	per gate;V= GND to Vcc	Vcc=1.65V to 1.95V		5.6	=	pF
			Vcc=2.3V to 2.7V		8.9		pF
			Vcc=3.0V to 3.6V		11.8		pF

Note:

- (1) Typical values are measured at Tamb=25°C and Vcc=1.2V,1.8V,2.5V,2.7V and 3.3V respectively.
- (2) tpd is the same as tph and tpHl.
- (3) Skew between any two outputs of the same package switching in the same direction. This parameter is guaranteed by design.
- (4) Cpo is used to determine the dynamic power dissipation (Po in uW).
 $Pp=(CpP \times Vcc^2 \times f \times N) + Z(CL \times Vcc^2 \times f)$ where:
 f=input frequency in MHz;
 fo=output frequency in MHz;
 CL=output load capacitance in pF;
 Vcc=supply voltage in V;
 N=number of inputs switching;
 Z(CL×Vcc²×fo)=sum of outputs.

AC Characteristics 2

(Tamb=-40°C to+105°C, voltages are referenced to GND (ground=0V), unless otherwise specified.)

Parameter	Symbo	Conditions	Min.	Typ.	Max.	Unit	
nA,nB to nY propagation delay	tpd	see Figure 5	Vcc=1.65V to 1.95V	0.3		9.7	ns
			Vcc=2.3V to 2.7V	1.0		5.7	ns
			Vcc=2.7V	1.0		5.9	ns
			Vcc=3.0V to 3.6V	0.5		5.1	NS
output skew time	tsk(o)	Vcc=3.0V to 3.6V				1.5	ns

Note:

- (1) Typical values are measured at Tamb=25°C and Vcc=1.2V,1.8V,2.5V,2.7V and 3.3V respectively.
- (2) tpo is the same as tpuhand tpHl.
- (3) Skew between any two outputs of the same package switching in the same direction. This parameter is guaranteed by design.



Testing Circuit AC Testing Circuit

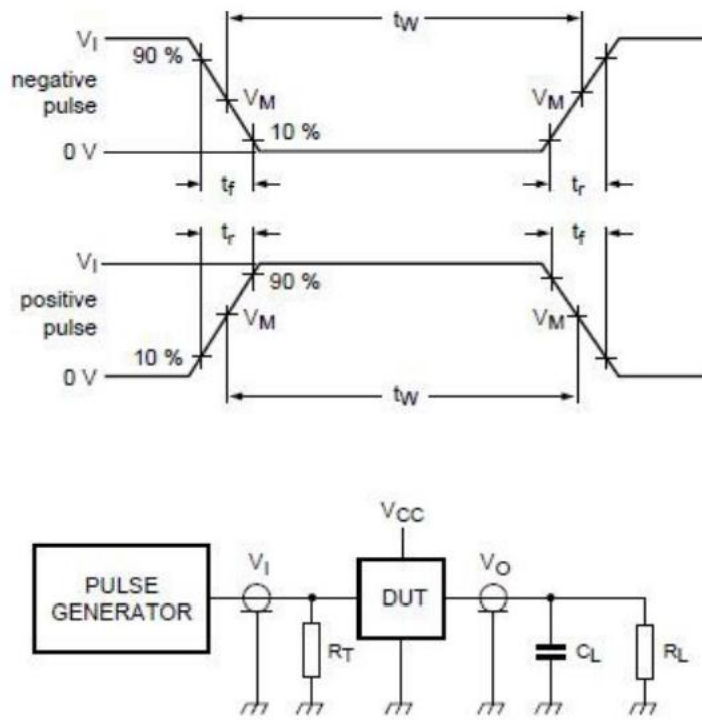


Figure 4. Load circuitry for switching times

Definitions for test circuit:

R_L = Load resistance.

R_r = Termination resistance should be equal to the output impedance Z_o of the pulse generator.

AC Testing Waveforms

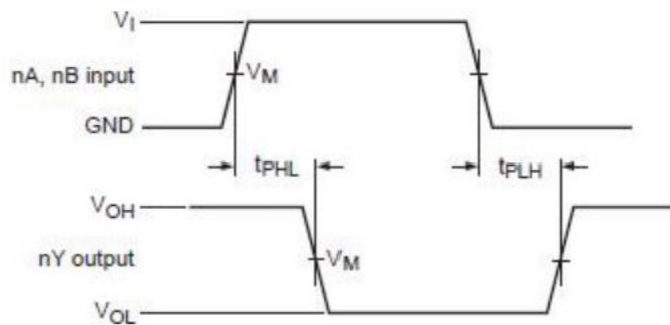


Figure 5. The input (nA, nB) to output (nY) propagation delays

Measurement Points

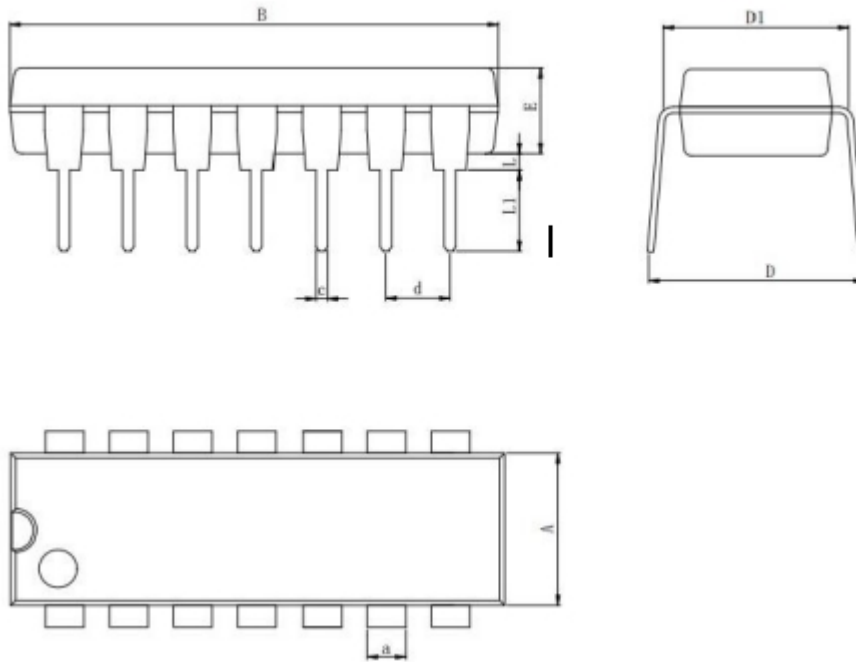
Supply voltage	Input	Output
V _{cc}	V _m	V _M
<2.7V	0.5×V _{cc}	0.5×V _{cc}
≥2.7V	1.5V	1.5V

Test Data

Supply voltage	Input		Load	
V _{cc}	V ₁	t _r ,t _r	CL	RL
1.2V	V _{cc}	≤2.0ns	30pF	1kΩ
1.65V to 1.95V	V _{cc}	≤2.0ns	30pF	1kΩ
2.3V to 2.7V	V _{cc}	≤2.0ns	30pF	500Ω
2.7V	2.7V	≤2.5ns	50pF	500Ω
3.0V to 3.6V	2.7V	≤2.5ns	50pF	500Ω

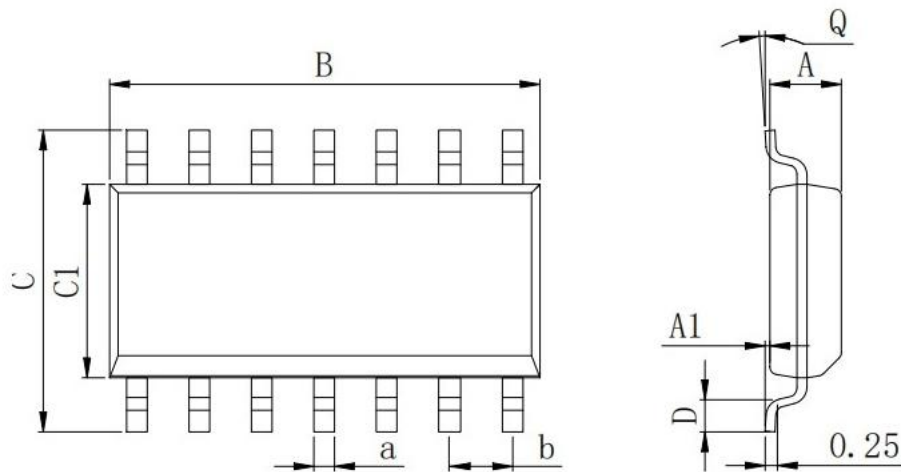
Physical Dimensions

DIP-14



Dimensions In Millimeters(DIP-14)										
Symbol:	A	B	D	D1	E	L	L1	a	C	d
Min:	6.10	18.94	8.10	7.42	3.10	0.50	3.00	1.50	0.40	2.54 BSC
Max:	6.68	19.56	10.9	7.82	3.55	0.70	3.60	1.55	0.50	

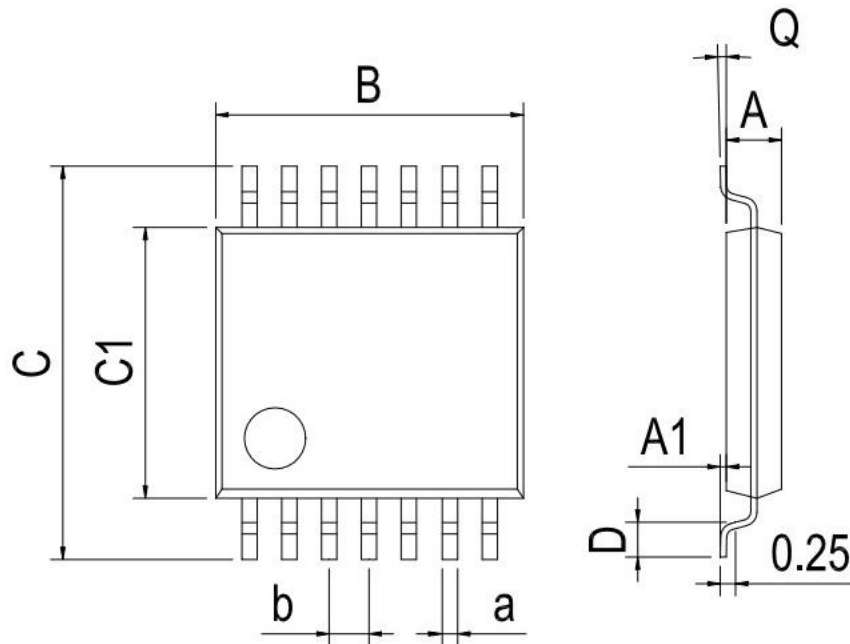
SOP-14



Dimensions In Millimeters(SOP-14)									
Symbol:	A	A1	B	C	C1	D	Q	a	b
Min:	1.35	0.05	8.55	5.80	3.80	0.40	0°	0.35	1.27 BSC
Max:	1.55	0.20	8.75	6.20	4.00	0.80	8°	0.45	

Physical Dimensions

TSSOP-14



Dimensions In Millimeters(TSSOP-14)									
Symbol:	A	A1	B	C	C1	D	Q	a	b
Min:	0.85	0.05	4.90	6.20	4.30	0.40	0°	0.20	0.65 BSC
Max	0.95	0.20	5.10	6.60	4.50	0.80	8°	0.25	

Revision History

DATE	REVISION	PAGE
2018-6-18	New	1-13
2023-9-8	Updated DIP-14 dimension、 Add annotation for Maximum Ratings.	4、 10