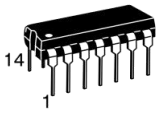
Quadruple 2-input NAND gates

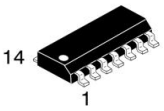
Product description

The 74HC00 is a high-speed silicon gate CMOS device with dual input and negative functions. It is compatible with low power Schottky TTL (LSTTL) circuits.

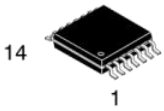
This circuit complies with JEDEC standard no.7A.



DIP-14



SOP-14



TSSOP-14

It's main features are as follows:

- Compatible with JEDEC standard no.8-1A.
- ESD capability:
  Human body model (EIA/JESD22 - A114 - A) over 2000V
  Mechanical model (EIA/JESD22 - A115 - A) over 200V
- Wide working environment temperature range: -40 ~ 85℃
- Package type: DIP-14/SOP-14/TSSOP-14

Product ordering information

Product name	Encapsulation	Print name	Package	Packing quantity
74HC00N	DIP-14	74HC00	Tube	1000 pcs/box
74HC00M/TR	SOP-14	74HC00	Braid	2500 pcs/tray
74HC00MT/TR	TSSOP-14	HC00	Braid	2500 pcs/tray

Function box

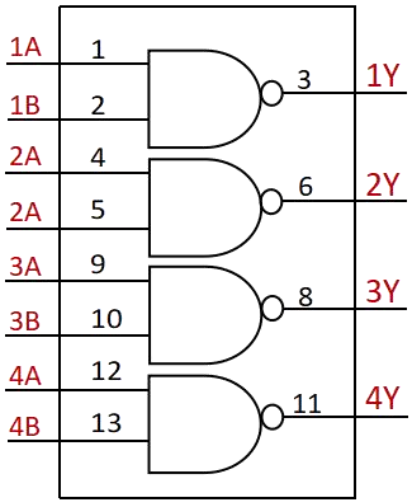


Figure 1: Overall functional block diagram

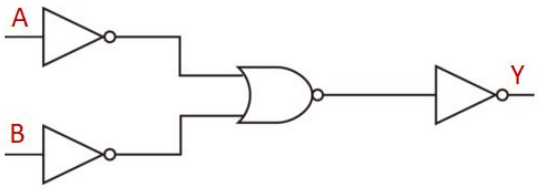


Figure 2: Single Channel functional block diagram

Truth table

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

Pinout description

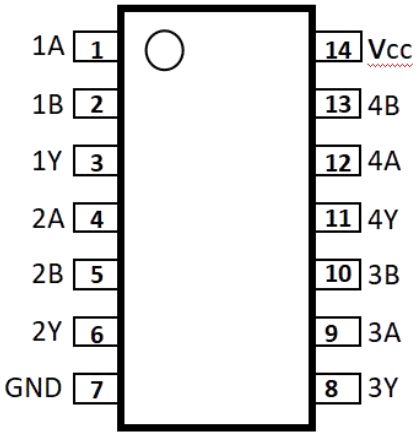


Figure 3: 74HV00 pinout

Pin description

Pin	Symbol	Function	Pin	Symbol	Function
1	1A	Data input	8	3Y	Data output
2	1B	Data input	9	3A	Data input
3	1Y	Date output	10	3B	Data input
4	2A	Data input	11	4Y	Data output
5	2B	Data input	12	4A	Data input
6	2Y	Data input	13	4B	Data input
7	GND	Systematically	14	Vcc	Power terminal

Limit parameters

(in accordance with IEC 60134 standard, GND=0V)

Parameter name	Symbol	Test conditions		Minimum	Maximum	Unit
Supply voltage	VCC			-0.5	+7.0	V
Clamping diode current	Iik	Vi<-0.5V or Vi> VCC +0.5V		-	±20	mA
Clamping diode current	Iok	Vo <-0.5V or VO> VCC +0.5V		-	±20	mA
Output current	Io	-0.5V<Vo< VCC +0.5V		-	±25	mA
Supply current	Icc，IGND			-	±50	mA
Storage temperature	Tstg			-65	+150	°C
Power dissipation	PD	Tamb=-40~125°C		-	500	mW
Soldering temperature	TL	10 seconds	DIP	245		°C
			SOP	245		

Note:

1. The limit parameters refer to the limit values that cannot be exceeded under any conditions. If the limit values are exceeded, physical damage such as product degradation may occur. At the same time, the chip cannot be guaranteed to work normally when the limit parameters are close to the limit parameters.
2. For DIP14 package, when the temperature is higher than 70°C, the rated power consumption decreases by 12mW for every 1°C increase in temperature.。
3. .SOP14 package: When the temperature is higher than 70°C, the rated power consumption decreases by 8mW for every 1°C increase in temperature

Recommended conditions of use

Parameter name		Symbol	Minimum	Typical	Maximum	Unit
Supply voltage		VCC	2.0	5.0	6.0	V
Input voltage		Vi	0	-	VCC	V
Output voltage		Vo	0	-	VCC	V
Working environment temperature		Tamb	-40	+25	+85	°C
Input rise and fall times	Vcc=2.0V	tr,tf	-		1000	ns
	Vcc=4.5V		-	6.0	500	ns
	Vcc=6.0V		-	-	400	ns

DC Parameters 1 (Tamb=-40~85°C，GND=0V）

Parameter name	Symbol	Test conditions		Minimum	Typical	Maximum	Unit
High level input voltage	VIH	VCC=2.0V		1.5	1.2	-	V
		VCC=4.5V		3.15	2.4	-	V
		VCC=6.0V		4.2	3.2	-	V
Low level input voltage	VIL	VCC=2.0V		-	0.8	0.5	V
		VCC=4.5V		-	2.1	1.35	V
		VCC=6.0V		-	2.8	1.8	V
High level output voltage	VOH	Vi=VIH or VIL	VCC=2.0V IO=-20uA	1.9	2.0	-	V
			VCC=4.5V IO=-20uA	4.4	4.5	-	V
			VCC=6.0V IO=-20uA	5.9	6.0	-	V
			VCC=4.5V IO=-4.0mA	3.84	4.32	-	V
			VCC=6.0V IO=-5.2mA	5.34	5.81	-	V
Low level output voltage	VOL	Vi=VIH or VIL	VCC=2.0V IO=20uA	-	0	0.1	V
			VCC=4.5V IO=20uA	-	0	0.1	V
			VCC=6.0V IO=20uA	-	0	0.1	V
			VCC=4.5V IO=4.0mA	-	0.15	0.33	V
			VCC=6.0V IO=5.2mA	-	0.16	0.33	V
Input leakage current	ILI	VCC=6.0V=Vi= VCC or GND		-	-	±1.0	uA
Three-state output cut-off current IOZ	IOZ	VCC=6.0V=Vi=VIH or VIL Vo= VCC or GND		-	-	±5.0	uA
Quiescent current	ICCQ	VCC=6.0V=Vi =VCC or GND IO=0		-	-	20	uA

DC Parameters 2（Tamb=-40~125°C，GND=0V）

Parameter name	Symbol	Test conditions		Minimum	Typical	Maximum	Unit
High level input voltage	VIH	VCC=2.0V		1.5	-	-	V
		VCC=4.5V		3.15	-	-	V
		VCC=6.0V		4.2	-	-	V
Low level input voltage	VIL	VCC=2.0V		-	-	0.5	V
		VCC=4.5V		-	-	1.35	V
		VCC=6.0V		-	-	1.8	V
High level output voltage	VOH	Vi=VIH or VIL	VCC=2.0V IO=-20uA	1.9	-	-	V
			VCC=4.5V IO=-20uA	4.4	-	-	V
			VCC=6.0V IO=-20uA	5.9	-	-	V
			VCC=4.5V IO=-4.0mA	3.7	-	-	V
			VCC=6.0V IO=-5.2mA	5.2	-	-	V
Low level output voltage	VOL	Vi=VIH or VIL	VCC=2.0V IO=20uA	-	-	0.1	V
			VCC=4.5V IO=20uA	-	-	0.1	V
			VCC=6.0V IO=20uA	-	-	0.1	V
			VCC=4.5V IO=4.0mA	-	-	0.4	V
			VCC=6.0V IO=5.2mA	-	-	0.4	V
Input leakage current	ILI	VCC=6.0V=Vi= VCC or GND		-	-	±1.0	uA
Three-state output cut-off current IOZ	IOZ	VCC=6.0V=Vi=VIH or VIL Vo= VCC or GND		-	-	±10.0	uA
Quiescent current	ICCQ	VCC=6.0V=Vi =VCC or GND IO=0		-	-	40	uA

Note: All typical values are measured at Tamb =25℃.

AC parameters 1 (unless otherwise specified, Tamb=-40~85℃,GND=0， tr=tf≤6.0ns,CL=50pF, see figure 4,figure 5)

Parameter name	Symbol	Test conditions	Minimum	Typical	Maximum	Unit
Propagation delay from nA, nB to nY	tPHL/tPLH	VCC=2.0V	-	25	115	ns
		VCC=4.5V	-	9	23	ns
		VCC=6.0V	-	7	20	ns
Transition time	tTHL/tTLH	VCC=2.0V	-	19	95	ns
		VCC=4.5V	-	7	19	ns
		VCC=6.0V	-	6	16	ns

AC parameters 2 (unless otherwise specified, Tamb=-40~125℃, GND=0, tr=tf≤6.0ns, CL=50pF, see figure 4,figure

Parameter name	Symbol	Test conditions	Minimum	Typical	Maximum	Unit
nA,nB to nY transmission	tPHL/tPLH	VCC=2.0V	-	-	135	ns
Delay		VCC=4.5V	-	-	27	ns
		VCC=6.0V	-	-	23	ns
Transition time	tTHL/tTLH	VCC=2.0V	-	-	110	ns
		VCC=4.5V	-	-	22	ns
		VCC=6.0V	-	-	19	ns

Note: All typical values are measured at Tamb =25℃.

AC parameter test chart

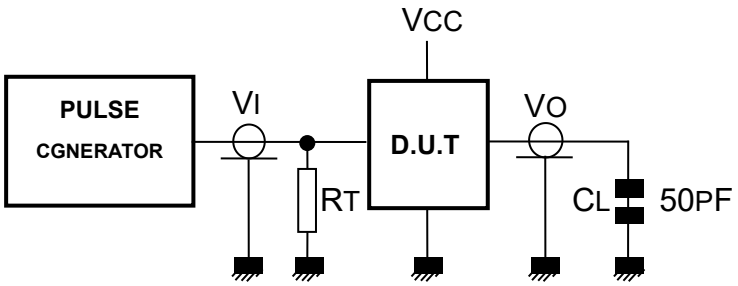
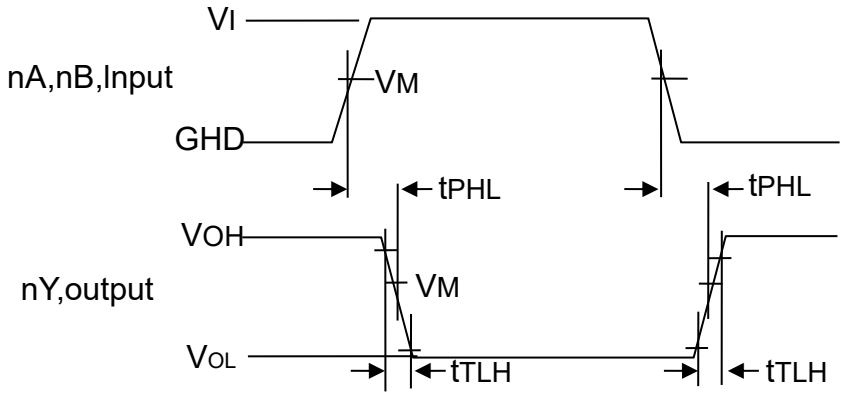


Figure 4: AC test circuit

AC waveform

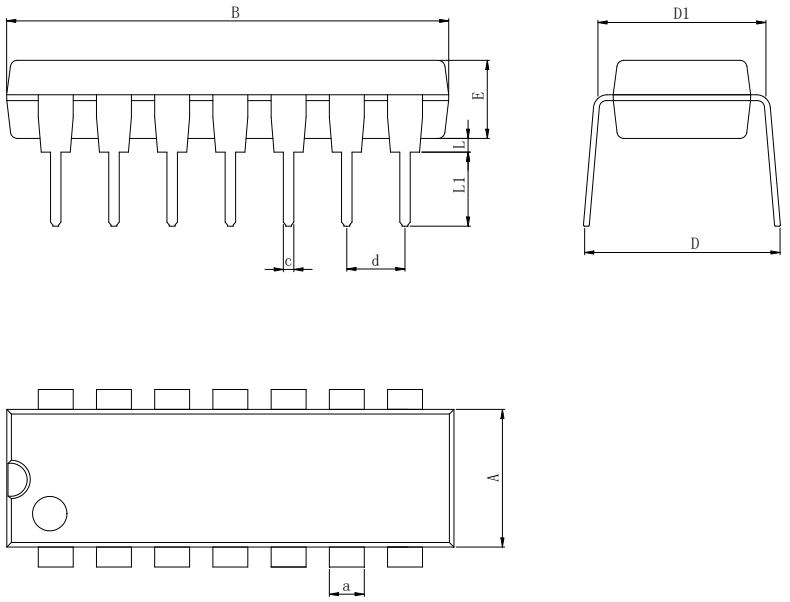


VM=50%; VI=GND to Vcc

Figure 5: Input（nA，nB）to output（nY）Delay waveform

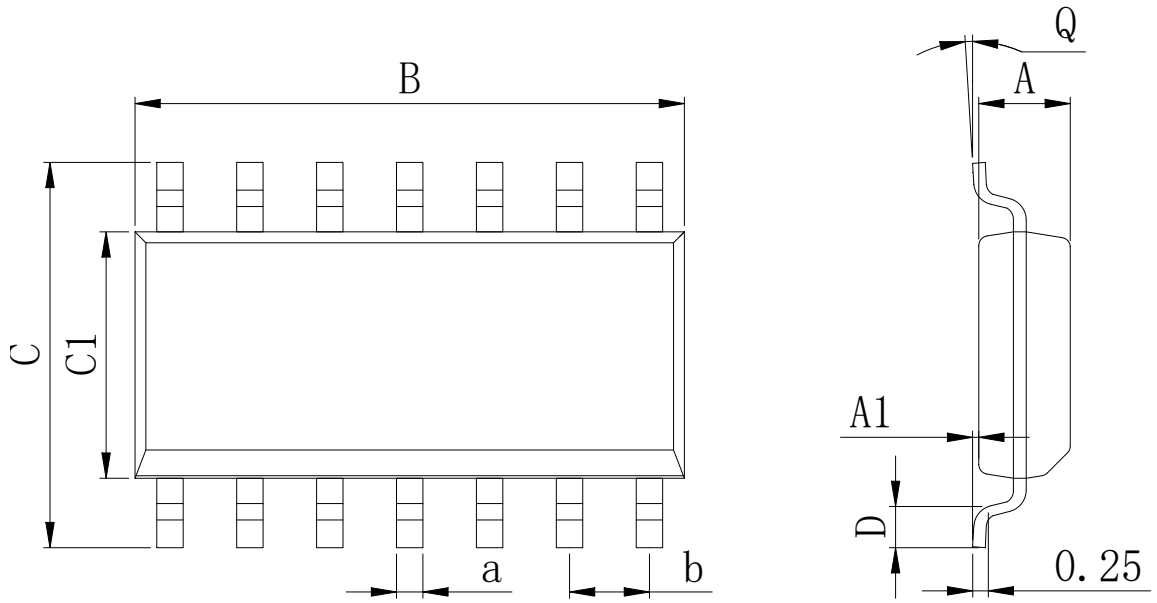
Package dimensions

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	

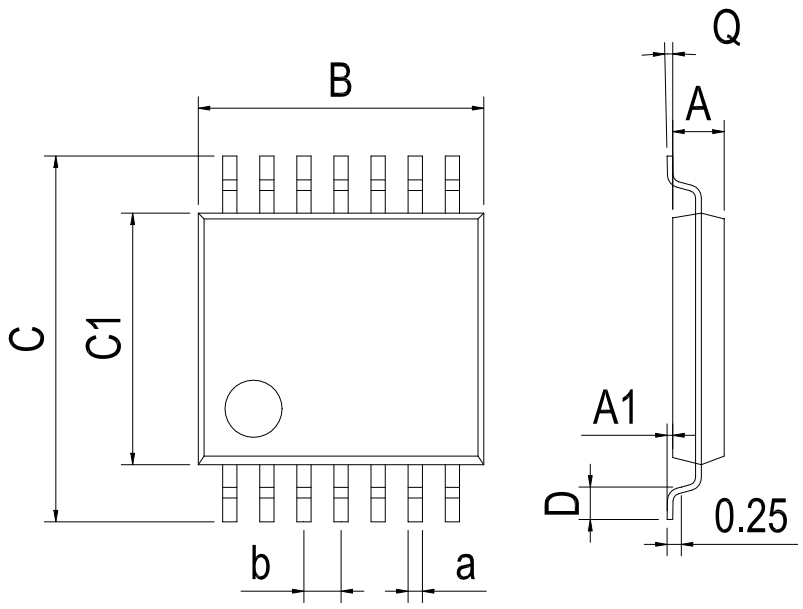
SOP-14



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	

Package 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	Modify content	Page number
2018-3-10	New revision	1-12
2023-9-15	Updated pin soldering temperature, updated package, updated DIP-14 size, added extreme parameter notes	1,4,9

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