

74HC10 Triple 3-input NAND Gate

1. General Description

1.1 Description

The 74HC10 contains three independent 3-input NAND Gates. Each gate performs the Boolean function $Y = A \bullet B \bullet C$ in positive logic.

1.2 Features

- Buffered Inputs
- Wide operating voltage range $V_{CC}=2V$ to $6V$

- Wide operating temperature range of $-40^{\circ}C$ to $85^{\circ}C$

1.3 Device Information

PART NUMBER	PACKAGE
74HC10	DIP
	SOP
	TSSOP

2. Connection Diagrams and Pin Description

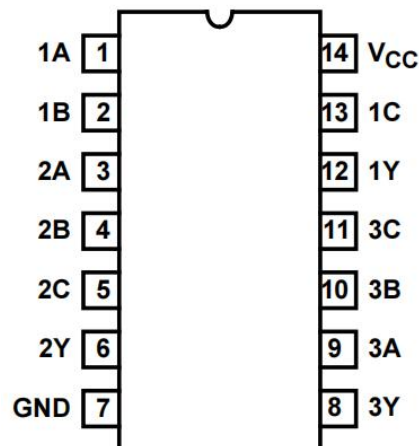


Figure 2.1 Top View

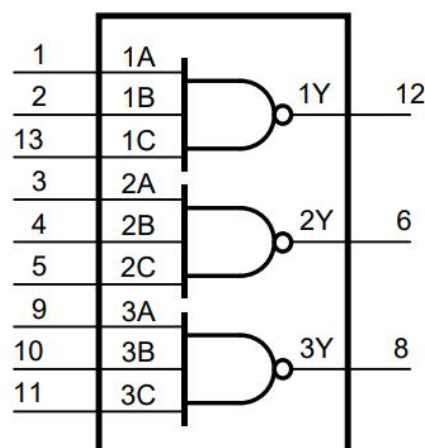


Figure 2.2 Functional Diagram

PIN No.	NAME	I/O	FUNCTION
1	1A	I	Data Input
2	1B	I	Data Input
3	2A	I	Data Input
4	2B	I	Data Input
5	2C	I	Data Input
6	2Y	O	Data Output
7	GND		Ground
8	3Y	O	Data Output
9	3A	I	Data Input
10	3B	I	Data Input
11	3C	I	Data Input
12	1Y	O	Data Output
13	1C	I	Data Input
14	VCC		Supply Voltage

3. System Diagram

3.1 Logic Diagram

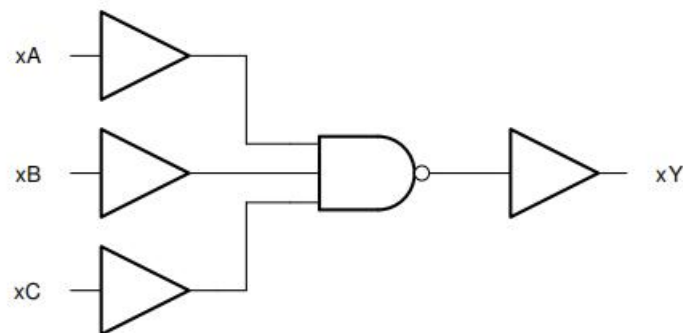


Figure 3.1: 74HC10 Logic Diagram

3.2 Truth Table

Input			Output
A	B	C	Y
1	1	1	0
0	X	X	1
X	0	X	1
X	X	0	1

X = Don't Care, 1≡High State, 0≡Low State



4. Specifications

4.1 Absolute Maximum Ratings

Symbol	Parameter	MIN	MAX	Unit
V_{CC}	Supply Voltage	-0.5	7	V
P_D	Power Dissipation		500	mW
T_J	Junction Temperature		125	°C
T_{OP}	Operating Temperature	-40	85	°C

Absolute maximum ratings are those values beyond which the device could be permanently damaged. These are stress ratings only, which do not imply functional operation of the device at these or any other conditions beyond those indicated under Recommended Operating Conditions.

4.2 Electrical Characteristics

4.2.1 DC Specifications

($T_a=25^{\circ}\text{C}$, voltages are referenced to GND (ground=0V), unless otherwise specified)

Symbol	Parameter	Test Condition	MIN	TYP	MAX	Unit
V_{IH}	High Level Input Voltage	$V_{CC}=2V$	1.5	--	--	V
		$V_{CC}=4.5V$	3.15	--	--	V
		$V_{CC}=6V$	4.2	--	--	V
V_{IL}	Low Level Input Voltage	$V_{CC}=2V$	--	--	0.5	V
		$V_{CC}=4.5V$	--	--	1.35	V
		$V_{CC}=6V$	--	--	1.8	V
V_{OH}	High Level Output Voltage	$V_{CC}=2V, I_O=-20\mu A$	1.9	--	--	V
		$V_{CC}=4.5V, I_O=-20\mu A$	4.4	--	--	V
		$V_{CC}=6V, I_O=-20\mu A$	5.9	--	--	V
		$V_{CC}=4.5V, I_O=-4mA$	4.0	--	--	V
		$V_{CC}=6V, I_O=-5.2mA$	5.5	--	--	V
V_{OL}	Low Level Output Voltage	$V_{CC}=2V, I_O=20\mu A$	--	--	0.1	V
		$V_{CC}=4.5V, I_O=20\mu A$	--	--	0.1	V
		$V_{CC}=6V, I_O=20\mu A$	--	--	0.1	V
		$V_{CC}=4.5V, I_O=4mA$	--	--	0.4	V
		$V_{CC}=6V, I_O=5.2mA$	--	--	0.4	V
I_I	Input Leakage Current	$V_{CC}=6V, V_I=V_{CC}$ or GND	--	0	± 2	μA
I_{CC}	Quiescent Supply Current	$V_{CC}=6V, V_I=V_{CC}/GND$	--	0	10	μA

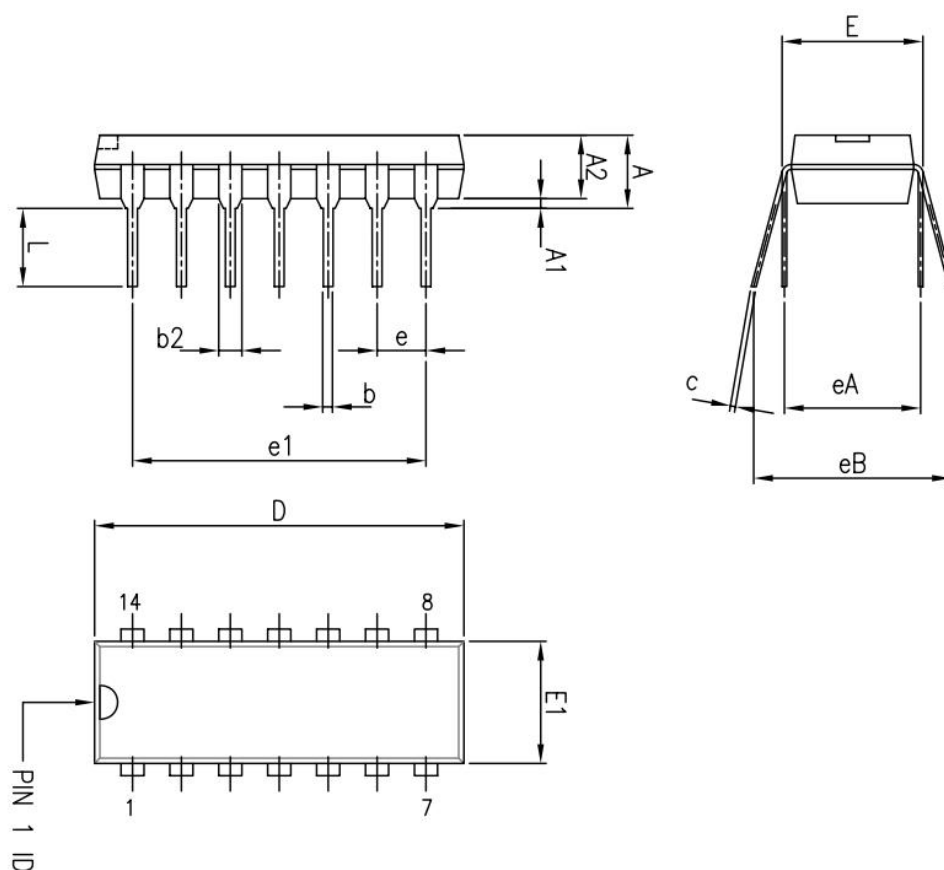


5. Ordering Information

Orderable Device	Package Type	Pins	Packing	Package Qty
74HC10ND14ATBE	DIP	14	Tube	25
74HC10NS14ARDQ	SOP	14	Tape & Reel	4000
74HC10TS14ARBQ	TSSOP	14	Tape & Reel	2000

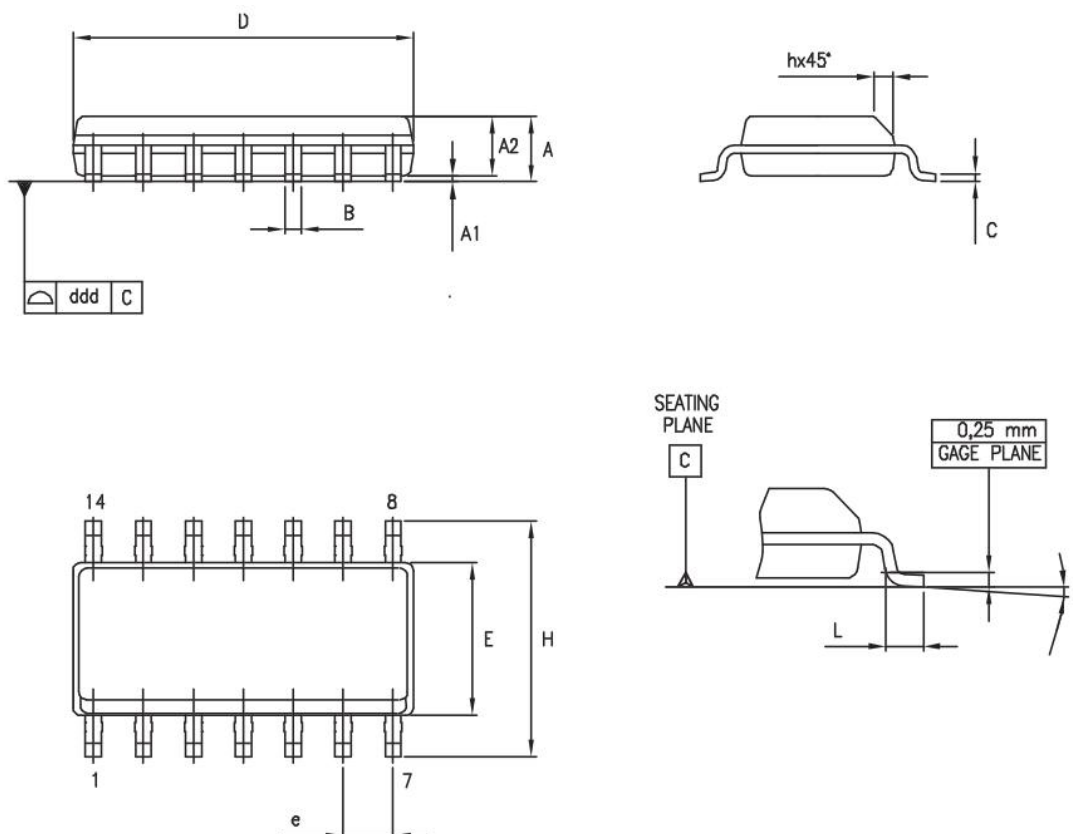
6. Package Information

6.1 DIP14



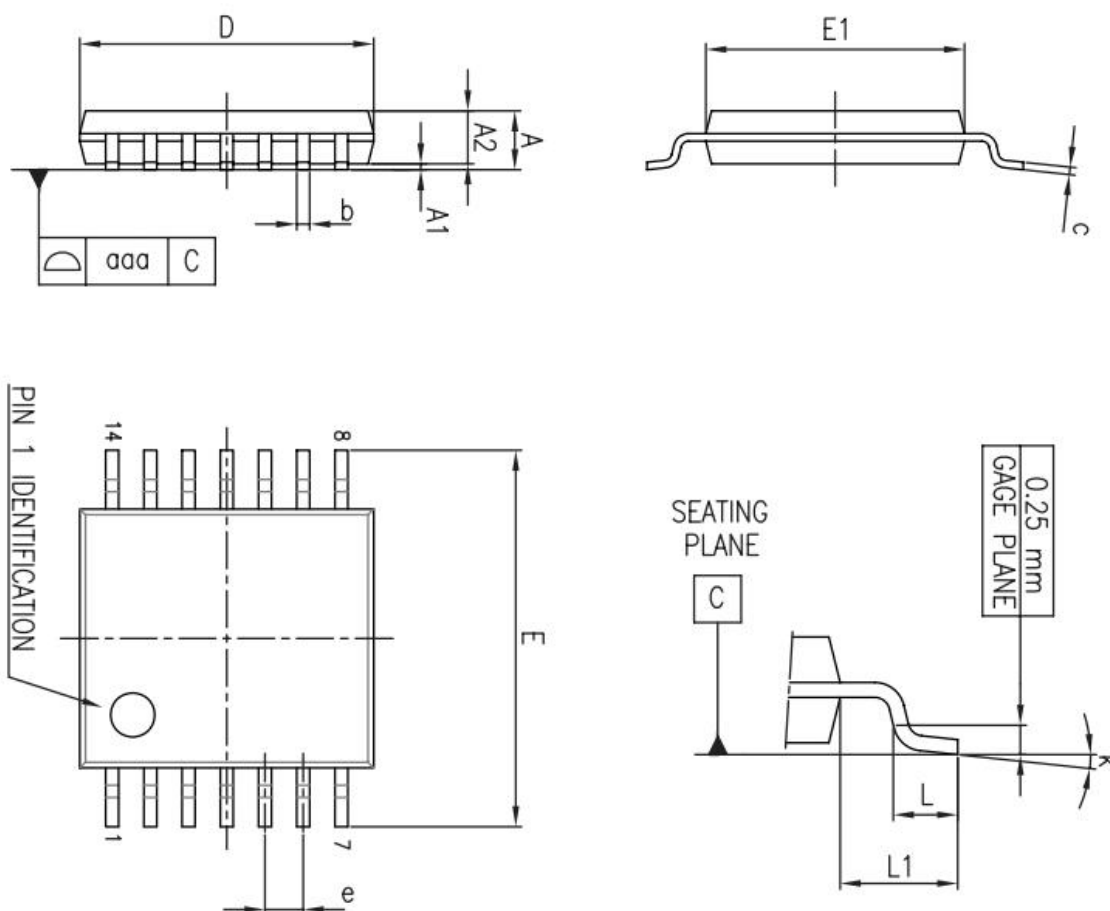
Dimensions						
Ref.	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A			5.33			0.21
A1	0.38			0.015		
A2	2.92	3.30	4.95	0.11	0.13	0.19
b	0.36	0.46	0.56	0.014	0.018	0.022
b2	1.14	1.52	1.78	0.04	0.06	0.07
c	0.20	0.25	0.36	0.007	0.009	0.01
D	18.67	19.05	19.69	0.73	0.75	0.77
E	7.62	7.87	8.26	0.30	0.31	0.32
E1	6.10	6.35	7.11	0.24	0.25	0.28
e		2.54			0.10	
e1		15.24			0.60	
eA		7.62			0.30	
eB			10.92			0.43
L	2.92	3.30	3.81	0.11	0.13	0.15

6.2 SOP14



Dimensions						
Ref.	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	1.35		1.75	0.05		0.068
A1	0.10		0.25	0.004		0.009
A2	1.10		1.65	0.04		0.06
B	0.33		0.51	0.01		0.02
C	0.19		0.25	0.007		0.009
D	8.55		8.75	0.33		0.34
E	3.80		4.0	0.15		0.15
e		1.27			0.05	
H	5.80		6.20	0.22		0.24
h	0.25		0.50	0.009		0.02
L	0.40		1.27	0.015		0.05
k	8° (max.)					
ddd			0.10			0.004

6.3 TSSOP14



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A			1.20			0.047
A1	0.05		0.15	0.002	0.004	0.006
A2	0.80	1.00	1.05	0.031	0.039	0.041
b	0.19		0.30	0.007		0.012
c	0.09		0.20	0.004		0.0089
D	4.90	5.00	5.10	0.193	0.197	0.201
E	6.20	6.40	6.60	0.244	0.252	0.260
E1	4.30	4.40	4.50	0.169	0.173	0.176
e		0.65			0.0256	
L	0.45	0.60	0.75	0.018	0.024	0.030
L1		1.00			0.039	
k	0°		8°	0°		8°
aaa			0.10			0.004