

74HC14 Hex Inverters with Schmitt-Trigger Inputs

1. General Description

1.1 Description

This device contains six independent inverters with Schmitt-trigger inputs. Each gate performs the Boolean function $Y = \overline{A}$ in positive logic.

1.2 Features

- Buffered inputs
- Wide operating voltage range of 2V to 6V

- Wide operating temperature range: -40°C to +85°C

1.3 Device Information

PART NUMBER	PACKAGE
74HC14	DIP
	SOP
	SSOP
	TSSOP

2. Connection Diagrams and Pin Description

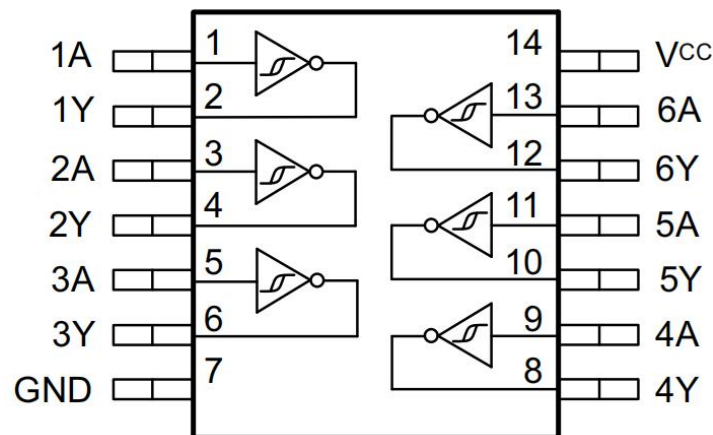


Figure 2.1: Top View

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

3. System Diagram

3.1 Logic Diagram

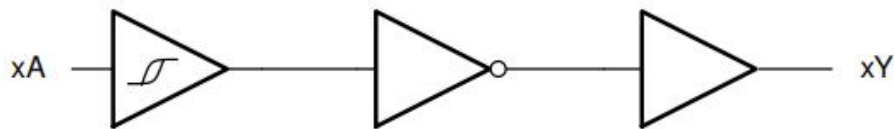


Figure 3.1: 74HC14 Logic Diagram

3.2 Function Table

Input	Output
A	Y
0	1
1	0

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 normal operating conditions.



4.2 Recommended Operating Conditions

Symbol	Parameter	Test Condition	MIN	NOM	MAX	Unit
V_{CC}	Supply Voltage		2	5	6	V
V_I	Input voltage		0		V_{CC}	V

4.3 Electrical Characteristics

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

Symbol	Parameter	Test Condition	MIN	TYP	MAX	Unit
V_{T+}	Positive Switching Threshold	$V_{CC}=2\text{V}$	0.8	1.3	1.6	V
		$V_{CC}=4.5\text{V}$	1.6	2.6	3.2	V
		$V_{CC}=6\text{V}$	2.1	3.4	4.2	V
V_{T-}	Negative Switching Threshold	$V_{CC}=2\text{V}$	0.5	0.8	1.2	V
		$V_{CC}=4.5\text{V}$	0.8	1.5	2.4	V
		$V_{CC}=6\text{V}$	1.0	1.8	3.0	V
ΔV_T	Hysteresis($V_{T+}-V_{T-}$)	$V_{CC}=2\text{V}$	0.2	0.5	1.2	V
		$V_{CC}=4.5\text{V}$	0.4	1.1	2.1	V
		$V_{CC}=6\text{V}$	0.5	1.6	2.5	V
V_{OH}	High Level Output Voltage	$V_{CC}=2\text{V}, I_O=-20\mu\text{A}$	1.9	--	--	V
		$V_{CC}=4.5\text{V}, I_O=-20\mu\text{A}$	4.4	--	--	V
		$V_{CC}=6\text{V}, I_O=-20\mu\text{A}$	5.9	--	--	V
		$V_{CC}=4.5\text{V}, I_O=-4\text{mA}$	4.0	--	--	V
		$V_{CC}=6\text{V}, I_O=-5.2\text{mA}$	5.5	--	--	V
V_{OL}	Low Level Output Voltage	$V_{CC}=2\text{V}, I_O=20\mu\text{A}$	--	--	0.1	V
		$V_{CC}=4.5\text{V}, I_O=20\mu\text{A}$	--	--	0.1	V
		$V_{CC}=6\text{V}, I_O=20\mu\text{A}$	--	--	0.1	V
		$V_{CC}=4.5\text{V}, I_O=4\text{mA}$	--	--	0.26	V
		$V_{CC}=6\text{V}, I_O=5.2\text{mA}$	--	--	0.26	V
I_I	Input Leakage Current	$V_{CC}=6\text{V}, V_I=V_{CC}$ or GND	--	0	± 1	μA
I_{CC}	Quiescent Supply Current	$V_{CC}=6\text{V}, V_I=V_{CC}/\text{GND}$	--	0	10	μA

5. Application Information

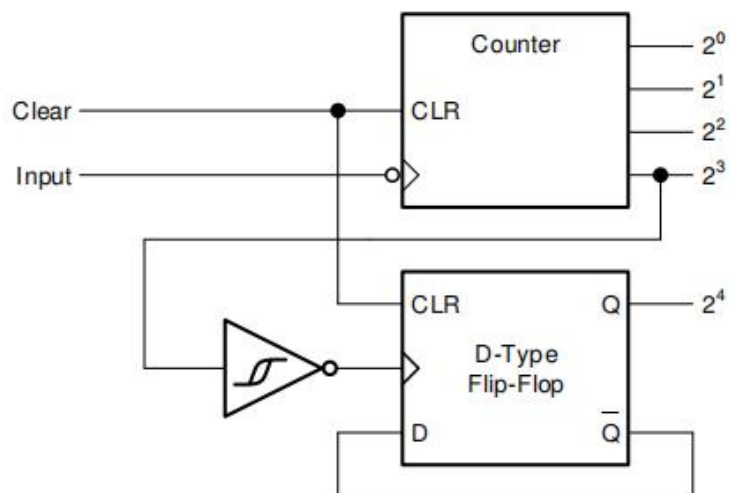


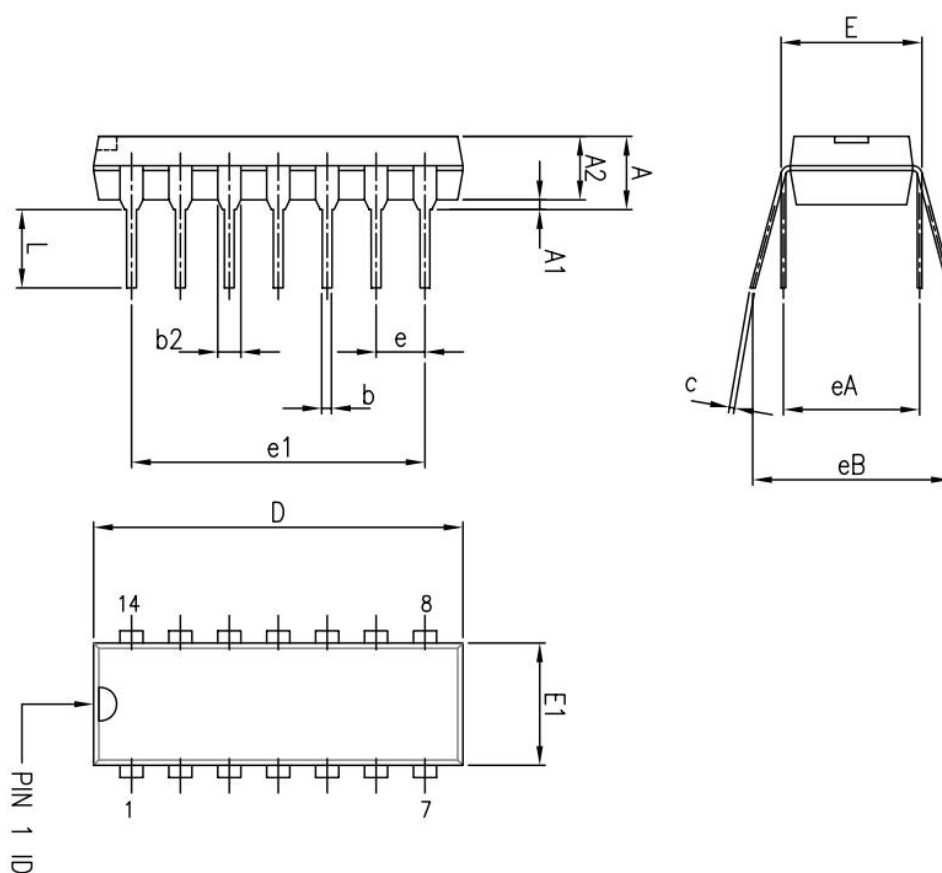
Figure 5.1: Typical application schematic

6. Ordering Information

Orderable Device	Package Type	Pins	Packing	Package Qty
74HC14ND14ATBE	DIP	14	Tube	25
74HC14NS14ARDQ	SOP	14	Tape & Reel	4000
74HC14SS14ARBQ	SSOP	14	Tape & Reel	2000
74HC14TS14ARDQ	TSSOP	14	Tape & Reel	4000

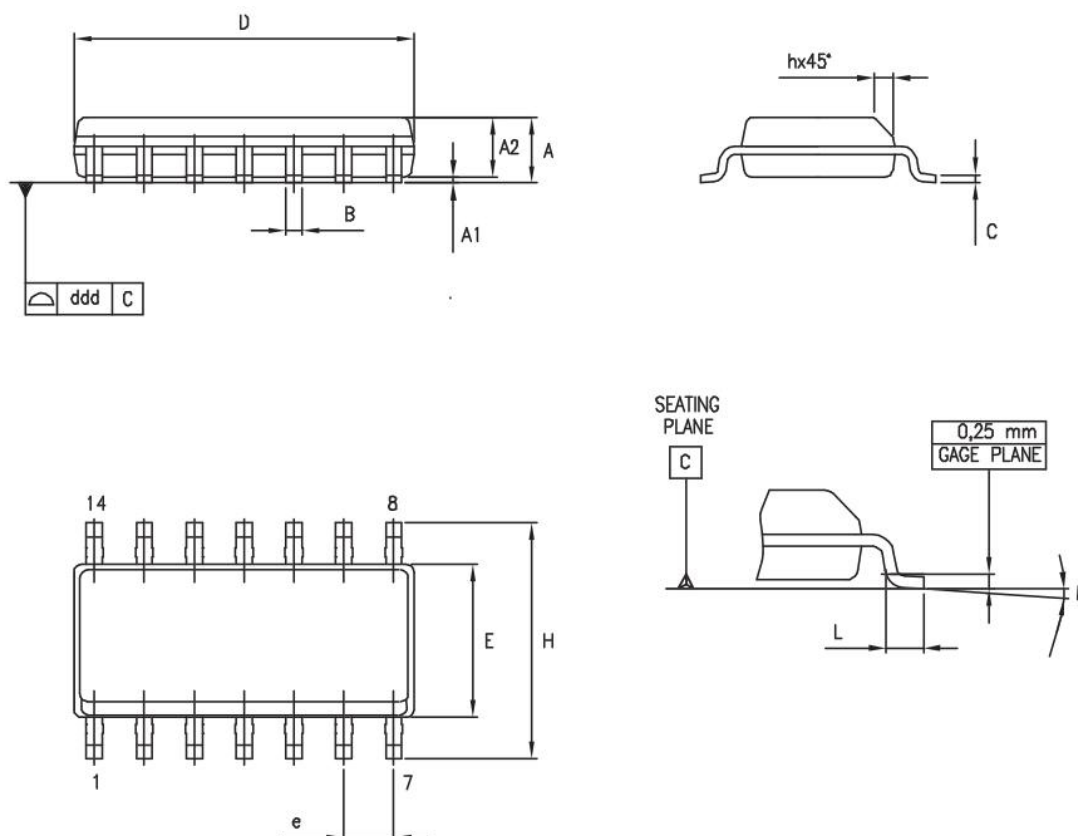
7. Package Information

7.1 DIP14



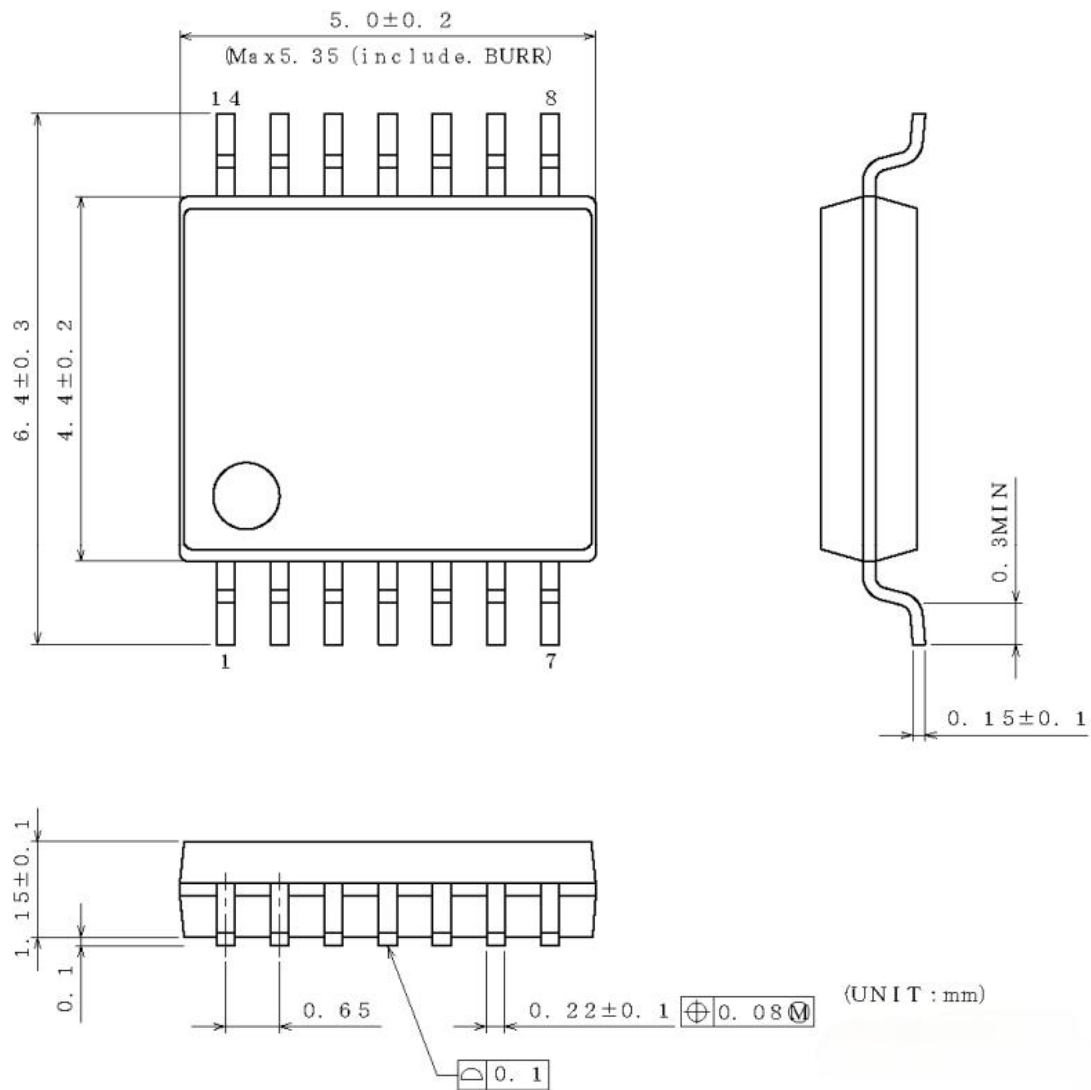
Dimensions						
Ref.	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A			5.33			0.21
A1	0.38			0.015		
A2	2.92	3.30	4.95	0.11	0.13	0.19
b	0.36	0.46	0.56	0.014	0.018	0.022
b2	1.14	1.52	1.78	0.04	0.06	0.07
c	0.20	0.25	0.36	0.007	0.009	0.01
D	18.67	19.05	19.69	0.73	0.75	0.77
E	7.62	7.87	8.26	0.30	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

7.2 SOP14

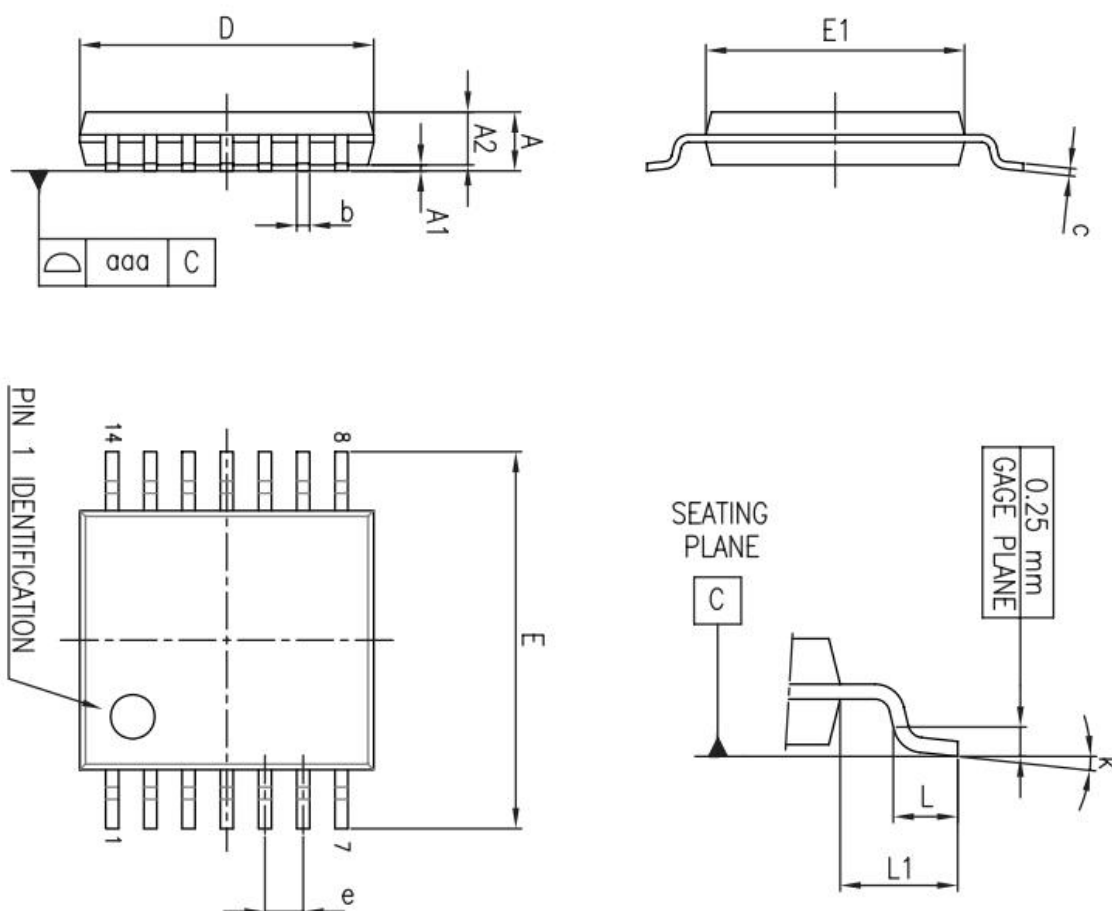


Dimensions						
Ref.	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	1.35		1.75	0.05		0.068
A1	0.10		0.25	0.004		0.009
A2	1.10		1.65	0.04		0.06
B	0.33		0.51	0.01		0.02
C	0.19		0.25	0.007		0.009
D	8.55		8.75	0.33		0.34
E	3.80		4.0	0.15		0.15
e		1.27			0.05	
H	5.80		6.20	0.22		0.24
h	0.25		0.50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

7.3 SSOP14



7.4 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