

HD74LV14

Hex Schmitt-trigger Inverters

Description

The HD74LV14 has six schmitt trigger inverters in a 14 pin package. Low voltage and high speed operation is suitable at the battery drive product (note type personal computer) and low power consumption extends the life of a battery for long time operation.

Features

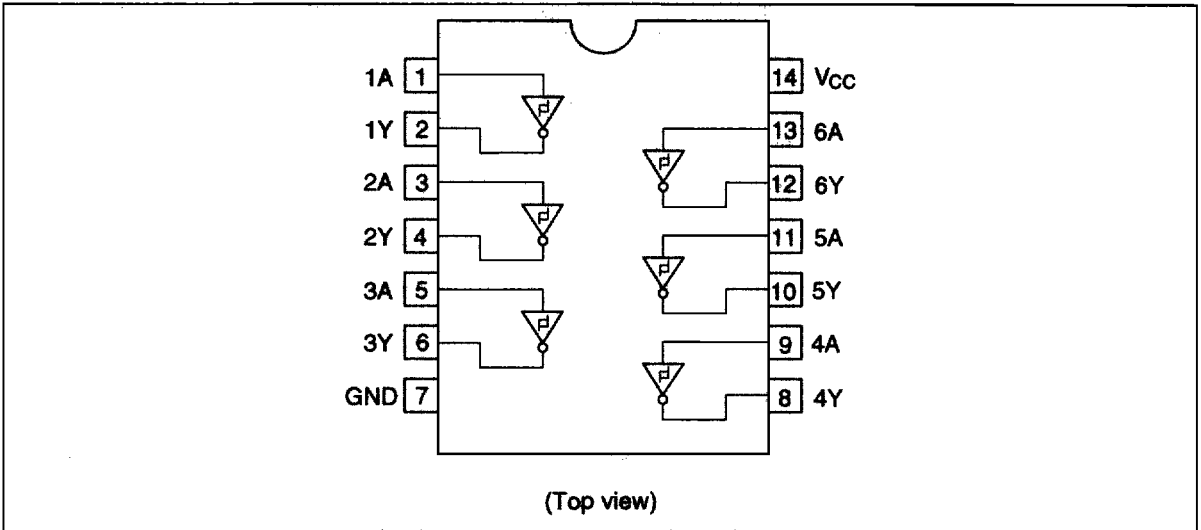
- $V_{CC} = 2.0\text{ V to }5.5\text{ V}$
- All inputs $V_{IH} (\text{Max.}) = 5.5\text{ V} (@V_{CC} = 0\text{ V to }5.5\text{ V})$
- Typical V_{OL} ground bounce $< 0.8\text{ V} (@V_{CC} = 3.3\text{ V}, T_a = 25^\circ\text{C})$
- Typical V_{OH} undershoot $> 2.0\text{ V} (@V_{CC} = 3.3\text{ V}, T_a = 25^\circ\text{C})$
- Output current $\pm 6\text{ mA} (@V_{CC} = 3.0\text{ V to }3.6\text{ V})$
 $\pm 12\text{ mA} (@V_{CC} = 4.5\text{ V to }5.5\text{ V})$

Function Table

Input A	Output Y
L	H
H	L

H: High level
L: Low level

Pin Arrangement



Absolute Maximum Ratings

Item	Symbol	Ratings	Unit	Conditions
Supply voltage	V_{CC}	-0.5 to 7.0	V	
Input diode current	I_{IK}	-20	mA	$V_i = -0.5\text{ V}$
Input voltage	V_i	-0.5 to 7.0	V	
Output diode current	I_{OK}	-50	mA	$V_o = -0.5\text{ V}$
		50	mA	$V_o = V_{CC} + 0.5\text{ V}$
Output voltage	V_o	-0.5 to $V_{CC} + 0.5$	V	
Output current	I_o	± 25	mA	
V_{CC} , GND current / pin	I_{CC} or I_{GND}	50	mA	
Storage temperature	T_{stg}	-65 to +150	$^{\circ}\text{C}$	

Notes: The absolute maximum ratings are values which must not individually be exceeded, and furthermore, no two of which may be realized at the same time.

HD74LV14

Recommended Operating Conditions

Item	Symbol	Ratings	Unit	Conditions
Supply voltage	V_{CC}	2.0 to 5.5	V	
Input / output voltage	V_I	0 to 5.5	V	A
	V_O	0 to V_{CC}	V	Y
Operating temperature	T_a	-40 to 85	°C	
Output current	I_{OH}	-6	mA	$V_{CC} = 3.0\text{ V to }3.6\text{ V}$
		-12 *2	mA	$V_{CC} = 4.5\text{ V to }5.5\text{ V}$
	I_{OL}	6	mA	$V_{CC} = 3.0\text{ V to }3.6\text{ V}$
		12 *2	mA	$V_{CC} = 4.5\text{ V to }5.5\text{ V}$
Input rise / fall time *1	t_r, t_f	50	ns/V	$V_{CC} = 5.5\text{ V}$
		100	ns/V	$V_{CC} = 3.6\text{ V}$

Notes: 1. This item guarantees maximum limit when one input switches.

Waveform : Refer to test circuit of switching characteristics.

2. duty cycle \leq 50%

Electrical Characteristics

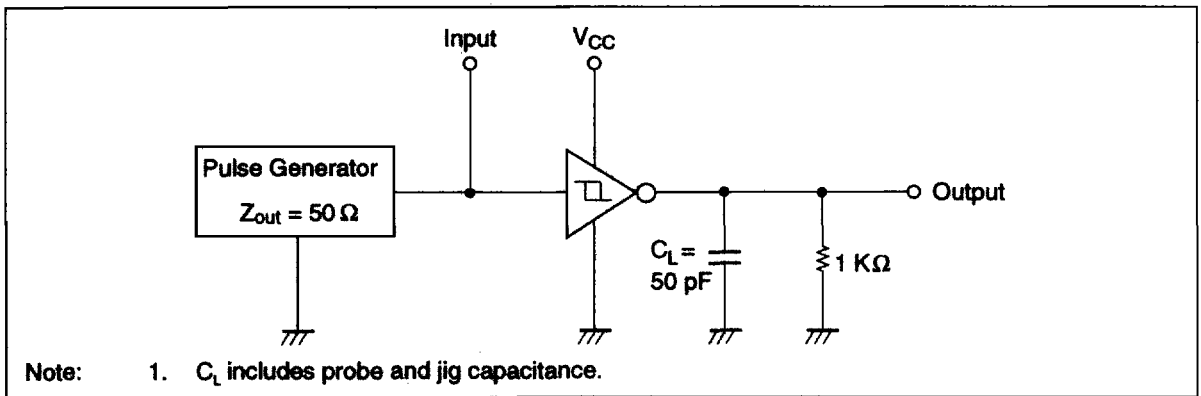
Item	Symbol	V _{CC} (V)	Ta = -40 to 85°C		Unit	Test Conditions
			Min	Max		
Threshold voltage	V _T ⁺	2.7	1.0	2.0	V	
		3.0	1.2	2.2	V	
		3.6	1.5	2.4	V	
		4.5	1.9	2.9	V	
		5.5	2.3	3.3	V	
	V _T ⁻	2.7	0.4	1.4	V	
		3.0	0.6	1.5	V	
		3.6	0.8	1.8	V	
		4.5	1.0	2.0	V	
		5.5	1.4	2.4	V	
Hysteresis voltage	V _H	2.7	0.3	1.1	V	V _T ⁺ - V _T ⁻
		3.0	0.4	1.2	V	
		3.6	0.4	1.2	V	
		4.5	0.5	1.3	V	
		5.5	0.5	1.3	V	
Input voltage	V _{IH}	2.7 to 3.6	2.4	—	V	
		4.5 to 5.5	3.3	—	V	
	V _{IL}	2.7 to 3.6	—	0.4	V	
		4.5 to 5.5	—	1.0	V	
Output voltage	V _{OH}	2.7 to 5.5	V _{CC} -0.2	—	V	I _{OH} = -100 μA
		3.0	2.4	—	V	I _{OH} = -6 mA
		4.5	3.6	—	V	I _{OH} = -12 mA
	V _{OL}	2.7 to 5.5	—	0.2	V	I _{OL} = 100 μA
		3.0	—	0.4	V	I _{OL} = 6 mA
		4.5	—	0.5	V	I _{OL} = 12 mA
Input current	I _{IN}	0 to 5.5	—	±1.0	μA	V _{IN} = 5.5 V or GND
Quiescent supply current	I _{CC}	5.5	—	20	μA	V _{IN} = V _{CC} or GND
	ΔI _{CC}	3.0 to 3.6	—	500	μA	V _{IN} = one input at (V _{CC} -0.6)V, other inputs at V _{CC} or GND

HD74LV14

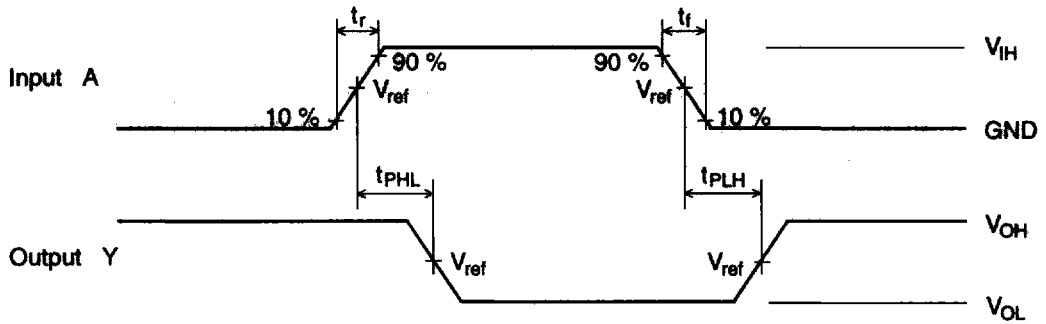
Switching Characteristics

Item	Symbol	$V_{CC}(V)$	$T_a = 25^\circ C$			$T_a = -40 \text{ to } 85^\circ C$			Unit	From (Input)	To (Output)
			Min	Typ	Max	Min	Typ	Max			
Propagation delay time	t_{PLH}	2.7	—	12.0	19.0	1.0	—	21.0	ns	A	Y
	t_{PHL}	3.3 ± 0.3	—	11.0	17.0	1.0	—	19.0	ns		
		5.0 ± 0.5	—	7.0	12.5	1.0	—	13.5	ns		
Input capacitance	C_{IN}	3.3 ± 0.3	—	—	—	—	2.5	—	pF		

Test Circuit



Waveforms



Symbol	$V_{CC} = 2.7\text{ V},$ $3.3 \pm 0.3\text{ V}$	$V_{CC} = 5.0 \pm 0.5\text{ V}$
V_{IH}	2.7 V	V_{CC}
V_{ref}	1.5 V	50% V_{CC}

- Notes:
1. $t_r = 2.5\text{ ns}, t_f = 2.5\text{ ns}$
 2. Input waveform : PRR = 10 MHz, duty cycle 50%