
HD74HCU04A

Hex Inverters

HITACHI

ADE-205-288 (Z)
1st. Edition
June 1999

Description

The HD74HCU04A has six inverters in a 14 pin package. $Y = \bar{A}$

Features

- $V_{CC} = 4.5$ to 5.5 V operation
- Input terminal has protection diode

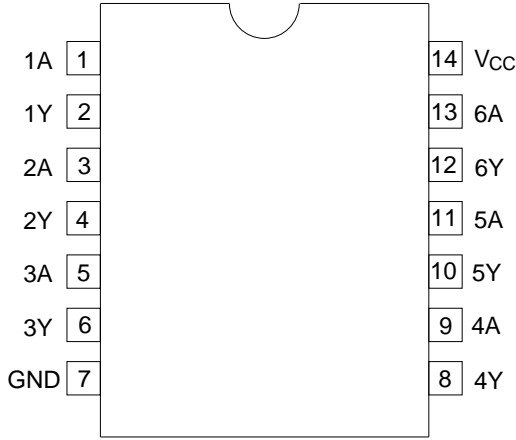
Function Table

Input A	Output Y
H	L
L	H

H : High level

L : Low level

Pin Arrangement



(Top view)

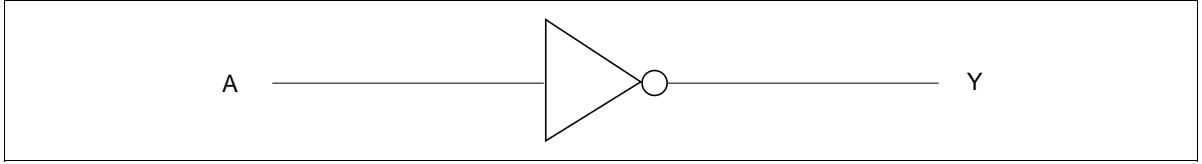
Absolute Maximum Ratings

Item	Symbol	Ratings	Unit
Supply voltage	V _{CC}	-0.5 to 7.0	V
Input diode peak current	I _{IK}	±20	mA
Output diode peak current	I _{OK}	±20	mA
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	°C

Recommended Operating Conditions

Item	Symbol	V _{CC} (V)	Min	Typ	Max	Unit
Supply voltage	V _{CC}		2.0	5.0	6.0	V
Input voltage	V _{IH}	2.0	1.7	—	—	V
		4.5	3.6	—	—	
		6.0	4.8	—	—	
	V _{IL}	2.0	0	—	0.3	
		4.5	0	—	0.8	
		6.0	0	—	1.1	
		V _I		0	—	V _{CC}
Output voltage	V _O		0	—	V _{CC}	V
Output current	I _{OH}	4.5	—	-4.0	—	mA
		6.0	—	-5.2	—	
	I _{OL}	4.5	—	4.0	—	
		6.0	—	5.2	—	
Input rise / fall time	t _r , t _f	2.0	0	—	1000	ns
		4.5	0	—	500	
		6.0	0	—	400	
Operating temperature	T _a		-40	—	85	°C

Logic Diagram (1/4 Circuit)



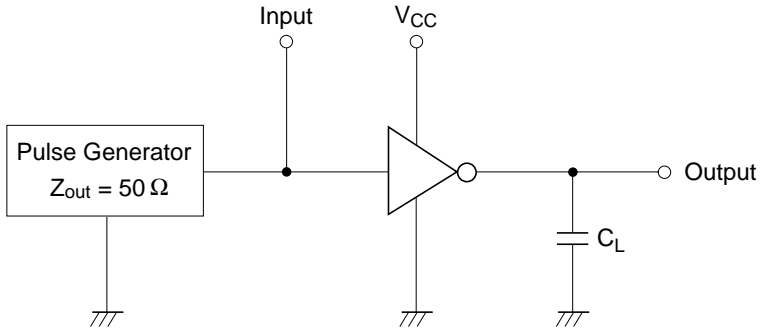
Electrical Characteristics

Item	Symbol	V_{CC} (V)	$T_a = 25^\circ\text{C}$			$T_a = -40 \text{ to } 85^\circ\text{C}$		Unit	Test Conditions	
			Min	Typ	Max	Min	Max			
Output voltage	V_{OH}	2.0	1.80	—	—	1.80	—	V	$I_o = -20 \mu\text{A}$	
		4.5	4.00	—	—	4.00	—			
		6.0	5.50	—	—	5.50	—			
		4.5	3.86	—	—	3.76	—			$I_o = -4 \text{ mA}$
		6.0	5.36	—	—	5.26	—			$I_o = -5.2 \text{ mA}$
		6.0	—	—	0.20	—	0.20			$I_o = 20 \mu\text{A}$
	V_{OL}	4.5	—	—	0.50	—	0.50	nA	$V_i = V_{CC} \text{ or GND}$	
		6.0	—	—	0.50	—	0.50			
		4.5	—	—	0.32	—	0.37			$I_o = 4 \text{ mA}$
		6.0	—	—	0.32	—	0.37			$I_o = 5.2 \text{ mA}$
Input current	I_i	6.0	—	± 0.1	± 100	—	± 1000	nA	$V_i = V_{CC} \text{ or GND}$	
Quiescent supply voltage	I_{CC}	6.0	—	—	2.0	—	20	μA	$V_i = V_{CC} \text{ or GND}, I_o = 0$	

Switching Characteristics ($C_L = 50 \text{ pF}$)

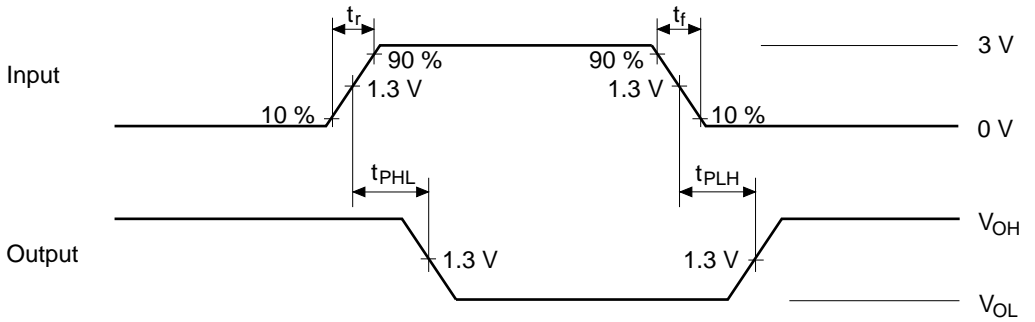
Item	Symbol	$V_{CC} \text{ (V)}$	$T_a = 25^\circ\text{C}$			$T_a = -40 \text{ to } 85^\circ\text{C}$		Unit	Input FROM	Output TO
			Min	Typ	Max	Min	Max			
Propagation delay time	t_{PLH}	2.0	—	16	60	—	75	ns	A	Y
	t_{PHL}	4.5	—	7	12	—	15			
		6.0	—	6	10	—	13			
Output rise / fall time	t_r	2.0	—	21	75	—	95	ns		Each
	t_f	4.5	—	8	15	—	19			output
		6.0	—	7	13	—	16			
Input capacitance	C_I	—	—	3	10	—	10	pF		
Power dissipation capacitance	C_{PD}	—	—	20	—	—	—	pF		

Test Circuit



Note: 1. C_L includes probe and jig capacitance.

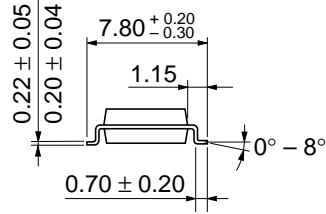
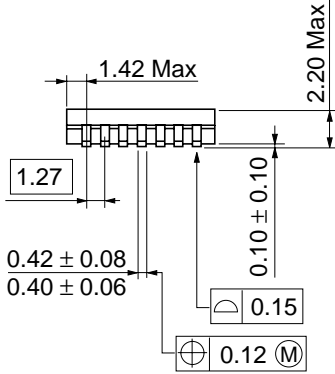
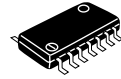
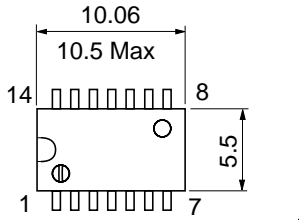
• Waveform



Note: 1. Input waveform : PRR = 1 MHz, duty cycle 50%, $t_r = 6$ ns, $t_f = 6$ ns

Package Dimensions

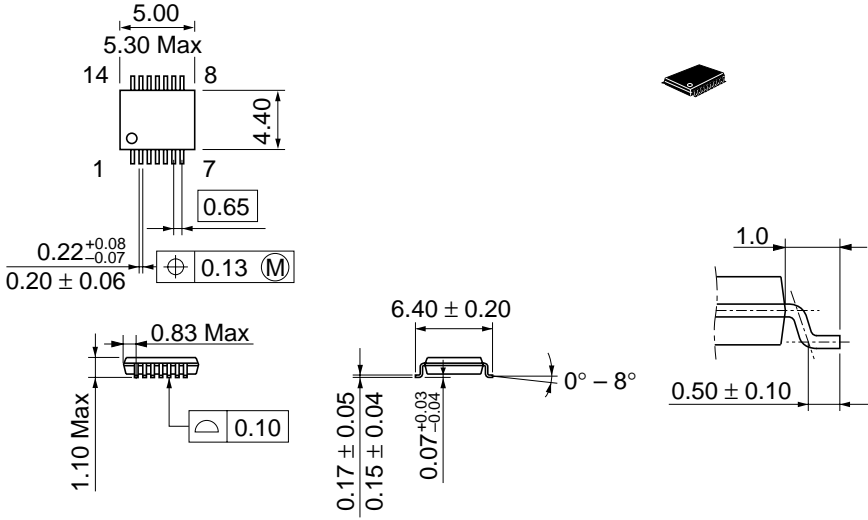
Unit : mm



Dimension including the plating thickness
Base material dimension

Hitachi Code	FP-14DA
JEDEC	—
EIAJ	Conforms
Weight (reference value)	0.23 g

HD74HCU04A



Dimension including the plating thickness
Base material dimension

Hitachi Code	TTP-14D
JEDEC	—
EIAJ	—
Weight (reference value)	0.05 g

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