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# HD74HCT04A

Hex Inverters

# HITACHI

ADE-205-287 (Z)  
1st. Edition  
June 1999

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## Description

The HD74HCT04A 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

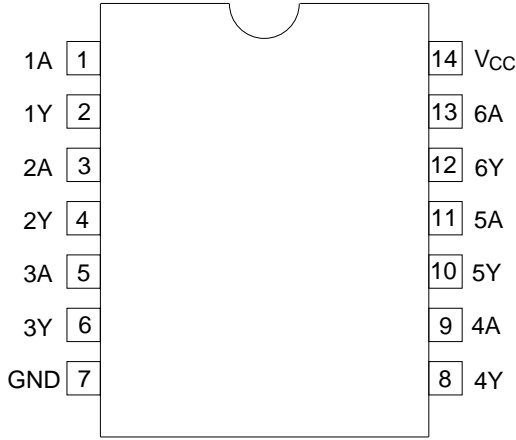
## Function Table

Input A	Output Y
H	L
L	H

H : High level

L : Low level

## Pin Arrangement



(Top view)

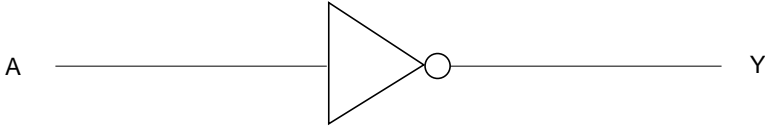
## Absolute Maximum Ratings

Item	Symbol	Ratings	Unit
Supply voltage	$V_{CC}$	-0.5 to 7.0	V
Input diode peak current	$I_{IK}$	$\pm 20$	mA
Output diode peak current	$I_{OK}$	$\pm 20$	mA
Output current	$I_O$	$\pm 25$	mA
$V_{CC}$ , GND current / pin	$I_{CC}$ or $I_{GND}$	$\pm 50$	mA
Storage temperature	T <sub>stg</sub>	-65 to 150	°C

## Recommended Operating Conditions

Item	Symbol	Min	Typ	Max	Unit
Supply voltage	$V_{CC}$	4.5	5.0	5.5	V
Input voltage	$V_{IH}$	2.0	—	—	V
	$V_{IL}$	0	—	0.8	
	$V_I$	0	—	$V_{CC}$	
Output voltage	$V_O$	0	—	$V_{CC}$	V
Output current	$I_{OH}$	—	-4	—	mA
	$I_{OL}$	—	4	—	
Input rise / fall time	$t_r, t_f$	—	—	500	ns
Operating temperature	$T_a$	-40	—	85	°C

## Logic Diagram (1/4 Circuit)



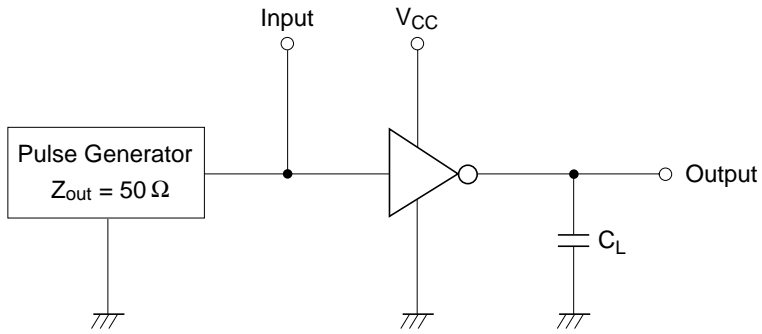
## Electrical Characteristics

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	$V_{OH}$	4.5	4.40	—	—	4.40	—	V	$I_o = -20 \mu\text{A}$
		4.5	3.98	—	—	3.84	—		$I_o = -4 \text{ mA}$
	$V_{OL}$	4.5	—	—	0.10	—	0.10		$I_o = 20 \mu\text{A}$
		4.5	—	—	0.26	—	0.33		$I_o = 4 \text{ mA}$
Input current	$I_i$	5.5	—	$\pm 0.1$	$\pm 100$	—	$\pm 1000$	nA	$V_i = V_{CC}$ or GND
Quiescent supply voltage	$I_{CC}$	5.5	—	—	2.0	—	20	$\mu\text{A}$	$V_i = V_{CC}$ or GND, $I_o = 0$

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

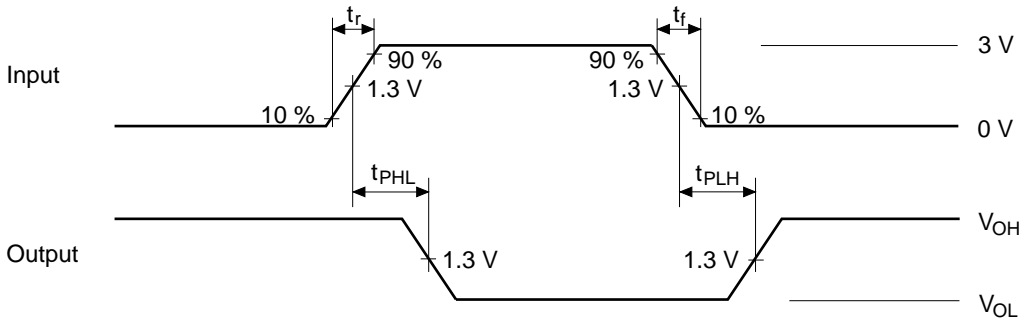
Item	Symbol	$V_{CC}$ (V)	$T_a = 25^\circ\text{C}$			$T_a = -40 \text{ to } 85^\circ\text{C}$		Unit	Input FROM	Output TO
			Min	Typ	Max	Min	Max			
Propagation delay time	$t_{PLH}$	4.5	—	8	18	—	23	ns	A	Y
	$t_{PHL}$	5.5	—	7	16	—	20			
Output rise / fall time	$t_r$	4.5	—	6	15	—	19	ns		Each output
	$t_f$	5.5	—	5	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.

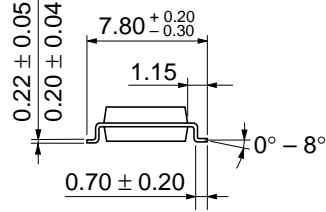
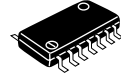
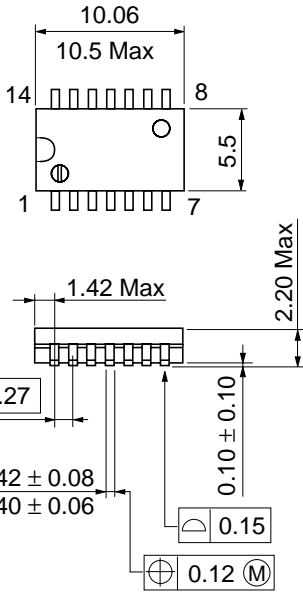
• Waveform



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

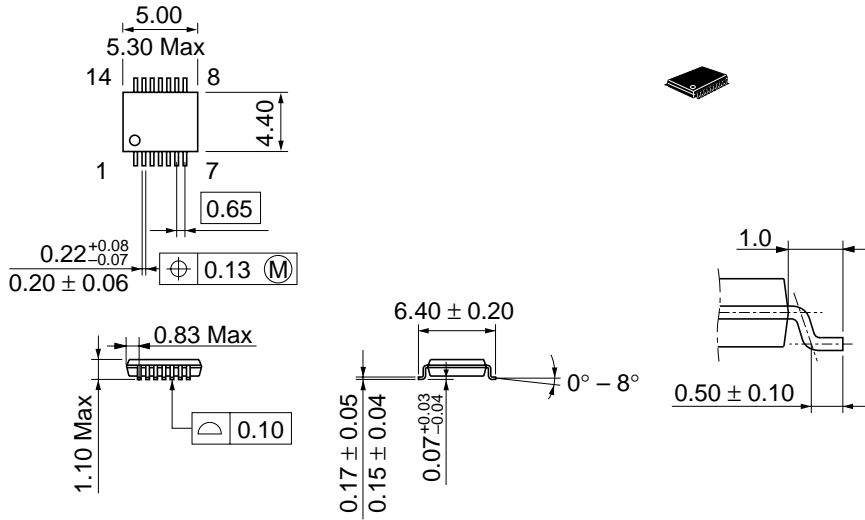
## Package Dimensions

Unit : mm



Dimension including the plating thickness  
Base material dimension

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



Dimension including the plating thickness  
Base material dimension

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

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