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Renesas Technology Corp.
Customer Support Dept.
April 1, 2003

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Keep safety first in your circuit designs!

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Remember to give due consideration to safety when making your circuit designs, with appropriate measures such as (i) placement of substitutive, auxiliary circuits, (ii) use of nonflammable material or (iii) prevention against any malfunction or mishap.

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HD74LVC14

Hex Schmitt-trigger Inverters



ADE-205-064B(Z)

Rev.2
September 1995

Description

The HD74LVC14 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 $> 2.0\text{ V} (@V_{CC} = 3.3\text{ V}, T_a = 25^\circ\text{C})$
- High output current $\pm 24\text{ mA} (@V_{CC} = 3.0\text{ V to }5.5\text{ V})$

Function Table

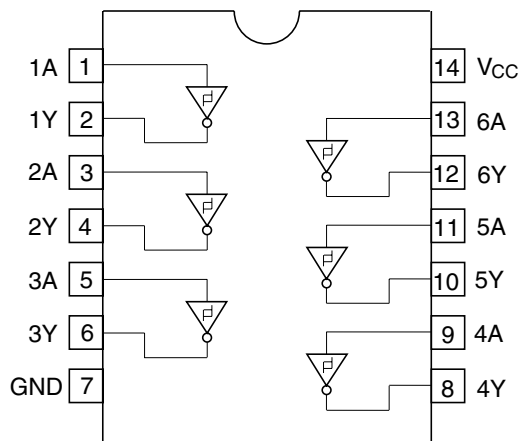
Input A	Output Y
L	H
H	L

H : High level

L : Low level

HD74LVC14

Pin Arrangement



(Top view)

Absolute Maximum Ratings

Item	Symbol	Ratings	Unit	Conditions
Supply voltage range	V_{CC}	-0.5 to 6.0	V	
Input diode current	I_{IK}	-50	mA	$V_I = -0.5$ V
Input voltage	V_I	-0.5 to 6.0	V	
Output diode current	I_{OK}	-50	mA	$V_O = -0.5$ V
		50	mA	$V_O = V_{CC} + 0.5$ V
Output voltage	V_O	-0.5 to $V_{CC} + 0.5$	V	
Output current	I_O	± 50	mA	
V_{CC} , GND current / pin	I_{CC} or I_{GND}	100	mA	
Storage temperature	T_{stg}	-65 to +150	$^{\circ}$ C	

Note: 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.

Recommended Operating Conditions

Item	Symbol	Ratings	Unit	Conditions
Supply voltage	V_{CC}	1.5 to 5.5	V	Data retention
		2.0 to 5.5	V	At operation
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}	-12	mA	$V_{CC} = 2.7\text{ V}$
		-24 ²	mA	$V_{CC} = 3.0\text{ V to }5.5\text{ V}$
	I_{OL}	12	mA	$V_{CC} = 2.7\text{ V}$
		24 ²	mA	$V_{CC} = 3.0\text{ V to }5.5\text{ V}$
Input rise / fall time ¹	t_r, t_f	10	ns/V	

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

Waveform : Refer to test circuit of switching characteristics.

2. duty cycle ≤ 50%

Electrical Characteristics

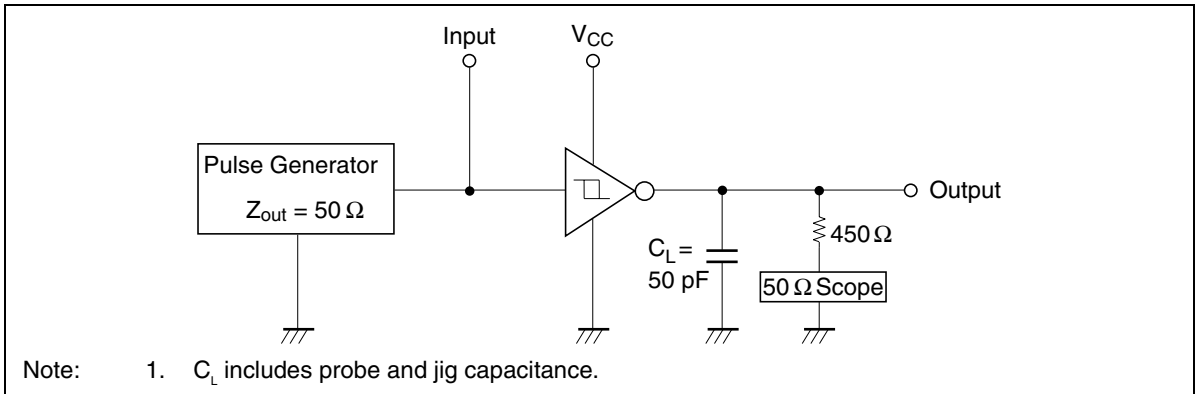
Ta = -40 to 85°C

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	V _T ⁺ - V _T ⁻
		3.0	1.2	2.2	V	
		3.6	1.5	2.4	V	
		4.5	1.6	2.6	V	
		5.5	2.0	3.0	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	
		3.0	0.4	1.2	V	
		3.6	0.4	1.2	V	
		4.5	0.4	1.2	V	
		5.5	0.4	1.2	V	
Input voltage	V _{IH}	2.7 to 3.6	2.4	—	V	
		4.5 to 5.5	3.0	—	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
		2.7	2.2	—	V	I _{OH} = -12 mA
		3.0	2.4	—	V	I _{OH} = -12 mA
		3.0	2.0	—	V	I _{OH} = -24 mA
		4.5	3.8	—	V	I _{OH} = -24 mA
	V _{OL}	2.7 to 5.5	—	0.2	V	I _{OL} = 100 μA
		2.7	—	0.4	V	I _{OL} = 12 mA
		3.0	—	0.55	V	I _{OL} = 24 mA
		4.5	—	0.55	V	I _{OL} = 24 mA
		Input current	I _{IN}	0 to 5.5	—	±5.0
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

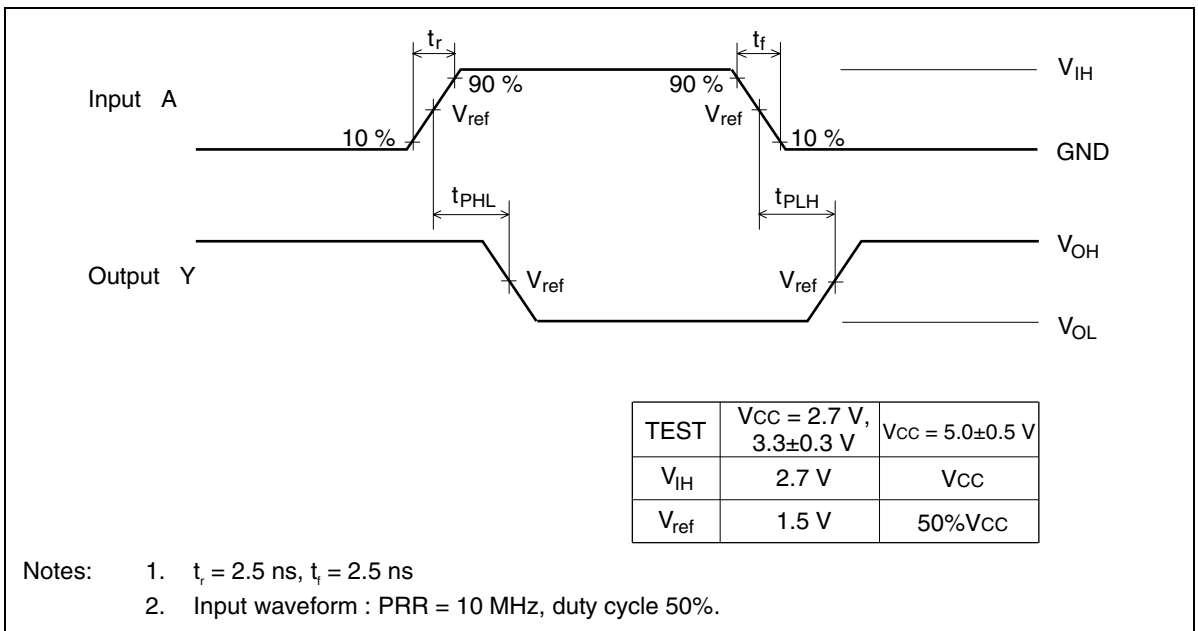
Switching Characteristics

Item	Symbol	V _{CC} (V)	Ta = -40 to 85°C			Unit	From (Input)	To (Output)
			Min	Typ	Max			
Propagation delay time	t _{PLH}	2.7	—	6.0	9.5	ns	A	Y
	t _{PHL}	3.3±0.3	1.5	5.0	8.5	ns		
		5.0±0.5	—	3.5	7.0	ns		
Input capacitance	C _{IN}	2.7	—	3.0	—	pF		
Output capacitance	C _O	2.7	—	15.0	—	pF		

Test Circuit



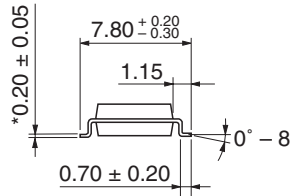
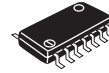
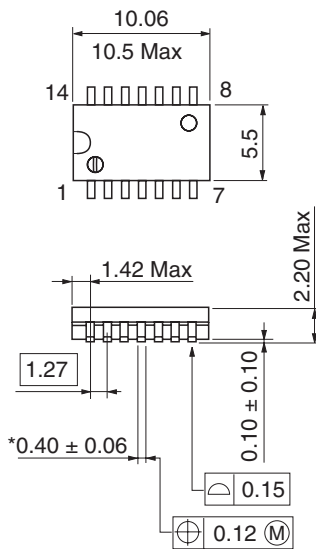
Waveforms



Package Dimensions

As of July, 2001

Unit: mm

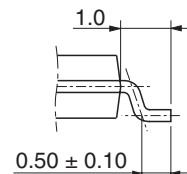
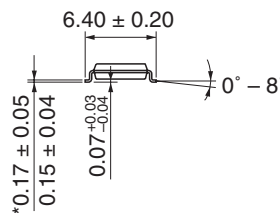
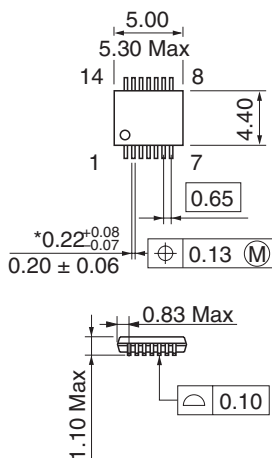


*Pd plating

Hitachi Code	FP-14DAV
JEDEC	—
JEITA	Conforms
Mass (reference value)	0.23 g

As of July, 2001

Unit: mm



*Dimension including the plating thickness
Base material dimension

Hitachi Code	TTP-14D
JEDEC	—
JEITA	—
Mass (reference value)	0.05 g

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Sales Offices

HITACHI

Hitachi, Ltd.

Semiconductor & Integrated Circuits.
Nippon Bldg., 2-6-2, Ohte-machi, Chiyoda-ku, Tokyo 100-0004, Japan
Tel: Tokyo (03) 3270-2111 Fax: (03) 3270-5109

URL NorthAmerica : <http://semiconductor.hitachi.com/>
 Europe : <http://www.hitachi-eu.com/hel/ecg>
 Asia : <http://sicapac.hitachi-asia.com>
 Japan : <http://www.hitachi.co.jp/Sicd/indx.htm>

For further information write to:

Hitachi Semiconductor
(America) Inc.
179 East Tasman Drive,
San Jose, CA 95134
Tel: <1>(408) 433-1990
Fax: <1>(408) 433-0223

Hitachi Europe GmbH
Electronic Components Group
Domacher StraÙe 3
D-85622 Feldkirchen, Munich
Germany
Tel: <49> (89) 9 9180-0
Fax: <49> (89) 9 29 30 00

Hitachi Europe Ltd.
Electronic Components Group.
Whitebrook Park
Lower Cookham Road
Maidenhead
Berkshire SL6 8YA, United Kingdom
Tel: <44> (1628) 585000
Fax: <44> (1628) 585160

Hitachi Asia Ltd.
Hitachi Tower
16 Collyer Quay #20-00,
Singapore 049318
Tel : <65>-538-6533/538-8577
Fax : <65>-538-6933/538-3877
URL : <http://www.hitachi.com.sg>

Hitachi Asia Ltd.
(Taipei Branch Office)
4/F, No. 167, Tun Hwa North Road,
Hung-Kuo Building,
Taipei (105), Taiwan
Tel : <886>-(2)-2718-3666
Fax : <886>-(2)-2718-8180
Telex : 23222 HAS-TP
URL : <http://www.hitachi.com.tw>

Hitachi Asia (Hong Kong) Ltd.
Group III (Electronic Components)
7/F., North Tower,
World Finance Centre,
Harbour City, Canton Road
Tsim Sha Tsui, Kowloon,
Hong Kong
Tel : <852>-(2)-735-9218
Fax : <852>-(2)-730-0281
URL : <http://www.hitachi.com.hk>

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