

To all our customers

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# Datasheet.Live

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

## Cautions

Keep safety first in your circuit designs!

1. Renesas Technology Corporation puts the maximum effort into making semiconductor products better and more reliable, but there is always the possibility that trouble may occur with them. Trouble with semiconductors may lead to personal injury, fire or property damage.

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.

Notes regarding these materials

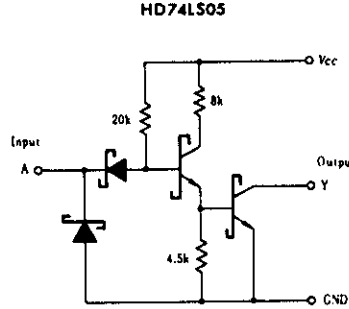
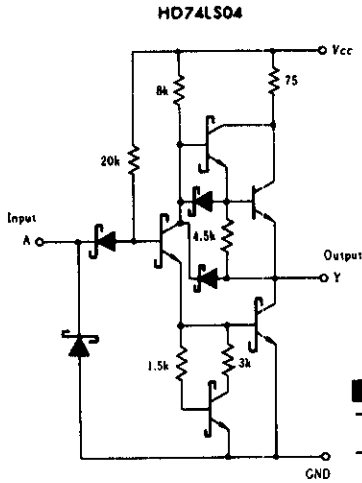
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# HD74LS04/HD74LS05

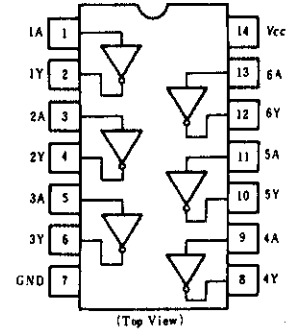
Hex Inverters

Hex Inverters (with Open Collector Outputs)

## CIRCUIT SCHEMATIC (1/6)



## PIN ARRANGEMENT



## HD74LS05 RECOMMENDED OPERATING CONDITIONS

Item	Symbol	min	typ	max	Unit
High level output voltage	$V_{OH}$	—	—	5.5	V
Low level output current	$I_{OL}$	—	—	8	mA

## ELECTRICAL CHARACTERISTICS ( $T_a = -20 \sim +75^\circ\text{C}$ )

Item	Symbol	Test Conditions	HD74LS04			HD74LS05			Unit	
			min	typ*	max	min	typ*	max		
Input voltage	$V_{IH}$		2.0	—	—	2.0	—	—	V	
	$V_{IL}$		—	—	0.8	—	—	0.8	V	
Output voltage	$V_{OH}$	$V_{CC}=4.75\text{V}, V_{IL}=0.8\text{V}, I_{OH}=-400\mu\text{A}$	2.7	—	—	—	—	—	V	
	$V_{OL}$	$V_{CC}=4.75\text{V}, V_{IH}=2\text{V}$	$I_{OL}=8\text{mA}$	—	—	0.5	—	—	0.5	V
			$I_{OL}=4\text{mA}$	—	—	0.4	—	—	0.4	
Output current	$I_{OH}$	$V_{CC}=4.75\text{V}, V_{IL}=0.8\text{V}, V_{OH}=5.5\text{V}$	—	—	—	—	—	100	$\mu\text{A}$	
Input current	$I_{IH}$	$V_{CC}=5.25\text{V}, V_I=2.7\text{V}$	—	—	20	—	—	20	$\mu\text{A}$	
	$I_{IL}$	$V_{CC}=5.25\text{V}, V_I=0.4\text{V}$	—	—	-0.4	—	—	-0.4	mA	
	$I_I$	$V_{CC}=5.25\text{V}, V_I=7\text{V}$	—	—	0.1	—	—	0.1	mA	
Short-circuit output current	$I_{OS}$	$V_{CC}=5.25\text{V}$	-20	—	-100	—	—	—	mA	
Supply current	$I_{CCH}$	$V_{CC}=5.25\text{V}$	—	1.2	2.4	—	1.2	2.4	mA	
	$I_{CCL}$		—	3.6	6.6	—	3.6	6.6		
Input clamp voltage	$V_{IK}$	$V_{CC}=4.75\text{V}, I_{IN}=-18\text{mA}$	—	—	-1.5	—	—	-1.5	V	

\*  $V_{CC}=5\text{V}, T_a=25^\circ\text{C}$

## SWITCHING CHARACTERISTICS ( $V_{CC}=5\text{V}, T_a=25^\circ\text{C}$ )

Item	Symbol	Test Conditions	HD74LS04			HD74LS05			Unit
			min	typ	max	min	typ	max	
Propagation delay time	$t_{PLH}$	$C_L=15\text{pF}, R_L=2\text{k}\Omega$	—	9	15	—	17	32	ns
	$t_{PHL}$		—	10	15	—	15	28	

Note) Refer to Test Circuit and Waveform of the Common Item



Hitachi Code	DP-14
JEDEC	Conforms
EIAJ	Conforms
Weight (reference value)	0.97 g



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

\*Dimension including the plating thickness  
Base material dimension



Hitachi Code	FP-14DN
JEDEC	Conforms
EIAJ	Conforms
Weight (reference value)	0.13 g

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