

To all our customers

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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

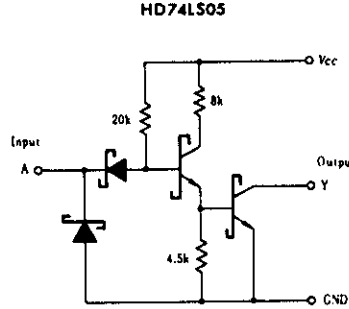
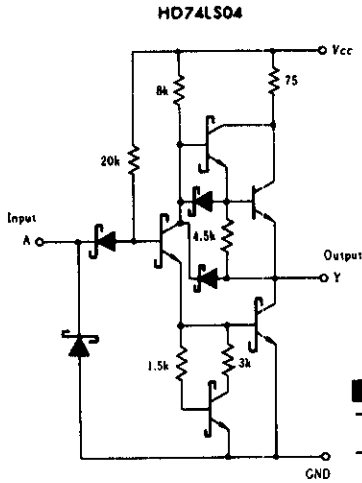
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HD74LS04/HD74LS05

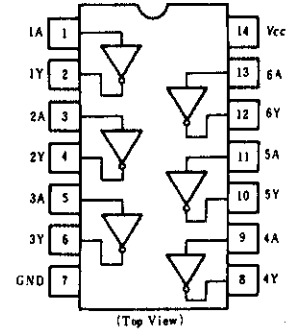
Hex Inverters

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 | μA | |
| Input current | I_{IH} | $V_{CC}=5.25\text{V}, V_I=2.7\text{V}$ | — | — | 20 | — | — | 20 | μA | |
| | 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 | |

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

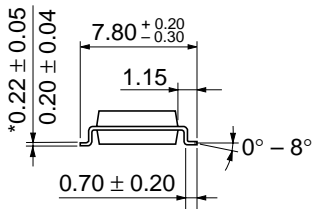
SWITCHING CHARACTERISTICS ($V_{CC}=5\text{V}, T_a=25^\circ\text{C}$)

| 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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