

HD74LVC00

Quad. 2-input NAND Gates

REJ03D0341-0300Z
 (Previous ADE-205-060B (Z))
 Rev.3.00
 Jul. 22, 2004

Description

The HD74LVC00 has four 2-input NAND gates 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 $\pm 24\text{ mA} (@V_{CC} = 3.0\text{ V to }5.5\text{ V})$
- Ordering Information

| Part Name | Package Type | Package Code | Package Abbreviation | Taping Abbreviation (Quantity) |
|---------------|--------------------|--------------|----------------------|--------------------------------|
| HD74LVC00FPEL | SOP-14 pin (JEITA) | FP-14DAV | FP | EL (2,000 pcs/reel) |
| HD74LVC00TELL | TSSOP-14 pin | TTP-14DV | T | ELL (2,000 pcs/reel) |

Note: Please consult the sales office for the above package availability.

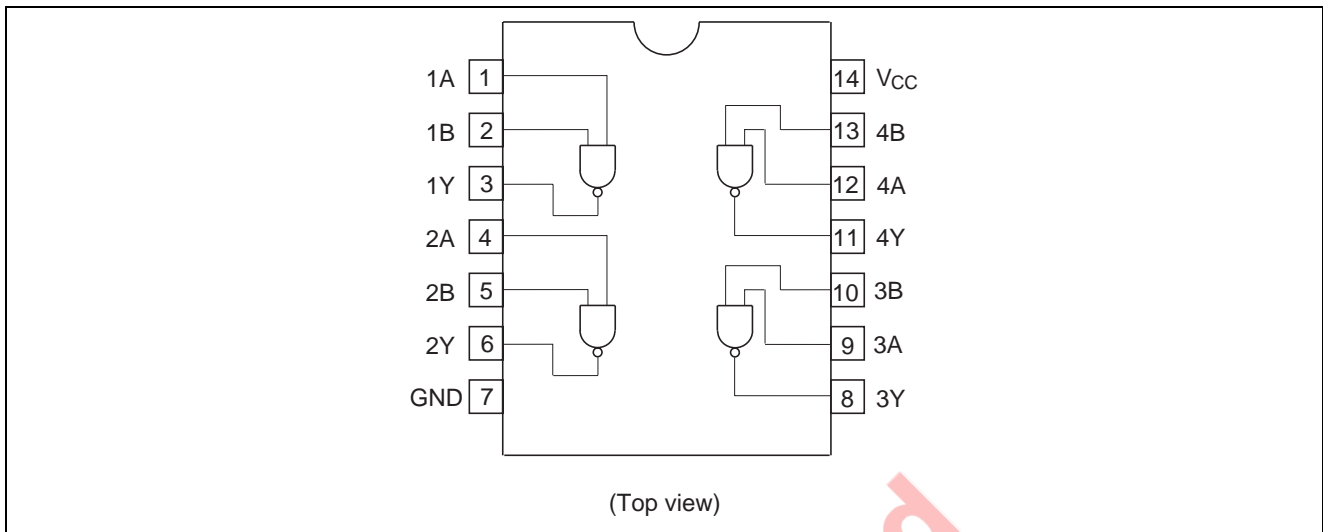
Function Table

| Inputs | | Output Y |
|--------|---|----------|
| A | B | |
| L | L | H |
| L | H | H |
| H | L | H |
| H | H | L |

H: High level

L: Low level

Pin Arrangement



Absolute Maximum Ratings

| Item | Symbol | Ratings | Unit | Conditions |
|------------------------------|-----------------------|------------------------|--------------------|-------------------------------|
| Supply voltage | V_{CC} | -0.5 to 6.0 | V | |
| Input diode current | I_{IK} | -50 | mA | $V_I = -0.5\text{ V}$ |
| Input voltage | V_I | -0.5 to 6.0 | V | |
| Output diode current | I_{OK} | -50 | mA | $V_O = -0.5\text{ V}$ |
| | | 50 | mA | $V_O = V_{CC} + 0.5\text{ V}$ |
| 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 | $^{\circ}\text{C}$ | |

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 | | At operation |
| Input / Output voltage | V_I | 0 to 5.5 | V | A, B |
| | V_O | 0 to V_{CC} | | Y |
| Operating temperature | T_a | -40 to 85 | $^{\circ}\text{C}$ | |
| Output current | I_{OH} | -12 | mA | $V_{CC} = 2.7\text{ V}$ |
| | | -24^{*2} | | $V_{CC} = 3.0\text{ V to } 5.5\text{ V}$ |
| | I_{OL} | 12 | | $V_{CC} = 2.7\text{ V}$ |
| | | 24^{*2} | | $V_{CC} = 3.0\text{ V to } 5.5\text{ V}$ |
| 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 $\leq 50\%$.

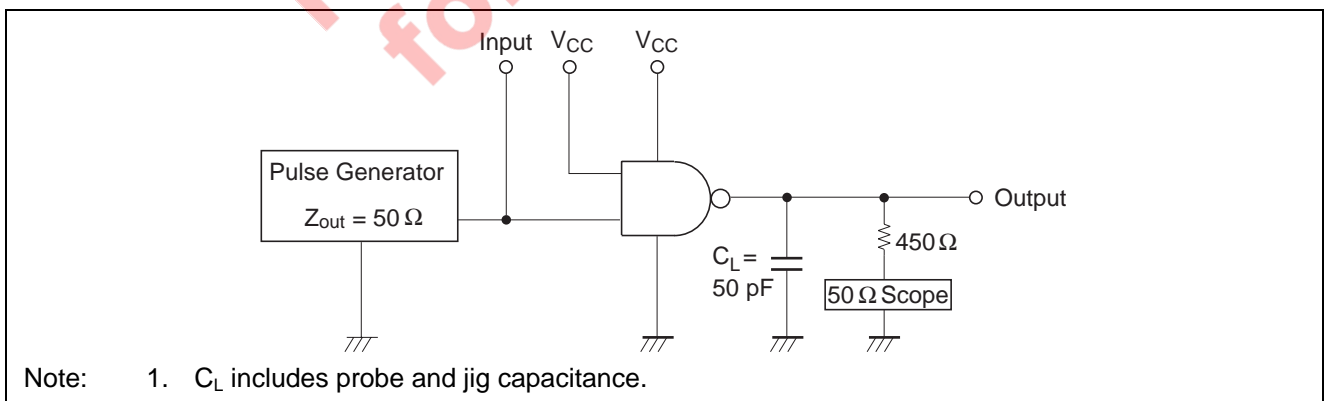
Electrical Characteristics

| Item | Symbol | V _{CC} (V) | Ta = -40 to 85°C | | Unit | Test Conditions |
|--------------------------|------------------|---------------------|----------------------|----------------------|------|--|
| | | | Min | Max | | |
| Input voltage | V _{IH} | 2.7 to 3.6 | 2.0 | — | V | |
| | | 4.5 to 5.5 | V _{CC} ×0.7 | — | | |
| | V _{IL} | 2.7 to 3.6 | — | 0.8 | | |
| | | 4.5 to 5.5 | — | V _{CC} ×0.3 | | |
| Output voltage | V _{OH} | 2.7 to 5.5 | V _{CC} -0.2 | — | V | I _{OH} = -100 μA |
| | | 2.7 | 2.2 | — | | I _{OH} = -12 mA |
| | | 3.0 | 2.4 | — | | |
| | | 3.0 | 2.0 | — | | I _{OH} = -24 mA |
| | V _{OL} | 2.7 to 5.5 | — | 0.2 | V | I _{OL} = 100 μA |
| | | 2.7 | — | 0.4 | | I _{OL} = 12 mA |
| | | 3.0 | — | 0.55 | | I _{OL} = 24 mA |
| | | 4.5 | — | 0.55 | | |
| Input current | I _{IN} | 0 to 5.5 | — | ±5.0 | μA | V _{IN} = 5.5 V or GND |
| 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 |

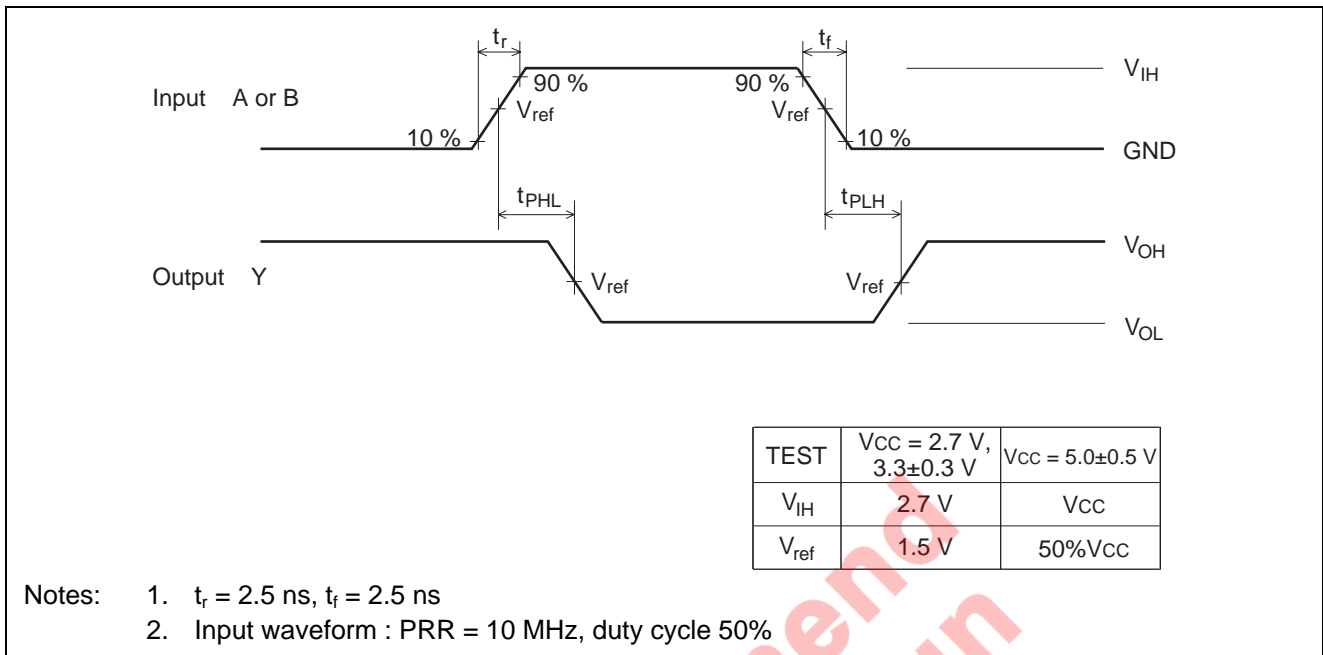
Switching Characteristics

| 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 | — | 4.5 | 7.0 | ns | A or B | Y |
| | | 3.3±0.3 | 1.5 | 3.5 | 6.0 | | | |
| | | 5.0±0.5 | — | 3.0 | 5.5 | | | |
| Input capacitance | C _{IN} | 2.7 | — | 3.0 | — | pF | | |
| Output capacitance | C _O | 2.7 | — | 15.0 | — | pF | | |

Test Circuit



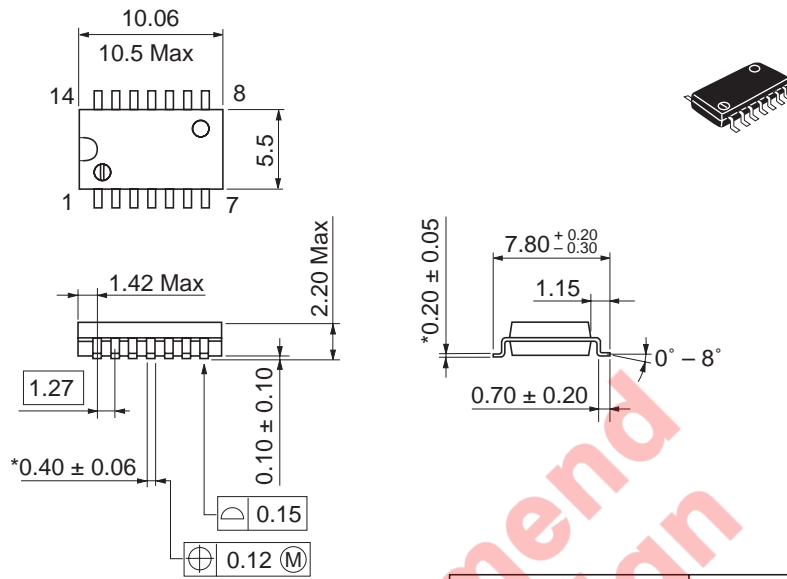
Waveforms



Not recommended for new design

Package Dimensions

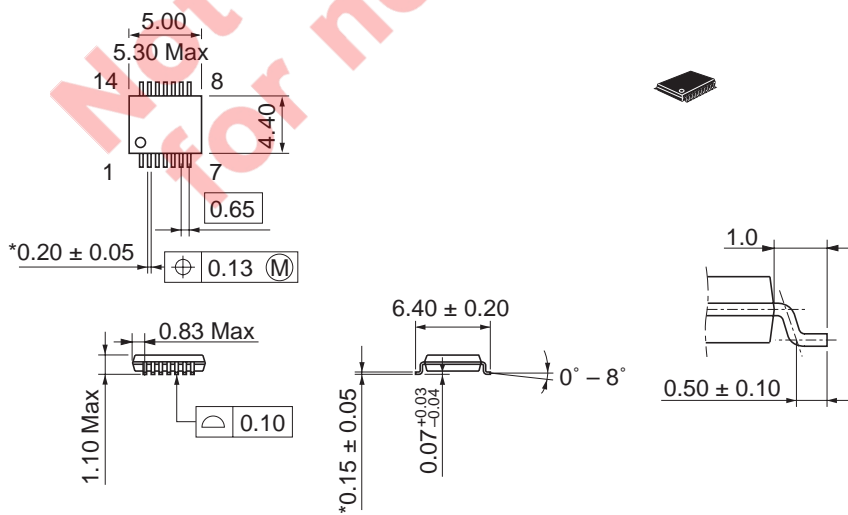
As of January, 2003
Unit: mm



*Ni/Pd/Au plating

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

As of January, 2003
Unit: mm



*Ni/Pd/Au plating

| | |
|------------------------|----------|
| Package Code | TTP-14DV |
| JEDEC | — |
| JEITA | — |
| Mass (reference value) | 0.05 g |

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