

# HD74LVC08

## Quad. 2-input AND Gates

REJ03D0344-0300Z  
(Previous ADE-205-063B (Z))  
Rev.3.00  
Jul. 22, 2004

### Description

The HD74LVC08 has four 2-input AND 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) |
|---------------|--------------------|--------------|----------------------|--------------------------------|
| HD74LVC08FPEL | SOP-14 pin (JEITA) | FP-14DAV     | FP                   | EL (2,000 pcs/reel)            |
| HD74LVC08TELL | TSSOP-14 pin       | TTP-14DV     | T                    | ELL (2,000 pcs/reel)           |

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

### Function Table

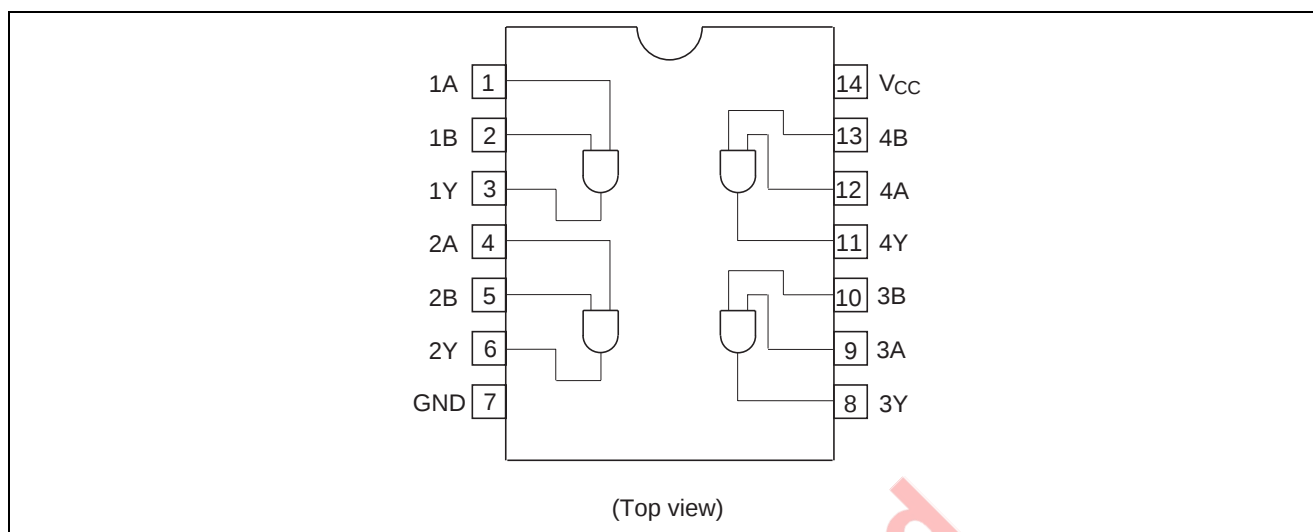
#### Inputs

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

H: High level

L: Low level

## Pin Arrangement



## 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                     |      | $V_O = V_{CC} + 0.5$ V |
| Output voltage               | $V_O$                 | -0.5 to $V_{CC} + 0.5$ | V    |                        |
| Output current               | $I_O$                 | $\pm 50$               | mA   |                        |
| $V_{CC}$ , GND current / pin | $I_{CC}$ or $I_{GND}$ | 100                    | mA   |                        |
| Storage temperature          | $T_{stg}$             | -65 to +150            | °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         | °C   |                           |
| Output current                       | $I_{OH}$   | -12               | mA   | $V_{CC} = 2.7$ V          |
|                                      |            | -24 <sup>*2</sup> |      | $V_{CC} = 3.0$ V to 5.5 V |
|                                      | $I_{OL}$   | 12                | mA   | $V_{CC} = 2.7$ V          |
|                                      |            | 24 <sup>*2</sup>  |      | $V_{CC} = 3.0$ V to 5.5 V |
| Input rise / fall time <sup>*1</sup> | $t_r, t_f$ | 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  $\leq 50\%$

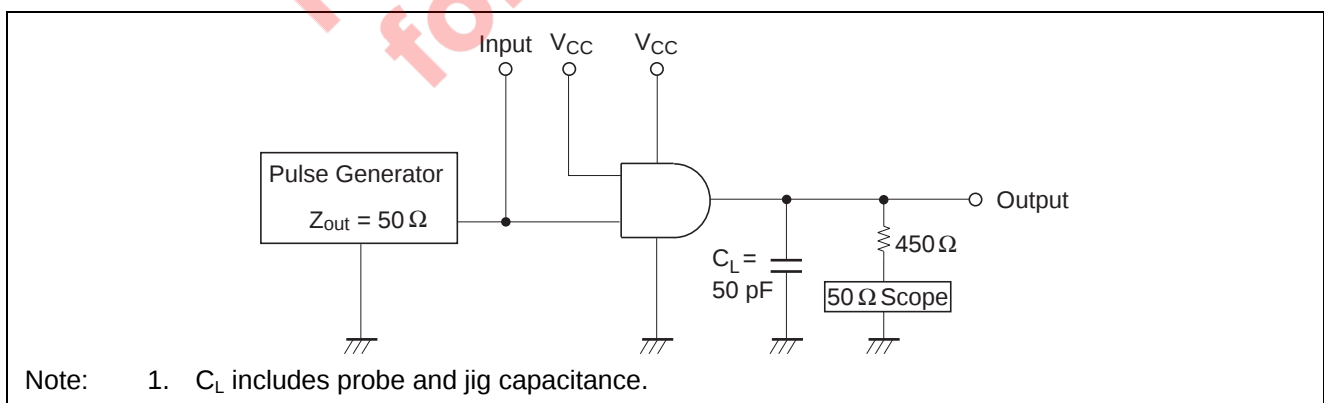
## Electrical Characteristics

| Item                     | Symbol           | V <sub>CC</sub> (V) | Ta = -40 to 85°C     |                      | Unit | Test Conditions                                                                                |
|--------------------------|------------------|---------------------|----------------------|----------------------|------|------------------------------------------------------------------------------------------------|
|                          |                  |                     | Min                  | Max                  |      |                                                                                                |
| Input voltage            | V <sub>IH</sub>  | 2.7 to 3.6          | 2.0                  | —                    | V    |                                                                                                |
|                          |                  | 4.5 to 5.5          | V <sub>CC</sub> ×0.7 | —                    |      |                                                                                                |
|                          | V <sub>IL</sub>  | 2.7 to 3.6          | —                    | 0.8                  | V    |                                                                                                |
|                          |                  | 4.5 to 5.5          | —                    | V <sub>CC</sub> ×0.3 |      |                                                                                                |
| Output voltage           | V <sub>OH</sub>  | 2.7 to 5.5          | V <sub>CC</sub> -0.2 | —                    | V    | I <sub>OH</sub> = -100 µA                                                                      |
|                          |                  | 2.7                 | 2.2                  | —                    |      | I <sub>OH</sub> = -12 mA                                                                       |
|                          |                  | 3.0                 | 2.4                  | —                    |      | I <sub>OH</sub> = -12 mA                                                                       |
|                          |                  | 3.0                 | 2.0                  | —                    |      | I <sub>OH</sub> = -24 mA                                                                       |
|                          |                  | 4.5                 | 3.8                  | —                    |      | I <sub>OH</sub> = -24 mA                                                                       |
|                          | V <sub>OL</sub>  | 2.7 to 5.5          | —                    | 0.2                  | V    | I <sub>OL</sub> = 100 µA                                                                       |
|                          |                  | 2.7                 | —                    | 0.4                  |      | I <sub>OL</sub> = 12 mA                                                                        |
|                          |                  | 3.0                 | —                    | 0.55                 |      | I <sub>OL</sub> = 24 mA                                                                        |
|                          |                  | 4.5                 | —                    | 0.55                 |      | I <sub>OL</sub> = 24 mA                                                                        |
|                          |                  |                     |                      |                      |      |                                                                                                |
| Input current            | I <sub>IN</sub>  | 0 to 5.5            | —                    | ±5.0                 | µA   | V <sub>IN</sub> = 5.5 V or GND                                                                 |
| Quiescent supply current | I <sub>CC</sub>  | 5.5                 | —                    | 20                   | µA   | V <sub>IN</sub> = V <sub>CC</sub> or GND                                                       |
|                          | ΔI <sub>CC</sub> | 3.0 to 3.6          | —                    | 500                  | µA   | V <sub>IN</sub> = one input at (V <sub>CC</sub> -0.6)V, other inputs at V <sub>CC</sub> or GND |

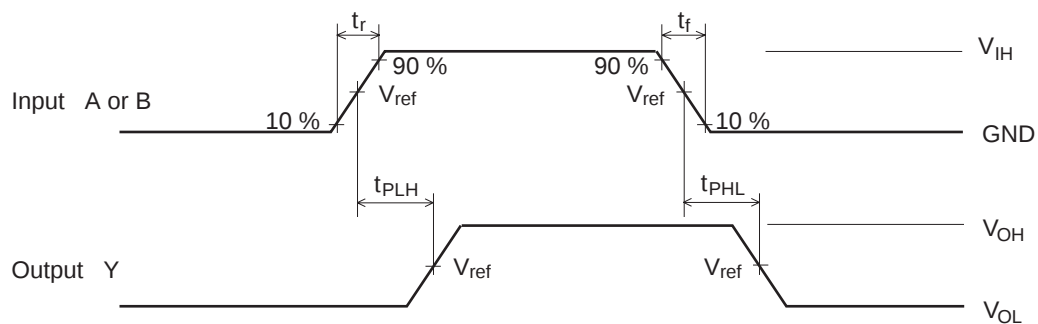
## Switching Characteristics

| Item                   | Symbol           | V <sub>CC</sub> (V) | Ta = -40 to 85°C |      |     | Unit | From (Input) | To (Output) |
|------------------------|------------------|---------------------|------------------|------|-----|------|--------------|-------------|
|                        |                  |                     | Min              | Typ  | Max |      |              |             |
| Propagation delay time | t <sub>PLH</sub> | 2.7                 | —                | 4.5  | 7.0 | ns   | A or B       | Y           |
|                        | t <sub>PHL</sub> | 3.3±0.3             | 1.5              | 3.5  | 6.0 |      |              |             |
|                        |                  | 5.0±0.5             | —                | 2.5  | 5.0 |      |              |             |
| Input capacitance      | C <sub>IN</sub>  | 2.7                 | —                | 3.0  | —   | pF   |              |             |
| Output capacitance     | C <sub>O</sub>   | 2.7                 | —                | 15.0 | —   | pF   |              |             |

## Test Circuit



# Waveforms



| TEST      | $V_{CC} = 2.7\text{ V}, 3.3 \pm 0.3\text{ V}$ | $V_{CC} = 5.0 \pm 0.5\text{ V}$ |
|-----------|-----------------------------------------------|---------------------------------|
| $V_{IH}$  | 2.7 V                                         | $V_{CC}$                        |
| $V_{ref}$ | 1.5 V                                         | 50% $V_{CC}$                    |

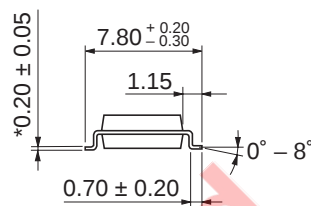
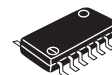
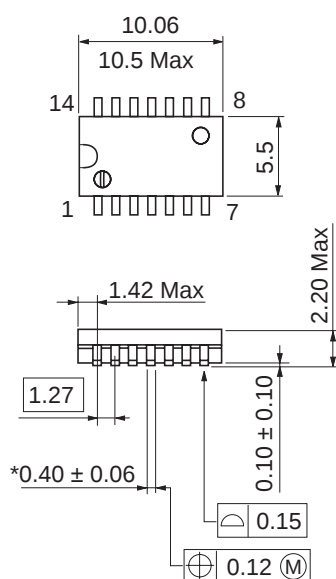
- Notes:
1.  $t_r = 2.5\text{ ns}$ ,  $t_f = 2.5\text{ ns}$
  2. Input waveform : PRR = 10 MHz, duty cycle 50%.

Not recommended  
for new design

# Package Dimensions

As of January, 2003

Unit: mm

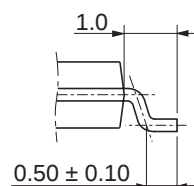
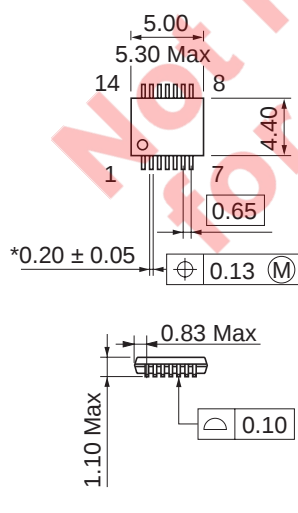


\*Ni/Pd/Au plating

|                        |          |
|------------------------|----------|
| 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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