
HD74LV1GT00A

2-input NAND Gate

HITACHI

ADE-205-325C (Z)
4th. Edition
April 2000

Description

The HD74LV1GT00A is high speed CMOS two input NAND gate using silicon gate CMOS process. With CMOS low power dissipation, it provides high speed equivalent to LS-TTL series. The internal circuit of three stages construction with buffer provides wide noise margin and stable output. Low voltage and high speed operation is suitable for the battery powered products (e.g., notebook computers), and the low power consumption extends the battery life.

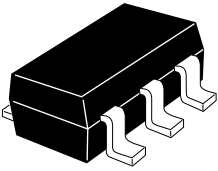
Features

- The basic gate function is lined up as hitachi uni logic series.
- Supplied on emboss taping for high speed automatic mounting.
- TTL compatible input level.
Supply voltage range : 4.5 to 5.5 V
Operating temperature range : -40 to +85°C
- All inputs V_{IH} (Max.) = 5.5 V (@ V_{CC} = 0 V to 5.5 V)
All outputs V_O (Max.) = 5.5 V (@ V_{CC} = 0 V)
- Output current ± 12 mA (@ V_{CC} = 4.5 V to 5.5 V)
- All the logical input has hysteresis voltage for the slow transition.

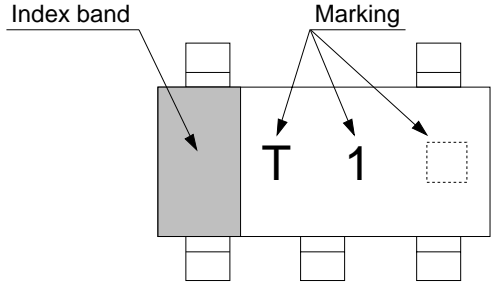
HD74LV1GT00A

Outline and Article Indication

- HD74LV1GT00A



CMLPAK-5



☐ = Control code
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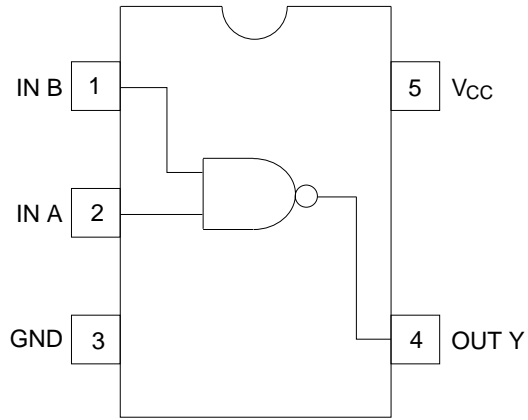
Function Table

| 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



(Top view)

Absolute Maximum Ratings

| Item | Symbol | Ratings | Unit | Test Conditions |
|------------------------|-----------------------|---------------------------------------|------|-----------------------------------|
| Supply voltage | V_{CC} | -0.5 to 7.0 | V | |
| Input voltage | V_{IN} | -0.5 to 7.0 | V | |
| Output voltage | V_{OUT} | -0.5 to $V_{CC} + 0.5$ -0.5 to 7.0 | V | Output : H or L V_{CC} : OFF |
| Input diode current | I_{IK} | -20 | mA | |
| Output diode current | I_{OK} | ± 50 | mA | |
| Output current | I_{OUT} | ± 25 | mA | |
| V_{CC} , GND current | I_{CC} or I_{GND} | ± 50 | mA | |
| Power dissipation | P_T | 200 | mW | |
| Storage temperature | T_{stg} | -65 to 150 | °C | |

Recommended Operating Conditions

| Item | Symbol | Ratings | Unit |
|------------------------|------------|------------------------------------|------|
| Supply voltage | V_{CC} | 4.5 to 5.5 | V |
| Input voltage | V_{IN} | 0 to 5.5 | V |
| Output voltage | V_{OUT} | 0 to V_{CC} | V |
| Operating temperature | T_{opr} | -40 to +85 | °C |
| Input rise / fall time | t_r, t_f | 0 to 20 ($V_{CC} = 4.5$ to 5.5 V) | ns |

Electrical Characteristic

- $T_a = -40$ to 85°C

| Item | Symbol | V_{CC} (V) * | Min | Typ | Max | Unit | Test condition |
|--------------------------|-----------------|----------------|--------------|------|---------|---------------|---|
| Input voltage | V_{IH} | 4.5 to 5.5 | 2.0 | — | — | V | |
| | V_{IL} | 4.5 to 5.5 | — | — | 0.8 | | |
| Hysteresis voltage | V_H | 5.0 | — | 0.15 | — | V | $V_T^+ - V_T^-$ |
| Output voltage | V_{OH} | Min to Max | $V_{CC}-0.1$ | — | — | V | $I_{OH} = -50 \mu\text{A}$ |
| | | 4.5 | 3.8 | — | — | | $I_{OH} = -12 \text{ mA}$ |
| | V_{OL} | Min to Max | — | — | 0.1 | | $I_{OL} = 50 \mu\text{A}$ |
| | | 4.5 | — | — | 0.55 | | $I_{OL} = 12 \text{ mA}$ |
| Input current | I_{IN} | 0 to 5.5 | — | — | ± 1 | μA | $V_{IN} = 5.5 \text{ V}$ or GND |
| Quiescent supply current | I_{CC} | 5.5 | — | — | 10 | μA | $V_{IN} = V_{CC}$ or GND, $I_O = 0$ |
| | ΔI_{CC} | 5.5 | — | — | 1.5 | mA | One input $V_{IN} = 3.4 \text{ V}$, other input V_{CC} or GND |
| Output leakage current | I_{OFF} | 0 | — | — | 5 | μA | $V_O = 5.5 \text{ V}$ |
| Input capacitance | C_{IN} | 5.0 | — | 2.5 | — | pF | $V_{IN} = V_{CC}$ or GND |

Note: For conditions shown as Min or Max, use the appropriate values under recommended operating conditions.

Switching Characteristics

- $V_{CC} = 5.0 \pm 0.5$ V

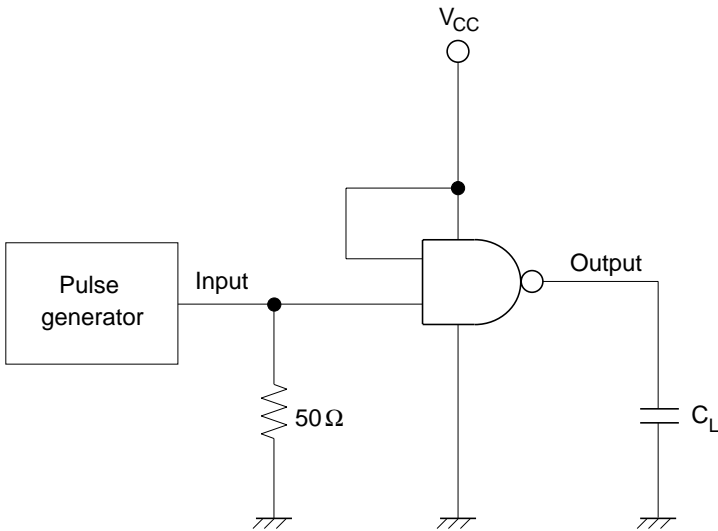
| Item | Symbol | $T_a = 25^\circ\text{C}$ | | | $T_a = -40$ to 85°C | | Unit | Test Conditions | FROM (Input) | TO (Output) |
|------------------------|-----------|--------------------------|-----|-----|-----------------------------------|-----|------|-----------------|--------------|-------------|
| | | Min | Typ | Max | Min | Max | | | | |
| Propagation delay time | t_{PLH} | — | 5.0 | 6.9 | 1.0 | 8.0 | ns | $C_L = 15$ pF | A or B | Y |
| | t_{PHL} | — | 5.5 | 7.9 | 1.0 | 9.0 | | $C_L = 50$ pF | | |

Operating Characteristics

- $C_L = 50$ pF

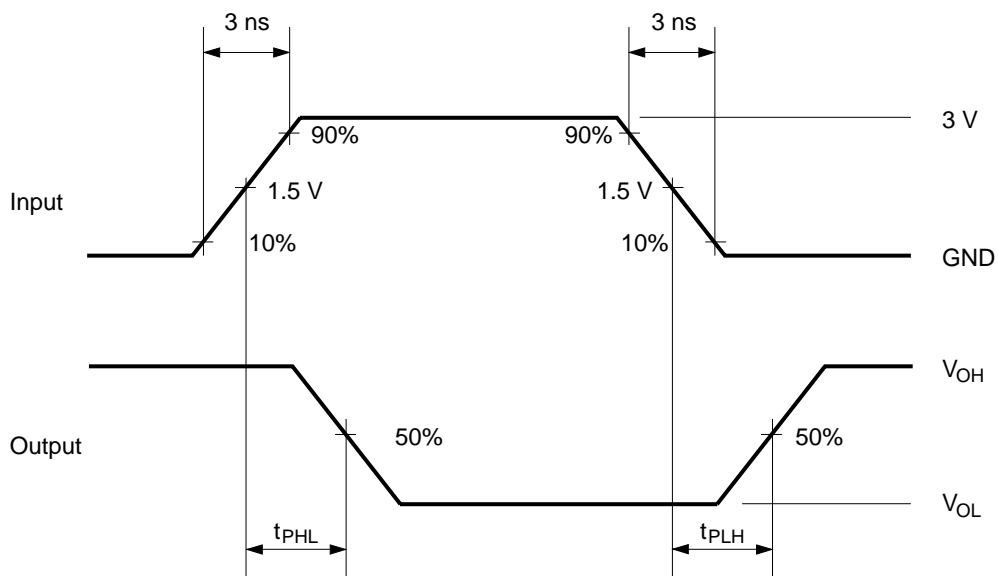
| Item | Symbol | V_{CC} (V) | $T_a = 25^\circ\text{C}$ | | | Unit | Test Conditions |
|-------------------------------|----------|--------------|--------------------------|------|-----|------|-----------------|
| | | | Min | Typ | Max | | |
| Power dissipation capacitance | C_{PD} | 5.0 | — | 11.0 | — | pF | $f = 10$ MHz |

Test Circuit



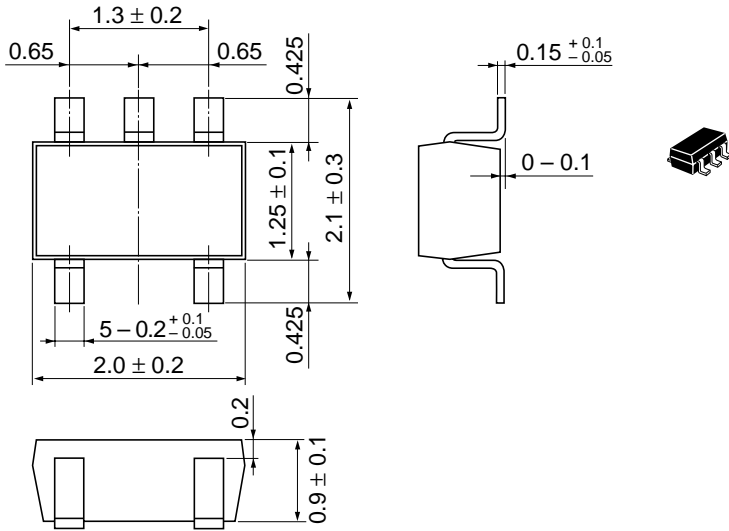
Note: Operating current test time, output is open.

• Waveforms



Package Dimensions

Unit : mm



| | |
|--------------------------|---------|
| Hitachi Code | CMPAK-5 |
| JEDEC | — |
| EIAJ | — |
| Weight (reference value) | 0.006 g |

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