

# HD74LV2GT240A

Dual Bus Buffer Inverted with 3–state Output

## HITACHI

ADE-205-678 (Z)

Rev. 0  
Mar. 2002

### Description

The HD74LV2GT240A has dual bus buffer inverted with 3–state output in a 8 pin package. Two inverters are included in one circuit. Each circuit can be independently controlled by the enable signal  $\overline{1OE}$  or  $\overline{2OE}$ , which enables outputs when receiving a low level signal. 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.

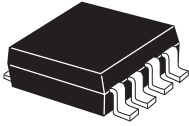
### Features

- 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 : Z)
- Output current  $\pm 12$  mA (@ $V_{CC}$  = 4.5 V to 5.5 V)
- All the logical input has hysteresis voltage for the slow transition.
- Package type

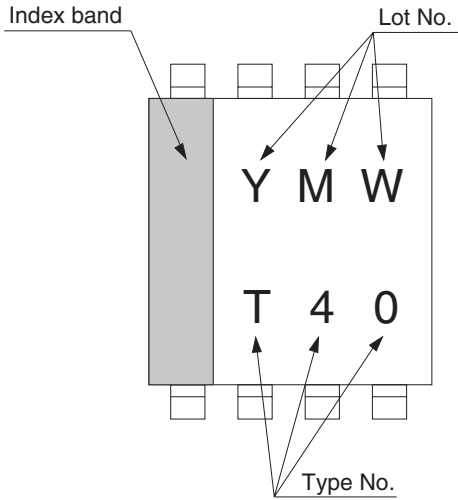
| Package type | Package code | Package suffix | Taping code          |
|--------------|--------------|----------------|----------------------|
| SSOP-8 pin   | TTP-8DB      | US             | E (3,000 pcs / Reel) |

## Outline and Article Indication

• HD74LV2GT240A



SSOP-8



Y : Year code  
(the last digit of year)  
M : Month code  
W : Week code

## Function Table

| Inputs          |   | Output $\bar{Y}$ |
|-----------------|---|------------------|
| $\overline{OE}$ | A |                  |
| L               | L | H                |
| L               | H | L                |
| H               | X | Z                |

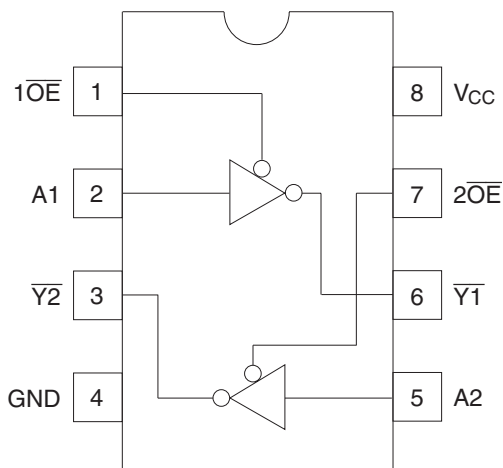
H : High level

L : Low level

X : Immaterial

Z : High impedance

Pin Arrangement



(Top view)

## Absolute Maximum Ratings

| Item   | Symbol                | Ratings                               | Unit             | Test Conditions                                 |
|--|-----------------------|---------------------------------------|------------------|---|
| Supply voltage range   | $V_{CC}$              | -0.5 to 7.0                           | V                |   |
| Input voltage range <sup>*1</sup>  | $V_I$                 | -0.5 to 7.0                           | V                |   |
| Output voltage range <sup>*1,2</sup>   | $V_O$                 | -0.5 to $V_{CC} + 0.5$<br>-0.5 to 7.0 | V                | Output : H or L<br>$V_{CC}$ : OFF or output : Z |
| Input clamp current  | $I_{IK}$              | -20                                   | mA               | $V_I < 0$                                       |
| Output clamp current   | $I_{OK}$              | $\pm 50$                              | mA               | $V_O < 0$ or $V_O > V_{CC}$                     |
| Continuous output current  | $I_O$                 | $\pm 25$                              | mA               | $V_O = 0$ to $V_{CC}$                           |
| Continuous current through $V_{CC}$ or GND   | $I_{CC}$ or $I_{GND}$ | $\pm 50$                              | mA               |   |
| Maximum power dissipation at $T_a = 25^\circ\text{C}$ (in still air) <sup>*3</sup> | $P_T$                 | 200                                   | mW               |   |
| Storage temperature  | $T_{stg}$             | -65 to 150                            | $^\circ\text{C}$ |   |

Notes: 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.

1. The input and output voltage ratings may be exceeded if the input and output clamp-current ratings are observed.
2. This value is limited to 5.5 V maximum.
3. The maximum package power dissipation was calculated using a junction temperature of  $150^\circ\text{C}$ .

## Recommended Operating Conditions

| Item                   | Symbol     | Ratings                              | Unit             | Test Conditions |
|------------------------|------------|--------------------------------------|------------------|-----------------|
| 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 $V_{CC}$<br>0 to 5.5            | V                | Output : Z      |
| Operating temperature  | $T_{opr}$  | -40 to +85                           | $^\circ\text{C}$ |                 |
| Input rise / fall time | $t_r, t_f$ | 0 to 20 ( $V_{CC} = 4.5$ to $5.5$ V) | ns               |                 |

**Electrical Characteristics**

- $T_a = -40$  to  $85^\circ\text{C}$

| 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       | —            | —    | $\pm 1$ | $\mu\text{A}$ | $V_{IN} = 5.5 \text{ V or GND}$                                     |
| Off state output current | $I_{OZ}$        | Min to Max     | —            | —    | $\pm 5$ | $\mu\text{A}$ | $V_O = 5.5 \text{ V or GND}$  |
| Quiescent supply current | $I_{CC}$        | 5.5            | —            | —    | 10      | $\mu\text{A}$ | $V_{IN} = V_{CC}$ or GND,<br>$I_O = 0$                              |
|                          | $\Delta I_{CC}$ | 5.5            | —            | —    | 1.5     | mA            | One input $V_{IN} = 3.4 \text{ V}$ ,<br>other input $V_{CC}$ or GND |
| Output leakage current   | $I_{OFF}$       | 0              | —            | —    | 5       | $\mu\text{A}$ | $V_O = 5.5 \text{ V}$   |
| Input capacitance        | $C_{IN}$        | 5.0            | —            | 3.0  | —       | 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

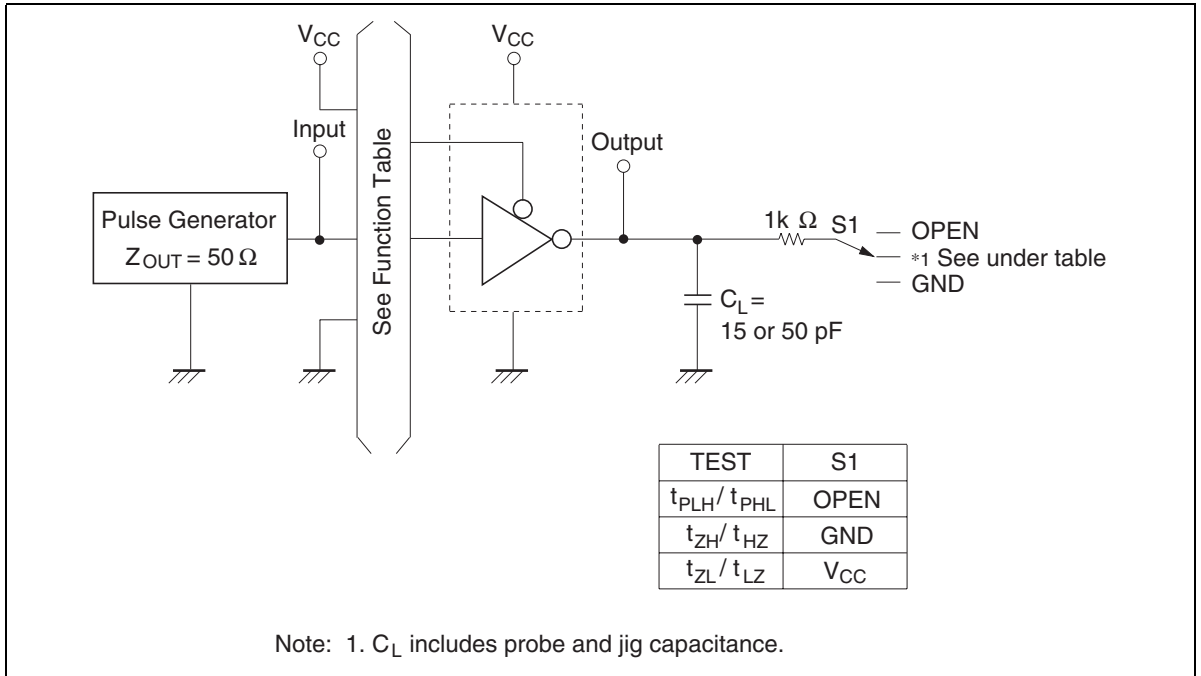
| Item                   | Symbol    | $T_a = 25^\circ\text{C}$ |     |     | $T_a = -40$ to $85^\circ\text{C}$ |      | Unit | Test Conditions | FROM (Input)    | TO (Output) |
|------------------------|-----------|--------------------------|-----|-----|-----------------------------------|------|------|-----------------|-----------------|-------------|
|                        |           | Min                      | Typ | Max | Min                               | Max  |      |                 |                 |             |
| Propagation delay time | $t_{PLH}$ | —                        | 3.4 | 5.5 | 1.0                               | 6.5  | ns   | $C_L = 15$ pF   | A               | $\bar{Y}$   |
|                        | $t_{PHL}$ | —                        | 4.3 | 7.5 | 1.0                               | 8.5  |      | $C_L = 50$ pF   |                 |             |
| Enable time            | $t_{ZH}$  | —                        | 3.4 | 5.1 | 1.0                               | 6.0  | ns   | $C_L = 15$ pF   | $\overline{OE}$ | $\bar{Y}$   |
|                        | $t_{ZL}$  | —                        | 4.4 | 7.1 | 1.0                               | 8.0  |      | $C_L = 50$ pF   |                 |             |
| Disable time           | $t_{HZ}$  | —                        | 3.2 | 6.8 | 1.0                               | 8.0  | ns   | $C_L = 15$ pF   | $\overline{OE}$ | $\bar{Y}$   |
|                        | $t_{LZ}$  | —                        | 4.0 | 8.8 | 1.0                               | 10.0 |      | $C_L = 50$ pF   |                 |             |

## Operating Characteristics

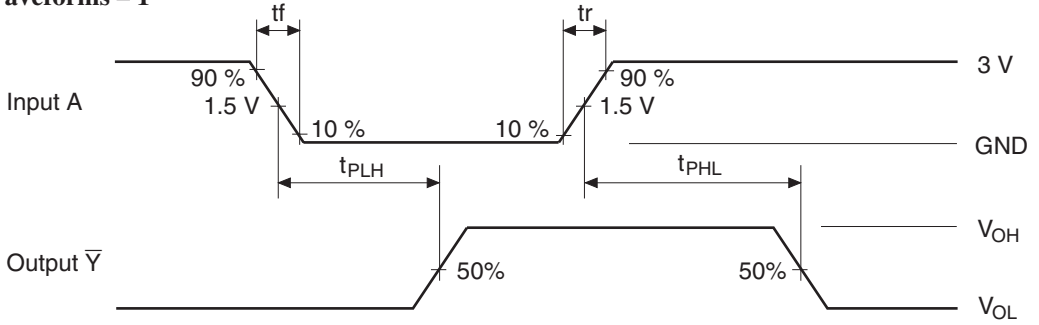
- $C_L = 50$  pF

| Item                          | Symbol   | $V_{CC}$ (V) | $T_a = 25^\circ\text{C}$ |      |     | Unit | Test Conditions |
|-------------------------------|----------|--------------|--------------------------|------|-----|------|-----------------|
|                               |          |              | Min                      | Typ  | Max |      |                 |
| Power dissipation capacitance | $C_{PD}$ | 5.0          | —                        | 11.5 | —   | pF   | $f = 10$ MHz    |

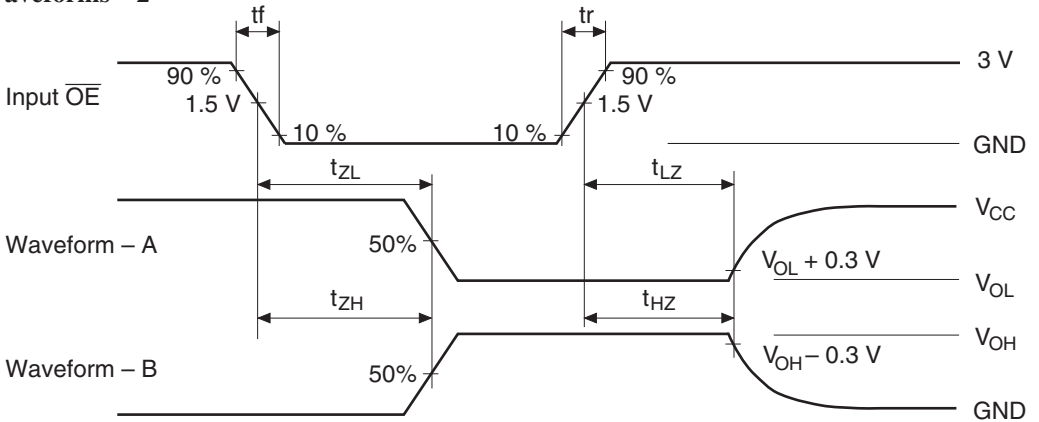
Test Circuit



## • Waveforms – 1



## • Waveforms – 2

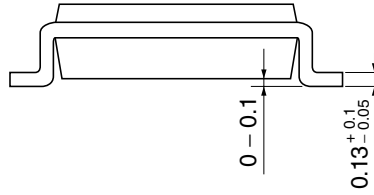
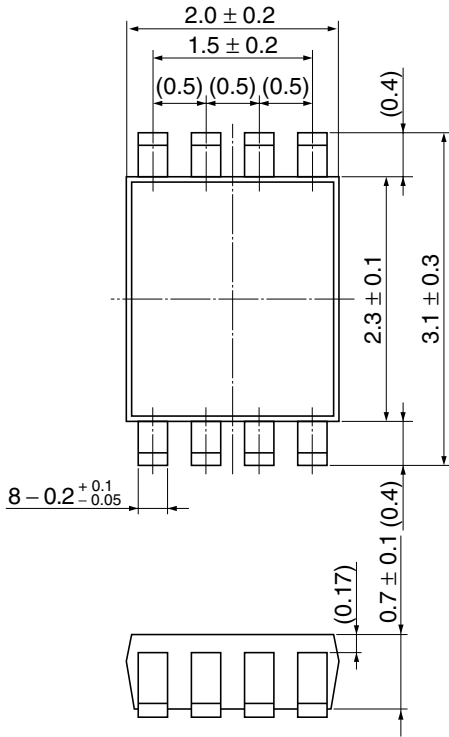


- Notes:
1. Input waveform :  $PRR \leq 1 \text{ MHz}$ ,  $Z_o = 50 \Omega$ ,  $t_r \leq 3 \text{ ns}$ ,  $t_f \leq 3 \text{ ns}$ .
  2. Waveform – A is for an output with internal conditions such that the output is low except when disabled by the output control.
  3. Waveform – B is for an output with internal conditions such that the output is high except when disabled by the output control.
  4. The output are measured one at a time with one transition per measurement.



Package Dimensions

As of July, 2001  
Unit: mm



|                        |         |
|------------------------|---------|
| Hitachi Code           | TTP-8DB |
| JEDEC                  | —       |
| JEITA                  | —       |
| Mass (reference value) | 0.010 g |

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