
HD74ALVC2G07

Triple Buffers / Drivers with Open Drain

HITACHI

ADE-205-633A (Z)

Rev. 1
August. 2001

Description

The HD74ALVC2G07 has triple buffers / drivers with open drain outputs in a 8 pin package. 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

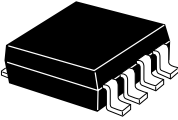
- The basic gate function is lined up as hitachi uni logic series.
- Supplied on emboss taping for high speed automatic mounting.
- Supply voltage range : 1.2 to 3.6 V
Operating temperature range : -40 to $+85^{\circ}\text{C}$
- All inputs V_{IH} (Max.) = 3.6 V (@ $V_{CC} = 0$ V to 3.6 V)
All outputs V_o (Max.) = 3.6 V (@ $V_{CC} = 0$ V)
- Output current 2 mA (@ $V_{CC} = 1.2$ V)
 4 mA (@ $V_{CC} = 1.4$ V to 1.6 V)
 6 mA (@ $V_{CC} = 1.65$ V to 1.95 V)
 18 mA (@ $V_{CC} = 2.3$ V to 2.7 V)
 24 mA (@ $V_{CC} = 3.0$ V to 3.6 V)
- Package type

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

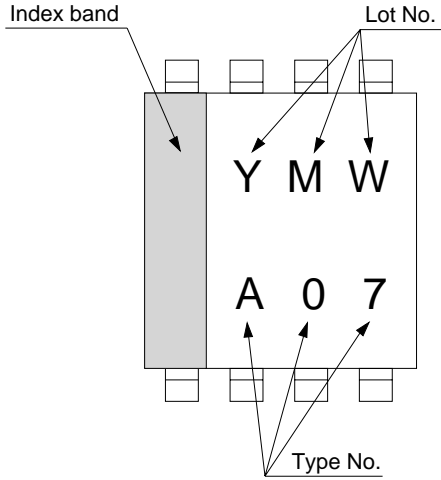
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Outline and Article Indication

- HD74ALVC2G07



SSOP-8



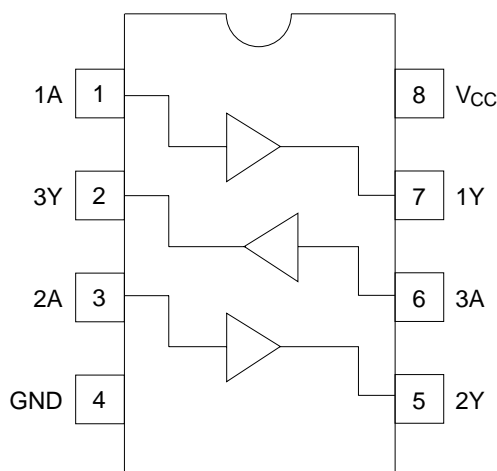
Y : Year code
(the last digit of year)
M : Month code
W : Week code

Function Table

| Input A | Output Y |
|---------|----------|
| L | L |
| H | Z |

H: High level
L: Low level
Z: High impedance

Pin Arrangement



(Top view)

Absolute Maximum Ratings

| Item | Symbol | Ratings | Unit | Conditions |
|---|-----------------------|-------------------------------------|------------------|-----------------------------------|
| Supply voltage range | V_{CC} | -0.5 to 4.6 | V | |
| Input voltage range ¹ | V_I | -0.5 to 4.6 | V | |
| Output voltage range ^{1,2} | V_O | -0.5 to $V_{CC}+0.5$ -0.5 to 4.6 | V | Output : L or Z V_{CC} : OFF |
| Input clamp current | I_{IK} | -50 | mA | $V_I < 0$ |
| Output clamp current | I_{OK} | ± 50 | mA | $V_O < 0$ or $V_O > V_{CC}$ |
| Continuous output current | I_O | ± 50 | mA | $V_O = 0$ to V_{CC} |
| Continuous current through V_{CC} or GND | I_{CC} or I_{GND} | ± 100 | mA | |
| Maximum power dissipation at $T_a = 25^\circ\text{C}$ (in still air) ³ | P_T | 200 | mW | |
| Storage temperature | Tstg | -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.
 - 3. The input and output voltage ratings may be exceeded if the input and output clamp-current ratings are observed.
 - 3. This value is limited to 4.6 V maximum.
 - 3. The maximum package power dissipation was calculated using a junction temperature of 150 $^\circ\text{C}$.

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Recommended Operating Conditions

| Item | Symbol | Min | Max | Unit | Conditions |
|------------------------------------|-----------------------|-----|----------|--------|---------------------------------------|
| Supply voltage range | V_{CC} | 1.2 | 3.6 | V | |
| Input voltage range | V_I | 0 | 3.6 | V | |
| Output voltage range | V_O | 0 | V_{CC} | V | |
| Output current | I_{OL} | — | 2 | mA | $V_{CC} = 1.2\text{ V}$ |
| | | — | 4 | | $V_{CC} = 1.4\text{ V}$ |
| | | — | 6 | | $V_{CC} = 1.65\text{ V}$ |
| | | — | 18 | | $V_{CC} = 2.3\text{ V}$ |
| | | — | 24 | | $V_{CC} = 3.0\text{ V}$ |
| Input transition rise or fall rate | $\Delta t / \Delta v$ | 0 | 20 | ns / V | $V_{CC} = 1.2\text{ to }2.7\text{ V}$ |
| | | 0 | 10 | | $V_{CC} = 3.3 \pm 0.3\text{ V}$ |
| Operating free-air temperature | T_a | -40 | 85 | °C | |

Note: Unused or floating inputs must be held high or low.

Electrical Characteristics

(Ta = -40 to 85°C)

| Item | Symbol | V _{CC} (V) [*] | Min | Typ | Max | Unit | Test conditions |
|--------------------------|------------------|----------------------------------|-----------------------|-----|-----------------------|------|---|
| Input voltage | V _{IH} | 1.2 | V _{CC} ×0.75 | — | — | V | |
| | | 1.4 to 1.6 | V _{CC} ×0.7 | — | — | | |
| | | 1.65 to 1.95 | V _{CC} ×0.7 | — | — | | |
| | | 2.3 to 2.7 | 1.7 | — | — | | |
| | | 3.0 to 3.6 | 2.0 | — | — | | |
| | V _{IL} | 1.2 | — | — | V _{CC} ×0.25 | | |
| | | 1.4 to 1.6 | — | — | V _{CC} ×0.3 | | |
| | | 1.65 to 1.95 | — | — | V _{CC} ×0.3 | | |
| | | 2.3 to 2.7 | — | — | 0.7 | | |
| | | 3.0 to 3.6 | — | — | 0.8 | | |
| Output voltage | V _{OL} | Min to Max | — | — | 0.2 | V | I _{OL} = 100 μA |
| | | 1.2 | — | — | 0.3 | | I _{OL} = 2 mA |
| | | 1.4 | — | — | 0.3 | | I _{OL} = 4 mA |
| | | 1.65 | — | — | 0.3 | | I _{OL} = 6 mA |
| | | 2.3 | — | — | 0.55 | | I _{OL} = 18 mA |
| | | 3.0 | — | — | 0.55 | | I _{OL} = 24 mA |
| | | | | | | | |
| Input current | I _{IN} | 3.6 | — | — | ±5 | μA | V _{IN} = 3.6 V or GND |
| Off state output current | I _{OZ} | 3.6 | — | — | ±5 | μA | V _{OUT} = V _{CC} or GND |
| Quiescent supply current | I _{CC} | 3.6 | — | — | 10 | μA | V _{IN} = V _{CC} or GND, I _O = 0 |
| Output leakage current | I _{OFF} | 0 | — | — | 5 | μA | V _{IN} or V _O = 0 to 3.6 V |
| Input capacitance | C _{IN} | 3.3 | — | 5.0 | — | pF | V _{IN} = V _{CC} or GND |

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

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Switching Characteristics

($T_a = -40$ to 85°C)

- $V_{CC} = 1.2\text{ V}$

| Item | Symbol | Min | Typ | Max | Unit | Test conditions | FROM (Input) | TO (Output) |
|------------------------|----------------------|-----|-----|-----|------|----------------------|--------------|-------------|
| Propagation delay time | t_{LZ} t_{ZL} | — | 5.5 | — | ns | $C_L = 15\text{ pF}$ | A | Y |

- $V_{CC} = 1.5\pm 0.1\text{ V}$

| Item | Symbol | Min | Typ | Max | Unit | Test conditions | FROM (Input) | TO (Output) |
|------------------------|----------------------|-----|-----|-----|------|----------------------|--------------|-------------|
| Propagation delay time | t_{LZ} t_{ZL} | 1.0 | — | 7.0 | ns | $C_L = 15\text{ pF}$ | A | Y |

- $V_{CC} = 1.8\pm 0.15\text{ V}$

| Item | Symbol | Min | Typ | Max | Unit | Test conditions | FROM (Input) | TO (Output) |
|------------------------|----------------------|-----|-----|-----|------|----------------------|--------------|-------------|
| Propagation delay time | t_{LZ} t_{ZL} | 1.0 | — | 5.0 | ns | $C_L = 30\text{ pF}$ | A | Y |

- $V_{CC} = 2.5\pm 0.2\text{ V}$

| Item | Symbol | Min | Typ | Max | Unit | Test conditions | FROM (Input) | TO (Output) |
|------------------------|----------------------|-----|-----|-----|------|----------------------|--------------|-------------|
| Propagation delay time | t_{LZ} t_{ZL} | 0.5 | — | 3.5 | ns | $C_L = 30\text{ pF}$ | A | Y |

- $V_{CC} = 3.3\pm 0.3\text{ V}$

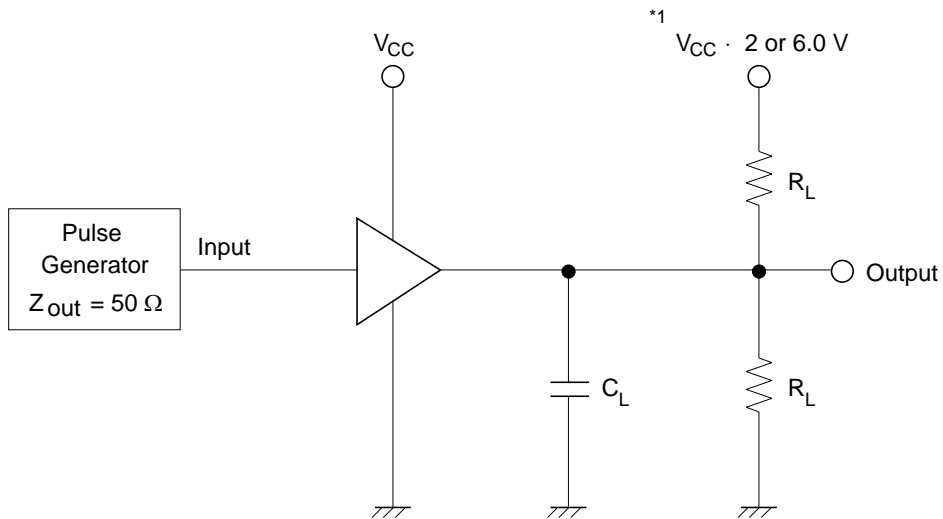
| Item | Symbol | Min | Typ | Max | Unit | Test conditions | FROM (Input) | TO (Output) |
|------------------------|----------------------|-----|-----|-----|------|----------------------|--------------|-------------|
| Propagation delay time | t_{LZ} t_{ZL} | 0.5 | — | 2.5 | ns | $C_L = 30\text{ pF}$ | A | Y |

Operating Characteristics

(Ta = 25°C)

| Item | Symbol | V _{CC} (V) | Min | Typ | Max | Unit | Test conditions |
|-------------------------------|-----------------|---------------------|-----|-----|-----|------|-----------------|
| Power dissipation capacitance | C _{PD} | 1.5 | — | 2.0 | — | pF | f = 10 MHz |
| | | 1.8 | — | 2.0 | — | | |
| | | 2.5 | — | 2.5 | — | | |
| | | 3.3 | — | 3.5 | — | | |

Test Circuit

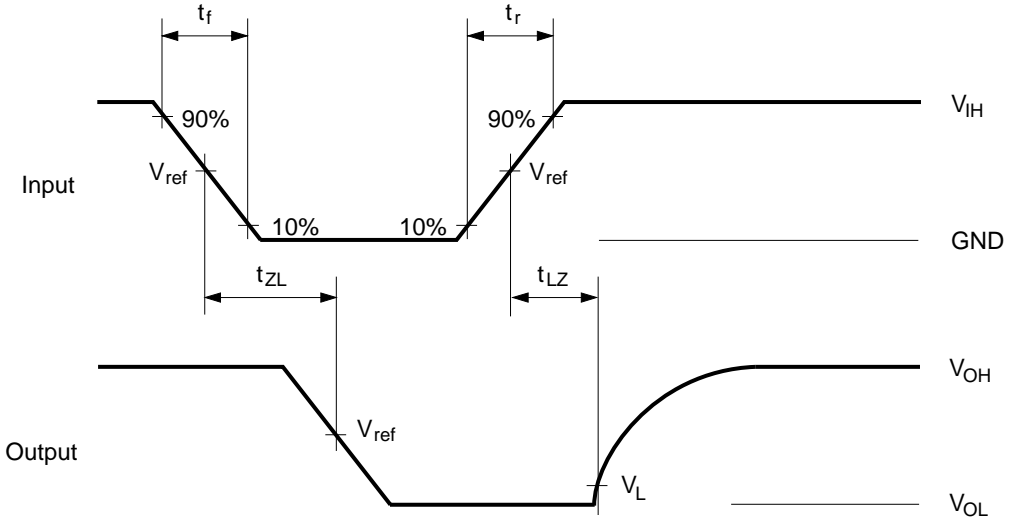


| Symbol | V _{CC} = 1.2 V, 1.5±0.1 V | V _{CC} = 1.8±0.15 V | V _{CC} = 2.5±0.2 V | V _{CC} = 3.3±0.3 V |
|----------------|---------------------------------------|------------------------------|-----------------------------|-----------------------------|
| R _L | 2.0 kΩ | 1.0 kΩ | 500 Ω | 500 Ω |
| C _L | 15 pF | 30 pF | 30 pF | 30 pF |
| *1 | V _{CC} · 2 | V _{CC} · 2 | V _{CC} · 2 | 6.0 V |

Note: C_L includes probe and jig capacitance.

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Waveforms



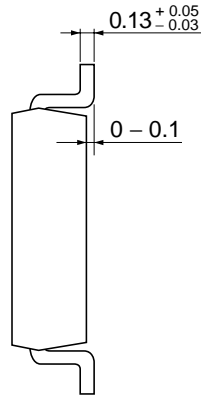
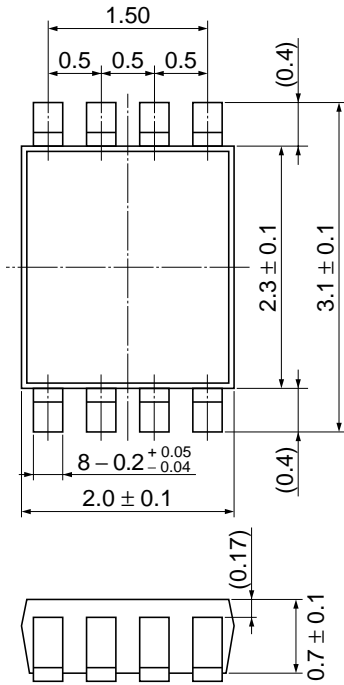
| Symbol | $V_{CC} = 1.2 \text{ V},$ $1.5 \pm 0.1 \text{ V}$ | $V_{CC} = 1.8 \pm 0.15 \text{ V}$ | $V_{CC} = 2.5 \pm 0.2 \text{ V}$ | $V_{CC} = 3.3 \pm 0.3 \text{ V}$ |
|-------------|--|-----------------------------------|----------------------------------|----------------------------------|
| t_r / t_f | 2.0 ns | 2.0 ns | 2.5 ns | 2.5 ns |
| V_{IH} | V_{CC} | V_{CC} | V_{CC} | 2.7 V |
| V_{ref} | 50% | 50% | 50% | 1.5 V |
| V_L | $V_L = V_{OL} + 0.1 \text{ V}$ | $V_L = V_{OL} + 0.15 \text{ V}$ | $V_L = V_{OL} + 0.15 \text{ V}$ | $V_L = V_{OL} + 0.3 \text{ V}$ |

Note: Input waveform : PRR = 10 MHz, duty cycle 50%

Package Dimensions

As of January, 2001

Unit: mm



| | |
|------------------------|---------|
| Hitachi Code | TTP-8DB |
| JEDEC | — |
| EIAJ | — |
| Mass (reference value) | 0.25 g |

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