

HD74ALVC1G14

Schmitt-trigger Inverter Buffer

REJ03D0111-0300Z
(Previous ADE-205-627B (Z))
Rev.3.00
Nov.12.2003

Description

The HD74ALVC1G14 has an inverter with schmitt-trigger input in a 5 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.

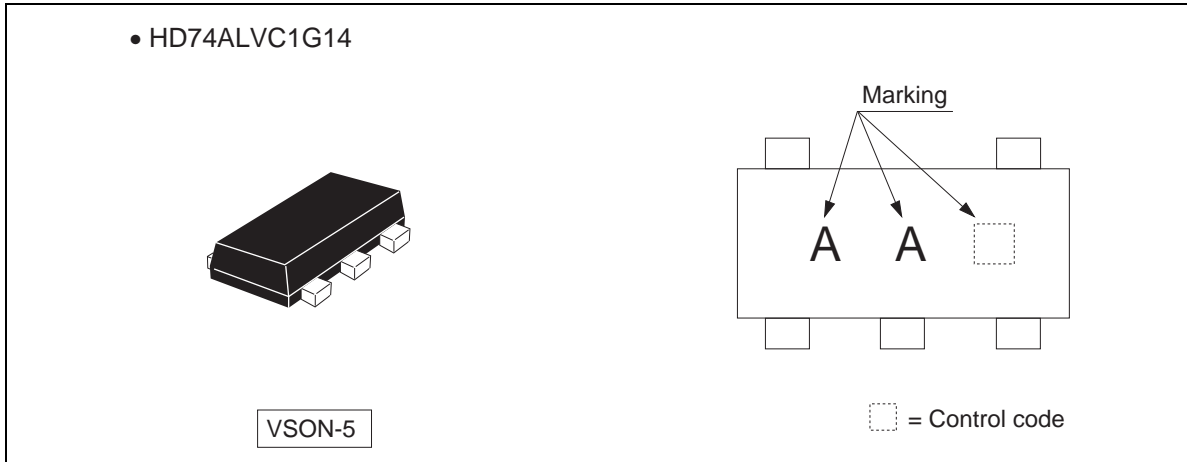
Features

- The basic gate function is lined up as Renesas 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°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)
 ± 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)
- All the logical input has hysteresis voltage for the slow transition.
- Ordering Information

| Part Name | Package Type | Package Code | Package Abbreviation | Taping Abbreviation (Quantity) |
|-----------------|--------------|--------------|----------------------|--------------------------------|
| HD74ALVC1G14VSE | VSON-5 pin | TNP-5DV | VS | E (3,000 pcs/reel) |

HD74ALVC1G14

Outline and Article Indication

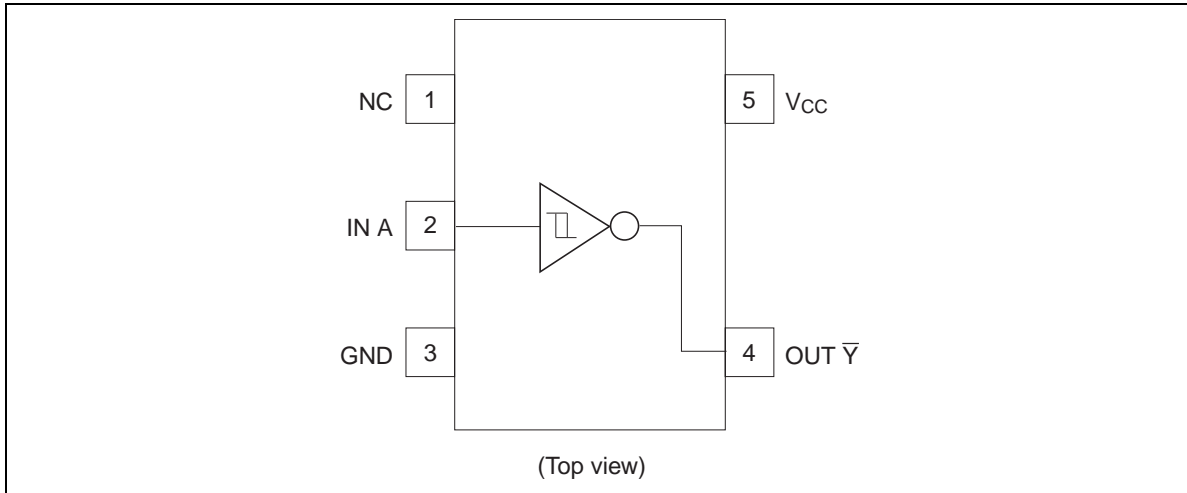


Function Table

| Input A | Output \bar{Y} |
|---------|------------------|
| H | L |
| L | 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 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 : H or L 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 | 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 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_{OH} | — | -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 | | $V_{CC} = 3.0\text{ V}$ |
| | I_{OL} | — | 2 | $V_{CC} = 1.2\text{ V}$ | |
| | | — | 4 | $V_{CC} = 1.4\text{ V}$ | |
| | | — | 6 | $V_{CC} = 1.65\text{ V}$ | |
| | | — | 18 | $V_{CC} = 2.3\text{ V}$ | |
| | | — | 24 | $V_{CC} = 3.0\text{ V}$ | |
| 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 |
|--------------------------|-----------------------------|----------------------------------|-----------------------|-----|-----------------------|------|---|
| Threshold voltage | V _T ⁺ | 1.2 | — | — | V _{CC} ×0.8 | V | |
| | | 1.4 to 1.6 | — | — | V _{CC} ×0.75 | | |
| | | 1.65 to 1.95 | — | — | V _{CC} ×0.7 | | |
| | | 2.3 to 2.7 | — | — | 1.7 | | |
| | | 3.0 to 3.6 | — | — | 2.0 | | |
| | V _T ⁻ | 1.2 | V _{CC} ×0.2 | — | — | | |
| | | 1.4 to 1.6 | V _{CC} ×0.25 | — | — | | |
| | | 1.65 to 1.95 | V _{CC} ×0.3 | — | — | | |
| | | 2.3 to 2.7 | 0.7 | — | — | | |
| | | 3.0 to 3.6 | 0.8 | — | — | | |
| | ΔV _T | 1.2 | 0.1 | — | 0.4 | | |
| | | 1.4 to 1.6 | 0.1 | — | 0.6 | | |
| | | 1.65 to 1.95 | 0.15 | — | 0.8 | | |
| | | 2.3 to 2.7 | 0.25 | — | 1.0 | | |
| | | 3.0 to 3.6 | 0.25 | — | 1.2 | | |
| Output voltage | V _{OH} | Min to Max | V _{CC} -0.2 | — | — | V | I _{OH} = -100 μA |
| | | 1.2 | 0.9 | — | — | | I _{OH} = -2 mA |
| | | 1.4 | 1.1 | — | — | | I _{OH} = -4 mA |
| | | 1.65 | 1.2 | — | — | | I _{OH} = -6 mA |
| | | 2.3 | 1.7 | — | — | | I _{OH} = -18 mA |
| | | 3.0 | 2.2 | — | — | | I _{OH} = -24 mA |
| | V _{OL} | Min to Max | — | — | 0.2 | | 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 |
| 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 _{OUT} = 0 to 3.6 V |
| Input capacitance | C _{IN} | 3.3 | — | 4.5 | — | 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)

$V_{CC} = 1.2$ V

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

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

| Item | Symbol | Min | Typ | Max | Unit | Test conditions | FROM (Input) | TO (Output) |
|------------------------|------------------------|-----|-----|-----|------|-----------------|--------------|-------------|
| Propagation delay time | t_{PLH} t_{PHL} | 2.0 | — | 8.0 | ns | $C_L = 15$ pF | A | \bar{Y} |

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

| Item | Symbol | Min | Typ | Max | Unit | Test conditions | FROM (Input) | TO (Output) |
|------------------------|------------------------|-----|-----|-----|------|-----------------|--------------|-------------|
| Propagation delay time | t_{PLH} t_{PHL} | 1.5 | — | 6.0 | ns | $C_L = 30$ pF | A | \bar{Y} |

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

| Item | Symbol | Min | Typ | Max | Unit | Test conditions | FROM (Input) | TO (Output) |
|------------------------|------------------------|-----|-----|-----|------|-----------------|--------------|-------------|
| Propagation delay time | t_{PLH} t_{PHL} | 1.0 | — | 4.5 | ns | $C_L = 30$ pF | A | \bar{Y} |

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

| Item | Symbol | Min | Typ | Max | Unit | Test conditions | FROM (Input) | TO (Output) |
|------------------------|------------------------|-----|-----|-----|------|-----------------|--------------|-------------|
| Propagation delay time | t_{PLH} t_{PHL} | 1.0 | — | 3.5 | ns | $C_L = 30$ pF | A | \bar{Y} |

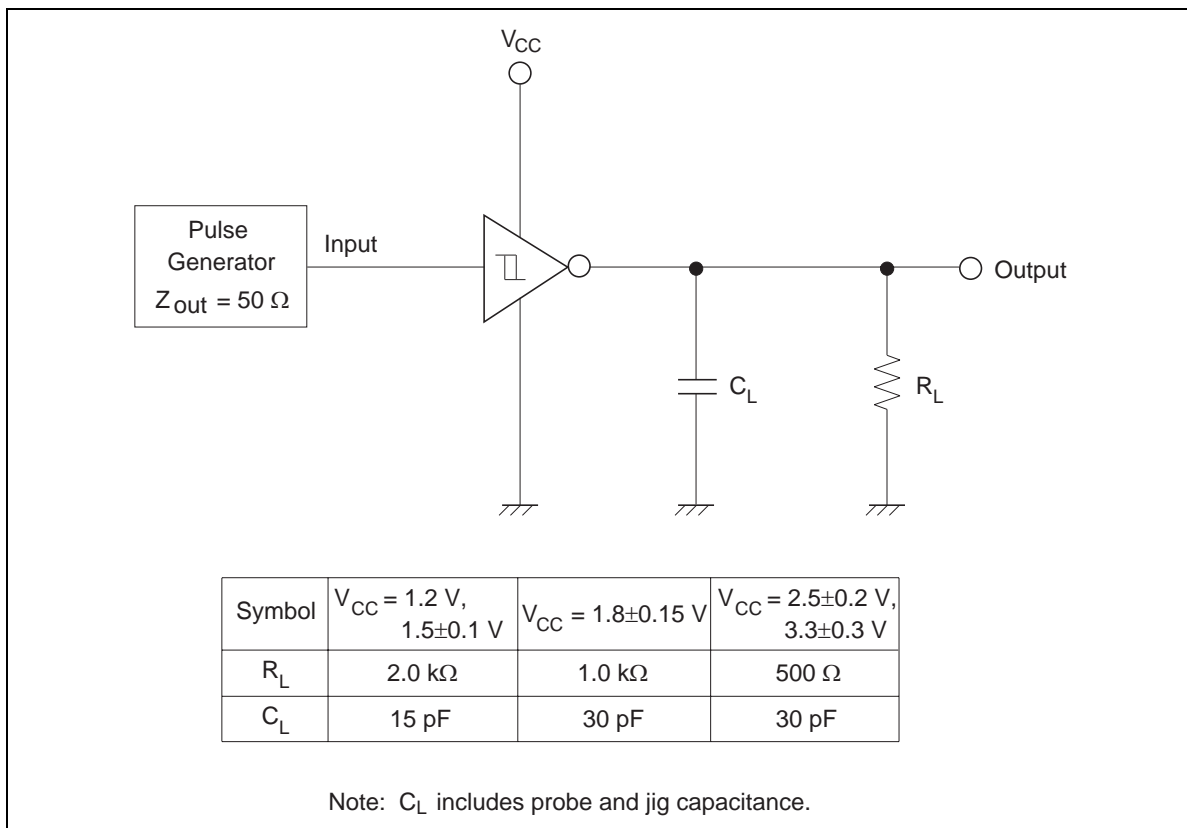
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Operating Characteristics

($T_a = 25^\circ\text{C}$)

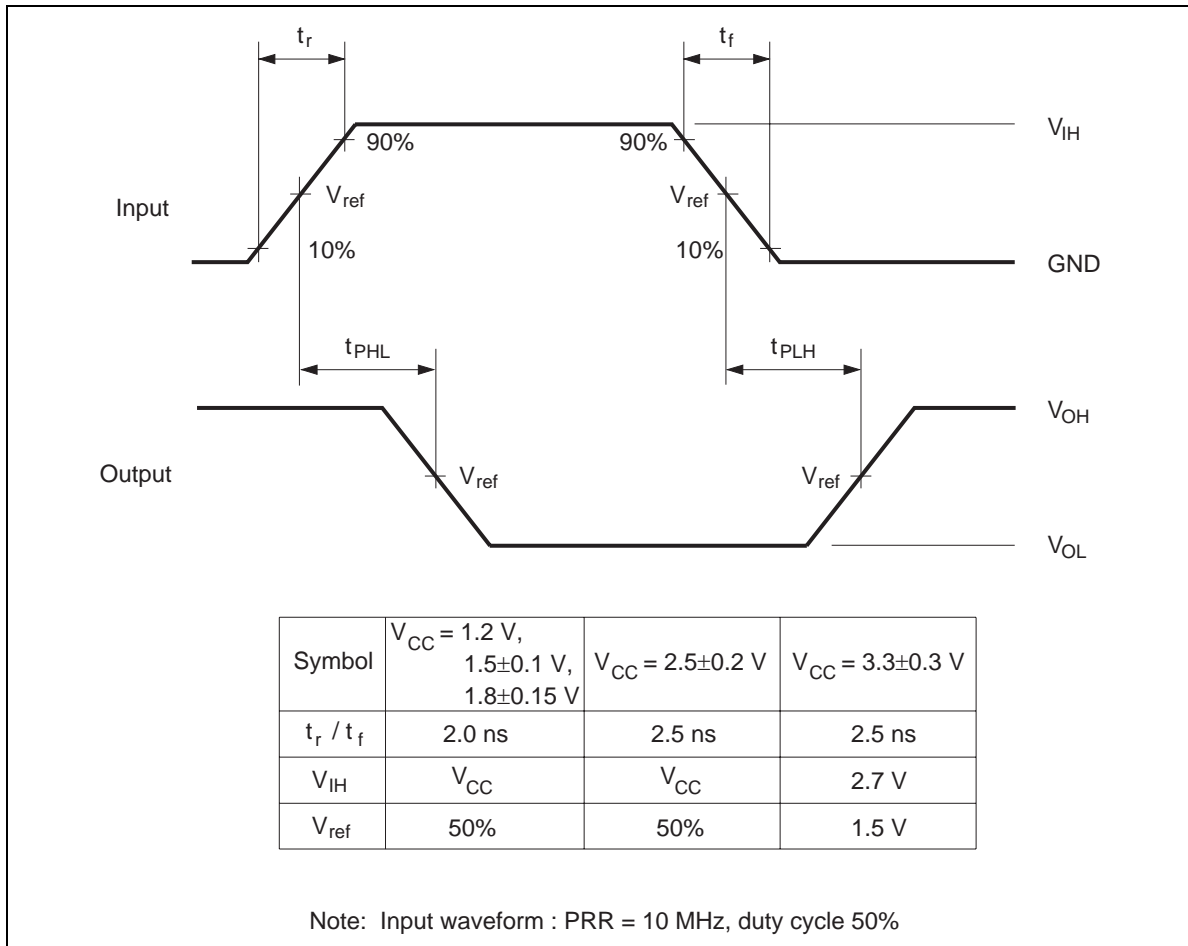
| Item | Symbol | V_{CC} (V) | Min | Typ | Max | Unit | Test conditions |
|-------------------------------|----------|--------------|-----|------|-----|------|---------------------|
| Power dissipation capacitance | C_{PD} | 1.5 | — | 10.5 | — | pF | $f = 10\text{ MHz}$ |
| | | 1.8 | — | 10.5 | — | | |
| | | 2.5 | — | 11.0 | — | | |
| | | 3.3 | — | 11.5 | — | | |

Test Circuit

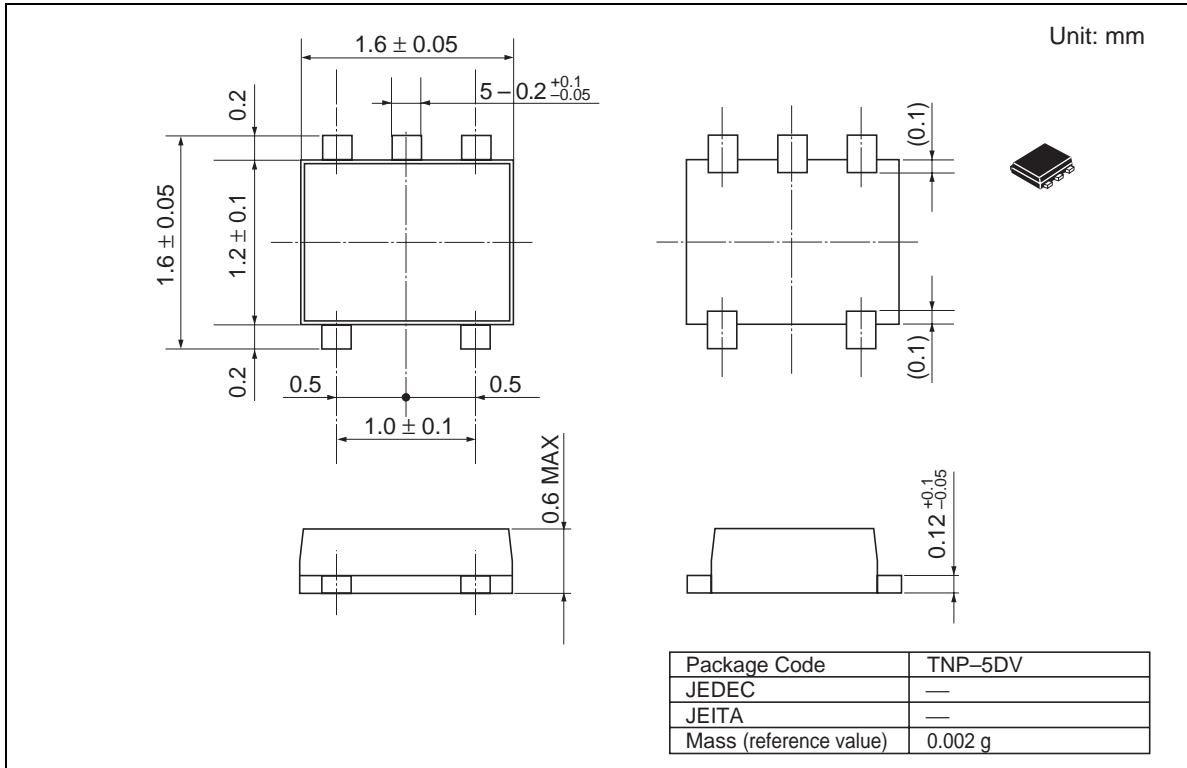


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Waveforms



Package Dimensions



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