

HD74LV1G126A

Bus Buffer Gate with 3–state Output

REJ03D0072–0600Z
(Previous ADE-205-324D (Z))
Rev.6.00
Sep.01.2003

Description

The HD74LV1G126A has a bus buffer gate with 3–state output in a 5 pin package. Output is disabled when the associated output enable (OE) input is low. To ensure the high impedance state during power up or power down, OE should be connected to V_{CC} through a pull-down resistor; the minimum value of the resistor is determined by the current sourcing capability of the driver. 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

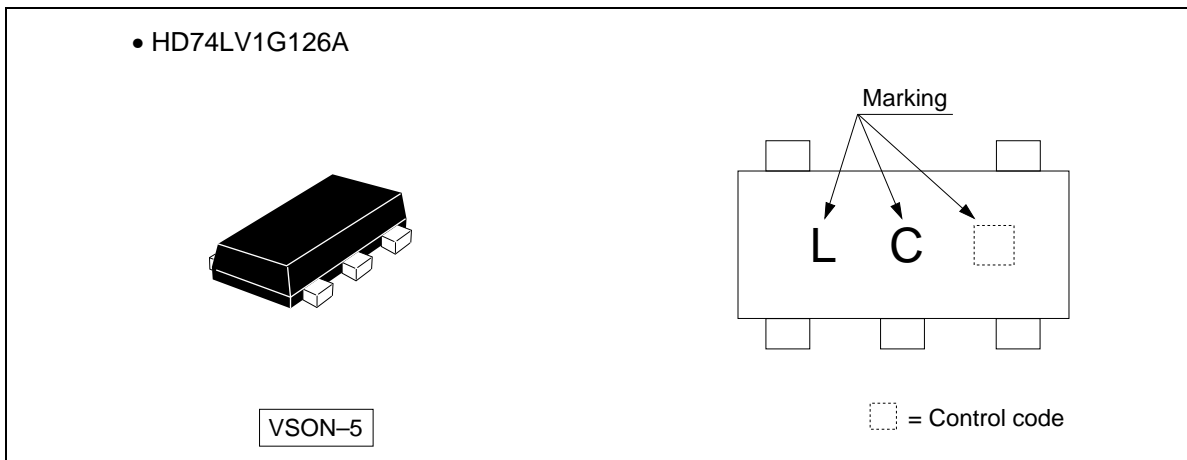
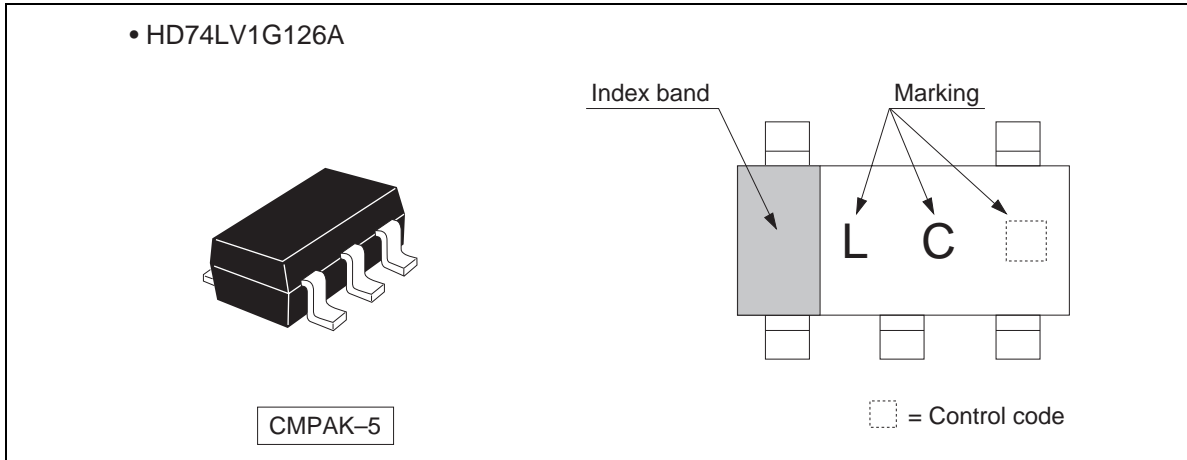
- The basic gate function is lined up as Renesas uni logic series.
- Supplied on emboss taping for high-speed automatic mounting.
- Electrical characteristics equivalent to the HD74LV126A
Supply voltage range : 1.65 to 5.5 V
Operating temperature range : –40 to +85°C
- All inputs V_{IH} (Max.) = 5.5 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 ± 6 mA (@ V_{CC} = 3.0 V to 3.6 V), ± 12 mA (@ V_{CC} = 4.5 V to 5.5 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) |
|-----------------|--------------|--------------|----------------------|--------------------------------|
| HD74LV1G126ACME | CMPAK–5 pin | CMPAK–5V | CM | E (3,000 pcs/reel) |
| | | CMPAK–5V(O) | | |
| HD74LV1G126AVSE | VSON–5 pin | TNP–5DV | VS | |

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

HD74LV1G126A

Outline and Article Indication



HD74LV1G126A

Function Table

| Inputs | | Output Y |
|--------|---|----------|
| OE | A | |
| H | H | H |
| H | L | L |
| L | X | Z |

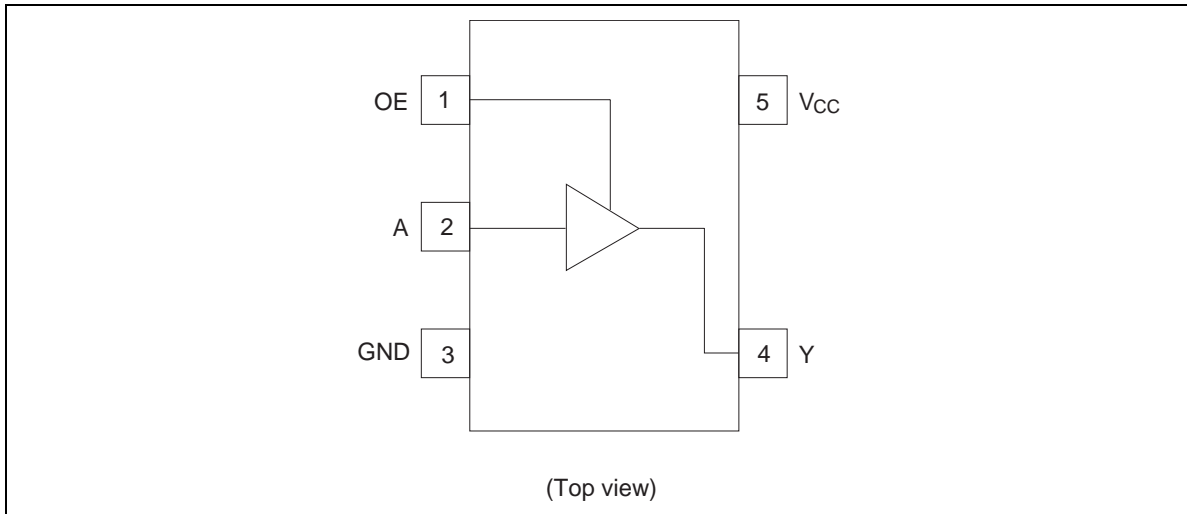
H : High level

L : Low level

X : Immaterial

Z : High impedance

Pin Arrangement



Absolute Maximum Ratings

| Item | Symbol | Ratings | Unit | Test Conditions |
|--|-----------------------|---------------------------------------|------------------|---|
| Supply voltage range | V_{CC} | -0.5 to 7.0 | V | |
| Input voltage range ^{*1} | V_I | -0.5 to 7.0 | V | |
| Output voltage range ^{*1, 2} | V_O | -0.5 to $V_{CC} + 0.5$ -0.5 to 7.0 | V | Output : H or L V_{CC} : OFF or Output : Z |
| Input clamp current | I_{IK} | -20 | mA | $V_I < 0$ |
| Output clamp current | I_{OK} | ± 50 | mA | $V_O < 0$ or $V_O > V_{CC}$ |
| Continuous output current | I_O | ± 25 | mA | $V_O = 0$ to V_{CC} |
| Continuous current through V_{CC} or GND | I_{CC} or I_{GND} | ± 50 | 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 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 | Min | Max | Unit | Conditions |
|------------------------------------|-----------------------|------|----------|--------|---------------------------|
| Supply voltage range | V_{CC} | 1.65 | 5.5 | V | |
| Input voltage range | V_I | 0 | 5.5 | V | |
| Output voltage range | V_O | 0 | V_{CC} | V | |
| | | 0 | 5.5 | | Output : Z |
| Output current | I_{OL} | — | 1 | mA | $V_{CC} = 1.65$ to 1.95 V |
| | | — | 2 | | $V_{CC} = 2.3$ to 2.7 V |
| | | — | 6 | | $V_{CC} = 3.0$ to 3.6 V |
| | | — | 12 | | $V_{CC} = 4.5$ to 5.5 V |
| | I_{OH} | — | -1 | | $V_{CC} = 1.65$ to 1.95 V |
| | | — | -2 | | $V_{CC} = 2.3$ to 2.7 V |
| | | — | -6 | | $V_{CC} = 3.0$ to 3.6 V |
| | | — | -12 | | $V_{CC} = 4.5$ to 5.5 V |
| Input transition rise or fall rate | $\Delta t / \Delta v$ | 0 | 300 | ns / V | $V_{CC} = 1.65$ to 1.95 V |
| | | 0 | 200 | | $V_{CC} = 2.3$ to 2.7 V |
| | | 0 | 100 | | $V_{CC} = 3.0$ to 3.6 V |
| | | 0 | 20 | | $V_{CC} = 4.5$ to 5.5 V |
| Operating free-air temperature | T_a | -40 | 85 | °C | |

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

Electrical Characteristic

- $T_a = -40$ to 85°C

| Item | Symbol | V_{CC} (V) * | Min | Typ | Max | Unit | Test condition |
|--------------------------|-----------|----------------|----------------------|------|----------------------|---------------------------|--|
| Input voltage | V_{IH} | 1.65 to 1.95 | $V_{CC} \times 0.75$ | — | — | V | |
| | | 2.3 to 2.7 | $V_{CC} \times 0.7$ | — | — | | |
| | | 3.0 to 3.6 | $V_{CC} \times 0.7$ | — | — | | |
| | | 4.5 to 5.5 | $V_{CC} \times 0.7$ | — | — | | |
| | V_{IL} | 1.65 to 1.95 | — | — | $V_{CC} \times 0.25$ | | |
| | | 2.3 to 2.7 | — | — | $V_{CC} \times 0.3$ | | |
| | | 3.0 to 3.6 | — | — | $V_{CC} \times 0.3$ | | |
| | | 4.5 to 5.5 | — | — | $V_{CC} \times 0.3$ | | |
| Hysteresis voltage | V_H | 1.8 | — | 0.25 | — | V | $V_{T^+} - V_{T^-}$ |
| | | 2.5 | — | 0.30 | — | | |
| | | 3.3 | — | 0.35 | — | | |
| | | 5.0 | — | 0.45 | — | | |
| Output voltage | V_{OH} | Min to Max | $V_{CC} - 0.1$ | — | — | V | $I_{OH} = -50 \mu\text{A}$ |
| | | 1.65 | 1.4 | — | — | | $I_{OH} = -1 \text{ mA}$ |
| | | 2.3 | 2.0 | — | — | | $I_{OH} = -2 \text{ mA}$ |
| | | 3.0 | 2.48 | — | — | | $I_{OH} = -6 \text{ mA}$ |
| | | 4.5 | 3.8 | — | — | | $I_{OH} = -12 \text{ mA}$ |
| | V_{OL} | Min to Max | — | — | 0.1 | $I_{OL} = 50 \mu\text{A}$ | |
| | | 1.65 | — | — | 0.3 | $I_{OL} = 1 \text{ mA}$ | |
| | | 2.3 | — | — | 0.4 | $I_{OL} = 2 \text{ mA}$ | |
| | | 3.0 | — | — | 0.44 | $I_{OL} = 6 \text{ mA}$ | |
| | | 4.5 | — | — | 0.55 | $I_{OL} = 12 \text{ mA}$ | |
| Input current | I_{IN} | 0 to 5.5 | — | — | ± 1 | μA | $V_{IN} = 5.5 \text{ V or GND}$ |
| Off state output current | I_{OZ} | Min to Max | — | — | ± 5 | μA | $V_O = 5.5 \text{ V or GND}$ |
| Quiescent supply current | I_{CC} | 5.5 | — | — | 10 | μA | $V_{IN} = V_{CC} \text{ or GND, } I_O = 0$ |
| Output leakage current | I_{OFF} | 0 | — | — | 5 | μA | $V_{IN} \text{ or } V_O = 0 \text{ to } 5.5 \text{ V}$ |
| Input capacitance | C_{IN} | 3.3 | — | 3.0 | — | pF | $V_{IN} = V_{CC} \text{ or GND}$ |

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

Switching Characteristics

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

| Item | Symbol | Ta = 25°C | | | Ta = -40 to 85°C | | Unit | Test Conditions | FROM (Input) | TO (Output) |
|------------------------|------------------|-----------|------|------|------------------|------|------|------------------------|--------------|-------------|
| | | Min | Typ | Max | Min | Max | | | | |
| Propagation delay time | t _{PLH} | — | 13.5 | 23.5 | 1.0 | 26.0 | ns | C _L = 15 pF | A | Y |
| | t _{PHL} | — | 19.0 | 33.0 | 1.0 | 36.0 | | C _L = 50 pF | | |
| Enable time | t _{ZH} | — | 13.7 | 26.5 | 1.0 | 29.0 | ns | C _L = 15 pF | OE | Y |
| | t _{ZL} | — | 20.5 | 36.0 | 1.0 | 38.0 | | C _L = 50 pF | | |
| Disable time | t _{HZ} | — | 8.3 | 20.0 | 1.0 | 22.5 | ns | C _L = 15 pF | OE | Y |
| | t _{LZ} | — | 13.0 | 29.5 | 1.0 | 32.0 | | C _L = 50 pF | | |

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

| Item | Symbol | Ta = 25°C | | | Ta = -40 to 85°C | | Unit | Test Conditions | FROM (Input) | TO (Output) |
|------------------------|------------------|-----------|-----|------|------------------|------|------|------------------------|--------------|-------------|
| | | Min | Typ | Max | Min | Max | | | | |
| Propagation delay time | t _{PLH} | — | 7.1 | 13.0 | 1.0 | 15.5 | ns | C _L = 15 pF | A | Y |
| | t _{PHL} | — | 9.2 | 16.5 | 1.0 | 18.5 | | C _L = 50 pF | | |
| Enable time | t _{ZH} | — | 7.4 | 13.0 | 1.0 | 15.5 | ns | C _L = 15 pF | OE | Y |
| | t _{ZL} | — | 9.5 | 16.5 | 1.0 | 18.5 | | C _L = 50 pF | | |
| Disable time | t _{HZ} | — | 5.7 | 14.7 | 1.0 | 17.0 | ns | C _L = 15 pF | OE | Y |
| | t _{LZ} | — | 8.1 | 18.2 | 1.0 | 20.5 | | C _L = 50 pF | | |

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

| Item | Symbol | Ta = 25°C | | | Ta = -40 to 85°C | | Unit | Test Conditions | FROM (Input) | TO (Output) |
|------------------------|------------------|-----------|-----|------|------------------|------|------|------------------------|--------------|-------------|
| | | Min | Typ | Max | Min | Max | | | | |
| Propagation delay time | t _{PLH} | — | 5.0 | 8.0 | 1.0 | 9.5 | ns | C _L = 15 pF | A | Y |
| | t _{PHL} | — | 6.4 | 11.5 | 1.0 | 13.0 | | C _L = 50 pF | | |
| Enable time | t _{ZH} | — | 5.1 | 8.0 | 1.0 | 9.5 | ns | C _L = 15 pF | OE | Y |
| | t _{ZL} | — | 6.6 | 11.5 | 1.0 | 13.0 | | C _L = 50 pF | | |
| Disable time | t _{HZ} | — | 4.4 | 9.7 | 1.0 | 11.5 | ns | C _L = 15 pF | OE | Y |
| | t _{LZ} | — | 6.1 | 13.2 | 1.0 | 15.0 | | C _L = 50 pF | | |

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Switching Characteristics (cont)

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

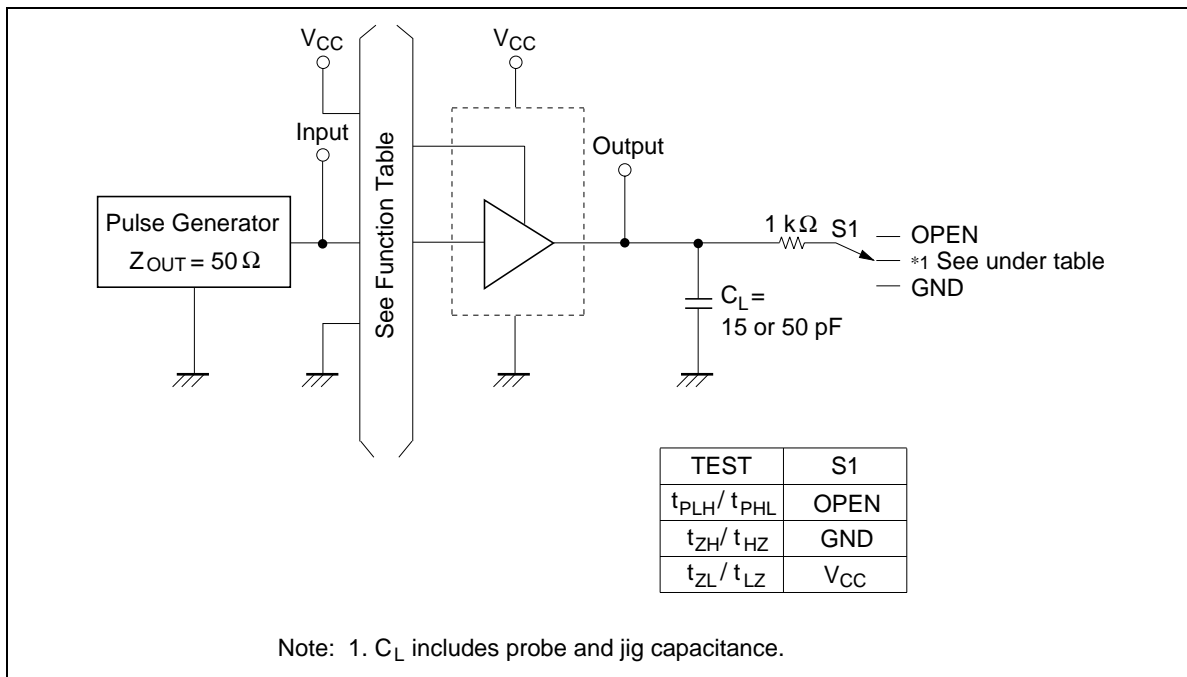
| Item | Symbol | Ta = 25°C | | | Ta = -40 to 85°C | | Unit | Test Conditions | FROM (Input) | TO (Output) |
|------------------------|-----------|-----------|-----|-----|------------------|------|------|-----------------|--------------|-------------|
| | | Min | Typ | Max | Min | Max | | | | |
| Propagation delay time | t_{PLH} | — | 3.5 | 5.5 | 1.0 | 6.5 | ns | $C_L = 15$ pF | A | Y |
| | t_{PHL} | — | 4.6 | 7.5 | 1.0 | 8.5 | | $C_L = 50$ pF | | |
| Enable time | t_{ZH} | — | 3.6 | 5.1 | 1.0 | 6.0 | ns | $C_L = 15$ pF | OE | Y |
| | t_{ZL} | — | 4.6 | 7.1 | 1.0 | 8.0 | | $C_L = 50$ pF | | |
| Disable time | t_{HZ} | — | 3.3 | 6.8 | 1.0 | 8.0 | ns | $C_L = 15$ pF | OE | Y |
| | t_{LZ} | — | 4.3 | 8.8 | 1.0 | 10.0 | | $C_L = 50$ pF | | |

Operating Characteristics

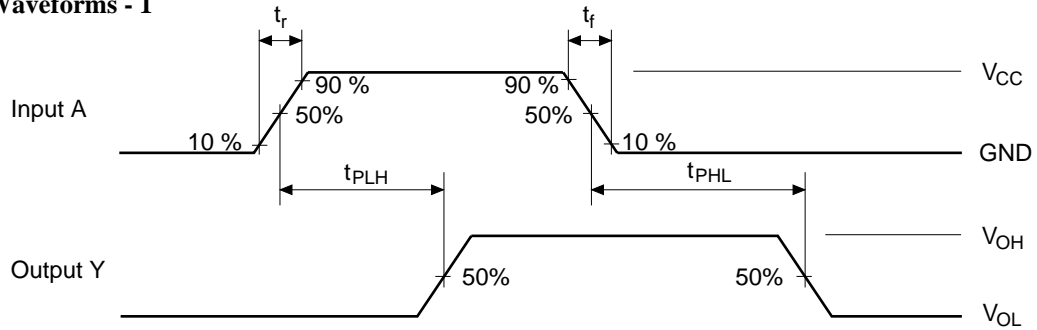
- $C_L = 50$ pF

| Item | Symbol | V _{CC} (V) | Ta = 25°C | | | Unit | Test Conditions |
|-------------------------------|-----------------|---------------------|-----------|------|-----|------|-----------------|
| | | | Min | Typ | Max | | |
| Power dissipation capacitance | C _{PD} | 3.3 | — | 10.5 | — | pF | f = 10 MHz |
| | | 5.0 | — | 11.5 | — | | |

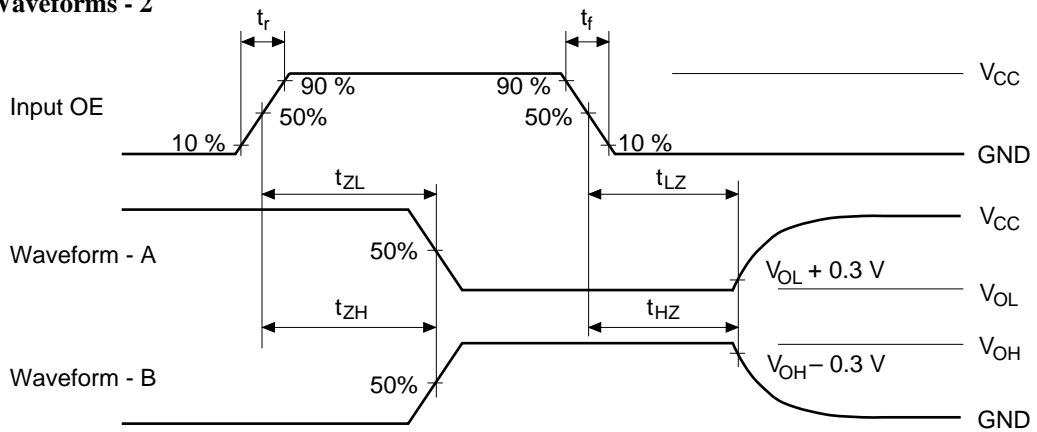
Test Circuit



• Waveforms - 1

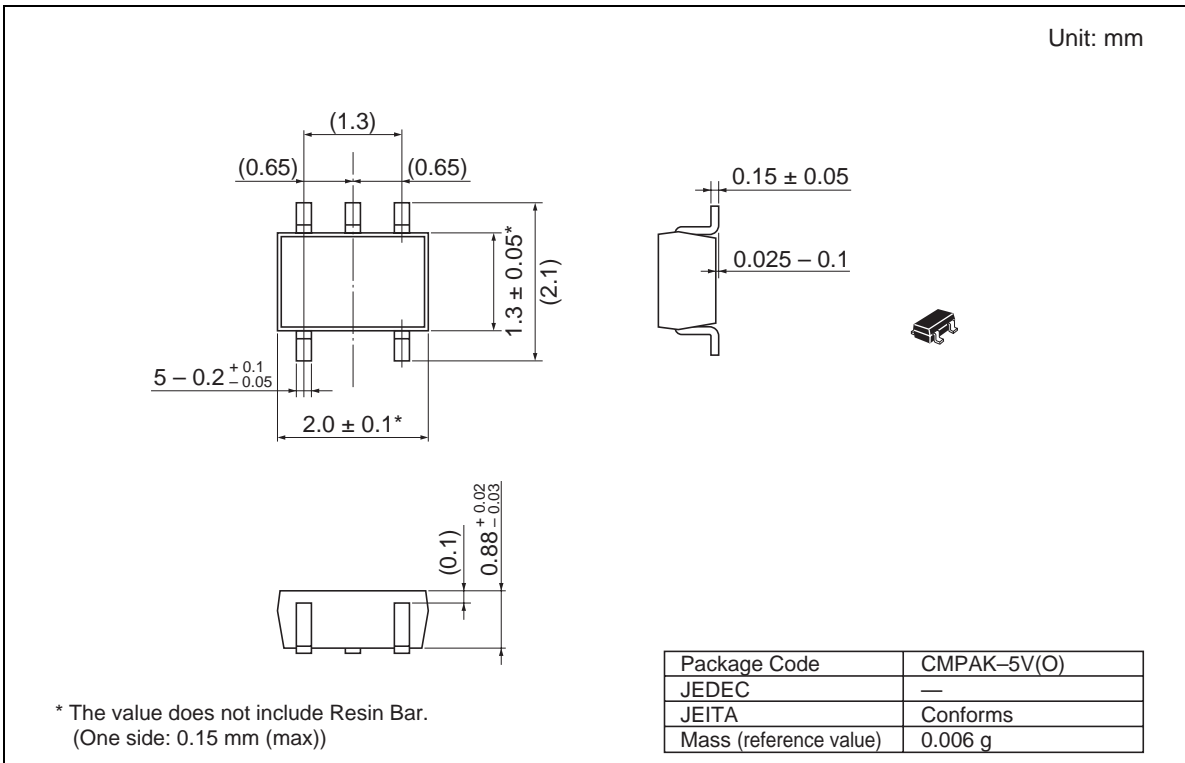
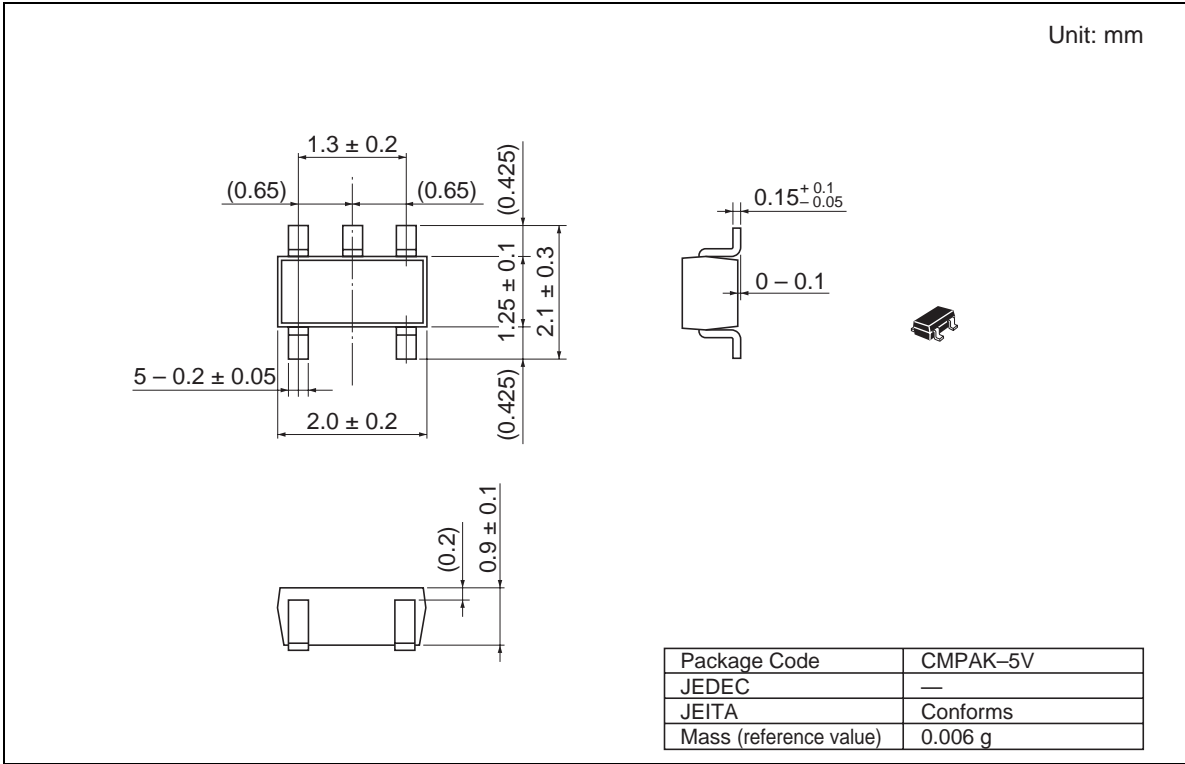


• Waveforms - 2

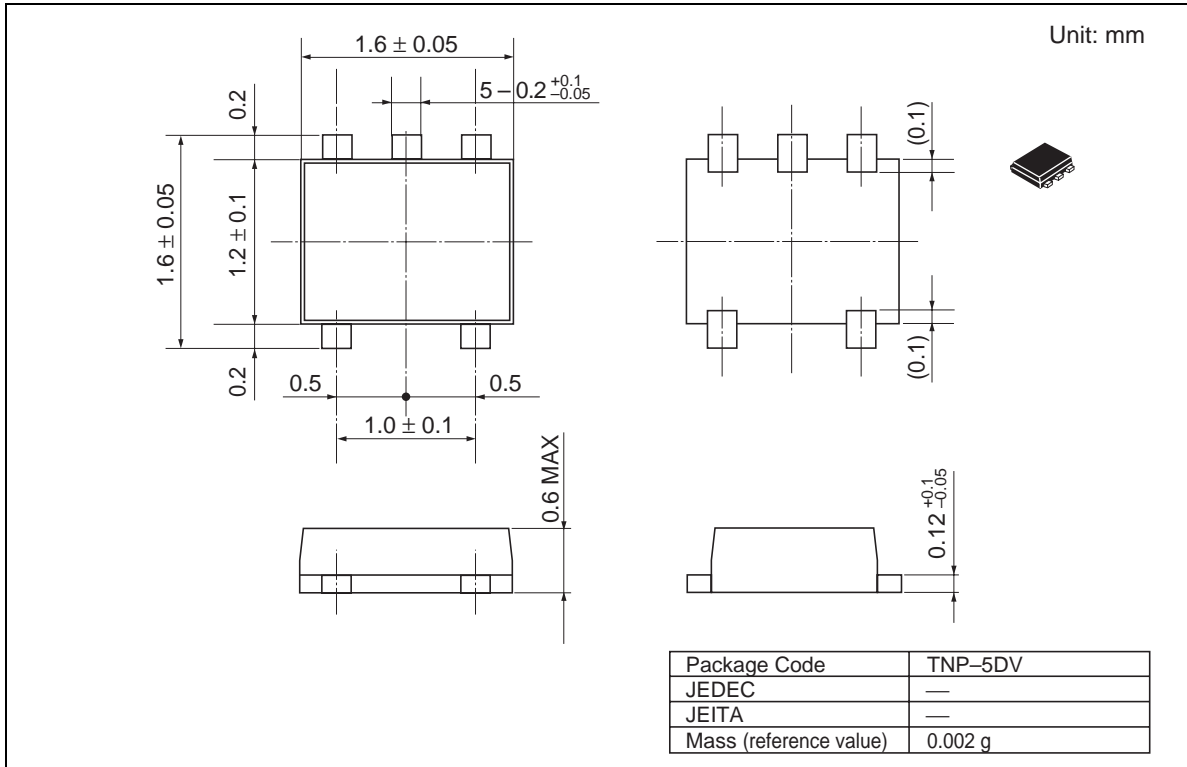


- Notes:
1. Input waveform : $PRR \leq 1 \text{ MHz}$, $Z_o = 50 \Omega$, $t_r \leq 3 \text{ ns}$, $t_f \leq 3 \text{ ns}$.
 2. Waveform - A is for an output with internal conditions such that the output is low except when disabled by the output control.
 3. Waveform - B is for an output with internal 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



HD74LV1G126A



RENESAS Technology Corp. Sales Strategic Planning Div. Nippon Bldg., 2-6-2, Ohte-machi, Chiyoda-ku, Tokyo 100-0004, Japan

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Renesas Technology America, Inc.
450 Holger Way, San Jose, CA 95134-1368, U.S.A
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Renesas Technology Europe Limited.
Dukes Meadow, Millboard Road, Bourne End, Buckinghamshire, SL8 5FH, United Kingdom
Tel: <44> (1628) 585 100, Fax: <44> (1628) 585 900

Renesas Technology Europe GmbH
Dornacher Str. 3, D-85622 Feldkirchen, Germany
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Renesas Technology Hong Kong Ltd.
7/F., North Tower, World Finance Centre, Harbour City, Canton Road, Hong Kong
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FL 10, #99, Fu-Hsing N. Rd., Taipei, Taiwan
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Renesas Technology (Shanghai) Co., Ltd.
26/F., Ruijin Building, No.205 Maoming Road (S), Shanghai 200020, China
Tel: <86> (21) 6472-1001, Fax: <86> (21) 6415-2952

Renesas Technology Singapore Pte. Ltd.
1, Harbour Front Avenue, #06-10, Keppel Bay Tower, Singapore 098632
Tel: <65> 6213-0200, Fax: <65> 6278-8001