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April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (<http://www.renesas.com>)

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Not recommended
for new design

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HD74UH32

2-input OR Gate

REJ03D0203-0500Z
(Previous ADE-205-018C (Z))
Rev.5.00
Feb.02.2004

Description

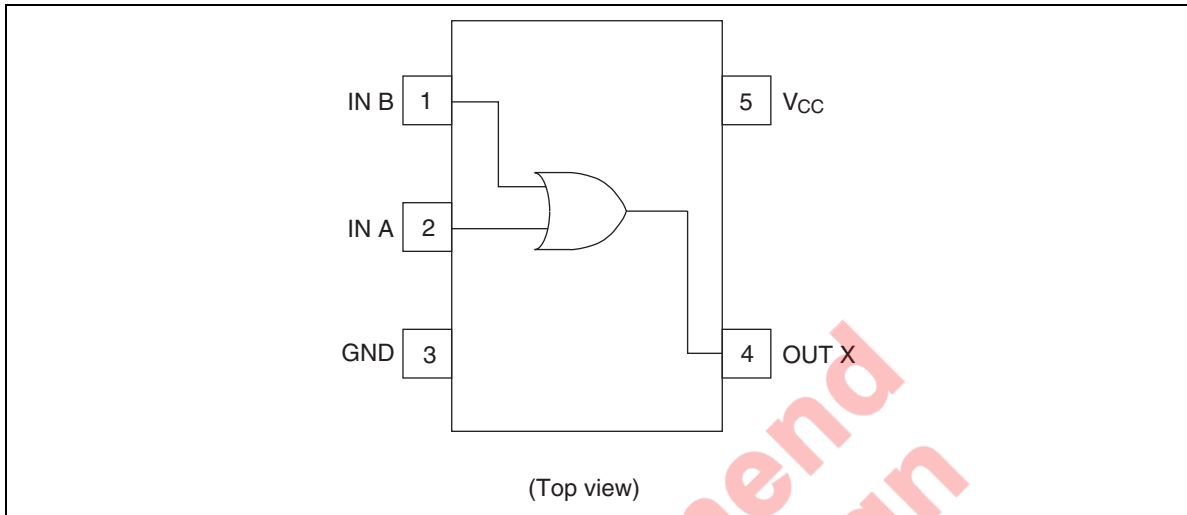
The HD74UH32 is high speed CMOS two input OR gate using silicon gate CMOS process. With CMOS low power dissipation, it provides high-speed equivalent to LS-TTL series. The internal circuit of three stages construction with buffer provides wide noise margin and stable output.

Features

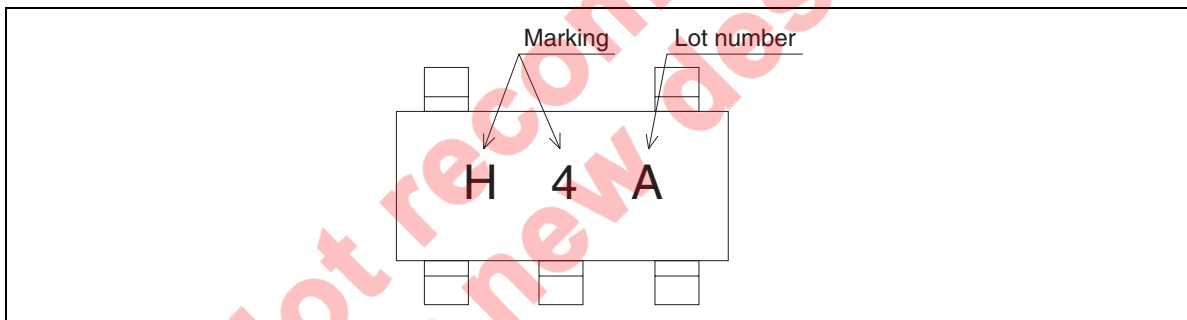
- Encapsulated in very small 5pins package of $2.9 \times 1.6 \times 1.1$ mm, the efficiency to mount on substrate is significantly improved.
- The basic gate function is lined up as Renesas uni logic series.
- Supplied on emboss taping for high-speed automatic mounting.
- Electrical characteristics equivalent to the HD74HC32
Supply voltage range: 2 to 6 V
Operating temperature range: -40 to $+85^{\circ}\text{C}$
- $|I_{OH}| = I_{OL} = 2$ mA (min)
- Ordering Information

| Part Name | Package Type | Package Code | Package Abbreviation | Taping Abbreviation (Quantity) |
|------------|--------------|--------------|----------------------|--------------------------------|
| HD74UH32EL | MPAK-5 pin | MPAK-5V | – | EL (3,000 pcs/reel) |

Pin Arrangement



Article Indication



Absolute Maximum Ratings

| Item | Symbol | Ratings | Unit |
|----------------------|-------------------|------------------------|-------------|
| Supply voltage | V_{CC} | -0.5 to +7.0 | V |
| Input voltage | V_{IN} | -0.5 to $V_{CC} + 0.5$ | V |
| Output voltage | V_{OUT} | -0.5 to $V_{CC} + 0.5$ | V |
| Input diode current | I_{IK} | ± 20 | mA |
| Output diode current | I_{OK} | ± 20 | mA |
| Output current | I_{OUT} | ± 25 | mA |
| V_{CC}/GND current | I_{CC}, I_{GND} | ± 25 | mA |
| Power dissipation | P_T | 200 | mW |
| Storage temperature | T_{stg} | -65 to +150 | $^{\circ}C$ |

Recommended Operating Conditions

| Item | Symbol | Ratings | Unit |
|-----------------------|------------|-------------------------------|------|
| Supply voltage | V_{CC} | 2 to 6 | V |
| Input voltage | V_{IN} | 0 to V_{CC} | 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 1000 ($V_{CC} = 2.0$ V) | ns |
| | | 0 to 500 ($V_{CC} = 4.5$ V) | |
| | | 0 to 400 ($V_{CC} = 6.0$ V) | |

Electrical Characteristics

| Item | Symbol | V_{CC} (V) | $T_a = 25^\circ\text{C}$ | | | $T_a = -40 \text{ to } 85^\circ\text{C}$ | | Unit | Test Conditions | |
|-------------------|----------|--------------|--------------------------|------|-----------|--|-----------|---------------|--|----------------------------|
| | | | Min | Typ | Max | Min | Max | | | |
| Input voltage | V_{IH} | 2.0 | 1.5 | — | — | 1.5 | — | V | | |
| | | 4.5 | 3.15 | — | — | 3.15 | — | | | |
| | | 6.0 | 4.2 | — | — | 4.2 | — | | | |
| | V_{IL} | 2.0 | — | — | 0.5 | — | 0.5 | V | | |
| | | 4.5 | — | — | 1.35 | — | 1.35 | | | |
| | | 6.0 | — | — | 1.8 | — | 1.8 | | | |
| Output voltage | V_{OH} | 2.0 | 1.9 | 2.0 | — | 1.9 | — | V | $I_{OH} = -20 \mu\text{A}$ | |
| | | 4.5 | 4.4 | 4.5 | — | 4.4 | — | | | |
| | | 6.0 | 5.9 | 6.0 | — | 5.9 | — | | | |
| | | 4.5 | 4.18 | 4.31 | — | 4.13 | — | | $I_{OH} = -2 \text{ mA}$ | |
| | | 6.0 | 5.68 | 5.80 | — | 5.63 | — | | | |
| | | 6.0 | 5.68 | 5.80 | — | 5.63 | — | | | $I_{OH} = -2.6 \text{ mA}$ |
| | V_{OL} | 2.0 | — | 0.0 | 0.1 | — | 0.1 | V | $V_{IN} = V_{IL}$ $I_{OL} = 20 \mu\text{A}$ | |
| | | 4.5 | — | 0.0 | 0.1 | — | 0.1 | | | |
| | | 6.0 | — | 0.0 | 0.1 | — | 0.1 | | | |
| | | 4.5 | — | 0.17 | 0.26 | — | 0.33 | | | $I_{OL} = 2 \text{ mA}$ |
| | | 6.0 | — | 0.18 | 0.26 | — | 0.33 | | | |
| | | 6.0 | — | 0.18 | 0.26 | — | 0.33 | | | |
| Input current | I_{IN} | 6.0 | — | — | ± 0.1 | — | ± 1.0 | μA | $V_{IN} = V_{CC}$ or GND | |
| Operating current | I_{CC} | 6.0 | — | — | 1.0 | — | 10.0 | | $V_{IN} = V_{CC}$ or GND | |

HD74UH32

Switching Characteristics

($C_L = 15 \text{ pF}$, $t_r = t_f = 6 \text{ ns}$, $V_{CC} = 5 \text{ V}$)

| Item | Symbol | Ta = 25°C | | | Unit | Test Conditions |
|------------------------|------------------------|-----------|-----|-----|------|------------------|
| | | Min | Typ | Max | | |
| Output rise/fall time | t_{TLH} t_{THL} | — | 5 | 10 | ns | See Test circuit |
| Propagation delay time | t_{PLH} t_{PHL} | — | 7 | 15 | ns | See Test circuit |

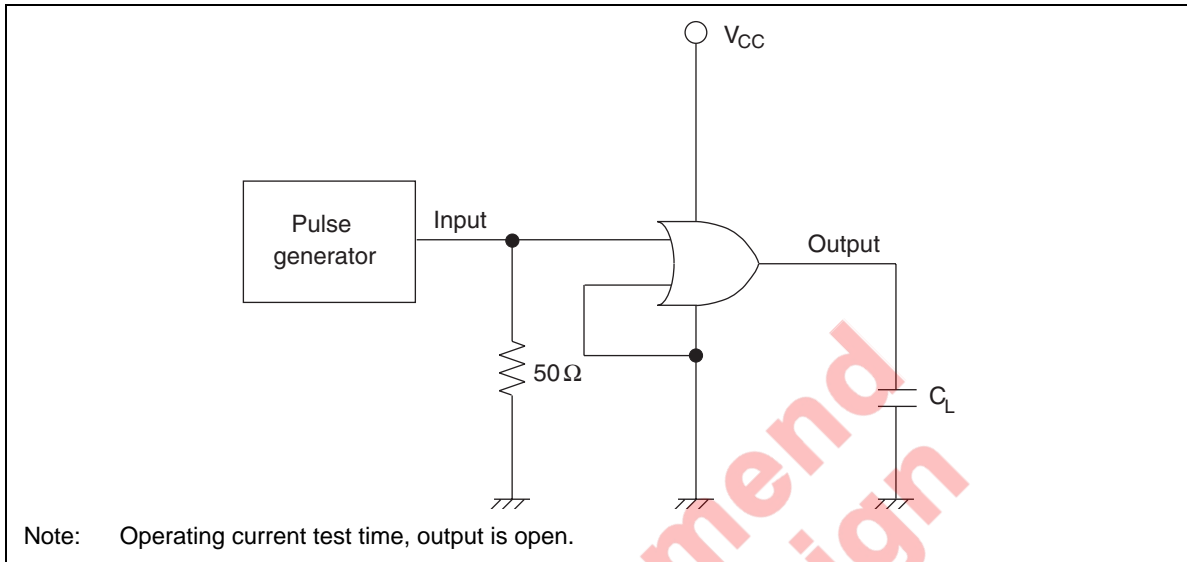
($C_L = 50 \text{ pF}$, $t_r = t_f = 6 \text{ ns}$)

| Item | Symbol | V _{CC} (V) | Ta = 25°C | | | Ta = -40 to 85°C | | Unit | Test Conditions |
|------------------------|-----------|---------------------|-----------|-----|-----|------------------|-----|------|------------------|
| | | | Min | Typ | Max | Min | Max | | |
| Output rise/fall time | t_{TLH} | 2.0 | — | 50 | 125 | — | 155 | ns | See Test circuit |
| | t_{THL} | 4.5 | — | 14 | 25 | — | 31 | | |
| | | 6.0 | — | 12 | 21 | — | 26 | | |
| Propagation delay time | t_{PLH} | 2.0 | — | 48 | 100 | — | 125 | ns | See Test circuit |
| | t_{PHL} | 4.5 | — | 12 | 20 | — | 25 | | |
| | | 6.0 | — | 9 | 17 | — | 21 | | |
| Input capacitance | C_{IN} | — | — | 5 | 10 | — | 10 | pF | |
| Equivalent capacitance | C_{PD} | — | — | 10 | — | — | — | | |

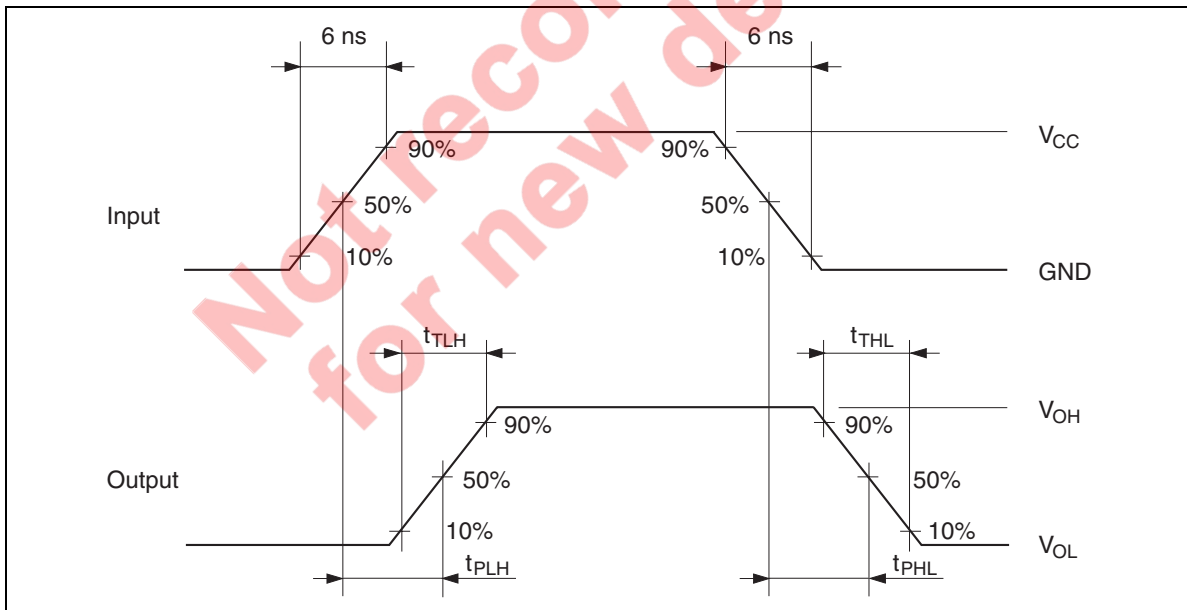
Note: C_{PD} is equivalent capacitance inside of the IC calculated from the operating current without load (see test circuit). The average operating current without load is calculated according to the expression below.

$$I_{CC(opr)} = C_{PD} \cdot V_{CC} \cdot f_{IN} + I_{CC}$$

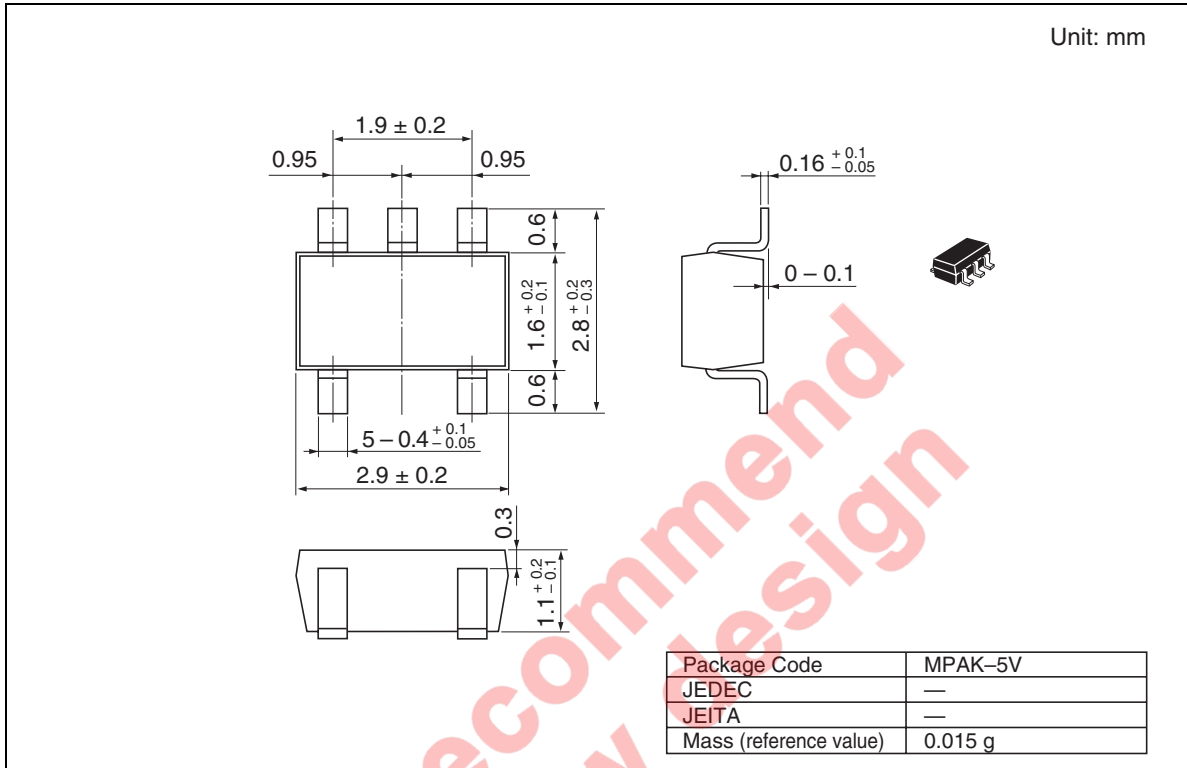
Test Circuit



Waveforms



Package Dimensions



Not recommend
for new design

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Renesas Technology America, Inc.

450 Holger Way, San Jose, CA 95134-1368, U.S.A
Tel: <1> (408) 382-7500 Fax: <1> (408) 382-7501

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
Tel: <49> (89) 380 70 0, Fax: <49> (89) 929 30 11

Renesas Technology Hong Kong Ltd.

7/F., North Tower, World Finance Centre, Harbour City, Canton Road, Hong Kong
Tel: <852> 2265-6688, Fax: <852> 2375-6836

Renesas Technology Taiwan Co., Ltd.

FL 10, #99, Fu-Hsing N. Rd., Taipei, Taiwan
Tel: <886> (2) 2715-2888, Fax: <886> (2) 2713-2999

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

