

RD74HV1G08

High-Voltage 2-input AND gate

REJ03D0888-0100
Rev.1.00
Feb 20, 2007

Description

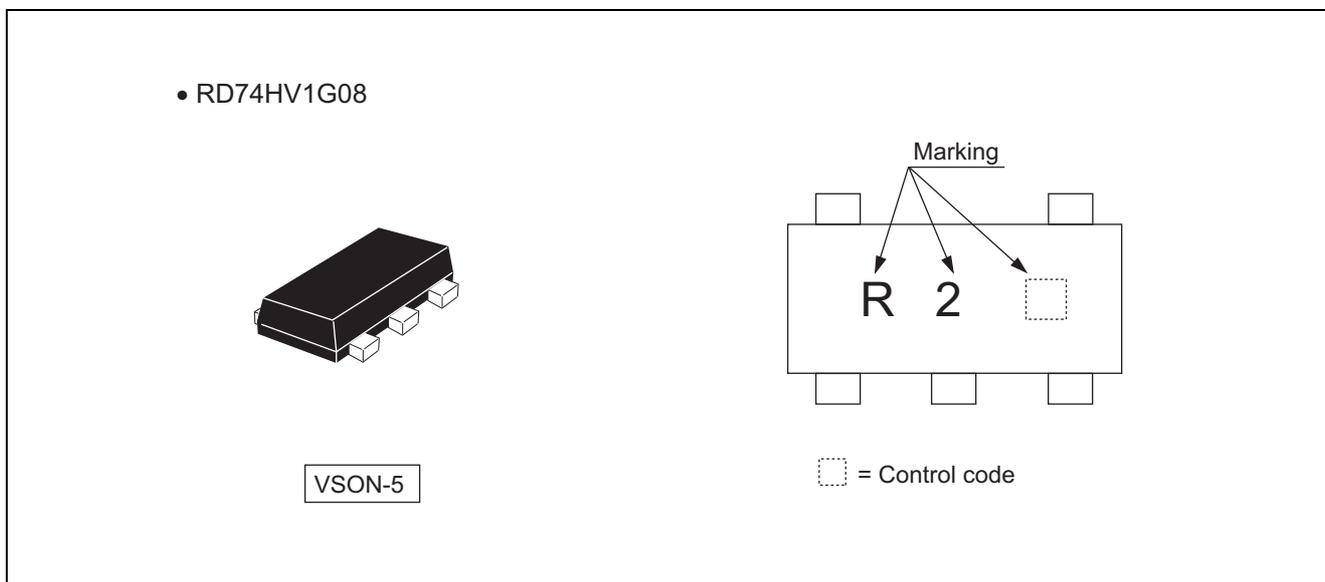
The RD74HV1G08 has two-input AND gate in a 5 pin package. Supports the wide power supply voltage and can use it for the other use as a general-purpose driver.

Features

- The basic gate function is lined up as Renesas uni logic series.
- Supplied on emboss taping for high-speed automatic mounting.
- Wide supply voltage range : 4.5 to 30 V
- Operating temperature range : -40 to +85°C
- All inputs V_{IH} (Min.) = 3.5 V, V_{IL} (Max.) = 0.8 V (@ V_{CC} = 10 V to 30 V)
- Output current : I_O short (Typ.) = ± 70 mA (@ V_{CC} = 15 V)
- Ordering Information

| Part Name | Package Type | Package Code (Previous Code) | Package Abbreviation | Taping Abbreviation (Quantity) |
|---------------|--------------|------------------------------|----------------------|--------------------------------|
| RD74HV1G08VSE | VSON-5 pin | PUSN0005KA-A (TNP-5DV) | VS | E (3,000 pcs / Reel) |

Outline and Article Indication



These products designed for general and industrial use.
It is not supported for special quality or reliability demanded use such as automotive or life support or something like that.

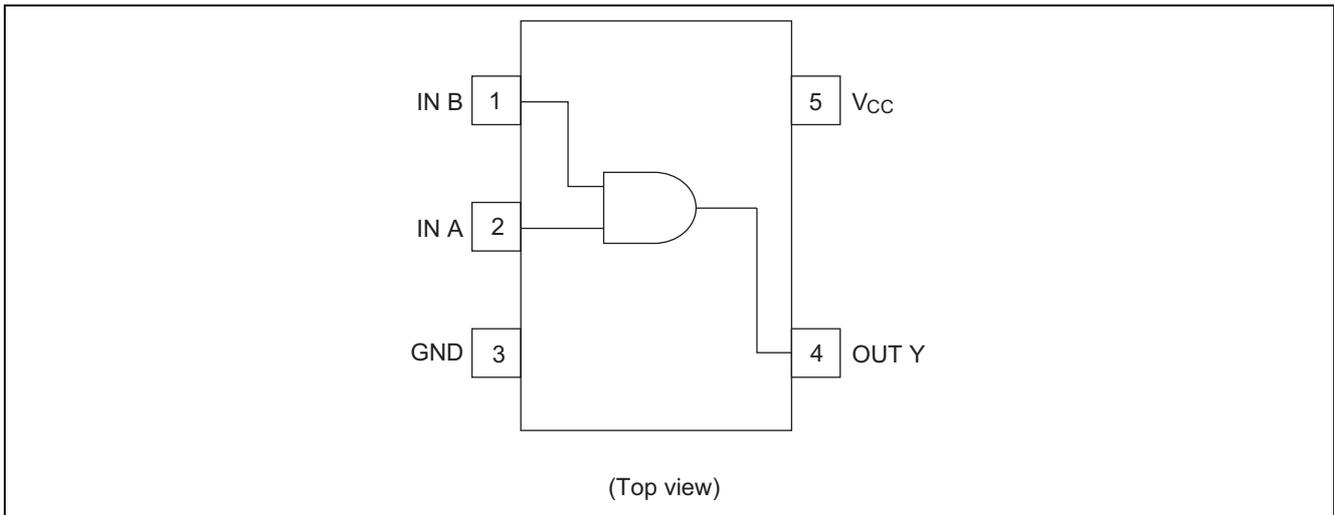
Function Table

| Inputs | | Output Y |
|--------|---|----------|
| A | B | |
| L | L | L |
| H | L | L |
| L | H | L |
| H | H | H |

H : High level

L : Low level

Pin Arrangement



Absolute Maximum Ratings

| Item | Symbol | Ratings | Unit | Test Conditions |
|--|-----------------------|------------------------|------------------|-----------------------------|
| Supply voltage range | V_{CC} | 0 to 30 | V | |
| Input voltage range ^{*1} | V_I | -0.5 to $V_{CC} + 0.5$ | V | |
| Output voltage range ^{*1, 2} | V_O | -0.5 to $V_{CC} + 0.5$ | V | |
| Input clamp current | I_{IK} | ± 50 | mA | $V_I < 0$ or $V_I > V_{CC}$ |
| Output clamp current | I_{OK} | ± 75 | mA | $V_O < 0$ or $V_O > V_{CC}$ |
| Continuous output current | I_O | ± 100 | 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 30 V maximum.
3. The maximum package power dissipation was calculated using a junction temperature of 150°C .

Recommended Operating Conditions

| Item | Symbol | Min | Max | Unit | Conditions |
|------------------------------------|-----------------------|-----|----------|--------------------|--|
| Supply voltage range | V_{CC} | 4.5 | 30 | V | |
| Input voltage range | V_I | 0 | V_{CC} | V | |
| Input / Output voltage range | $V_{I/O}$ | 0 | V_{CC} | V | |
| Output current | I_{OH} | — | -2.5 | mA | $V_{CC} = 10\text{ V}$ |
| | | — | -5 | | $V_{CC} = 15\text{ V}$ |
| | | — | -10 | | $V_{CC} = 25\text{ V}$ |
| | | — | -15 | | $V_{CC} = 30\text{ V}$ |
| | I_{OL} | — | 2.5 | | $V_{CC} = 10\text{ V}$ |
| | | — | 5 | | $V_{CC} = 15\text{ V}$ |
| | | — | 10 | | $V_{CC} = 25\text{ V}$ |
| | | — | 15 | | $V_{CC} = 30\text{ V}$ |
| Input transition rise or fall rate | $\Delta t / \Delta v$ | 0 | 100 | ns / V | $V_{CC} < 5\text{ V}$ |
| | | 0 | 20 | | $15\text{ V} > V_{CC} \geq 5\text{ V}$ |
| | | 0 | 10 | | $30\text{ V} \geq V_{CC} \geq 15\text{ V}$ |
| Operating free-air temperature | T_a | -40 | 85 | $^{\circ}\text{C}$ | |

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} | 10 | 3.5 | — | — | V | |
| | | 15 | 3.5 | — | — | | |
| | | 25 | 3.5 | — | — | | |
| | | 30 | 3.5 | — | — | | |
| | V_{IL} | 105 | — | — | 0.8 | | |
| | | 15 | — | — | 0.8 | | |
| | | 25 | — | — | 0.8 | | |
| | | 30 | — | — | 0.8 | | |
| Output voltage | V_{OH} | 10 | 9.0 | — | — | V | $I_{OH} = -2.5\text{ mA}$ |
| | | 15 | 13.5 | — | — | | $I_{OH} = -5\text{ mA}$ |
| | | 25 | 22.5 | — | — | | $I_{OH} = -10\text{ mA}$ |
| | | 30 | 27.0 | — | — | | $I_{OH} = -15\text{ mA}$ |
| | V_{OL} | 10 | — | — | 1.0 | | $I_{OL} = 2.5\text{ mA}$ |
| | | 15 | — | — | 1.5 | | $I_{OL} = 5\text{ mA}$ |
| | | 25 | — | — | 2.5 | | $I_{OL} = 10\text{ mA}$ |
| | | 30 | — | — | 3.0 | | $I_{OL} = 15\text{ mA}$ |
| Output current | I_{OH} short | 15 | -46 | -70 | -95 | mA | $V_O = 0\text{ V}$ |
| | I_{OL} short | 15 | 46 | 70 | 95 | | $V_O = V_{CC}$ |
| Input current | I_{IN} | V_{CC} | — | — | ± 1 | μA | $V_{IN} = V_{CC}$ or GND |
| Quiescent supply current | I_{CC} | 10 | — | — | 0.5 | μA | $V_{IN} = V_{CC}$ or GND |
| | | 15 | — | — | 1.0 | | |
| | | 25 | — | — | 2.0 | | |
| | | 30 | — | — | 2.0 | | |
| Supply current | I_{SUPP} | 10 | — | — | 2 | mA | $V_{CC} = 10\text{ V}$, $V_{IN} = 4.5\text{ V}$ |
| | | 30 | — | — | 10 | | $V_{CC} = 30\text{ V}$, $V_{IN} = 4.5\text{ V}$ |
| Input capacitance | C_{IN} | V_{CC} | — | 2.5 | — | pF | $V_{IN} = V_{CC}$ or GND |

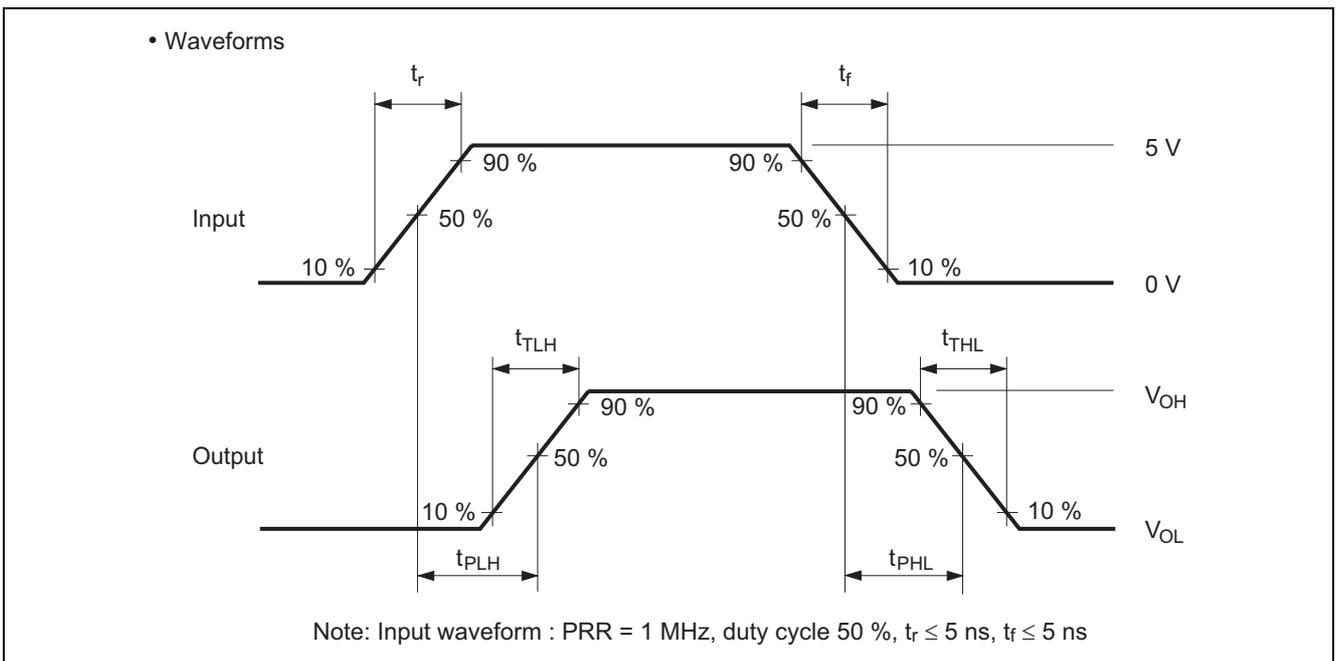
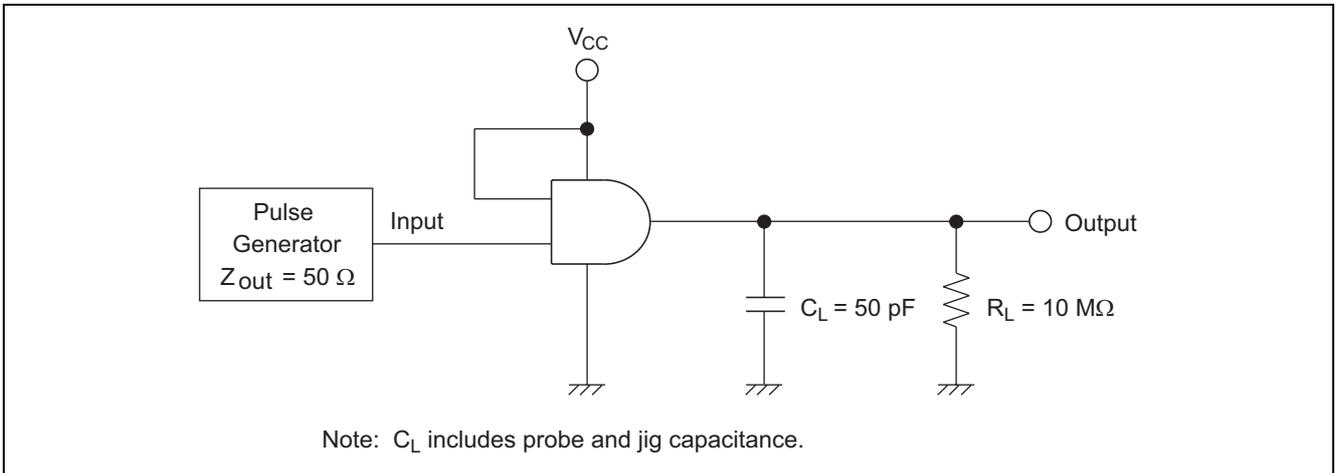
Note: For conditions shown as Min or Max, use the appropriate values under recommended operating conditions.

Switching Characteristics

($C_L = 50 \text{ pF}$, $t_r = t_f = 5 \text{ ns}$)

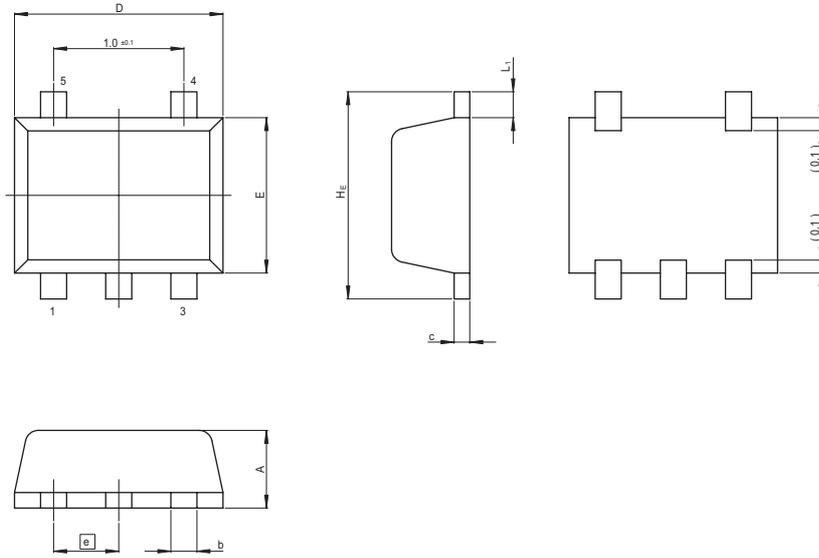
| Item | Symbol | Vcc (V) | Ta = -40 to 85°C | | | Unit | FROM (Input) | TO (Output) |
|-------------------------|------------------------|---------|------------------|-----|-----|------|--------------|-------------|
| | | | Min | Typ | Max | | | |
| Propagation delay time | t_{PLH} t_{PHL} | 10 | 15 | — | 85 | ns | A or B | Y |
| | | 15 | 10 | — | 60 | | | |
| | | 20 | 10 | — | 50 | | | |
| | | 25 | 10 | — | 40 | | | |
| | | 30 | 10 | — | 35 | | | |
| Output rise / fall time | t_{TLH} t_{THL} | 10 | 8 | — | 30 | ns | A or B | Y |
| | | 15 | 7 | — | 25 | | | |
| | | 20 | 6 | — | 20 | | | |
| | | 25 | 5 | — | 17 | | | |
| | | 30 | 5 | — | 15 | | | |

Test Circuit



Package Dimensions

| | | | |
|----------------------|--------------|----------------|------------|
| JEITA Package Code | RENESAS Code | Previous Code | MASS[Typ.] |
| P-USON5-1.2x1.6-0.50 | PUSN0005KA-A | TNP-5D/TNP-5DV | 0.002g |



| Reference Symbol | Dimension in Millimeters | | |
|------------------|--------------------------|------|------|
| | Min | Nom | Max |
| D | 1.55 | 1.6 | 1.65 |
| E | 1.1 | 1.2 | 1.3 |
| A | — | — | 0.6 |
| A ₁ | — | — | — |
| A ₂ | — | — | — |
| b | 0.15 | 0.2 | 0.3 |
| b ₁ | — | — | — |
| Ⓢ | — | 0.5 | — |
| L _p | — | — | — |
| x | — | — | — |
| y | — | — | — |
| Z _D | — | — | — |
| c | 0.07 | 0.12 | 0.22 |
| c ₁ | — | — | — |
| H _E | 1.55 | 1.6 | 1.65 |
| L ₁ | — | 0.2 | — |

Notes:

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