To our customers,

Old Company Name in Catalogs and Other Documents

On April 1st, 2010, NEC Electronics Corporation merged with Renesas Technology Corporation, and Renesas Electronics Corporation took over all the business of both companies. Therefore, although the old company name remains in this document, it is a valid Renesas Electronics document. We appreciate your understanding.

Renesas Electronics website: http://www.renesas.com

April 1st, 2010
Renesas Electronics Corporation

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

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RD74HV1G00

High-Voltage 2-input NAND gate

REJ03D0885-0200
Rev.2.00
Jul 27, 2009

Description

The RD74HV1G00 has two–input NAND 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.

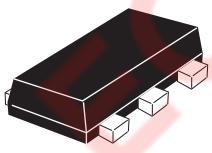
Features

- 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

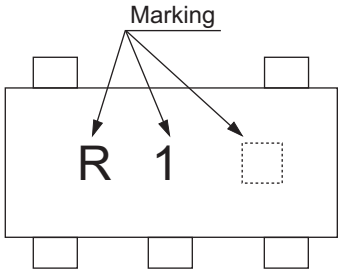
Part Name	Package Type	Package Code (Previous Code)	Package Abbreviation	Packing Abbreviation (Quantity)	Surface Treatment
RD74HV1G00VSH1	VSON-5 pin	PUSN0005KA-A (TNP-5DV)	VS	H (3,000 pcs/reel)	1 (Sn-Bi)

Outline and Article Indication

• RD74HV1G00



VSON-5



= Control code

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.

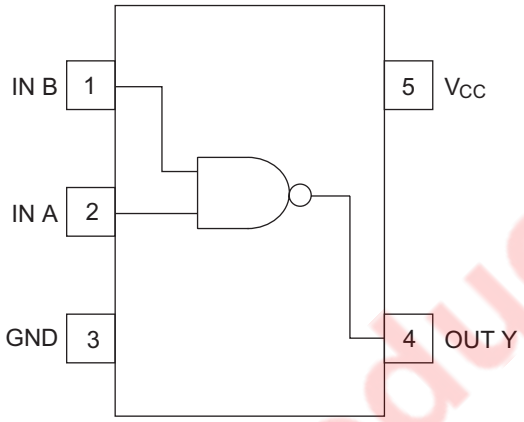
Function Table

Inputs		Output Y
A	B	
L	L	H
H	L	H
L	H	H
H	H	L

H : High level

L : Low level

Pin Arrangement



(Top view)

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 Ta = 25°C (in still air) [*3]	P_T	200	mW	
Storage temperature	Tstg	–65 to 150	°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 V
		—	–5		V_{CC} = 15 V
		—	–10		V_{CC} = 25 V
		—	–15		V_{CC} = 30 V
	I_{OL}	—	2.5		V_{CC} = 10 V
		—	5		V_{CC} = 15 V
		—	10		V_{CC} = 25 V
		—	15		V_{CC} = 30 V
Input transition rise or fall rate	$\Delta t / \Delta v$	0	100	ns / V	V_{CC} < 5 V
		0	20		15 V > V_{CC} ≥ 5 V
		0	10		30 V ≥ V_{CC} ≥ 15 V
Operating free-air temperature	T_a	–40	85	°C	

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

Electrical Characteristic

(Ta = –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 mA
		15	13.5	—	—		I_{OH} = –5 mA
		25	22.5	—	—		I_{OH} = –10 mA
		30	27.0	—	—		I_{OH} = –15 mA
	V_{OL}	10	—	—	1.0		I_{OL} = 2.5 mA
		15	—	—	1.5		I_{OL} = 5 mA
		25	—	—	2.5		I_{OL} = 10 mA
		30	—	—	3.0		I_{OL} = 15 mA
Output current	I_{OH} short	15	–46	–70	–95	mA	V_O = 0V
	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 V , VIN = 4.5 V
		30	—	—	10		V_{CC} = 30 V , VIN = 4.5 V
Input capacitance	C_{IN}	V_{CC}	—	2.5	—	pF	V_{IN} = V_{CC} or GND

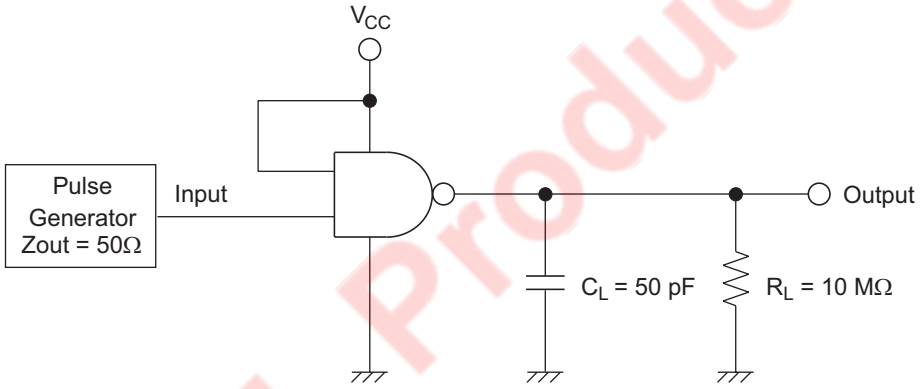
Note: For conditions shown as Min or Max, use the appropriate values under recommended operating conditions.

Switching Characteristics

(C_L = 50 pF, $t_r = t_f$ = 5 ns)

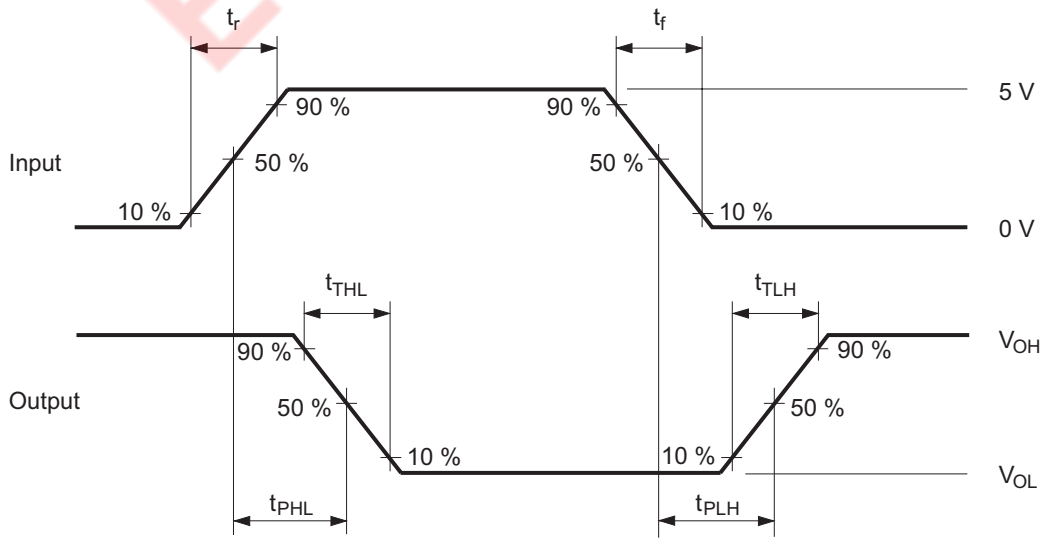
Item	Symbol	Vcc (V)	Ta = –40 to 85°C			Unit	FROM (Input)	TO (Output)
			Min	Typ	Max			
Propagation delay time	t_{PLH} t_{PHL}	10	15	—	75	ns	A or B	Y
		15	10	—	55			
		20	10	—	45			
		25	10	—	35			
		30	10	—	35			
Output rise / fall time	t_{TLH} t_{THL}	10	8	—	30	ns	A or B	Y
		15	7	—	25			
		20	6	—	20			
		25	5	—	17			
		30	5	—	15			

Test Circuit



Note: C_L includes probe and jig capacitance.

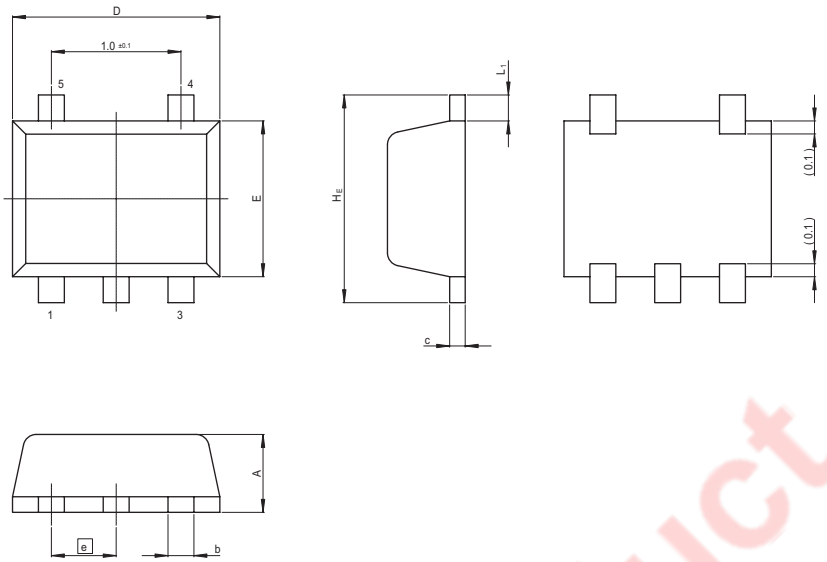
Waveform



Note: Input waveform : PRR = 1 MHz, duty cycle 50 %, $t_r \leq 5$ ns, $t_f \leq 5$ ns

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	—	—	—
e	—	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	—

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

RENESAS SALES OFFICES

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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, U.K.
Tel: <44> (1628) 585-100, Fax: <44> (1628) 585-900

Renesas Technology (Shanghai) Co., Ltd.
Unit 204, 205, AZIACenter, No.1233 Lujiazui Ring Rd, Pudong District, Shanghai, China 200120
Tel: <86> (21) 5877-1818, Fax: <86> (21) 6887-7858/7898

Renesas Technology Hong Kong Ltd.
7th Floor, North Tower, World Finance Centre, Harbour City, Canton Road, Tsimshatsui, Kowloon, Hong Kong
Tel: <852> 2265-6688, Fax: <852> 2377-3473

Renesas Technology Taiwan Co., Ltd.
10th Floor, No.99, Fushing North Road, Taipei, Taiwan
Tel: <886> (2) 2715-2888, Fax: <886> (2) 3518-3399

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

Renesas Technology Korea Co., Ltd.
Kukje Center Bldg. 18th Fl., 191, 2-ka, Hangang-ro, Yongsan-ku, Seoul 140-702, Korea
Tel: <82> (2) 796-3115, Fax: <82> (2) 796-2145

Renesas Technology Malaysia Sdn. Bhd
Unit 906, Block B, Menara Amcorp, Amcorp Trade Centre, No.18, Jln Persiaran Barat, 46050 Petaling Jaya, Selangor Darul Ehsan, Malaysia
Tel: <603> 7955-9390, Fax: <603> 7955-9510

Colophon .7.2