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# **RD74HV1G00**

# High-Voltage 2-input NAND gate

REJ03D0885-0200 Rev.2.00 Jul 27, 2009

#### **Description**

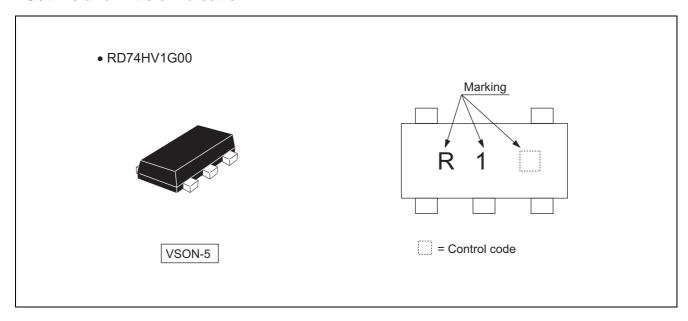
The RD74HV1G00 has two–input NAND gate in a 5 pin package. Supports the wide power supply voltage and can use it for the other use as a general–purpose driver.

#### **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.) =  $\pm 70$  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**



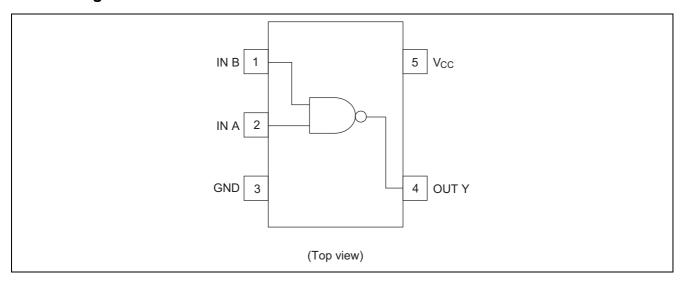
These products designed for general and industrial use. It is not supported for special quality or reliability demanded use such as automotive or life support or something like that.

#### **Function Table**

Inp	Output Y		
A	В	Ομίραι 1	
L	L	Н	
Н	L	Н	
L	Н	Н	
Н	Н	L	

H : High level L : Low level

### **Pin Arrangement**



## **Absolute Maximum Ratings**

Item	Symbol	Ratings	Unit	Test Conditions
Supply voltage range	V <sub>CC</sub>	0 to 30	V	
Input voltage range *1	Vı	–0.5 to V <sub>CC</sub> + 0.5	V	
Output voltage range *1, 2	Vo	–0.5 to V <sub>CC</sub> + 0.5	V	
Input clamp current	I <sub>IK</sub>	±50	mA	$V_I < 0$ or $V_I > V_{CC}$
Output clamp current	I <sub>OK</sub>	±75	mA	$V_O < 0$ or $V_O > V_{CC}$
Continuous output current	I <sub>0</sub>	±100	mA	$V_O = 0$ to $V_{CC}$
Continuous current through V <sub>CC</sub> or GND	I <sub>CC</sub> or I <sub>GND</sub>	±100	mA	
Maximum power dissipation at Ta = 25°C (in still air) *3	P <sub>T</sub>	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 <sub>CC</sub>	4.5	30	V	
Input voltage range	Vı	0	V <sub>CC</sub>	V	
Input / Output voltage range	V <sub>I/O</sub>	0	V <sub>CC</sub>	V	
		_	-2.5		V <sub>CC</sub> = 10 V
		_	-5		V <sub>CC</sub> = 15 V
	Іон	_	-10		V <sub>CC</sub> = 25 V
Output ourrant		_	-15	mA	V <sub>CC</sub> = 30 V
Output current	l <sub>OL</sub>	_	2.5	IIIA	V <sub>CC</sub> = 10 V
		_	5		V <sub>CC</sub> = 15 V
		_	10		V <sub>CC</sub> = 25 V
		_	15		V <sub>CC</sub> = 30 V
	Δt / Δν	0	100		V <sub>CC</sub> < 5 V
Input transition rise or fall rate		0	20	ns / V	15 V > V <sub>CC</sub> ≥ 5 V
		0	10		30 V ≥ V <sub>CC</sub> ≥ 15 V
Operating free-air temperature	Ta	-40	85	°C	

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

### **Electrical Characteristic**

 $(Ta = -40 \text{ to } 85^{\circ}\text{C})$ 

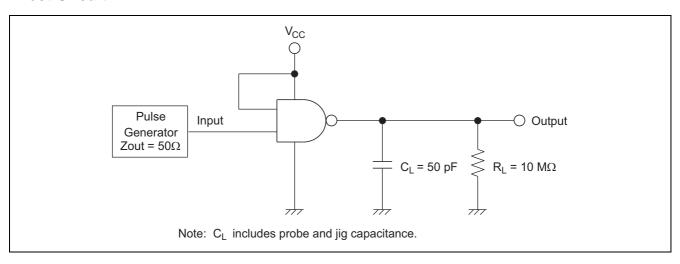
ltem	Symbol	V <sub>CC</sub> (V) *	Min	Тур	Max	Unit	Test condition
		10	3.5	_			
	\/	15	3.5	_			
	$V_{IH}$	25	3.5	_	_		
Input voltage		30	3.5	_	_	V	
input voitage		105	_	_	8.0	\ \ \	
	\/	15	_	_	0.8		
	$V_{IL}$	25	_	_	0.8		
		30	_	_	8.0		
		10	9.0	_	_		I <sub>OH</sub> = -2.5 mA
	1/	15	13.5	_	_		I <sub>OH</sub> = -5 mA
Outout valle va	V <sub>OH</sub>	25	22.5	_	_	V	I <sub>OH</sub> = -10 mA
		30	27.0	_	_		I <sub>OH</sub> = -15 mA
Output voltage	V <sub>OL</sub>	10	_	_	1.0		I <sub>OL</sub> = 2.5 mA
		15	_	_	1.5		I <sub>OL</sub> = 5 mA
		25	_	_	2.5		I <sub>OL</sub> = 10 mA
		30	_	_	3.0		I <sub>OL</sub> = 15 mA
0 1 1 1 1 1 1 1 1 1 1	I <sub>OH</sub> short	15	-46	<b>–</b> 70	-95	mΛ	V <sub>O</sub> = 0V
Output current	I <sub>OL</sub> short	15	46	70	95	mA	$V_{O} = V_{CC}$
Input current	I <sub>IN</sub>	V <sub>CC</sub>	_	_	±1	μΑ	V <sub>IN</sub> = V <sub>CC</sub> or GND
		10	_	_	0.5		
Quiescent supply current		15	_	_	1.0	^	V = V or CND
	I <sub>CC</sub>	25	_	_	2.0	μΑ	$V_{IN} = V_{CC}$ or GND
		30	_	_	2.0		
Supply current	I <sub>SUPP</sub>	10	_	_	2	A	V <sub>CC</sub> = 10 V , VIN = 4.5 V
		30	_	_	10	mA	V <sub>CC</sub> = 30 V , VIN = 4.5 V
Input capacitance	C <sub>IN</sub>	V <sub>CC</sub>	_	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.

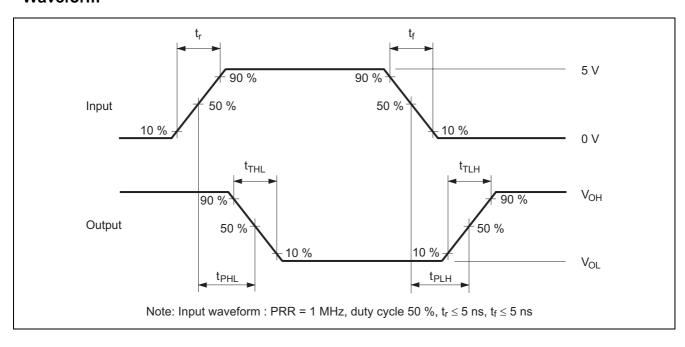
### **Switching Characteristics**

Item	Symbol	Vcc (V)	Ta = -40 to 85°C			Unit	FROM	ТО
item		VCC (V)	Min	Тур	Max	Unit	(Input)	(Output)
Propagation delay time	t <sub>PLH</sub> t <sub>PHL</sub>	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 <sub>тLH</sub> t <sub>тHL</sub>	10	8	_	30	ns	A or B	Y
		15	7	_	25			
		20	6	_	20			
		25	5	_	17			
		30	5	_	15			

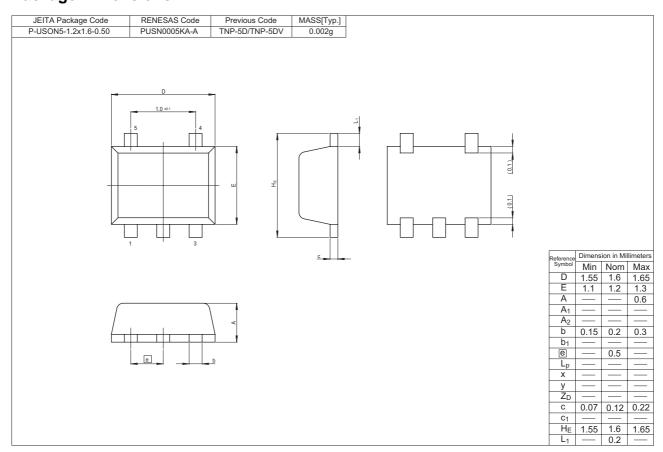
### **Test Circuit**



### Waveform



### **Package Dimensions**



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