

# RD74HV1G04

## High-Voltage Single Inverter Buffer

REJ03D0887-0100  
Rev.1.00  
Feb 20, 2007

### Description

The RD74HV1G04 has one Inverter in a 5 pin package. Supports the wide power supply voltage and can use it for the other use as a general-purpose driver.

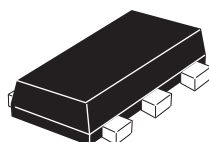
### Features

- 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

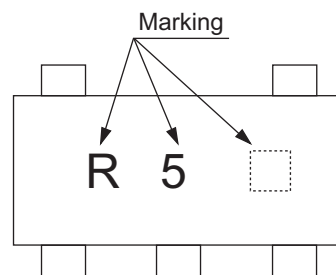
Part Name	Package Type	Package Code (Previous Code)	Package Abbreviation	Taping Abbreviation (Quantity)
RD74HV1G04VSE	VSON-5 pin	PUSN0005KA-A (TNP-5DV)	VS	E (3,000 pcs / Reel)

### Outline and Article Indication

- RD74HV1G04



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.

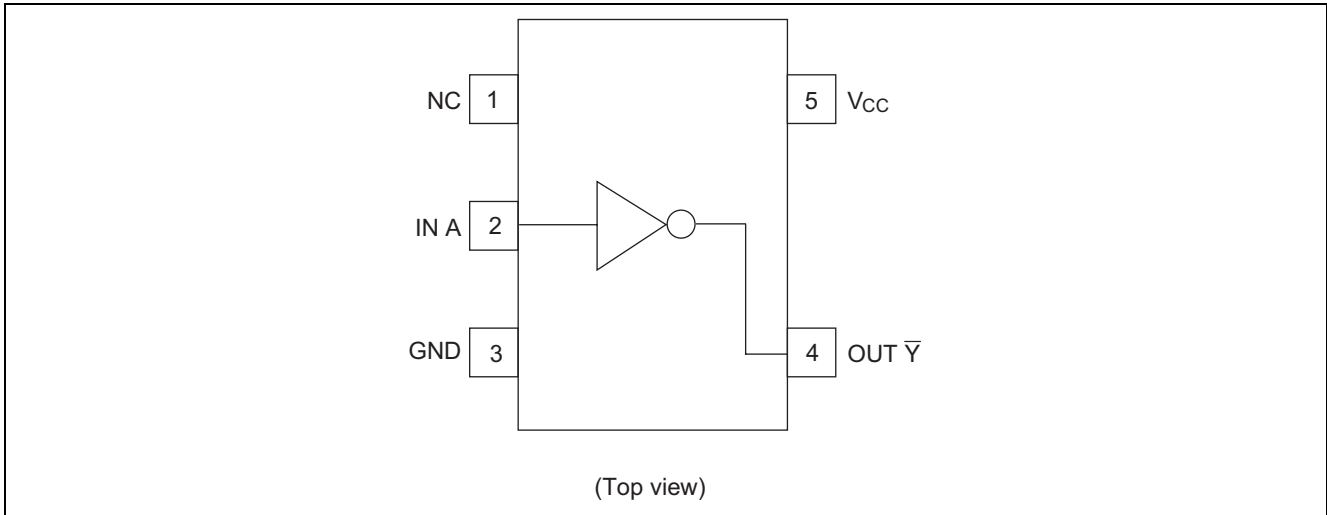
## Function Table

Input A	Output $\bar{Y}$
H	L
L	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 <sup>*1</sup>	$V_I$	-0.5 to $V_{CC} + 0.5$	V	
Output voltage range <sup>*1, 2</sup>	$V_O$	-0.5 to $V_{CC} + 0.5$	V	
Input clamp current	$I_{IK}$	$\pm 50$	mA	$V_I < 0$ or $V_I > V_{CC}$
Output clamp current	$I_{OK}$	$\pm 75$	mA	$V_O < 0$ or $V_O > V_{CC}$
Continuous output current	$I_O$	$\pm 100$	mA	$V_O = 0$ to $V_{CC}$
Continuous current through $V_{CC}$ or GND	$I_{CC}$ or $I_{GND}$	$\pm 100$	mA	
Maximum power dissipation at $T_a = 25^\circ\text{C}$ (in still air) <sup>*3</sup>	$P_T$	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  $150^\circ\text{C}$ .

## 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	°C	

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

## Electrical Characteristic

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

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	$I_{IN}$	$V_{CC}$	—	—	$\pm 1$	$\mu\text{A}$	$V_{IN} = V_{CC}$ or GND
Quiescent supply current	$I_{CC}$	10	—	—	0.5	$\mu\text{A}$	$V_{IN} = V_{CC}$ or GND
		15	—	—	1.0		
		25	—	—	2.0		
		30	—	—	2.0		
Supply current	$I_{SUPP}$	10	—	—	1	mA	$V_{CC} = 10\text{ V}$ , $V_{IN} = 4.5\text{ V}$
		30	—	—	5		$V_{CC} = 30\text{ V}$ , $V_{IN} = 4.5\text{ V}$
Input capacitance	$C_{IN}$	$V_{CC}$	—	2.5	—	pF	$V_{IN} = V_{CC}$ or GND

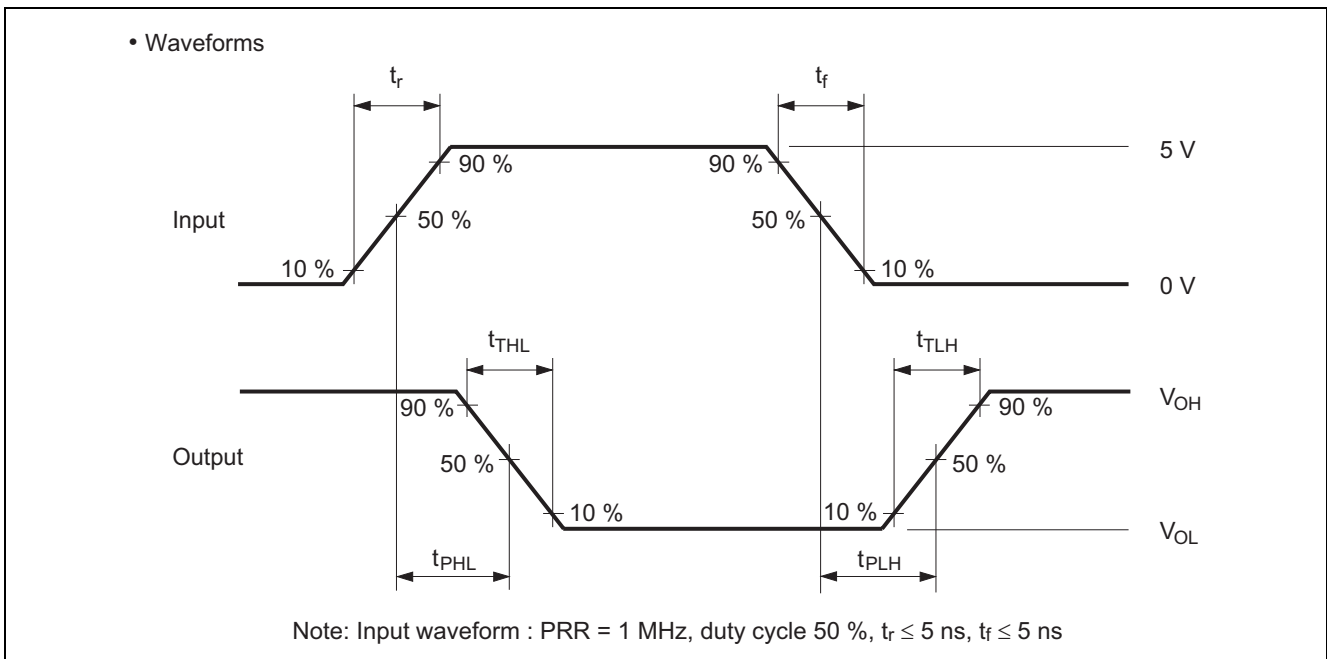
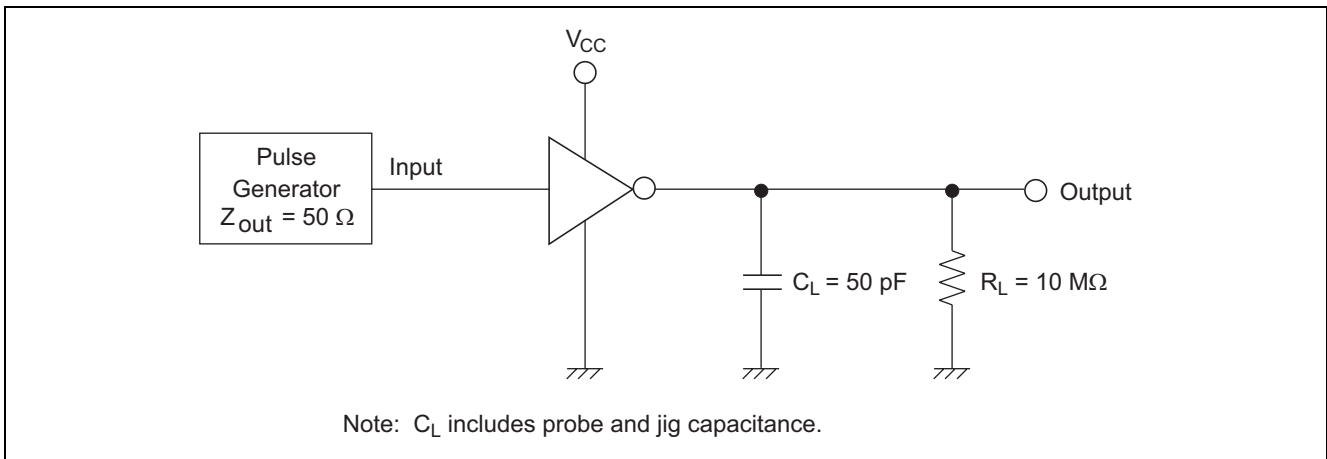
Note: For conditions shown as Min or Max, use the appropriate values under recommended operating conditions.

Switching Characteristics

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

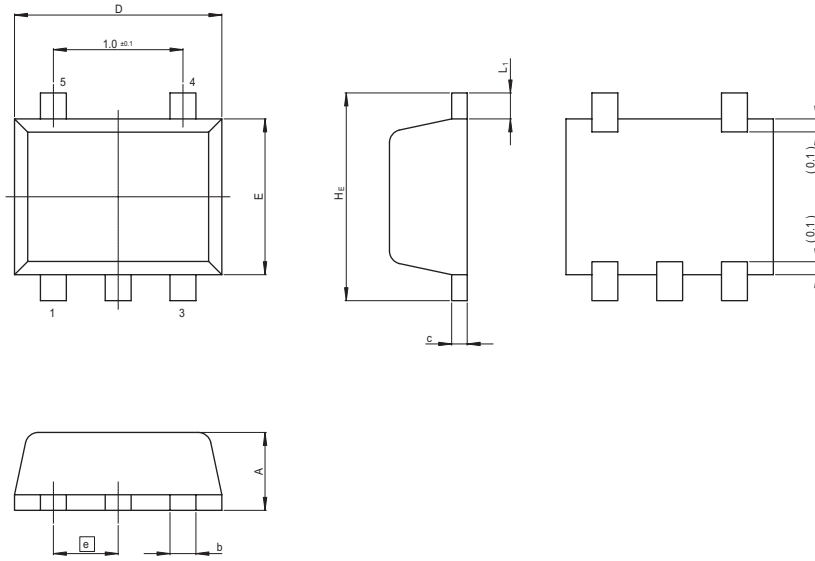
Item	Symbol	Vcc (V)	Ta = -40 to 85°C			Unit	FROM (Input)	TO (Output)
			Min	Typ	Max			
Propagation delay time	$t_{PLH}$ $t_{PHL}$	10	15	—	70	ns	A	$\bar{Y}$
		15	10	—	50			
		20	10	—	40			
		25	10	—	35			
		30	9	—	35			
Output rise / fall time	$t_{TLH}$ $t_{THL}$	10	8	—	30	ns	A	$\bar{Y}$
		15	7	—	25			
		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 <sub>1</sub>	—	—	—
A <sub>2</sub>	—	—	—
b	0.15	0.2	0.3
b <sub>1</sub>	—	—	—
Ⓢ	—	0.5	—
L <sub>p</sub>	—	—	—
x	—	—	—
y	—	—	—
Z <sub>D</sub>	—	—	—
c	0.07	0.12	0.22
c <sub>1</sub>	—	—	—
H <sub>E</sub>	1.55	1.6	1.65
L <sub>1</sub>	—	0.2	—

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