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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RD74HV1G04

High–Voltage Single Inverter Buffer

REJ03D0887-0200
Rev.2.00
Jul 27, 2009

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.

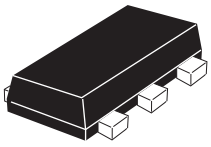
Features

- 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.) = ±70 mA (@V_{CC} = 15 V)
- Ordering Information

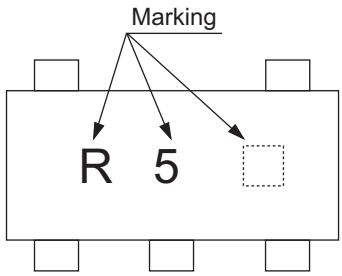
Part Name	Package Type	Package Code (Previous Code)	Package Abbreviation	Packing Abbreviation (Quantity)	Surface Treatment
RD74HV1G04VSH1	VSON-5 pin	PUSN0005KA-A (TNP-5DV)	VS	H (3,000 pcs/reel)	1 (Sn-Bi)

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.

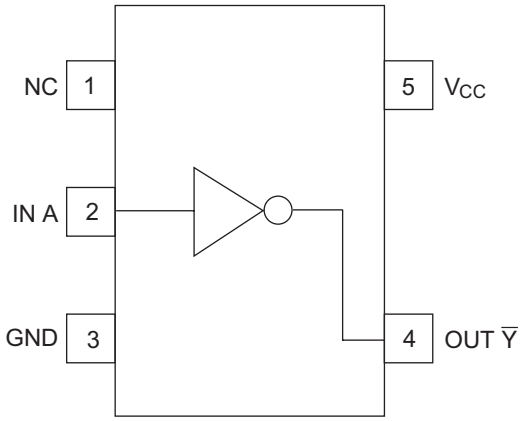
Function Table

Input A	Output $\overline{Y}$
H	**L**
L	H

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	—	—	1	mA	V_{CC} = 10 V , VIN = 4.5 V
		30	—	—	5		V_{CC} = 30 V , VIN = 4.5 V
Input capacitance	C_{IN}	V_{CC}	—	2.5	—	pF	V_{IN} = V_{CC} or GND

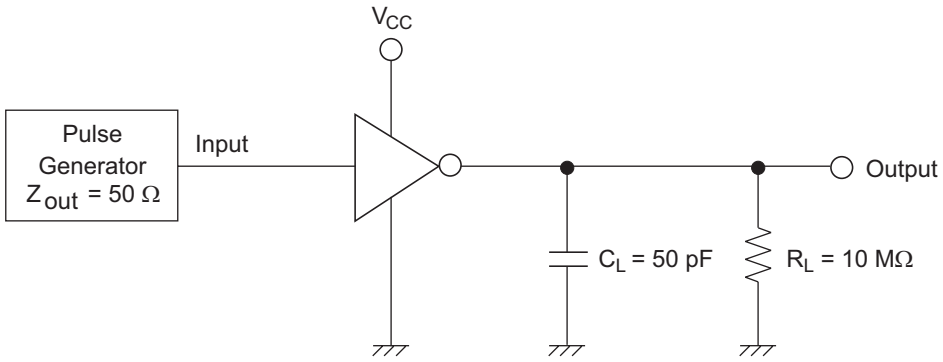
Note: For conditions shown as Min or Max, use the appropriate values under recommended operating conditions.

Switching Characteristics

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

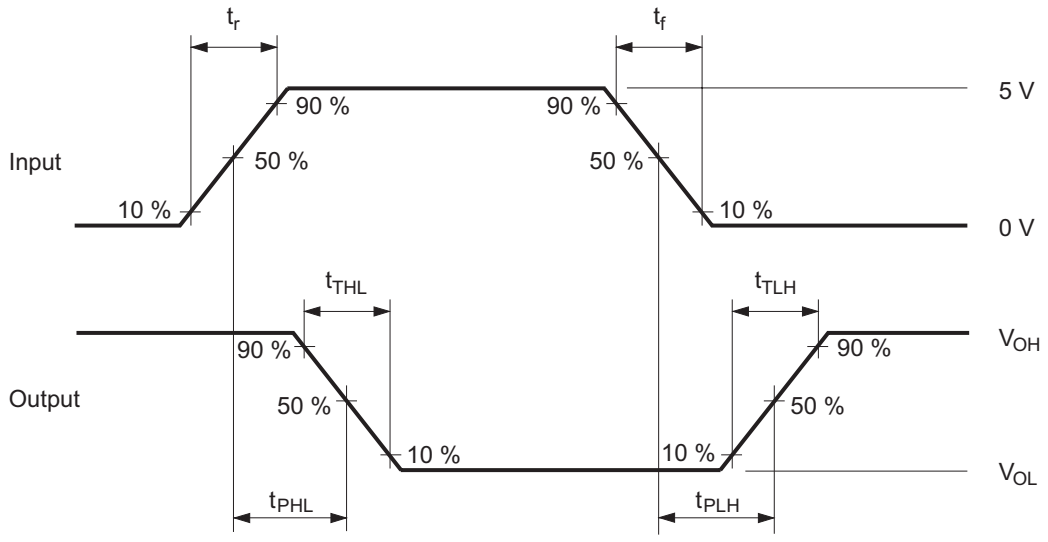
Item	Symbol	Vcc (V)	Ta = –40 to 85°C			Unit	FROM (Input)	TO (Output)
			Min	Typ	Max			
Propagation delay time	t_{PLH} t_{PHL}	10	15	—	70	ns	A	$\overline{Y}$
		15	10	—	50			
		20	10	—	40			
		25	10	—	35			
		30	9	—	35			
Output rise / fall time	t_{TLH} t_{THL}	10	8	—	30	ns	A	$\overline{Y}$
		15	7	—	25			
		20	6	—	20			
		25	5	—	17			
		30	5	—	15			

Test Circuit



Note: C_L includes probe and jig capacitance.

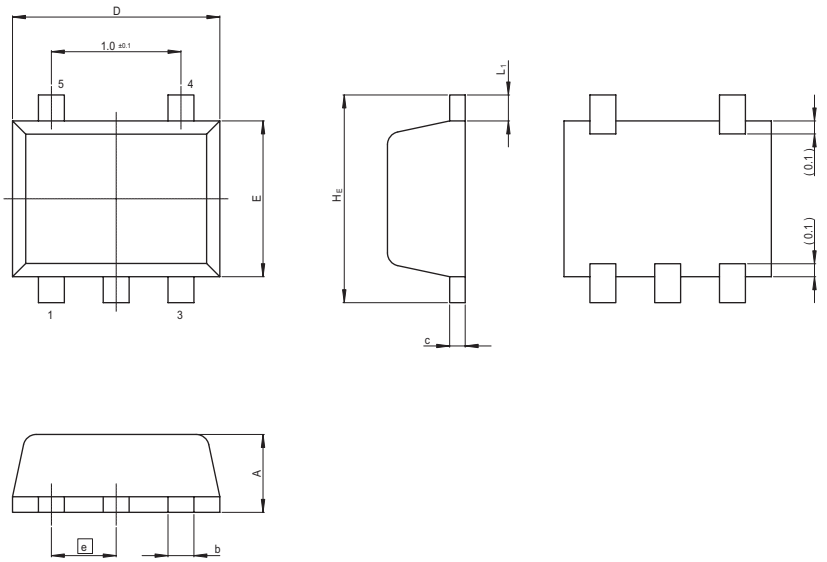
Waveform



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	—

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Colophon .7.2