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April 1st, 2010
Renesas Electronics Corporation

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

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HD74LV2GU04A

Triple Unbuffered Inverters

REJ03D0089–0300Z
(Previous ADE-205-341B (Z))
Rev.3.00
Sep.22.2003

Description

The HD74LV2GU04A has triple unbuffered inverters in a 8 pin package. Low voltage and high-speed operation is suitable for the battery powered products (e.g., notebook computers), and the low power consumption extends the battery life.

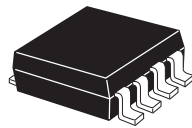
Features

- The basic gate function is lined up as Renesas uni logic series.
- Supplied on emboss taping for high-speed automatic mounting.
- Electrical characteristics equivalent to the HD74LVU04A
Supply voltage range : 1.65 to 5.5 V
Operating temperature range : –40 to +85°C
- All inputs V_{IH} (Max.) = 5.5 V (@ V_{CC} = 0 V to 5.5 V)
All outputs V_O (Max.) = 5.5 V (@ V_{CC} = 0 V)
- Output current ± 6 mA (@ V_{CC} = 3.0 V to 3.6 V), ± 12 mA (@ V_{CC} = 4.5 V to 5.5 V)
- Ordering Information

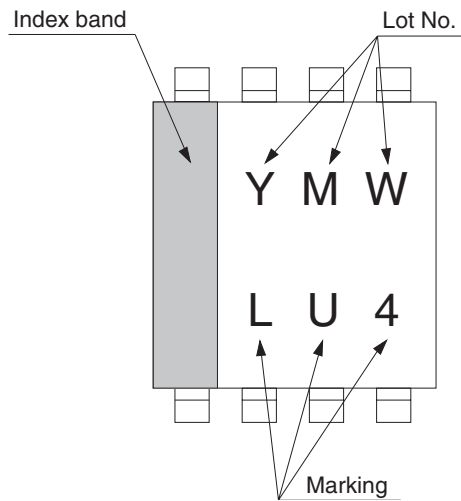
Part Name	Package Type	Package Code	Package Abbreviation	Taping Abbreviation (Quantity)
HD74LV2GU04AUSE	SSOP-8 pin	TTP-8DBV	US	E (3,000 pcs/reel)

Outline and Article Indication

- HD74LV2GU04A



SSOP-8



Y : Year code
(the last digit of year)
M : Month code
W : Week code

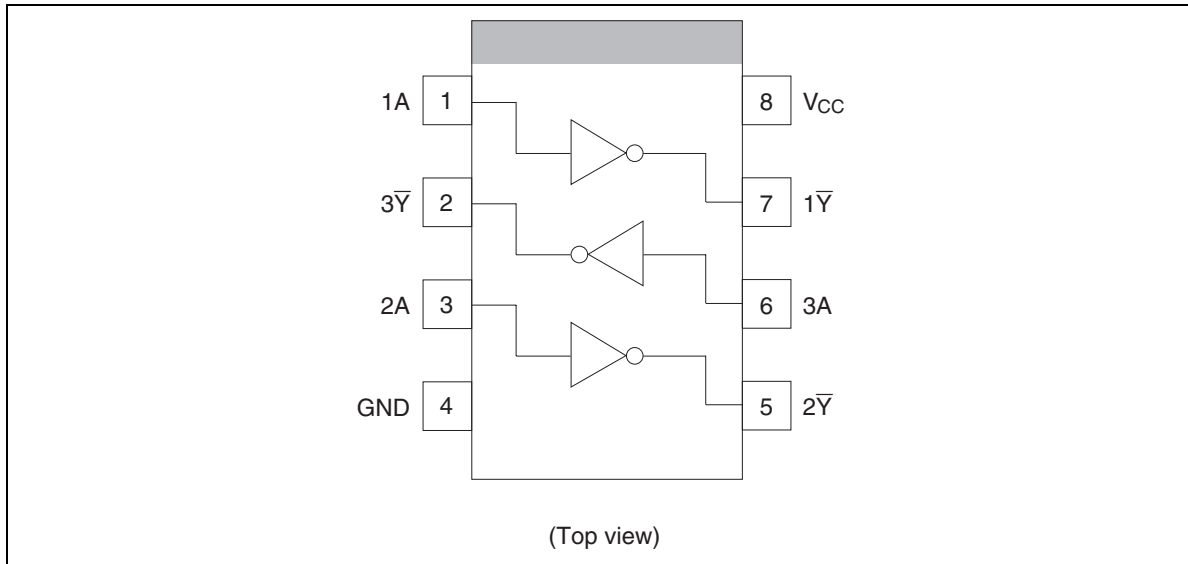
Function Table

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}	-0.5 to 7.0	V	
Input voltage range ^{*1}	V_I	-0.5 to 7.0	V	
Output voltage range ^{*1, 2}	V_O	-0.5 to $V_{CC} + 0.5$	V	Output : H or L
Input clamp current	I_{IK}	-20	mA	$V_I < 0$
Output clamp current	I_{OK}	± 50	mA	$V_O < 0$ or $V_O > V_{CC}$
Continuous output current	I_O	± 25	mA	$V_O = 0$ to V_{CC}
Continuous current through V_{CC} or GND	I_{CC} or I_{GND}	± 50	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 5.5 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}	1.65	5.5	V	
Input voltage range	V_I	0	5.5	V	
Output voltage range	V_O	0	V_{CC}	V	
Output current	I_{OL}	—	1	mA	$V_{CC} = 1.65$ to 1.95 V
		—	2		$V_{CC} = 2.3$ to 2.7 V
		—	6		$V_{CC} = 3.0$ to 3.6 V
		—	12		$V_{CC} = 4.5$ to 5.5 V
	I_{OH}	—	–1		$V_{CC} = 1.65$ to 1.95 V
		—	–2		$V_{CC} = 2.3$ to 2.7 V
		—	–6		$V_{CC} = 3.0$ to 3.6 V
		—	–12		$V_{CC} = 4.5$ to 5.5 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°C

Item	Symbol	V_{CC} (V) *	Min	Typ	Max	Unit	Test condition
Input voltage	V_{IH}	1.65 to 1.95	$V_{CC} \times 0.85$	—	—	V	
		2.3 to 2.7	$V_{CC} \times 0.8$	—	—		
		3.0 to 3.6	$V_{CC} \times 0.8$	—	—		
		4.5 to 5.5	$V_{CC} \times 0.8$	—	—		
	V_{IL}	1.65 to 1.95	—	—	$V_{CC} \times 0.15$		
		2.3 to 2.7	—	—	$V_{CC} \times 0.2$		
		3.0 to 3.6	—	—	$V_{CC} \times 0.2$		
		4.5 to 5.5	—	—	$V_{CC} \times 0.2$		
Output voltage	V_{OH}	Min to Max	$V_{CC} - 0.1$	—	—	V	$I_{OH} = -50 \mu\text{A}$
		1.65	1.4	—	—		$I_{OH} = -1 \text{ mA}$
		2.3	2.0	—	—		$I_{OH} = -2 \text{ mA}$
		3.0	2.48	—	—		$I_{OH} = -6 \text{ mA}$
		4.5	3.8	—	—		$I_{OH} = -12 \text{ mA}$
	V_{OL}	Min to Max	—	—	0.1		$I_{OL} = 50 \mu\text{A}$
		1.65	—	—	0.3		$I_{OL} = 1 \text{ mA}$
		2.3	—	—	0.4		$I_{OL} = 2 \text{ mA}$
		3.0	—	—	0.44		$I_{OL} = 6 \text{ mA}$
		4.5	—	—	0.55		$I_{OL} = 12 \text{ mA}$
Input current	I_{IN}	0 to 5.5	—	—	± 1	μA	$V_{IN} = 5.5 \text{ V or GND}$
Quiescent supply current	I_{CC}	5.5	—	—	10	μA	$V_{IN} = V_{CC} \text{ or GND, } I_O = 0$
Input capacitance	C_{IN}	3.3	—	4.0	—	pF	$V_{IN} = V_{CC} \text{ or GND}$

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

Switching Characteristics

- $V_{CC} = 1.8 \pm 0.15 \text{ V}$

Item	Symbol	$T_a = 25^\circ\text{C}$			$T_a = -40 \text{ to } 85^\circ\text{C}$		Unit	Test Conditions	FROM (Input)	TO (Output)
		Min	Typ	Max	Min	Max				
Propagation delay time	t_{PLH}	—	8.0	15.0	1.0	18.0	ns	$C_L = 15 \text{ pF}$	A	$\bar{Y}$
	t_{PHL}	—	15.2	24.0	1.0	27.0		$C_L = 50 \text{ pF}$		

- $V_{CC} = 2.5 \pm 0.2 \text{ V}$

Item	Symbol	$T_a = 25^\circ\text{C}$			$T_a = -40 \text{ to } 85^\circ\text{C}$		Unit	Test Conditions	FROM (Input)	TO (Output)
		Min	Typ	Max	Min	Max				
Propagation delay time	t_{PLH}	—	6.0	10.9	1.0	14.0	ns	$C_L = 15 \text{ pF}$	A	$\bar{Y}$
	t_{PHL}	—	9.5	13.4	1.0	16.0		$C_L = 50 \text{ pF}$		

- $V_{CC} = 3.3 \pm 0.3 \text{ V}$

Item	Symbol	$T_a = 25^\circ\text{C}$			$T_a = -40 \text{ to } 85^\circ\text{C}$		Unit	Test Conditions	FROM (Input)	TO (Output)
		Min	Typ	Max	Min	Max				
Propagation delay time	t_{PLH}	—	5.0	8.9	1.0	10.5	ns	$C_L = 15 \text{ pF}$	A	$\bar{Y}$
	t_{PHL}	—	7.5	11.4	1.0	13.0		$C_L = 50 \text{ pF}$		

- $V_{CC} = 5.0 \pm 0.5 \text{ V}$

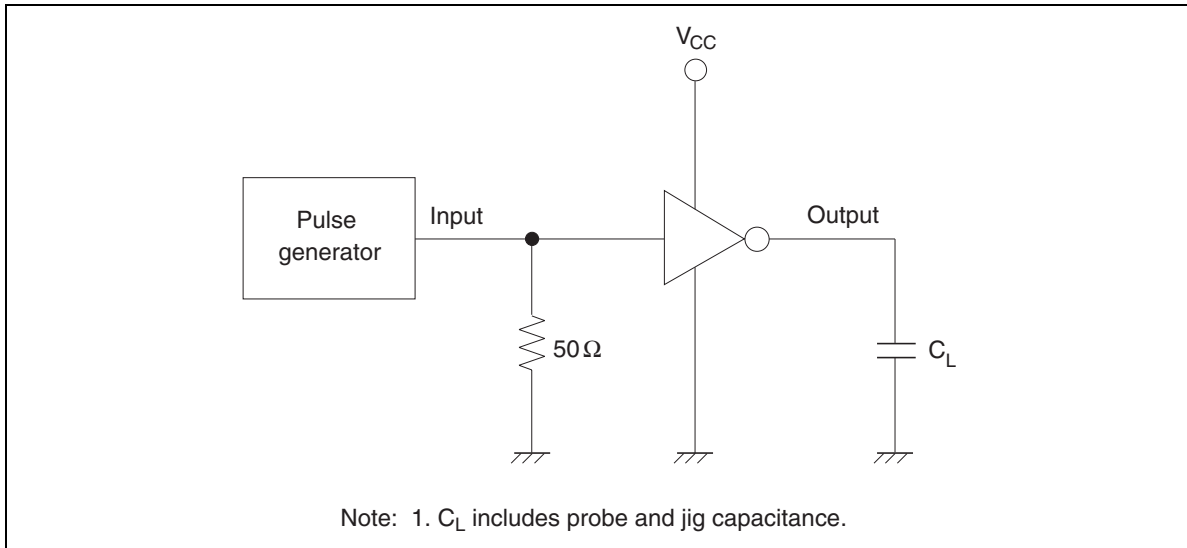
Item	Symbol	$T_a = 25^\circ\text{C}$			$T_a = -40 \text{ to } 85^\circ\text{C}$		Unit	Test Conditions	FROM (Input)	TO (Output)
		Min	Typ	Max	Min	Max				
Propagation delay time	t_{PLH}	—	3.5	5.5	1.0	6.5	ns	$C_L = 15 \text{ pF}$	A	$\bar{Y}$
	t_{PHL}	—	5.0	7.0	1.0	8.0		$C_L = 50 \text{ pF}$		

Operating Characteristics

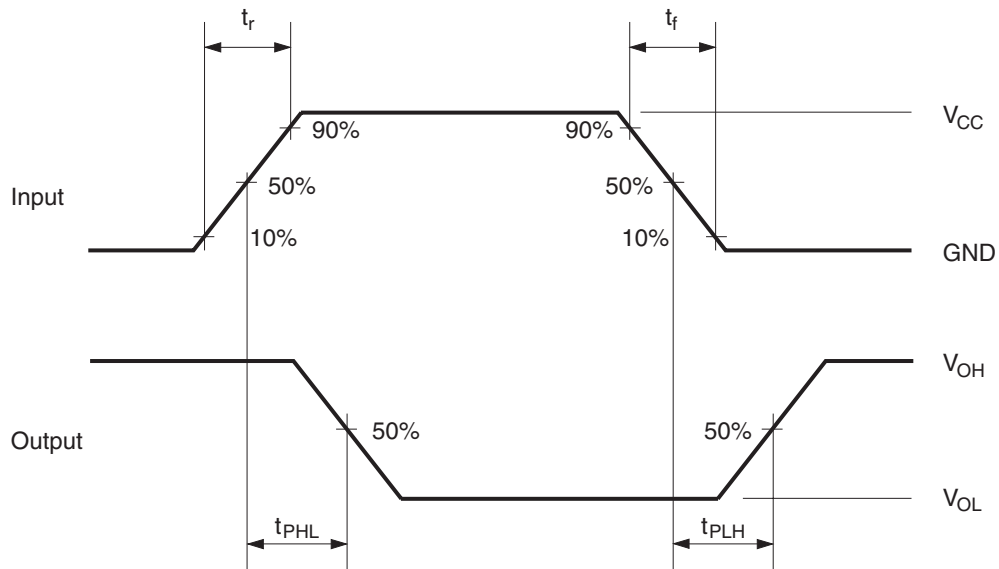
- $C_L = 50 \text{ pF}$

Item	Symbol	$V_{CC} \text{ (V)}$	$T_a = 25^\circ\text{C}$			Unit	Test Conditions
			Min	Typ	Max		
Power dissipation capacitance	C_{PD}	3.3	—	4.0	—	pF	$f = 10 \text{ MHz}$
		5.0	—	5.0	—		

Test Circuit

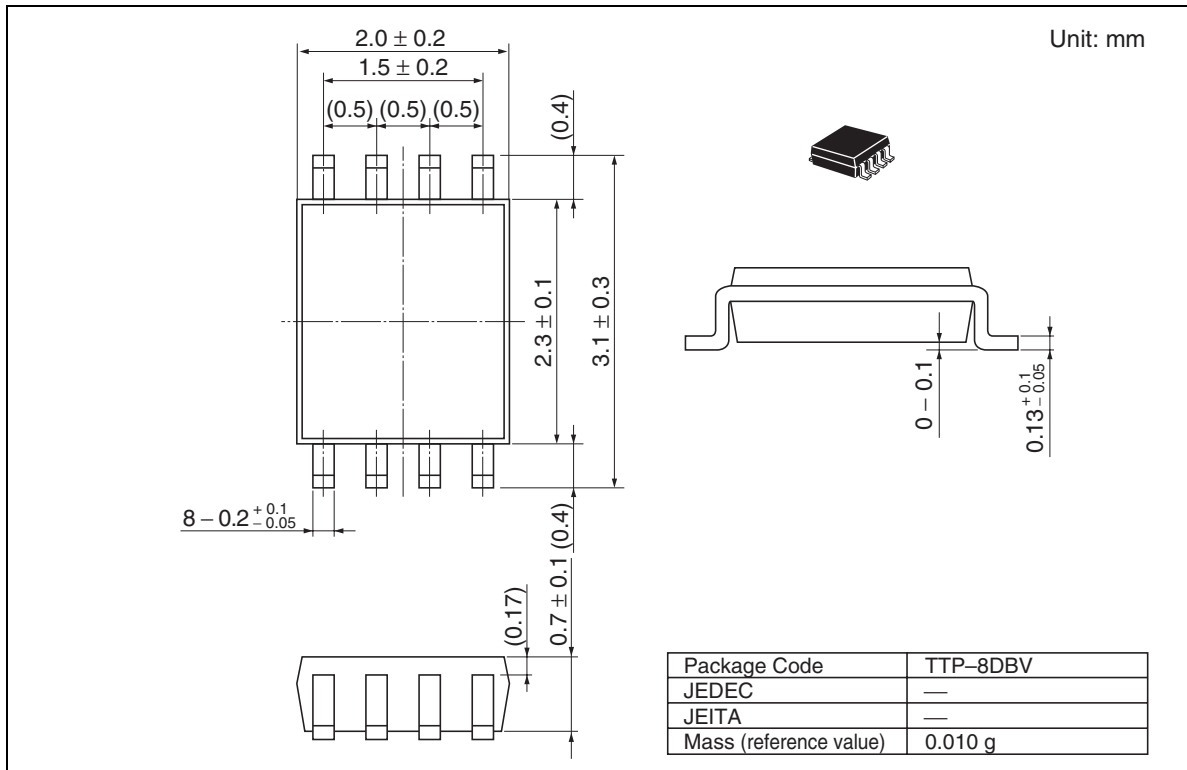


• Waveforms



- Notes: 1. Input waveform : $PRR \leq 1 \text{ MHz}$, $Z_o = 50 \Omega$, $t_r \leq 3 \text{ ns}$, $t_f \leq 3 \text{ ns}$.
 2. The output are measured one at a time with one transition per measurement.

Package Dimensions



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