To all our customers

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Renesas Technology Corp.
Customer Support Dept.
April 1, 2003

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HD74LV2GU04A

Triple Unbuffered Inverters

ADE-205-341B (Z)

Rev.2
Feb. 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.

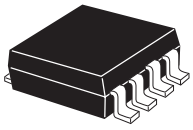
Features

- The basic gate function is lined up as hitachi 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

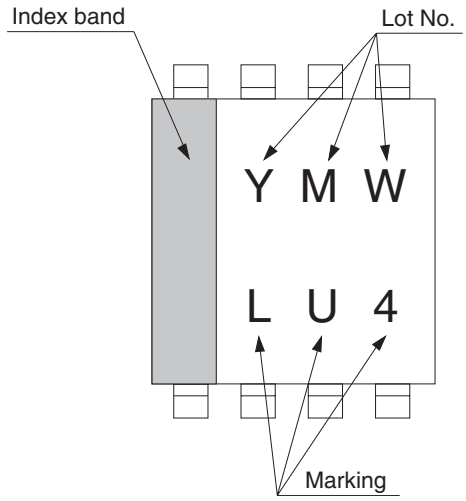
Part Name	Package Type	Package Code	Package Abbreviation	Taping Abbreviation (Quantity)
HD74LV2GU04AUSE	SSOP-8 pin	TTP-8DBV	US	E (3,000 pcs/reel)

Outline and Article Indication

• HD74LV2GU04A



SSOP-8



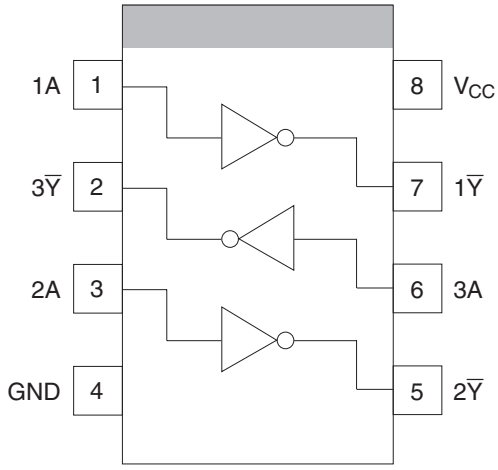
Y : Year code
(the last digit of year)
M : Month code
W : Week code

Function Table

Input A	Output $\overline{Y}$
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}	–0.5 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 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 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

- Ta = –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}×0.85	—	—	V	
		2.3 to 2.7	V_{CC}×0.8	—	—		
		3.0 to 3.6	V_{CC}×0.8	—	—		
		4.5 to 5.5	V_{CC}×0.8	—	—		
	V_{IL}	1.65 to 1.95	—	—	V_{CC}×0.15		
		2.3 to 2.7	—	—	V_{CC}×0.2		
		3.0 to 3.6	—	—	V_{CC}×0.2		
		4.5 to 5.5	—	—	V_{CC}×0.2		
Output voltage	V_{OH}	Min to Max	V_{CC}–0.1	—	—	V	I_{OH} = –50 μA
		1.65	1.4	—	—		I_{OH} = –1 mA
		2.3	2.0	—	—		I_{OH} = –2 mA
		3.0	2.48	—	—		I_{OH} = –6 mA
		4.5	3.8	—	—		I_{OH} = –12 mA
	V_{OL}	Min to Max	—	—	0.1		I_{OL} = 50 μA
		1.65	—	—	0.3		I_{OL} = 1 mA
		2.3	—	—	0.4		I_{OL} = 2 mA
		3.0	—	—	0.44		I_{OL} = 6 mA
		4.5	—	—	0.55		I_{OL} = 12 mA
Input current	I_{IN}	0 to 5.5	—	—	±1	μA	V_{IN} = 5.5 V or GND
Quiescent supply current	I_{CC}	5.5	—	—	10	μA	V_{IN} = V_{CC} or GND, I_O = 0
Input capacitance	C_{IN}	3.3	—	4.0	—	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

- V_{CC} = 1.8 ± 0.15 V

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

- V_{CC} = 2.5 ± 0.2 V

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

- V_{CC} = 3.3 ± 0.3 V

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

- V_{CC} = 5.0 ± 0.5 V

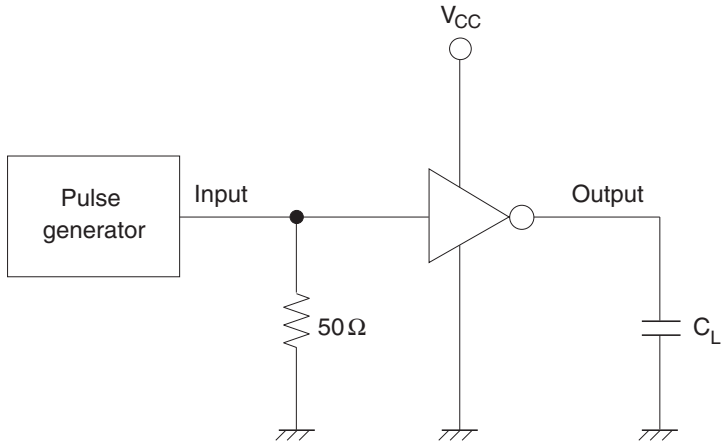
Item	Symbol	T_a = 25°C			T_a = –40 to 85°C		Unit	Test Conditions	FROM (Input)	TO (Output)
		Min	Typ	Max	Min	Max				
Propagation	t_{PLH}	—	3.5	5.5	1.0	6.5	ns	C_L = 15 pF	A	$\overline{Y}$
delay time	t_{PHL}	—	5.0	7.0	1.0	8.0		C_L = 50 pF		

Operating Characteristics

- C_L = 50 pF

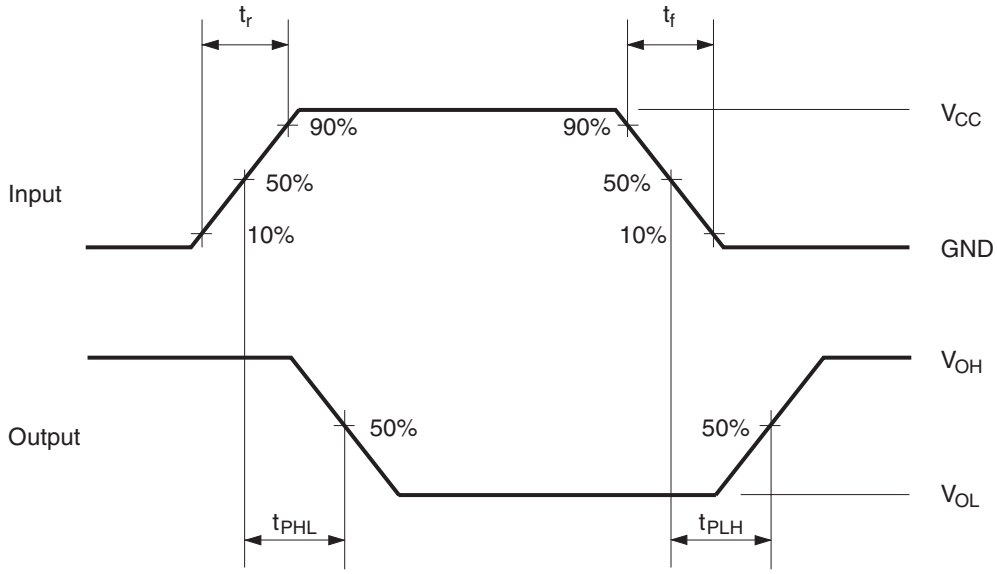
Item	Symbol	V_{cc} (V)	T_a = 25°C			Unit	Test Conditions
			Min	Typ	Max		
Power dissipation	C_{PD}	3.3	—	4.0	—	pF	f = 10 MHz
capacitance		5.0	—	5.0	—		

Test Circuit



Note: 1. C_L includes probe and jig capacitance.

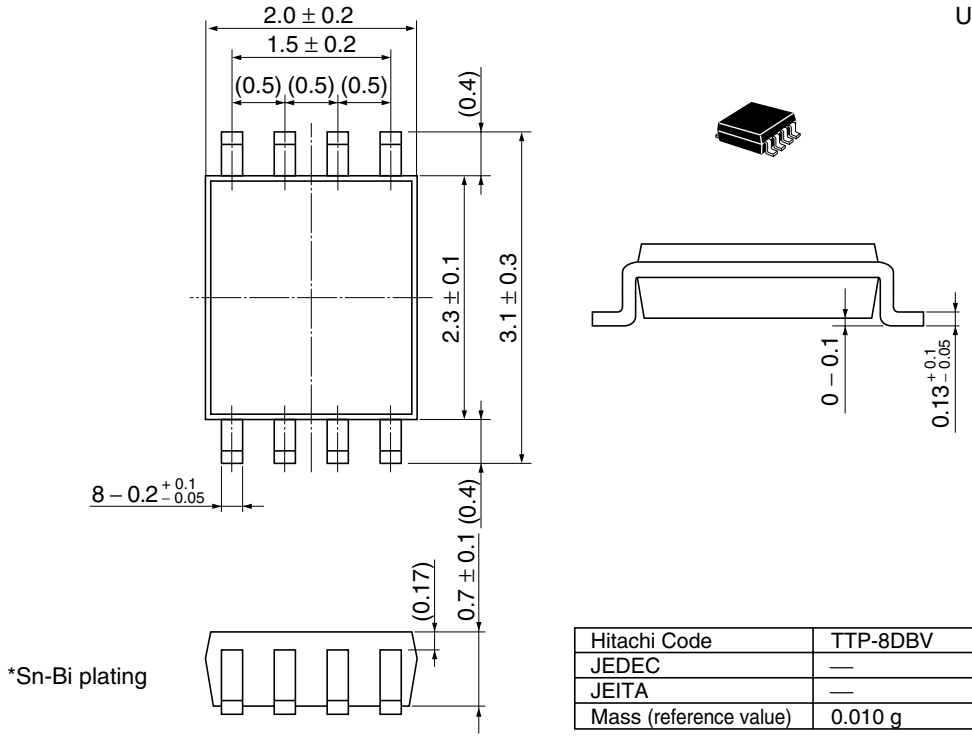
• **Waveforms**



Notes: 1. Input waveform : PRR ≤ 1 MHz, Zo = 50 Ω, t_r ≤ 3 ns, t_f ≤ 3 ns.
2. The output are measured one at a time with one transition per measurement.

Package Dimensions

Unit: mm



Hitachi Code	TTP-8DBV
JEDEC	—
JEITA	—
Mass (reference value)	0.010 g

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