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

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# HD74LV2GT86A

## 2-input Exclusive-OR Gate



ADE-205-669A (Z)

Rev. 1  
Feb. 2003

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### Description

The HD74LV2GT86A performs the Boolean functions  $Y = A \oplus B$  or  $Y = \bar{A}B + A\bar{B}$  in positive logic. A common application is as a true / complement element. If one of the inputs is low, the other input will be reproduced in true form at the output. If one of the inputs is high, the signal on the other input will be reproduced inverted form at the output. 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

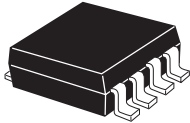
- The basic gate function is lined up as hitachi uni logic series.
- Supplied on emboss taping for high speed automatic mounting.
- TTL compatible input level.  
Supply voltage range : 4.5 to 5.5 V  
Operating temperature range : -40 to +85°C
- All inputs  $V_{IH}$  (Max.) = 5.5 V (@  $V_{CC} = 0$  V to 5.5 V)  
All outputs  $V_o$  (Max.) = 5.5 V (@  $V_{CC} = 0$  V)
- Output current  $\pm 12$  mA (@  $V_{CC} = 4.5$  V to 5.5 V)
- All the logical input has hysteresis voltage for the slow transition.
- Ordering Information

Part Name	Package Type	Package Code	Package Abbreviation	Taping Abbreviation (Quantity)
HD74LV2GT86AUSE	SSOP-8 pin	TTP-8DBV	US	E (3,000 pcs/reel)

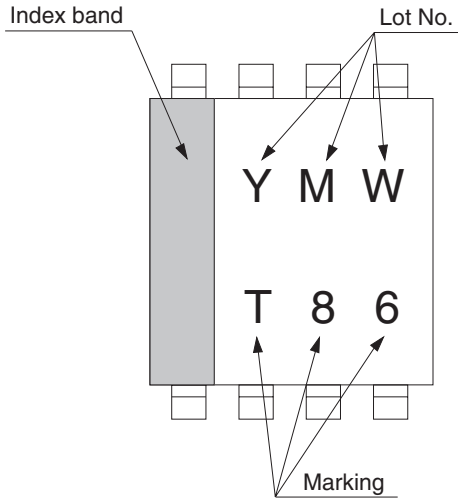
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## Outline and Article Indication

- HD74LV2GT86A



SSOP-8



## Function Table

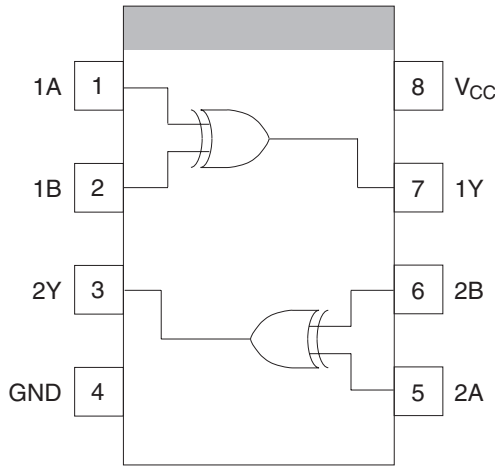
### Inputs

A	B	Output Y
L	L	L
L	H	H
H	L	H
H	H	L

H: High level

L: Low level

Pin Arrangement



(Top view)

Absolute Maximum Ratings

Item	Symbol	Ratings	Unit	Test Conditions
Supply voltage	$V_{CC}$	-0.5 to 7.0	V	
Input voltage	$V_{IN}$	-0.5 to 7.0	V	
Output voltage	$V_{OUT}$	-0.5 to $V_{CC} + 0.5$ -0.5 to 7.0	V	Output : H or L $V_{CC}$ : OFF
Input diode current	$I_{IK}$	-20	mA	
Output diode current	$I_{OK}$	$\pm 50$	mA	
output current	$I_{OUT}$	$\pm 25$	mA	
$V_{CC}$ , GND current	$I_{CC}$ or $I_{GND}$	$\pm 50$	mA	
power dissipation	$P_T$	200	mW	
Storage temperature	Tstg	-65 to 150	$^{\circ}C$	

Recommended Operating Conditions

Item	Symbol	Ratings	Unit
Supply voltage	$V_{CC}$	4.5 to 5.5	V
Input voltage	$V_{IN}$	0 to 5.5	V
Output voltage	$V_{OUT}$	0 to $V_{CC}$	V
Operating temperature	$T_{opr}$	-40 to +85	$^{\circ}C$
Input rise / fall time	$t_{r}$ , $t_{f}$	0 to 20 ( $V_{CC} = 4.5$ to $5.5$ V)	ns

## Electrical Characteristic

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

Item	Symbol	$V_{CC}$ (V) *	Min	Typ	Max	Unit	Test condition
Input voltage	$V_{IH}$	4.5 to 5.5	2.0	—	—	V	
	$V_{IL}$	4.5 to 5.5	—	—	0.8		
Hysteresis voltage	$V_H$	5.0	—	0.15	—	V	$V_T^+ - V_T^-$
Output voltage	$V_{OH}$	Min to Max	$V_{CC}-0.1$	—	—	V	$I_{OH} = -50 \mu\text{A}$
		4.5	3.8	—	—		$I_{OH} = -12 \text{ mA}$
	$V_{OL}$	Min to Max	—	—	0.1		$I_{OL} = 50 \mu\text{A}$
		4.5	—	—	0.55		$I_{OL} = 12 \text{ mA}$
Input current	$I_{IN}$	0 to 5.5	—	—	$\pm 1$	$\mu\text{A}$	$V_{IN} = 5.5 \text{ V}$ or GND
Quiescent supply current	$I_{CC}$	5.5	—	—	10	$\mu\text{A}$	$V_{IN} = V_{CC}$ or GND, $I_O = 0$
	$\Delta I_{CC}$	5.5	—	—	1.5	$\text{mA}$	One input $V_{IN} = 3.4 \text{ V}$ , other input $V_{CC}$ or GND
Output leakage current	$I_{OFF}$	0	—	—	5	$\mu\text{A}$	$V_O = 5.5 \text{ V}$
Input capacitance	$C_{IN}$	5.0	—	2.5	—	$\text{pF}$	$V_{IN} = V_{CC}$ or GND

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

## Switching Characteristics

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

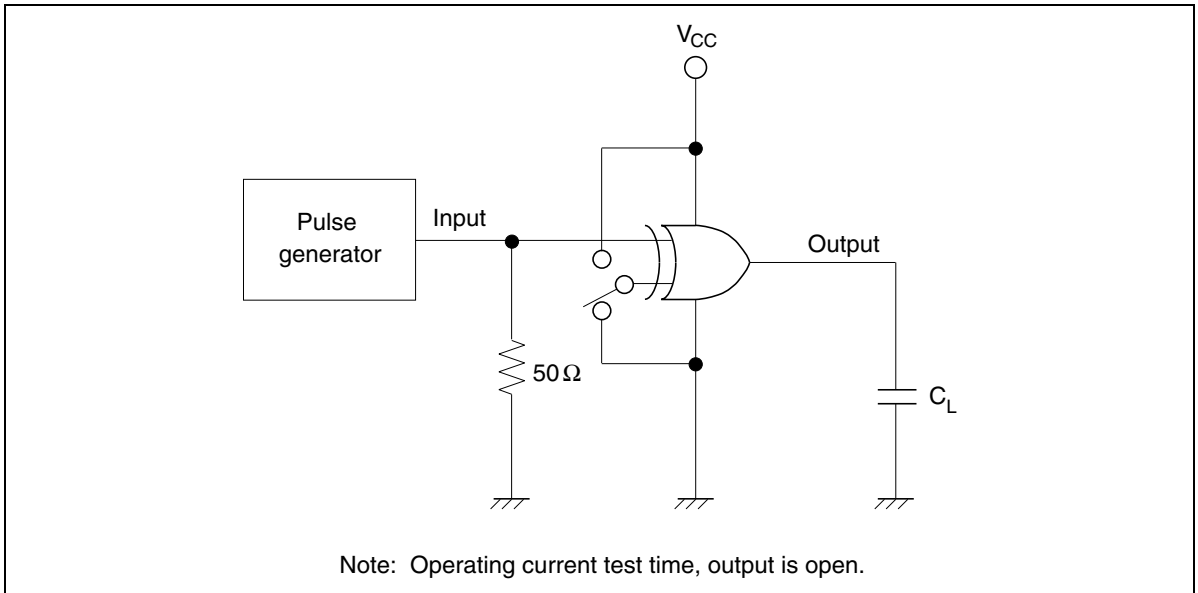
Item	Symbol	$T_a = 25^\circ\text{C}$			$T_a = -40$ to $85^\circ\text{C}$		Unit	Test Conditions	FROM (Input)	TO (Output)
		Min	Typ	Max	Min	Max				
Propagation delay time	$t_{PLH}$	—	5.5	7.5	1.0	8.5	ns	$C_L = 15 \text{ pF}$	A or B	Y
	$t_{PHL}$	—	6.5	10.3	1.0	11.5		$C_L = 50 \text{ pF}$		

## Operating Characteristics

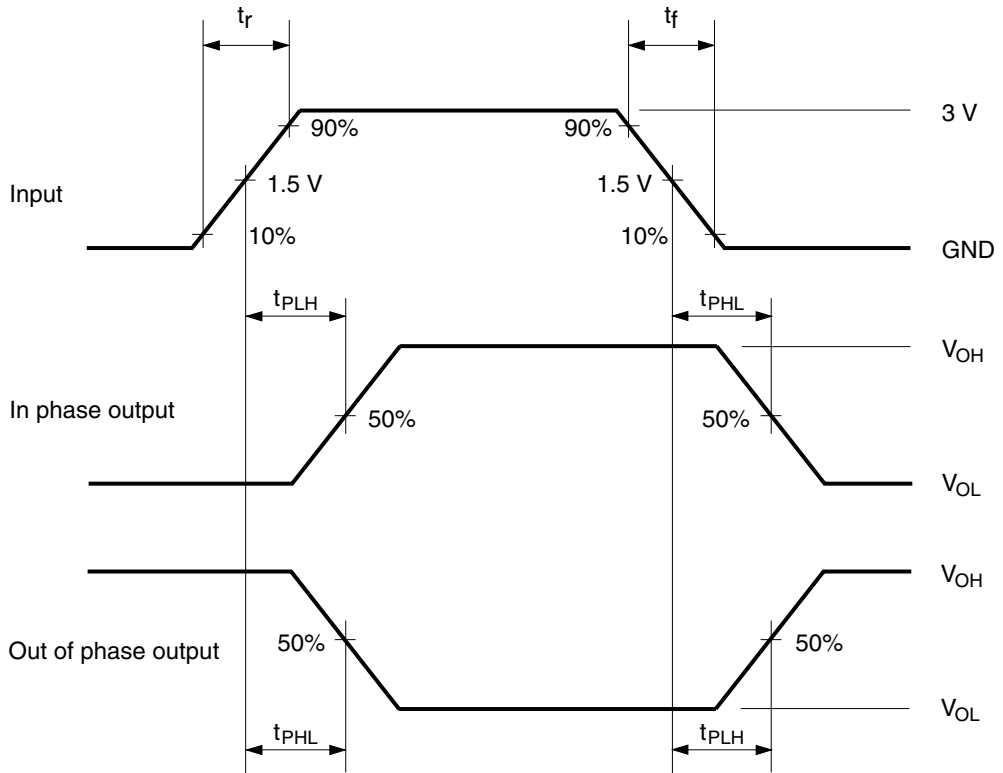
- $C_L = 50 \text{ pF}$

Item	Symbol	$V_{CC}$ (V)	$T_a = 25^\circ\text{C}$			Unit	Test Conditions
			Min	Typ	Max		
Power dissipation capacitance	$C_{PD}$	5.0	—	11.0	—	$\text{pF}$	$f = 10 \text{ MHz}$

## Test Circuit



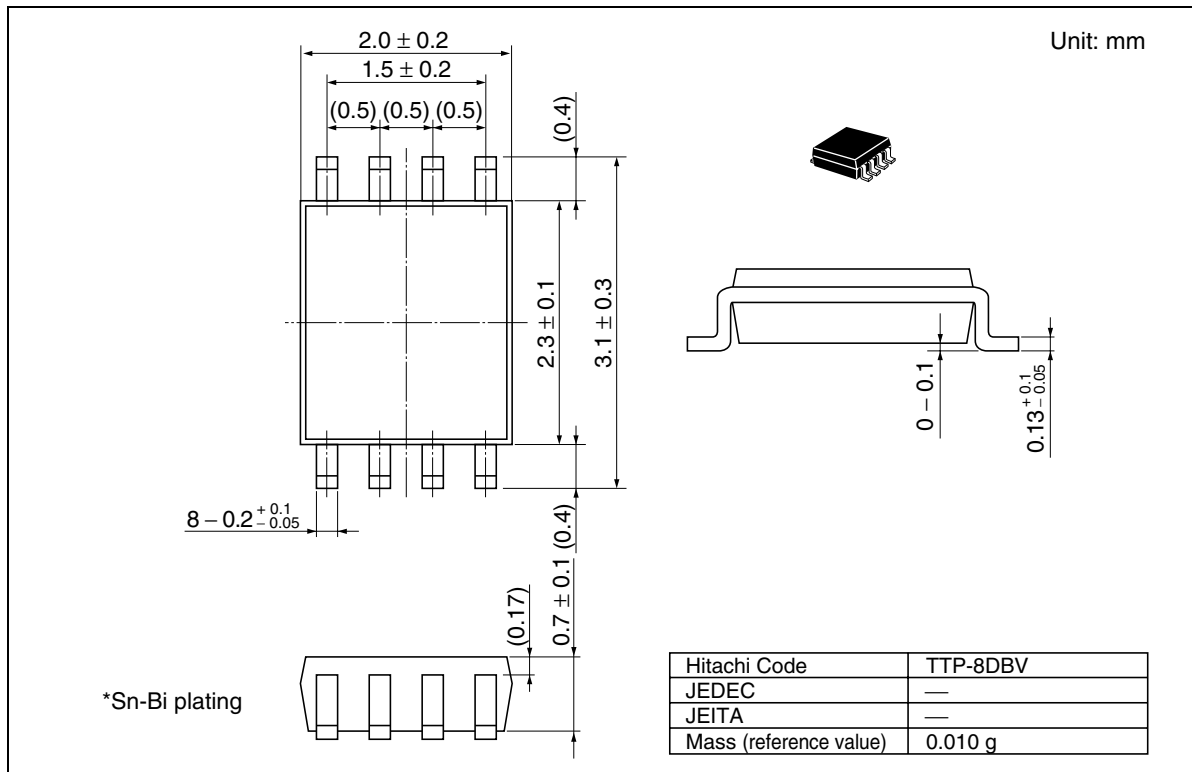
• Waveforms



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



Package Dimensions



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