
HD74LV2G02A

Dual 2–input NOR Gates

HITACHI

ADE-205-339A (Z)

Rev.1
July 2001

Description

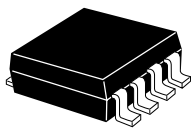
The HD74LV2G02A has dual two–input NOR gates in a 8 pin package. Low voltage and high speed operation is suitable for the battery powered products (e.g., notebook computers), and the low power consumption extends the battery life.

Features

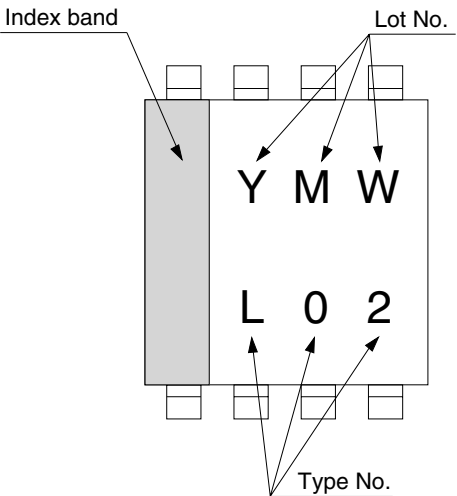
- The basic gate function is lined up as hitachi uni logic series.
- Supplied on emboss taping for high speed automatic mounting.
- Electrical characteristics equivalent to the HD74LV02A
Supply voltage range : 1.65 to 5.5 V
Operating temperature range : –40 to +85°C
- All inputs V_{IH} (Max.) = 5.5 V (@ 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)
- All the logical input has hysteresis voltage for the slow transition.

Outline and Article Indication

• HD74LV2G02A



SSOP-8



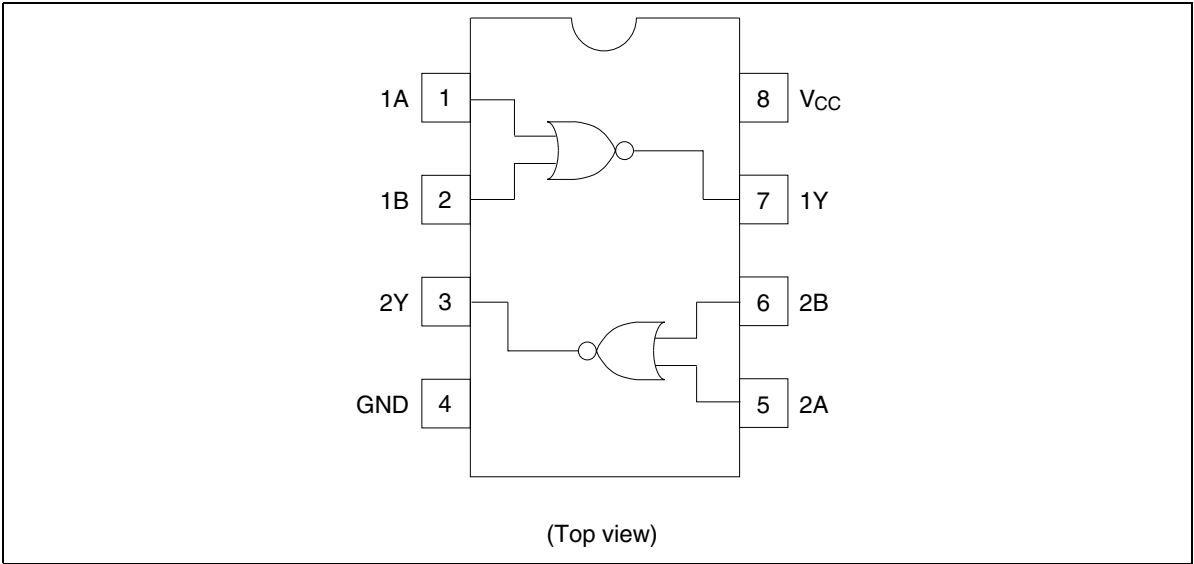
Y : Year code
(the last digit of year)
M : Month code
W : Week code

Function Table

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

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 $V_{CC} + 0.5$ -0.5 to 7.0	V	Output : H or L V_{CC} : OFF
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	Tstg	-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	$V_{cc} = 1.65 \text{ to } 1.95 \text{ V}$
		—	2		$V_{cc} = 2.3 \text{ to } 2.7 \text{ V}$
		—	6		$V_{cc} = 3.0 \text{ to } 3.6 \text{ V}$
		—	12		$V_{cc} = 4.5 \text{ to } 5.5 \text{ V}$
	I_{OH}	—	−1		$V_{cc} = 1.65 \text{ to } 1.95 \text{ V}$
		—	−2		$V_{cc} = 2.3 \text{ to } 2.7 \text{ V}$
		—	−6		$V_{cc} = 3.0 \text{ to } 3.6 \text{ V}$
		—	−12		$V_{cc} = 4.5 \text{ to } 5.5 \text{ V}$
Input transition rise or fall rate	$\Delta t / \Delta v$	0	300	ns / V	$V_{cc} = 1.65 \text{ to } 1.95 \text{ V}$
		0	200		$V_{cc} = 2.3 \text{ to } 2.7 \text{ V}$
		0	100		$V_{cc} = 3.0 \text{ to } 3.6 \text{ V}$
		0	20		$V_{cc} = 4.5 \text{ to } 5.5 \text{ V}$
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°C

Item	Symbol	V_{cc} (V) *	Min	Typ	Max	Unit	Test condition
Input voltage	V_{IH}	1.65 to 1.95	$V_{cc} \times 0.75$	—	—	V	
		2.3 to 2.7	$V_{cc} \times 0.7$	—	—		
		3.0 to 3.6	$V_{cc} \times 0.7$	—	—		
		4.5 to 5.5	$V_{cc} \times 0.7$	—	—		
	V_{IL}	1.65 to 1.95	—	—	$V_{cc} \times 0.25$		
		2.3 to 2.7	—	—	$V_{cc} \times 0.3$		
		3.0 to 3.6	—	—	$V_{cc} \times 0.3$		
		4.5 to 5.5	—	—	$V_{cc} \times 0.3$		
Hysteresis voltage	V_H	1.8	—	0.25	—	V	$V_T^+ - V_T^-$
		2.5	—	0.30	—		
		3.3	—	0.35	—		
		5.0	—	0.45	—		
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	$V_{IN} = V_{CC}$ or GND, $I_O = 0$
Output leakage current	I_{OFF}	0	—	—	5	μA	V_{IN} or $V_O = 0$ to 5.5 V
Input capacitance	C_{IN}	3.3	—	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

• $V_{CC} = 1.8 \pm 0.15\text{ V}$

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 delay time	t _{PLH}	—	14.2	23.3	1.0	26.0	ns	C _L = 15 pF	A or B	Y
	t _{PHL}	—	20.5	33.5	1.0	36.5		C _L = 50 pF		

• $V_{CC} = 2.5 \pm 0.2\text{ V}$

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 delay time	t _{PLH}	—	8.3	12.4	1.0	15.0	ns	C _L = 15 pF	A or B	Y
	t _{PHL}	—	11.0	16.1	1.0	19.0		C _L = 50 pF		

• $V_{CC} = 3.3 \pm 0.3\text{ V}$

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 delay time	t _{PLH}	—	5.6	7.9	1.0	9.5	ns	C _L = 15 pF	A or B	Y
	t _{PHL}	—	7.6	11.4	1.0	13.0		C _L = 50 pF		

• $V_{CC} = 5.0 \pm 0.5\text{ V}$

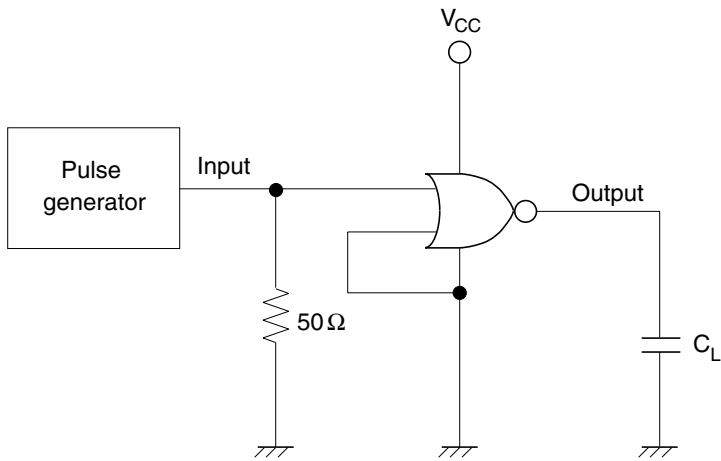
Item	Symbol	T _a = 25°C			T _a = −40 to 85°C		Unit	Test Conditions	FROM (Input)	TO (Output)
		Min	Typ	Max	Min	Max				
Propagation delay time	t _{PLH}	—	3.9	5.5	1.0	6.5	ns	C _L = 15 pF	A or B	Y
	t _{PHL}	—	5.3	7.5	1.0	8.5		C _L = 50 pF		

Operating Characteristics

• C_L = 50 pF

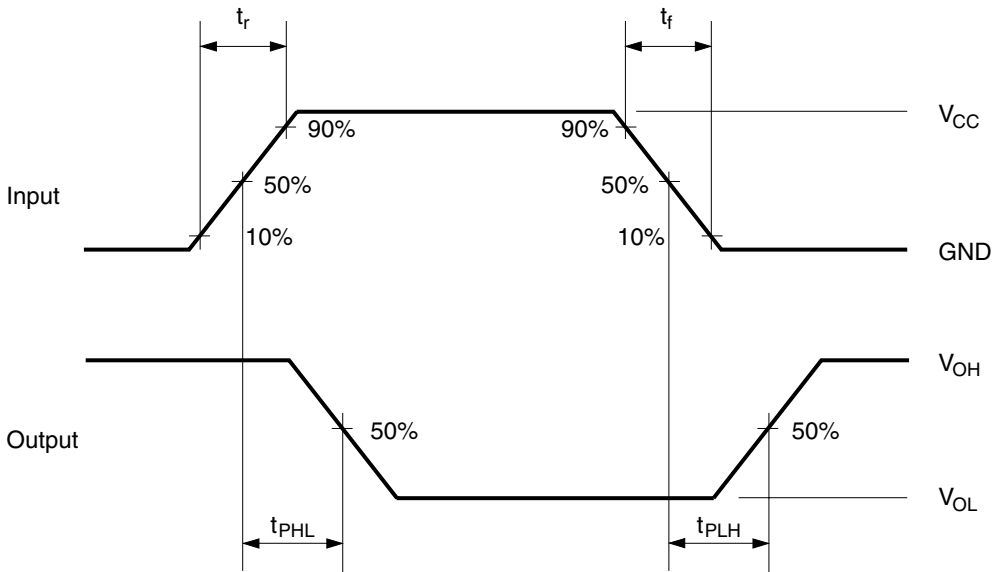
Item	Symbol	V _{CC} (V)	T _a = 25°C			Unit	Test Conditions
			Min	Typ	Max		
Power dissipation capacitance	C _{PD}	3.3	—	8.9	—	pF	f = 10 MHz
		5.0	—	10.3	—		

Test Circuit



Note: 1. C_L includes probe and jig capacitance.

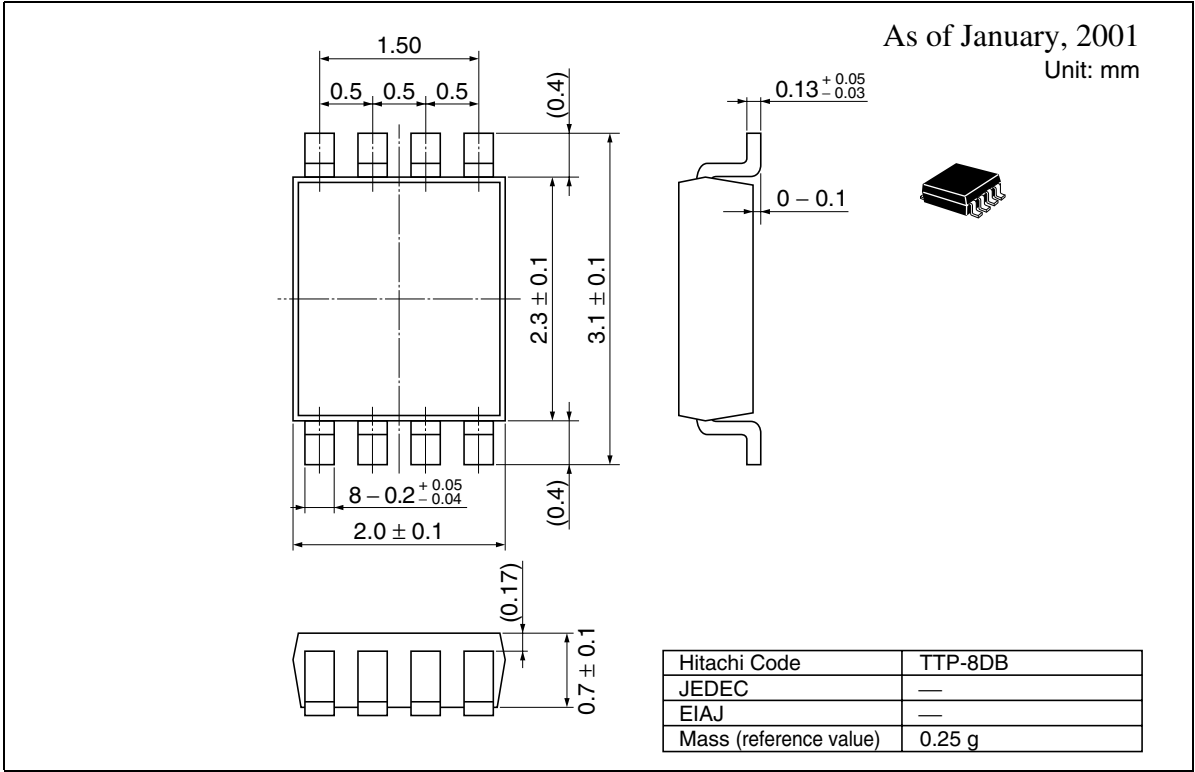
• Waveforms



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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Hitachi, Ltd.

Semiconductor & Integrated Circuits
Nippon Bldg., 2-6-2, Ohte-machi, Chiyoda-ku, Tokyo 100-0004, Japan
Tel: (03) 3270-2111 Fax: (03) 3270-5109

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For further information write to:

Hitachi Semiconductor (America) Inc. 179 East Tasman Drive San Jose, CA 95134 Tel: <1> (408) 433-1990 Fax: <1> (408) 433-0223	Hitachi Europe Ltd. Electronic Components Group Whitebrook Park Lower Cookham Road Maidenhead Berkshire SL6 8YA, United Kingdom Tel: <44> (1628) 585000 Fax: <44> (1628) 585200
	Hitachi Europe GmbH Electronic Components Group Dornacher Straße 3 D-85622 Feldkirchen, Munich Germany Tel: <49> (89) 9 9180-0 Fax: <49> (89) 9 29 30 00

Hitachi Asia Ltd. Hitachi Tower 16 Collyer Quay #20-00 Singapore 049318 Tel: <65>-538-6533/538-8577 Fax: <65>-538-6933/538-3877 URL: http://www.hitachi.com.sg	Hitachi Asia Ltd. (Taipei Branch Office) 4/F, No. 167, Tun Hwa North Road Hung-Kuo Building Taipei (105), Taiwan Tel: <886>-(2)-2718-3666 Fax: <886>-(2)-2718-8180 Telex: 23222 HAS-TP URL: http://www.hitachi.com.tw
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Hitachi Asia (Hong Kong) Ltd. Group III (Electronic Components) 7/F., North Tower World Finance Centre, Harbour City, Canton Road Tsim Sha Tsui, Kowloon Hong Kong Tel: <852>-(2)-735-9218 Fax: <852>-(2)-730-0281 URL: http://semiconductor.hitachi.com.hk

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