
HD74LV1G125A

Bus Buffer Gate with 3–state Output

HITACHI

ADE-205-323C (Z)
4th. Edition
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Description

The HD74LV1G125A has a bus buffer gate with 3–state output in a 5 pin package. Output is disabled when the associated output enable (\overline{OE}) input is high. To ensure the high impedance state during power up or power down, \overline{OE} should be connected to V_{CC} through a pull-down resistor; the minimum value of the resistor is determined by the current sourcing capability of the driver. 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.

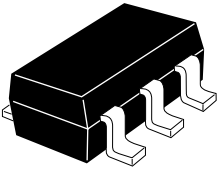
Features

- 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 HD74LV125A
Supply voltage range : 1.65 to 5.5 V
Operating temperature range : -40 to $+85^{\circ}\text{C}$
- 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 : Z)
- 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.

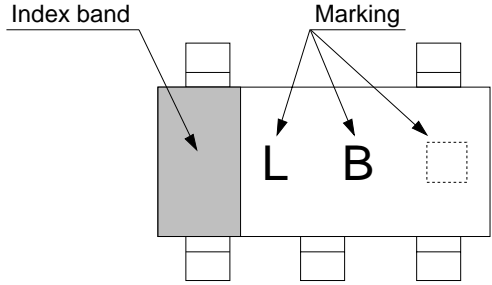
HD74LV1G125A

Outline and Article Indication

- HD74LV1G125A

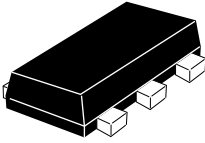


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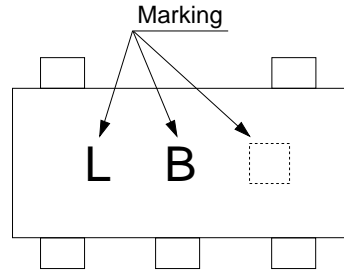


□ = Control code
(— or blank)

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VSON-5



□ = Control code

Function Table

Inputs		Output Y
\overline{OE}	A	
L	H	H
L	L	L
H	X	Z

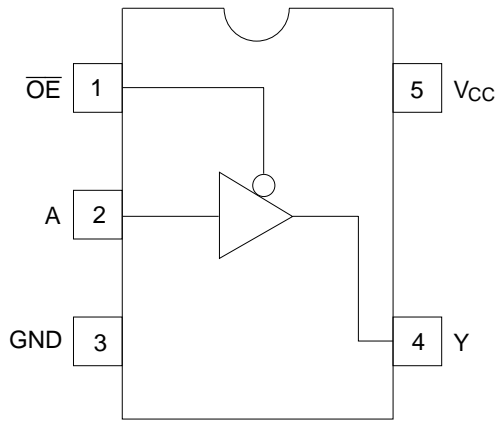
H : High level

L : Low level

X : Immaterial

Z : High impedance

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 $V_{CC} + 0.5$ -0.5 to 7.0	V	Output : H or L V_{CC} : OFF or Output : Z
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	
		0	5.5		Output : Z
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
Input transition rise or fall rate	$\Delta t / \Delta v$	0	300	ns / V	$V_{CC} = 1.65$ to 1.95 V
		0	200		$V_{CC} = 2.3$ to 2.7 V
		0	100		$V_{CC} = 3.0$ to 3.6 V
		0	20		$V_{CC} = 4.5$ 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} ×0.75	—	—	V	
		2.3 to 2.7	V _{CC} ×0.7	—	—		
		3.0 to 3.6	V _{CC} ×0.7	—	—		
		4.5 to 5.5	V _{CC} ×0.7	—	—		
	V _{IL}	1.65 to 1.95	—	—	V _{CC} ×0.25		
		2.3 to 2.7	—	—	V _{CC} ×0.3		
		3.0 to 3.6	—	—	V _{CC} ×0.3		
		4.5 to 5.5	—	—	V _{CC} ×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 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
Off state output current	I _{OZ}	Min to Max	—	—	±5	μA	V _O = 5.5 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	—	3.0	—	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

• $V_{CC} = 1.8 \pm 0.15 \text{ V}$

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}	—	13.5	23.5	1.0	26.0	ns	$C_L = 15 \text{ pF}$	A	Y
	t_{PHL}	—	19.0	33.0	1.0	36.0		$C_L = 50 \text{ pF}$		
Enable time	t_{ZH}	—	13.7	26.5	1.0	29.0	ns	$C_L = 15 \text{ pF}$	\overline{OE}	Y
	t_{ZL}	—	20.5	36.0	1.0	38.0		$C_L = 50 \text{ pF}$		
Disable time	t_{HZ}	—	8.3	20.0	1.0	22.5	ns	$C_L = 15 \text{ pF}$	\overline{OE}	Y
	t_{LZ}	—	13.0	29.5	1.0	32.0		$C_L = 50 \text{ pF}$		

• $V_{CC} = 2.5 \pm 0.2 \text{ V}$

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}	—	6.8	13.0	1.0	15.5	ns	$C_L = 15 \text{ pF}$	A	Y
	t_{PHL}	—	8.7	16.5	1.0	18.5		$C_L = 50 \text{ pF}$		
Enable time	t_{ZH}	—	7.0	13.0	1.0	15.5	ns	$C_L = 15 \text{ pF}$	\overline{OE}	Y
	t_{ZL}	—	8.8	16.5	1.0	18.5		$C_L = 50 \text{ pF}$		
Disable time	t_{HZ}	—	5.1	14.7	1.0	17.0	ns	$C_L = 15 \text{ pF}$	\overline{OE}	Y
	t_{LZ}	—	7.3	18.2	1.0	20.5		$C_L = 50 \text{ pF}$		

• $V_{CC} = 3.3 \pm 0.3 \text{ V}$

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}	—	4.8	8.0	1.0	9.5	ns	$C_L = 15 \text{ pF}$	A	Y
	t_{PHL}	—	6.1	11.5	1.0	13.0		$C_L = 50 \text{ pF}$		
Enable time	t_{ZH}	—	4.8	8.0	1.0	9.5	ns	$C_L = 15 \text{ pF}$	\overline{OE}	Y
	t_{ZL}	—	6.2	11.5	1.0	13.0		$C_L = 50 \text{ pF}$		
Disable time	t_{HZ}	—	4.1	9.7	1.0	11.5	ns	$C_L = 15 \text{ pF}$	\overline{OE}	Y
	t_{LZ}	—	5.5	13.2	1.0	15.0		$C_L = 50 \text{ pF}$		

HD74LV1G125A

Switching Characteristics (cont)

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

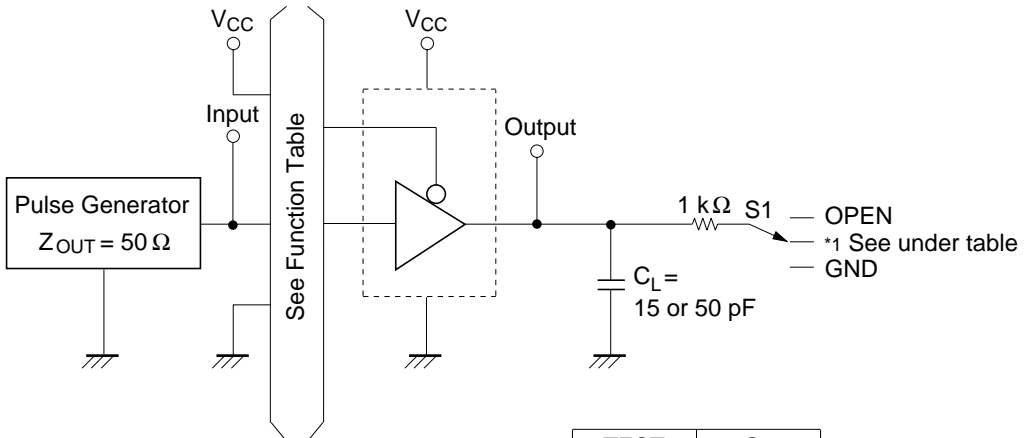
Item	Symbol	$T_a = 25^\circ\text{C}$			$T_a = -40$ to 85°C		Unit	Test Conditions	FROM (Input)	TO (Output)
		Min	Typ	Max	Min	Max				
Propagation delay time	t_{PLH}	—	3.4	5.5	1.0	6.5	ns	$C_L = 15$ pF	A	Y
	t_{PHL}	—	4.3	7.5	1.0	8.5		$C_L = 50$ pF		
Enable time	t_{ZH}	—	3.4	5.1	1.0	6.0	ns	$C_L = 15$ pF	\overline{OE}	Y
	t_{ZL}	—	4.4	7.1	1.0	8.0		$C_L = 50$ pF		
Disable time	t_{HZ}	—	3.2	6.8	1.0	8.0	ns	$C_L = 15$ pF	\overline{OE}	Y
	t_{LZ}	—	4.0	8.8	1.0	10.0		$C_L = 50$ pF		

Operating Characteristics

- $C_L = 50$ pF

Item	Symbol	V_{CC} (V)	$T_a = 25^\circ\text{C}$			Unit	Test Conditions
			Min	Typ	Max		
Power dissipation capacitance	C_{PD}	3.3	—	10.5	—	pF	$f = 10$ MHz
		5.0	—	11.5	—		

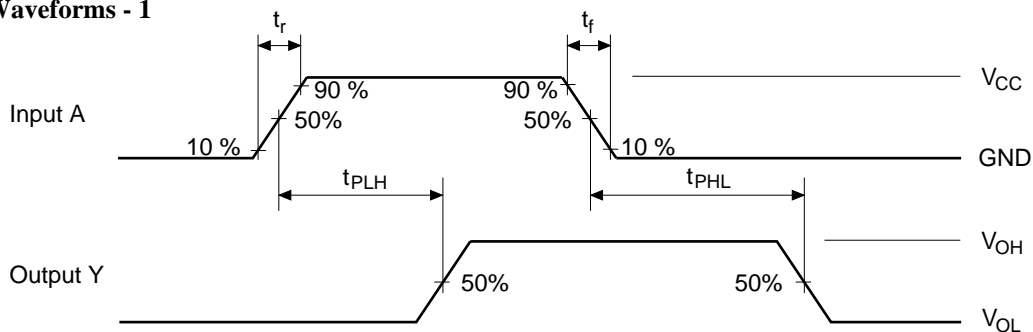
Test Circuit



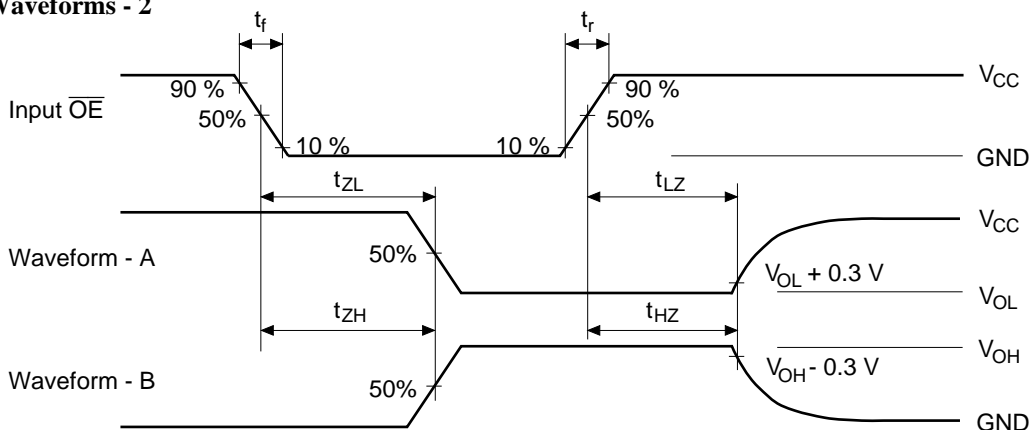
TEST	S1
t_{PLH}/t_{PHL}	OPEN
t_{ZH}/t_{HZ}	GND
t_{ZL}/t_{LZ}	V_{CC}

Note: 1. C_L includes probe and jig capacitance.

• Waveforms - 1



• Waveforms - 2

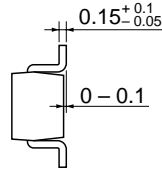
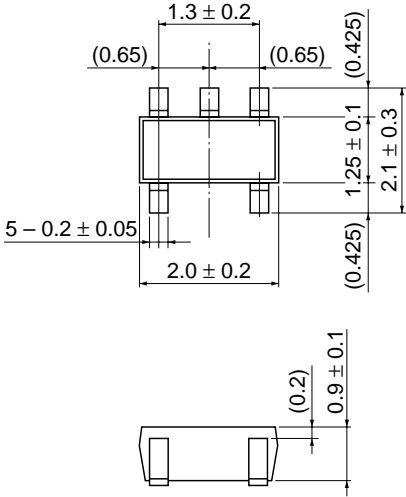


- Notes:
1. Input waveform : $PRR \leq 1 \text{ MHz}$, $Z_o = 50 \Omega$, $t_r \leq 3 \text{ ns}$, $t_f \leq 3 \text{ ns}$.
 2. Waveform - A is for an output with internal conditions such that the output is low except when disabled by the output control.
 3. Waveform - B is for an output with internal conditions such that the output is high except when disabled by the output control.
 4. The output are measured one at a time with one transition per measurement.

Package Dimensions

As of January, 2001

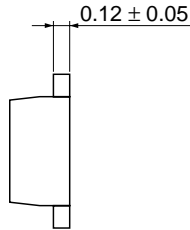
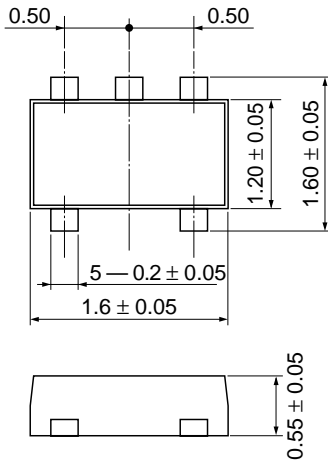
Unit: mm



Hitachi Code	CMPAK-5
JEDEC	—
EIAJ	Conforms
Mass (reference value)	0.006 g

As of January, 2001

Unit: mm



Hitachi Code	TNP-5D
JEDEC	—
EIAJ	—
Mass (reference value)	—

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Hitachi, Ltd.

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

URL NorthAmerica : <http://semiconductor.hitachi.com/>
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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>

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
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