
HD74LV1GT14A

Inverter with Schmitt-trigger Input

HITACHI

ADE-205-329C (Z)
4th. Edition
April 2001

Description

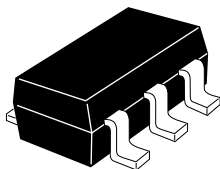
The HD74LV1GT14A is high speed CMOS schmitt-trigger inverter using silicon gate CMOS process. With CMOS low power dissipation, it provides high speed equivalent to LS-TTL series. The internal circuit of three stages construction with buffer provides wide noise margin and stable output. Low voltage and high speed operation is suitable for the battery powered products (e.g., notebook computers), and the low power consumption extends the battery life.

Features

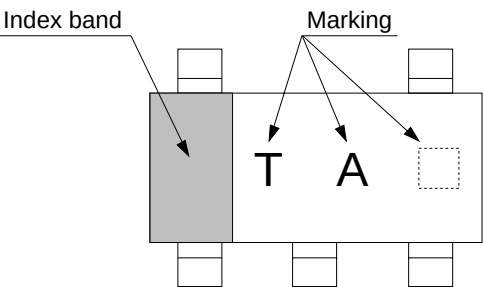
- The basic gate function is lined up as hitachi uni logic series.
- Supplied on emboss taping for high speed automatic mounting.
- TTL compatible input level.
Supply voltage range : 4.5 to 5.5 V
Operating temperature range : -40 to +85°C
- All inputs V_{IH} (Max.) = 5.5 V (@ V_{CC} = 0 V to 5.5 V)
All outputs V_O (Max.) = 5.5 V (@ V_{CC} = 0 V)
- Output current ± 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

- HD74LV1GT14A

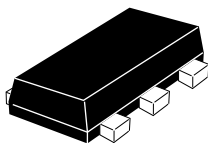


CMPAK-5

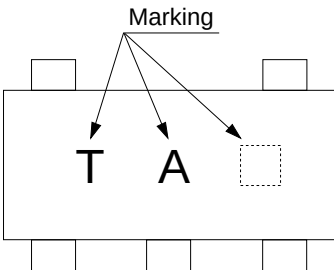


□ = Control code
(— or blank)

- HD74LV1GT14A



VSON-5



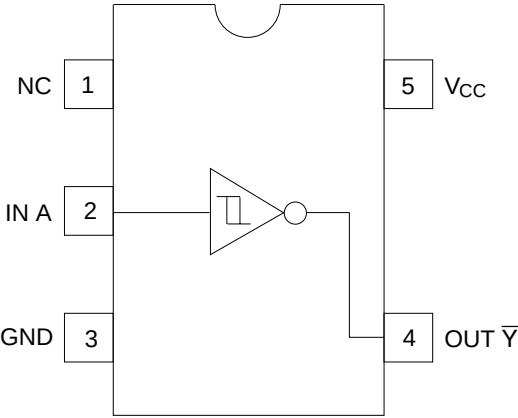
□ = Control code

Function Table

Input A	Output $\bar{Y}$
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
		−0.5 to 7.0		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 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}	4.5	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}	—	12	mA	V _{CC} = 4.5 to 5.5 V
	I _{OH}	—	−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 _T ⁺	4.5	—	—	1.9	V	
		5.5	—	—	2.1		
	V _T ⁻	4.5	0.5	—	—		
		5.5	0.6	—	—		
	ΔV _T	4.5	0.4	—	1.4		
		5.5	0.4	—	1.5		
Output voltage	V _{OH}	Min to Max	V _{CC} -0.1	—	—	V	I _{OH} = -50 μA
		4.5	3.8	—	—		I _{OH} = -12 mA
	V _{OL}	Min to Max	—	—	0.1		I _{OL} = 50 μA
		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
	ΔI _{CC}	5.5	—	—	1.5	mA	One input V _{IN} = 3.4 V, other input V _{CC} or GND
Output leakage current	I _{OFF}	0	—	—	5	μA	V _{IN} or V _O = 0 to 5.5 V
Input capacitance	C _{IN}	5.0	—	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

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

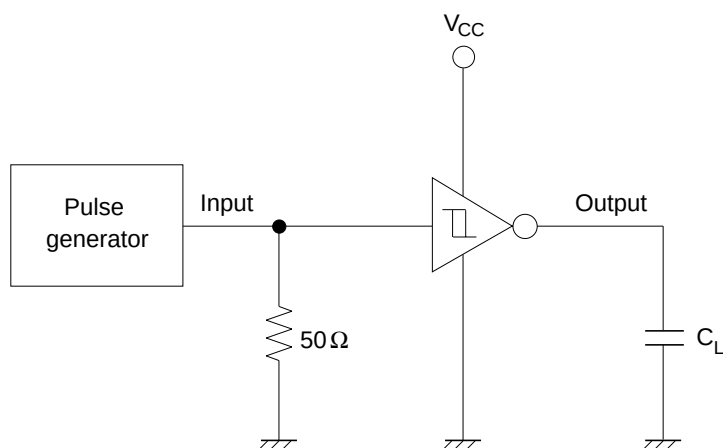
Item	Symbol	T _a = 25°C			T _a = -40 to 85°C		Unit	Test Conditions	FROM (Input)	TO (Output)
		Min	Typ	Max	Min	Max				
Propagation delay time	t _{PLH}	—	5.0	7.6	1.0	9.0	ns	C _L = 15 pF	A	$\bar{Y}$
	t _{PHL}	—	6.5	9.6	1.0	11.0		C _L = 50 pF		

Operating Characteristics

- $C_L = 50 \text{ pF}$

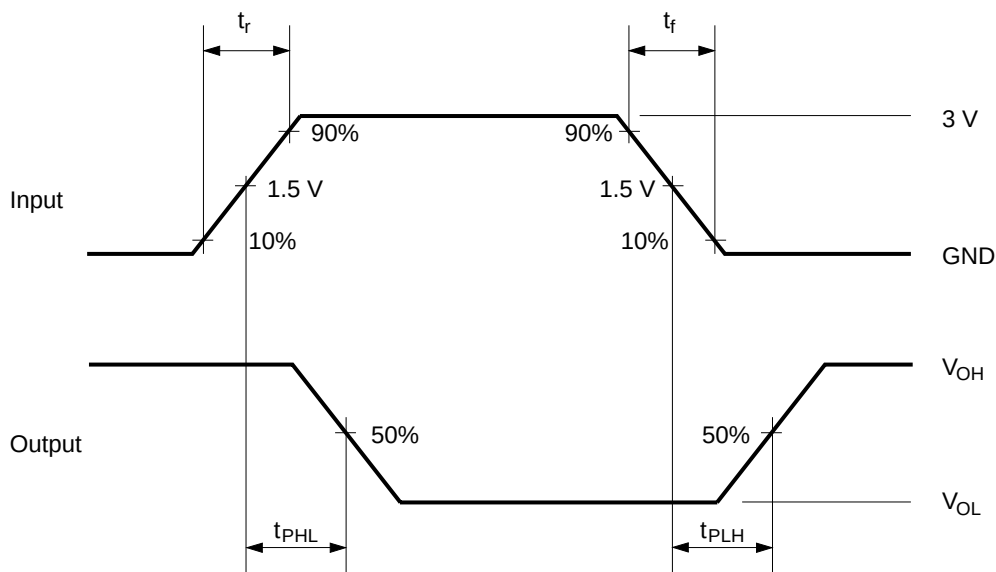
Item	Symbol	V _{CC} (V)	T _a = 25°C			Unit	Test Conditions
			Min	Typ	Max		
Power dissipation capacitance	C _{PD}	5.0	—	10.0	—	pF	f = 10 MHz

Test Circuit



Note: C_L includes probe and jig capacitance.

• Waveforms

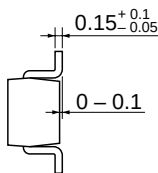
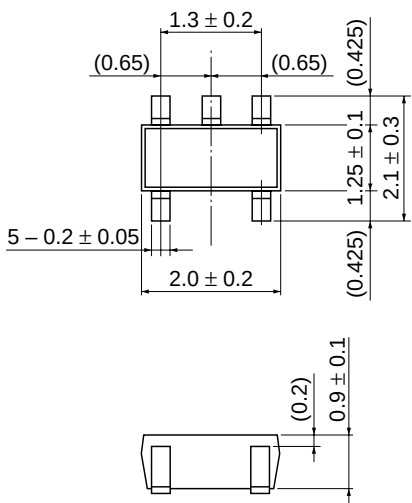


Notes: 1. Input waveform : $PRR \leq 1 \text{ MHz}$, $Z_o = 50 \Omega$, $t_r \leq 3 \text{ ns}$, $t_f \leq 3 \text{ ns}$.

2. The output are measured one at a time with one transition per measurement.

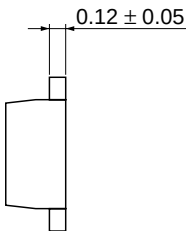
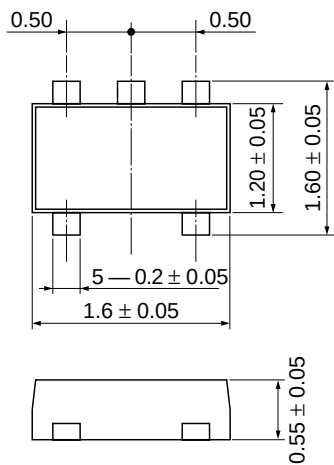
Package Dimensions

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

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

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