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.

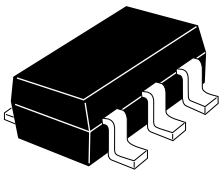
Features

- 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.

Hitachi semiconductor

Outline and Article Indication

• HD74LV1GT14A



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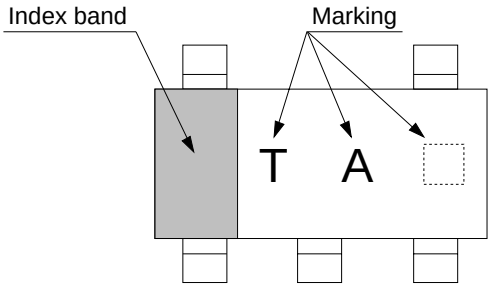

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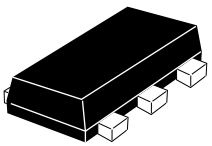
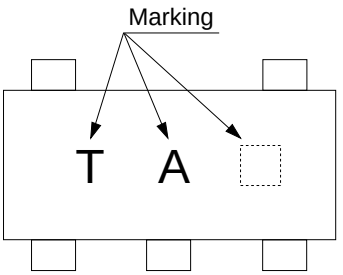
• HD74LV1GT14A



VSON-5



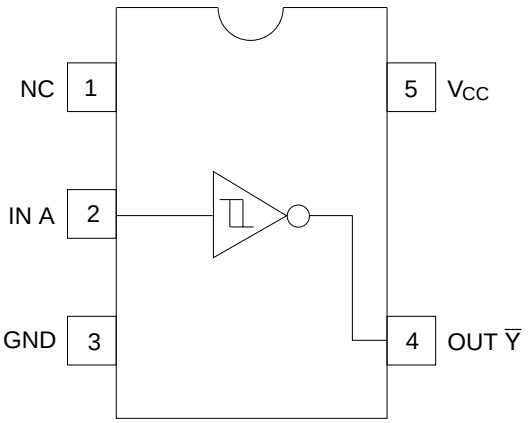
= Control code

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
		–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 ± 0.5 V

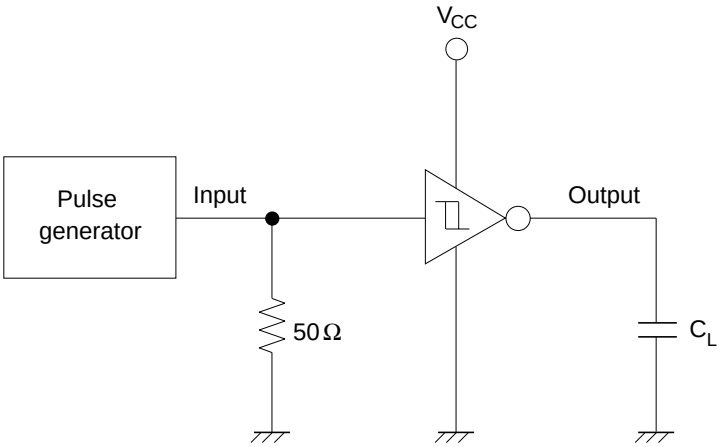
Item	Symbol	T_a = 25°C			T_a = –40 to 85°C		Unit	Test Conditions	FROM (Input)	TO (Output)
		Min	Typ	Max	Min	Max				
Propagation	t_{PLH}	—	5.0	7.6	1.0	9.0	ns	C_L = 15 pF	A	$\overline{Y}$
delay time	t_{PHL}	—	6.5	9.6	1.0	11.0		C_L = 50 pF		

Operating Characteristics

- C_L = 50 pF

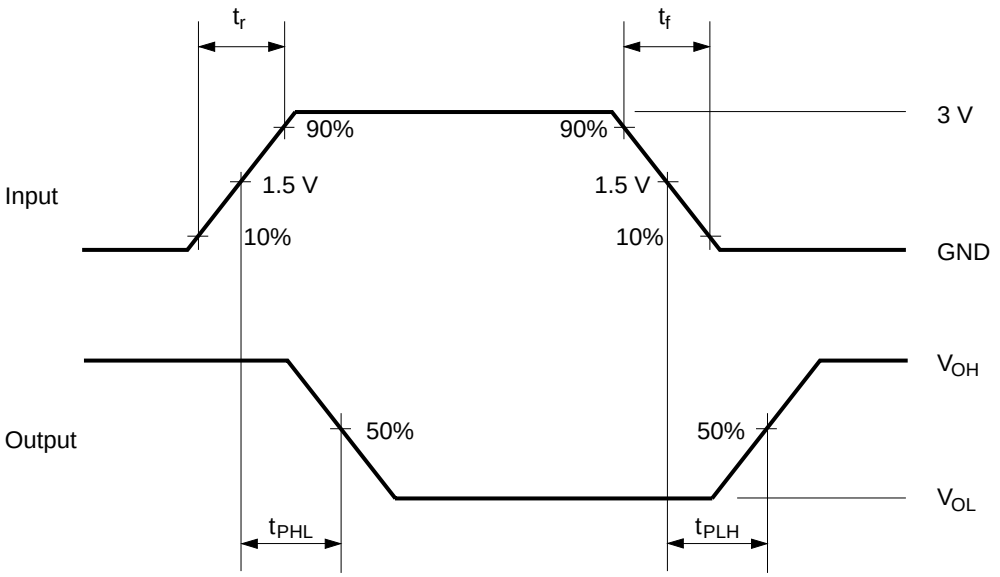
Item	Symbol	V_{CC} (V)	T_a = 25°C			Unit	Test Conditions
			Min	Typ	Max		
Power dissipation capacitance	C_{PD}	5.0	—	10.0	—	pF	f = 10 MHz

Test Circuit



Note: C_L includes probe and jig capacitance.

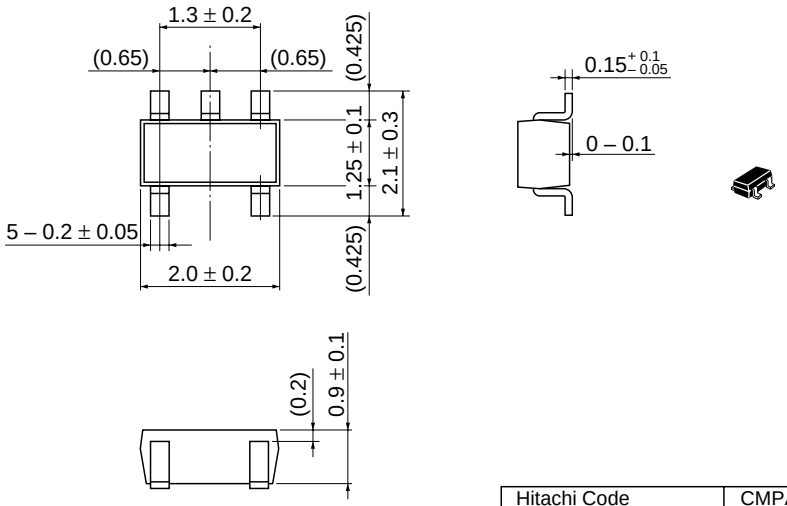
• **Waveforms**



Notes: 1. Input waveform : PRR ≤ 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.

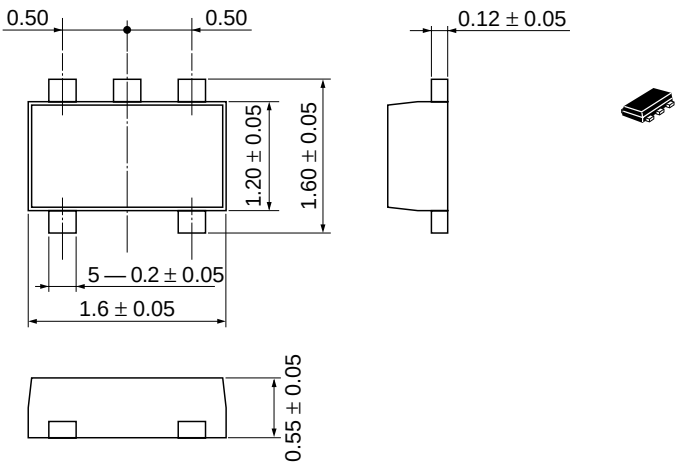
Package Dimensions

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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