
HD74LV1G14A

Inverter with Schmitt–trigger Input

HITACHI

ADE-205-320C (Z)
4th. Edition
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Description

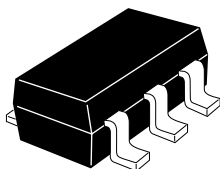
The HD74LV1G14A has an inverter with schmitt–trigger input in a 5 pin package. Low voltage and high speed operation is suitable for the battery powered products (e.g., notebook computers), and the low power consumption extends the battery life.

Features

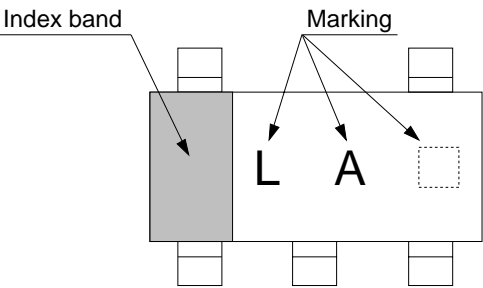
- The basic gate function is lined up as hitachi uni logic series.
- Supplied on emboss taping for high speed automatic mounting.
- Electrical characteristics equivalent to the HD74LV14A
Supply voltage range : 1.65 to 5.5 V
Operating temperature range : –40 to +85°C
- All inputs V_{IH} (Max.) = 5.5 V (@ 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

• HD74LV1G14A

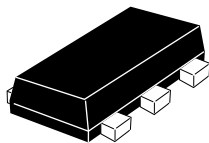


CMPAK-5

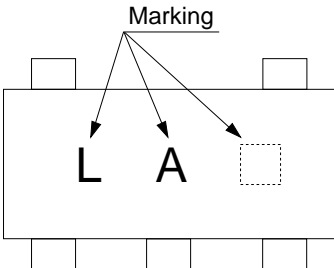


□ = Control code
(— or blank)

• HD74LV1G14A



VSON-5



□ = Control code

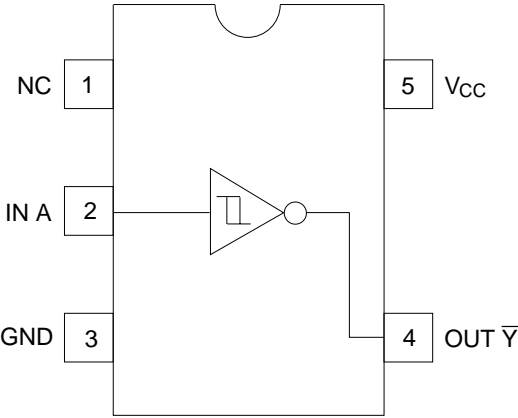
Function Table

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 $V_{CC} + 0.5$ -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	T_{stg}	-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 $^{\circ}\text{C}$.

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	$V_{CC} = 1.65$ 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
Operating free-air temperature	T_a	-40	85	$^{\circ}\text{C}$	

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
Threshold voltage	V_T^+	1.65 to 1.95	—	—	$V_{CC} \times 0.75$	V	
		2.5	—	—	1.75		
		3.3	—	—	2.31		
		5.0	—	—	3.50		
	V_T^-	1.65 to 1.95	$V_{CC} \times 0.25$	—	—		
		2.5	0.75	—	—		
		3.3	0.99	—	—		
		5.0	1.5	—	—		
	ΔV_T	1.65 to 1.95	0.1	—	$V_{CC} \times 0.4$		
		2.5	0.25	—	1.0		
		3.3	0.33	—	1.32		
		5.0	0.5	—	2.0		
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	—	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°C			T _a = -40 to 85°C		Unit	Test Conditions	FROM (Input)	TO (Output)
		Min	Typ	Max	Min	Max				
Propagation delay time	t _{PLH}	—	16.8	32.0	1.0	34.0	ns	C _L = 15 pF	A	Y
	t _{PHL}	—	23.8	43.0	1.0	46.0		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}	—	10.5	19.7	1.0	22.0	ns	C _L = 15 pF	A	Y
	t _{PHL}	—	14.0	24.0	1.0	27.0		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}	—	8.3	12.8	1.0	15.0	ns	C _L = 15 pF	A	Y
	t _{PHL}	—	10.8	16.3	1.0	18.5		C _L = 50 pF		

• $V_{CC} = 5.0 \pm 0.5\text{ V}$

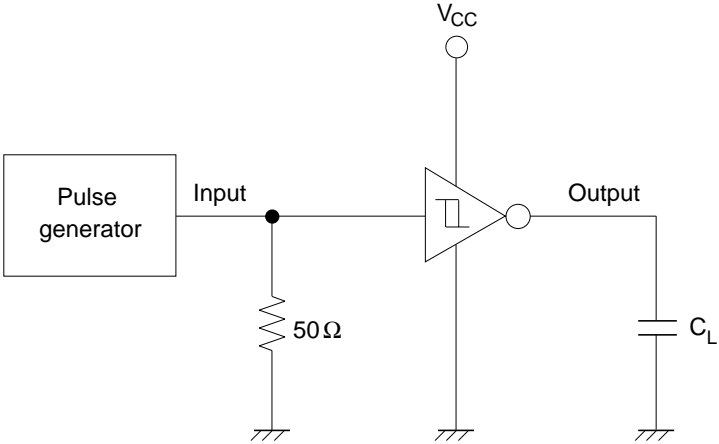
Item	Symbol	T _a = 25°C			T _a = -40 to 85°C		Unit	Test Conditions	FROM (Input)	TO (Output)
		Min	Typ	Max	Min	Max				
Propagation delay time	t _{PLH}	—	5.5	8.6	1.0	10.0	ns	C _L = 15 pF	A	Y
	t _{PHL}	—	7.0	10.6	1.0	12.0		C _L = 50 pF		

Operating Characteristics

• $C_L = 50\text{ pF}$

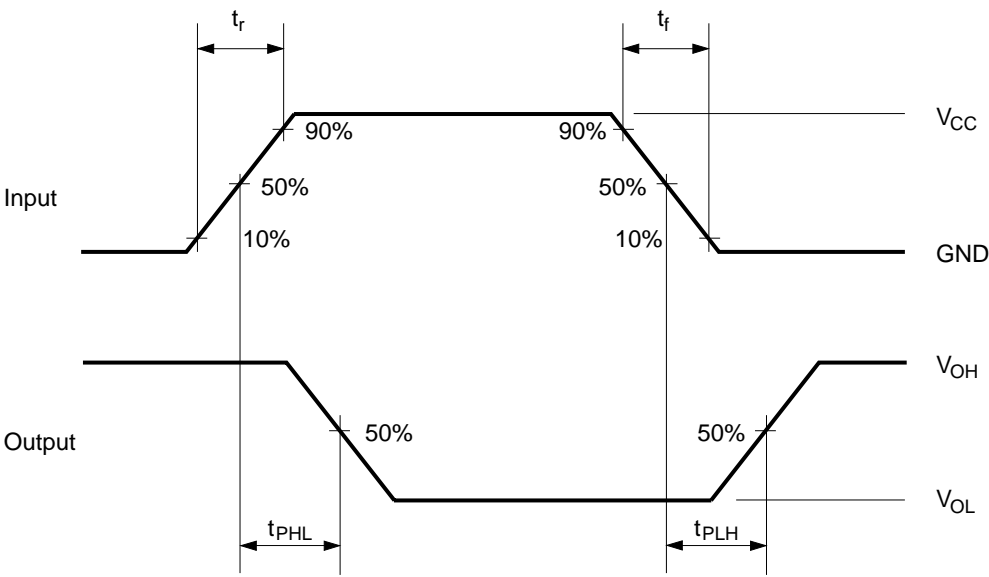
Item	Symbol	V _{CC} (V)	T _a = 25°C			Unit	Test Conditions
			Min	Typ	Max		
Power dissipation capacitance	C _{PD}	3.3	—	8.5	—	pF	f = 10 MHz
		5.0	—	10.0	—		

Test Circuit



Note: C_L includes probe and jig capacitance.

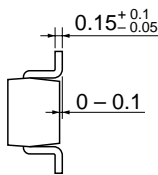
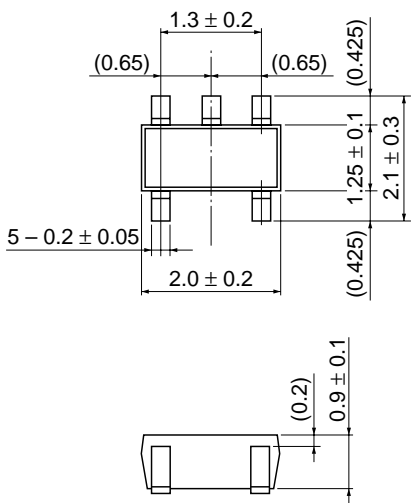
• Waveforms



- 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.

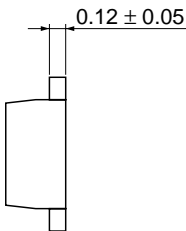
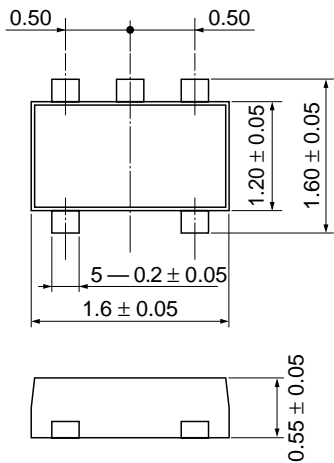
Package Dimensions

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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