HD74HCT1G32

2–input OR Gate

HITACHI

ADE-205-306B (Z)
3rd. Edition
April 2001

Description

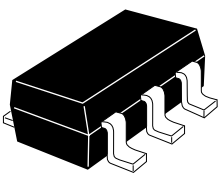
The HD74HCT1G32 is high speed CMOS two input OR gate using silicon gate CMOS process. With CMOS low power dissipation, it provides high speed equivalent to LS–TTL series. The internal circuit of three stages construction with buffer provides wide noise margin and stable output.

Features

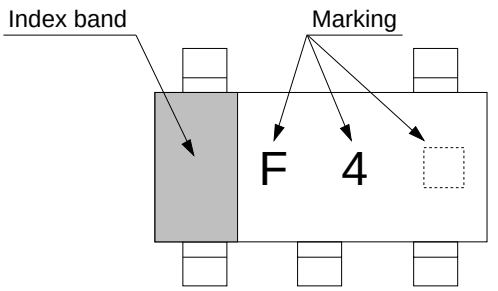
- The basic gate function is lined up as hitachi uni logic series.
- Supplied on emboss taping for high speed automatic mounting.
- TTL compatible input level.
  Supply voltage range : 4.5 to 5.5 V
  Operating temperature range : –40 to +85°C
- $|I_{OH}| = I_{OL} = 2$ mA (min)

Outline and Article Indication

• HD74HCT1G32



CMPAK–5



= Control code
(— or blank)

Hitachi semiconductor

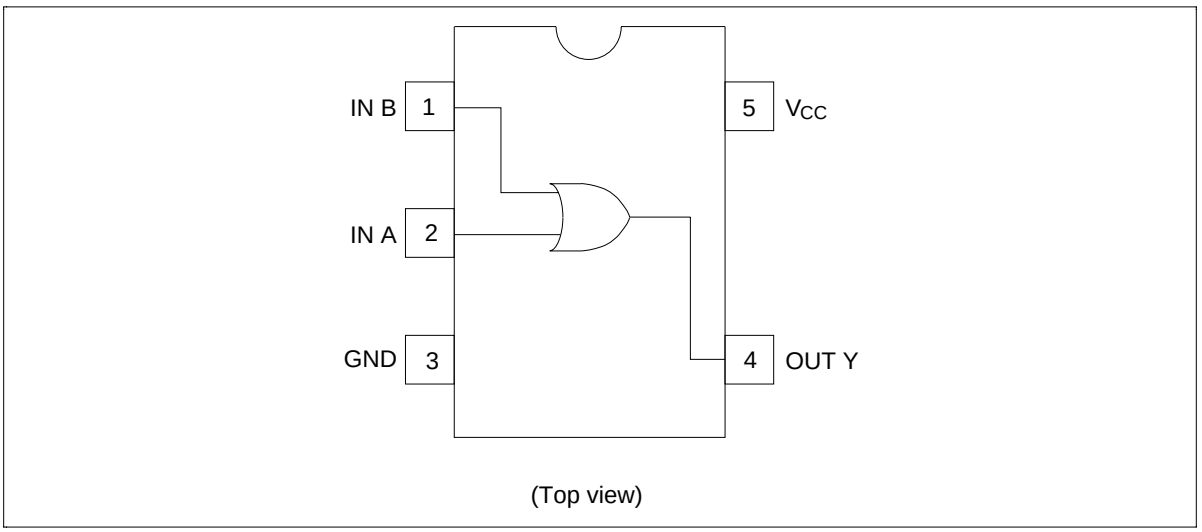
Function Table

Inputs		Output Y
A	**B**	
L	L	L
H	L	H
L	H	H
H	H	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 V_{CC} + 0.5	V	
Output voltage range [*1, 2]	V_O	–0.5 to V_{CC} + 0.5	V	Output : H or L
Input clamp current	I_{IK}	±20	mA	$V_I < 0$ or $V_I > V_{CC}$
Output clamp current	I_{OK}	±20	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}	±25	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 caluculated using a junction temperature of 150°C.

Recommended Operating Conditions

Item	Symbol	Min	Max	Unit	Test 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}	—	2	mA	V_{CC} = 4.5 to 5.5 V
	I_{OH}	—	–2		V_{CC} = 4.5 to 5.5 V
Input rise / fall time (0.3 V to 2.7 V)	t_r, t_f	0	500	ns	V_{CC} = 4.5 to 5.5 V
Operating temperature	Ta	–40	85	°C	

Note: Unused or floating inputs must be held high or low.

Electrical Characteristics

Item	Symbol	V_{CC}	T_a = 25°C			T_a = –40 to 85°C		Unit	Test Conditions	
		(V)	Min	Typ	Max	Min	Max			
Input voltage	V_{IH}	4.5 to 5.5	2.0	—	—	2.0	—	V		
	V_{IL}	4.5 to 5.5	—	—	0.8	—	0.8			
Output voltage	V_{OH}	4.5	4.4	4.5	—	4.4	—	V	V_{IN} =	I_{OH} = –20 µA
		4.5	4.18	4.31	—	4.13	—		V_{IH} or V_{IL}	I_{OH} = –2 mA
	V_{OL}	4.5	—	0.0	0.1	—	0.1			I_{OL} = 20 µA
		4.5	—	0.17	0.26	—	0.33			I_{OL} = 2 mA
Input current	I_{IN}	5.5	—	—	±0.1	—	±1.0	µA	V_{IN} = V_{CC} or GND	
Operating current	I_{CC}	5.5	—	—	1.0	—	10.0	µA	V_{IN} = V_{CC} or GND	
Quiescent supply current	I_{CCT}	5.5	—	—	2.0	—	2.9	mA	One input V_{IN} = 2.4 V, other input V_{CC} or GND	

Switching Characteristics

Item	Symbol	T_a = 25°C			Unit	Test Conditions
		Min	Typ	Max		
Output rise / fall time	t_{TLH} t_{THL}	—	5	10	ns	Test circuit
Propagation delay time	t_{PLH}	—	7.8	12	ns	Test circuit
	t_{PHL}	—	9.6	17		

(C_L = 15 pF, t_r = t_f = 6 ns, V_{CC} = 5 V)

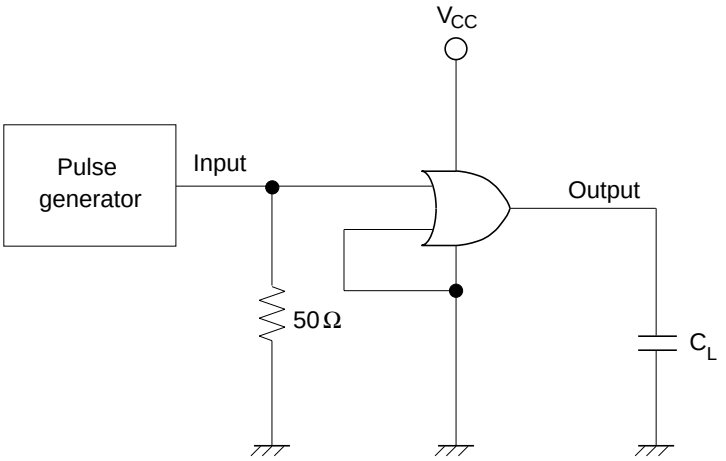
Item	Symbol		T_a = 25°C			T_a = –40 to 85°C		Unit	Test Conditions
		V_{CC}	Min	Typ	Max	Min	Max		
Output rise / fall time	t_{TLH} t_{THL}	4.5	—	14	25	—	31	ns	Test circuit
Propagation delay time	t_{PLH}	4.5	—	10.5	16	—	20	ns	Test circuit
	t_{PHL}	4.5	—	16.0	27	—	31		
Input capacitance	C_{IN}	—	—	2.5	5	—	5	pF	
Equivalent capacitance	C_{PD}	—	—	10	—	—	—	pF	

(C_L = 50 pF, t_r = t_f = 6 ns)

Note: C_{PD} is equivalent capacitance inside of the IC calculated from the operating current without load (see test circuit). The average operating current without load is calculated according to the expression below.

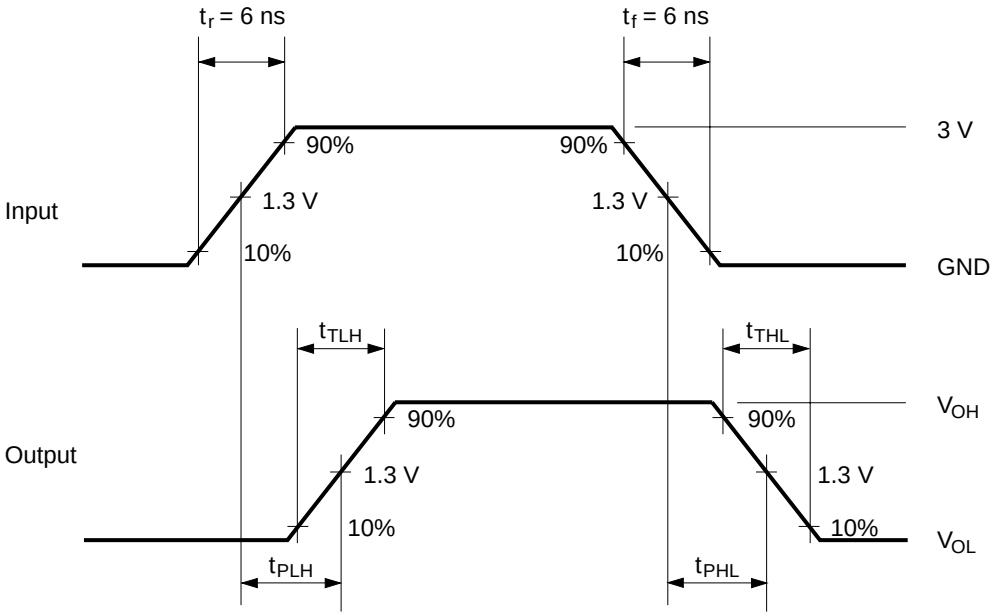
I_{CC} (opr) = C_{PD} • V_{CC} • f_{IN} + I_{CC}

Test Circuit



Note: 1. C_L includes probe and jig capacitance.

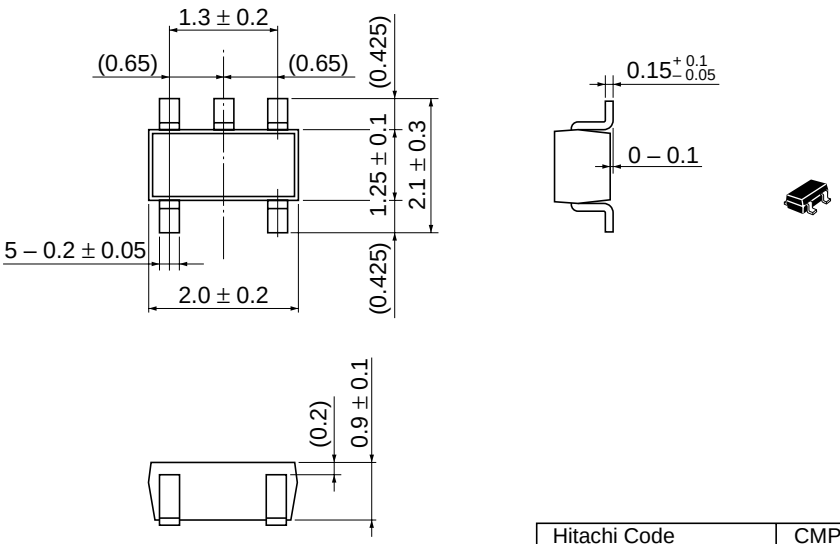
• **Waveforms**



Package Dimensions

As of January, 2001

Unit: mm



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

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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/
Europe : http://www.hitachi-eu.com/hel/ecg
Asia : http://sicapac.hitachi-asia.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
URL : http://semiconductor.hitachi.com.hk

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