

# HD74BC540A

Octal Buffers/Line Drivers With 3 State Outputs

# HITACHI

ADE-205-031 (Z)

Rev. 0

June 1993

## Description

The HD74BC540A provides high drivability and operation equal to or better than high speed bipolar standard logic IC by using Bi-CMOS process. The device features low power dissipation that is about 1/5 of high speed bipolar logic IC, when the frequency is 10 MHz. The device has eight inverter drivers with three state outputs in a 20 pin package. When  $\overline{G1}$  and  $\overline{G2}$  is low level, this drivers set up output is enable.

## Features

- Input/Output are at high impedance state when power supply is off.
- Built in input pull up circuit can make input pins be open, when not used.
- Input is TTL level.
- Wide operating temperature range  
Ta = -40 to +85°C

## Function Table

### Inputs

$\overline{G1}$	$\overline{G2}$	A	Output Y
L	L	L	H
L	L	H	L
H	X	X	Z
X	H	X	Z

H : High level

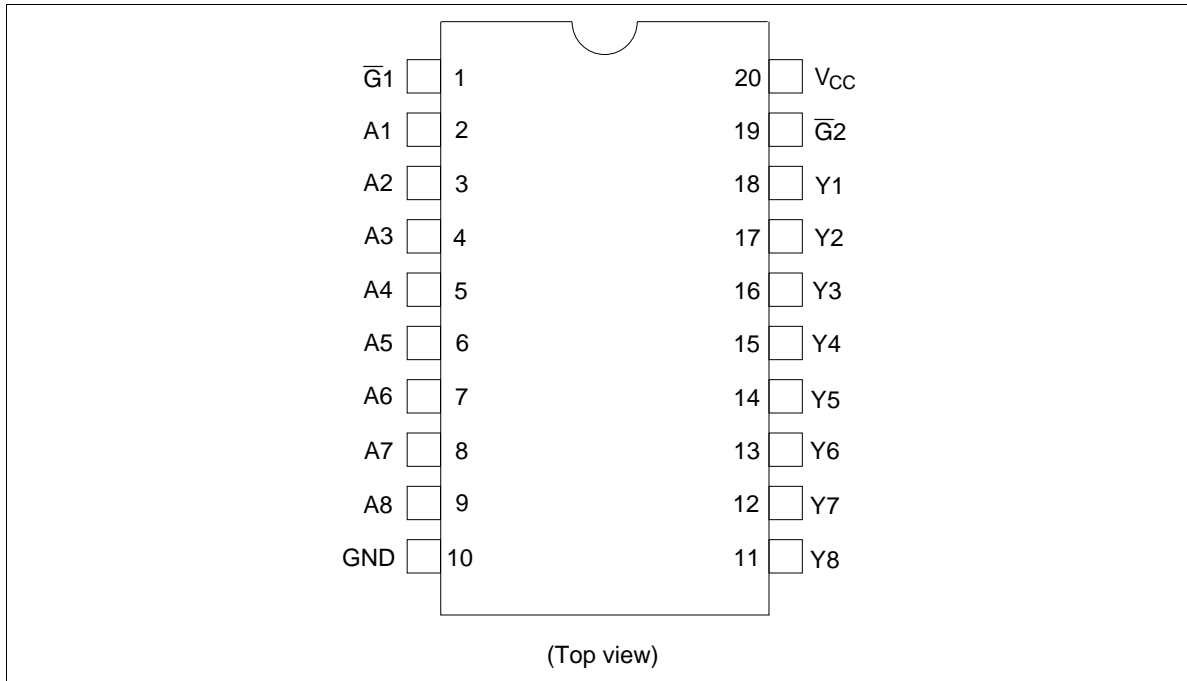
L : Low level

X : Immaterial

Z : High impedance

## HD74BC540A

### Pin Arrangement



### Absolute Maximum Ratings

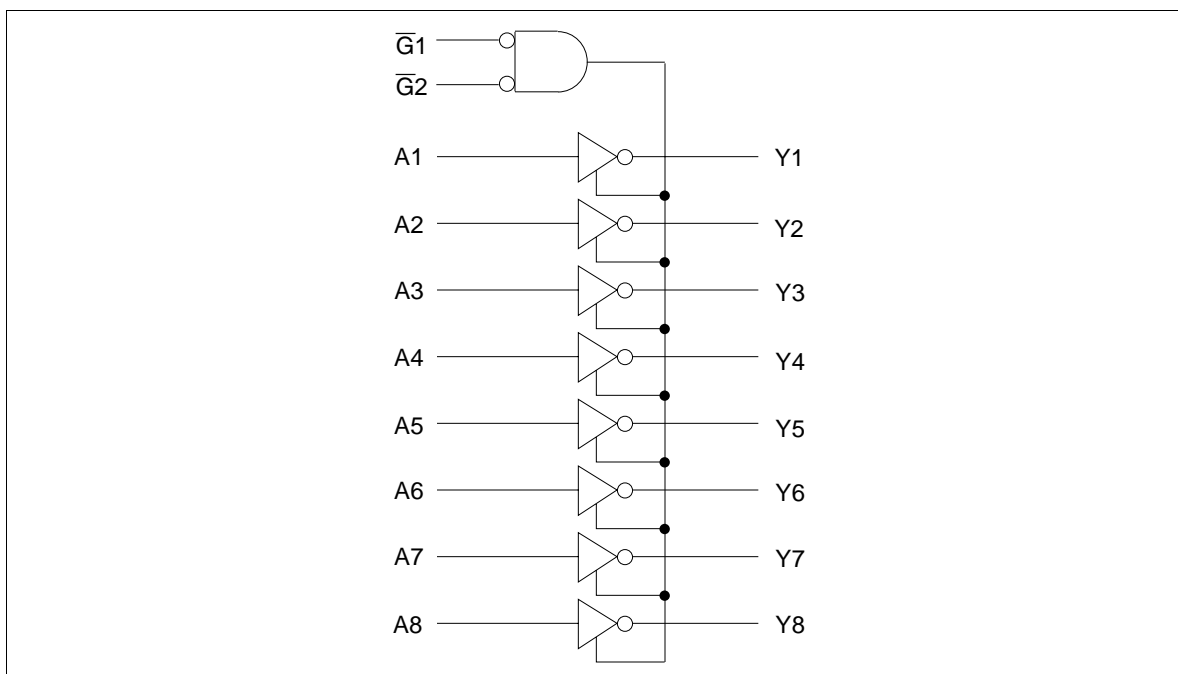
Item	Symbol	Rating	Unit
Supply voltage	V <sub>CC</sub>	−0.5 to +7.0	V
Input diode current	I <sub>IK</sub>	±30	mA
Input voltage	V <sub>IN</sub>	−0.5 to +7.5	V
Output voltage	V <sub>OUT</sub>	−0.5 to +7.5	V
Off state output voltage	V <sub>OUT(off)</sub>	−0.5 to +5.5	V
Storage temperature	T <sub>stg</sub>	−65 to +150	°C

Note: 1. 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.

**Recommended Operating Conditions**

Item	Symbol	Min	Typ	Max	Unit
Supply voltage	$V_{CC}$	4.5	5.0	5.5	V
Input voltage	$V_{IN}$	0	—	$V_{CC}$	V
Ouput voltage	$V_{OUT}$	0	—	$V_{CC}$	V
Operating temperature	$T_{opr}$	-40	—	85	°C
Input rise/fall time*1	$t_r, t_f$	0	—	8	ns/V

Note: 1. This item guarantees maximum limit when one input switches.  
Waveform: Refer to test circuit of switching characteristics.

**Logic Diagram**


## HD74BC540A

### Electrical Characteristics (Ta = -40 to +85°C)

Item	Symbol	V <sub>cc</sub> (V)	Min	Max	Unit	Test Conditions
Input voltage	V <sub>IH</sub>		2.0	—	V	
	V <sub>IL</sub>		—	0.8	V	
Output voltage	V <sub>OH</sub>	4.5	2.4	—	V	I <sub>OH</sub> = -3 mA
		4.5	2.0	—	V	I <sub>OH</sub> = -15 mA
	V <sub>OL</sub>	4.5	—	0.5	V	I <sub>OL</sub> = 48 mA
		4.5	—	0.55	V	I <sub>OL</sub> = 64 mA
Input diode voltage	V <sub>IK</sub>	4.5	—	-1.2	V	I <sub>IN</sub> = -18 mA
Input current	I <sub>I</sub>	5.5	—	-250	μA	V <sub>IN</sub> = 0 V
		5.5	—	1.0	μA	V <sub>IN</sub> = 5.5 V
		5.5	—	100	μA	V <sub>IN</sub> = 7.0 V
Short circuit output current* <sup>1</sup>	I <sub>OS</sub>	5.5	-100	-225	mA	V <sub>IN</sub> = 0 or 5.5 V
Off state output current	I <sub>OZH</sub>	5.5	—	50	μA	V <sub>O</sub> = 2.7 V
	I <sub>OZL</sub>	5.5	—	-50	μA	V <sub>O</sub> = 0.5 V
Supply current	I <sub>CCL</sub>	5.5	—	27.5	mA	V <sub>IN</sub> = 0 or 5.5 V All outputs is "L"
	I <sub>CCH</sub>	5.5	—	2.5	mA	V <sub>IN</sub> = 0 or 5.5 V All outputs is "H"
	I <sub>CCZ</sub>	5.5	—	2.5	mA	V <sub>IN</sub> = 0 or 5.5 V All outputs is "Z"
	I <sub>CCT</sub> * <sup>2</sup>	5.5	—	1.5	mA	V <sub>IN</sub> = 3.4V or 0.5V

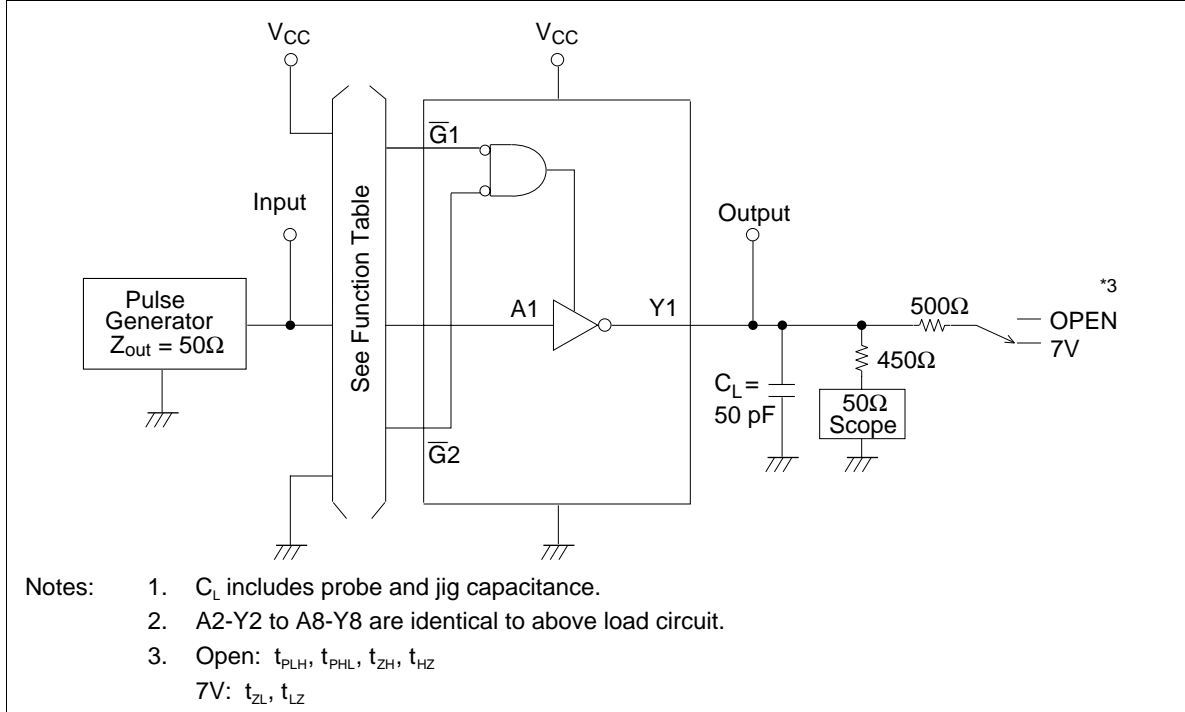
Notes: 1. Not more than one output should be shorted at a time and duration of the short circuit should not exceed one second.

2. When input by the TTL level, it shows I<sub>cc</sub> increase at per one input pin.

Switching Characteristics ( $C_L = 50 \text{ pF}$ )

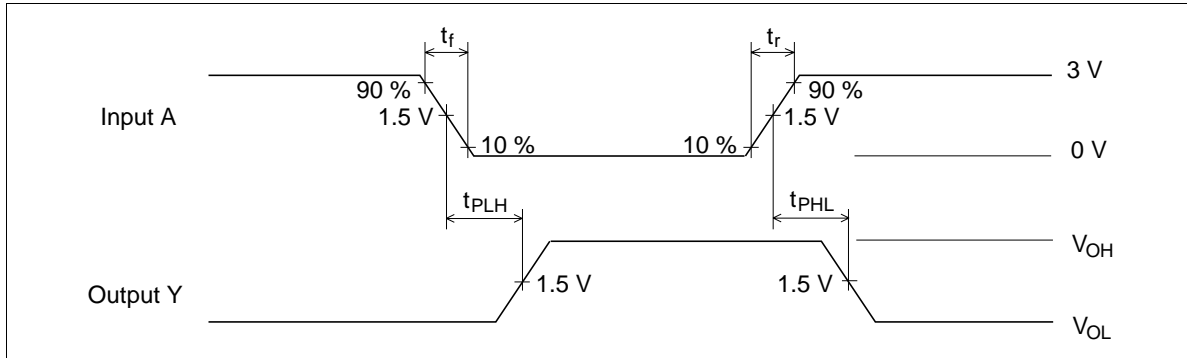
Item	Symbol	Ta = 25°C V <sub>CC</sub> = 5.0 V		Ta = -40 to +85°C V <sub>CC</sub> = 5.0 V ±10		Unit	Test Conditions
		Min	Max	Min	Max		
Propagation delay time	t <sub>PLH</sub>	3.0	6.0	3.0	7.0	ns	See under figure
	t <sub>PHL</sub>	3.0	6.0	3.0	7.0		
Output enable time	t <sub>ZH</sub>	3.0	9.0	3.0	11.0	ns	
	t <sub>ZL</sub>	3.0	9.0	3.0	11.0		
Output disable time	t <sub>HZ</sub>	3.0	8.0	3.0	10.0	ns	
	t <sub>LZ</sub>	3.0	8.0	3.0	10.0		
Input capacitance	C <sub>IN</sub>	3.0(Typ)		—		pF	V <sub>IN</sub> = V <sub>CC</sub> or GND
Output capacitance	C <sub>O</sub>	15.0(Typ)		—		pF	V <sub>O</sub> = V <sub>CC</sub> or GND

Test circuit

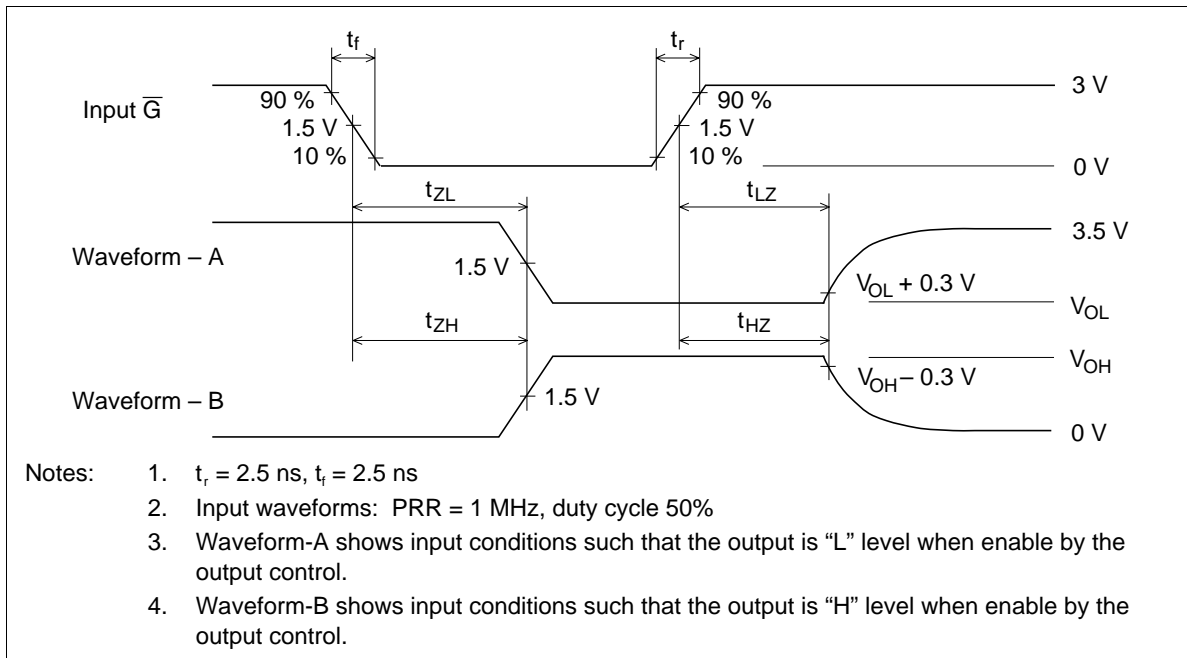


## HD74BC540A

### Waveforms-1



### Waveforms-2



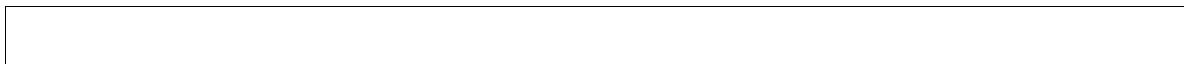
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**HD74BC540A**

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**Package Dimensions**

Unit: mm



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