

# HD74BC541A

## Octal Buffers/Line Drivers With 3 State Outputs

REJ03D0286-0200Z  
(Previous ADE-205-023 (Z))  
Rev.2.00  
Jul.16.2004

### Description

The HD74BC541A 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  
 $T_a = -40$  to  $+85^\circ\text{C}$
- Ordering Information

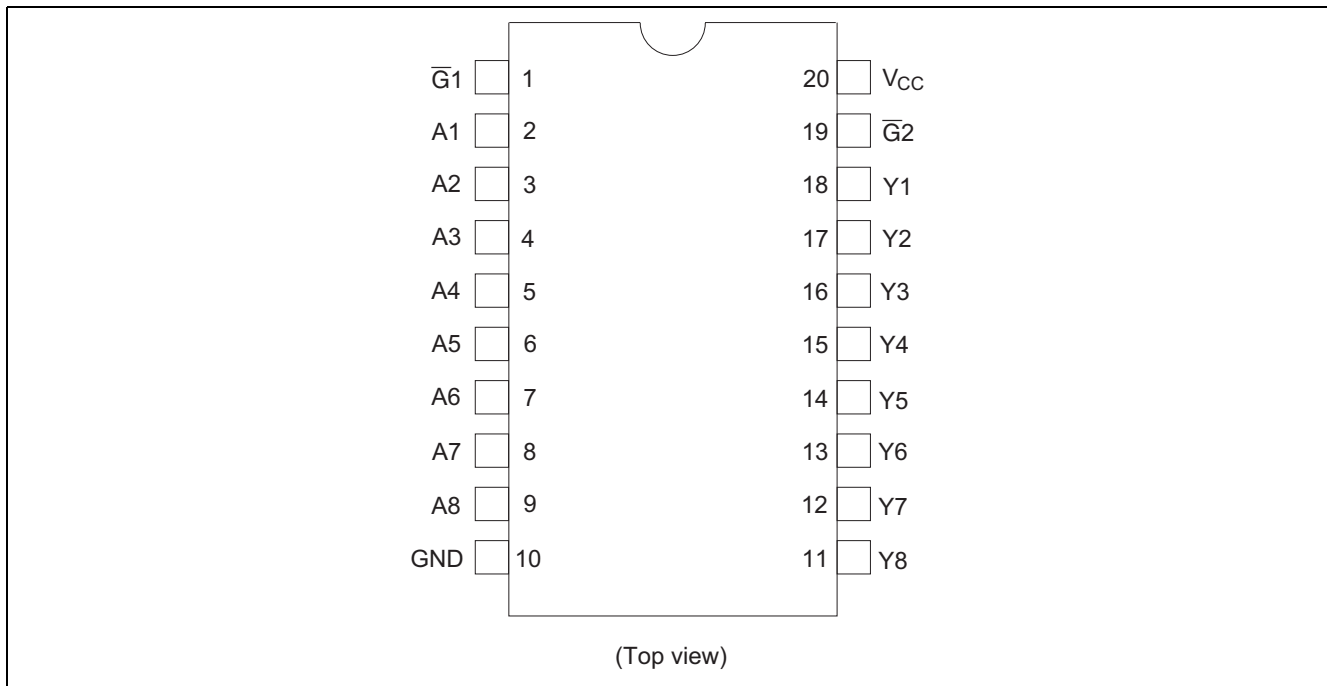
Part Name	Package Type	Package Code	Package Abbreviation	Taping Abbreviation (Quantity)
HD74BC541AFPEL	SOP-20 pin (JEITA)	FP-20DAV	FP	EL (2,000 pcs/reel)

### Function Table

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

H : High level  
L : Low level  
X : Immaterial  
Z : High impedance

## Pin Arrangement



## Absolute Maximum Ratings

Item	Symbol	Rating	Unit
Supply voltage	$V_{CC}$	-0.5 to +7.0	V
Input diode current	$I_{IK}$	$\pm 30$	mA
Input voltage	$V_{IN}$	-0.5 to +7.5	V
Output voltage	$V_{OUT}$	-0.5 to +7.5	V
Off state output voltage	$V_{OUT(off)}$	-0.5 to +5.5	V
Storage temperature	$T_{stg}$	-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.

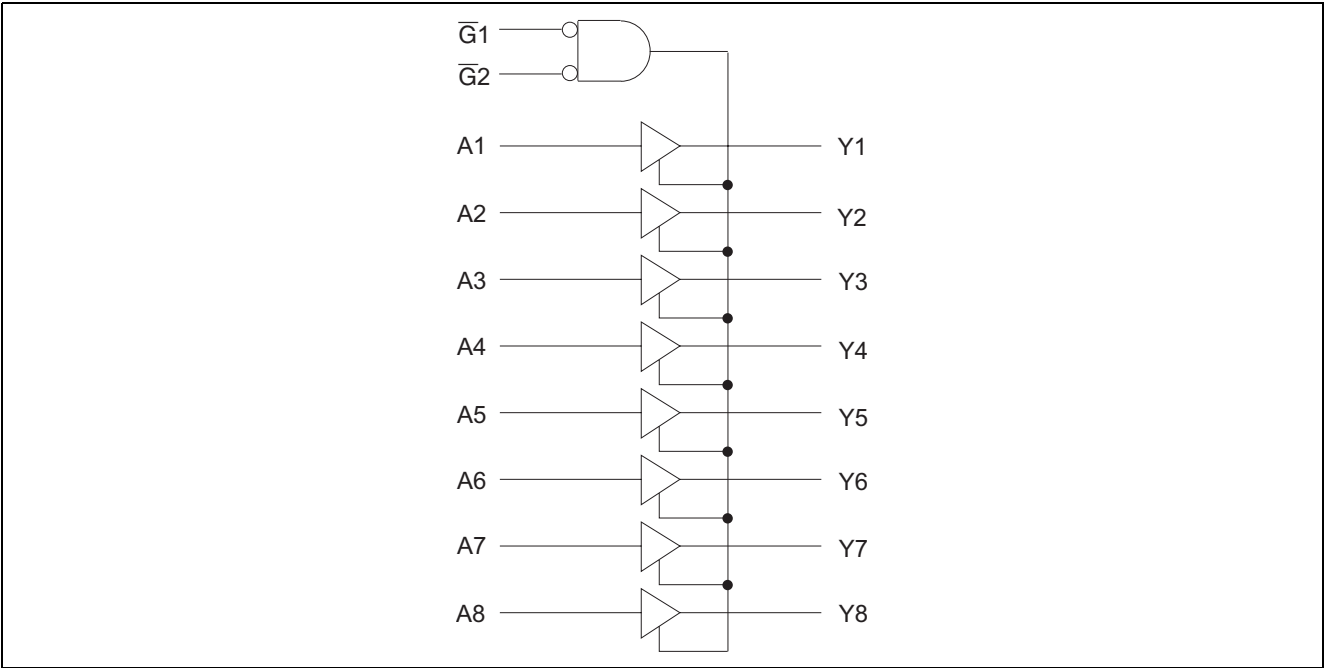
## Recommended Operating Conditions

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
Output 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



**Electrical Characteristics** ( $T_a = -40$  to  $+85^\circ\text{C}$ )

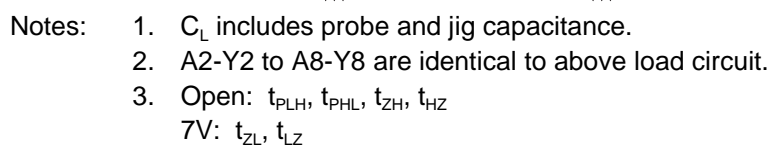
Item	Symbol	$V_{CC}(\text{V})$	Min	Max	Unit	Test Conditions
Input voltage	$V_{IH}$		2.0	—	V	
	$V_{IL}$		—	0.8	V	
Output voltage	$V_{OH}$	4.5	2.4	—	V	$I_{OH} = -3 \text{ mA}$
		4.5	2.0	—	V	$I_{OH} = -15 \text{ mA}$
	$V_{OL}$	4.5	—	0.5	V	$I_{OL} = 48 \text{ mA}$
		4.5	—	0.55	V	$I_{OL} = 64 \text{ mA}$
Input diode voltage	$V_{IK}$	4.5	—	-1.2	V	$I_{IN} = -18 \text{ mA}$
Input current	$I_I$	5.5	—	-250	$\mu\text{A}$	$V_{IN} = 0 \text{ V}$
		5.5	—	1.0	$\mu\text{A}$	$V_{IN} = 5.5 \text{ V}$
		5.5	—	100	$\mu\text{A}$	$V_{IN} = 7.0 \text{ V}$
Short circuit output current*1	$I_{OS}$	5.5	-100	-225	mA	$V_{IN} = 0$ or $5.5 \text{ V}$
Off state output current	$I_{OZH}$	5.5	—	50	$\mu\text{A}$	$V_O = 2.7 \text{ V}$
	$I_{OZL}$	5.5	—	-50	$\mu\text{A}$	$V_O = 0.5 \text{ V}$
Supply current	$I_{CCL}$	5.5	—	29.5	mA	$V_{IN} = V_{CC}$ or GND All outputs is "L"
	$I_{CCH}$	5.5	—	0.5	mA	$V_{IN} = V_{CC}$ or GND All outputs is "H"
	$I_{CCZ}$	5.5	—	2.5	mA	$V_{IN} = V_{CC}$ or GND All outputs is "Z"
	$I_{CCT}$ *2	5.5	—	1.5	mA	$V_{IN} = 3.4\text{V}$ or $0.5\text{V}$

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

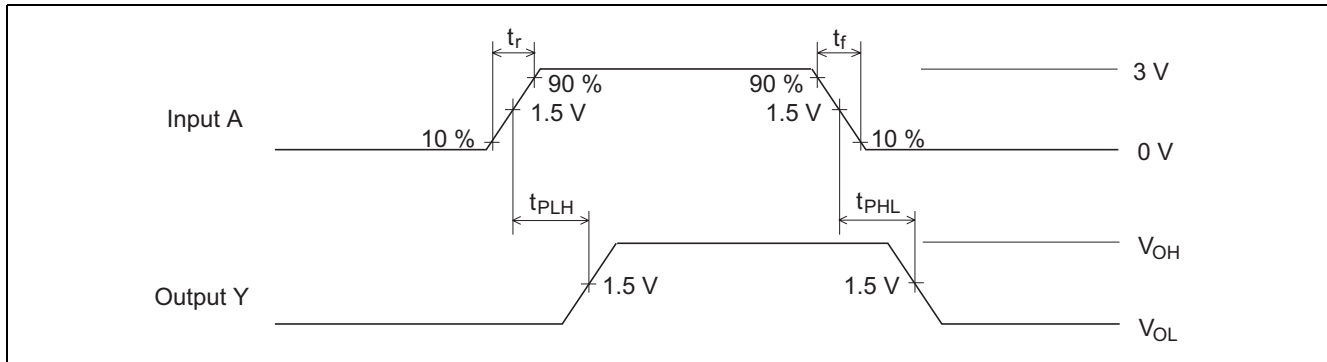
2. When input by the TTL level, it shows  $I_{CC}$  increase at per one input pin.

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

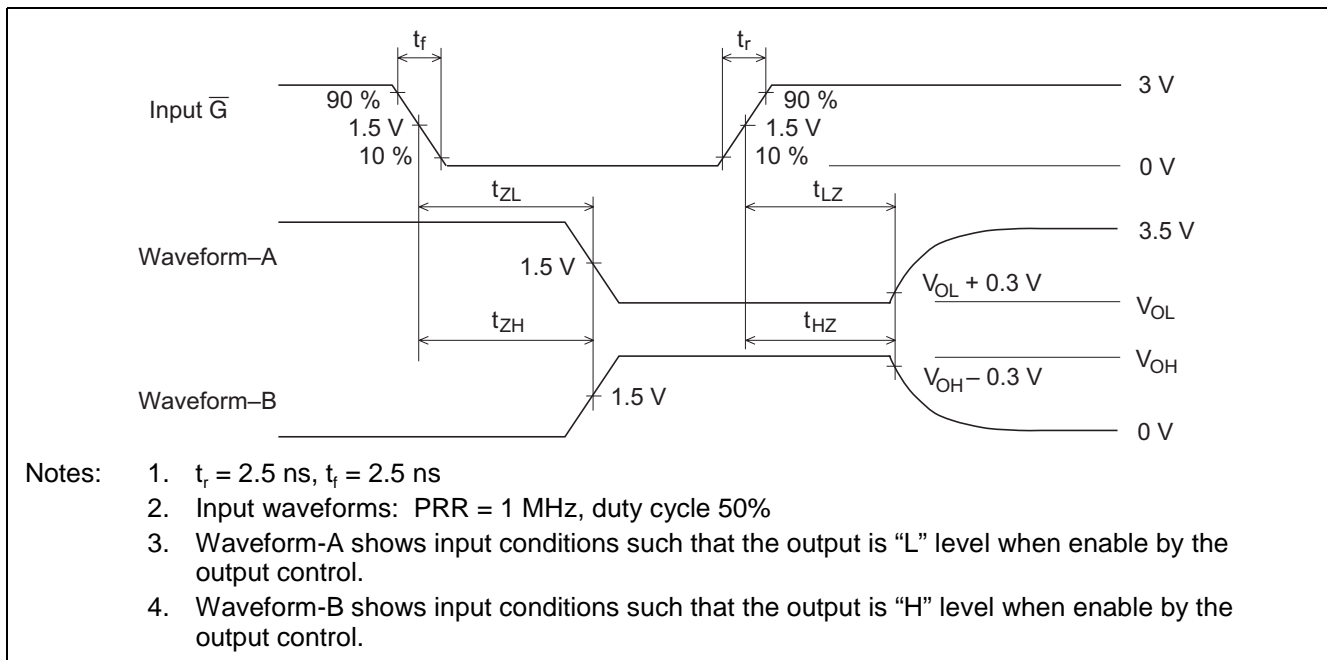
Item	Symbol	Ta = 25°C VCC = 5.0 V		Ta = −40 to +85°C VCC = 5.0 V ±10%		Unit	Test Conditions
		Min	Max	Min	Max		
Propagation delay time	tPLH	3.0	6.0	3.0	7.0	ns	See under figure
	tPHL	3.0	6.0	3.0	7.0		
Output enable time	tZH	3.0	9.0	3.0	11.0	ns	
	tZL	3.0	9.0	3.0	11.0		
Output disable time	tHZ	3.0	8.0	3.0	10.0	ns	
	tLZ	3.0	8.0	3.0	10.0		
Input capacitance	CIN	3.0 (Typ)		—		pF	VIN = VCC or GND
Output capacitance	CO	15.0 (Typ)		—		pF	VO = VCC or GND



## Waveforms-1

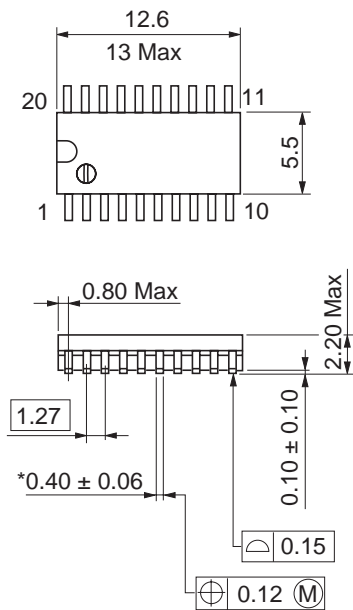


## Waveforms-2

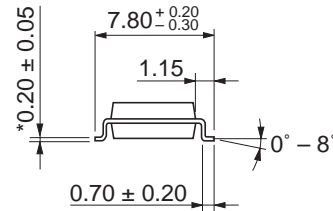
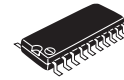


# Package Dimensions

As of January, 2003  
Unit: mm



\*Ni/Pd/Au plating



Package Code	FP-20DAV
JEDEC	—
JEITA	Conforms
Mass (reference value)	0.31 g

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