
HD74BC240A

Octal Buffers/Line Drivers With 3 State Outputs

HITACHI

ADE-205-006A(Z)
2nd Edition
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Description

The HD74BC240A 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. This device is a non inverting buffer and has two active low enables ($\overline{1G}$ and $\overline{2G}$). Each enable independently controls 4 buffers.

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.
- TTL level input
- Wide operating temperature range
Ta = -40 to + 85°C

Function Table

Inputs

| \overline{G} | A | Output \overline{Y} |
|----------------|---|-----------------------|
| H | X | Z |
| L | H | L |
| L | L | H |

H : High level

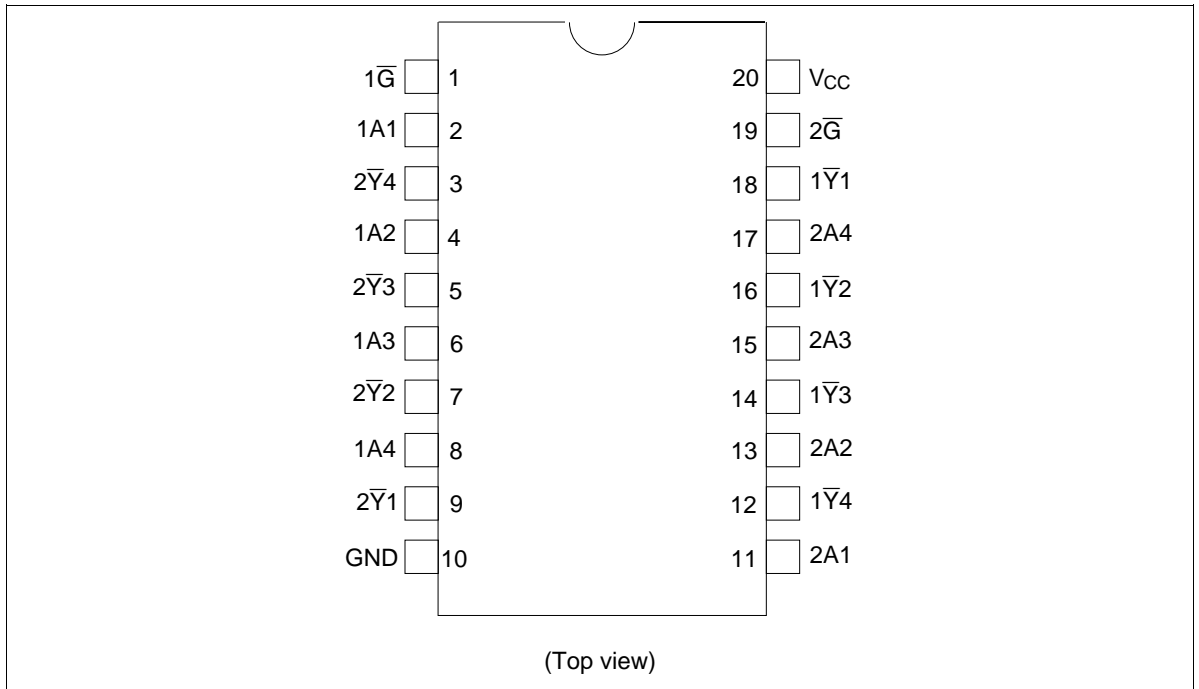
L : Low level

X : Immaterial

Z : High impedance

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Pin Arrangement



Absolute Maximum Ratings

| Item | Symbol | Rating | Unit |
|--------------------------|-----------------------|--------------|------|
| Supply voltage | V _{CC} | -0.5 to +7.0 | V |
| Input diode current | I _{IK} | ±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 |

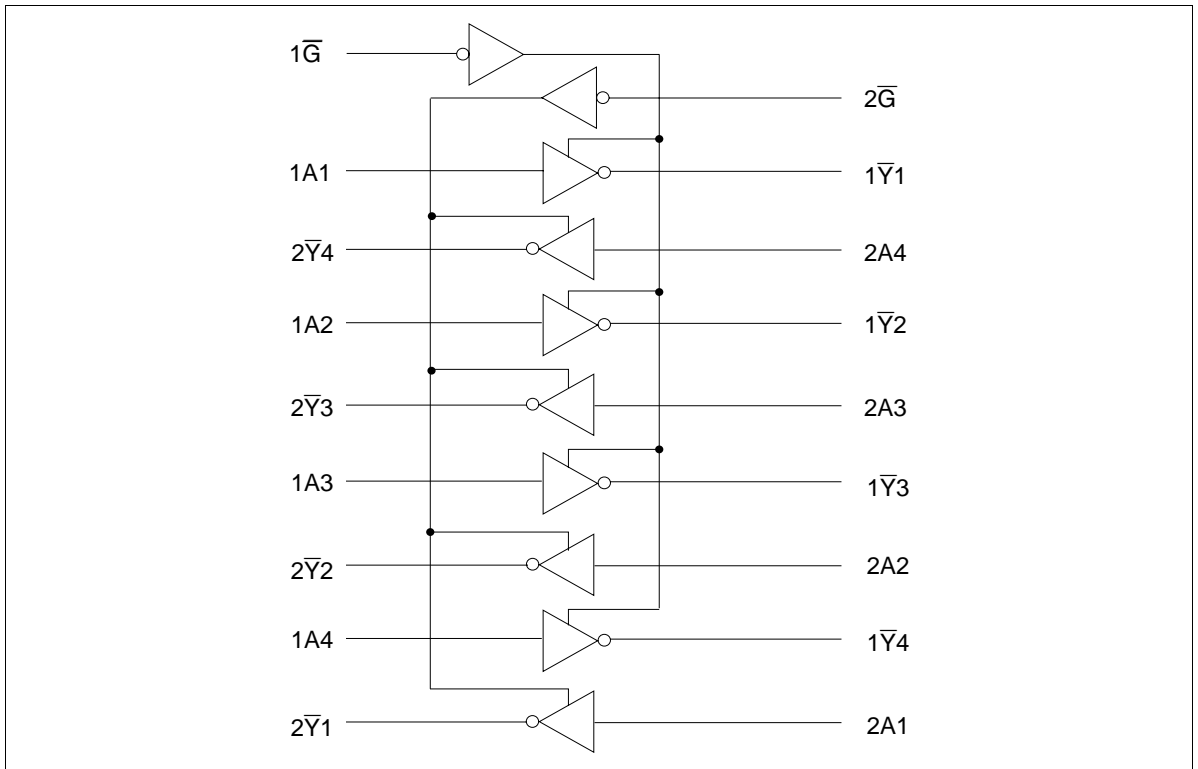
Note: 1. The absolute maximum ratings are values which must not individually be exceeded, and furthermore, no two of which may be realized at the same time.

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



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

| Item | Symbol | V _{cc} (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 mA |
| | | 4.5 | 2.0 | — | V | I _{OH} = -15 mA |
| | V _{OL} | 4.5 | — | 0.5 | V | I _{OL} = 48 mA |
| | | 4.5 | — | 0.55 | V | I _{OL} = 64 mA |
| Input diode voltage | V _{IK} | 4.5 | — | -1.2 | V | I _{IN} = -18 mA |
| Input current | I _I | 5.5 | — | -250 | μA | V _{IN} = 0 V |
| | | 5.5 | — | 1.0 | μA | V _{IN} = 5.5 V |
| | | 5.5 | — | 100 | μA | V _{IN} = 7.0 V |
| Short circuit output current*1 | I _{OS} | 5.5 | -100 | -225 | mA | V _{IN} = 0 or 5.5 V |
| Off state output current | I _{OZH} | 5.5 | — | 50 | μA | V _O = 2.7 V |
| | I _{OZL} | 5.5 | — | -50 | μA | V _O = 0.5 V |
| Supply current | I _{CCL} | 5.5 | — | 27.5 | mA | V _{IN} = 0 or 5.5 V All outputs is "L" |
| | I _{CCH} | 5.5 | — | 2.5 | mA | V _{IN} = 0 or 5.5 V All outputs is "H" |
| | I _{CCZ} | 5.5 | — | 2.5 | mA | V _{IN} = 0 or 5.5 V All outputs is "Z" |
| | I _{CCT} *2 | 5.5 | — | 1.5 | mA | V _{IN} = 3.4 or 0.5 V |

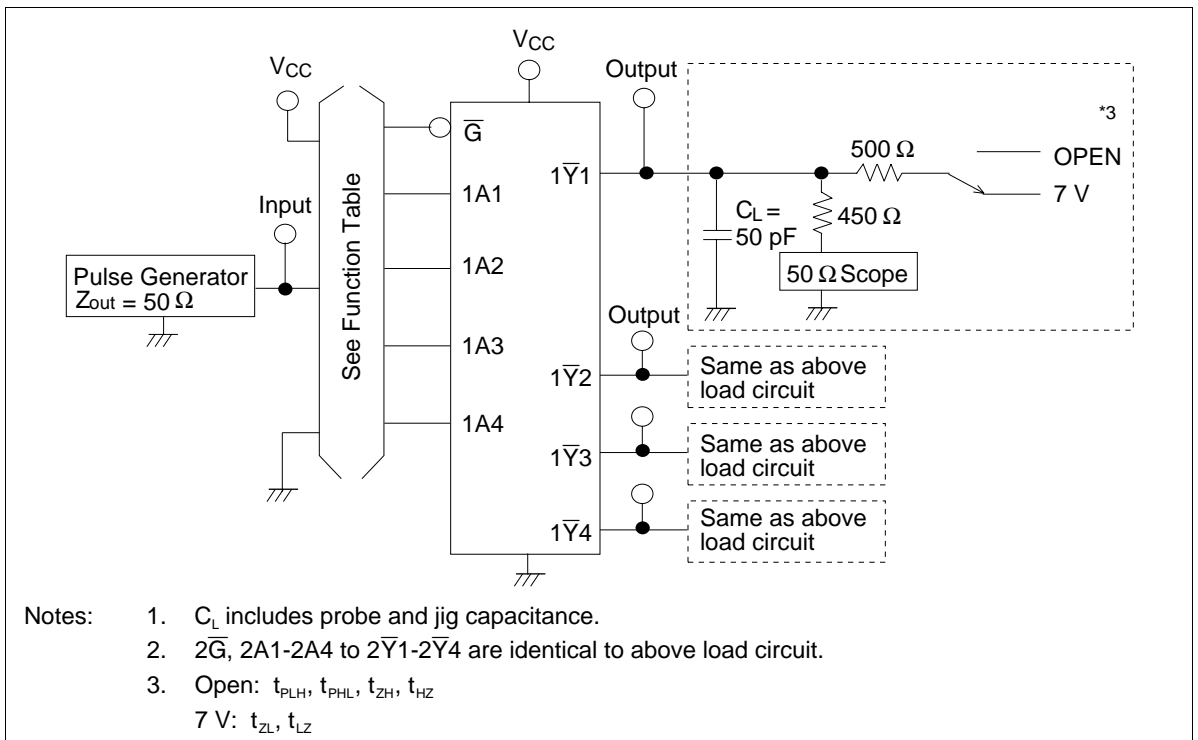
Notes: 1. Not more than one output should be shorted at a time and duration of the short circuit should not exceed one second.

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

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

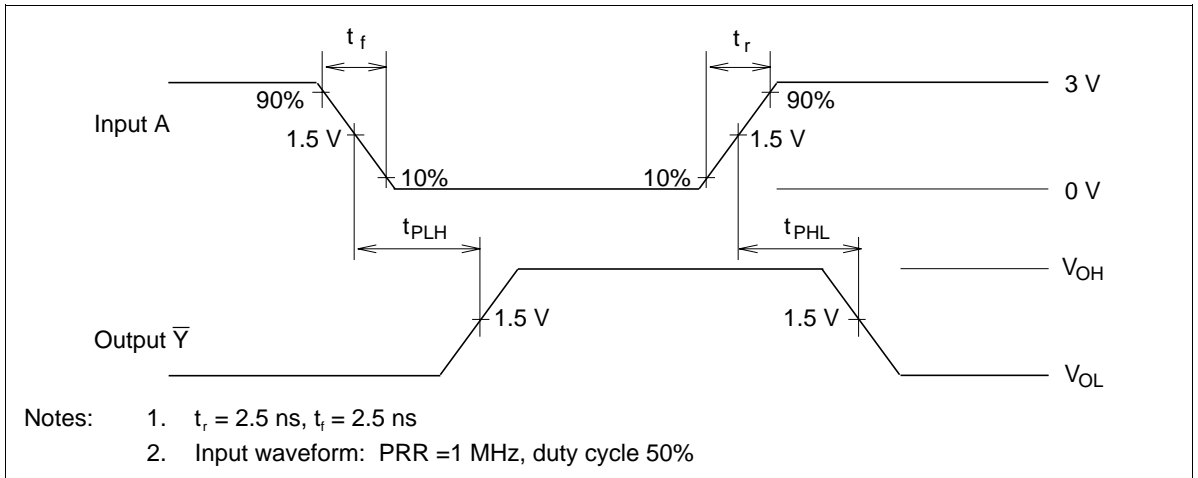
| Item | Symbol | $T_a = 25^\circ\text{C}$ $V_{CC} = 5.0 \text{ V}$ | | $T_a = -40 \text{ to } 85^\circ\text{C}$ $V_{CC} = 5.0 \text{ V} \pm 10\%$ | | Unit | Test Conditions |
|------------------------|-----------|--|-----|---|------|------|----------------------------------|
| | | Min | Max | Min | Max | | |
| Propagation delay time | t_{PLH} | 3.0 | 6.0 | 3.0 | 7.0 | ns | See under figure |
| | t_{PHL} | 3.0 | 6.0 | 3.0 | 7.0 | | |
| Output enable time | t_{ZH} | 3.0 | 8.0 | 3.0 | 10.0 | ns | |
| | t_{ZL} | 3.0 | 8.0 | 3.0 | 10.0 | | |
| Output disable time | t_{HZ} | 3.0 | 7.0 | 3.0 | 9.0 | ns | |
| | t_{LZ} | 3.0 | 7.0 | 3.0 | 9.0 | | |
| Input capacitance | C_{IN} | 3.0(Typ) | | — | | pF | $V_{IN} = V_{CC} \text{ or GND}$ |
| Output capacitance | C_O | 15.0(Typ) | | — | | pF | $V_O = V_{CC} \text{ or GND}$ |

Test Circuit

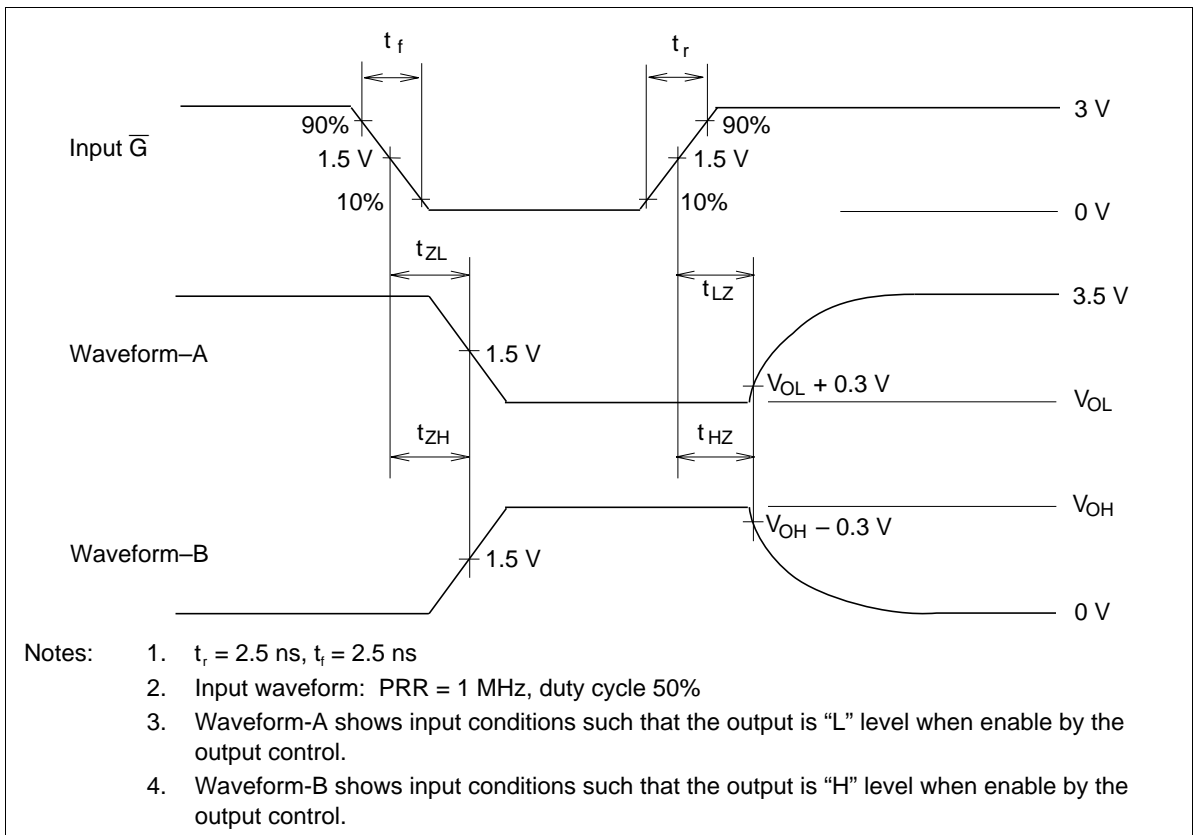


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Waveforms-1



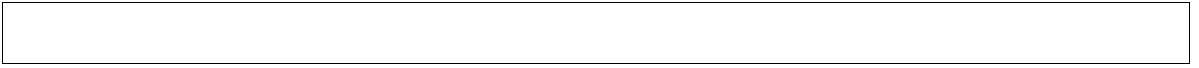
Waveforms-2



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Package Dimensions

Unit: mm



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