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# HD151005

## Octal Inverter Buffers/Drivers With Open Drain High Voltage Outputs

# HITACHI

ADE-205-594 (Z)  
1st. Edition  
Dec. 2000

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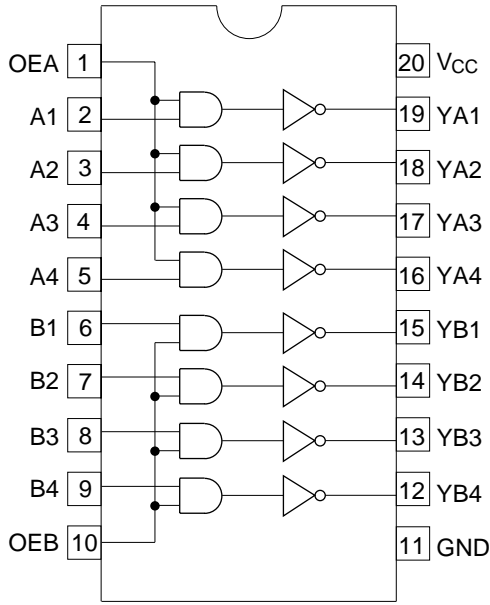
### Description

The HD151005 features octal inverter buffers and drivers with open drain high voltage outputs with N channel power MOSFET.

### Features

- Wired connection available with open drain outputs
- Output voltage: 30 V Max
- Output current: 100 mA Max
- Ensures  $V_{OL}$  0.4 V when the output current is 48 mA
- Low power dissipation: 10  $\mu$ A

## Pin Arrangement



(Top view)

## Function Table

Inputs		Outputs		Inputs		Outputs	
OEA	A	YA		OEB	B	YB	
H	L	Z		H	L	Z	
H	H	L		H	H	L	
L	X	Z		L	X	Z	

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

**Absolute Maximum Ratings** ( $T_a = 25^\circ\text{C}$ )

Item	Symbol	Ratings	Unit
Supply voltage	$V_{CC}$	0.5 to 7.0	V
Input voltage	$V_{IN}$	-0.5 to $V_{CC} + 0.5$	V
Input Current	$I_{IN}$	-10 to +0.1	mA
Output voltage	$V_{OUT}$	-0.5 to +30	V
Output Current	$I_{OUT}$	+100	mA/Unit
Power Dissipation	$P_T$	835 (FP), 1375 (DP)	mW
Storage Temperature Range	$T_{stg}$	-65 to +150	$^\circ\text{C}$

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	$V_{OUT}$	—	—	24	V
Output Current	$I_{OL}$	0	48	100	mA
Operating Temperature	$T_{opr}$	0	25	70	$^\circ\text{C}$
Input Voltage	$V_{IH}$	$0.7 \times V_{CC}$	—	—	V
	$V_{IL}$	—	—	$0.3 \times V_{CC}$	V
Input Rise and Fall Time *1	$t_r, t_f$	0	—	500	ns

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

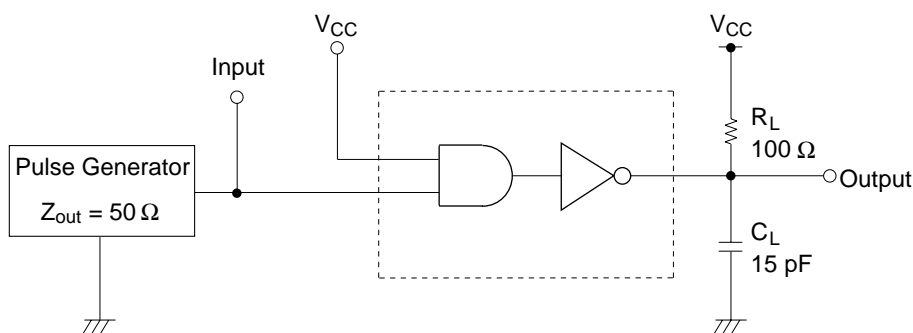
**Electrical Characteristics** (Ta = 0 to +70°C)

Item	Symbol	V <sub>CC</sub> (V)	Min	Max	Unit	Conditions
Output voltage	V <sub>OL1</sub>	4.5	—	0.2	V	I <sub>OL</sub> = 24 mA, V <sub>I</sub> = V <sub>IH</sub>
	V <sub>OL2</sub>	4.5	—	0.4	V	I <sub>OL</sub> = 48 mA, V <sub>I</sub> = V <sub>IH</sub>
	V <sub>OL3</sub>	4.5	—	0.8	V	I <sub>OL</sub> = 100 mA, V <sub>I</sub> = V <sub>IH</sub>
Output Current	I <sub>O</sub>	5.5	—	5	μA	V <sub>O</sub> = 30 V, V <sub>I</sub> = 0 V
	I <sub>O(off)</sub>	0	—	5	μA	V <sub>O</sub> = 30 V
Input voltage	V <sub>IH</sub>	5.0	3.5	—	V	V <sub>O</sub> = 0.4 V, I <sub>O</sub> ≥ 48 mA
	V <sub>IL</sub>	5.0	—	1.5	V	V <sub>O</sub> = 30 V, I <sub>O</sub> ≤ 5 mA
Input Current	I <sub>I</sub>	5.5	—	±1	μA	V <sub>I</sub> = 0 V or V <sub>CC</sub>
	I <sub>I(off)</sub>	0	—	±1	μA	V <sub>I</sub> = 5.5 V
Power Supply Current	I <sub>CC</sub>	5.5	—	10	μA	V <sub>I</sub> = 0 V or V <sub>CC</sub> , No Load

**Switching Characteristics** (Ta = 25°C, V<sub>CC</sub> = 5 V)

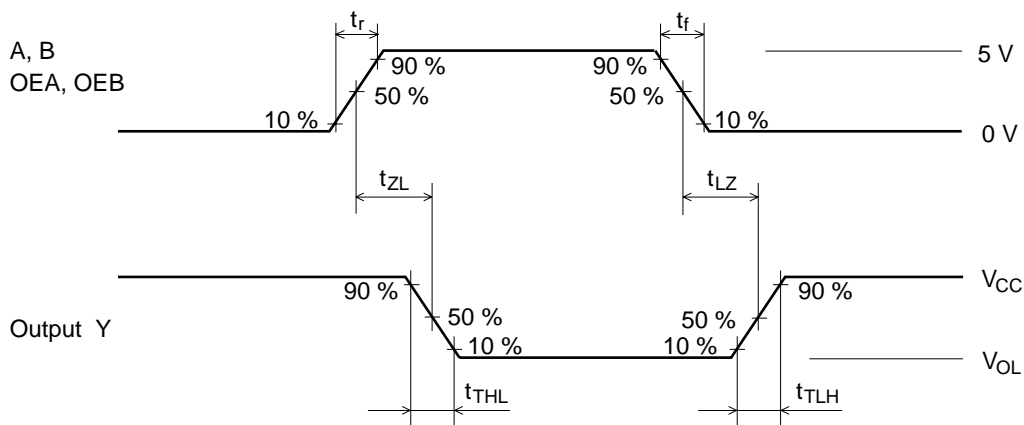
Item	Symbol	Min	Typ	Max	Unit	Conditions
Propagation Delay Time	t <sub>ZL</sub>	—	15	30	ns	See next page
	t <sub>LZ</sub>	—	20	30	ns	See next page
Transition Time	t <sub>THL</sub>	—	10	30	ns	See next page
	t <sub>TLH</sub>	—	15	30	ns	See next page
Input Capacitance	C <sub>IN</sub>	—	7	15	pF	See next page
Power Dissipation Capacitance	C <sub>PD</sub>	—	30	—	pF	See next page

Test Circuit



Note: 1.  $C_L$  includes probe and jig capacitance.

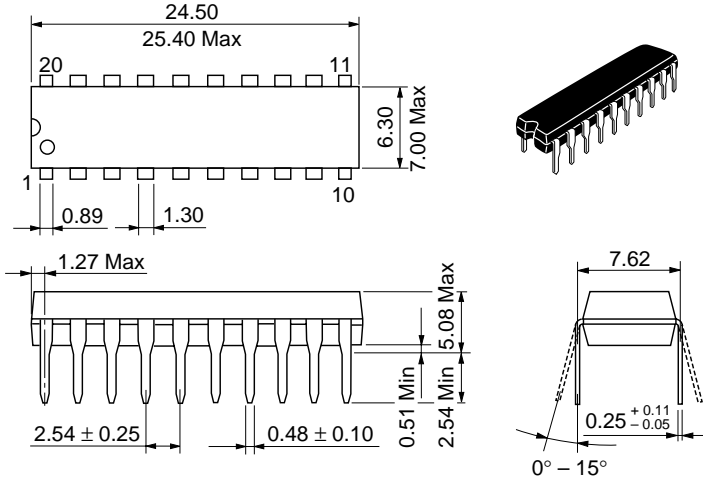
Waveforms-1



Notes: 1.  $t_r = 5 \text{ ns}$ ,  $t_f = 5 \text{ ns}$   
 2. Input waveforms: PRR = 1 MHz, duty cycle 50%

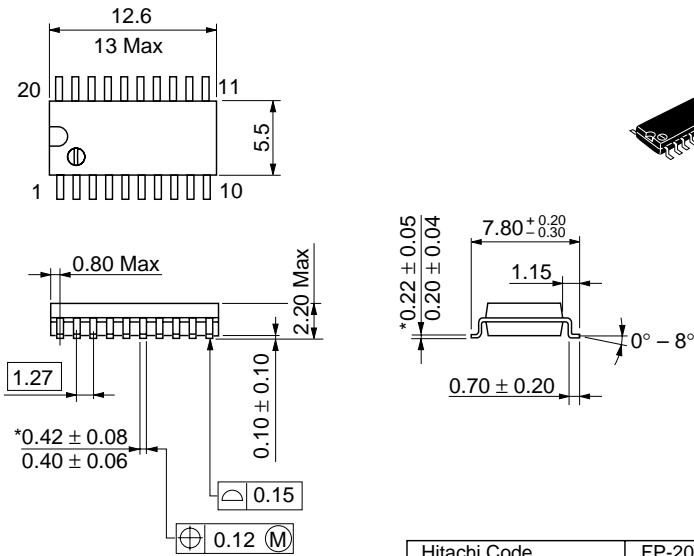
## Package Dimensions

Unit: mm



Hitachi Code	DP-20N
JEDEC	—
EIAJ	Conforms
Mass (reference value)	1.26 g

Unit: mm



Hitachi Code	FP-20DA
JEDEC	—
EIAJ	Conforms
Mass (reference value)	0.31 g

\*Dimension including the plating thickness  
Base material dimension

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