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# HD74AC153

## Dual 4-Input Multiplexer

# HITACHI

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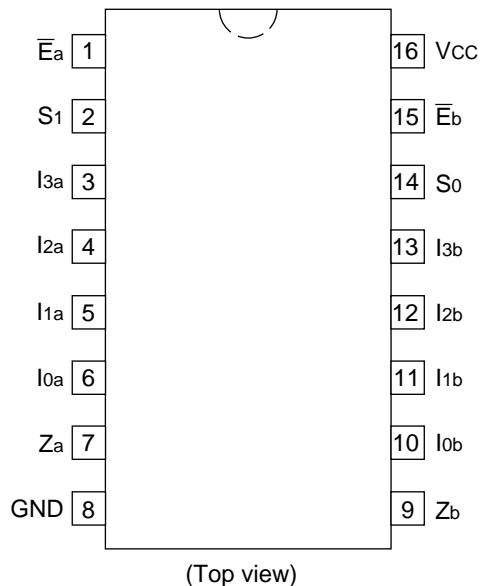
### Description

The HD74AC153 is a high-speed dual 4-input multiplexer with common select inputs and individual enable inputs for each section. It can select two lines of data from four sources. The two buffered outputs present data in the true (noninverted) form. In addition to multiplexer operation, the HD74AC153 can act as a function generator and generate any two functions of three variables.

### Feature

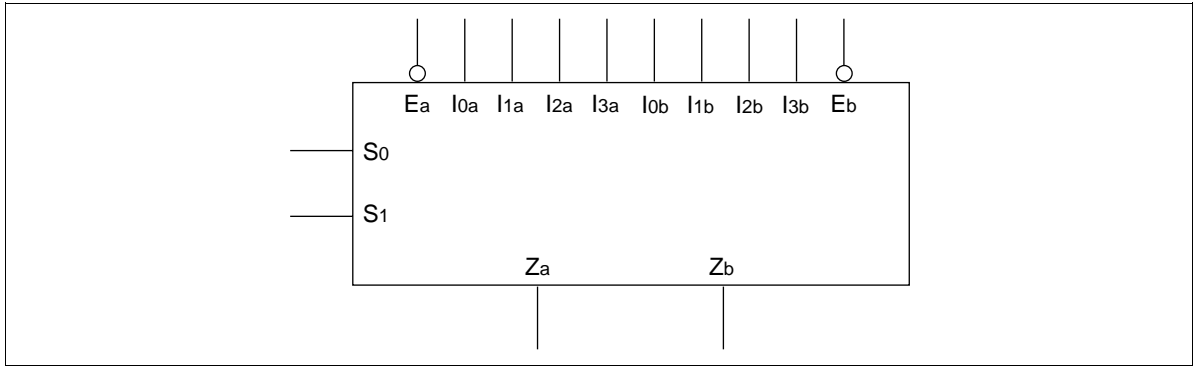
- Outputs Source/Sink 24 mA

### Pin Arrangement



# HD74AC153

## Logic Symbol



## Pin Names

$I_{0a}$  to  $I_{3a}$  Side A Data Inputs

$I_{0b}$  to  $I_{3b}$  Side B Data Inputs

$S_0, S_1$  Common Select Inputs

$\bar{E}_a$  Side A Enable Input

$\bar{E}_b$  Side B Enable Input

$Z_a$  Side A Output

$Z_b$  Side B Output

## Functional Description

The HD74AC153 is a dual 4-input multiplexer. It can select two bits of data from up to four sources under the control of the common Select inputs ( $S_0, S_1$ ). The two 4-input multiplexer circuits have individual active-Low Enables ( $\bar{E}_a, \bar{E}_b$ ) which can be used to strobe the outputs independently. When the Enables ( $\bar{E}_a, \bar{E}_b$ ) are High, the corresponding outputs ( $Z_a, Z_b$ ) are forced Low. The HD74AC153 is the logic implementation of a 2-pole, 4-position switch, where the position of the switch is determined by the logic levels supplied to the two Select inputs. The logic equations for the outputs are shown below.

$$Z_a = \bar{E}_a \cdot (I_{0a} \cdot \bar{S}_1 \cdot \bar{S}_0 + I_{1a} \cdot \bar{S}_1 \cdot S_0 + I_{2a} \cdot S_1 \cdot \bar{S}_0 + I_{3a} \cdot S_1 \cdot S_0)$$

$$Z_b = \bar{E}_b \cdot (I_{0b} \cdot \bar{S}_1 \cdot \bar{S}_0 + I_{1b} \cdot \bar{S}_1 \cdot S_0 + I_{2b} \cdot S_1 \cdot \bar{S}_0 + I_{3b} \cdot S_1 \cdot S_0)$$

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**Truth Table**

Select Inputs		Input (a or b)					Output
S <sub>0</sub>	S <sub>1</sub>	$\bar{E}$	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	Z
X	X	H	X	X	X	X	L
L	L	L	L	X	X	X	L
L	L	L	H	X	X	X	H
H	L	L	X	L	X	X	L
H	L	L	X	H	X	X	H
L	H	L	X	X	L	X	L
L	H	L	X	X	H	X	H
H	H	L	X	X	X	L	L
H	H	L	X	X	X	H	H

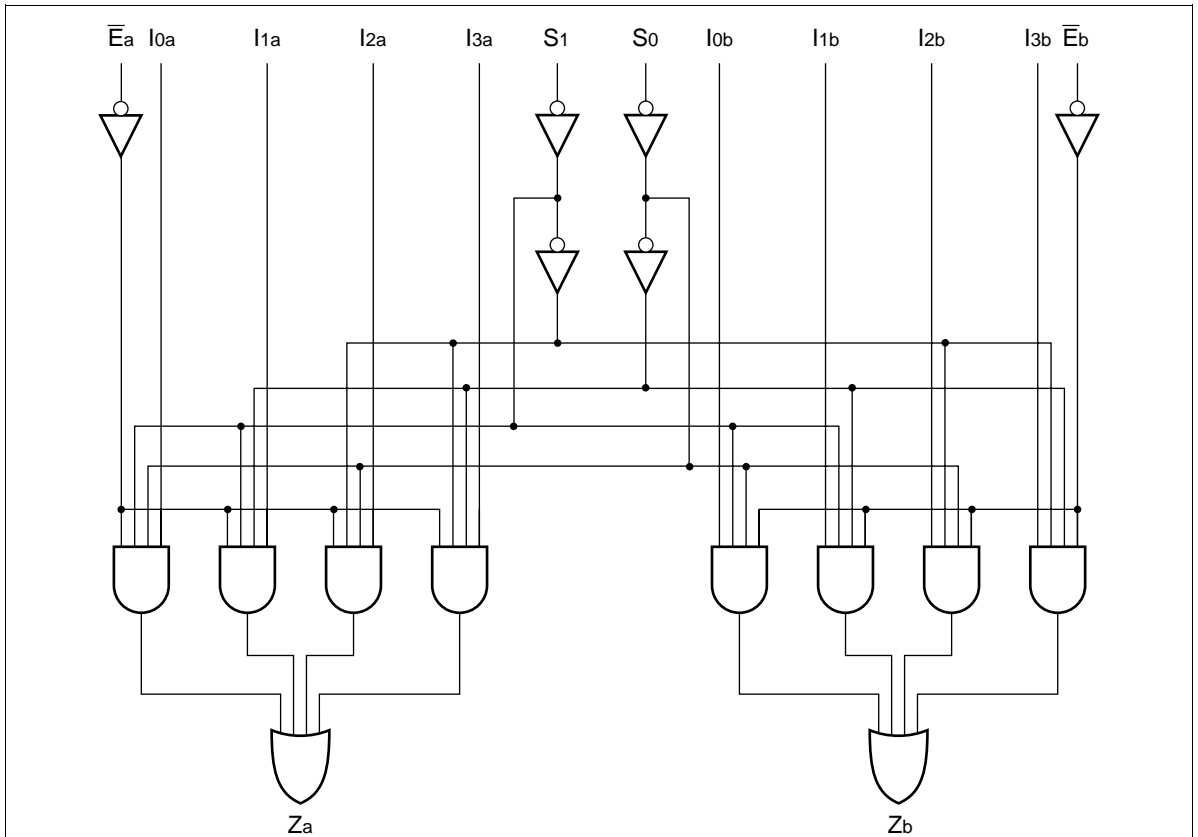
H : High Voltage Level

L : Low Voltage Level

X : Immaterial

# HD74AC153

## Logic Diagram



Please note that this diagram is provided only for the understanding of logic operations and should not be used to estimate propagation delays.

## DC Characteristics (unless otherwise specified)

Item	Symbol	Max	Unit	Condition
Maximum quiescent supply current	$I_{CC}$	80	$\mu A$	$V_{IN} = V_{CC}$ or ground, $V_{CC} = 5.5 V$ , $T_a = \text{Worst case}$
Maximum quiescent supply current	$I_{CC}$	8.0	$\mu A$	$V_{IN} = V_{CC}$ or ground, $V_{CC} = 5.5 V$ , $T_a = 25^\circ C$

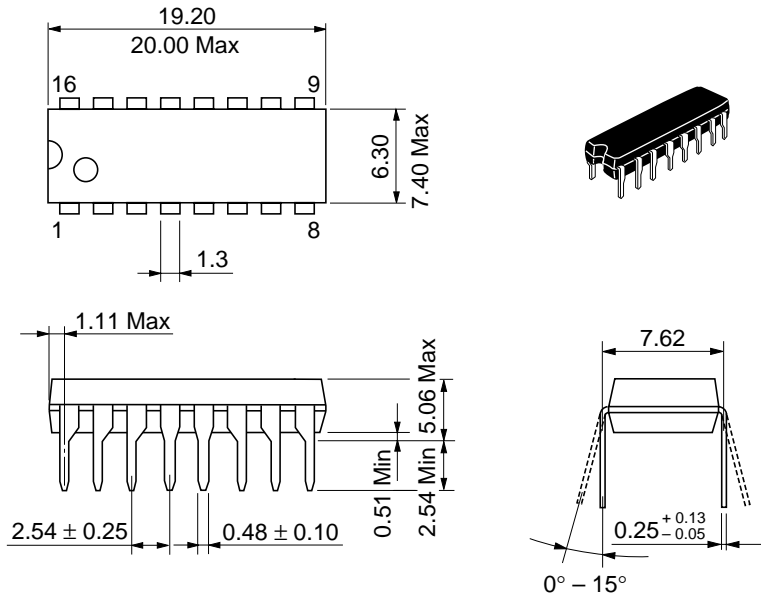
AC Characteristics: HD74AC153

Item	Symbol	V <sub>CC</sub> (V)* <sup>1</sup>	Ta = +25°C C <sub>L</sub> = 50 pF			Ta = -40°C to +85°C C <sub>L</sub> = 50 pF		Unit
			Min	Typ	Max	Min	Max	
Propagation delay S <sub>n</sub> to Z <sub>n</sub>	t <sub>PLH</sub>	3.3	1.0	9.5	15.0	1.0	17.5	ns
		5.0	1.0	6.5	11.0	1.0	12.5	
Propagation delay S <sub>n</sub> to Z <sub>n</sub>	t <sub>PHL</sub>	3.3	1.0	8.5	14.5	1.0	16.5	ns
		5.0	1.0	6.5	11.0	1.0	12.0	
Propagation delay E <sub>n</sub> to Z <sub>n</sub>	t <sub>PLH</sub>	3.3	1.0	8.0	13.5	1.0	16.0	ns
		5.0	1.0	5.5	9.5	1.0	11.0	
Propagation delay E <sub>n</sub> to Z <sub>n</sub>	t <sub>PHL</sub>	3.3	1.0	7.0	11.0	1.0	12.5	ns
		5.0	1.0	5.0	8.0	1.0	9.0	
Propagation delay I <sub>n</sub> to Z <sub>n</sub>	t <sub>PLH</sub>	3.3	1.0	7.5	12.5	1.0	14.5	ns
		5.0	1.0	5.5	9.0	1.0	10.5	
Propagation delay I <sub>n</sub> to Z <sub>n</sub>	t <sub>PHL</sub>	3.3	1.0	7.0	11.5	1.0	13.0	ns
		5.0	1.0	5.0	8.5	1.0	10.0	

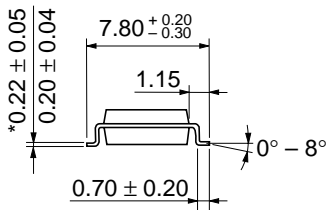
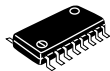
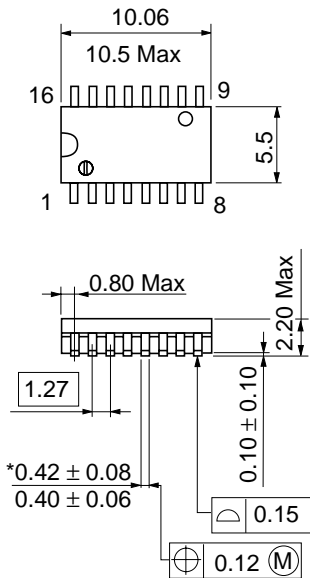
Note: 1. Voltage Range 3.3 is 3.3 V ± 0.3 V  
Voltage Range 5.0 is 5.0 V ± 0.5 V

Capacitance

Item	Symbol	Typ	Unit	Condition
Input capacitance	C <sub>IN</sub>	4.5	pF	V <sub>CC</sub> = 5.5 V
Power dissipation capacitance	C <sub>PD</sub>	65.0	pF	V <sub>CC</sub> = 5.0 V



Hitachi Code	DP-16
JEDEC	Conforms
EIAJ	Conforms
Weight (reference value)	1.07 g



\*Dimension including the plating thickness  
 Base material dimension

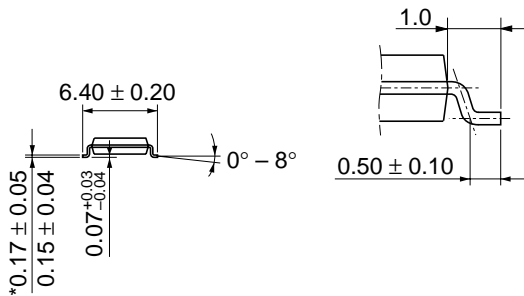
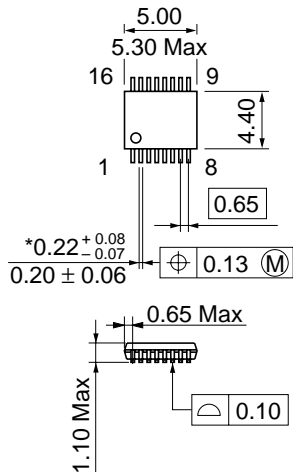
Hitachi Code	FP-16DA
JEDEC	—
EIAJ	Conforms
Weight (reference value)	0.24 g



\*Dimension including the plating thickness  
Base material dimension

Hitachi Code	FP-16DN
JEDEC	Conforms
EIAJ	Conforms
Weight (reference value)	0.15 g





\*Dimension including the plating thickness  
 Base material dimension

Hitachi Code	TTP-16DA
JEDEC	—
EIAJ	—
Weight (reference value)	0.05 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 North America : <http://semiconductor.hitachi.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 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 Europe Ltd.  
Electronic Components Group.  
Whitebrook Park  
Lower Cookham Road  
Maidenhead  
Berkshire SL6 8YA, United Kingdom  
Tel: <44> (1628) 585000  
Fax: <44> (1628) 778322

Hitachi Asia Pte. Ltd.  
16 Collyer Quay #20-00  
Hitachi Tower  
Singapore 049318  
Tel: 535-2100  
Fax: 535-1533

Hitachi Asia Ltd.  
Taipei Branch Office  
3F, Hung Kuo Building, No.167,  
Tun-Hwa North Road, Taipei (105)  
Tel: <886> (2) 2718-3666  
Fax: <886> (2) 2718-8180

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  
Telex: 40815 HITEC HX

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