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# HD74AC157

## Quad 2-Input Multiplexer

# HITACHI

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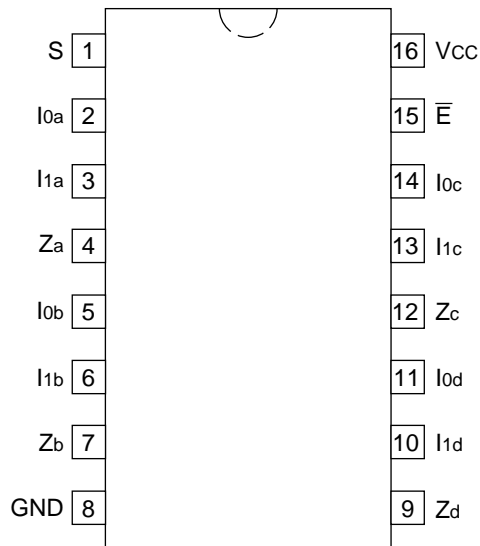
### Description

The HD74AC157 is a high-speed quad 2-input multiplexer. Four bits of data from two sources can be selected using the common Select and Enable inputs. The four outputs present the selected data in the true (noninverted) form. The HD74AC157 can also be used as a function generator.

### Feature

- Outputs Source/Sink 24 mA

### Pin Arrangement



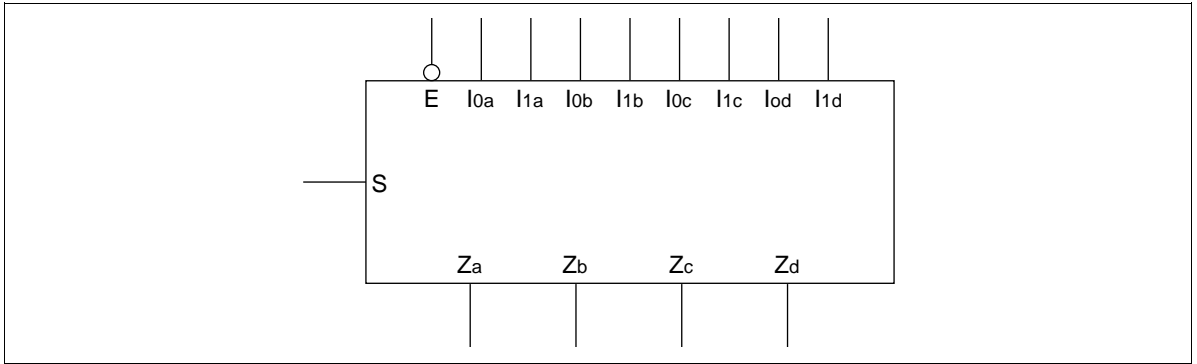
(Top view)

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# HD74AC157

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## Logic Symbol



## Pin Names

- $I_{0a}$  to  $I_{0d}$  Source 0 Data Inputs
- $I_{1a}$  to  $I_{1d}$  Source 1 Data Inputs
- $\bar{E}$  Enable Input
- S Select Input
- $\bar{Z}_a$  to  $\bar{Z}_d$  Outputs

## Functional Description

The HD74AC157 is a quad 2-input multiplexer. It selects four bits of data from two sources under the control of a common Select input (S). The Enable input ( $\bar{E}$ ) is active-Low. when  $\bar{E}$  is High, all of the outputs (Z) are forced Low regardless of all other inputs. The HD74AC157 is the logic implementation of a 4-pole, 2-position switch where the position of the switch is determined by the logic levels supplied to the Select input. The logic equations for the outputs are shown below:

$$\begin{aligned} Z_a &= \bar{E} \cdot (I_{1a} \cdot S + I_{0a} \cdot \bar{S}) \\ Z_b &= \bar{E} \cdot (I_{1b} \cdot S + I_{0b} \cdot \bar{S}) \\ Z_c &= \bar{E} \cdot (I_{1c} \cdot S + I_{0c} \cdot \bar{S}) \\ Z_d &= \bar{E} \cdot (I_{1d} \cdot S + I_{0d} \cdot \bar{S}) \end{aligned}$$

A common use of the HD74AC157 is the moving of data from two groups of register to four common output busses. The particular register from which the data comes is determined by the state of the Select input. A less obvious use is as a function generator. The HD74AC157 can generate any four of the sixteen different functions of two variables with one variable common. This is useful for implementing gating functions.

**Truth Table**

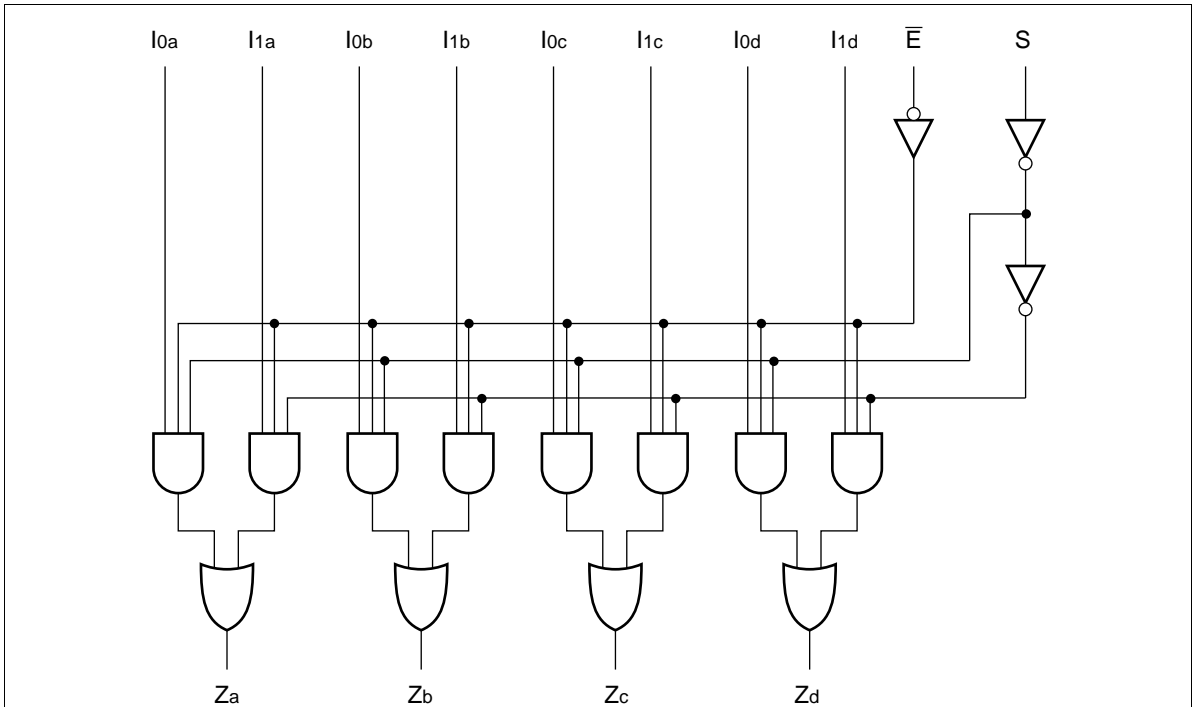
Inputs				Output
E	S	I <sub>0</sub>	I <sub>1</sub>	Z
H	X	X	X	L
L	H	X	L	L
L	H	X	H	H
L	L	L	X	L
L	L	H	X	H

H : High Voltage Level

L : Low Voltage Level

X : Immaterial

**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.

# HD74AC157

## 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: HD74AC157

Item	Symbol	$V_{CC} (V)^{*1}$	$T_a = +25^\circ C$ $C_L = 50 pF$			$T_a = -40^\circ C \text{ to } +85^\circ C$ $C_L = 50 pF$		Unit
			Min	Typ	Max	Min	Max	
Propagation delay	$t_{PLH}$	3.3	1.0	7.0	11.5	1.0	13.0	ns
S to $Z_n$		5.0	1.0	5.5	9.0	1.0	10.0	
Propagation delay	$t_{PHL}$	3.3	1.0	6.5	11.0	1.0	12.0	ns
S to $Z_n$		5.0	1.0	5.0	8.5	1.0	9.5	
Propagation delay	$t_{PLH}$	3.3	1.0	7.0	11.5	1.0	13.0	ns
$\bar{E}$ to $Z_n$		5.0	1.0	5.5	9.0	1.0	10.0	
Propagation delay	$t_{PHL}$	3.3	1.0	6.5	11.0	1.0	12.0	ns
$\bar{E}$ to $Z_n$		5.0	1.0	5.5	9.0	1.0	9.5	
Propagation delay	$t_{PLH}$	3.3	1.0	5.0	8.5	1.0	9.0	ns
$I_n$ to $Z_n$		5.0	1.0	4.0	6.5	1.0	7.0	
Propagation delay	$t_{PHL}$	3.3	1.0	5.0	8.0	1.0	9.0	ns
$I_n$ to $Z_n$		5.0	1.0	4.0	6.5	1.0	7.0	

Note: 1. Voltage Range 3.3 is  $3.3 V \pm 0.3 V$   
Voltage Range 5.0 is  $5.0 V \pm 0.5 V$

## Capacitance

Item	Symbol	Typ	Unit	Condition
Input capacitance	$C_{IN}$	4.5	pF	$V_{CC} = 5.5 V$
Power dissipation capacitance	$C_{PD}$	50.0	pF	$V_{CC} = 5.0 V$



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



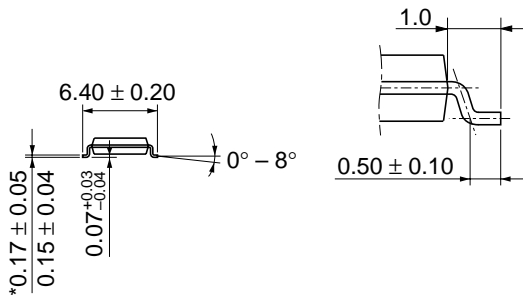
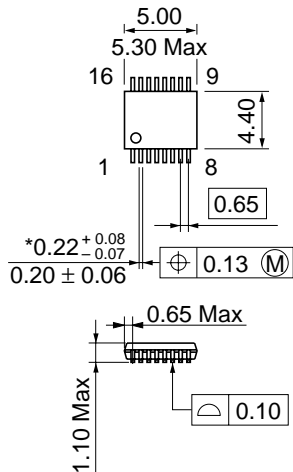
\*Dimension including the plating thickness  
Base material dimension

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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