

---

# HD74AC158

## Quad 2-Input Multiplexer

# HITACHI

---

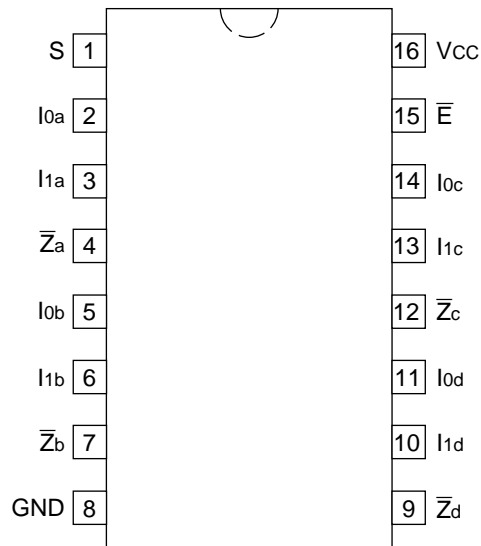
### Description

The HD74AC158 is a high-speed quad 2-input multiplexer. It selects four bits of data from two source using the common Select and Enable inputs. The four buffered outputs present the selected data in the inverted form. The HD74AC158 can also be used as a function generator.

### Feature

- Outputs Source/Sink 24 mA

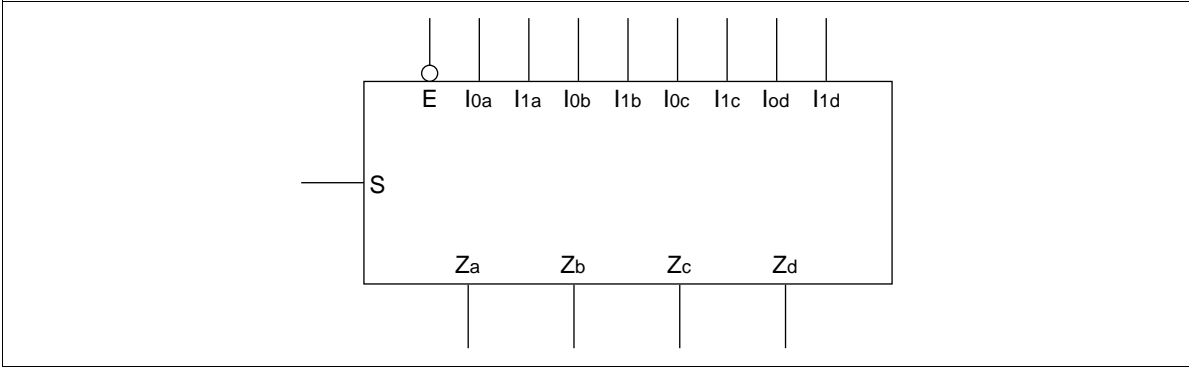
### Pin Arrangement



(Top view)

# HD74AC158

## Logic Symbol



## Pin Names

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

## Functional Description

The HD74AC158 quad 2-input multiplexer selects four bits of data from two sources under the control of a common Select input ( $S$ ) and presents the data in inverted form at the four outputs. The Enable Input ( $\overline{E}$ ) is active-LOW. When  $\overline{E}$  is HIGH, all of the outputs ( $\overline{Z}$ ) are forced HIGH regardless of all other inputs. The HD74AC158 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.

A common use of the HD74AC158 is the moving of data from two groups of registers 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 HD74AC158 can generate four functions of two variables with one variable common. This is useful for implementing gating functions.

## Truth Table

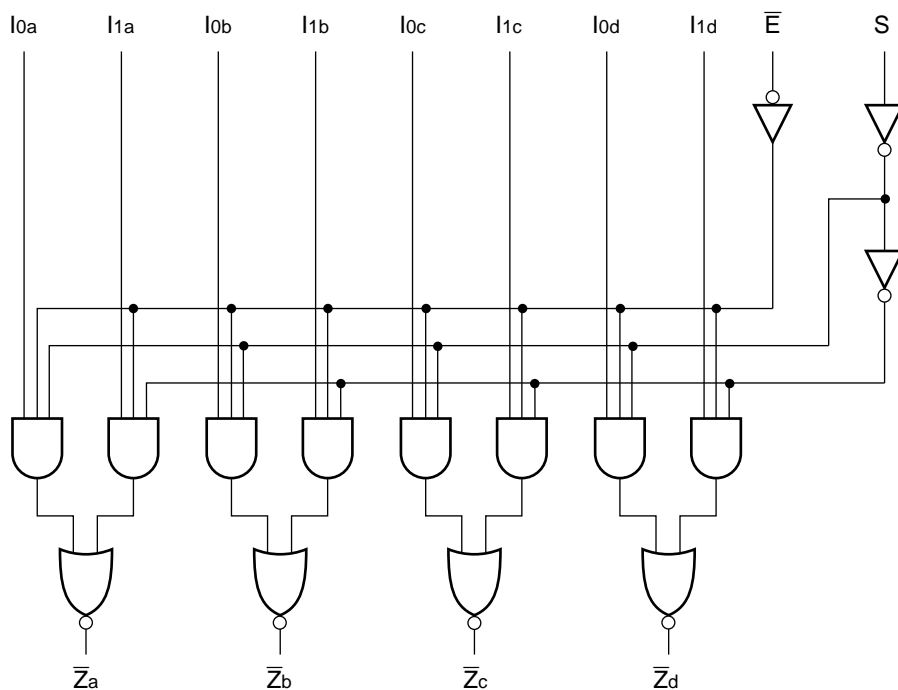
Inputs				Output
$\bar{E}$	S	$I_0$	$I_1$	Z
H	X	X	X	H
L	L	L	X	H
L	L	H	X	L
L	H	X	L	H
L	H	X	H	L

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.

# HD74AC158

## 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: HD74AC158

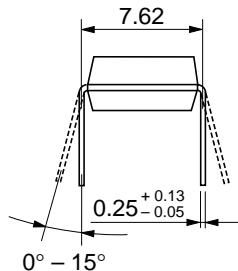
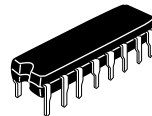
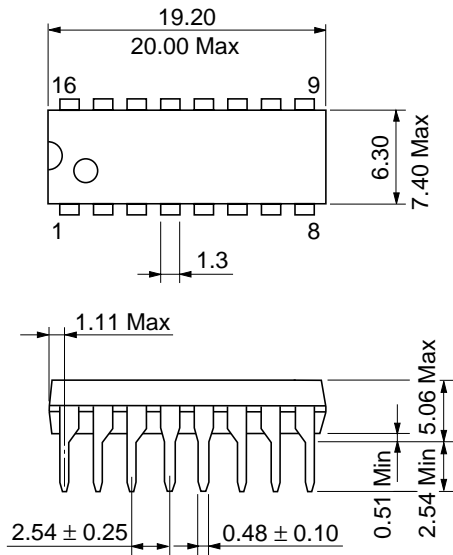
Item	Symbol	$V_{CC} (V)^{*1}$	$T_a = +25^{\circ}C$ $C_L = 50 pF$			$T_a = -40^{\circ}C \text{ to } +85^{\circ}C$ $C_L = 50 pF$		Unit
			Min	Typ	Max	Min	Max	
Propagation delay	$t_{PLH}$	3.3	1.0	7.0	11.5	1.0	12.5	ns
S to $\bar{Z}_n$		5.0	1.0	5.5	9.0	1.0	9.5	
Propagation delay	$t_{PHL}$	3.3	1.0	7.0	11.5	1.0	12.5	ns
S to $\bar{Z}_n$		5.0	1.0	5.5	9.0	1.0	10.0	
Propagation delay	$t_{PLH}$	3.3	1.0	7.5	12.0	1.0	13.0	ns
$\bar{E}$ to $\bar{Z}_n$		5.0	1.0	6.0	9.5	1.0	10.5	
Propagation delay	$t_{PHL}$	3.3	1.0	7.0	11.0	1.0	12.0	ns
$\bar{E}$ to $\bar{Z}_n$		5.0	1.0	5.5	8.5	1.0	9.5	
Propagation delay	$t_{PLH}$	3.3	1.0	5.5	9.0	1.0	10.0	ns
$I_n$ to $\bar{Z}_n$		5.0	1.0	4.0	7.0	1.0	7.5	
Propagation delay	$t_{PHL}$	3.3	1.0	5.0	8.0	1.0	8.5	ns
$I_n$ to $\bar{Z}_n$		5.0	1.0	4.0	6.5	1.0	6.5	

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

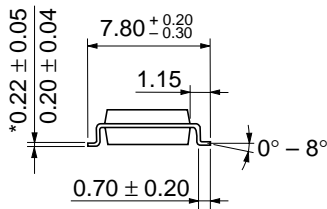
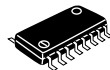
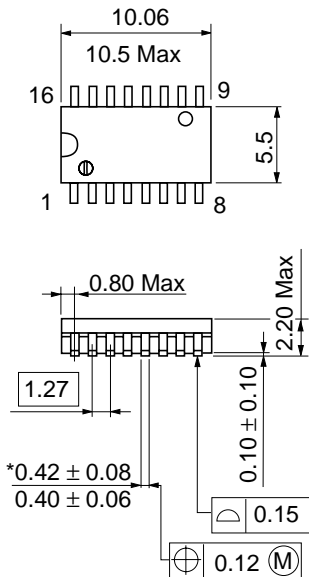
## Capacitance

Item	Symbol	Typ	Unit	Condition
Input capacitance	$C_{IN}$	4.5	pF	$V_{CC} = 5.5 V$
Power dissipation capacitance	$C_{PD}$	45.0	pF	$V_{CC} = 5.0 V$

Unit: mm

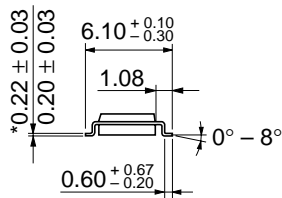
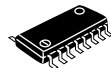
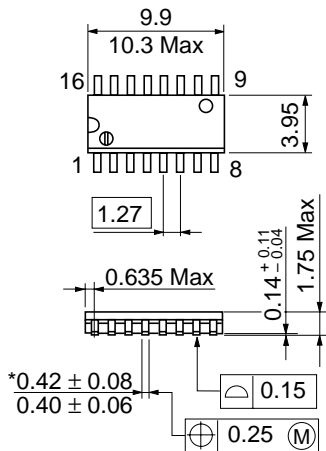


Hitachi Code	DP-16
JEDEC	Conforms
EIAJ	Conforms
Weight (reference value)	1.07 g



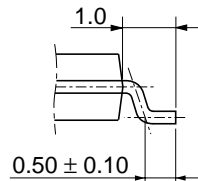
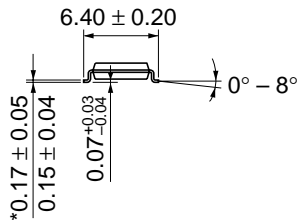
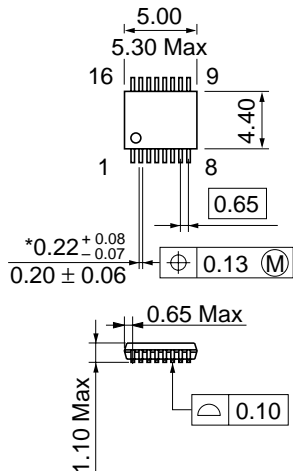
\*Dimension including the plating thickness  
Base material dimension

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



Hitachi Code	TTP-16DA
JEDEC	—
EIAJ	—
Weight (reference value)	0.05 g

$$\frac{\text{*Dimension including the plating thickness}}{\text{Base material dimension}}$$



## Cautions

1. Hitachi neither warrants nor grants licenses of any rights of Hitachi's or any third party's patent, copyright, trademark, or other intellectual property rights for information contained in this document. Hitachi bears no responsibility for problems that may arise with third party's rights, including intellectual property rights, in connection with use of the information contained in this document.
2. Products and product specifications may be subject to change without notice. Confirm that you have received the latest product standards or specifications before final design, purchase or use.
3. Hitachi makes every attempt to ensure that its products are of high quality and reliability. However, contact Hitachi's sales office before using the product in an application that demands especially high quality and reliability or where its failure or malfunction may directly threaten human life or cause risk of bodily injury, such as aerospace, aeronautics, nuclear power, combustion control, transportation, traffic, safety equipment or medical equipment for life support.
4. Design your application so that the product is used within the ranges guaranteed by Hitachi particularly for maximum rating, operating supply voltage range, heat radiation characteristics, installation conditions and other characteristics. Hitachi bears no responsibility for failure or damage when used beyond the guaranteed ranges. Even within the guaranteed ranges, consider normally foreseeable failure rates or failure modes in semiconductor devices and employ systemic measures such as fail-safes, so that the equipment incorporating Hitachi product does not cause bodily injury, fire or other consequential damage due to operation of the Hitachi product.
5. This product is not designed to be radiation resistant.
6. No one is permitted to reproduce or duplicate, in any form, the whole or part of this document without written approval from Hitachi.
7. Contact Hitachi's sales office for any questions regarding this document or Hitachi semiconductor products.

# 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	NorthAmerica	: <a href="http://semiconductor.hitachi.com/">http://semiconductor.hitachi.com/</a>
	Europe	: <a href="http://www.hitachi-eu.com/hel/ecg">http://www.hitachi-eu.com/hel/ecg</a>
	Asia (Singapore)	: <a href="http://www.has.hitachi.com.sg/grp3/sicd/index.htm">http://www.has.hitachi.com.sg/grp3/sicd/index.htm</a>
	Asia (Taiwan)	: <a href="http://www.hitachi.com.tw/E/Product/SICD_Frame.htm">http://www.hitachi.com.tw/E/Product/SICD_Frame.htm</a>
	Asia (HongKong)	: <a href="http://www.hitachi.com.hk/eng/bo/grp3/index.htm">http://www.hitachi.com.hk/eng/bo/grp3/index.htm</a>
	Japan	: <a href="http://www.hitachi.co.jp/Sicd/indx.htm">http://www.hitachi.co.jp/Sicd/indx.htm</a>

## 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

Copyright ' Hitachi, Ltd., 1999. All rights reserved. Printed in Japan.