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Renesas Technology Corp.
Customer Support Dept.
April 1, 2003

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HD74AC157

Quad 2-Input Multiplexer

RENESAS

ADE-205-371 (Z)

1st. Edition

Sep. 2000

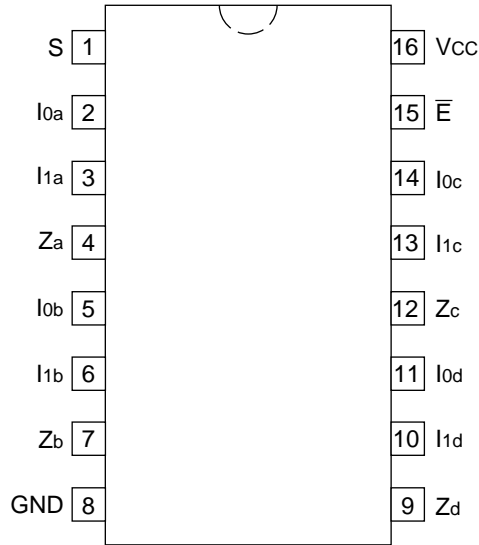
Description

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

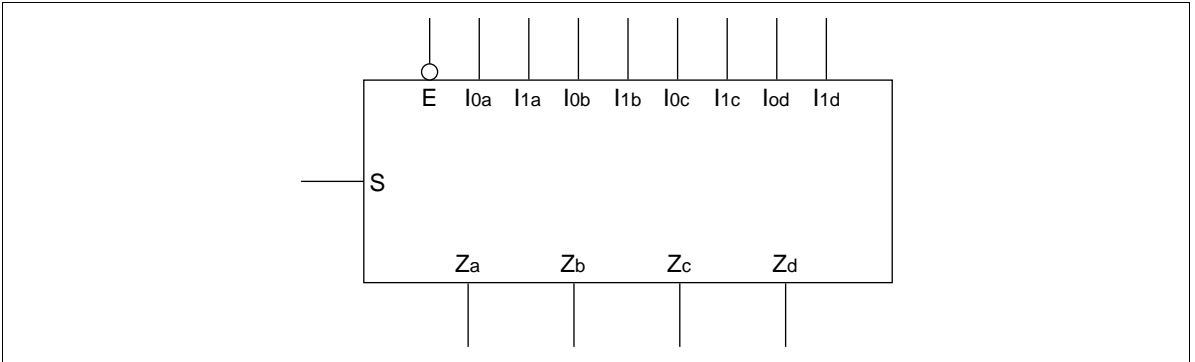
- Outputs Source/Sink 24 mA

Pin Arrangement



(Top view)

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
- Z_a to 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:

$$Z_a = \bar{E} \cdot (I_{1a} \cdot S + I_{0a} \cdot \bar{S})$$

$$Z_b = \bar{E} \cdot (I_{1b} \cdot S + I_{0b} \cdot \bar{S})$$

$$Z_c = \bar{E} \cdot (I_{1c} \cdot S + I_{0c} \cdot \bar{S})$$

$$Z_d = \bar{E} \cdot (I_{1d} \cdot S + I_{0d} \cdot \bar{S})$$

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

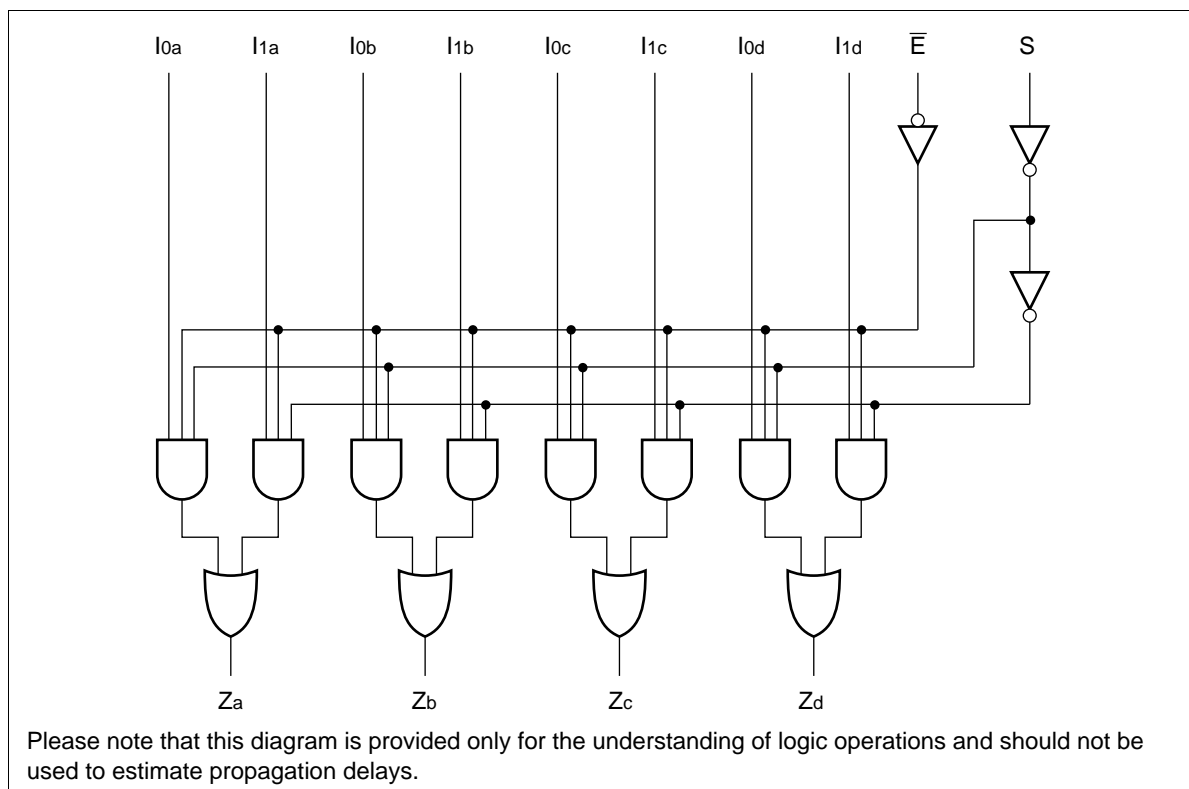
Inputs				Output
E	S	I ₀	I ₁	Z
H	X	X	X	L
L	H	X	L	L
L	H	X	H	H
L	L	L	X	L
L	L	H	X	H

H : High Voltage Level

L : Low Voltage Level

X : Immaterial

Logic Diagram



HD74AC157

DC Characteristics (unless otherwise specified)

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

AC Characteristics: HD74AC157

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

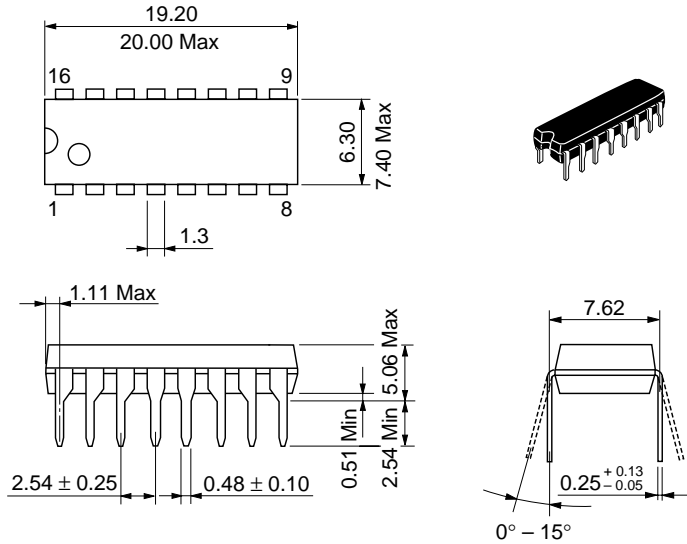
Note: 1. Voltage Range 3.3 is $3.3 \text{ V} \pm 0.3 \text{ V}$
Voltage Range 5.0 is $5.0 \text{ V} \pm 0.5 \text{ V}$

Capacitance

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

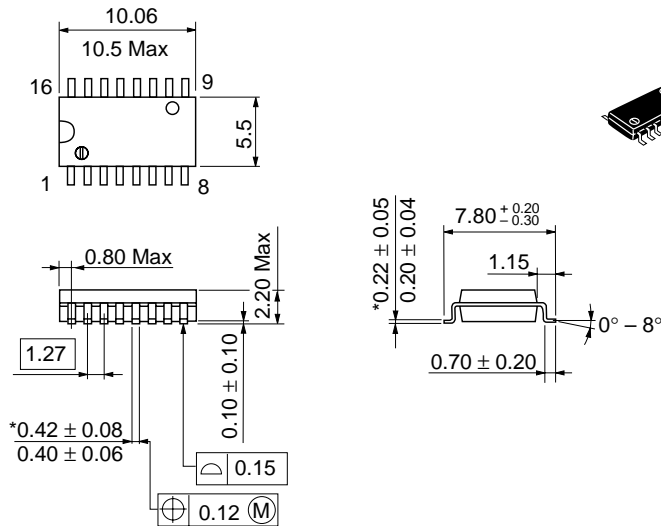
Package Dimensions

Unit: mm



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

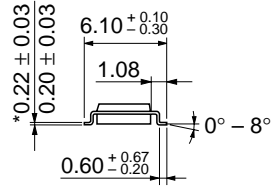
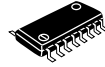
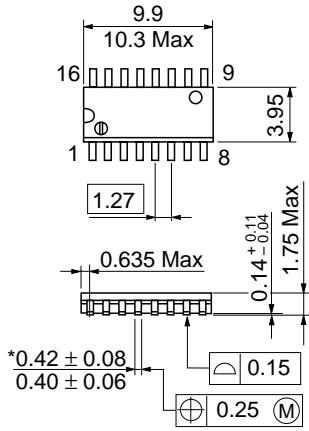
Unit: mm



*Dimension including the plating thickness
Base material dimension

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

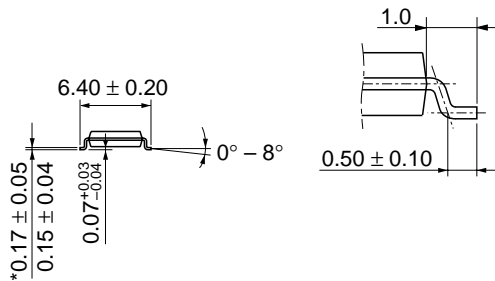
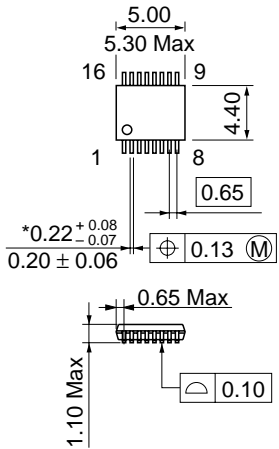
Unit: mm



*Dimension including the plating thickness
Base material dimension

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

Unit: mm



*Dimension including the plating thickness
Base material dimension

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

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