
HD74HC356

8-to-1-line Data Selector/Multiplexer/Register
(with 3-state outputs)

HITACHI

ADE-205-493 (Z)
1st. Edition
Sep. 2000

Description

This data selectors/multiplexers contain full on-chip binary decoding to select one of eight data sources. The data select address is stored in transparent latches that are enabled by a low level address on pin 11, Select Control. Data on the 8 input lines is stored in a parallel input/output register which in the HD74HC356 is composed of 8 edge-triggered flip-flops, clocked by a low to high transition on pin 9, clock. Both true (Y) and complementary (W) 3-state outputs are available.

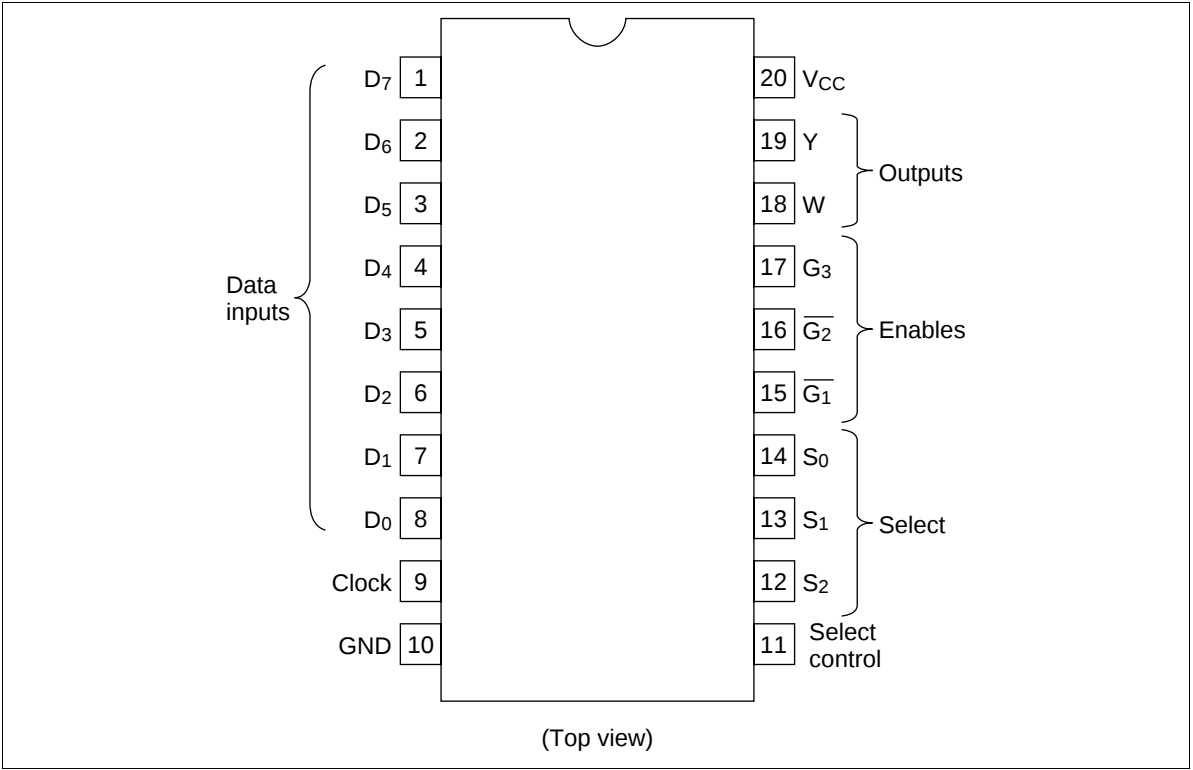
Features

- High Speed Operation: t_{pd} (Clock to W, Y) = 27 ns typ ($C_L = 50$ pF)
- High Output Current: Fanout of 15 LSTTL Loads
- Wide Operating Voltage: $V_{CC} = 2$ to 6 V
- Low Input Current: 1 μ A max
- Low Quiescent Supply Current: I_{CC} (static) = 4 μ A max ($T_a = 25^\circ\text{C}$)

Function Table

Inputs								
Select			Clock	Output Enable			Outputs	
S ₁	S ₂	S ₀		$\overline{\text{G}}_1$	$\overline{\text{G}}_2$	G ₃	W	Y
X	X	X	X	H	X	X	Z	Z
X	X	X	X	X	H	X	Z	Z
X	X	X	X	X	X	L	Z	Z
L	L	L		L	L	H	$\overline{\text{D}}_0$	D ₀
L	L	L	H or L	L	L	H	$\overline{\text{D}}_{0n}$	D _{0n}
L	L	H		L	L	H	$\overline{\text{D}}_1$	D ₁
L	L	H	H or L	L	L	H	$\overline{\text{D}}_{1n}$	D _{1n}
L	H	L		L	L	H	$\overline{\text{D}}_2$	D ₂
L	H	L	H or L	L	L	H	$\overline{\text{D}}_{2n}$	D _{2n}
L	H	H		L	L	H	$\overline{\text{D}}_3$	D ₃
L	H	H	H or L	L	L	H	$\overline{\text{D}}_{3n}$	D _{3n}
H	L	L		L	L	H	$\overline{\text{D}}_4$	D ₄
H	L	L	H or L	L	L	H	$\overline{\text{D}}_{4n}$	D _{4n}
H	L	H		L	L	H	$\overline{\text{D}}_5$	D ₅
H	L	H	H or L	L	L	H	$\overline{\text{D}}_{5n}$	D _{5n}
H	H	L		L	L	H	$\overline{\text{D}}_6$	D ₆
H	H	L	H or L	L	L	H	$\overline{\text{D}}_{6n}$	D _{6n}
H	H	H		L	L	H	$\overline{\text{D}}_7$	D ₇
H	H	H	H or L	L	L	H	$\overline{\text{D}}_{7n}$	D _{7n}

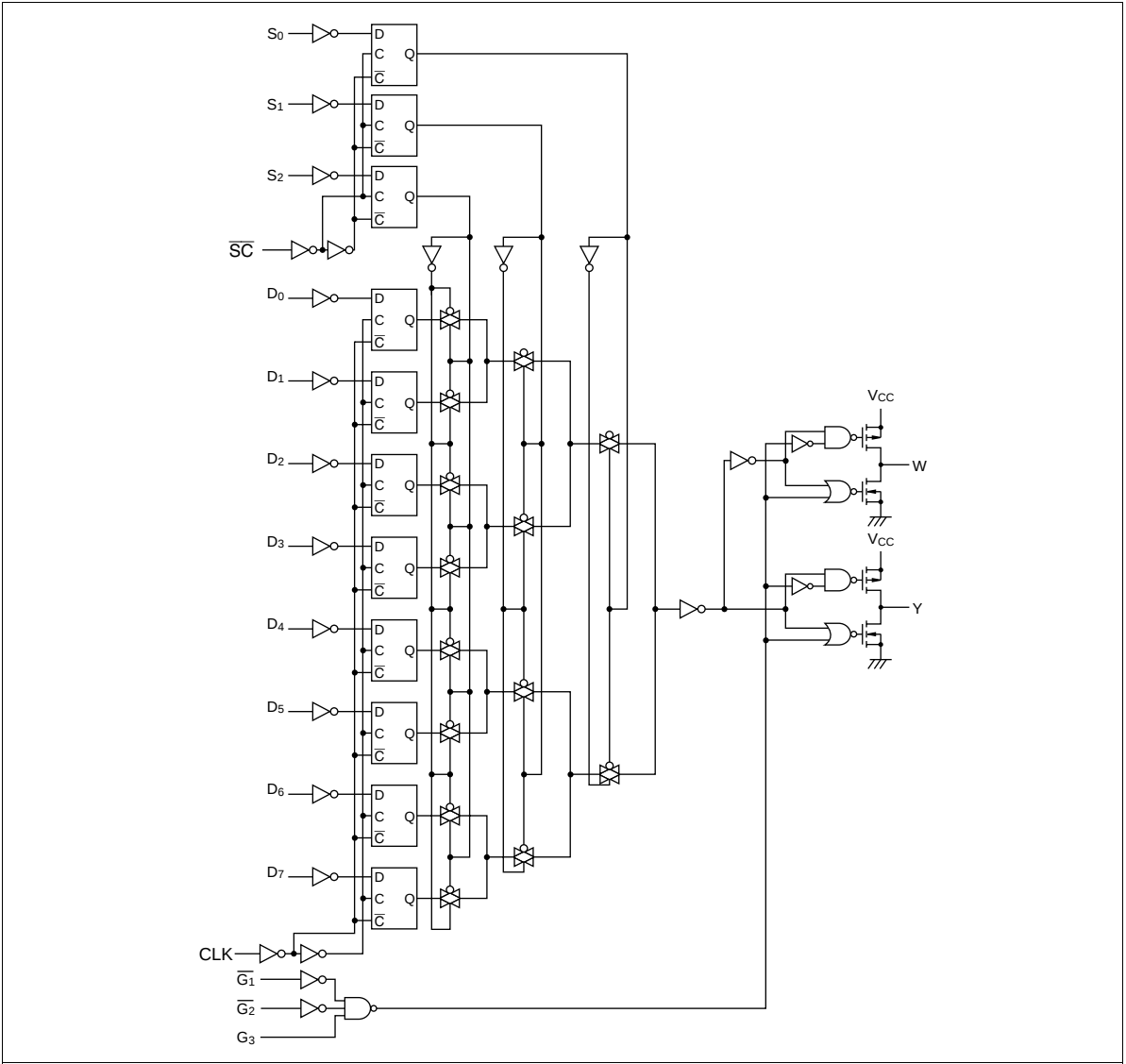
Pin Arrangement



Absolute Masimum Ratings

Item	Symbol	Rating	Unit
Supply voltage range	V_{CC}	-0.5 to +7.0	V
Input voltage	V_{IN}	-0.5 to $V_{CC} + 0.5$	V
Output voltage	V_{OUT}	-0.5 to $V_{CC} + 0.5$	V
Output current	I_{OUT}	±35	mA
DC current drain per V_{CC} , GND	I_{CC} , I_{GND}	±75	mA
DC input diode current	I_{IK}	±20	mA
DC output diode current	I_{OK}	±20	mA
Power dissipation per package	P_T	500	mW
Storage temperature	Tstg	-65 to +150	°C

Block Diagram



DC Characteristics

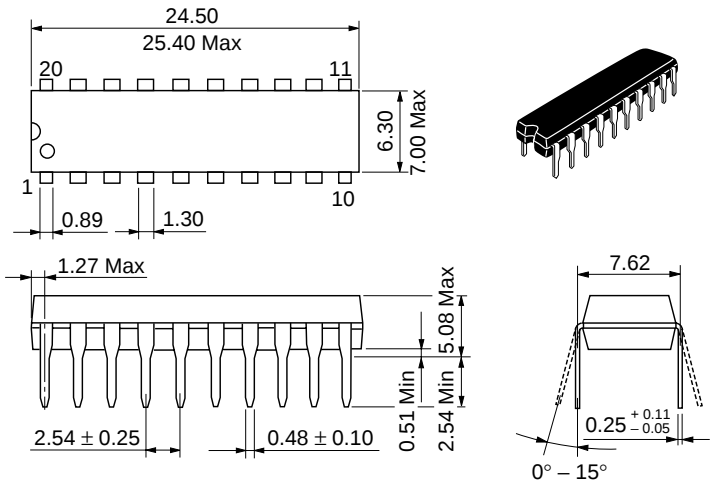
Item	Symbol	V _{CC} (V)	Ta = 25°C			Ta = -40 to +85°C		Unit	Test Conditions	
			Min	Typ	Max	Min	Max			
Input voltage	V _{IH}	2.0	1.5	—	—	1.5	—	V		
		4.5	3.15	—	—	3.15	—			
		6.0	4.2	—	—	4.2	—			
	V _{IL}	2.0	—	—	0.5	—	0.5	V		
		4.5	—	—	1.35	—	1.35			
		6.0	—	—	1.8	—	1.8			
Output voltage	V _{OH}	2.0	1.9	2.0	—	1.9	—	V	Vin = V _{IH} or V _{IL} I _{OH} = -20 μA	
		4.5	4.4	4.5	—	4.4	—			
		6.0	5.9	6.0	—	5.9	—			
		4.5	4.18	—	—	4.13	—			I _{OH} = -6 mA
		6.0	5.68	—	—	5.63	—			I _{OH} = -7.8 mA
	V _{OL}	2.0	—	0.0	0.1	—	0.1	V	Vin = V _{IH} or V _{IL} I _{OL} = 20 μA	
		4.5	—	0.0	0.1	—	0.1			
		6.0	—	0.0	0.1	—	0.1			
		4.5	—	—	0.26	—	0.33			I _{OL} = 6 mA
		6.0	—	—	0.26	—	0.33			I _{OL} = 7.8 mA
Off-state output current	I _{OZ}	6.0	—	—	±0.5	—	±5.0	μA	Vin = V _{IH} or V _{IL} , Vout = V _{CC} or GND	
Input current	I _{in}	6.0	—	—	±0.1	—	±1.0	μA	Vin = V _{CC} or GND	
Quiescent supply current	I _{CC}	6.0	—	—	4.0	—	40	μA	Vin = V _{CC} or GND, Iout = 0 μA	

AC Characteristics (C_L = 50 pF, Input t_r = t_f = 6 ns)

Item	Symbol	V _{CC} (V)	Ta = 25°C		Ta = -40 to +85°C		Unit	Test Conditions
			Min	Typ	Max	Min		
Propagation delay time	t _{PLH}	2.0	—	—	255	—	ns	Clock to output
		4.5	—	27	51	—		
		6.0	—	—	43	—		
	t _{PLH}	2.0	—	—	285	—	ns	S ₀ – S ₂ to output
		4.5	—	25	57	—		
		6.0	—	—	48	—		
	t _{PHL}	2.0	—	—	300	—	ns	Select control to output
		4.5	—	25	60	—		
		6.0	—	—	51	—		
Output enable time	t _{ZH}	2.0	—	—	150	—	ns	
	t _{ZL}	4.5	—	12	30	—		
		6.0	—	—	26	—		
Output disable time	t _{LZ}	2.0	—	—	165	—	ns	
	t _{HZ}	4.5	—	17	33	—		
		6.0	—	—	28	—		
Setup time	t _{SU}	2.0	50	—	—	65	ns	D ₀ to D ₇ to Clock
		4.5	10	2	—	13		S ₀ to S ₇ to Select control
		6.0	10	—	—	13		
Hold time	t _H	2.0	5	—	—	5	ns	D ₀ to D ₇ to Clock
		4.5	5	1	—	5		S ₀ to S ₇ to Select control
		6.0	5	—	—	5		
Pulse width	t _W	2.0	80	—	—	100	ns	
		4.5	16	5	—	20		
		6.0	14	—	—	17		
Output rise/fall time	t _{TLH}	2.0	—	—	60	—	ns	
	t _{THL}	4.5	—	4	12	—		
		6.0	—	—	10	—		
Input capacitance	C _{in}	—	—	5	10	—	10	pF

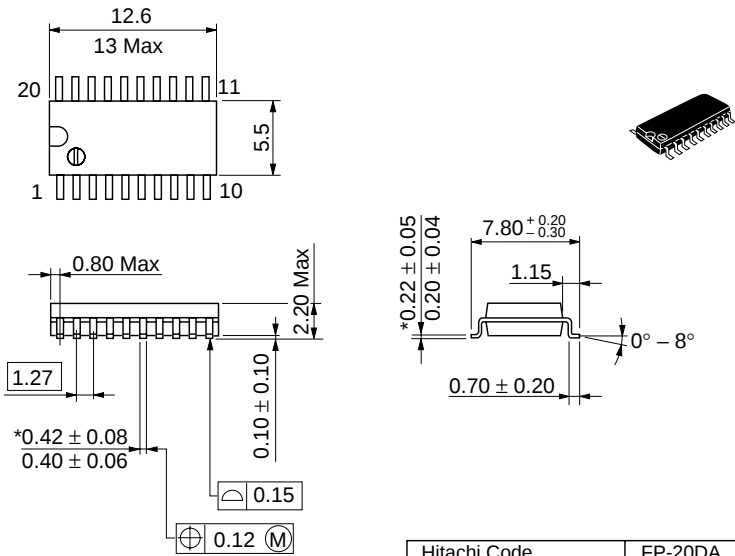
Package Dimensions

Unit: mm



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

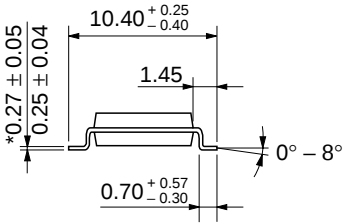
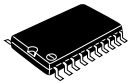
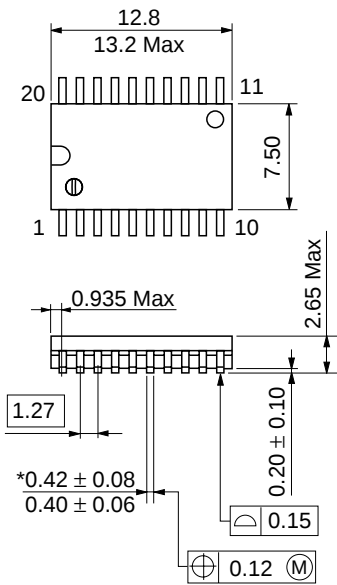
Unit: mm



*Dimension including the plating thickness
Base material dimension

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

Unit: mm



*Dimension including the plating thickness
Base material dimension

Hitachi Code	FP-20DB
JEDEC	Conforms
EIAJ	—
Mass (reference value)	0.52 g

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, Ohite-machi, Chiyoda-ku, Tokyo 100-0004, Japan
Tel: Tokyo (03) 3270-2111 Fax: (03) 3270-5109

URL	North America	: http://semiconductor.hitachi.com/
	Europe	: http://www.hitachi-eu.com/hel/ecg
	Asia	: http://sicapac.hitachi-asia.com
	Japan	: http://www.hitachi.co.jp/Sicd/indx.htm

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) 585160

Hitachi Asia Ltd. Hitachi Tower 16 Collyer Quay #20-00, Singapore 049318 Tel: <65>-538-6533/538-8577 Fax: <65>-538-6933/538-3877 URL: http://www.hitachi.com.sg	Hitachi Asia Ltd. (Taipei Branch Office) 4/F, No. 167, Tun Hwa North Road, Hung-Kuo Building, Taipei (105), Taiwan Tel: <886>-(2)-2718-3666 Fax: <886>-(2)-2718-8180 Telex: 23222 HAS-TP URL: http://www.hitachi.com.tw
---	---

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 URL: http://www.hitachi.com.hk
--

Copyright © Hitachi, Ltd., 2000. All rights reserved. Printed in Japan.
Colophon 2.0

HITACHI