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

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HD74HC356

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

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

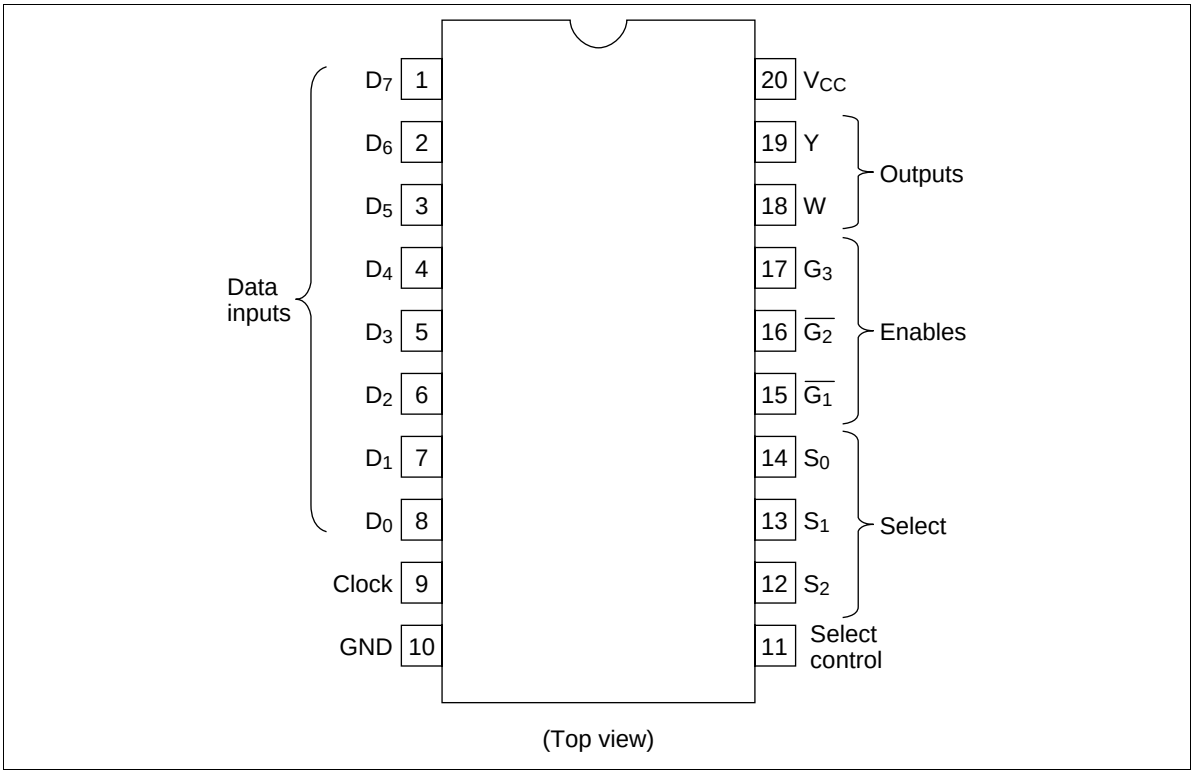
- High Speed Operation: t_{pd} (Clock to W, Y) = 27 ns typ (C_L = 50 pF)
- High Output Current: Fanout of 15 LSTTL Loads
- Wide Operating Voltage: V_{CC} = 2 to 6 V
- Low Input Current: 1 μA max
- Low Quiescent Supply Current: I_{CC} (static) = 4 μA max (Ta = 25°C)

Function Table

Inputs

Select				Output Enable			Outputs	
S_1	S_2	S_0	Clock	$\overline{G}_1$	$\overline{G}_2$	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	$\overline{D}_0$	D_0
L	L	L	H or L	L	L	H	$\overline{D}_{0n}$	D_{0n}
L	L	H	↑	L	L	H	$\overline{D}_1$	D_1
L	L	H	H or L	L	L	H	$\overline{D}_{1n}$	D_{1n}
L	H	L	↑	L	L	H	$\overline{D}_2$	D_2
L	H	L	H or L	L	L	H	$\overline{D}_{2n}$	D_{2n}
L	H	H	↑	L	L	H	$\overline{D}_3$	D_3
L	H	H	H or L	L	L	H	$\overline{D}_{3n}$	D_{3n}
H	L	L	↑	L	L	H	$\overline{D}_4$	D_4
H	L	L	H or L	L	L	H	$\overline{D}_{4n}$	D_{4n}
H	L	H	↑	L	L	H	$\overline{D}_5$	D_5
H	L	H	H or L	L	L	H	$\overline{D}_{5n}$	D_{5n}
H	H	L	↑	L	L	H	$\overline{D}_6$	D_6
H	H	L	H or L	L	L	H	$\overline{D}_{6n}$	D_{6n}
H	H	H	↑	L	L	H	$\overline{D}_7$	D_7
H	H	H	H or L	L	L	H	$\overline{D}_{7n}$	D_{7n}

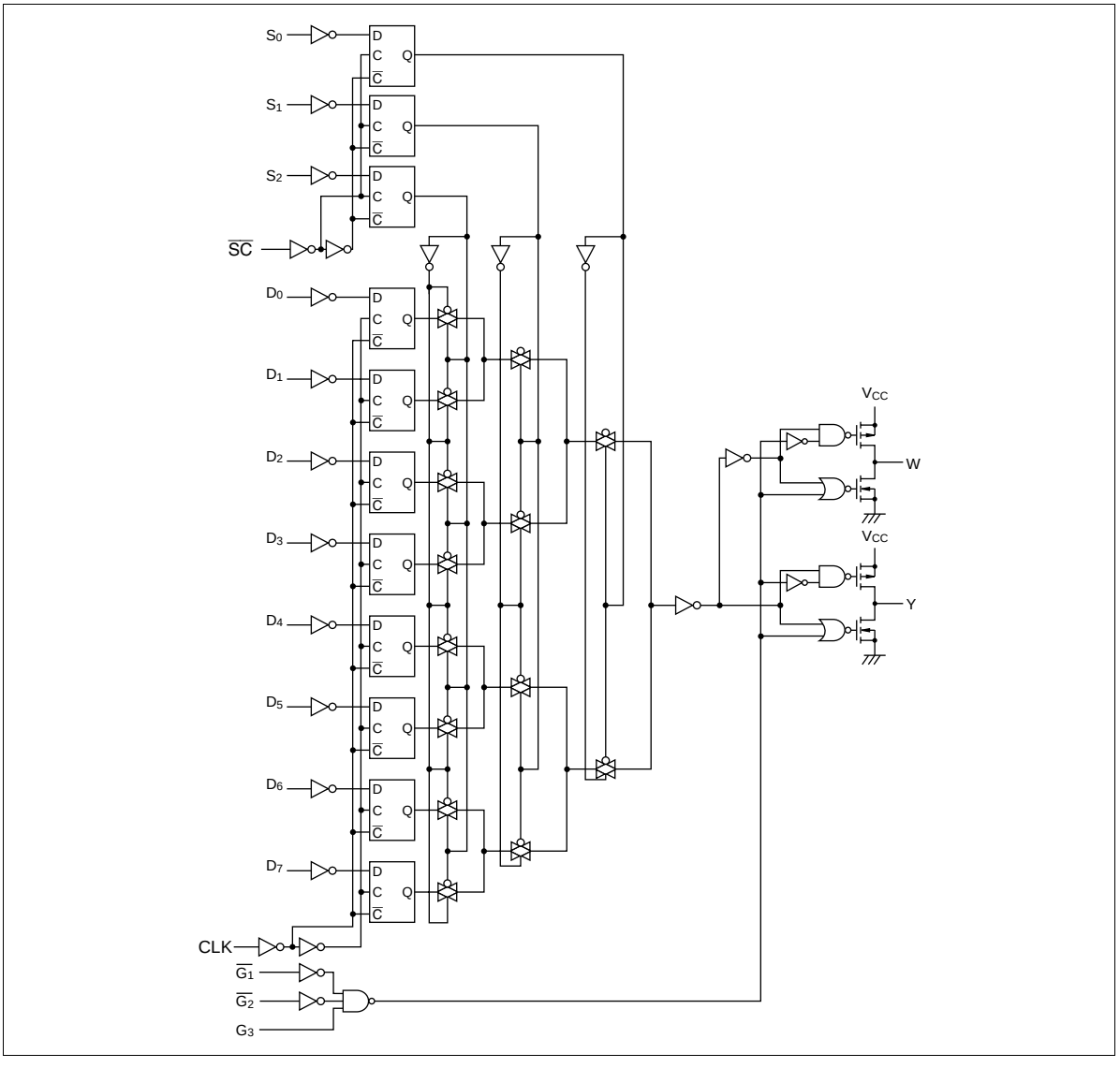
Pin Arrangement



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

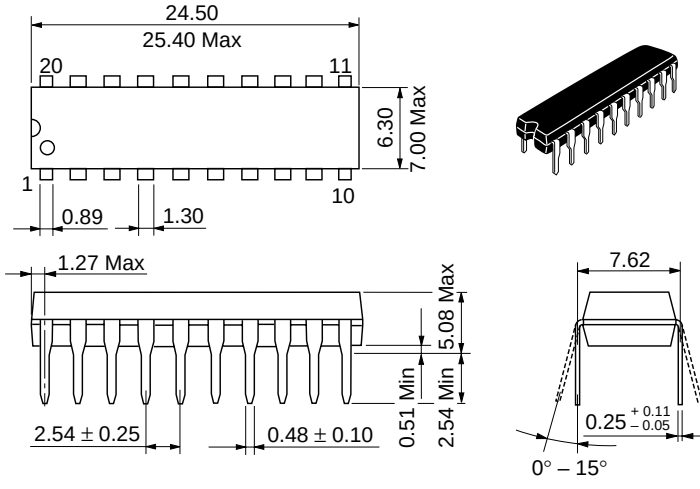
Item	Symbol	V_{CC} (V)	Ta = 25°C Min	Typ	Max	Ta = –40 to +85°C Min	Max	Unit	Test Conditions
Input voltage	V_{IH}	2.0	1.5	—	—	1.5	—	V	
		4.5	3.15	—	—	3.15	—		
		6.0	4.2	—	—	4.2	—		
	V_{IL}	2.0	—	—	0.5	—	0.5	V	
		4.5	—	—	1.35	—	1.35		
		6.0	—	—	1.8	—	1.8		
Output voltage	V_{OH}	2.0	1.9	2.0	—	1.9	—	V	Vin = 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	Iin	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)

			Ta = 25°C			Ta = –40 to +85°C			
Item	**Symbol**	**V_{cc} (V)**	**Min**	**Typ**	**Max**	**Min**	**Max**	**Unit**	**Test Conditions**
Propagation delay time	t_{PLH}	2.0	—	—	255	—	320	ns	Clock to output
	t_{PHL}	4.5	—	27	51	—	64		
		6.0	—	—	43	—	54		
	t_{PLH}	2.0	—	—	285	—	355	ns	S_0 – S_2 to output
	t_{PHL}	4.5	—	25	57	—	71		
		6.0	—	—	48	—	60		
	t_{PLH}	2.0	—	—	300	—	375	ns	Select control to output
	t_{PHL}	4.5	—	25	60	—	75		
		6.0	—	—	51	—	64		
Output enable time	t_{ZH}	2.0	—	—	150	—	190	ns	
	t_{ZL}	4.5	—	12	30	—	38		
		6.0	—	—	26	—	33		
Output disable time	t_{LZ}	2.0	—	—	165	—	205	ns	
	t_{HZ}	4.5	—	17	33	—	41		
		6.0	—	—	28	—	35		
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	—	75	ns	
	t_{THL}	4.5	—	4	12	—	15		
		6.0	—	—	10	—	13		
Input capacitance	Cin	—	—	5	10	—	10	pF	

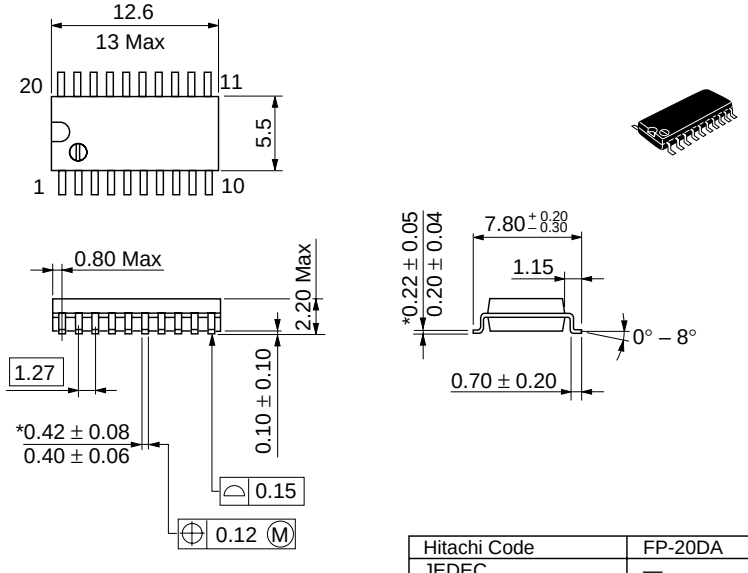
Package Dimensions

Unit: mm



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

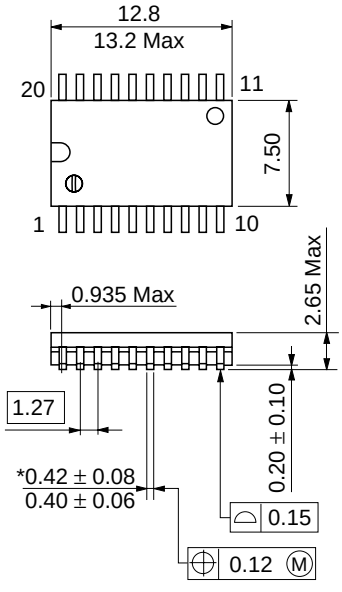
Unit: mm

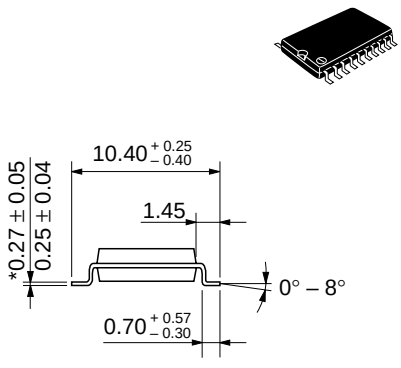


*Dimension including the plating thickness
Base material dimension

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

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