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

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   Remember to give due consideration to safety when making your circuit designs, with appropriate measures such as (i) placement of substitutive, auxiliary circuits, (ii) use of nonflammable material or (iii) prevention against any malfunction or mishap.

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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

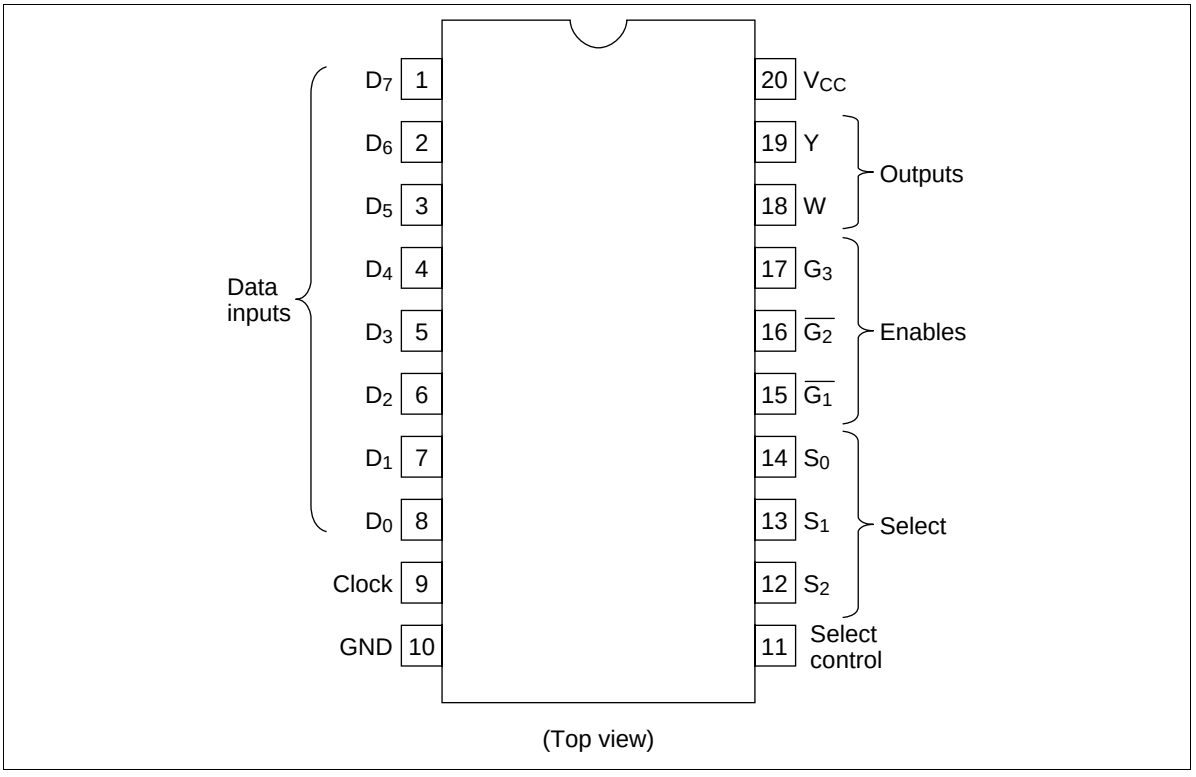
- High Speed Operation: t_{pd} (Clock to W, Y) = 27 ns typ (C_L = 50 pF)
- High Output Current: Fanout of 15 LSTTL Loads
- Wide Operating Voltage: V_{CC} = 2 to 6 V
- Low Input Current: 1 μA max
- Low Quiescent Supply Current: I_{CC} (static) = 4 μA max (Ta = 25°C)

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}

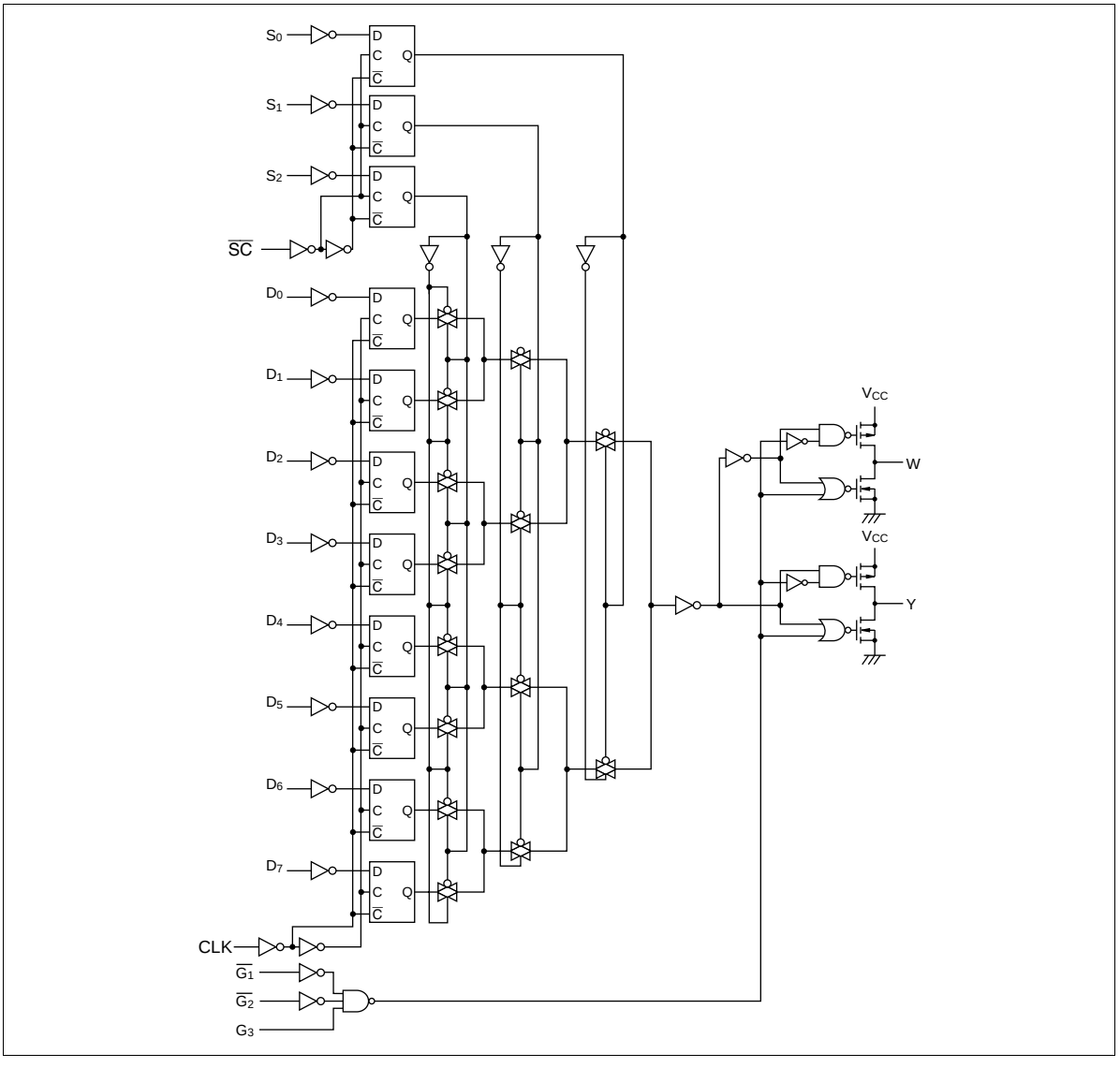
Pin Arrangement



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

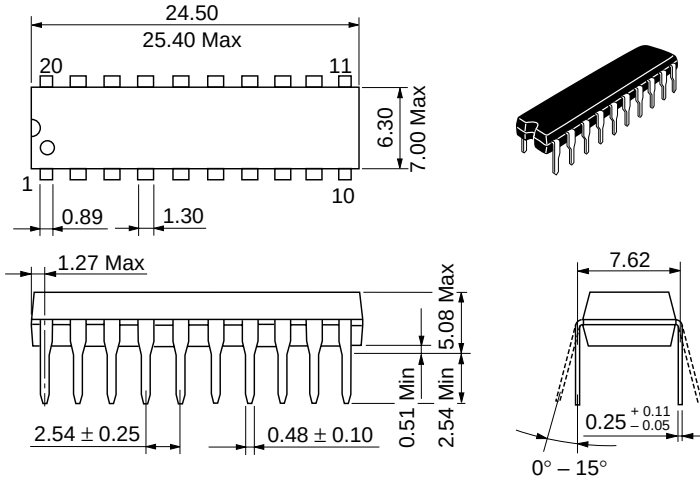
Item	Symbol	V_{CC} (V)	Ta = 25°C Min	Typ	Max	Ta = –40 to +85°C Min	Max	Unit	Test Conditions
Input voltage	V_{IH}	2.0	1.5	—	—	1.5	—	V	
		4.5	3.15	—	—	3.15	—		
		6.0	4.2	—	—	4.2	—		
	V_{IL}	2.0	—	—	0.5	—	0.5	V	
		4.5	—	—	1.35	—	1.35		
		6.0	—	—	1.8	—	1.8		
Output voltage	V_{OH}	2.0	1.9	2.0	—	1.9	—	V	Vin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

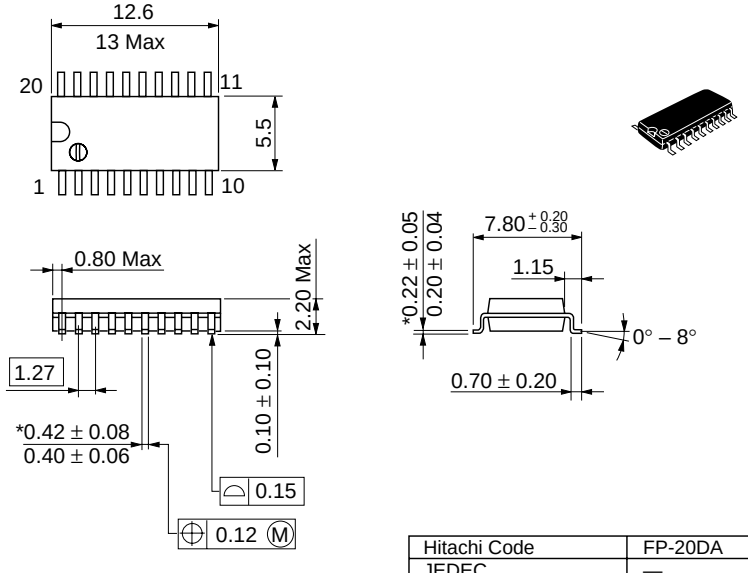
Package Dimensions

Unit: mm



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

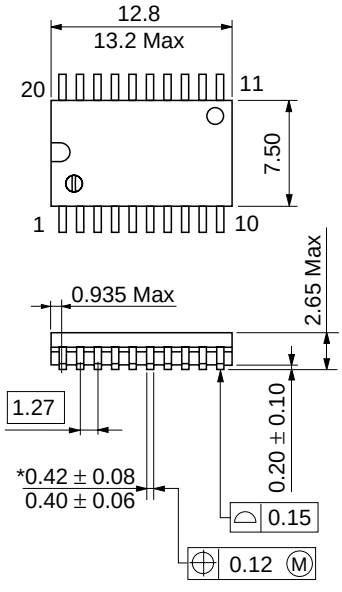
Unit: mm

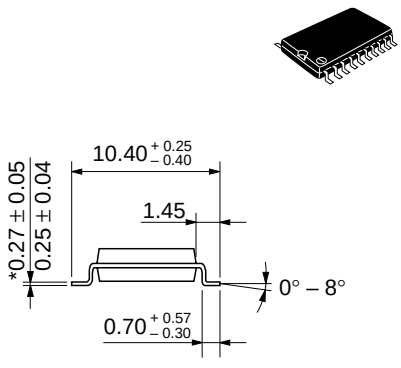


*Dimension including the plating thickness
Base material dimension

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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