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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

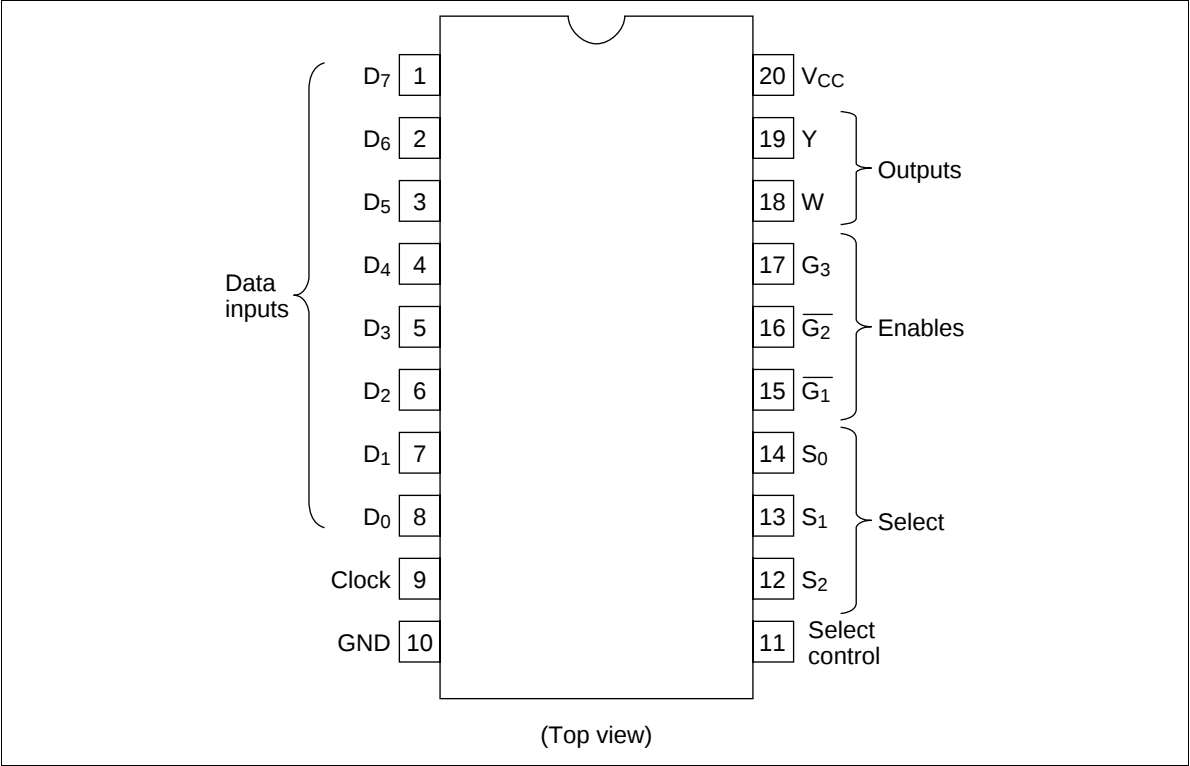
- High Speed Operation: t_{pd} (Clock to W, Y) = 27 ns typ ($C_L = 50$ pF)
- High Output Current: Fanout of 15 LSTTL Loads
- Wide Operating Voltage: $V_{CC} = 2$ to 6 V
- Low Input Current: 1 μ A max
- Low Quiescent Supply Current: I_{CC} (static) = 4 μ A max ($T_a = 25^\circ\text{C}$)

Function Table

Inputs

Select				Output Enable			Outputs	
S ₁	S ₂	S ₀	Clock	$\overline{\text{G}}_1$	$\overline{\text{G}}_2$	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}

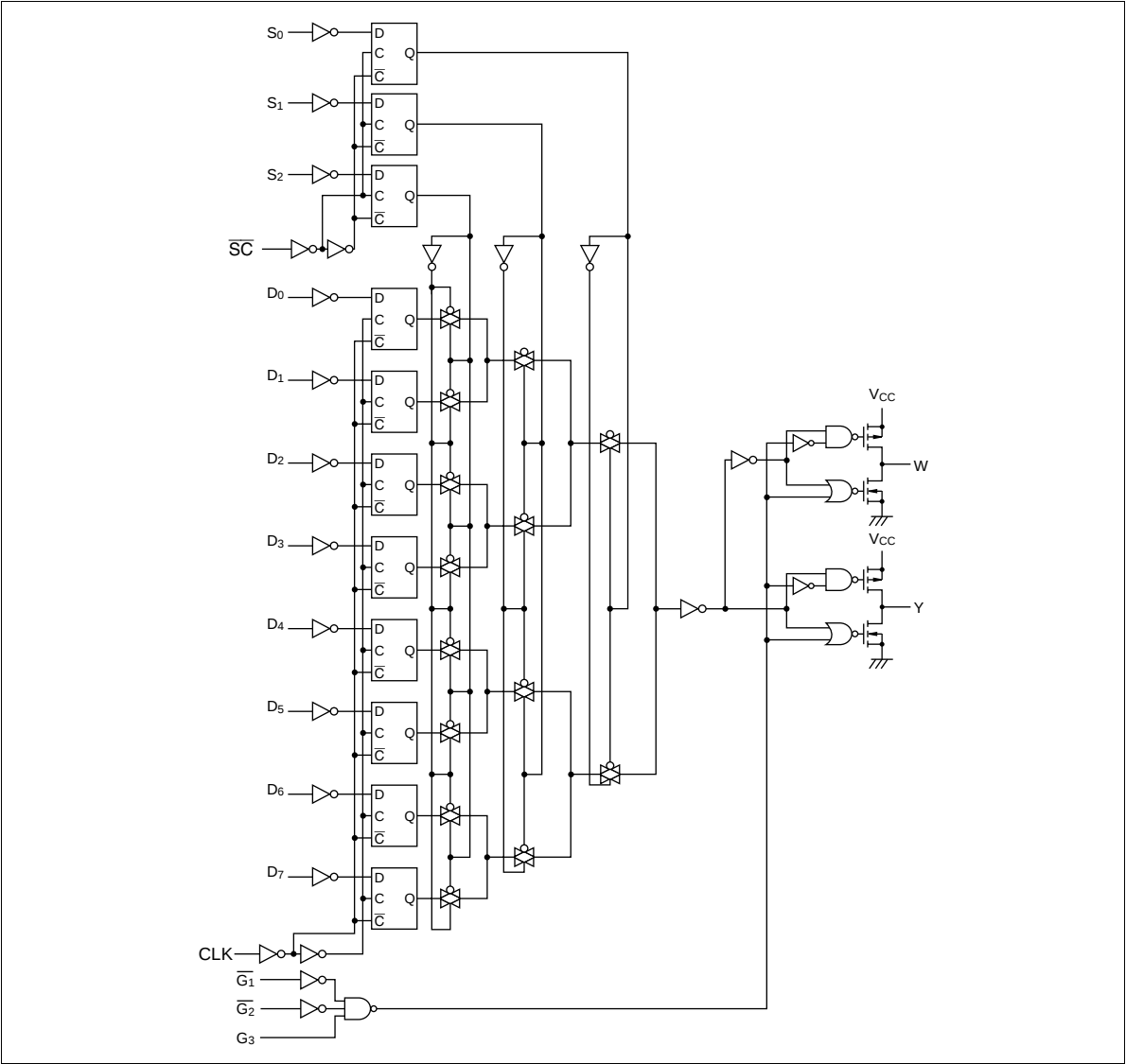
Pin Arrangement



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	T_{stg}	-65 to +150	$^{\circ}C$

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	$V_{in} = V_{IH}$ or V_{IL} $I_{OH} = -20 \mu A$
		4.5	4.4	4.5	—	4.4	—		
		6.0	5.9	6.0	—	5.9	—		
		4.5	4.18	—	—	4.13	—		
		6.0	5.68	—	—	5.63	—		
	V_{OL}	2.0	—	0.0	0.1	—	0.1	V	$V_{in} = V_{IH}$ or V_{IL} $I_{OL} = 20 \mu A$
		4.5	—	0.0	0.1	—	0.1		
		6.0	—	0.0	0.1	—	0.1		
		4.5	—	—	0.26	—	0.33		
		6.0	—	—	0.26	—	0.33		
Off-state output current	I_{OZ}	6.0	—	—	± 0.5	—	± 5.0	μA	$V_{in} = V_{IH}$ or V_{IL} , $V_{out} = V_{CC}$ or GND
Input current	I_{in}	6.0	—	—	± 0.1	—	± 1.0	μA	$V_{in} = V_{CC}$ or GND
Quiescent supply current	I_{CC}	6.0	—	—	4.0	—	40	μA	$V_{in} = V_{CC}$ or GND, $I_{out} = 0 \mu A$

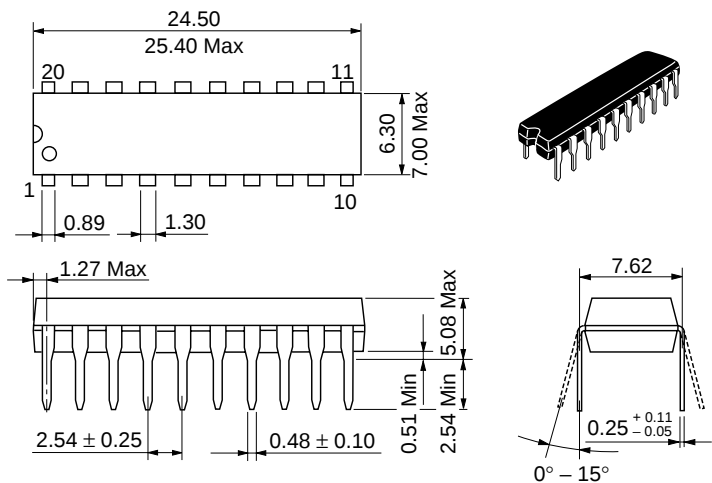
HD74HC356

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			Max
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	

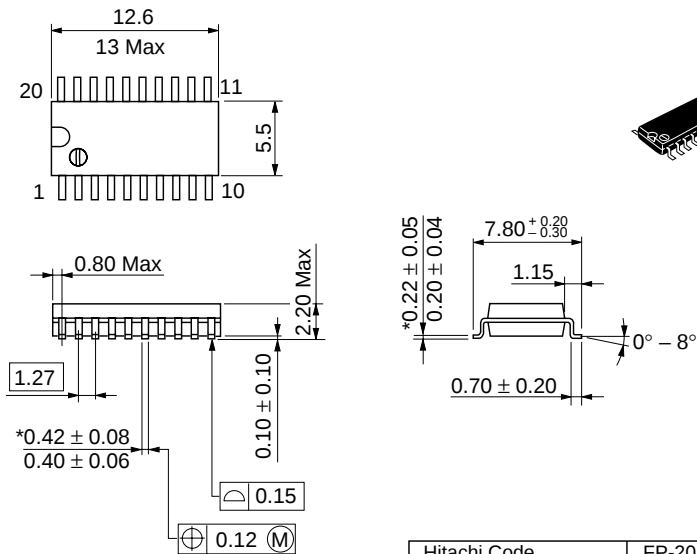
Package Dimensions

Unit: mm



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

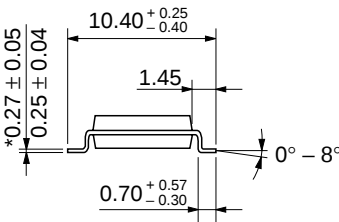
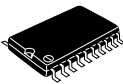
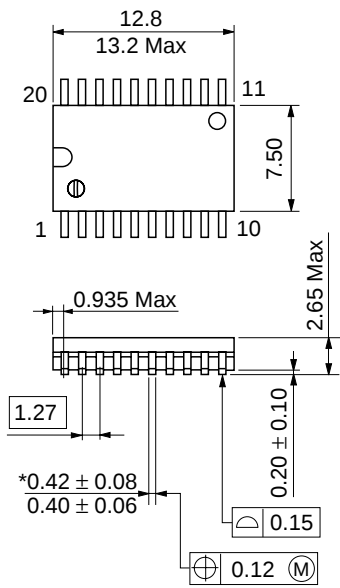
Unit: mm



*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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