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

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HD74HC137

3-to-8-line Decoder/Demultiplexer with Address Latch



ADE-205-443 (Z)
1st. Edition
Sep. 2000

Description

The HD74HC137 implements a three-to-eight line decoder with latches on the three address inputs. When \overline{GL} goes from low to high, the address present at the select inputs (A, B and C) is stored in the latches. As long as \overline{GL} remains high no address changes will be recognized. Output enable controls, G_1 and $\overline{G_2}$, control the state of the outputs independently of the select or latch-enable inputs.

All of the outputs are high unless G_1 is high and $\overline{G_2}$ is low. The HD74HC137 is ideally suited for the implementation of glitchfree decoders in stored-address applications in bus oriented systems.

Features

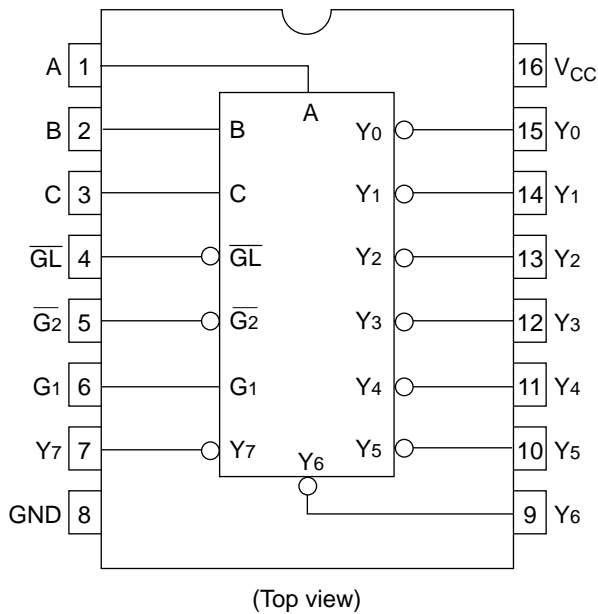
- High Speed Operation: t_{pd} (A, B, C to Y) = 16.5 ns typ ($C_L = 50$ pF)
- High Output Current: Fanout of 10 LSTTL Loads
- Wide Operating Voltage: $V_{CC} = 2$ V to 6 V
- Low Input Current: 1 μ A max
- Low Quiescent Supply Current: I_{CC} (static) = 4 μ A max ($T_a = 25^\circ\text{C}$)

Function Table

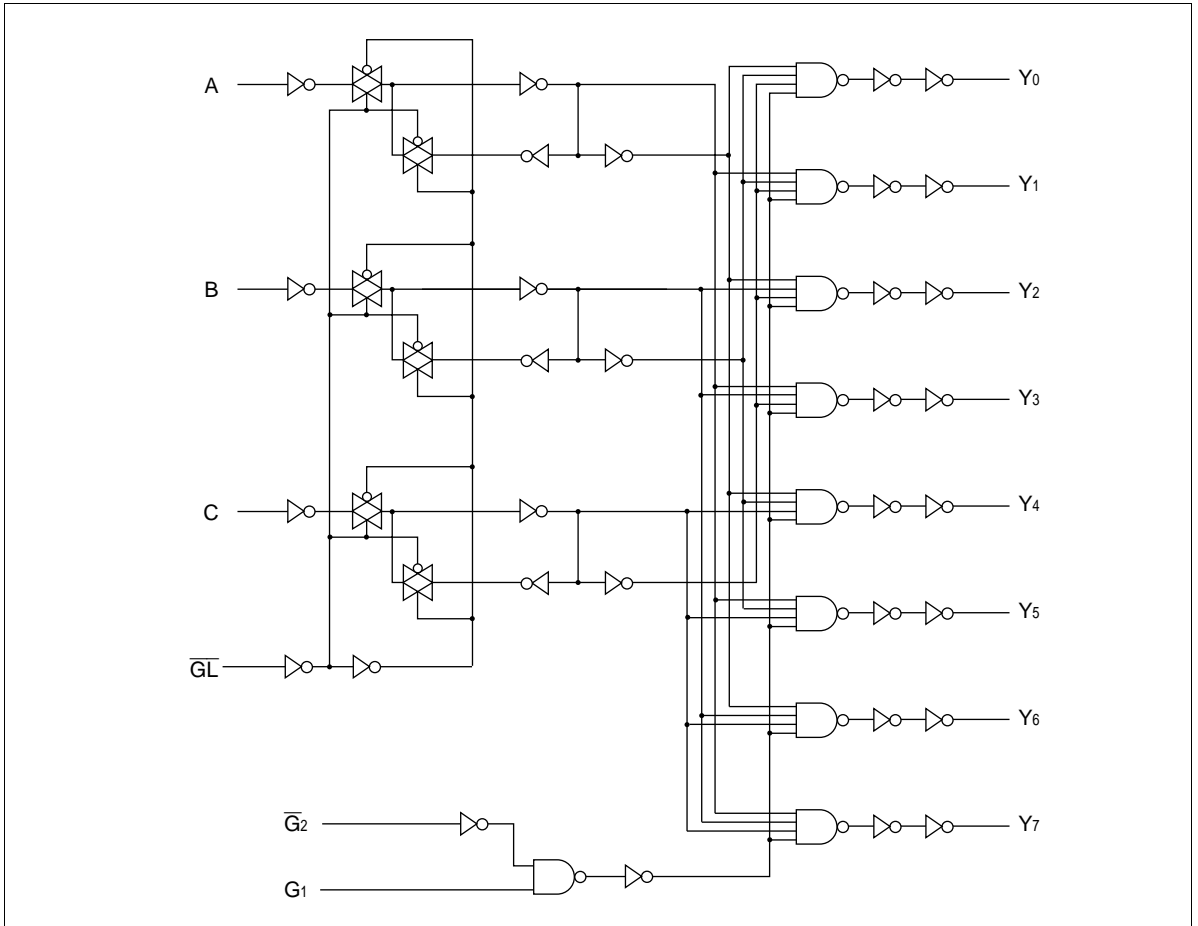
Inputs

Enable			Select			Outputs							
$\overline{G_L}$	G_1	$\overline{G_2}$	C	B	A	Y_0	Y_1	Y_2	Y_3	Y_4	Y_5	Y_6	Y_7
X	X	H	X	X	X	H	H	H	H	H	H	H	H
X	L	X	X	X	X	H	H	H	H	H	H	H	H
L	H	L	L	L	L	L	H	H	H	H	H	H	H
L	H	L	L	L	H	H	L	H	H	H	H	H	H
L	H	L	L	H	L	H	H	L	H	H	H	H	H
L	H	L	L	H	H	H	H	H	L	H	H	H	H
L	H	L	H	L	L	H	H	H	H	L	H	H	H
L	H	L	H	L	H	H	H	H	H	H	L	H	H
L	H	L	H	H	L	H	H	H	H	H	H	L	H
L	H	L	H	H	H	H	H	H	H	H	H	H	L
H	H	L	X	X	X	Output Corresponding to stored address L; all Others. H							

Pin Arrangement



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} = -4 mA
		6.0	5.68	—	—	5.63	—			I _{OH} = -5.2 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} = 4 mA
		6.0	—	—	0.26	—	0.33			I _{OL} = 5.2 mA
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, I _{out} = 0 μA	

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

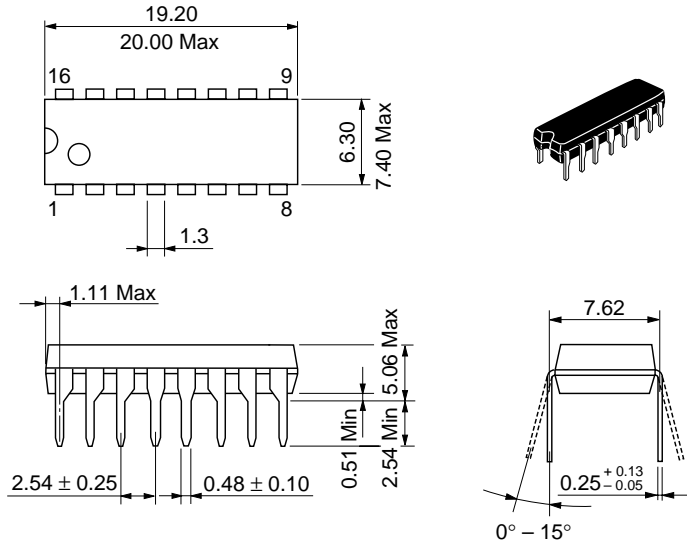
Item	Symbol	V_{CC} (V)	$T_a = 25^\circ\text{C}$		$T_a = -40$ to $+85^\circ\text{C}$		Unit	Test Conditions					
			Min	Typ	Max	Min			Max				
Propagation delay time	t_{PLH}	2.0	—	—	170	—	215	ns	A, B or C to Y				
		4.5	—	16	34	—	43						
		6.0	—	—	29	—	37						
	t_{PHL}	2.0	—	—	240	—	300			ns			
		4.5	—	17	48	—	60						
		6.0	—	—	41	—	51						
	t_{PLH}	2.0	—	—	130	—	165					ns	\overline{G}_2 to Y
		4.5	—	13	26	—	33						
		6.0	—	—	22	—	28						
	t_{PHL}	2.0	—	—	195	—	245	ns					
		4.5	—	14	39	—	49						
		6.0	—	—	33	—	42						
	t_{PLH}	2.0	—	—	150	—	190			ns	G_1 to Y		
		4.5	—	14	30	—	38						
		6.0	—	—	26	—	33						
	t_{PHL}	2.0	—	—	195	—	245					ns	
		4.5	—	14	39	—	49						
		6.0	—	—	33	—	42						
t_{PLH}	2.0	—	—	175	—	220	ns	$\overline{G_L}$ to Y					
	4.5	—	17	35	—	44							
	6.0	—	—	30	—	37							
t_{PHL}	2.0	—	—	250	—	315			ns				
	4.5	—	18	50	—	63							
	6.0	—	—	43	—	54							
Setup time	t_{su}	2.0	100	—	—	125					—	ns	A, B, C inputs
		4.5	20	3	—	25					—		
		6.0	17	—	—	21					—		
Hold time	t_h	2.0	50	—	—	65	—	ns			A, B, C inputs		
		4.5	10	-3	—	13	—						
		6.0	9	—	—	11	—						

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

Item	Symbol	V_{CC} (V)	Ta = 25°C		Ta = -40 to +85°C		Unit	Test Conditions
			Min	Typ	Max	Min		
Pulse width	t_w	2.0	80	—	—	100	—	ns
		4.5	16	7	—	20	—	
		6.0	14	—	—	17	—	
Output rise/fall time	t_{TLH}	2.0	—	—	75	—	90	ns
		4.5	—	5	15	—	19	
		6.0	—	—	13	—	16	
Input capacitance	C_{in}	—	—	5	10	—	10	pF

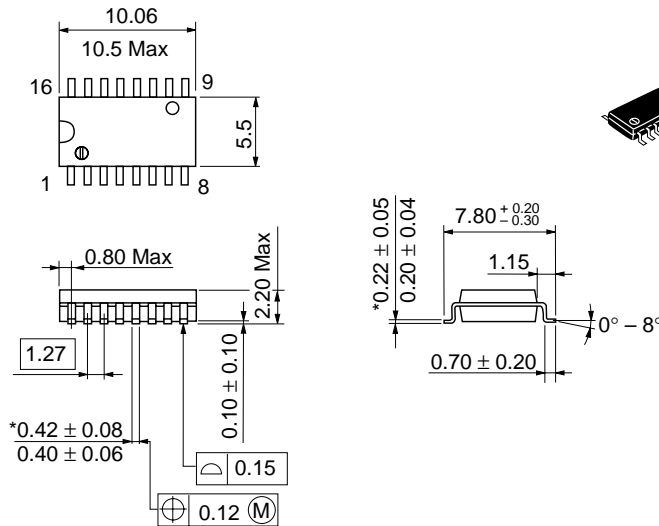
Package Dimensions

Unit: mm



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

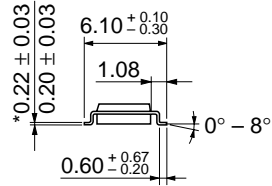
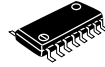
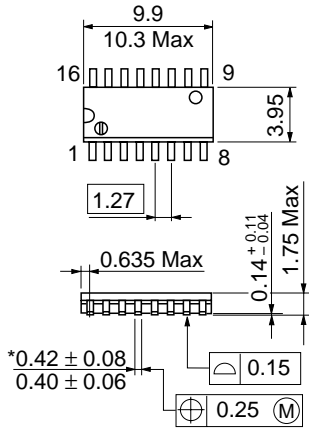
Unit: mm



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

*Dimension including the plating thickness
Base material dimension

Unit: mm



*Dimension including the plating thickness
Base material dimension

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

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