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# HD74HC139

Dual 2-to-4-line Decoders/Demultiplexers

# HITACHI

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## Description

The HD74HC139 contains two independent two-to-four-line decoders each with a single active low enable input (1G or 2G). Data on the select inputs (1A and 1B or 2A and 2B) cause one of the four normally high outputs to go low.

## Features

- High Speed Operation:  $t_{pd}$  (A, B to Y, 4 levels) = 14 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  $\mu$ A max
- Low Quiescent Supply Current:  $I_{CC}$  (static) = 4  $\mu$ A max ( $T_a = 25^\circ\text{C}$ )

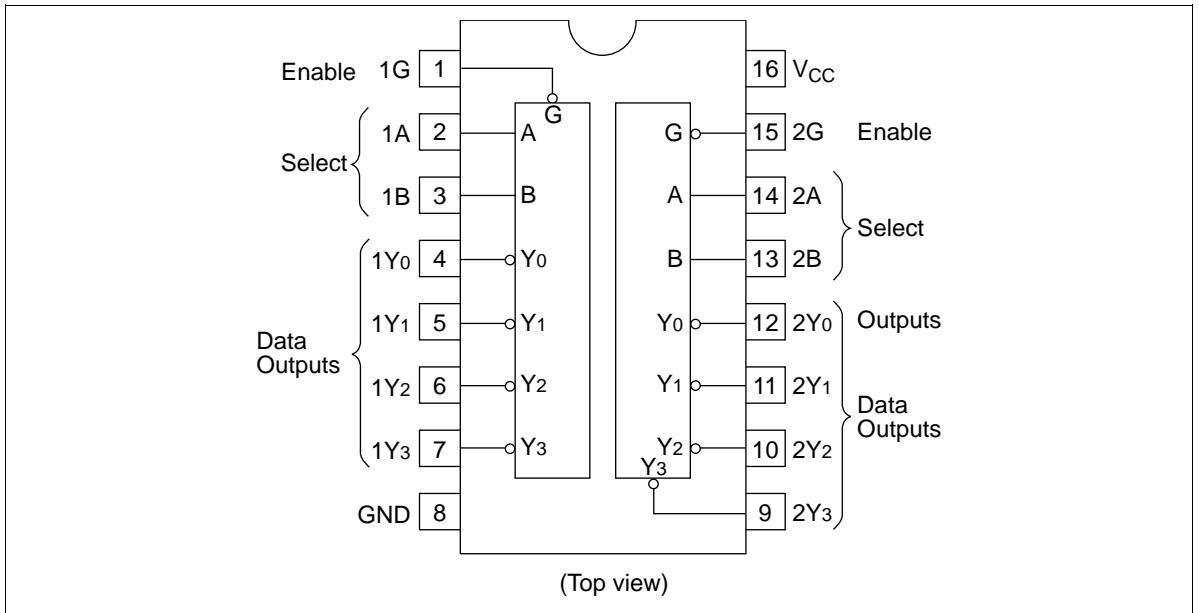
## Function Table

### Inputs

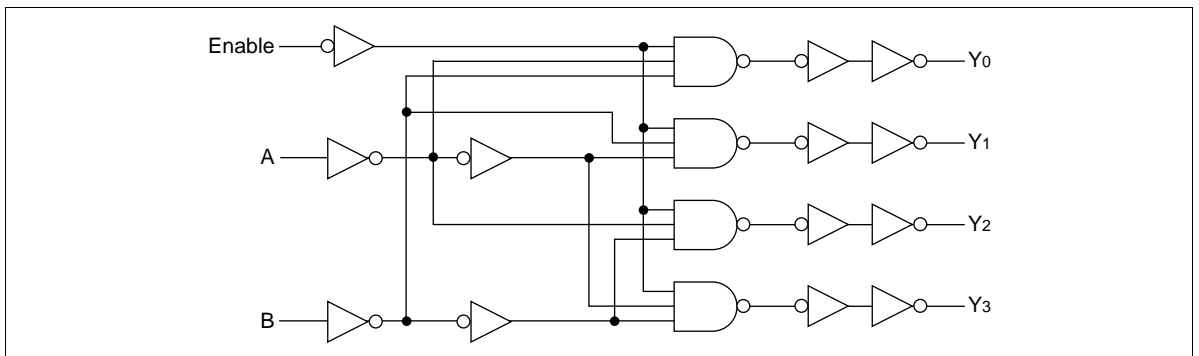
Enable	Select		Outputs			
G	B	A	$Y_0$	$Y_1$	$Y_2$	$Y_3$
H	X	X	H	H	H	H
L	L	L	L	H	H	H
L	L	H	H	L	H	H
L	H	L	H	H	L	H
L	H	H	H	H	H	L

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## Pin Arrangement



## Logic Diagram (1/2)



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DC Characteristics

Item	Symbol	V <sub>CC</sub> (V)	Ta = 25°C			Ta = -40 to +85°C		Unit	Test Conditions	
			Min	Typ	Max	Min	Max			
Input voltage	V <sub>IH</sub>	2.0	1.5	—	—	1.5	—	V		
		4.5	3.15	—	—	3.15	—			
		6.0	4.2	—	—	4.2	—			
	V <sub>IL</sub>	2.0	—	—	0.5	—	0.5	V		
		4.5	—	—	1.35	—	1.35			
		6.0	—	—	1.8	—	1.8			
Output voltage	V <sub>OH</sub>	2.0	1.9	2.0	—	1.9	—	V	Vin = V <sub>IH</sub> or V <sub>IL</sub> I <sub>OH</sub> = -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 <sub>OH</sub> = -4 mA
		6.0	5.68	—	—	5.63	—			I <sub>OH</sub> = -5.2 mA
		6.0	—	0.0	0.1	—	0.1			V
	4.5	—	0.0	0.1	—	0.1				
	6.0	—	0.0	0.1	—	0.1				
	4.5	—	—	0.26	—	0.33	I <sub>OL</sub> = 4 mA			
	6.0	—	—	0.26	—	0.33	I <sub>OL</sub> = 5.2 mA			
Input current	I <sub>in</sub>	6.0	—	—	±0.1	—	±1.0	μA	Vin = V <sub>CC</sub> or GND	
Quiescent supply current	I <sub>CC</sub>	6.0	—	—	4.0	—	40	μA	Vin = V <sub>CC</sub> or GND, I <sub>out</sub> = 0 μA	

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## 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	$t_{PHL}$	2.0	—	—	150	—	190	ns	Select to any output (4 levels)	
		4.5	—	15	30	—	38			
		6.0	—	—	26	—	33			
		2.0	—	—	150	—	190			ns
		4.5	—	13	30	—	38			
		6.0	—	—	26	—	33			
	$t_{PLH}$	2.0	—	—	150	—	190	ns	Select to any output (5 levels)	
		4.5	—	18	30	—	38			
		6.0	—	—	26	—	33			
		2.0	—	—	150	—	190			ns
		4.5	—	18	30	—	38			
		6.0	—	—	26	—	33			
	$t_{PHL}$	2.0	—	—	160	—	200	ns	Enable to any output	
		4.5	—	19	32	—	40			
		6.0	—	—	27	—	34			
		2.0	—	—	160	—	200			ns
		4.5	—	16	32	—	40			
		6.0	—	—	27	—	34			
Output rise/fall time	$t_{TLH}$	2.0	—	—	75	—	95	ns		
	$t_{THL}$	4.5	—	5	15	—	19			
		6.0	—	—	13	—	16			
Input capacitance	$C_{in}$	—	—	5	10	—	10	pF		



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



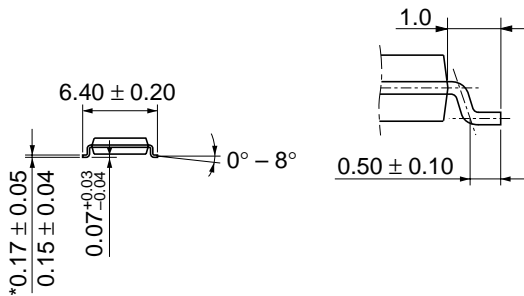
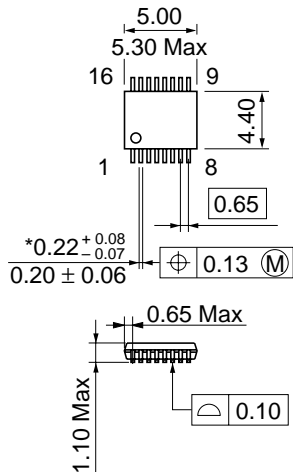
\*Dimension including the plating thickness  
Base material dimension

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



\*Dimension including the plating thickness  
Base material dimension

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



\*Dimension including the plating thickness  
 Base material dimension

Hitachi Code	TTP-16DA
JEDEC	—
EIAJ	—
Weight (reference value)	0.05 g



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