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

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Keep safety first in your circuit designs!

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HD74HC138

3-to-8-line Decoder/Demultiplexer



ADE-205-444 (Z)

1st. Edition

Sep. 2000

Description

The HD74HC138 has 3 binary select inputs (A, B and C). If the device is enabled these inputs determine which one of the eight normally high outputs will go low. Two active low and one active high enables (G_1 , G_{2A} and G_{2B}) are provided to ease the cascading of decoders.

Features

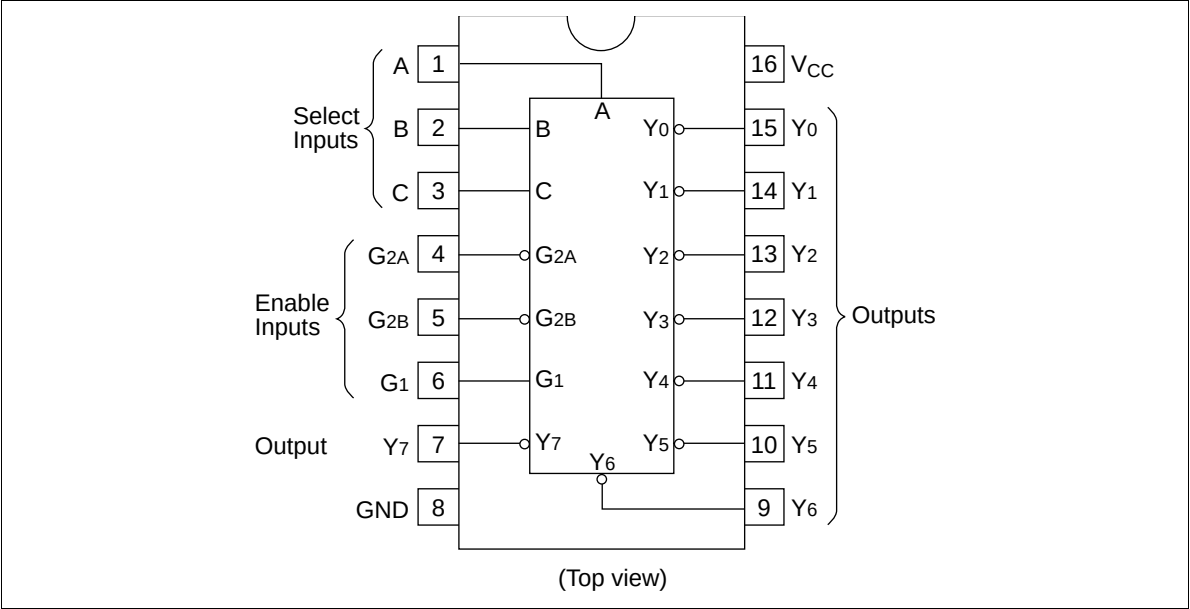
- High Speed Operation: t_{pd} (A, B, C to Y) = 16.5 ns typ ($C_L = 50$ pF)
- High Output Current: Fanout of 10 LSTTL Loads
- Wide Operating Voltage: $V_{CC} = 2$ V to 6 V
- Low Input Current: $1 \mu A$ max
- Low Quiescent Supply Current: I_{CC} (static) = $4 \mu A$ max ($T_a = 25^\circ C$)

Function Table

Inputs

[illegible]

Pin Arrangement



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	—		
		6.0	5.68	—	—	5.63	—		
	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		
		6.0	—	—	0.26	—	0.33		
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

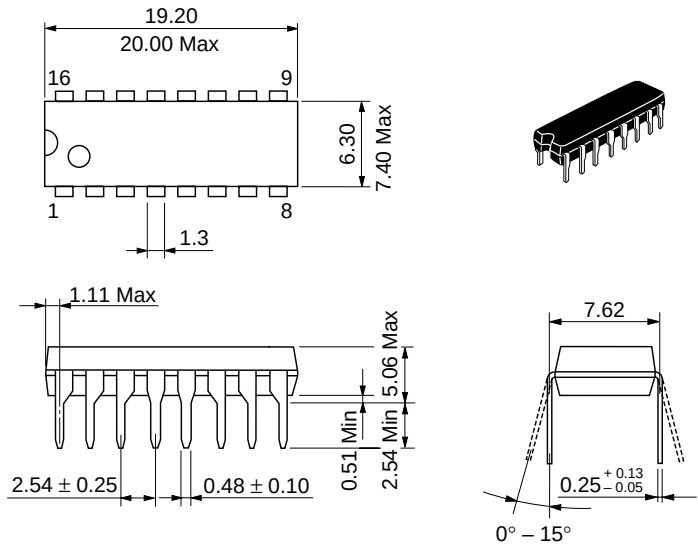
HD74HC138

AC Characteristics ($C_L = 50 \text{ pF}$, Input $t_r = t_f = 6 \text{ ns}$)

Item	Symbol	V _{cc} (V)	Ta = −40 to +85°C						Unit	Test Conditions
			Ta = 25°C							
			Min	Typ	Max	Min	Max			
Propagation delay time	t _{PHL}	2.0	—	—	175	—	220	ns	A, B or C to Output	
		4.5	—	17	35	—	44			
		6.0	—	—	30	—	37			
	t _{PLH}	2.0	—	—	150	—	190	ns		
		4.5	—	16	30	—	38			
		6.0	—	—	26	—	33			
	t _{PHL}	2.0	—	—	150	—	190	ns	G ₁ to Output	
		4.5	—	16	30	—	38			
		6.0	—	—	26	—	33			
	t _{PLH}	2.0	—	—	150	—	190	ns		
		4.5	—	17	30	—	38			
		6.0	—	—	26	—	33			
	t _{PHL}	2.0	—	—	175	—	220	ns	G _{2A} or G _{2B} to Output	
		4.5	—	15	35	—	44			
		6.0	—	—	30	—	37			
	t _{PLH}	2.0	—	—	150	—	190	ns		
		4.5	—	17	30	—	38			
		6.0	—	—	26	—	33			
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		

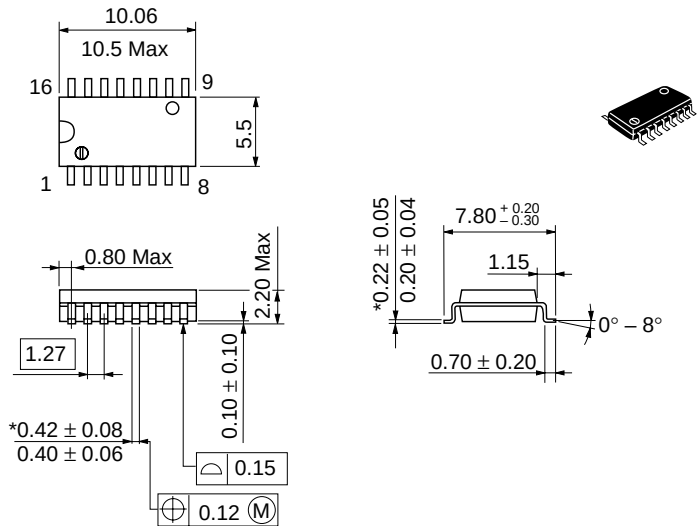
Package Dimensions

Unit: mm



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

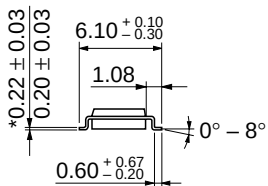
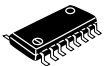
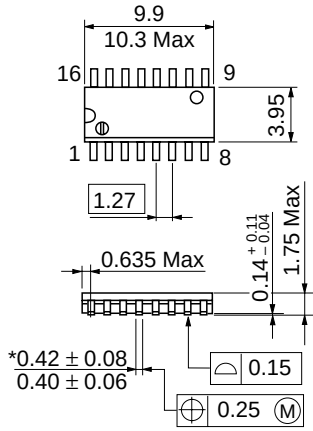
Unit: mm



*Dimension including the plating thickness
Base material dimension

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

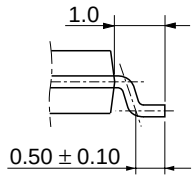
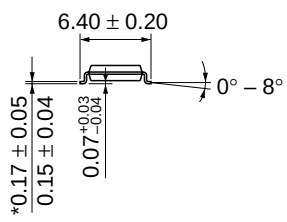
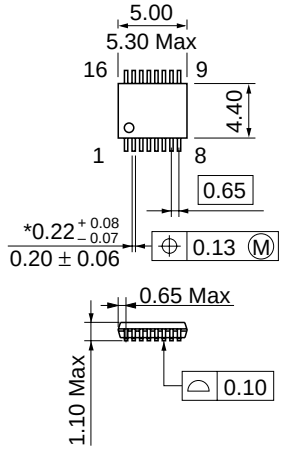
Unit: mm



*Dimension including the plating thickness
Base material dimension

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

Unit: mm



*Dimension including the plating thickness
Base material dimension

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

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