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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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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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HD74HCT138

3-to-8-line Decoder/Demultiplexer



ADE-205-547 (Z)
1st. Edition
Sep. 2000

Description

The HD74HCT138 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

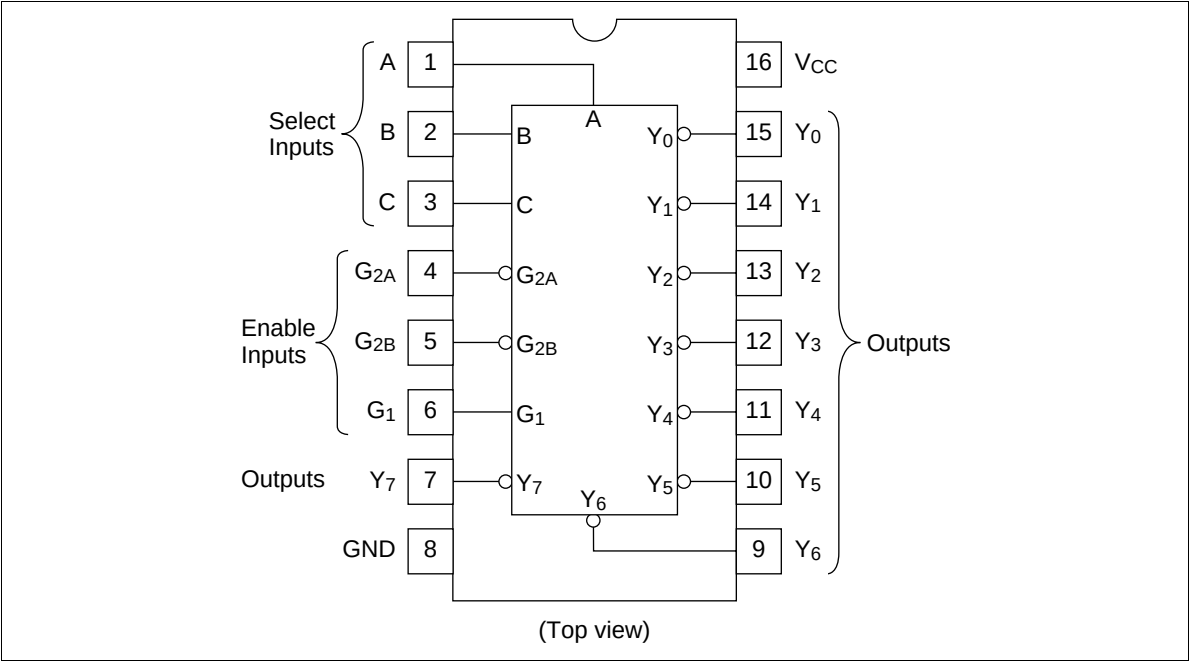
- LSTTL Output Logic Level Compatibility as well as CMOS Output Compatibility
- High Speed Operation: t_{pd} (A, B, C to Y) = 18.5 ns typ ($C_L = 50$ pF)
- High Output Current: Fanout of 10 LSTTL Loads
- Wide Operating Voltage: $V_{CC} = 4.5$ to 5.5 V
- Low Input Current: 1 μ A max
- Low Quiescent Supply Current: I_{CC} (static) = 4 μ A max ($T_a = 25^\circ\text{C}$)

Function Table

Inputs

Enable		Select				Outputs							
G ₁	G _{2A}	G _{2B}	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	H	X	X	X	X	H	H	H	H	H	H	H	H
L	X	X	X	X	X	H	H	H	H	H	H	H	H
H	L	L	L	L	L	L	H	H	H	H	H	H	H
H	L	L	L	L	H	H	L	H	H	H	H	H	H
H	L	L	L	H	L	H	H	L	H	H	H	H	H
H	L	L	L	H	H	H	H	H	L	H	H	H	H
H	L	L	H	L	L	H	H	H	H	L	H	H	H
H	L	L	H	L	H	H	H	H	H	H	L	H	H
H	L	L	H	H	L	H	H	H	H	H	H	L	H
H	L	L	H	H	H	H	H	H	H	H	H	H	L

Pin Arrangement



DC Characteristics

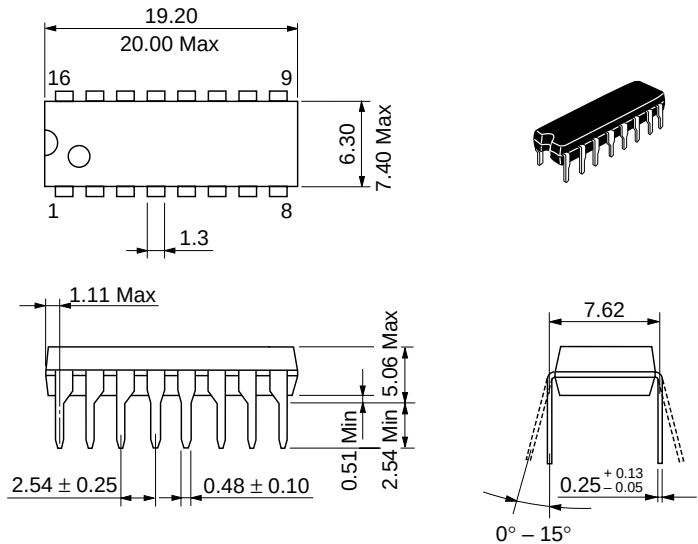
Item	Symbol	Ta = 25°C		Ta = -40 to +85°C		Unit	Test Conditions	
		Min	Typ	Max	Min	Max	V _{CC} (V)	
Input voltage	V _{IH}	2.0	—	—	2.0	—	V	4.5 to 5.5
	V _{IL}	—	—	0.8	—	0.8	V	4.5 to 5.5
Output voltage	V _{OH}	4.4	—	—	4.4	—	V	4.5 Vin = V _{IH} or V _{IL} I _{OH} = -20 μA
		4.18	—	—	4.13	—		I _{OH} = -4 mA
	V _{OL}	—	—	0.1	—	0.1	V	4.5 Vin = V _{IH} or V _{IL} I _{OL} = 20 μA
		—	—	0.26	—	0.33		I _{OL} = 4 mA
Input current	I _{in}	—	—	±0.1	—	±1.0	μA	5.5 Vin = V _{CC} or GND
Quiescent supply current	I _{CC}	—	—	4.0	—	40	μA	5.5 Vin = V _{CC} or GND, I _{out} = 0 μA

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

Item	Symbol	Ta = 25°C		Ta = -40 to +85°C		Unit	Test Conditions	
		Min	Typ	Max	Min	Max	V _{CC} (V)	
Propagation delay time	t _{PHL}	—	18	35	—	44	ns	4.5 A, B or C to output
	t _{PLH}	—	19	30	—	38	ns	4.5
	t _{PHL}	—	17	30	—	38	ns	4.5 G ₁ to output
	t _{PLH}	—	17	30	—	38	ns	4.5
	t _{PHL}	—	17	35	—	44	ns	4.5 G _{2A} or G _{2B} to output
	t _{PLH}	—	17	30	—	38	ns	4.5
Output rise/fall time	t _{TLH}	—	5	15	—	19	ns	4.5
	t _{THL}	—	5	15	—	19	ns	4.5
Input capacitance	C _{in}	—	5	10	—	10	pF	—

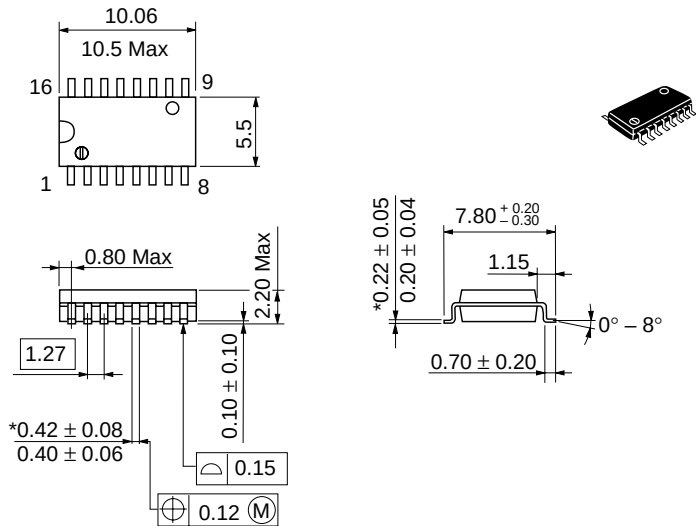
Package Dimensions

Unit: mm



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

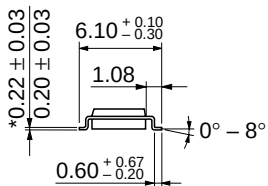
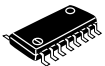
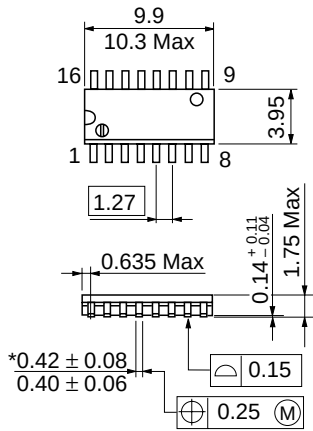
Unit: mm



*Dimension including the plating thickness
Base material dimension

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

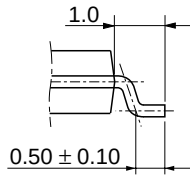
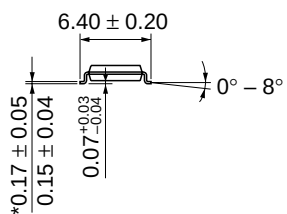
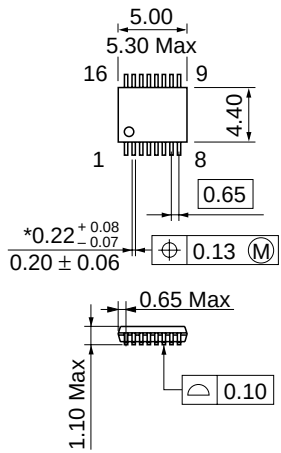
Unit: mm



*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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