HD74AC538

1-of-8 Decoder with 3-State Output

HITACHI

Description

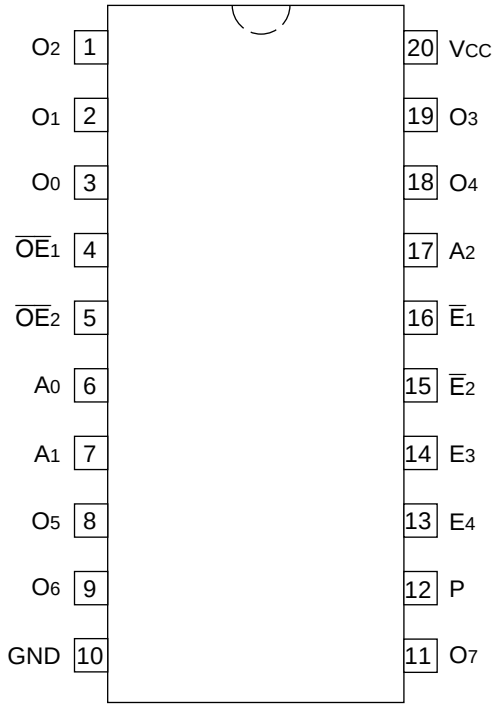
The HD74AC538 decoder/demultiplexer accepts three Address (A0 to A2) input signal and decodes them to select one of eight mutually exclusive outputs. A polarity control input (P) determines whether the outputs are active LOW or active HIGH. A HIGH signal on either of the active LOW output Enable ($\overline{OE}$) inputs forces all outputs to the high impedance state. Two active HIGH and two active LOW input enables are available for easy expansion to 1-of-32 decoding with four packages, or for data demultiplexing to 1-of-8 or 1-of-16 destinations.

Features

- Output Polarity Control
- Data Demultiplexing Capability
- Multiple Enables for Expansion
- Outputs Source/Sink 24 mA

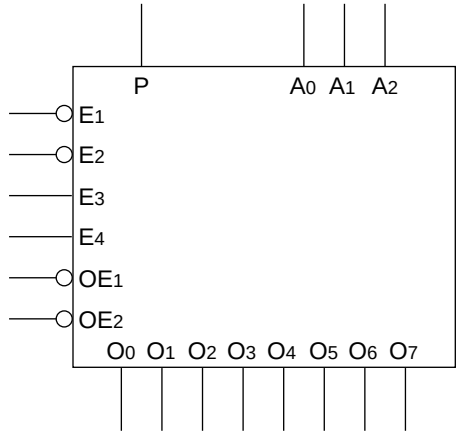
Hitachi semiconductor

Pin Arrangement



(Top view)

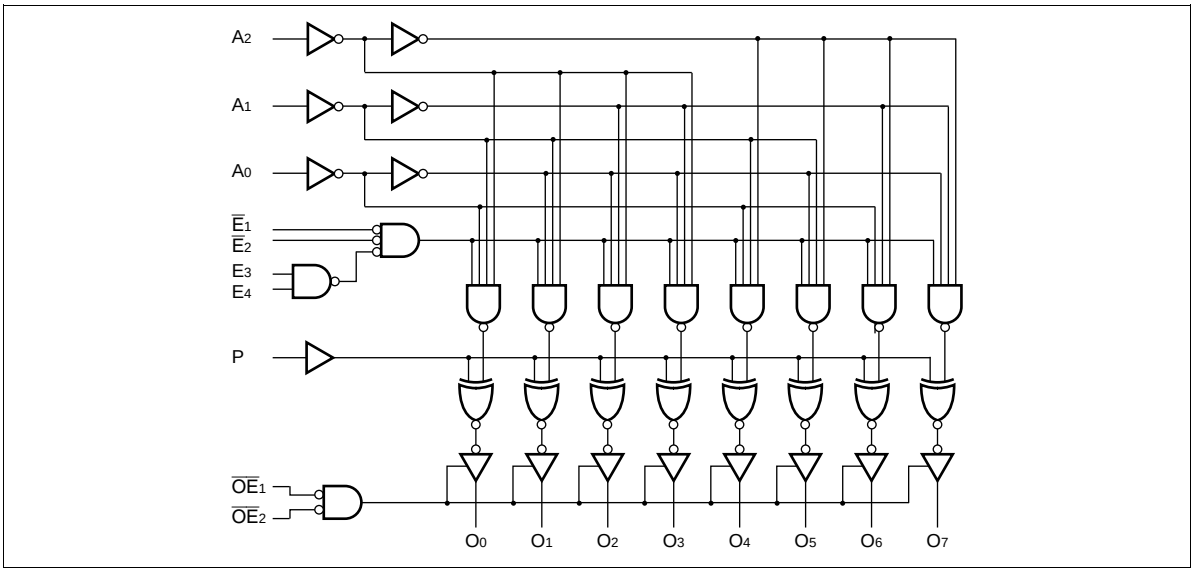
Logic Symbol



Pin Names

A_0 to A_2	Address Inputs
E_1, E_2	Enable Inputs (Active LOW)
E_3, E_4	Enable Inputs (Active HIGH)
P	Polarity Control Input
$\overline{OE}_1$, $\overline{OE}_2$	Output Enable Inputs (Active LOW)
O_0 to O_7	3-State Outputs

Logic Diagram



Truth Table

	Inputs									Outputs							
Function	$\overline{OE}_1$	$\overline{OE}_2$	$\overline{E}_1$	$\overline{E}_2$	E_3	E_4	A_2	A_1	A_0	O_0	O_1	O_2	O_3	O_4	O_5	O_6	O_7
High impedance	H	X	X	X	X	X	X	X	X	X	Z	Z	Z	Z	Z	Z	Z
	Z	H	X	X	X	X	X	X	X	Z	Z	Z	Z	Z	Z	Z	Z
Disable	L	L	H	X	X	X	X	X	X	Outputs equal input							
	L	L	X	H	X	X	X	X	X								
	L	L	X	X	L	X	X	X	X								
	L	L	X	X	X	L	X	X	X								
Active HIGH output	L	L	L	L	H	H	L	L	L	H	L	L	L	L	L	L	L
(P = L)	L	L	L	L	H	H	L	L	H	L	H	L	L	L	L	L	L
	L	L	L	L	H	H	L	H	L	L	L	H	L	L	L	L	L
	L	L	L	L	H	H	L	H	H	L	L	L	H	L	L	L	L
	L	L	L	L	H	H	H	L	L	L	L	L	L	H	L	L	L
	L	L	L	L	H	H	H	L	H	L	L	L	L	L	H	L	L
	L	L	L	L	H	H	H	H	L	L	L	L	L	L	L	H	L
	L	L	L	L	H	H	H	H	H	L	L	L	L	L	L	L	H
Active LOW output	L	L	L	L	H	H	L	L	L	L	H	H	H	H	H	H	H
(P = L)	L	L	L	L	H	H	L	L	H	H	L	H	H	H	H	H	H
	L	L	L	L	H	H	L	H	L	H	H	L	H	H	H	H	H
	L	L	L	L	H	H	L	H	H	H	H	H	L	H	H	H	H
	L	L	L	L	H	H	H	L	L	H	H	H	H	L	H	H	H
	L	L	L	L	H	H	H	L	H	H	H	H	H	H	L	H	H
	L	L	L	L	H	H	H	H	L	H	H	H	H	H	H	L	H
	L	L	L	L	H	H	H	H	H	H	H	H	H	H	H	H	L

H : High Voltage Level
L : Low Voltage Level
X : Immaterial
Z : High Impedance

DC Characteristics (unless otherwise specified)

Item	Symbol	Max	Unit	Condition
Maximum quiescent supply current	I_{CC}	80	μA	V_{IN} = V_{CC} or ground, V_{CC} = 5.5 V, Ta = Worst case
Maximum quiescent supply current	I_{CC}	8.0	μA	V_{IN} = V_{CC} or ground, V_{CC} = 5.5 V, Ta = 25°C

AC Characteristics: HD74AC538

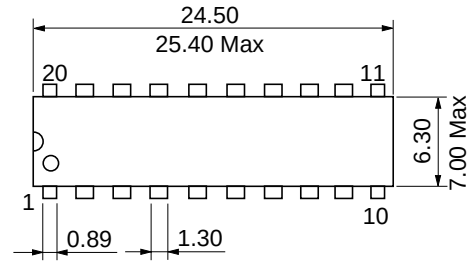
			Ta = +25°C C_L = 50 pF			Ta = –40°C to +85°C C_L = 50 pF		
Item	**Symbol**	**V_{CC} (V)*[1]**	**Min**	**Typ**	**Max**	**Min**	**Max**	**Unit**
Propagation delay	t_{PLH}	3.3	1.0	10.5	17.5	1.0	20.0	ns
A_n to O_n		5.0	1.0	8.0	12.5	1.0	14.0	
Propagation delay	t_{PHL}	3.3	1.0	9.5	17.5	1.0	20.0	ns
A_n to O_n		5.0	1.0	7.0	12.0	1.0	14.0	
Propagation delay	t_{PLH}	3.3	1.0	11.0	19.5	1.0	23.0	ns
$\overline{E}_1$, or $\overline{E}_2$ to O_n		5.0	1.0	8.0	14.5	1.0	16.5	
Propagation delay	t_{PHL}	3.3	1.0	10.0	19.5	1.0	23.0	ns
$\overline{E}_1$, or $\overline{E}_2$ to O_n		5.0	1.0	8.0	14.0	1.0	16.5	
Propagation delay	t_{PLH}	3.3	1.0	11.0	19.5	1.0	23.0	ns
$\overline{E}_3$, or $\overline{E}_4$ to O_n		5.0	1.0	8.5	14.5	1.0	17.0	
Propagation delay	t_{PHL}	3.3	1.0	10.5	20.0	1.0	23.5	ns
$\overline{E}_3$, or $\overline{E}_4$ to O_n		5.0	1.0	8.0	15.0	1.0	18.0	
Propagation delay	t_{PLH}	3.3	1.0	10.5	15.5	1.0	17.5	ns
P to O_n		5.0	1.0	9.0	11.0	1.0	12.5	
Propagation delay	t_{PHL}	3.3	1.0	9.0	15.0	1.0	17.0	ns
P to O_n		5.0	1.0	7.5	10.5	1.0	11.5	
Propagation delay	t_{PZH}	3.3	1.0	7.0	14.0	1.0	15.5	ns
$\overline{OE}_n$ to O_n		5.0	1.0	5.0	8.5	1.0	9.5	
Propagation delay	t_{PZL}	3.3	1.0	8.5	16.5	1.0	19.0	ns
$\overline{OE}_n$ to O_n		5.0	1.0	5.5	9.5	1.0	11.5	
Propagation delay	t_{PHZ}	3.3	1.0	7.0	14.0	1.0	15.5	ns
$\overline{OE}_n$ to O_n		5.0	1.0	6.0	10.5	1.0	11.5	
Propagation delay	t_{PLZ}	3.3	1.0	9.0	14.5	1.0	17.0	ns
$\overline{OE}_n$ to O_n		5.0	1.0	7.0	10.5	1.0	12.0	

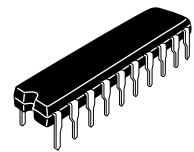
Note: 1. Voltage Range 3.3 is 3.3 V ± 0.3 V
Voltage Range 5.0 is 5.0 V ± 0.5 V

Capacitance

Item	**Symbol**	**Typ**	**Unit**	**Condition**
Input capacitance	C_{IN}	4.5	pF	V_{CC} = 5.5 V
Power dissipation capacitance	C_{PD}	100	pF	V_{CC} = 5.0 V

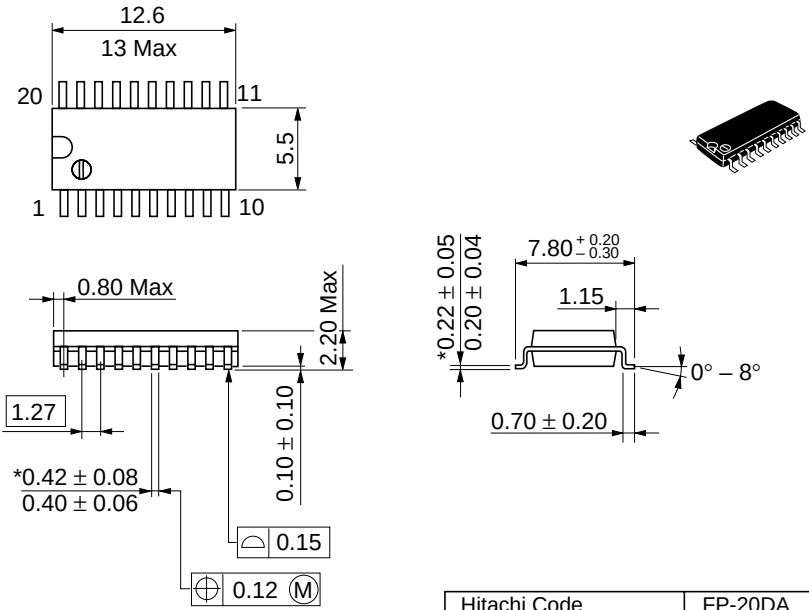
Unit: mm





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

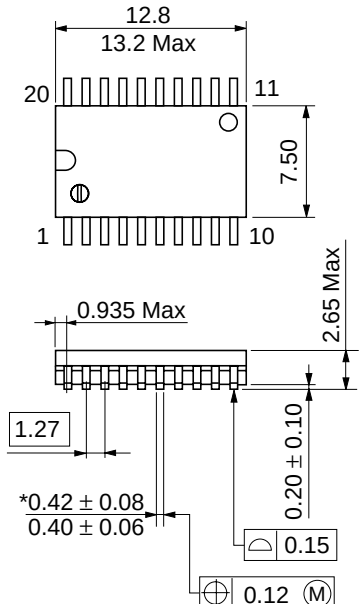
Unit: mm

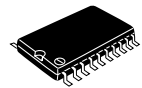


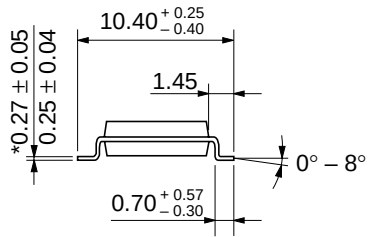
*Dimension including the plating thickness
Base material dimension

Hitachi Code	FP-20DA
JEDEC	—
EIAJ	Conforms
Weight (reference value)	0.31 g

Unit: mm



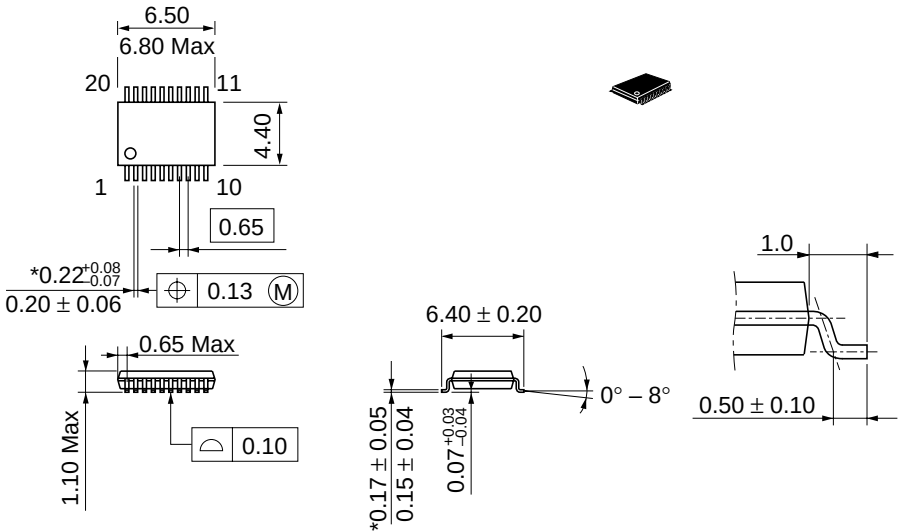




*Dimension including the plating thickness
Base material dimension

Hitachi Code	FP-20DB
JEDEC	Conforms
EIAJ	—
Weight (reference value)	0.52 g

Unit: mm



Hitachi Code	TTP-20DA
JEDEC	—
EIAJ	—
Weight (reference value)	0.07 g

*Dimension including the plating thickness
Base material dimension

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