
HD74AC538

1-of-8 Decoder with 3-State Output

HITACHI

Description

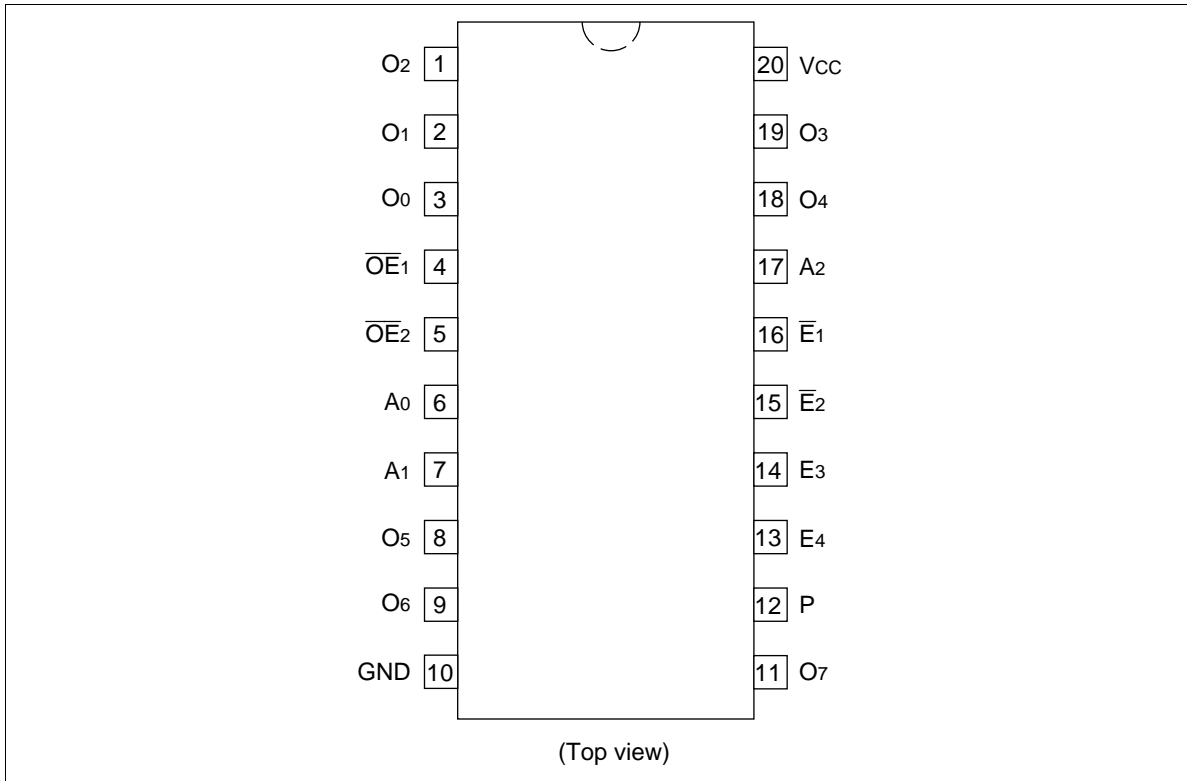
The HD74AC538 decoder/demultiplexer accepts three Address (A0 to A2) input signal and decodes them to select one of eight mutually exclusive outputs. A polarity control input (P) determines whether the outputs are active LOW or active HIGH. A HIGH signal on either of the active LOW output Enable (\overline{OE}) 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

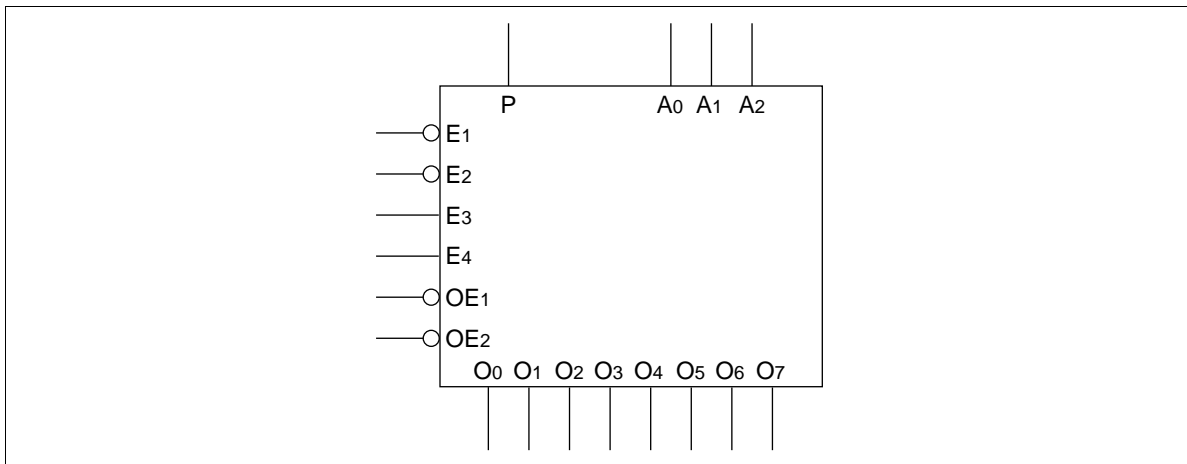
- Output Polarity Control
- Data Demultiplexing Capability
- Multiple Enables for Expansion
- Outputs Source/Sink 24 mA

HD74AC538

Pin Arrangement



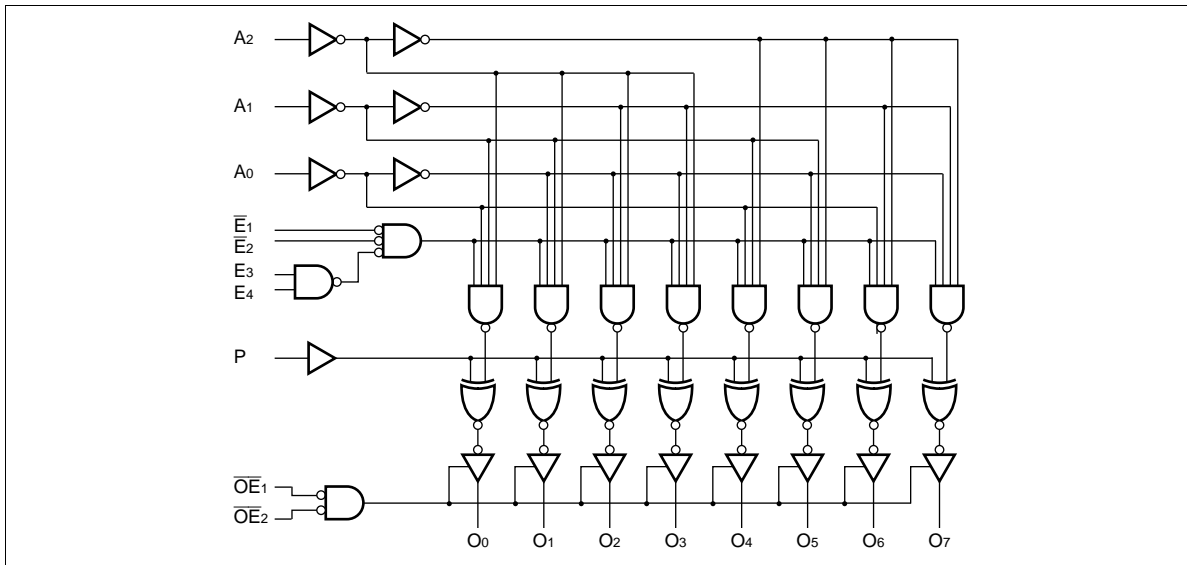
Logic Symbol



Pin Names

- A₀ to A₂ Address Inputs
- E₁, E₂ Enable Inputs (Active LOW)
- E₃, E₄ Enable Inputs (Active HIGH)
- P Polarity Control Input
- \overline{OE}_1 , \overline{OE}_2 Output Enable Inputs (Active LOW)
- O₀ to O₇ 3-State Outputs

Logic Diagram



HD74AC538

Truth Table

Function	Inputs									Outputs							
	OE ₁	OE ₂	\bar{E}_1	\bar{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 (P = L)	L	L	L	L	H	H	L	L	L	H	L	L	L	L	L	L	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	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
	L	L	L	L	H	H	L	L	L	L	H	H	H	H	H	H	H
Active LOW output (P = L)	L	L	L	L	H	H	L	L	L	L	H	H	H	H	H	H	H
	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	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
	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

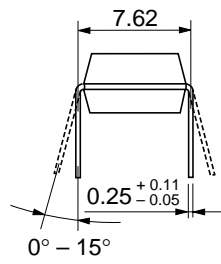
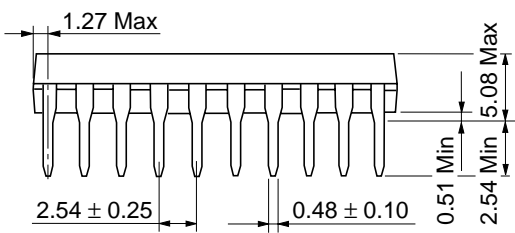
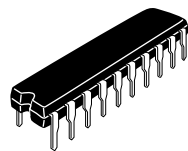
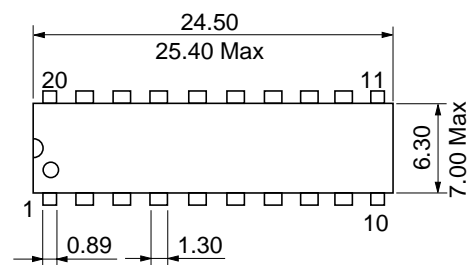
Item	Symbol	V _{CC} (V)* ¹	Ta = +25°C C _L = 50 pF			Ta = -40°C to +85°C C _L = 50 pF		Unit
			Min	Typ	Max	Min	Max	
Propagation delay A _n to O _n	t _{PLH}	3.3	1.0	10.5	17.5	1.0	20.0	ns
		5.0	1.0	8.0	12.5	1.0	14.0	
Propagation delay A _n to O _n	t _{PHL}	3.3	1.0	9.5	17.5	1.0	20.0	ns
		5.0	1.0	7.0	12.0	1.0	14.0	
Propagation delay E ₁ , or E ₂ to O _n	t _{PLH}	3.3	1.0	11.0	19.5	1.0	23.0	ns
		5.0	1.0	8.0	14.5	1.0	16.5	
Propagation delay E ₁ , or E ₂ to O _n	t _{PHL}	3.3	1.0	10.0	19.5	1.0	23.0	ns
		5.0	1.0	8.0	14.0	1.0	16.5	
Propagation delay E ₃ , or E ₄ to O _n	t _{PLH}	3.3	1.0	11.0	19.5	1.0	23.0	ns
		5.0	1.0	8.5	14.5	1.0	17.0	
Propagation delay E ₃ , or E ₄ to O _n	t _{PHL}	3.3	1.0	10.5	20.0	1.0	23.5	ns
		5.0	1.0	8.0	15.0	1.0	18.0	
Propagation delay P to O _n	t _{PLH}	3.3	1.0	10.5	15.5	1.0	17.5	ns
		5.0	1.0	9.0	11.0	1.0	12.5	
Propagation delay P to O _n	t _{PHL}	3.3	1.0	9.0	15.0	1.0	17.0	ns
		5.0	1.0	7.5	10.5	1.0	11.5	
Propagation delay OE _n to O _n	t _{PZH}	3.3	1.0	7.0	14.0	1.0	15.5	ns
		5.0	1.0	5.0	8.5	1.0	9.5	
Propagation delay OE _n to O _n	t _{PZL}	3.3	1.0	8.5	16.5	1.0	19.0	ns
		5.0	1.0	5.5	9.5	1.0	11.5	
Propagation delay OE _n to O _n	t _{PHZ}	3.3	1.0	7.0	14.0	1.0	15.5	ns
		5.0	1.0	6.0	10.5	1.0	11.5	
Propagation delay OE _n to O _n	t _{PLZ}	3.3	1.0	9.0	14.5	1.0	17.0	ns
		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

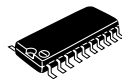
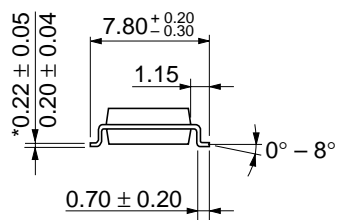
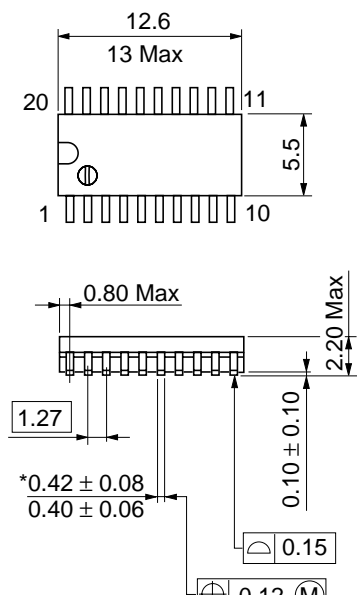
Capacitance

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

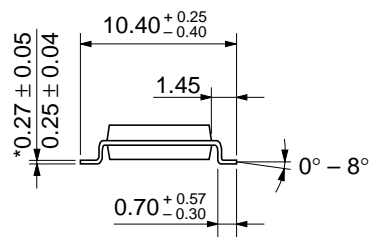
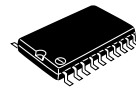
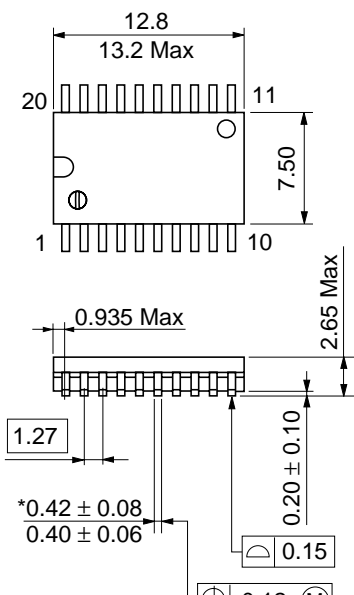
Unit: mm



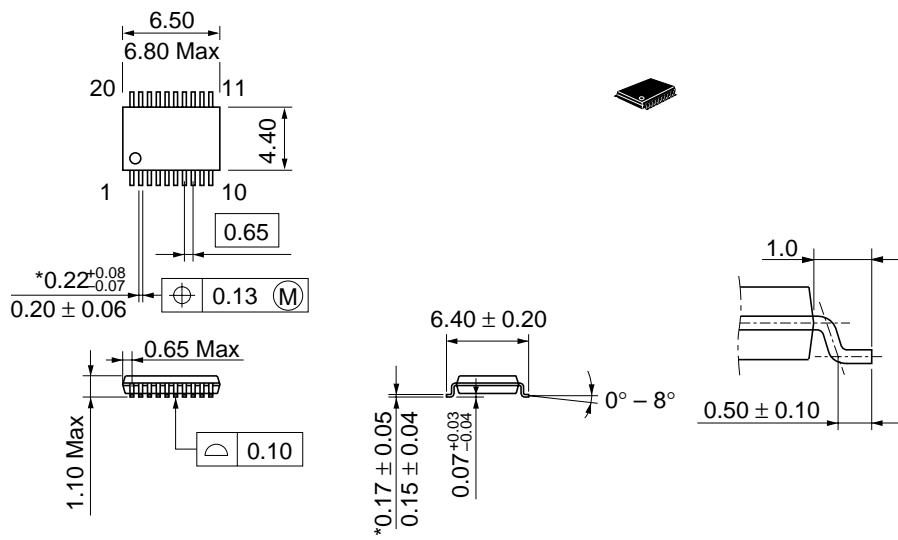
Unit: mm



Unit: mm



Unit: mm



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