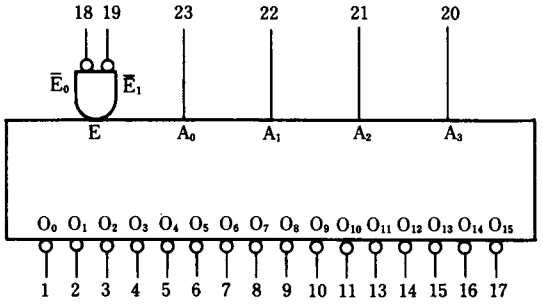
HD74AC154/HD74ACT154 • 1-of-16 Decoder/Demultiplexer

Description

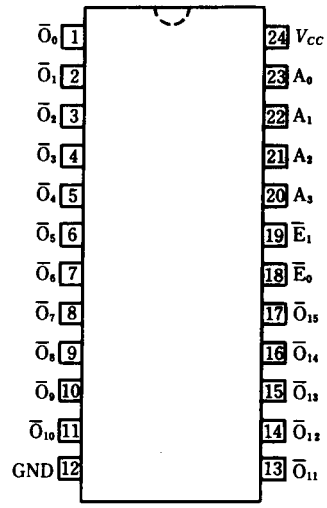
The HD74AC154/HD74ACT154 is a multipurpose decoder designed to accept four inputs and provide 16 mutually exclusive outputs. By means of the Address (A_0—A_3) inputs, data applied to one of the Enable inputs can be routed to any one of the outputs in True (non-inverted) form.

- Outputs Source/Sink 24 mA
- HD74ACT154 has TTL-Compatible Inputs

Logic Symbol



Pin Assignment



(Top View)

Pin Names

A_0—A_3	Address Inputs
$\overline{E}_0$, $\overline{E}_1$	Enable Inputs (Active Low)
$\overline{O}_0$—$\overline{O}_{15}$	Outputs (Active Low)

Functional Description

The HD74AC154/HD74ACT154 decoder accepts four inputs and provides 16 mutually exclusive active Low outputs, as shown by the logic symbol. The active Low outputs facilitate addressing other MSI units with active Low enable.

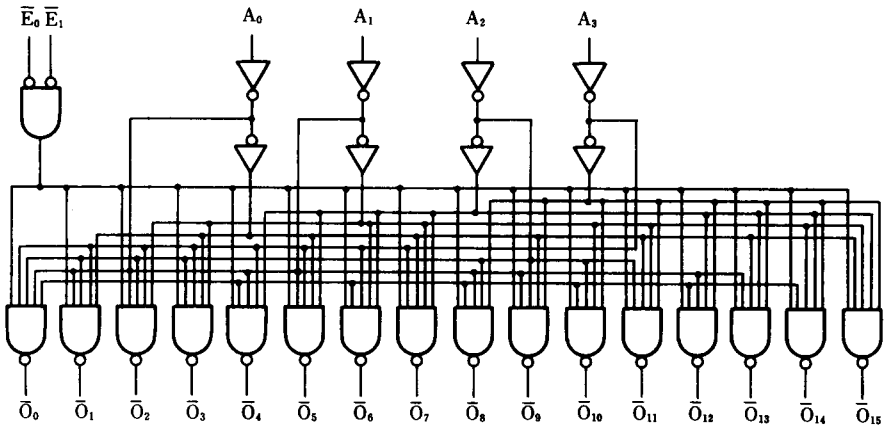
The HD74AC154/HD74ACT154 can demultiplex data by routing it from one input to one of 16 possible decoder outputs. The desired output is addressed and the data is applied to one of the enable inputs. Providing that the other enable is Low, the addressed output will follow the state of the applied data.

Truth Table

Inputs						Outputs															
$\overline{E}_0$	$\overline{E}_1$	A_0	A_1	A_2	A_3	$\overline{O}_0$	$\overline{O}_1$	$\overline{O}_2$	$\overline{O}_3$	$\overline{O}_4$	$\overline{O}_5$	$\overline{O}_6$	$\overline{O}_7$	$\overline{O}_8$	$\overline{O}_9$	$\overline{O}_{10}$	$\overline{O}_{11}$	$\overline{O}_{12}$	$\overline{O}_{13}$	$\overline{O}_{14}$	$\overline{O}_{15}$
H	H	X	X	X	X	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H
H	L	X	X	X	X	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H
L	H	X	X	X	X	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H
L	L	L	L	L	L	L	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H
L	L	H	L	L	L	H	L	H	H	H	H	H	H	H	H	H	H	H	H	H	H
L	L	L	H	L	L	H	H	L	H	H	H	H	H	H	H	H	H	H	H	H	H
L	L	H	H	L	L	H	H	H	L	H	H	H	H	H	H	H	H	H	H	H	H
L	L	L	L	H	L	H	H	H	H	L	H	H	H	H	H	H	H	H	H	H	H
L	L	H	L	H	L	H	H	H	H	H	L	H	H	H	H	H	H	H	H	H	H
L	L	L	H	H	L	H	H	H	H	H	H	L	H	H	H	H	H	H	H	H	H
L	L	H	H	H	L	H	H	H	H	H	H	H	L	H	H	H	H	H	H	H	H
L	L	L	L	L	H	H	H	H	H	H	H	H	H	L	H	H	H	H	H	H	H
L	L	H	L	L	H	H	H	H	H	H	H	H	H	H	L	H	H	H	H	H	H
L	L	L	H	L	H	H	H	H	H	H	H	H	H	H	H	L	H	H	H	H	H
L	L	H	H	L	H	H	H	H	H	H	H	H	H	H	H	H	L	H	H	H	H
L	L	L	L	H	H	H	H	H	H	H	H	H	H	H	H	H	H	L	H	H	H
L	L	H	L	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	L	H	H
L	L	L	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	L	H
L	L	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	L

H = High Voltage Level L = Low Voltage Level X = Immaterial

Logic Diagram



DC Characteristics (unless otherwise specified)

Symbol	Parameter	Max	Unit	Condition
I_{CC}	Maximum Quiescent Supply Current	80	μA	V_{IN} = V_{CC} or Ground, V_{CC} = 5.5V, Ta = Worst Case
I_{CC}	Maximum Quiescent Supply Current	8.0	μA	V_{IN} = V_{CC} or Ground, V_{CC} = 5.5V, Ta = 25°C
I_{CCT}	Maximum I_{CC}/Input (HD74ACT154)	1.5	mA	V_{IN} = V_{CC} − 2.1V V_{CC} = 5.5V Ta = Worst Case

AC Characteristics: HD74AC154

Symbol	Parameter	V_{CC} * (V)	Ta = +25°C C_L = 50pF			Ta = −40°C to +85°C C_L = 50pF		Unit
			Min	Typ	Max	Min	Max	
t_{PLH}	Propagation Delay Any A to Any $\overline{O}$	3.3 5.0	1.0 1.0	12.0 9.0	14.5 11.0	1.0 1.0	15.5 12.0	ns
t_{PHL}	Propagation Delay Any A to Any $\overline{O}$	3.3 5.0	1.0 1.0	11.0 8.0	14.0 10.5	1.0 1.0	15.0 11.5	
t_{PLH}	Propagation Delay $\overline{E}_1$ or $\overline{E}_2$ to Any $\overline{O}$	3.3 5.0	1.0 1.0	12.0 9.0	15.0 11.0	1.0 1.0	16.0 12.0	
t_{PHL}	Propagation Delay $\overline{E}_1$ or $\overline{E}_2$ to Any $\overline{O}$	3.3 5.0	1.0 1.0	11.5 8.5	14.0 10.5	1.0 1.0	15.0 11.5	

* Voltage Range 3.3 is 3.3V ± 0.3V
Voltage Range 5.0 is 5.0V ± 0.5V

AC Characteristics: HD74ACT154

Symbol	Parameter	V_{CC}* (V)	Ta = +25°C, C_L = 50pF			Ta = −40°C to +85°C, C_L = 50pF		Unit
			Min	Typ	Max	Min	Max	
t_{PLH}	Propagation Delay Any A to Any $\overline{O}$	5.0	1.0	11.0	13.5	1.0	14.5	ns
t_{PHL}	Propagation Delay Any A to Any $\overline{O}$	5.0	1.0	10.0	12.5	1.0	13.5	
t_{PLH}	Propagation Delay $\overline{E}_1$ or $\overline{E}_2$ to Any $\overline{O}$	5.0	1.0	9.5	11.5	1.0	12.5	
t_{PHL}	Propagation Delay $\overline{E}_1$ or $\overline{E}_2$ to Any $\overline{O}$	5.0	1.0	9.5	11.5	1.0	12.5	

* Voltage Range 5.0 is 5.0V ±0.5V

Capacitance

Symbol	Parameter	Typ	Unit	Condition
C_{IN}	Input Capacitance	4.5	pF	V_{CC} = 5.5V
C_{PD}	Power Dissipation Capacitance	60.0	pF	V_{CC} = 5.0V

Package Information

In the HD74AC series of Advanced CMOS logic, either plastic DIP and small outline packages can be selected.
To order, please refer to the following package code.

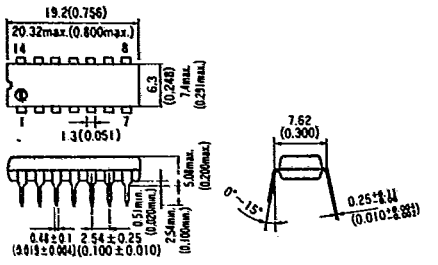
• Package code of Advanced CMOS Logic

HD74AC XXXX P

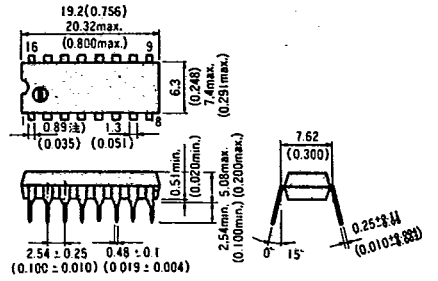
- Package code
  - P: Plastic DIP,
  - FP: Small outline package
- Individual device code
- 74AC: Commercial FACT
- 74ACT: Commercial TTL-Compatible Advanced CMOS
- Initial cad of Hitachi digital IC

Plastic DIP Package [Unit: mm (inch)]

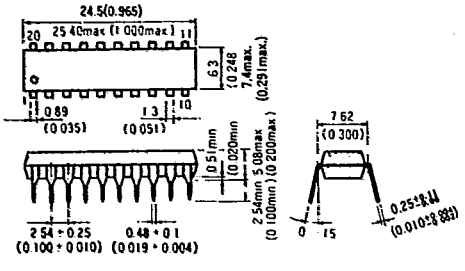
14 Pin type



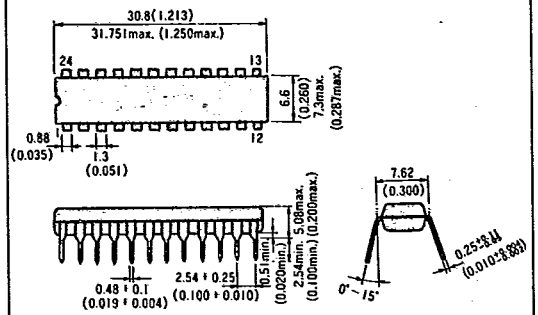
16 Pin type



20 Pin type



24 Pin type



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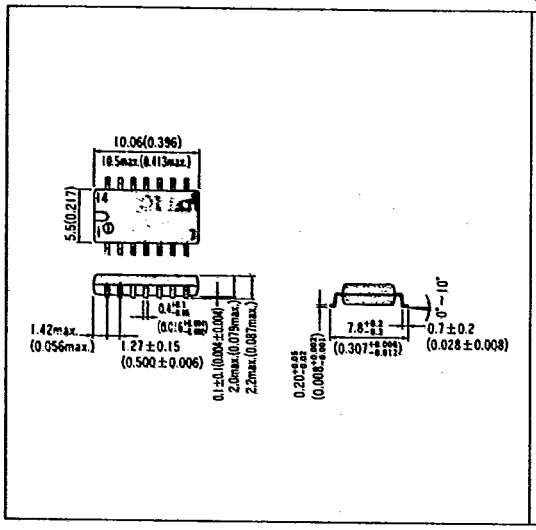
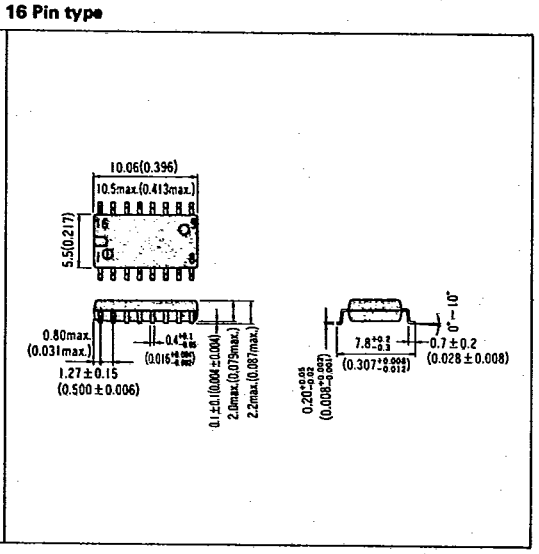
Package Information

Small Outline Package [Unit: mm (inch)]

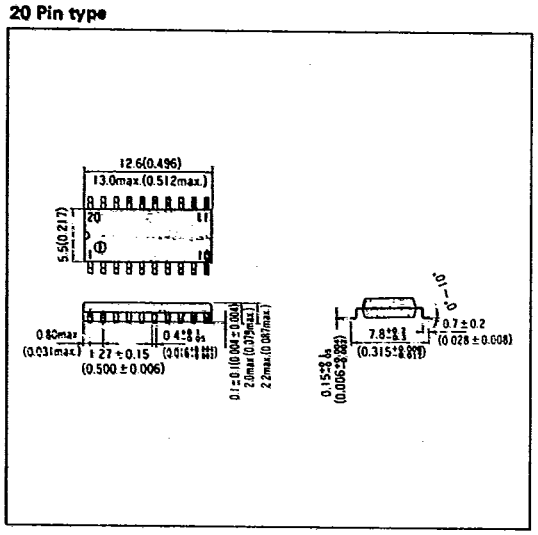
14 Pin type



16 Pin type



20 Pin type



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