

HD74HC149

8-to-8-line Priority Encoder

REJ03D0574-0200
 (Previous ADE-205-448)
 Rev.2.00
 Oct 11, 2005

Description

The HD74HC149 is priority encoder which has 8 input lines (0 - 7) and 8 output lines (Y0 - Y7).

It is the logical combination of a HD74HC148 8-3 line priority encoder driving a HD74HC138 3-8 line decoder.

Only one request output can be low at a time. The output that is low is dependent on the highest priority request that is low. The order of priority is 7 highest and 0 lowest.

When E input is high, all outputs are high.

When a output (Y0 - Y7) is low, P output is low and this indicates active condition.

Features

- High Speed Operation: t_{pd} (0 - 7 to Y) = 16 ns typ ($C_L = 50$ pF)
- High Output Current: Fanout of 10 LSTTL Loads
- Wide Operating Voltage: $V_{CC} = 2$ to 6 V
- Low Input Current: 1 μ A max
- Low Quiescent Supply Current: I_{CC} (static) = 4 μ A max ($T_a = 25^\circ\text{C}$)
- Ordering Information

Part Name	Package Type	Package Code (Previous Code)	Package Abbreviation	Taping Abbreviation (Quantity)
HD74HC149RPEL	SOP-20 pin (JEDEC)	PRSP0020DC-A (FP-20DBV)	RP	EL (1,000 pcs/reel)

Function Table

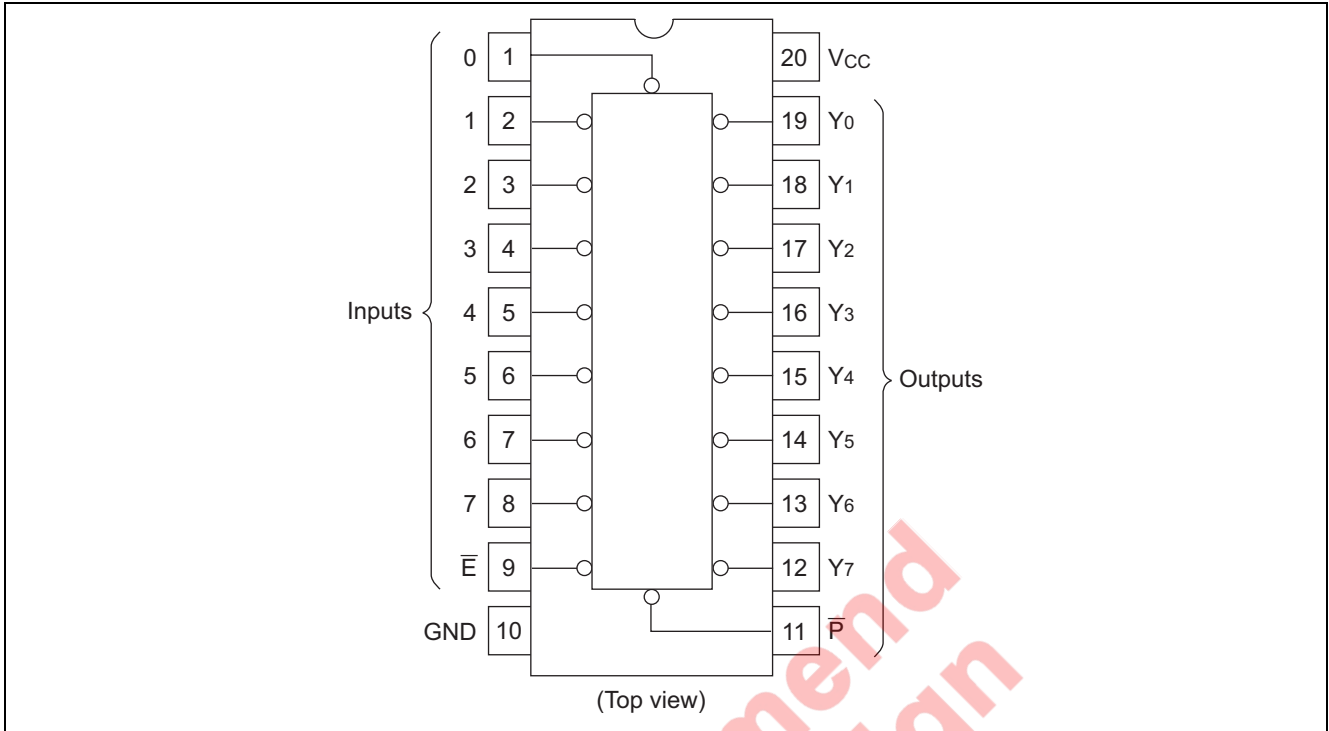
Inputs									Outputs									
0	1	2	3	4	5	6	7	\bar{E}	Y ₀	Y ₁	Y ₂	Y ₃	Y ₄	Y ₅	Y ₆	Y ₇	\bar{P}	
X	X	X	X	X	X	X	X	H	H	H	H	H	H	H	H	H	H	H
H	H	H	H	H	H	H	H	L	H	H	H	H	H	H	H	H	H	H
X	X	X	X	X	X	X	L	L	H	H	H	H	H	H	H	H	L	L
X	X	X	X	X	X	L	H	L	H	H	H	H	H	H	L	H	H	L
X	X	X	X	L	H	H	H	L	H	H	H	H	L	H	H	H	H	L
X	X	X	L	H	H	H	H	L	H	H	L	H	H	H	H	H	H	L
X	X	L	H	H	H	H	H	L	H	H	L	H	H	H	H	H	H	L
X	L	H	H	H	H	H	H	L	H	L	H	H	H	H	H	H	H	L
L	H	H	H	H	H	H	H	L	L	H	H	H	H	H	H	H	H	L

H: High level

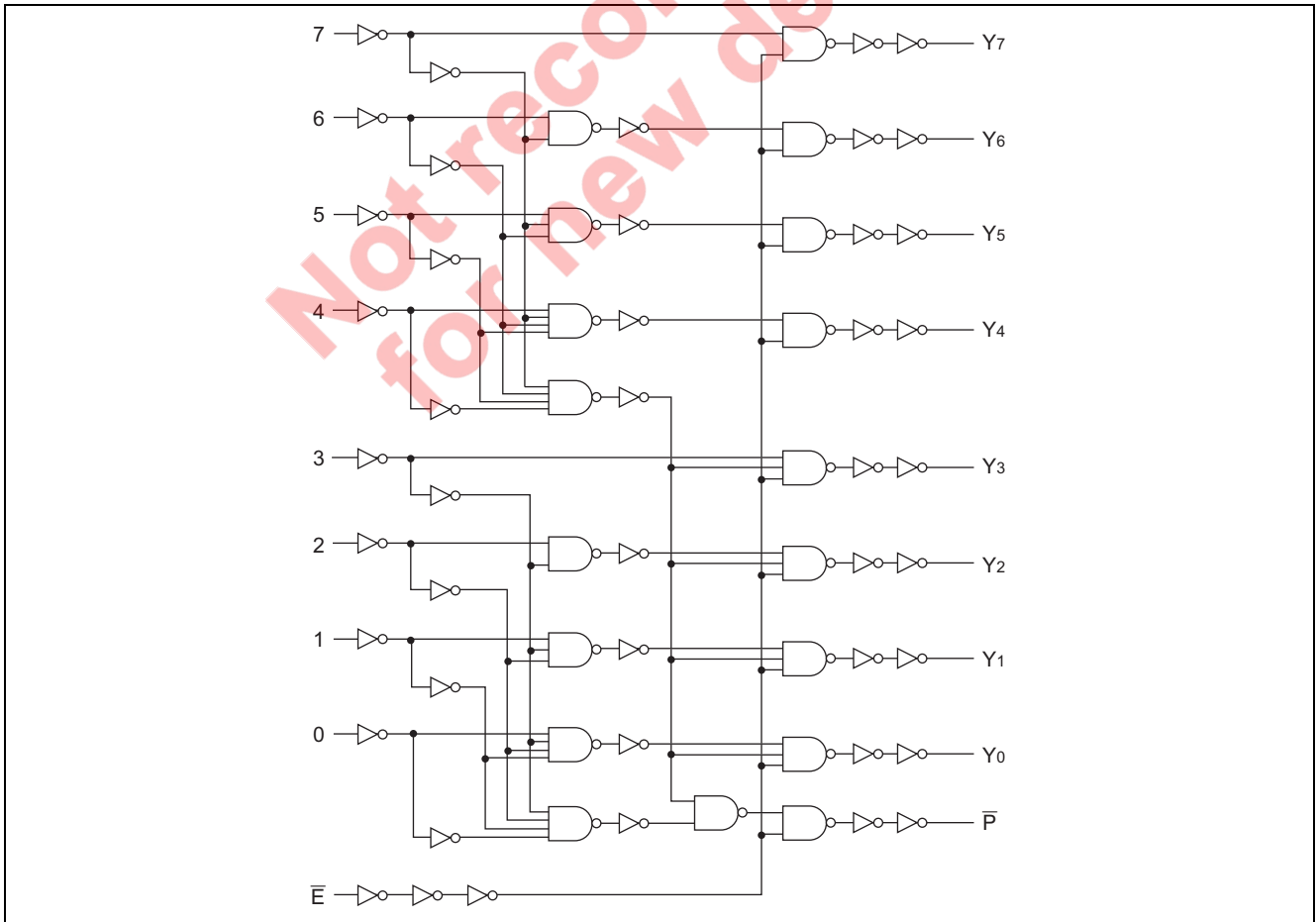
L: Low level

X: Irrelevant

Pin Arrangement



Logic Diagram



Absolute Maximum Ratings

Item	Symbol	Ratings	Unit
Supply voltage range	V_{CC}	-0.5 to 7.0	V
Input / Output voltage	V_{in}, V_{out}	-0.5 to $V_{CC} + 0.5$	V
Input / Output diode current	I_{IK}, I_{OK}	± 20	mA
Output current	I_O	± 25	mA
V_{CC} , GND current	I_{CC} or I_{GND}	± 50	mA
Power dissipation	P_T	500	mW
Storage temperature	T_{stg}	-65 to +150	°C

Note: The absolute maximum ratings are values, which must not individually be exceeded, and furthermore, no two of which may be realized at the same time.

Recommended Operating Conditions

Item	Symbol	Ratings	Unit	Conditions
Supply voltage	V_{CC}	2 to 6	V	
Input / Output voltage	V_{IN}, V_{OUT}	0 to V_{CC}	V	
Operating temperature	T_a	-40 to 85	°C	
Input rise / fall time ^{*1}	t_r, t_f	0 to 1000	ns	$V_{CC} = 2.0$ V
		0 to 500		$V_{CC} = 4.5$ V
		0 to 400		$V_{CC} = 6.0$ V

Note: 1. This item guarantees maximum limit when one input switches.
Waveform: Refer to test circuit of switching characteristics.

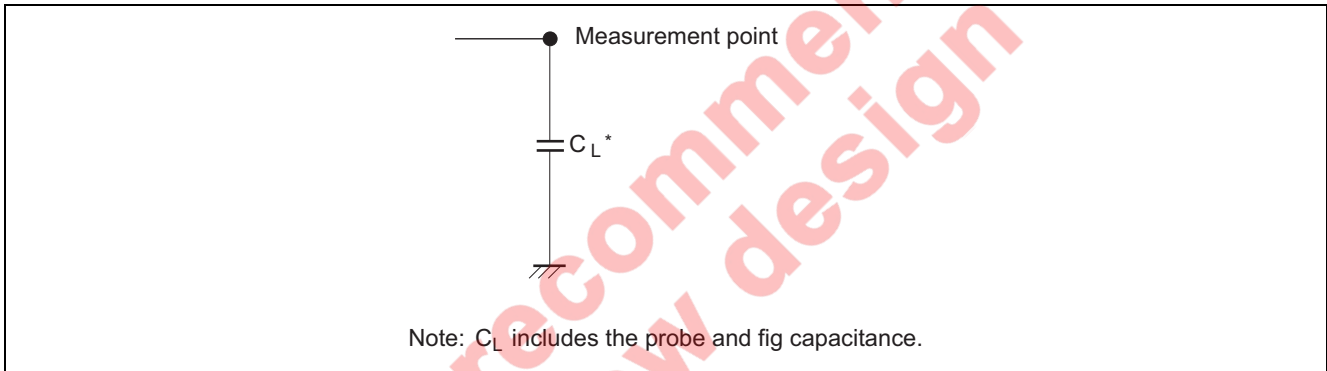
Electrical Characteristics

Item	Symbol	V_{CC} (V)	$T_a = 25^\circ\text{C}$			$T_a = -40 \text{ to } +85^\circ\text{C}$		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	$V_{in} = V_{IH}$ or V_{IL}	$I_{OH} = -20 \mu\text{A}$
		4.5	4.4	4.5	—	4.4	—			$I_{OH} = -4 \text{ mA}$
		6.0	5.9	6.0	—	5.9	—			$I_{OH} = -5.2 \text{ mA}$
		4.5	4.18	—	—	4.13	—			
		6.0	5.68	—	—	5.63	—			
	V_{OL}	2.0	—	0.0	0.1	—	0.1	V	$V_{in} = V_{IH}$ or V_{IL}	$I_{OL} = 20 \mu\text{A}$
		4.5	—	0.0	0.1	—	0.1			
		6.0	—	0.0	0.1	—	0.1			
		4.5	—	—	0.26	—	0.33			$I_{OL} = 4 \text{ mA}$
		6.0	—	—	0.26	—	0.33			$I_{OL} = 5.2 \text{ mA}$
Input current	I_{in}	6.0	—	—	± 0.1	—	± 1.0	μA	$V_{in} = V_{CC}$ or GND	
Quiescent supply current	I_{CC}	6.0	—	—	4.0	—	40	μA	$V_{in} = V_{CC}$ or GND, $I_{out} = 0 \mu\text{A}$	

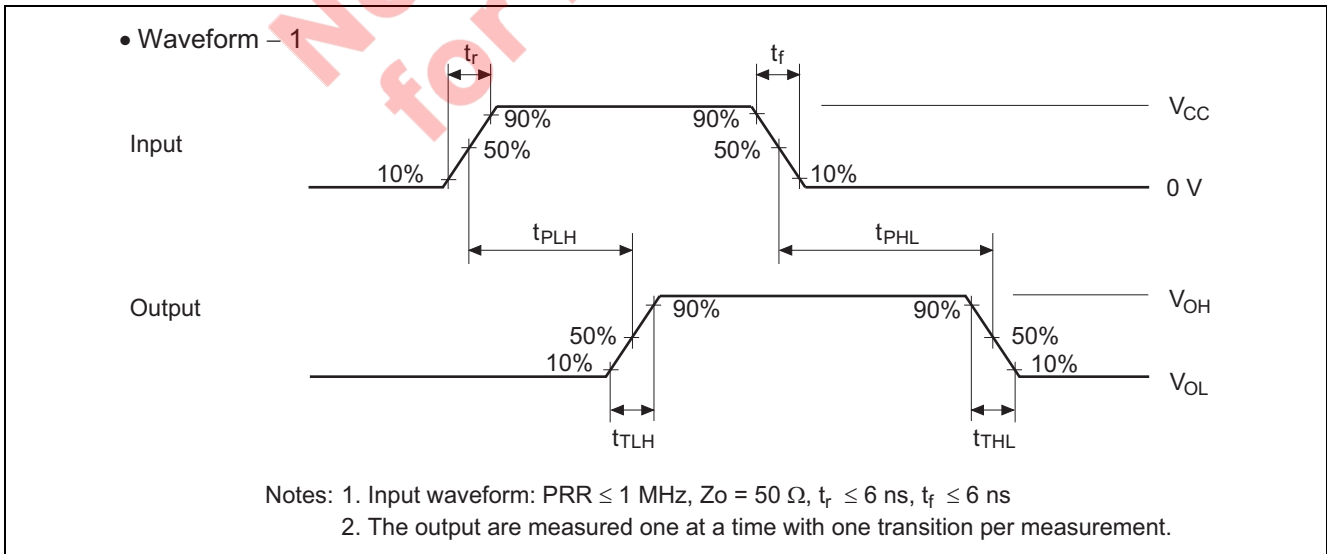
Switching Characteristics ($C_L = 50$ pF, Input $t_r = t_f = 6$ ns)

Item	Symbol	V_{CC} (V)	$T_a = 25^\circ\text{C}$			$T_a = -40$ to $+85^\circ\text{C}$		Unit	Test Conditions
			Min	Typ	Max	Min	Max		
Propagation delay time	t_{PLH}	2.0	—	—	140	—	175	ns	0 - 7 to Y, \bar{P}
		4.5	—	16	28	—	35		
		6.0	—	—	24	—	30		
	t_{PHL}	2.0	—	—	155	—	195		
		4.5	—	13	31	—	39		
		6.0	—	—	26	—	33		
Output rise time	t_{TLH}	2.0	—	—	75	—	95	ns	
		4.5	—	5	15	—	19		
		6.0	—	—	13	—	16		
Output fall time	t_{THL}	2.0	—	—	75	—	95	ns	
		4.5	—	5	15	—	19		
		6.0	—	—	13	—	16		
Input capacitance	C_{in}	—	—	5	10	—	10	pF	

Test Circuit

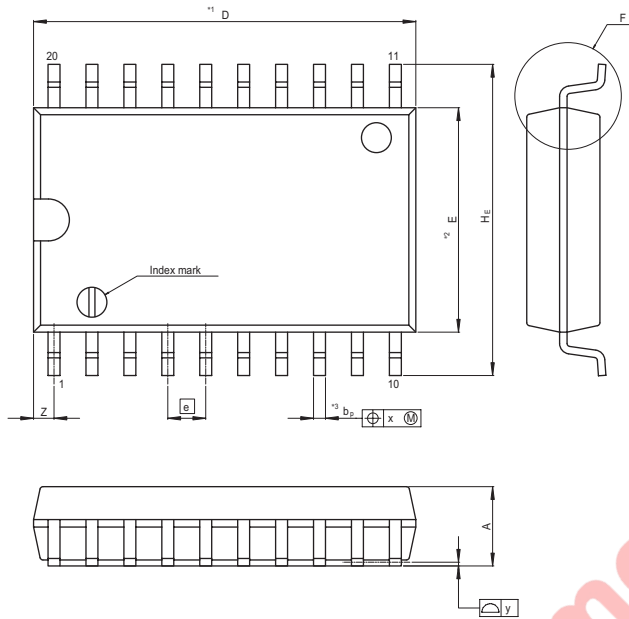


Waveforms

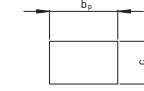


Package Dimensions

JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
P-SOP20-7.5x12.8-1.27	PRSP0020DC-A	FP-20DBV	0.52g



NOTE)
 1. DIMENSIONS**1 (Nom)**AND**2"
 @ DO NOT INCLUDE MOLD FLASH.
 2. DIMENSION**3**DOES NOT
 @ INCLUDE TRIM OFFSET.



Terminal cross section (Ni/Pd/Au plating)

Reference Symbol	Dimension in Millimeters		
	Min	Nom	Max
D	—	12.80	13.2
E	—	7.50	—
A ₂	—	—	—
A ₁	0.10	0.20	0.30
A	—	—	2.65
b _p	0.34	0.40	0.46
b ₁	—	—	—
c	0.20	0.25	0.30
c ₁	—	—	—
θ	0°	—	8°
H _E	10.00	10.40	10.65
Ⓜ	—	1.27	—
x	—	—	0.12
y	—	—	0.15
Z	—	—	0.935
L	0.40	0.70	1.27
L ₁	—	1.45	—

Detail F

Not recommended for new designs

Keep safety first in your circuit designs!

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