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April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (<http://www.renesas.com>)

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HD74HC148

8-to-3-line Octal Priority Encoder

REJ03D0573-0200
 (Previous ADE-205-447)
 Rev.2.00
 Oct 11, 2005

Description

HD74HC148 encodes eight data lines to three-line (4-2-1) binary (octal). Cascading circuitry (enable input EI and enable output EO) is provided to allow octal expansion without the need for external circuitry. The data inputs and outputs are active at the low logic level.

Features

- High Speed Operation: t_{pd} (0 - 7 to A_0 - A_2) = 15 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)
HD74HC148P	DILP-16 pin	PRDP0016AE-B (DP-16FV)	P	—
HD74HC148FPEL	SOP-16 pin (JEITA)	PRSP0016DH-B (FP-16DAV)	FP	EL (2,000 pcs/reel)

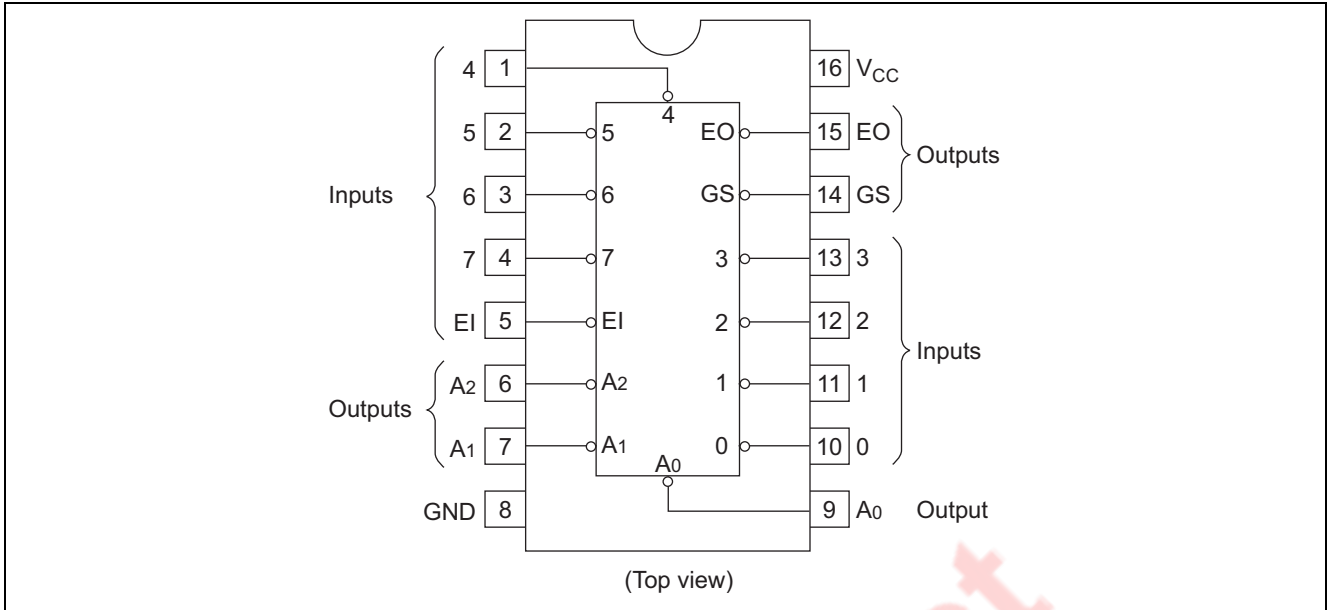
Note: Please consult the sales office for the above package availability.

Function Table

Inputs									Outputs				
EI	0	1	2	3	4	5	6	7	A_2	A_1	A_0	GS	EO
H	X	X	X	X	X	X	X	X	H	H	H	H	H
L	H	H	H	H	H	H	H	H	H	H	H	H	L
L	X	X	X	X	X	X	X	L	L	L	L	L	H
L	X	X	X	X	X	X	L	H	L	L	H	L	H
L	X	X	X	X	X	L	H	H	L	H	L	L	H
L	X	X	X	L	H	H	H	H	H	L	L	L	H
L	X	X	L	H	H	H	H	H	H	L	H	L	H
L	X	L	H	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 : High level
 L : Low level
 X : Irrelevant

Pin Arrangement



Absolute Maximum Ratings

Item	Symbol	Rating	Unit
Supply voltage range	V_{CC}	-0.5 to +7.0	V
Input voltage	V_{IN}	-0.5 to $V_{CC} + 0.5$	V
Output voltage	V_{OUT}	-0.5 to $V_{CC} + 0.5$	V
Output current	I_{OUT}	±25	mA
DC current drain per V_{CC} , GND	I_{CC} , I_{GND}	±50	mA
DC input diode current	I_{IK}	±20	mA
DC output diode current	I_{OK}	±20	mA
Power dissipation per package	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	$V_{CC} = 2.0\text{ V}$
		0 to 500		$V_{CC} = 4.5\text{ V}$
		0 to 400		$V_{CC} = 6.0\text{ V}$

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

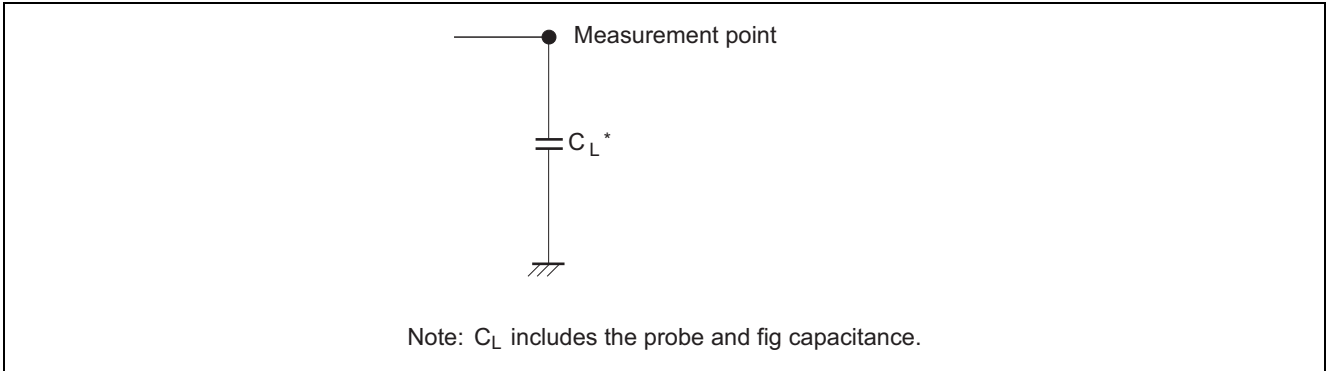
Electrical Characteristics

Item	Symbol	V _{CC} (V)	Ta = 25°C			Ta = -40 to +85°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	Vin = V _{IH} or V _{IL}	I _{OH} = -20 μA
		4.5	4.4	4.5	—	4.4	—			I _{OH} = -4 mA
		6.0	5.9	6.0	—	5.9	—			I _{OH} = -5.2 mA
		4.5	4.18	—	—	4.13	—			
		6.0	5.68	—	—	5.63	—			
		6.0	5.68	—	—	5.63	—			
	V _{OL}	2.0	—	0.0	0.1	—	0.1	V	Vin = V _{IH} or V _{IL}	I _{OL} = 20 μA
		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 mA
		6.0	—	—	0.26	—	0.33			I _{OL} = 5.2 mA
		6.0	—	—	0.26	—	0.33			
Input current	I _{in}	6.0	—	—	±0.1	—	±1.0	μA	Vin = V _{CC} or GND	
Quiescent supply current	I _{CC}	6.0	—	—	4.0	—	40	μA	Vin = V _{CC} or GND, I _{out} = 0 μA	

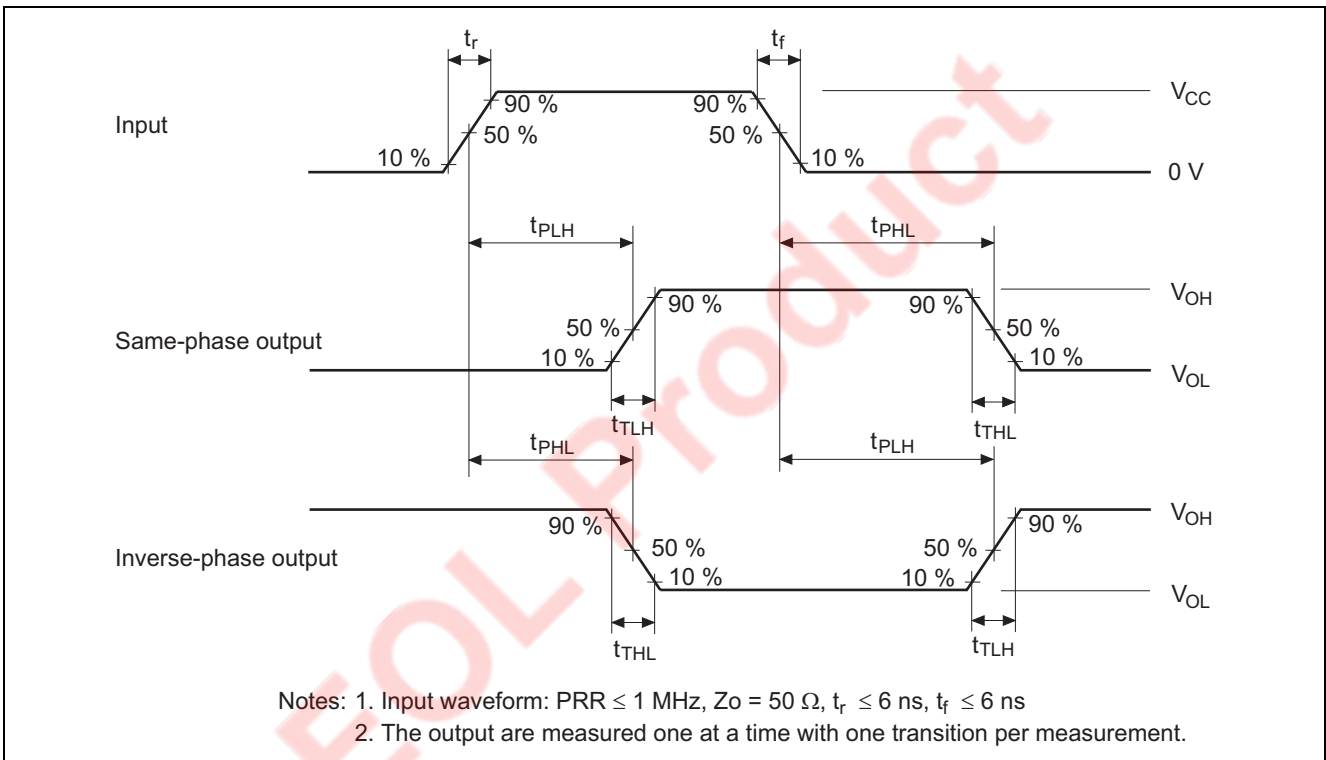
Switching Characteristics (C_L = 50 pF, Input t_r = t_f = 6 ns)

Item	Symbol	V _{CC} (V)	Ta = 25°C			Ta = -40 to +85°C		Unit	Test Conditions		
			Min	Typ	Max	Min	Max				
Propagation delay time	t _{PLH} , t _{PHL}	2.0	—	—	230	—	290	ns	0 - 7 to A ₀ - A ₂		
		4.5	—	15	46	—	58				
		6.0	—	—	39	—	49				
	t _{PLH} , t _{PHL}	2.0	—	—	250	—	315	ns	0 - 7 to EO		
		4.5	—	16	50	—	63				
		6.0	—	—	43	—	54				
	t _{PLH} , t _{PHL}	2.0	—	—	270	—	340	ns	0 - 7 to GS		
		4.5	—	18	54	—	68				
		6.0	—	—	46	—	58				
	t _{PLH} , t _{PHL}	2.0	—	—	230	—	290	ns	E1 to A ₀ - A ₂		
		4.5	—	12	46	—	58				
		6.0	—	—	39	—	49				
	t _{PLH} , t _{PHL}	2.0	—	—	250	—	315	ns	E1 to GS		
		4.5	—	12	50	—	63				
		6.0	—	—	43	—	54				
	t _{PLH} , t _{PHL}	2.0	—	—	270	—	340	ns	E1 to EO		
		4.5	—	12	54	—	68				
		6.0	—	—	46	—	58				
	Output rise/fall time	t _{TLH} , t _{THL}	2.0	—	—	75	—	90	ns		
			4.5	—	5	15	—	19			
			6.0	—	—	13	—	16			
	Input capacitance	C _{in}	—	—	5	10	—	10	pF		

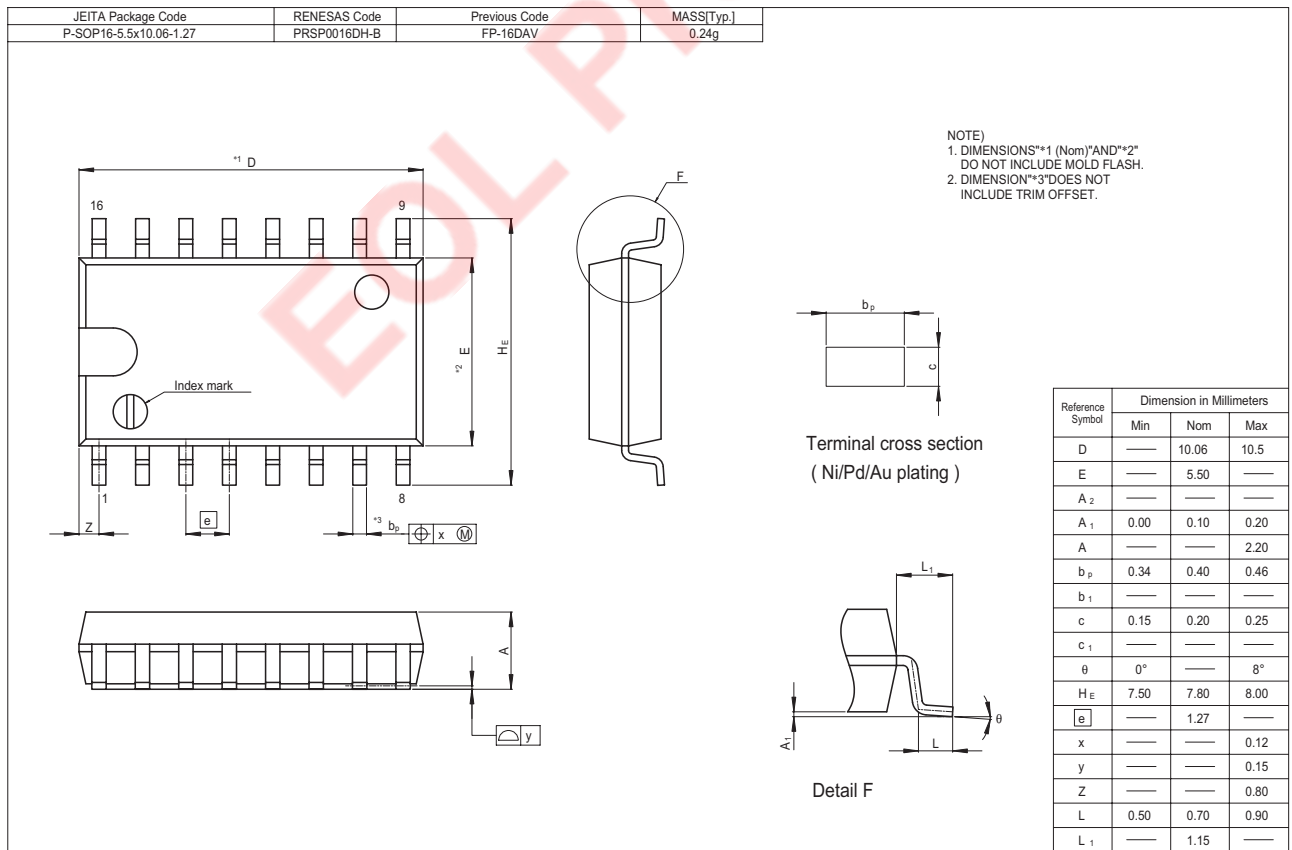
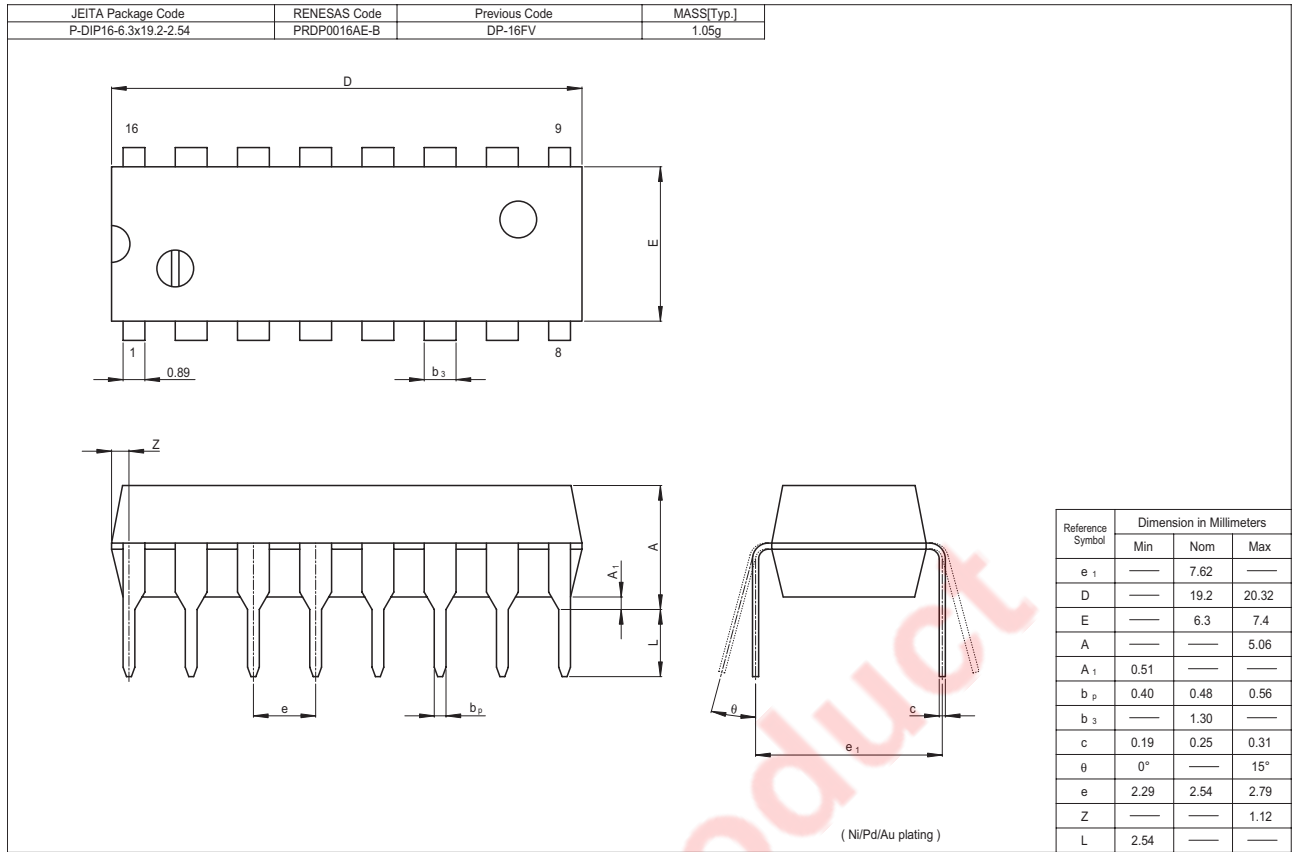
Test Circuit



Waveforms



Package Dimensions



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