

# 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  $\mu$ A max
- Low Quiescent Supply Current:  $I_{CC}$  (static) = 4  $\mu$ 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)

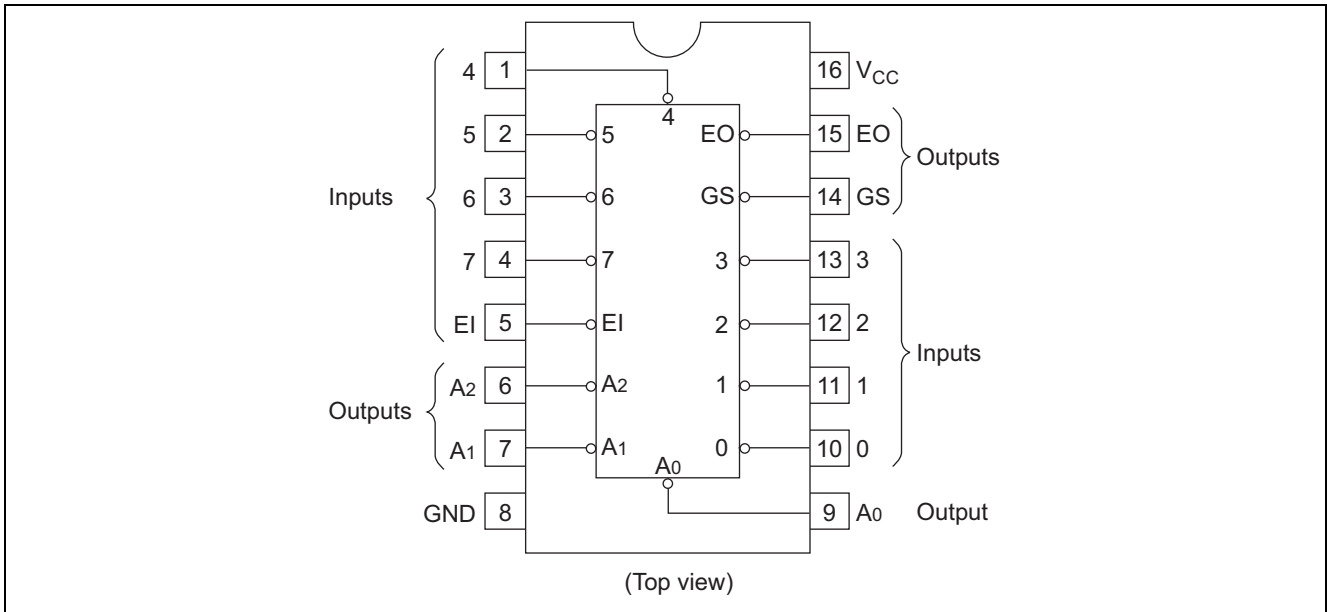
Note: Please consult the sales office for the above package availability.

### 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 <sup>*1</sup>	$t_r$ , $t_f$	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 <sub>CC</sub> (V)	Ta = 25°C			Ta = -40 to +85°C		Unit	Test Conditions	
			Min	Typ	Max	Min	Max			
Input voltage	V <sub>IH</sub>	2.0	1.5	—	—	1.5	—	V		
		4.5	3.15	—	—	3.15	—			
		6.0	4.2	—	—	4.2	—			
	V <sub>IL</sub>	2.0	—	—	0.5	—	0.5	V		
		4.5	—	—	1.35	—	1.35			
		6.0	—	—	1.8	—	1.8			
Output voltage	V <sub>OH</sub>	2.0	1.9	2.0	—	1.9	—	V	Vin = V <sub>IH</sub> or V <sub>IL</sub>	I <sub>OH</sub> = -20 μA
		4.5	4.4	4.5	—	4.4	—			I <sub>OH</sub> = -4 mA
		6.0	5.9	6.0	—	5.9	—			I <sub>OH</sub> = -5.2 mA
		4.5	4.18	—	—	4.13	—			
		6.0	5.68	—	—	5.63	—			
		6.0	5.68	—	—	5.63	—			
	V <sub>OL</sub>	2.0	—	0.0	0.1	—	0.1	V	Vin = V <sub>IH</sub> or V <sub>IL</sub>	I <sub>OL</sub> = 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 <sub>OL</sub> = 4 mA
		6.0	—	—	0.26	—	0.33			I <sub>OL</sub> = 5.2 mA
		6.0	—	—	0.26	—	0.33			
Input current	I <sub>in</sub>	6.0	—	—	±0.1	—	±1.0	μA	Vin = V <sub>CC</sub> or GND	
Quiescent supply current	I <sub>CC</sub>	6.0	—	—	4.0	—	40	μA	Vin = V <sub>CC</sub> or GND, I <sub>out</sub> = 0 μA	

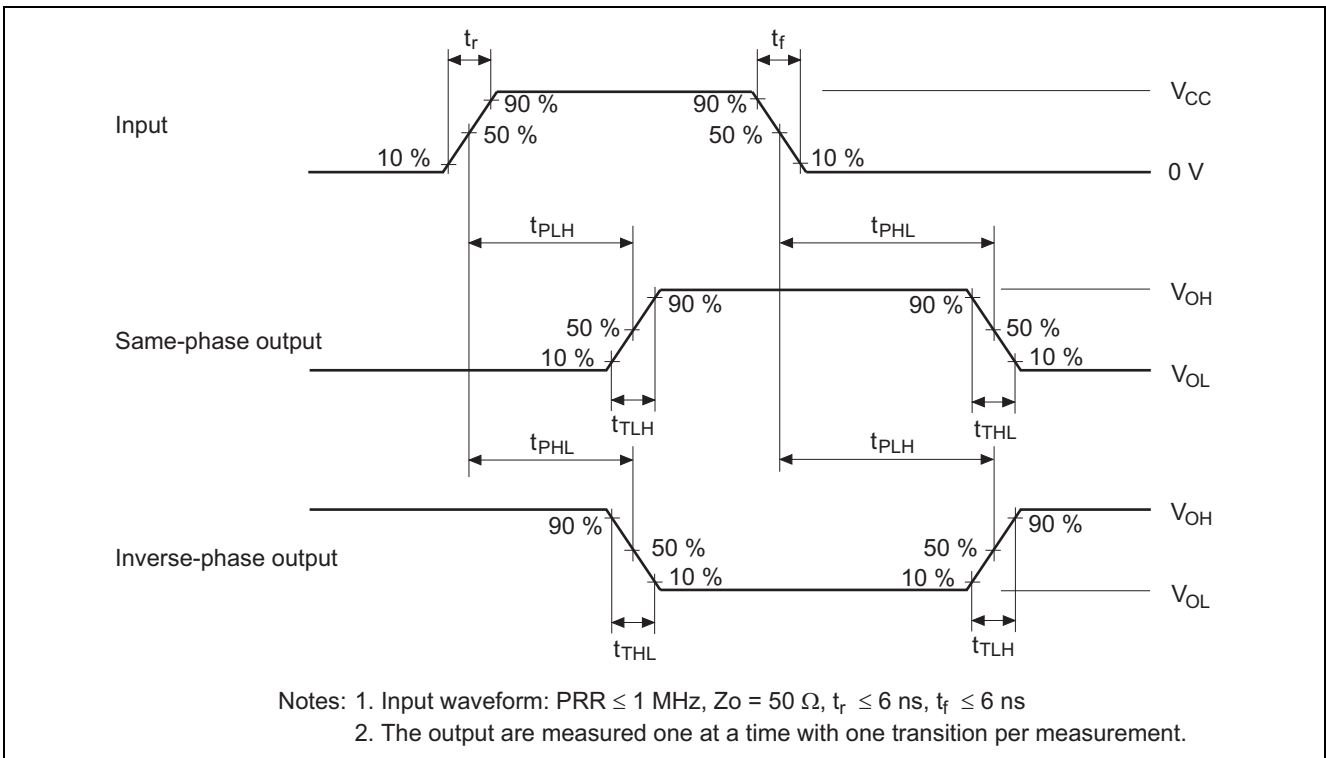
Switching Characteristics (C<sub>L</sub> = 50 pF, Input t<sub>r</sub> = t<sub>f</sub> = 6 ns)

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

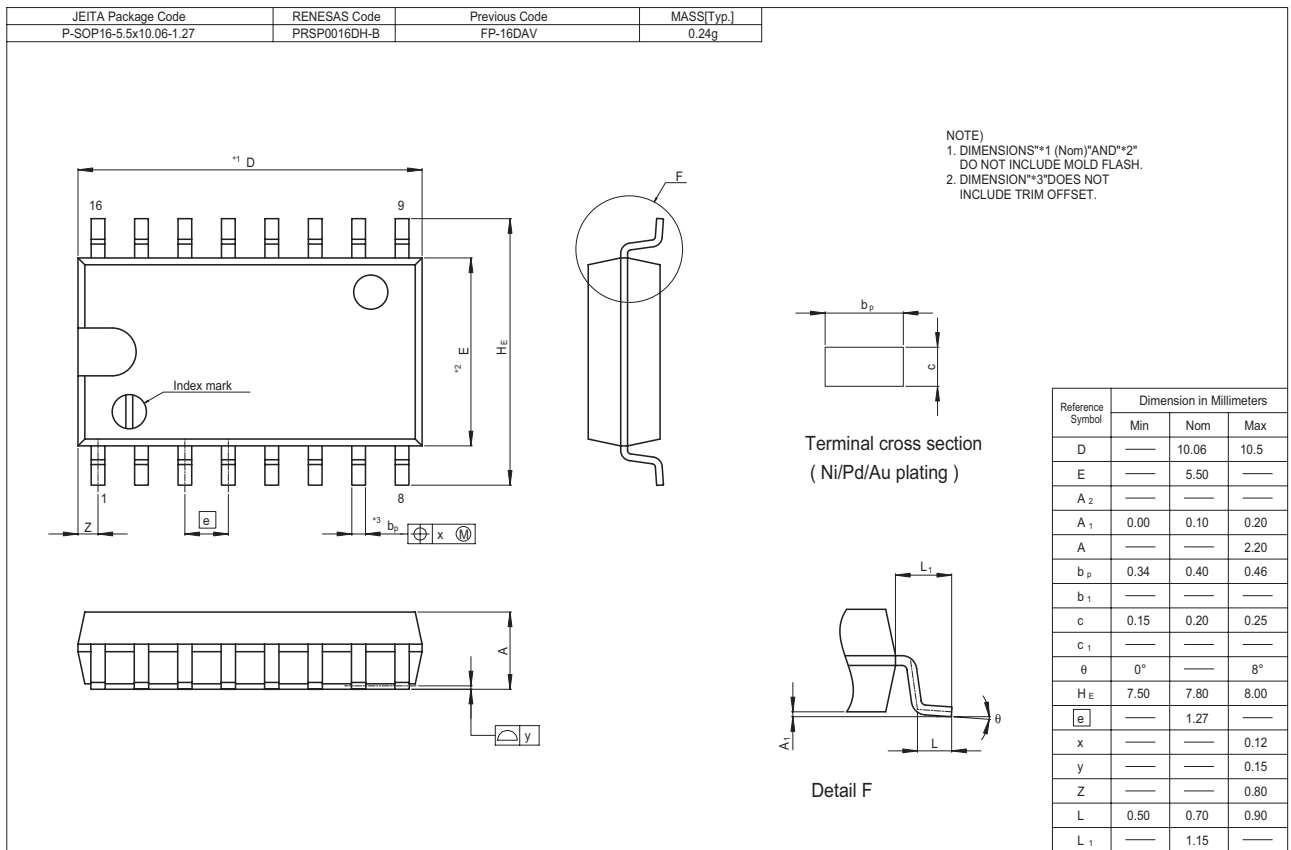
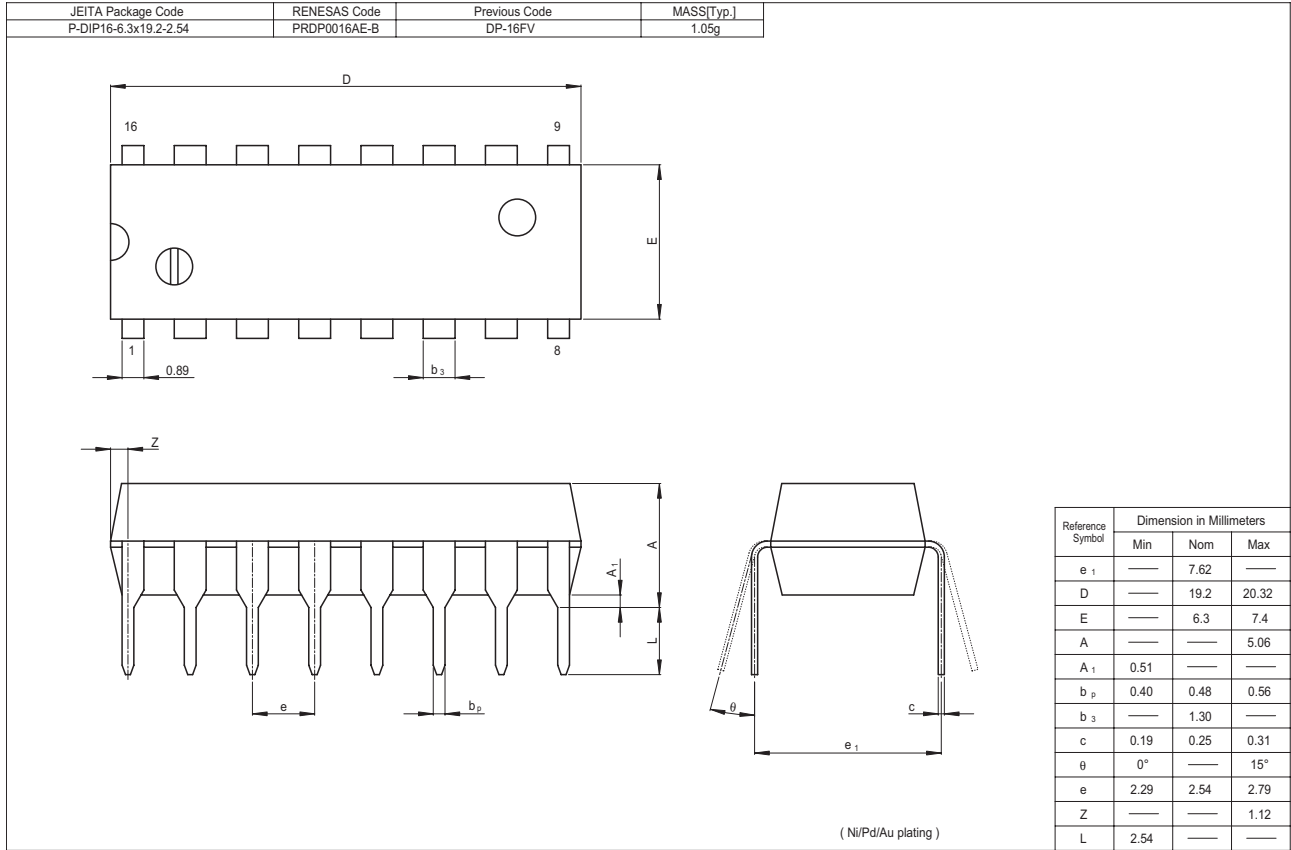
Test Circuit



Waveforms



Package Dimensions



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