

To our customers,

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## Old Company Name in Catalogs and Other Documents

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April 1<sup>st</sup>, 2010  
Renesas Electronics Corporation

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# HD74LS148

## 8-line-to-3-line Octal Priority Encoder

REJ03D0437-0200

Rev.2.00

Feb.18.2005

The HD74LS148 encodes eight data lines to three-line (4-2-1) binary (octal). Cascading circuitry (enable input EI and enable output EO) has been provided to allow octal expansion without the need for external circuitry. The data inputs and outputs are active at the low logic level.

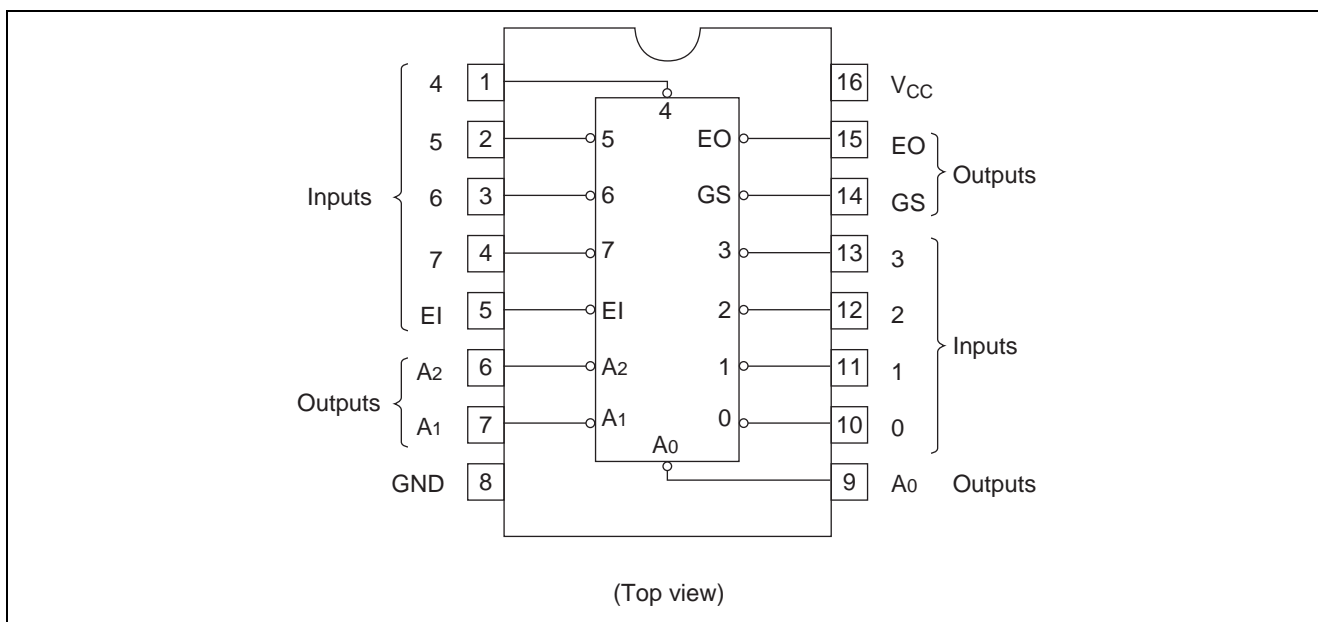
### Features

- Ordering Information

Part Name	Package Type	Package Code (Previous Code)	Package Abbreviation	Taping Abbreviation (Quantity)
HD74LS148P	DILP-16 pin	PRDP0016AE-B (DP-16FV)	P	—
HD74LS148FPEL	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.

### Pin Arrangement

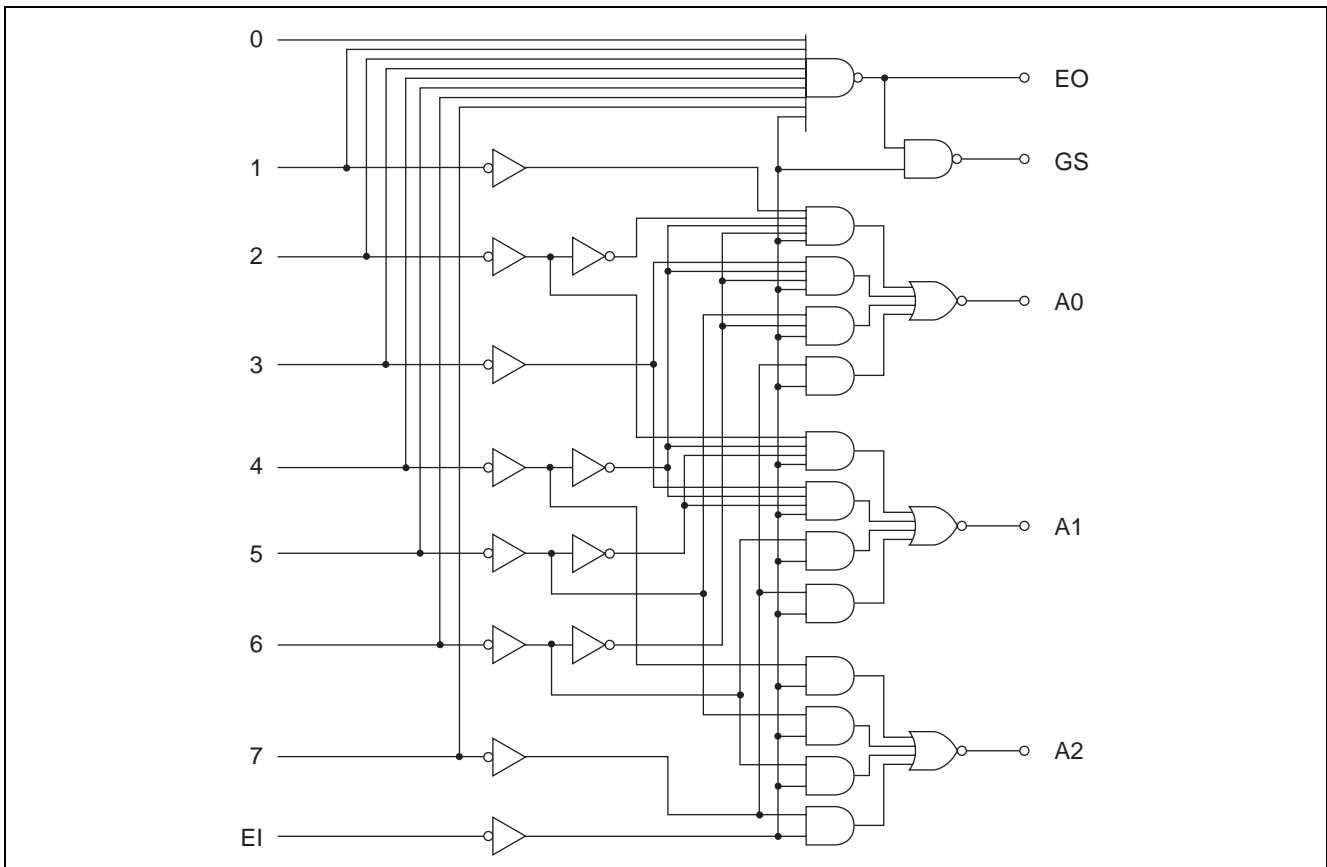


**Function Table**

Inputs									Outputs				
EI	0	1	2	3	4	5	6	7	A2	A1	A0	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

**Block Diagram**



**Absolute Maximum Ratings**

Item	Symbol	Ratings	Unit
Supply voltage	$V_{CC}$	7	V
Input voltage	$V_{IN}$	7	V
Power dissipation	$P_T$	400	mW
Storage temperature	$T_{stg}$	-65 to +150	°C

Note: Voltage value, unless otherwise noted, are with respect to network ground terminal.

## Recommended Operating Conditions

Item	Symbol	Min	Typ	Max	Unit
Supply voltage	$V_{CC}$	4.75	5.00	5.25	V
Output current	$I_{OH}$	—	—	-400	$\mu A$
	$I_{OL}$	—	—	8	mA
Operating temperature	$T_{opr}$	-20	25	75	$^{\circ}C$

## Electrical Characteristics

( $T_a = -20$  to  $+75$   $^{\circ}C$ )

Item	Symbol	min.	typ.*	max.	Unit	Condition	
Input voltage	$V_{IH}$	2.0	—	—	V		
	$V_{IL}$	—	—	0.8	V		
Output voltage	$V_{OH}$	2.7	—	—	V	$V_{CC} = 4.75$ V, $V_{IH} = 2$ V, $V_{IL} = 0.8$ V, $I_{OH} = -400$ $\mu A$	
	$V_{OL}$	—	—	0.4	V	$I_{OL} = 4$ mA $V_{CC} = 4.75$ V, $V_{IH} = 2$ V, $V_{IL} = 0.8$ V	
—		—	0.5				
Input current	1 to 7 Inputs	$I_{IH}$	—	—	40	$\mu A$	$V_{CC} = 5.25$ V, $V_I = 2.7$ V
			Other inputs	—	—		
	1 to 7 Inputs	$I_{IL}$	—	—	-0.8	mA	$V_{CC} = 5.25$ V, $V_I = 0.4$ V
			Other inputs	—	—		
1 to 7 Inputs	$I_I$	—	—	0.2	mA	$V_{CC} = 5.25$ V, $V_I = 7$ V	
		Other inputs	—	—			0.1
Short-circuit output current	$I_{OS}$	-20	—	-100	mA	$V_{CC} = 5.25$ V	
Supply current**	$I_{CC}$	—	12	20	mA	Condition 1	
		—	10	17	mA	Condition 2	
Input clamp voltage	$V_{IK}$	—	—	-1.5	V	$V_{CC} = 4.75$ V, $I_{IN} = -18$ mA	

Notes: \*  $V_{CC} = 5$  V,  $T_a = 25$   $^{\circ}C$

\*\* The condition 1 is measured with inputs 7 and EI grounded, other inputs and outputs open, the condition 2 is measured with all inputs and outputs open.

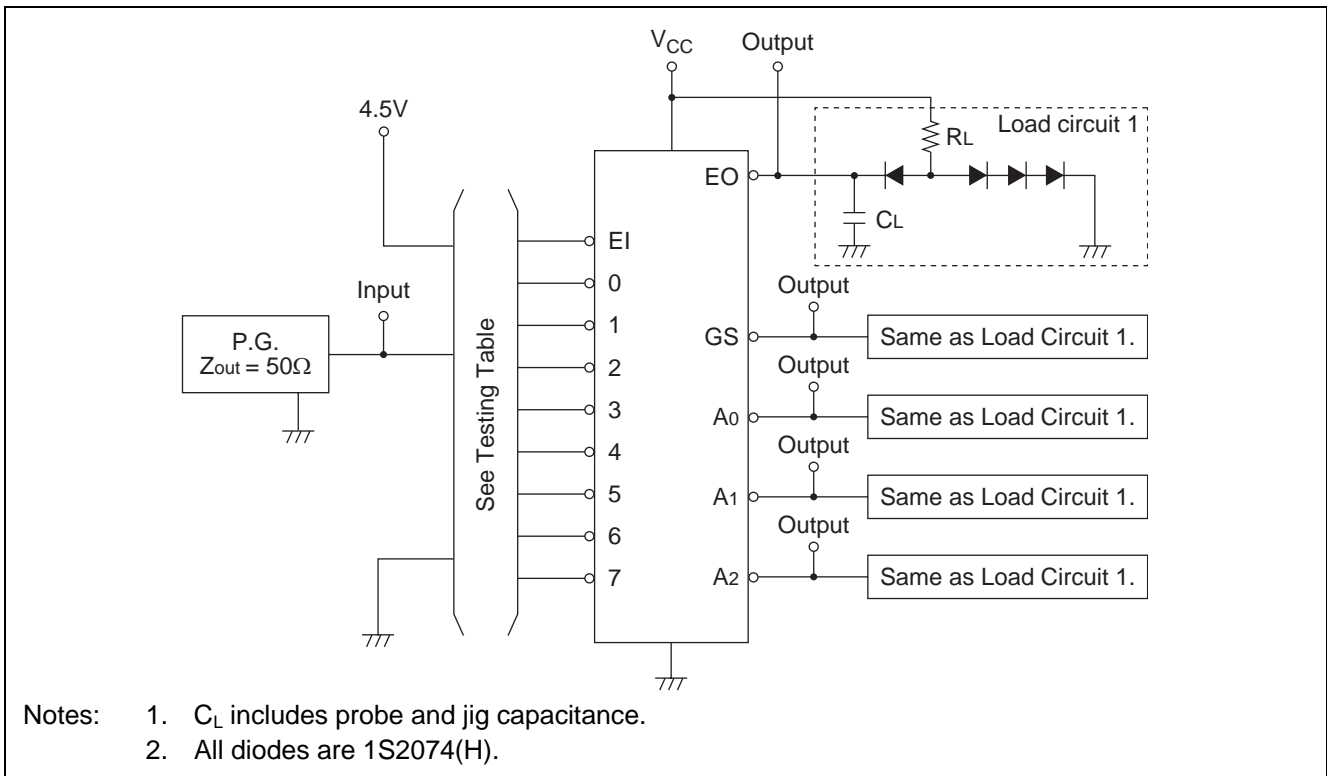
## Switching Characteristics

( $V_{CC} = 5$  V,  $T_a = 25$   $^{\circ}C$ )

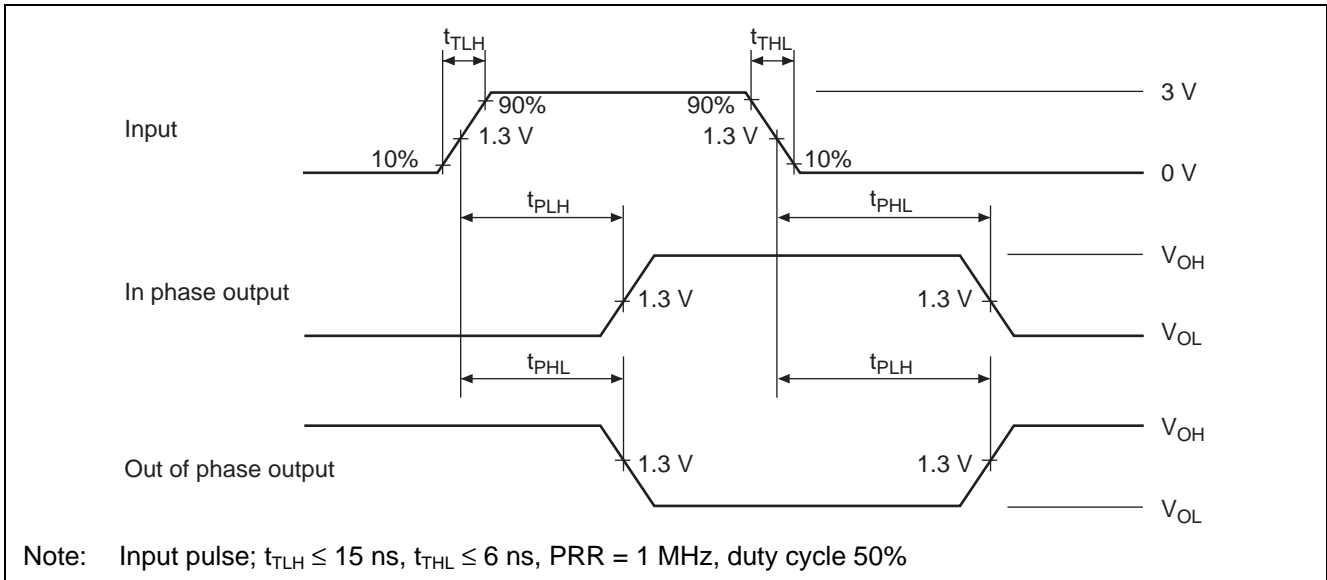
Item	Symbol	min.	typ.	max.	Unit	Inputs	Outputs	Output Waveforms	Condition
Propagation delay time	$t_{PLH}$	—	14	18	ns	0 to 7	$A_0, A_1$ or $A_2$	In-phase Output	$C_L = 15$ pF, $R_L = 2$ k $\Omega$
	$t_{PHL}$	—	15	25					
	$t_{PLH}$	—	20	36	ns	0 to 7	$A_0, A_1$ or $A_2$	Out-of-phase Output	
	$t_{PHL}$	—	16	29					
	$t_{PLH}$	—	7	18	ns	0 to 7	EO	Out-of-phase Output	
	$t_{PHL}$	—	25	40					
	$t_{PLH}$	—	35	55	ns	0 to 7	GS	In-phase Output	
	$t_{PHL}$	—	9	21					
	$t_{PLH}$	—	16	25	ns	EI	$A_0, A_1$ or $A_2$	In-phase Output	
	$t_{PHL}$	—	12	25					
	$t_{PLH}$	—	12	17	ns	EI	GS	In-phase Output	
	$t_{PHL}$	—	14	36					
$t_{PLH}$	—	12	21	ns	EI	EO	In-phase Output		
$t_{PHL}$	—	23	35						

## Testing Method

### Test Circuit

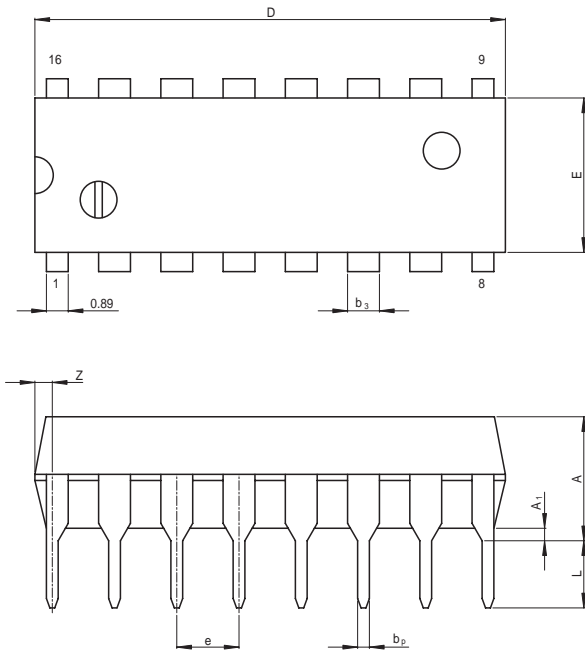


### Waveform



Package Dimensions

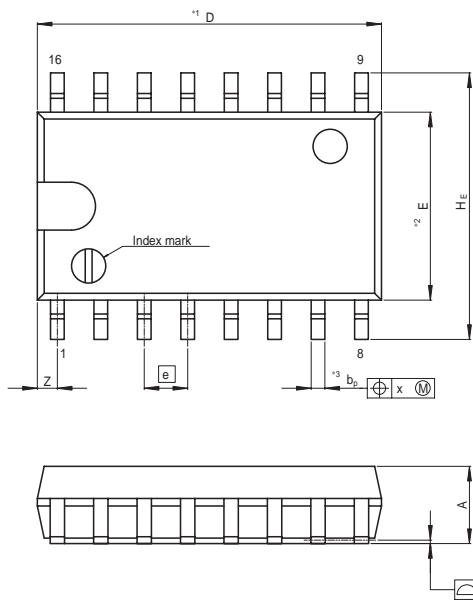
JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
P-DIP16-6.3x19.2-2.54	PRDP0016AE-B	DP-16FV	1.05g



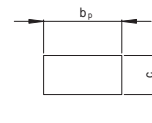
Reference Symbol	Dimension in Millimeters		
	Min	Nom	Max
e <sub>1</sub>	—	7.62	—
D	—	19.2	20.32
E	—	6.3	7.4
A	—	—	5.06
A <sub>1</sub>	0.51	—	—
b <sub>P</sub>	0.40	0.48	0.56
b <sub>3</sub>	—	1.30	—
c	0.19	0.25	0.31
θ	0°	—	15°
e	2.29	2.54	2.79
Z	—	—	1.12
L	2.54	—	—

( Ni/Pd/Au plating )

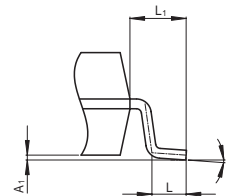
JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
P-SOP16-5.5x10.06-1.27	PRSP0016DH-B	FP-16DAV	0.24g



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 )



Detail F

Reference Symbol	Dimension in Millimeters		
	Min	Nom	Max
D	—	10.06	10.5
E	—	5.50	—
A <sub>2</sub>	—	—	—
A <sub>1</sub>	0.00	0.10	0.20
A	—	—	2.20
b <sub>P</sub>	0.34	0.40	0.46
b <sub>1</sub>	—	—	—
c	0.15	0.20	0.25
c <sub>1</sub>	—	—	—
θ	0°	—	8°
H <sub>E</sub>	7.50	7.80	8.00
e	—	1.27	—
x	—	—	0.12
y	—	—	0.15
Z	—	—	0.80
L	0.50	0.70	0.90
L <sub>1</sub>	—	1.15	—

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