

# HD74LS86

## Quadruple 2-input Exclusive-OR Gates

REJ03D0422-0200

Rev.2.00

Feb.18.2005

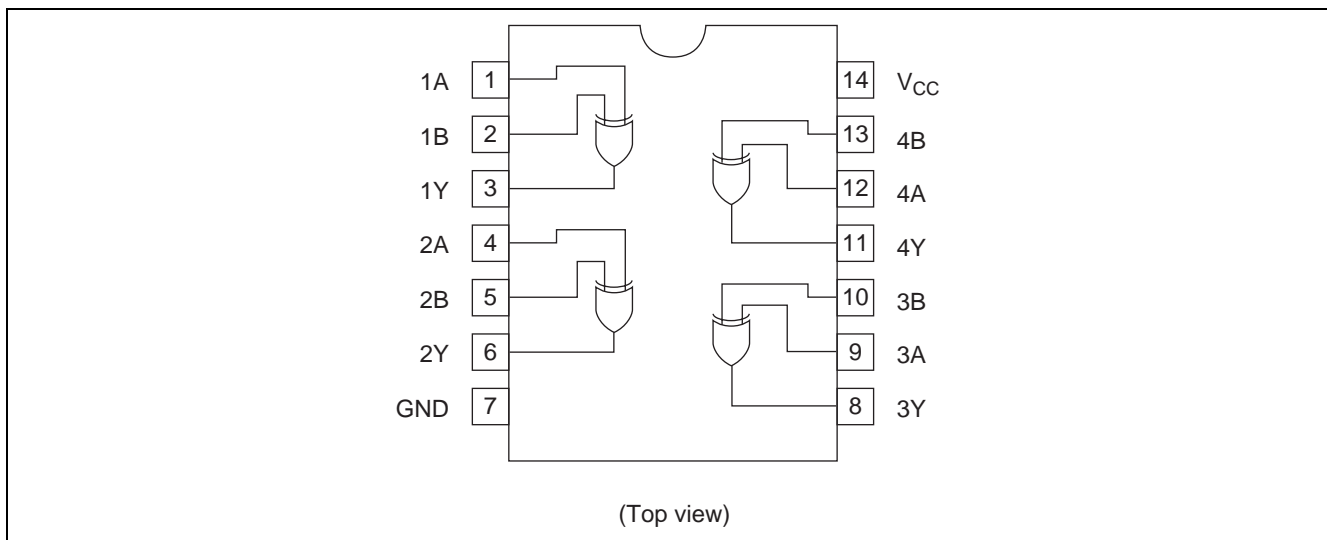
### Features

- Ordering Information

Part Name	Package Type	Package Code (Previous Code)	Package Abbreviation	Taping Abbreviation (Quantity)
HD74LS86P	DILP-14 pin	PRDP0014AB-B (DP-14AV)	P	—
HD74LS86FPEL	SOP-14 pin (JEITA)	PRSP0014DF-B (FP-14DAV)	FP	EL (2,000 pcs/reel)
HD74LS86RPEL	SOP-14 pin (JEDEC)	PRSP0014DE-A (FP-14DNV)	RP	EL (2,500 pcs/reel)

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

### Pin Arrangement



### Function Table

Inputs		Outputs
A	B	Y
L	L	L
L	H	H
H	L	H
H	H	L

H; high level, L; low level

## 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	Tstg	-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	μA
	$I_{OL}$	—	—	8	mA
Operating temperature	Topr	-20	25	75	°C

## Electrical Characteristics

( $T_a = -20$  to  $+75$  °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, $I_{OH} = -400$ μA
	$V_{OL}$	—	—	0.4	V	$I_{OL} = 4$ mA
—		—	0.5	$I_{OL} = 8$ mA		
Input current	$I_{IH}$	—	—	40	μA	$V_{CC} = 5.25$ V, $V_I = 2.7$ V
	$I_{IL}$	—	—	-0.8	mA	$V_{CC} = 5.25$ V, $V_I = 0.4$ V
	$I_I$	—	—	0.2	mA	$V_{CC} = 5.25$ V, $V_I = 7$ V
Short-circuit output current	$I_{OS}$	-20	—	-100	mA	$V_{CC} = 5.25$ V
Supply current**	$I_{CC}$	—	6.1	10	mA	$V_{CC} = 5.25$ V
Input clamp voltage	$V_{IK}$	—	—	-1.5	V	$V_{CC} = 4.75$ V, $I_{IN} = -18$ mA

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

\*\*  $I_{CC}$  is measured with all outputs open and all other inputs grounded.

## Switching Characteristics

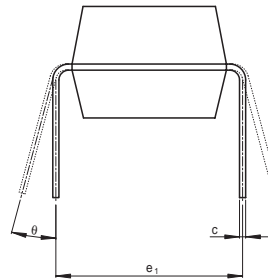
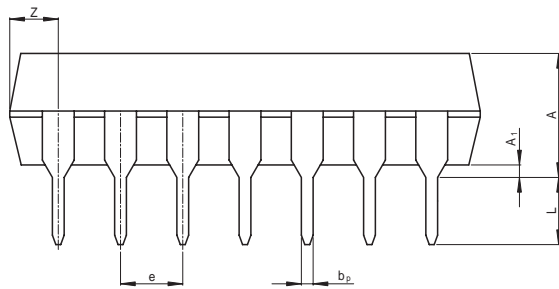
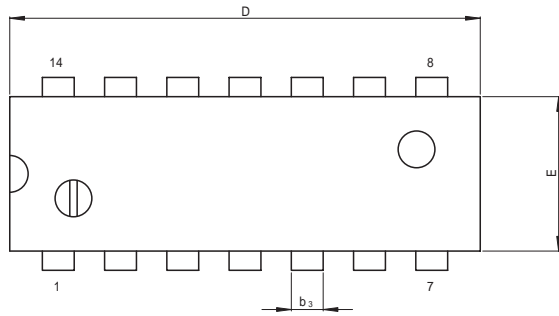
( $V_{CC} = 5$  V,  $T_a = 25$  °C)

Item	Symbol	Inputs	min.	typ.	max.	Unit	Test Conditions
Propagation delay time	$t_{PLH}$	A or B	—	12	23	ns	$C_L = 15$ pF, $R_L = 2$ kΩ
	$t_{PHL}$		—	10	17	ns	
	$t_{PLH}$	A or B	—	20	30	ns	
	$t_{PHL}$		—	13	22	ns	

Note: Refer to Test Circuit and Waveform of the Common Item "TTL Common Matter (Document No.: REJ27D0005-0100)".

Package Dimensions

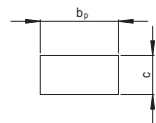
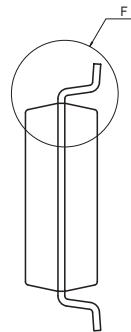
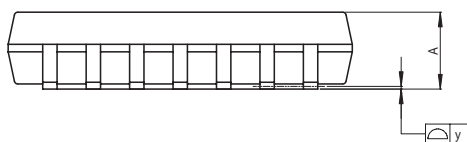
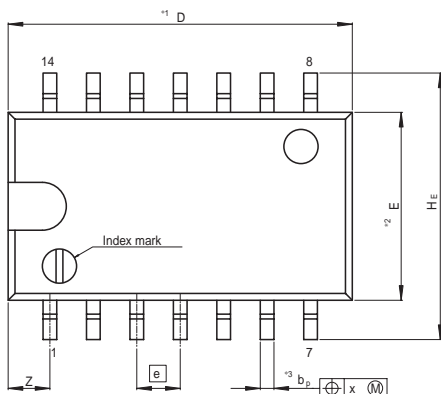
JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
P-DIP14-6.3x19.2-2.54	PRDP0014AB-B	DP-14AV	0.97g



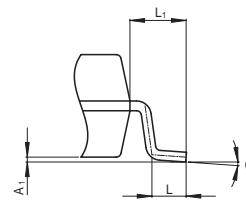
( Ni/Pd/Au plating )

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	—	—	2.39
L	2.54	—	—

JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
P-SOP14-5.5x10.06-1.27	PRSP0014DF-B	FP-14DAV	0.23g



Terminal cross section  
( Ni/Pd/Au plating )

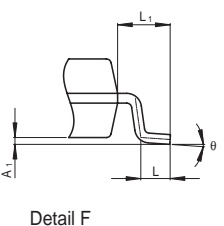
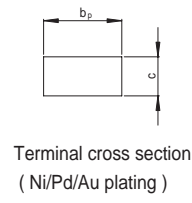
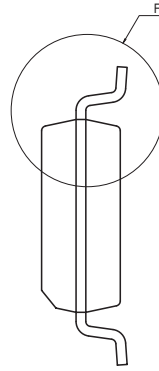
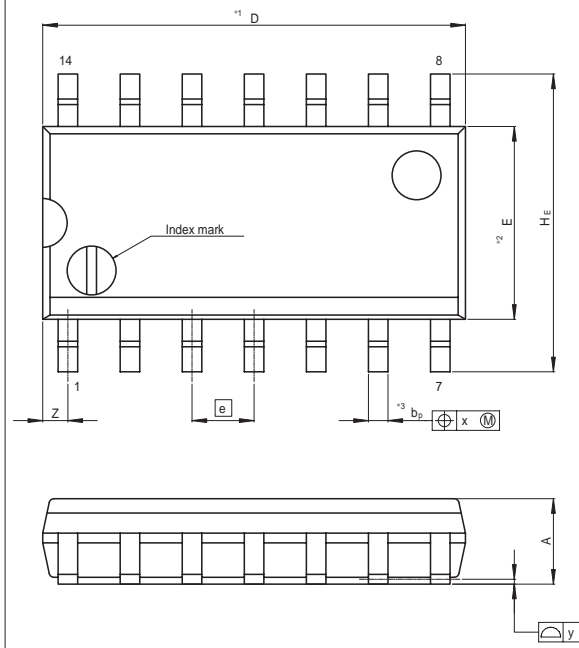


Detail F

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

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	—	—	1.42
L	0.50	0.70	0.90
L <sub>1</sub>	—	1.15	—

JEITA Package Code P-SOP14-3.95x8.65-1.27	RENESAS Code PRSP0014DE-A	Previous Code FP-14DNV	MASS[Typ.] 0.13g
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NOTE)  
1. DIMENSIONS\*1 (Nom)\*AND\*2\*  
DO NOT INCLUDE MOLD FLASH.  
2. DIMENSION\*3\*DOES NOT  
INCLUDE TRIM OFFSET.

Reference Symbol	Dimension in Millimeters		
	Min	Nom	Max
D	—	8.65	9.05
E	—	3.95	—
A <sub>2</sub>	—	—	—
A <sub>1</sub>	0.10	0.14	0.25
A	—	—	1.75
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>	—	—	—
$\theta$	0°	—	8°
H <sub>E</sub>	5.80	6.10	6.20
e	—	1.27	—
x	—	—	0.25
y	—	—	0.15
Z	—	—	0.635
L	0.40	0.60	1.27
L <sub>1</sub>	—	1.08	—

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Unit2607 Ruijing Building, No.205 Maoming Road (S), Shanghai 200020, China  
Tel: <86> (21) 6472-1001, Fax: <86> (21) 6415-2952

#### **Renesas Technology Singapore Pte. Ltd.**

1 Harbour Front Avenue, #06-10, Keppel Bay Tower, Singapore 098632  
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