RD74HC14A

Hex Schmitt-trigger Inverters

R07DS0046EJ0100
Rev.1.00
Jul 20, 2010

Features

- High Speed Operation: t_{pd} = 10.5 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 µA max
- Low Quiescent Supply Current: I_{CC} (static) = 1 µA max (Ta = 25°C)
- Ordering Information

Part Name	Package Type	Package Code (Previous Code)	Package Abbreviation	Taping Abbreviation (Quantity)	Surface Treatment
RD74HC14APT0	DILP-14 pin	PRDP0014AB-B (DP-14AV)	P	—	0 (Ni/Pd/Au)
RD74HC14AFPH0	SOP-14 pin (JEITA)	PRSP0014DF-B (FP-14DAV)	FP	H (2,000 pcs/reel)	0 (Ni/Pd/Au)
RD74HC14ARPH0	SOP-14 pin (JEDEC)	PRSP0014DE-A (FP-14DNV)	RP	H (2,500 pcs/reel)	0 (Ni/Pd/Au)

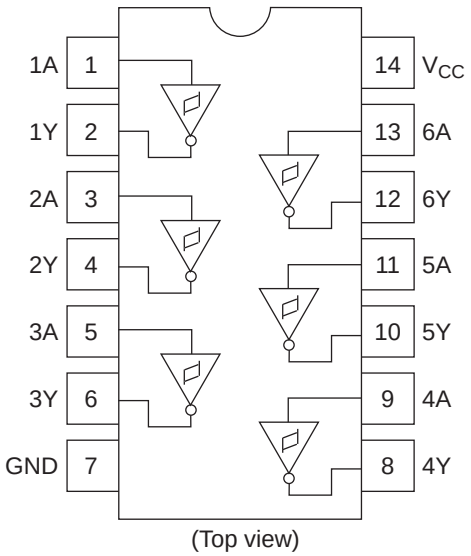
Note: Please consult the sales office for the above package availability.

Function Table

Input	Output
A	**Y**
L	H
H	L

H : High level
L : Low level

Pin Arrangement



(Top view)

Absolute Maximum Ratings

Item	Symbol	Ratings	Unit	Conditions
Supply voltage range	V_{CC}	–0.5 to 7.0	V	
Input / Output voltage	Vin, Vout	–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	1185	mW	DIP
		785	mW	SOP
		500	mW	TSSOP
Storage temperature	Tstg	–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	Ta	–40 to 85	°C	
Input rise / fall time[*1]	t_r, t_f	0 to unlimited	ns	V_{CC} = 2.0 V
		0 to unlimited		V_{CC} = 4.5 V
		0 to unlimited		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

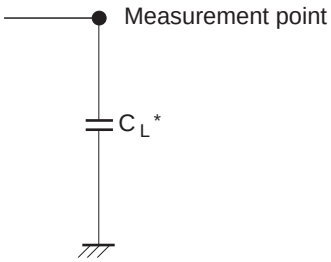
Item	Symbol	V_{CC} (V)	Ta = 25°C			Ta = –40 to+85°C		Unit	Test Conditions	
			Min	Typ	Max	Min	Max			
Threshold voltage	V_T^+	2.0	—	—	1.5	—	1.5	V		
		4.5	—	—	3.15	—	3.15			
		6.0	—	—	4.2	—	4.2			
	V_T^-	2.0	0.3	—	—	0.3	—	V		
		4.5	0.9	—	—	0.9	—			
		6.0	1.2	—	—	1.2	—			
Hysteresis voltage	V_H	2.0	0.2	—	1.2	0.2	1.2	V		
		4.5	0.4	—	2.25	0.4	2.25			
		6.0	0.6	—	3.0	0.6	3.0			
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	—			
		6.0	5.9	6.0	—	5.9	—			
		4.5	4.18	—	—	4.13	—			I_{OH} = –4 mA
		6.0	5.68	—	—	5.63	—			I_{OH} = –5.2 mA
	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
Input current	Iin	6.0	—	—	±0.1	—	±1.0	μA	Vin = V_{CC} or GND	
Quiescent supply current	I_{CC}	6.0	—	—	1.0	—	10	μA	Vin = V_{CC} or GND, Iout = 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}	2.0	—	—	125	—	155	ns	
		4.5	—	10	25	—	31		
		6.0	—	—	21	—	26		
	t_{PHL}	2.0	—	—	125	—	155	ns	
		4.5	—	11	25	—	31		
		6.0	—	—	21	—	26		
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	Cin	—	—	5	10	—	10	pF	

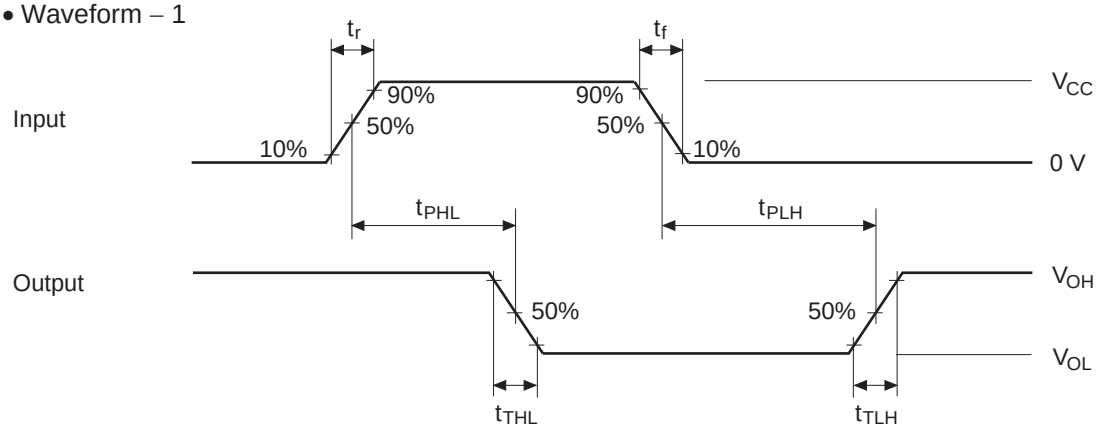
Test Circuit



Note: C_L includes the probe and fig capacitance.

Waveforms

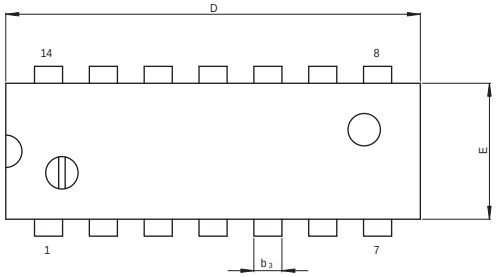
• Waveform – 1

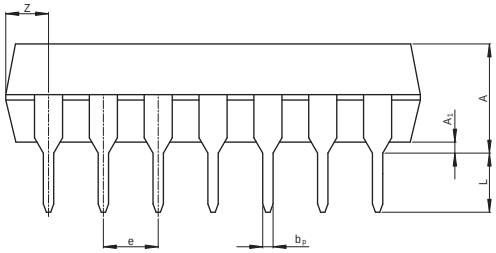


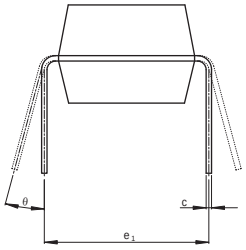
Notes: 1. Input waveform: PRR ≤ 1 MHz, Zo = 50 Ω, t_r ≤ 6 ns, t_f ≤ 6 ns
2. The output are measured one at a time with one transition per measurement.

Package Dimensions

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





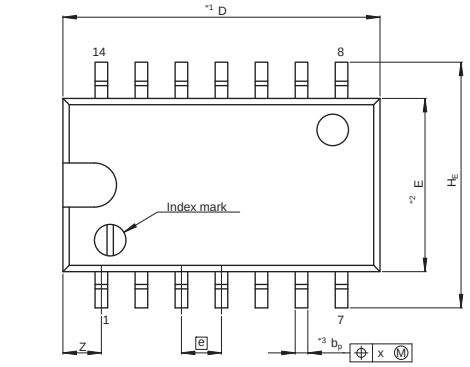


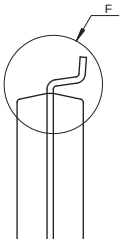
(Ni/Pd/Au plating)

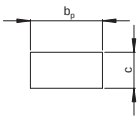
Reference Symbol	Dimension in Millimeters		
	Min	Nom	Max
e_1	—	7.62	—
D	—	19.2	20.32
E	—	6.3	7.4
A	—	—	5.06
A_1	0.51	—	—
b_p	0.40	0.48	0.56
b_3	—	1.30	—
c	0.19	0.25	0.31
θ	0°	—	15°
e	2.29	2.54	2.79
Z	—	—	2.39
L	2.54	—	—

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

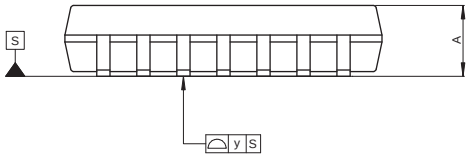
NOTE)
1. DIMENSIONS"*1 (Nom)"AND"*2" DO NOT INCLUDE MOLD FLASH.
2. DIMENSION"*3"DOES NOT INCLUDE TRIM OFFSET.

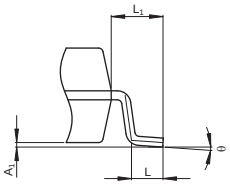






Terminal cross section
(Ni/Pd/Au plating)

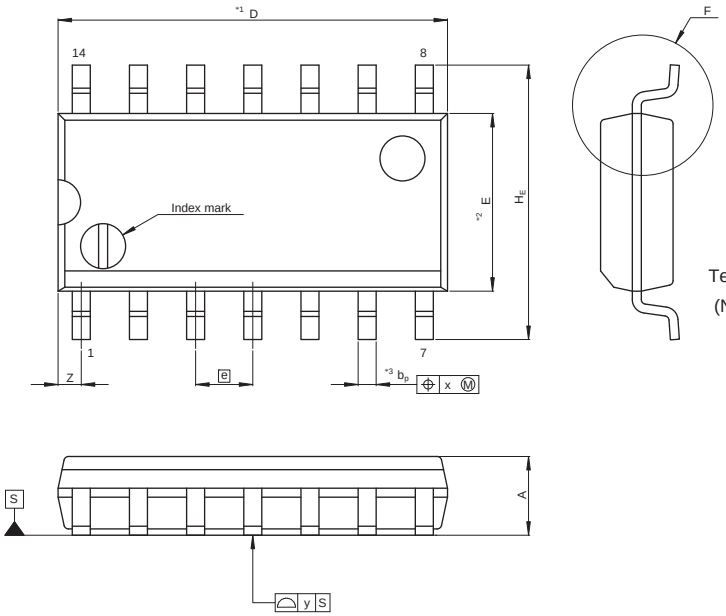




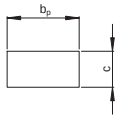
Detail F

Reference Symbol	Dimension in Millimeters		
	Min	Nom	Max
D	—	10.06	10.5
E	—	5.50	—
A_2	—	—	—
A_1	0.00	0.10	0.20
A	—	—	2.20
b_p	0.34	0.40	0.46
b_1	—	—	—
c	0.15	0.20	0.25
c_1	—	—	—
θ	0°	—	8°
H_E	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_1	—	1.15	—

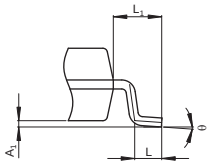
JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
P-SOP14-3.95x8.65-1.27	PRSP0014DE-A	FP-14DNV	0.13g



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	—	8.65	9.05
E	—	3.95	—
A_2	—	—	—
A_1	0.10	0.14	0.25
A	—	—	1.75
b_p	0.34	0.40	0.46
b_1	—	—	—
c	0.15	0.20	0.25
c_1	—	—	—
θ	0°	—	8°
H_E	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_1	—	1.08	—

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