

HD74HC91

8-bit Shift Register

REJ03D0696-0200
 (Previous ADE-205-429)
 Rev.2.00
 Oct 06, 2005

Description

This serial-in, serial-out, 8-bit shift register is composed of eight R-S master-slave flip-flops, input gating, and a clock drive. Single-rail data and input control are gated through inputs A and B and an internal inverter to form the complementary inputs to the first bit of the shift register. Drive for the internal common clock line is provided by an inverting clock driver. This clock pulse inverter/driver causes these circuits to shift information one bit on the positive edge of an input clock pulse.

Features

- High Speed Operation: t_{pd} (Data Word Input to Output) = 21 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)
HD74HC91RPEL	SOP-14 pin (JEDEC)	PRSP0014DE-A (FP-14DNV)	RP	EL (2,500 pcs/reel)

Function Table

Inputs		Outputs	
t_n		t_{n+8}	
A	B	Q_H	\bar{Q}_H
H	H	H	L
L	X	L	H
X	L	L	H

H : High level

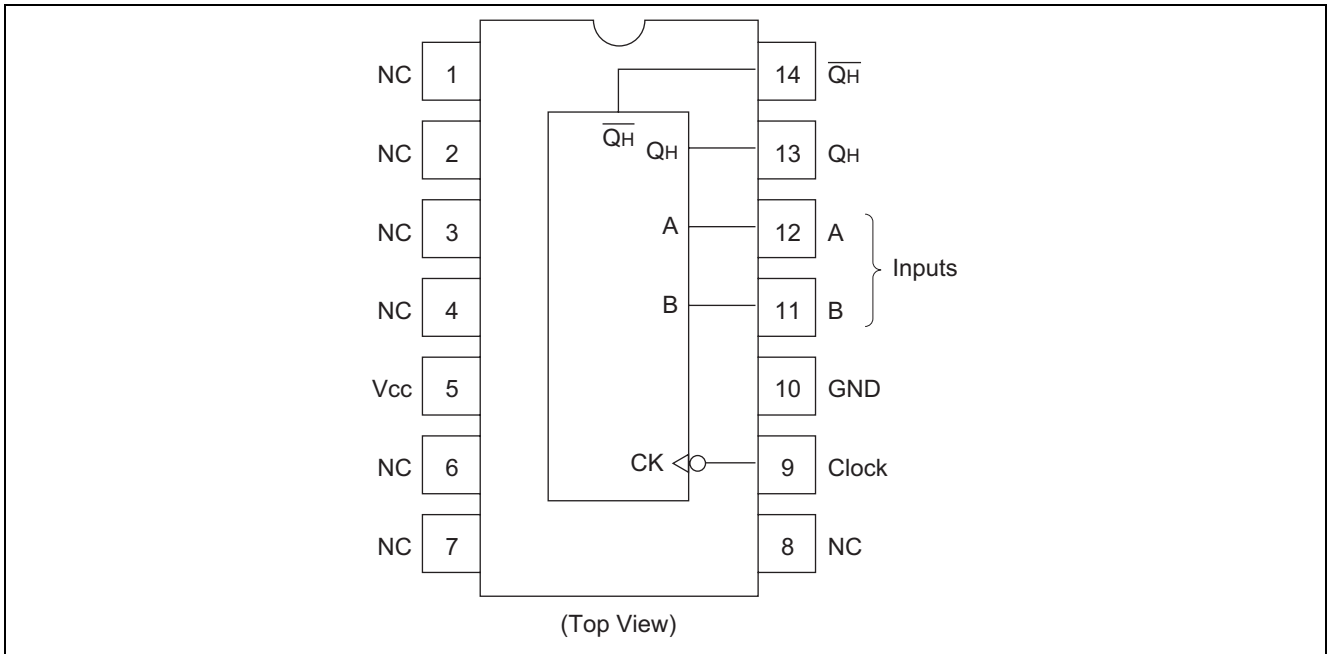
L : Low level

X : Irrelevant

t_n : Reference bit time, clock low

t_{n+8} : Bit time after 8 low-to-high clock transitions

Pin Arrangement



Absolute Maximum Ratings

Item	Symbol	Ratings	Unit
Supply voltage range	V_{CC}	-0.5 to 7.0	V
Input / Output voltage	V_{in}, V_{out}	-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	500	mW
Storage temperature	T_{stg}	-65 to +150	$^{\circ}C$

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	$^{\circ}C$	
Input rise / fall time ^{*1}	t_r, t_f	0 to 1000	ns	$V_{CC} = 2.0 V$
		0 to 500		$V_{CC} = 4.5 V$
		0 to 400		$V_{CC} = 6.0 V$

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

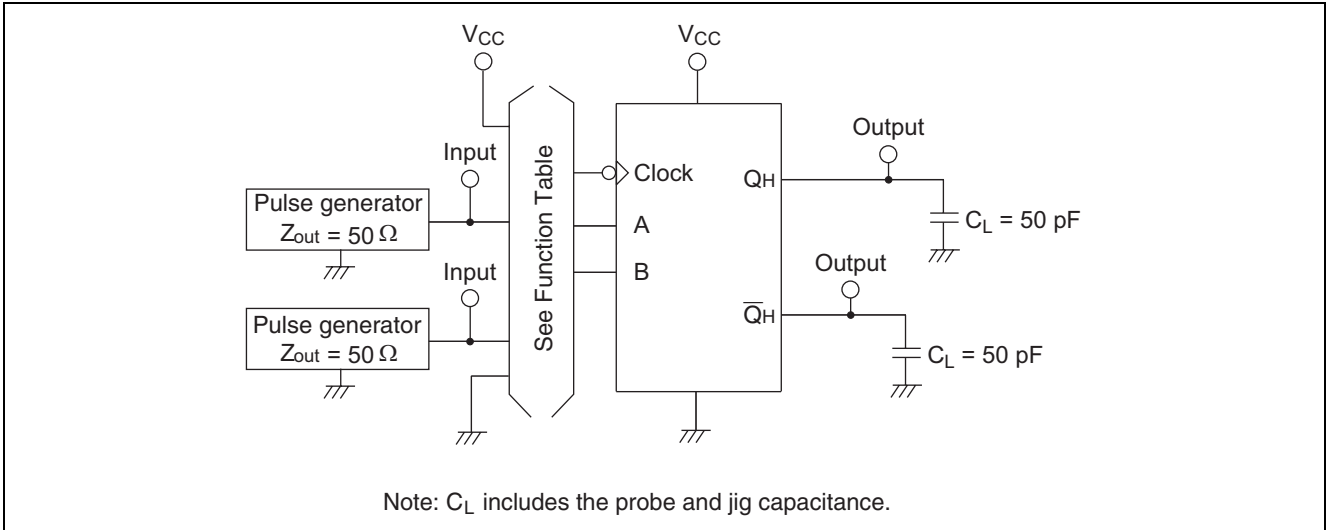
Electrical Characteristics

Item	Symbol	V _{CC} (V)	Ta = 25°C			Ta = -40 to +85°C		Unit	Test Conditions				
			Min	Typ	Max	Min	Max						
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	—						
	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	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			

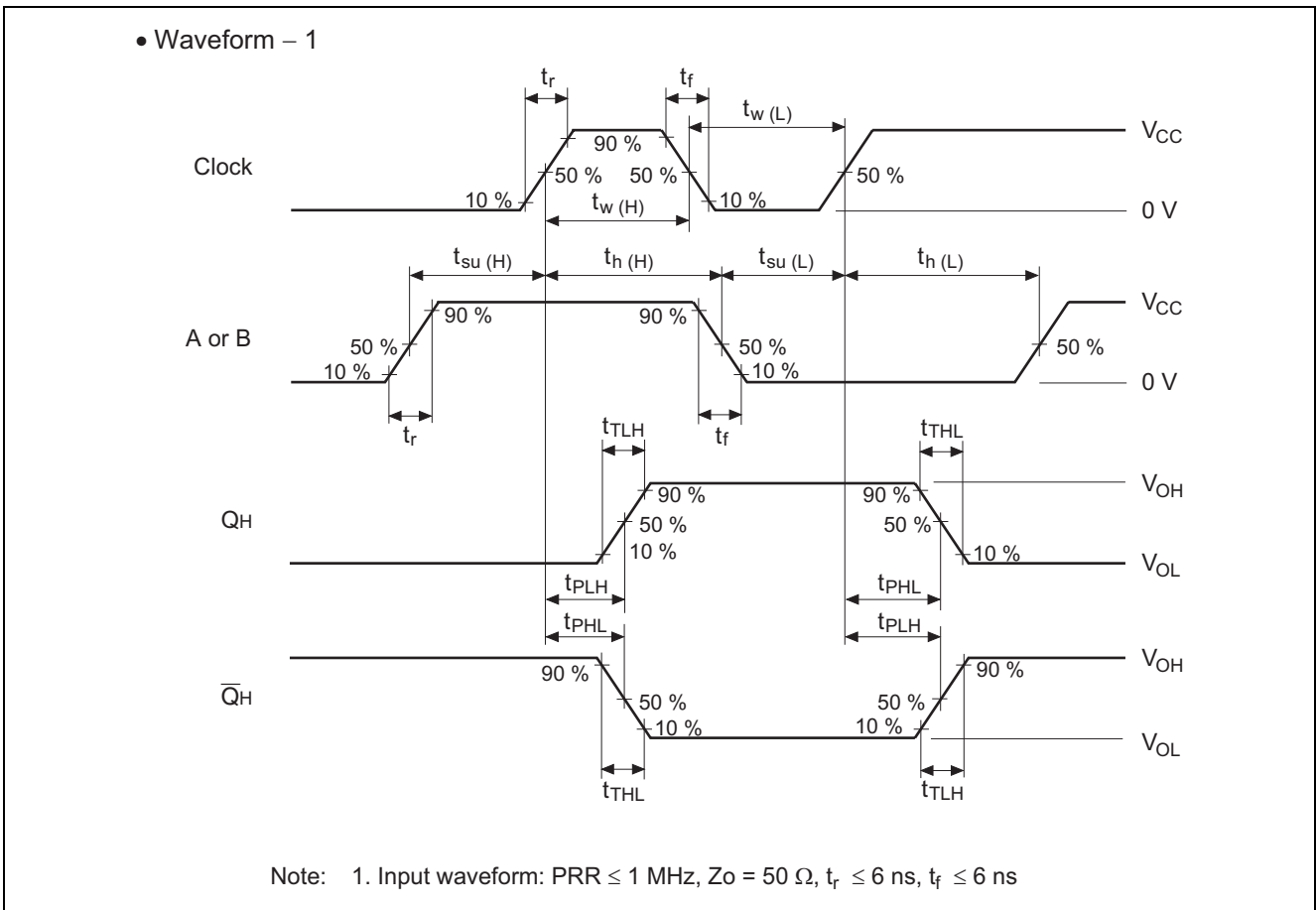
Switching Characteristics (C_L = 50 pF, Input t_r = t_f = 6 ns)

Item	Symbol	V _{CC} (V)	Ta = 25°C			Ta = -40 to +85°C		Unit	Test Conditions				
			Min	Typ	Max	Min	Max						
Maximum clock frequency	f _{max}	2.0	—	—	5	—	4	MHz					
		4.5	—	—	25	—	20						
		6.0	—	—	29	—	24						
Propagation delay time	t _{PLH}	2.0	—	—	210	—	265	ns					
		4.5	—	21	42	—	53						
		6.0	—	—	36	—	45						
	t _{PHL}	2.0	—	—	210	—	265				ns		
		4.5	—	21	42	—	53						
		6.0	—	—	36	—	45						
Pulse width	t _w	2.0	125	—	—	156	—	ns	Clock				
		4.5	25	9	—	31	—						
		6.0	21	—	—	26	—						
Setup time	t _{su}	2.0	125	—	—	156	—	ns					
		4.5	25	1	—	31	—						
		6.0	21	—	—	26	—						
Hold time	t _h	2.0	5	—	—	5	—	ns					
		4.5	5	-1	—	5	—						
		6.0	5	—	—	5	—						
Output rise/fall time	t _{TLH} , t _{THL}	2.0	—	—	75	—	95	ns					
		4.5	—	5	15	—	19						
		6.0	—	—	13	—	16						
Input capacitance	C _{in}	—	—	5	10	—	10	pF					

Test Circuit

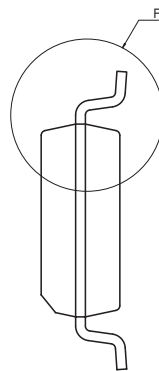
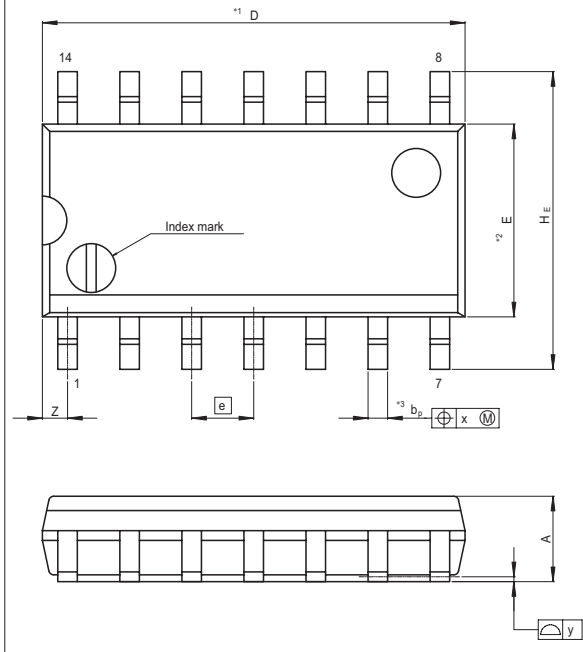


Waveforms

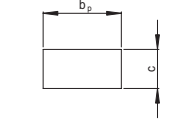


Package Dimensions

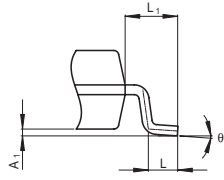
JEITA Package Code P-SOP14-3.95x8.65-1.27	RENESAS Code PRSP0014DE-A	Previous Code FP-14DNV	MASS[Typ.] 0.13g
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NOTE)
1. DIMENSIONS*1 (Nom)*AND*2*
DO NOT INCLUDE MOLD FLASH.
2. DIMENSION*3*DOES NOT
INCLUDE TRIM OFFSET.



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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