HD14014B

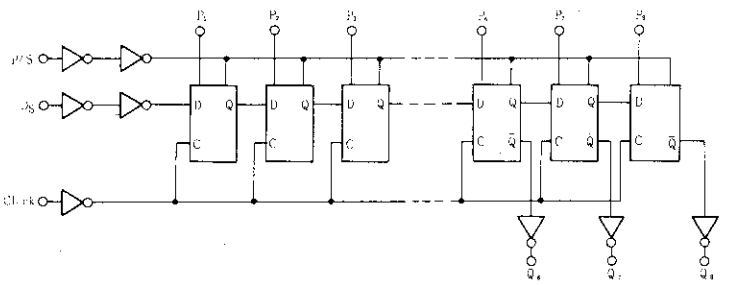
8-bit Static Shift Register

The HD14014B 8-bit shift registerfinds primary use in parallel-to-serial data conversion, synchronousparallel input, serial output data queueing; and other general purpose register applications requiring low power and/or high noise immunity.

■ FEATURES

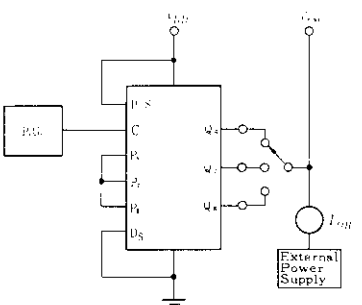
Quiescent Current = 5nA/pkg typ @5V
Full Static Operation from DC to 7MHz
Supply Voltage Range = 3 to 18V
Capable of Driving One Low-power Schottky TTL Load Over the Rated Temperature Range
Pin-for-Pin Replacement for CD4014B and MC14014B

■ LOGIC DIAGRAM

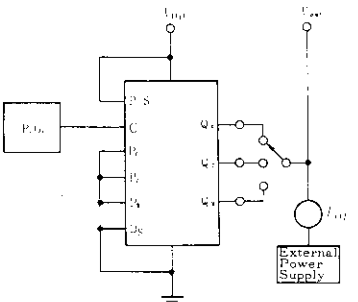


■ DC CHARACTERISTIC TEST CIRCUIT

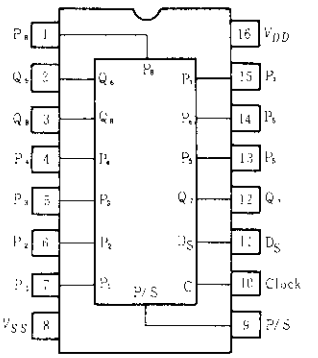
● I_{OH}



● I_{OL}



■ PIN ARRANGEMENT



(Top View)

■ TRUTH TABLE

● Serial Operation

t	Clock	D_S	P/S
n	⌐	0	0
n+1	⌐	1	0
n+2	⌐	0	0
n+3	⌐	1	0
	¬	×	0

Q_6 t = n+6	Q_7 t = n+7	Q_8 t = n+8
0	?	?
1	0	?
0	1	0
1	0	1
Q_6	Q_7	Q_8

● Parallel Operation

Clock	D_S	P/S	Dm	Qm^*
⌐	×	1	0	0
⌐	×	1	1	1

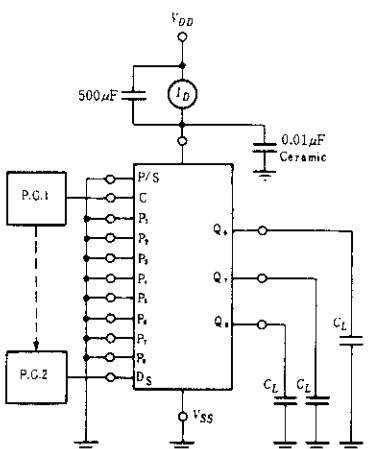
* : Q_6, Q_7, & Q_8 are available externally
× : Don't Care

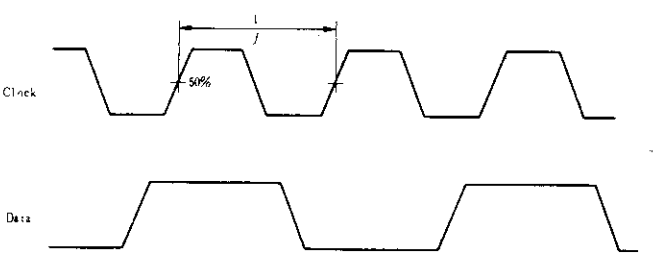
■ELECTRICAL CHARACTERISTICS

Characteristic	Symbol	V_{DD}(V)	Test Conditions	−40℃ min	−40℃ max	25℃ min	25℃ typ	25℃ max	85℃ min	85℃ max	Unit
Output Voltage	V_{OL}	5.0	$V_{in}=V_{DD}$ or 0	—	0.05	—	0	0.05	—	0.05	V
		10		—	0.05	—	0	0.05	—	0.05	
		15		—	0.05	—	0	0.05	—	0.05	
	V_{OH}	5.0	$V_{in}=0$ or V_{DD}	4.95	—	4.95	5.0	—	4.95	—	V
		10		9.95	—	9.95	10	—	9.95	—	
		15		14.95	—	14.95	15	—	14.95	—	
Input Voltage	V_{IL}	5.0	$V_{out}=4.5$ or 0.5V	—	1.5	—	2.25	1.5	—	1.5	V
		10	$V_{out}=9.0$ or 1.0V	—	3.0	—	4.50	3.0	—	3.0	
		15	$V_{out}=13.5$ or 1.5V	—	4.0	—	6.75	4.0	—	4.0	
	V_{IH}	5.0	$V_{out}=0.5$ or 4.5V	3.5	—	3.5	2.75	—	3.5	—	V
		10	$V_{out}=1.0$ or 9.0V	7.0	—	7.0	5.50	—	7.0	—	
		15	$V_{out}=1.5$ or 13.5V	11.0	—	11.0	8.25	—	11.0	—	
Output Drive Current	I_{OH}	5.0	$V_{OH}=2.5$V	−1.0	—	−0.8	−1.7	—	−0.6	—	mA
		5.0	$V_{OH}=4.6$V	−0.2	—	−0.16	−0.36	—	−0.12	—	
		10	$V_{OH}=9.5$V	−0.5	—	−0.4	−0.9	—	−0.3	—	
		15	$V_{OH}=13.5$V	−1.4	—	−1.2	−3.5	—	−1.0	—	
	I_{OL}	5.0	$V_{OL}=0.4$V	0.52	—	0.44	0.88	—	0.36	—	mA
		10	$V_{OL}=0.5$V	1.3	—	1.1	2.25	—	0.9	—	
		15	$V_{OL}=1.5$V	3.6	—	3.0	8.8	—	2.4	—	
Input Current	I_{in}	15		—	±0.3	—	±0.00001	±0.3	—	±1.0	μA
Input Capacitance	C_{in}		$V_{in}=0$	—	—	—	5.0	7.5	—	—	pF
Quiescent Current	I_{DD}	5.0	Zero Signal, per Package	—	20	—	0.005	20	—	150	μA
		10		—	40	—	0.010	40	—	300	
		15		—	80	—	0.015	80	—	600	
Total Supply Current*	I_T	5.0	Dynamic+I_{DD}, per Gate, C_L=50pF, f= 1 kHz	—	—	—	0.76	—	—	—	μA
		10		—	—	—	1.51	—	—	—	
		15		—	—	—	2.27	—	—	—	

* To calculate total supply current at frequency other than 1kHz.
@V_{DD}=5.0V $I_T=(0.75\mu A/kHz)f+I_{DD}$, @$V_{DD}$=10V $I_T=(1.50\mu A/kHz)f+I_{DD}$, @$V_{DD}$=15V $I_T=(2.25\mu A/kHz)f+I_{DD}$

■POWER DISSIPATION TEST CIRCUIT AND WAVEFORM

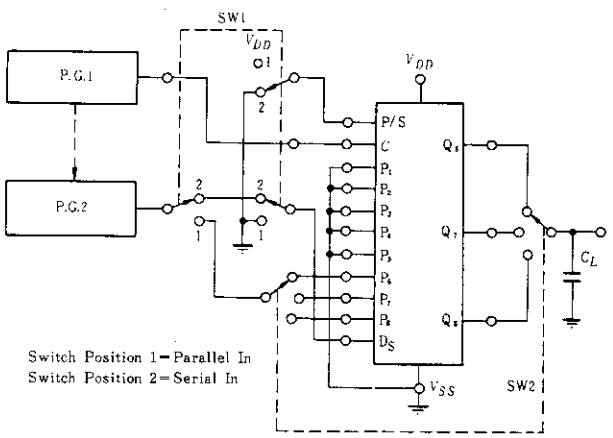


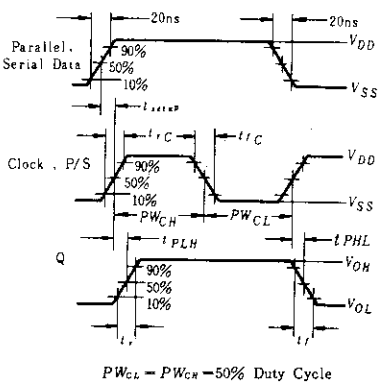


■ SWITCHING CHARACTERISTICS (C_L=50pF, Ta=25°C)

Characteristic	Symbol	V_{DD}(V)	min	typ	max	Unit
Output Rise Time	t_r	5.0	—	180	400	ns
		10	—	90	200	
		15	—	65	160	
Output Fall Time	t_f	5.0	—	100	200	ns
		10	—	50	100	
		15	—	37	80	
Propagation Delay Time	t_{PLH}, t_{PHL}	5.0	—	400	1000	ns
		10	—	170	400	
		15	—	115	265	
Clock Pulse Width	PW_C	5.0	500	150	—	ns
		10	200	75	—	
		15	150	40	—	
Clock Frequency	f_C	5.0	—	3.0	1.0	MHz
		10	—	6.0	2.5	
		15	—	8.0	3.0	
Parallel/Serial Control Pulse Width	PW(P/S)	5.0	500	150	—	ns
		10	200	75	—	
		15	150	40	—	
Setup Time	t_{setup}	5.0	500	150	—	ns
		10	100	50	—	
		15	80	30	—	
Input Clock Rise Time	t_{rc}	5.0	—	—	15	μs
		10	—	—	15	
		15	—	—	15	

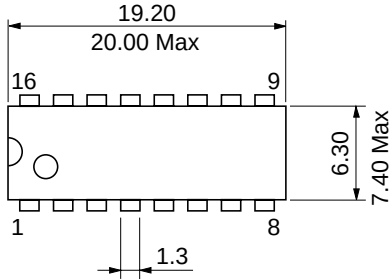
■ SWITCHING TIME TEST CIRCUIT

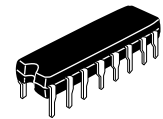


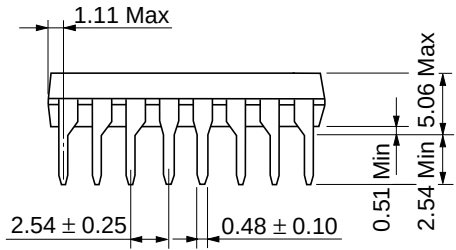


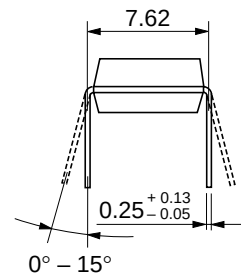
$PW_{CL}=PW_{CH}$=50% Duty Cycle

Unit: mm









Hitachi Code	DP-16
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