

# HD14014B

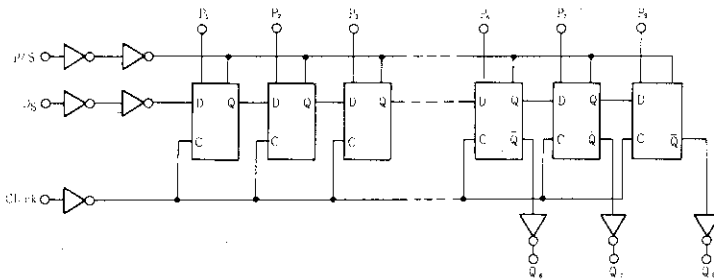
## 8-bit Static Shift Register

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

### FEATURES

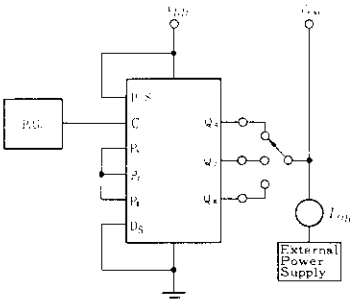
- Quiescent Current = 5nA/pkg typ @5V
- Full Static Operation from DC to 7MHz
- Supply Voltage Range = 3 to 18V
- Capable of Driving One Low-power Schottky TTL Load Over the Rated Temperature Range
- Pin-for-Pin Replacement for CD4014B and MC14014B

### LOGIC DIAGRAM

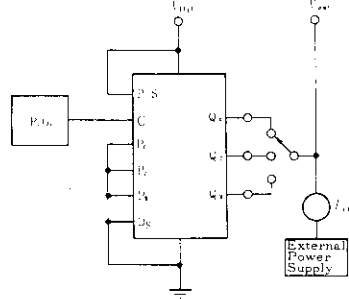


### DC CHARACTERISTIC TEST CIRCUIT

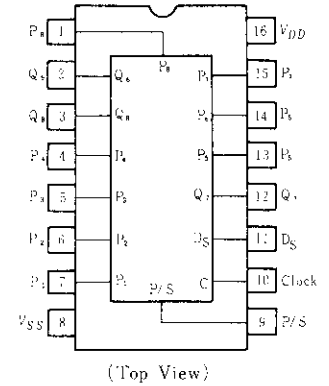
●  $I_{OH}$



●  $I_{OL}$



### PIN ARRANGEMENT



### TRUTH TABLE

#### Serial Operation

t	Clock	D <sub>n</sub>	P/S
n		0	0
n+1		1	0
n+2		0	0
n+3		1	0
		x	0

Q <sub>n</sub> t = n+6	Q <sub>n+1</sub> t = n+7	Q <sub>n+2</sub> t = n+8
0	?	?
1	0	?
0	1	0
1	0	1
Q <sub>n</sub>	Q <sub>n+1</sub>	Q <sub>n+2</sub>

#### Parallel Operation

Clock	D <sub>n</sub>	P/S	D <sub>m</sub>	Q <sub>m</sub> *
	x	1	0	0
	x	1	1	1

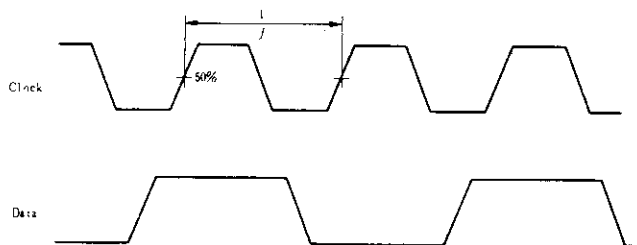
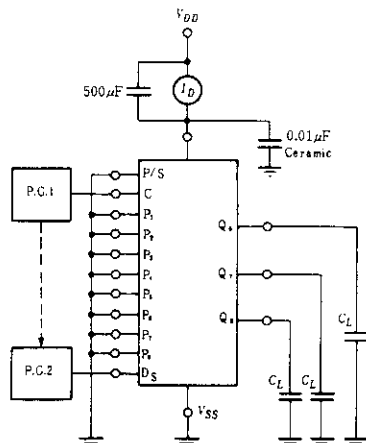
\* : Q<sub>n</sub>, Q<sub>n+1</sub>, & Q<sub>n+2</sub> are available externally  
 x : Don't Care

**ELECTRICAL CHARACTERISTICS**

Characteristic	Symbol	Test Conditions	-40°C		25°C			85°C		Unit	
			min	max	min	typ	max	min	max		
Output Voltage	$V_{OL}$	$V_{DD}(V)$									
		5.0	—		0.05	—	0	0.05	—	0.05	V
		10	—		0.05	—	0	0.05	—	0.05	
	15	—		0.05	—	0	0.05	—	0.05		
	$V_{OH}$	$V_{in}=V_{DD}$ or 0									
		5.0	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	$V_{IL}$	$V_{out}$									
		4.5 or 0.5V	—	1.5	—	2.25	1.5	—	1.5	V	
		9.0 or 1.0V	—	3.0	—	4.50	3.0	—	3.0		
	13.5 or 1.5V	—	4.0	—	6.75	4.0	—	4.0			
	$V_{IH}$	$V_{out}$									
		0.5 or 4.5V	3.5	—	3.5	2.75	—	3.5	—	V	
1.0 or 9.0V		7.0	—	7.0	5.50	—	7.0	—			
1.5 or 13.5V	11.0	—	11.0	8.25	—	11.0	—				
Output Drive Current	$I_{OH}$	$V_{OH}$									
		2.5V	-1.0	—	-0.8	-1.7	—	-0.6	—	mA	
		4.6V	-0.2	—	-0.16	-0.36	—	-0.12	—		
	9.5V	-0.5	—	-0.4	-0.9	—	-0.3	—			
	$I_{OL}$	$V_{OH}$									
		13.5V	-1.4	—	-1.2	-3.5	—	-1.0	—	mA	
0.4V		0.52	—	0.44	0.88	—	0.36	—			
0.5V	1.3	—	1.1	2.25	—	0.9	—				
Input Current	$I_{in}$	$V_{OL}$									
		1.5V	3.6	—	3.0	8.8	—	2.4	—		
Input Current	$I_{in}$	15	—	$\pm 0.3$	—	$\pm 0.00001$	$\pm 0.3$	—	$\pm 1.0$	$\mu A$	
Input Capacitance	$C_{in}$	$V_{in}=0$	—	—	—	5.0	7.5	—	—	pF	
Quiescent Current	$I_{DD}$	$V_{DD}$									
		5.0	—	20	—	0.005	20	—	150	$\mu A$	
		10	—	40	—	0.010	40	—	300		
15	—	80	—	0.015	80	—	600				
Total Supply Current*	$I_T$	$V_{DD}$									
		5.0	—	—	—	0.76	—	—	—	$\mu A$	
		10	—	—	—	1.51	—	—	—		
15	—	—	—	2.27	—	—	—				

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

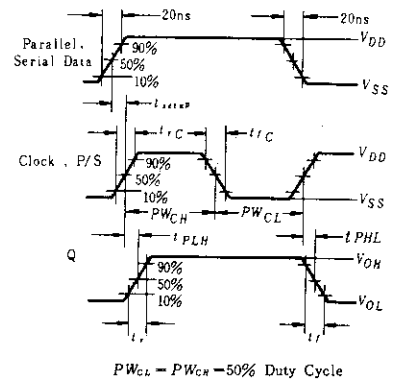
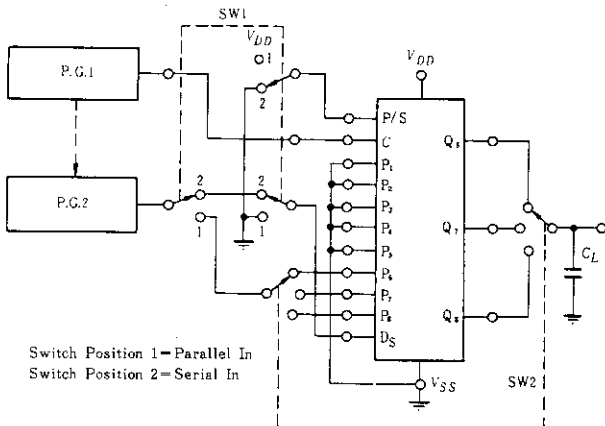
**POWER DISSIPATION TEST CIRCUIT AND WAVEFORM**

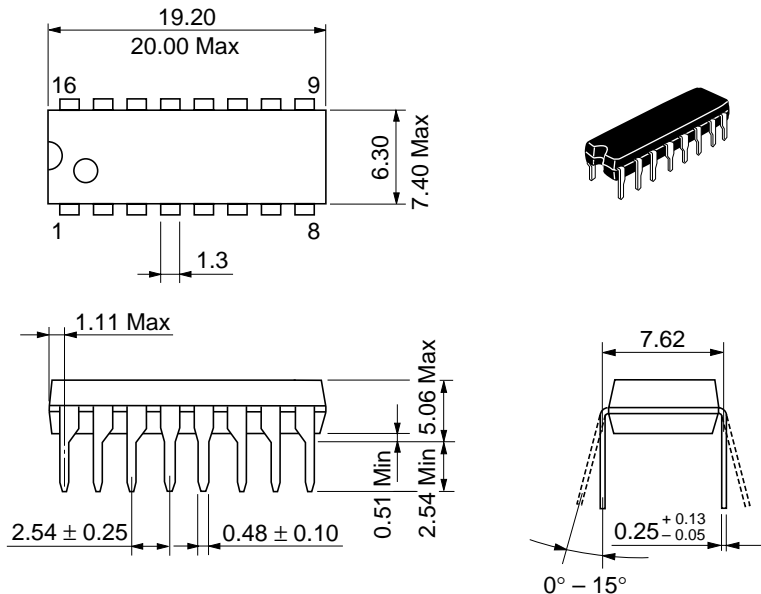


■ SWITCHING CHARACTERISTICS ( $C_L=50\text{pF}$ ,  $T_a=25^\circ\text{C}$ )

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	$\mu\text{s}$
		10	—	—	15	
		15	—	—	15	

■ SWITCHING TIME TEST CIRCUIT





Hitachi Code	DP-16
JEDEC	Conforms
EIAJ	Conforms
Weight (reference value)	1.07 g

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