

# HD14006B

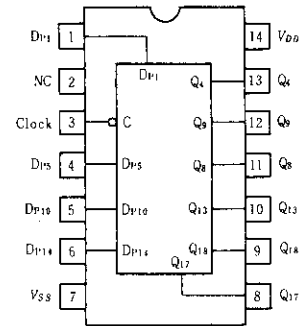
## 18-bit Static Shift Register

The HD14006B shift register is comprised of four separate shift register sections sharing a common clock: two sections have four stages and two sections have five stages with an output tap on both the fourth and fifth stages. This makes it possible to obtain a shift register of 4, 5, 8, 9, 10, 12, 13, 14, 16, 17 or 18 bits by appropriate selection of inputs and outputs. This part is particularly useful in serial shift registers and time delay circuits.

### FEATURES

- Output Transitions Occur on the Falling Edge of the Clock Pulse
- Quiescent Current = 5nA/pkg typ @5V
- Fully Static Operation
- 8MHz Shift Rate Typical
- Can be Cascaded to Provide Longer Shift Register Lengths
- Supply Voltage Range = 3 to 18V
- Capable of Driving One Lowpower Schottky TTL Load Over the Rated Temperature Range
- Pin-for-Pin Replacement for CD4006B and MC14006B

### PIN ARRANGEMENT



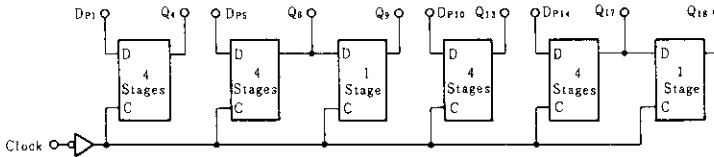
(Top View)

### TRUTH TABLE

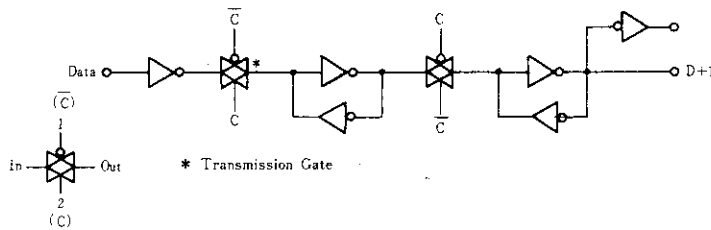
$D_n$	C	$Q_{n+1}$
0		0
1		1
X		$Q_n$

X : Don't Care

### BLOCK DIAGRAM



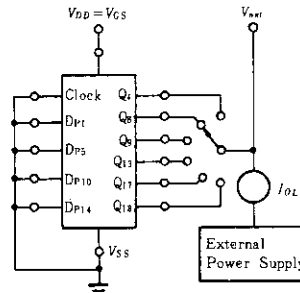
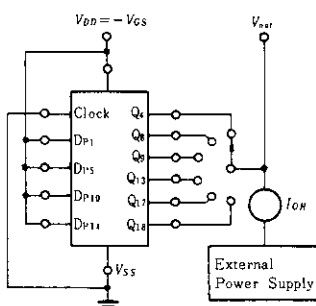
### LOGIC DIAGRAM



### DC CHARACTERISTIC TEST CIRCUIT

●  $I_{OH}$

●  $I_{OL}$

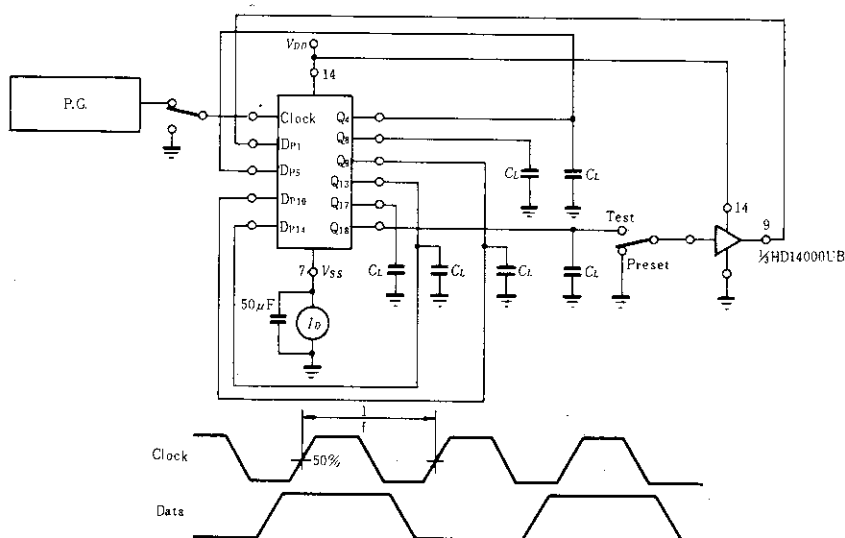


**ELECTRICAL CHARACTERISTICS**

Characteristic	Symbol	$V_{DD}(V)$	Test Conditions	-40°C		25°C			85°C		Unit
				min	max	min	typ	max	min	max	
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	$V_{OH}=2.5V$	-1.0	—	-0.8	-1.7	—	-0.6	—	mA
		5.0	$V_{OH}=4.6V$	-0.2	—	-0.16	-0.36	—	-0.12	—	
		10	$V_{OH}=9.5V$	-0.5	—	-0.4	-0.9	—	-0.3	—	
	$I_{OL}$	5.0	$V_{OL}=0.4V$	0.52	—	0.44	0.88	—	0.36	—	mA
		10	$V_{OL}=0.5V$	1.3	—	1.1	2.25	—	0.9	—	
		15	$V_{OL}=1.5V$	3.6	—	3.0	8.8	—	2.4	—	
Input Current	$I_{in}$	15		—	$\pm 0.3$	—	$\pm 0.0001$	$\pm 0.3$	—	$\pm 1.0$	$\mu A$
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	$\mu A$
		10		—	40	—	0.010	40	—	300	
		15		—	80	—	0.015	80	—	600	
Total Supply Current*	$I_T$	5.0	Dynamic + $I_{DD}$ ,	—	—	—	1.3	—	—	—	$\mu A$
		10	Per Gate,	—	—	—	2.6	—	—	—	
		15	$C_L=50pF, f=1kHz$	—	—	—	3.9	—	—	—	

\* To calculate total supply current at frequency other than 1kHz.  
 @ $V_{DD}=5.0V$   $I_T=(1.3\mu A/kHz)f+I_{DD}$ , @ $V_{DD}=10V$   $I_T=(2.6\mu A/kHz)f+I_{DD}$ , @ $V_{DD}=15V$   $I_T=(3.9\mu A/kHz)f+I_{DD}$

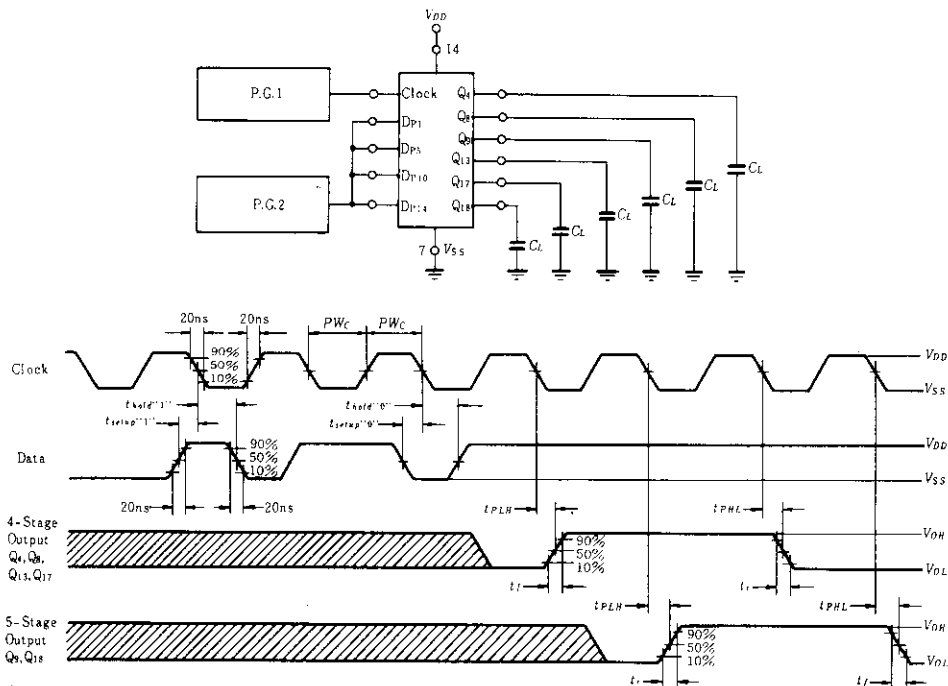
**POWER DISSIPATION TEST CIRCUIT AND WAVEFORM**



■ 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	—	305	600	ns
		10	—	110	275	
		15	—	80	200	
Clock Pulse Width	$PW_C$	5.0	250	100	—	ns
		10	125	60	—	
		15	95	40	—	
Clock Pulse Frequency	$PRF$	5.0	—	5.0	2.0	MHz
		10	—	8.3	4.0	
		15	—	12	6.0	
Clock Pulse Rise and Fall Time	$t_r, t_f$	5.0	—	—	15	$\mu\text{s}$
		10	—	—	15	
		15	—	—	15	
Setup Time	$t_{setup}$	5.0	0	-50	—	ns
		10	0	-15	—	
		15	0	-8.0	—	
Hold Time	$t_{hold}$	5.0	220	75	—	ns
		10	110	25	—	
		15	90	20	—	

■ SWITCHING TIME TEST CIRCUIT



▨ Output state can change since data previously clocked in might be in either state.



Hitachi Code	DP-14
JEDEC	Conforms
EIAJ	Conforms
Weight (reference value)	0.97 g

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