

# HD14042B

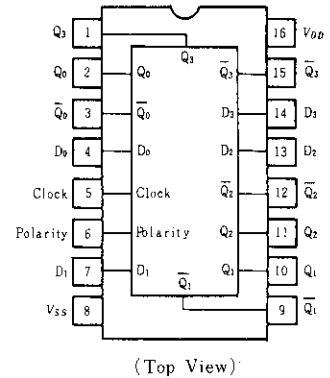
## Quadruple Latch

The HD14042B quad latch has a separate data input, but all four latches share a common clock. The clock polarity (high or low) used to strobe data through the latches can be reversed using the polarity input. Information present at the data input is transferred to outputs Q and  $\bar{Q}$  during the clock level which is determined by the polarity input. When the polarity input is in the logic "0" state, data is transferred during the low clock level, and when the polarity input is in the logic "1" state the transfer occurs during the high clock level.

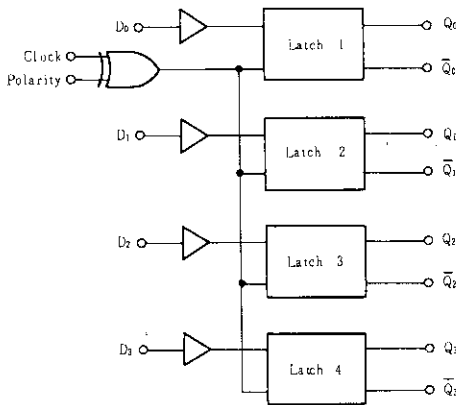
### FEATURES

- Buffered Data Inputs
- Common Clock
- Positive or Negative Edge Clocked
- Q and  $\bar{Q}$  Outputs
- Quiescent Current = 2nA/pkg typ. @5V
- Supply Voltage Range = 3 to 18V
- Capable of Driving One Low-power Schottky TTL Load Over the Rated Temperature Range

### PIN ARRANGEMENT



### LOGIC DIAGRAM

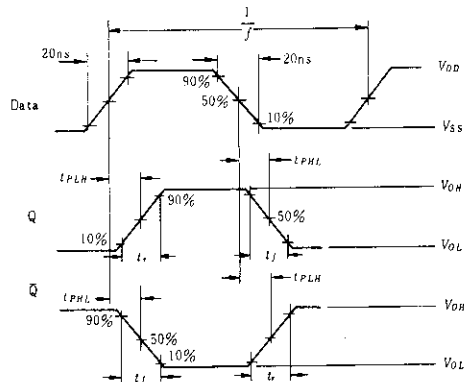
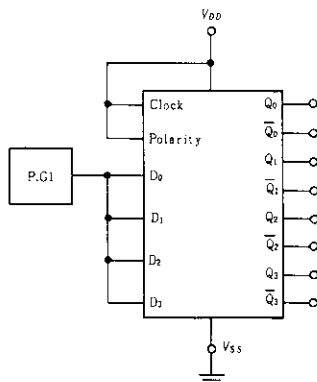


### TRUTH TABLE

Clock	Polarity	Q
0	0	Data
1	0	Latch
0	1	Data
1	1	Latch

### DC CHARACTERISTIC TEST CIRCUIT

(Data to Q,  $\bar{Q}$ )



For Power Dissipation test, each output is loaded with capacitance  $C_L$ .

**■ ELECTRICAL CHARACTERISTICS**

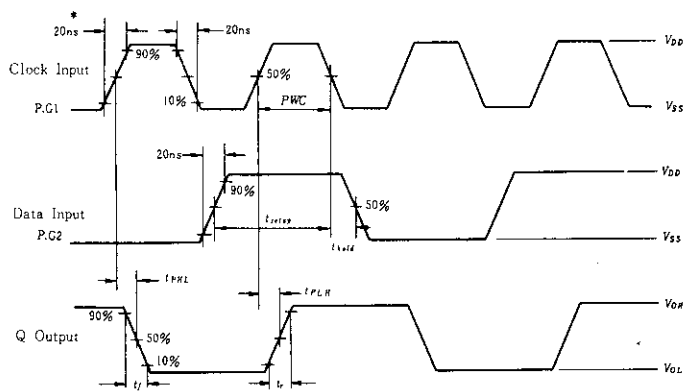
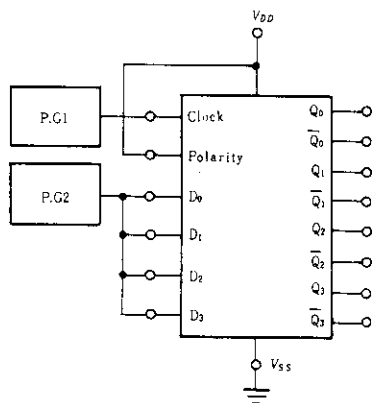
Characteristic	Symbol	$V_{DD}(V)$	Test Conditions	-40°C		25°C			85°C		Unit			
				min	max	min	typ	max	min	max				
Output Voltage	$V_{OL}$	5.0	$V_{in} = V_{DD}$ or 0	-	0.05	-	0	0.05	-	0.05	V			
		10		-	0.05	-	0	0.05	-	0.05				
		15		-	0.05	-	0	0.05	-	0.05				
	$V_{OH}$	5.0	$V_{in} = 0$ or $V_{DD}$	4.95	-	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	Data	$V_{IL}$	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			
			Clock Polarity	5.0	$V_{out} = 4.5$ or $0.5V$	-	1.5	-	2.25	1.5	-		1.5	
				10	$V_{out} = 9.0$ or $1.0V$	-	3.0	-	4.50	3.0	-		3.0	
				15	$V_{out} = 13.5$ or $1.5V$	-	3.75	-	6.75	3.75	-		3.75	
	Data	$V_{IH}$	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	-			
			Clock Polarity	5.0	$V_{out} = 0.5$ or $4.5V$	3.5	-	3.5	2.75	-	3.5		-	
				10	$V_{out} = 1.0$ or $9.0V$	7.0	-	7.0	5.50	-	7.0		-	
				15	$V_{out} = 1.5$ or $13.5V$	11.25	-	11.25	8.25	-	11.25		-	
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	-				
		15	$V_{OH} = 13.5V$	-1.4	-	-1.2	-3.5	-	-1.0	-				
	$I_{OL}$	5.0	$V_{OL} = 0.4V$	0.52	-	0.44	0.88	-	0.36	-				
		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	-	$\pm 0.3$	-	$\pm 0.00001$	$\pm 0.3$		-	$\pm 1.0$	$\mu A$
		Input Capacitance		$C_{in}$	-	$V_{in} = 0$	-	-	-	5.0		7.5	-	pF
Quiescent Current	$I_{DD}$	5.0	Zero Signal, per Package	-	4.0	-	0.002	4.0	-	30	$\mu A$			
		10		-	8.0	-	0.004	8.0	-	60				
		15		-	16	-	0.006	16	-	120				
Total Supply Current*	$I_T$	5.0	Dynamic $+I_{DDi}$ per Gate	-	-	-	1.0	-	-	-	$\mu A$			
		10		-	-	-	2.0	-	-	-				
		15		$C_L = 50pF, f = 1kHz$	-	-	-	3.0	-	-		-		

\* To calculate total supply current at frequency other than 1kHz.  
 @  $V_{DD} = 5.0V$   $I_T = (1.0 \mu A/kHz)f + I_{DD}$ , @  $V_{DD} = 10V$   $I_T = (2.0 \mu A/kHz)f + I_{DD}$ , @  $V_{DD} = 15V$   $I_T = (3.0 \mu A/kHz)f + I_{DD}$

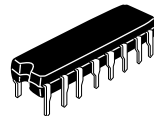
■SWITCHING CHARACTERISTICS ( $C_L=50pF, T_a=25^{\circ}C$ )

Characteristic		Symbol	$V_{DD}$ (V)	min	typ	max	Unit
Output Rise Time		$t_r$	5.0	—	180	360	ns
			10	—	90	180	
			15	—	65	130	
Output Fall Time		$t_f$	5.0	—	100	200	ns
			10	—	50	100	
			15	—	40	80	
Propagation Delay Time	Data to Q, $\bar{Q}$	$t_{PLH}$	5.0	—	220	440	ns
			10	—	90	180	
			15	—	60	120	
	Clock to Q, $\bar{Q}$	$t_{PHL}$	5.0	—	220	440	
			10	—	90	180	
			15	—	60	120	
Clock Pulse Width		$PW_C$	5.0	300	150	—	ns
			10	100	50	—	
			15	80	40	—	
Clock Rise Time		$t_r$	5.0	No Limit			
			10				
			15				
Hold Time		$t_{hold}$	5.0	100	50	—	ns
			10	50	25	—	
			15	40	20	—	
Setup Time		$t_{setup}$	5.0	50	0	—	ns
			10	30	0	—	
			15	25	0	—	

■AC TEST CIRCUIT (Clock to Q)



\* Input clock rise time is 20ns except for maximum

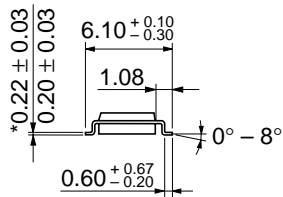
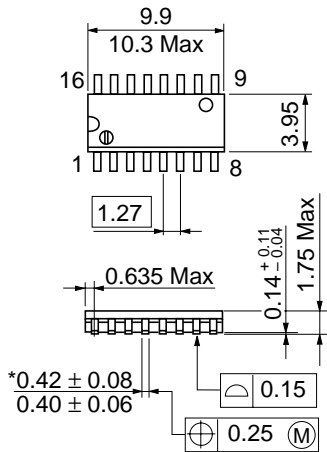


Hitachi Code	DP-16
JEDEC	Conforms
EIAJ	Conforms
Weight (reference value)	1.07 g



\*Dimension including the plating thickness  
Base material dimension

Hitachi Code	FP-16DA
JEDEC	—
EIAJ	Conforms
Weight (reference value)	0.24 g



\*Dimension including the plating thickness  
Base material dimension

Hitachi Code	FP-16DN
JEDEC	Conforms
EIAJ	Conforms
Weight (reference value)	0.15 g

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# HITACHI

## Hitachi, Ltd.

Semiconductor & Integrated Circuits.  
Nippon Bldg., 2-6-2, Ohte-machi, Chiyoda-ku, Tokyo 100-0004, Japan  
Tel: Tokyo (03) 3270-2111 Fax: (03) 3270-5109

URL      North America      : <http://semiconductor.hitachi.com/>  
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## For further information write to:

Hitachi Semiconductor  
(America) Inc.  
179 East Tasman Drive,  
San Jose, CA 95134  
Tel: <1> (408) 433-1990  
Fax: <1> (408) 433-0223

Hitachi Europe GmbH  
Electronic components Group  
Dornacher Straße 3  
D-85622 Feldkirchen, Munich  
Germany  
Tel: <49> (89) 9 9180-0  
Fax: <49> (89) 9 29 30 00

Hitachi Europe Ltd.  
Electronic Components Group.  
Whitebrook Park  
Lower Cookham Road  
Maidenhead  
Berkshire SL6 8YA, United Kingdom  
Tel: <44> (1628) 585000  
Fax: <44> (1628) 778322

Hitachi Asia Pte. Ltd.  
16 Collyer Quay #20-00  
Hitachi Tower  
Singapore 049318  
Tel: 535-2100  
Fax: 535-1533

Hitachi Asia Ltd.  
Taipei Branch Office  
3F, Hung Kuo Building, No.167,  
Tun-Hwa North Road, Taipei (105)  
Tel: <886> (2) 2718-3666  
Fax: <886> (2) 2718-8180

Hitachi Asia (Hong Kong) Ltd.  
Group III (Electronic Components)  
7/F., North Tower, World Finance Centre,  
Harbour City, Canton Road, Tsim Sha Tsui,  
Kowloon, Hong Kong  
Tel: <852> (2) 735 9218  
Fax: <852> (2) 730 0281  
Telex: 40815 HITEC HX

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