HD14043B, HD14044B

Quadruple R-S Latch

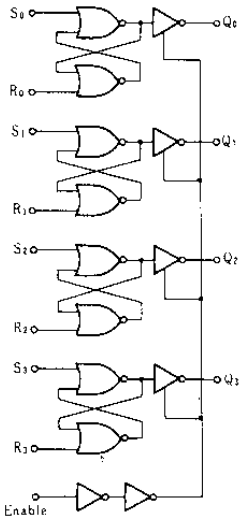
The HD14043B and HD14044B quad R-S latches have an independent Q output and set and reset inputs. The Q outputs are gated through three-state buffers having a common enable input. The outputs are enabled with a logical "1" or high on the enable input; a logical "0" or low disconnects the latch from the Q outputs, resulting in an open circuit at the Q outputs.

■ FEATURES

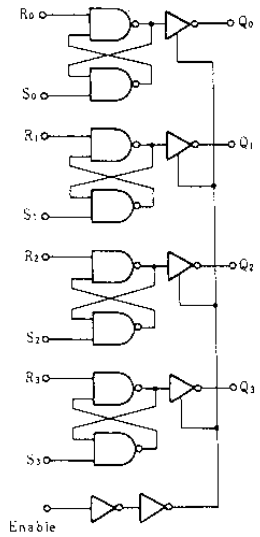
- Quiescent Current = 4 nA/pkg typ. @10V
- Double Diode Input Protection
- Three-State Outputs with Common Enable
- Outputs Capable of Driving One Low-power Schottky TTL Load Over the Rated Temperature Range
- Supply Voltage Range = 3 to 18V

■ LOGIC DIAGRAM

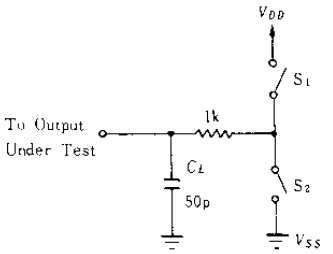
● HD14043B

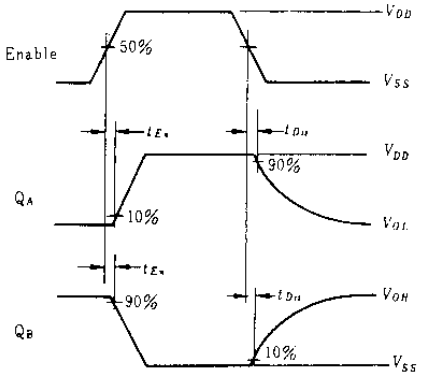


● HD14044B



■ THREE-STATE ENABLE/DISABLE DELAYS



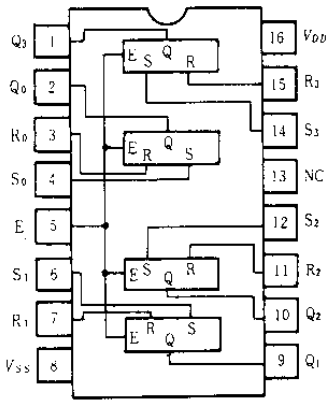


Testing Method

Test	S	R	HD14043B			HD14044B		
			S_1	S_2	Q	S_1	S_2	Q
t_{En}	V_{DD}	V_{SS}	Open	Closed	A	Closed	Open	B
t_{En}	V_{SS}	V_{DD}	Closed	Open	B	Open	Closed	A
t_{Dn}	V_{DD}	V_{SS}	Open	Closed	A	Closed	Open	B
t_{Dn}	V_{SS}	V_{DD}	Closed	Open	B	Open	Closed	A

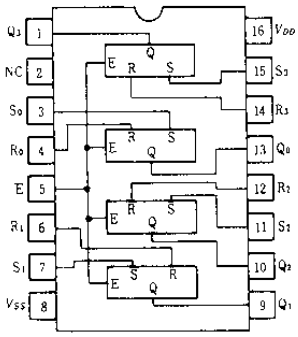
■ PIN ARRANGEMENT

● HD14043B



(Top View)

● HD14044B



(Top View)

■ TRUTH TABLE

● HD14043B

S	R	E	Q
X	X	0	High Inpedance
0	0	1	No Change
0	1	1	0
1	0	1	1
1	1	1	1

● HD14044B

S	R	E	Q
X	X	0	High Inpedance
0	0	1	0
0	1	1	1
1	0	1	0
1	1	1	No Change

x = Don't Care

HITACHI

■ 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	−2.5	—	−2.1	−4.2	—	−1.7	—	mA
		5.0	$V_{OH}=4.6$V	−0.52	—	−0.44	−0.88	—	−0.36	—	
		10	$V_{OH}=9.5$V	−1.3	—	−1.1	−2.25	—	−0.9	—	
		15	$V_{OH}=13.5$V	−3.6	—	−3.0	−8.8	—	−2.4	—	
	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	—	4.0	—	0.002	4.0	—	30	μA
		10		—	8.0	—	0.004	8.0	—	60	
		15		—	16	—	0.006	16	—	120	
Total Supply Current*	I_T	5.0	Dynamic+I_{DD}, per Gate $C_L=50$pF, $f=1$kHz	—	—	—	0.58	—	—	—	μA
		10		—	—	—	1.15	—	—	—	
		15		—	—	—	1.73	—	—	—	
Three-State Output Leakage Current	I_{TL}	15		—	±1.0	—	±0.00001	±1.0	—	±7.5	μA

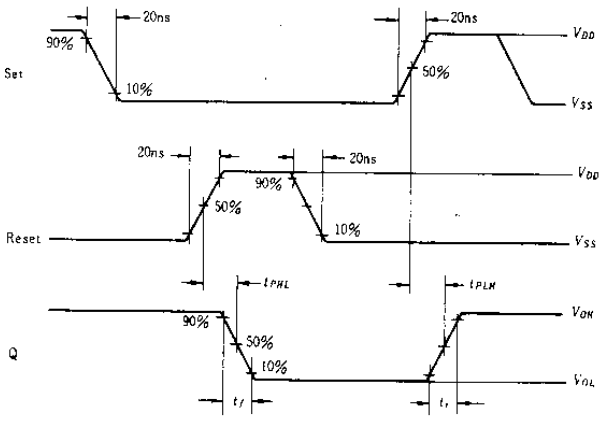
* To calculate total supply current at frequency other than 1kHz.
@$V_{DD}=5.0$V $I_T=(0.58\,\mu A/kHz)f+I_{DD}$, @$V_{DD}=10$V $I_T=(1.15\,\mu A/kHz)f+I_{DD}$, @$V_{DD}=15$V $I_T=(1.73\,\mu A/kHz)f+I_{DD}$

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

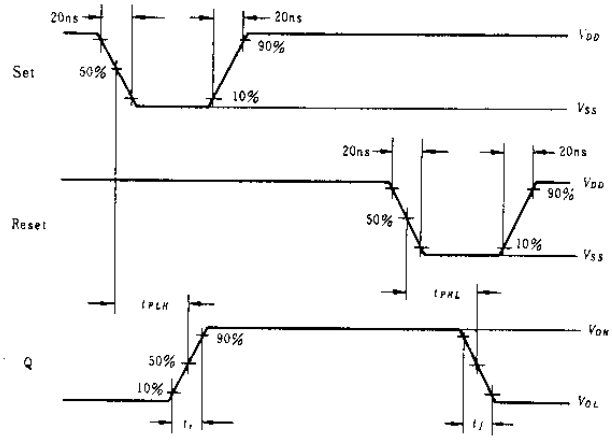
Characteristic	Symbol	V_{DD} (V)	min	typ	max	Unit
Output Rise Time	t_r	5.0	—	100	200	ns
		10	—	50	100	
		15	—	40	80	
Output Fall Time	t_f	5.0	—	100	200	ns
		10	—	50	100	
		15	—	40	80	
Propagation Delay Time	t_{PLH}	5.0	—	175	350	ns
		10	—	75	175	
		15	—	60	120	
	t_{PHL}	5.0	—	175	350	ns
		10	—	75	175	
		15	—	60	120	
Set Pulse Width	PW_S	5.0	200	80	—	ns
		10	100	40	—	
		15	70	30	—	
Reset Pulse Width	PW_R	5.0	200	80	—	ns
		10	100	40	—	
		15	70	30	—	
Three-state Enable/Disable Delay	t_{En}, t_{Dis}	5.0	—	150	300	ns
		10	—	80	160	
		15	—	55	110	

■DYNAMIC SIGNAL WAVEFORMS

●HD14043B



●HD14044B



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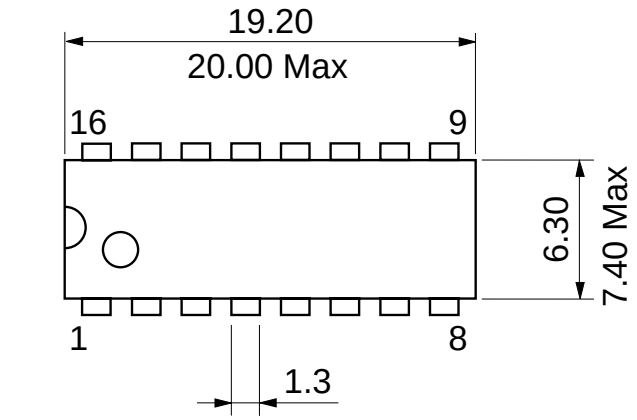

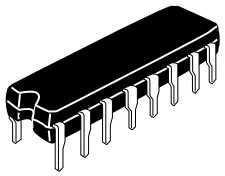

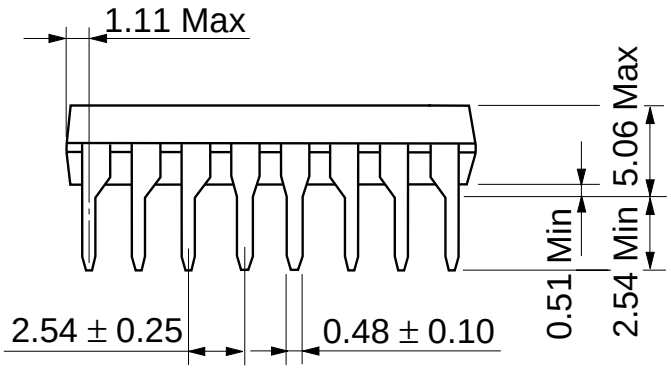

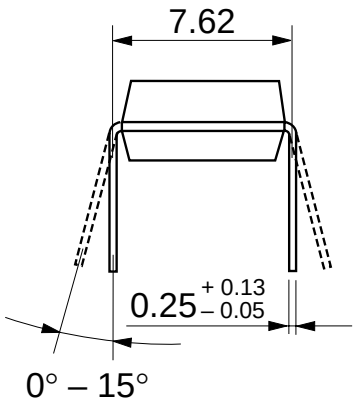

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