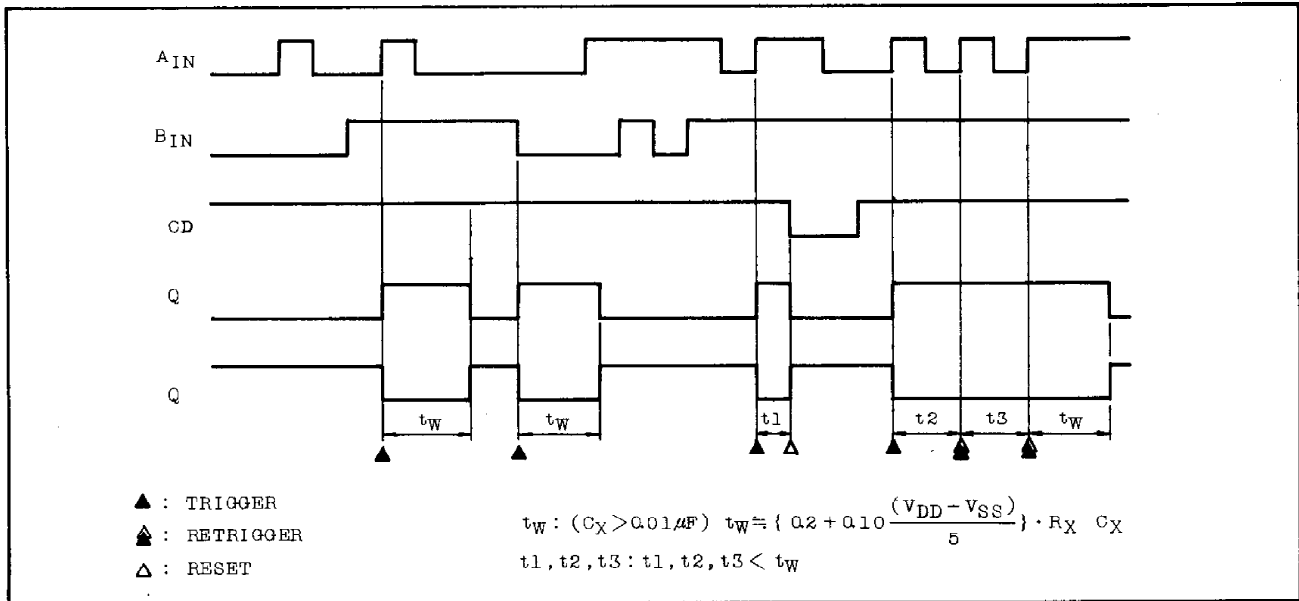




## TIMING CHART



## RECOMMENDED OPERATING CONDITIONS (V<sub>SS</sub>=0V)

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNITS
DC Supply Voltage	V <sub>DD</sub>	3	-	18	V
Input Voltage	V <sub>IN</sub>	0	-	V <sub>DD</sub>	V
External Resistance	R <sub>X</sub>	5	-	1000	kΩ
External Capacitance	C <sub>X</sub>	No Limits			μF

## STATIC ELECTRICAL CHARACTERISTICS (V<sub>SS</sub>=0V)

CHARACTERISTIC	SYMBOL	TEST CONDITIONS	V <sub>DD</sub> (V)	-40°C		25°C			85°C		UNITS
				MIN.	MAX.	MIN.	TYP.	MAX.	MIN.	MAX.	
High-Level Output Voltage	V <sub>OH</sub>	I <sub>OUT</sub>   < 1μA V <sub>IN</sub> =V <sub>SS</sub> , V <sub>DD</sub>	5	4.95	-	4.95	5.00	-	4.95	-	V
			10	9.95	-	9.95	10.00	-	9.95	-	
			15	14.95	-	14.95	15.00	-	14.95	-	
Low-Level Output Voltage	V <sub>OL</sub>	I <sub>OUT</sub>   < 1μA V <sub>IN</sub> =V <sub>SS</sub> , V <sub>DD</sub>	5	-	0.05	-	0.00	0.05	-	0.05	V
			10	-	0.05	-	0.00	0.05	-	0.05	
			15	-	0.05	-	0.00	0.05	-	0.05	
Output High Current	I <sub>OH</sub>	V <sub>OH</sub> =4.6V V <sub>OH</sub> =2.5V V <sub>OH</sub> =9.5V V <sub>OH</sub> =13.5V V <sub>IN</sub> =V <sub>SS</sub> , V <sub>DD</sub>	5	-0.61	-	-0.51	-1.0	-	-0.42	-	mA
			5	-2.5	-	-2.1	-4.0	-	-1.7	-	
			10	-1.5	-	-1.3	-2.2	-	-1.1	-	
			15	-4.0	-	-3.4	-9.0	-	-2.8	-	
Output Low Current	I <sub>OL</sub>	V <sub>OL</sub> =0.4V V <sub>OL</sub> =0.5V V <sub>OL</sub> =1.5V V <sub>IN</sub> =V <sub>SS</sub> , V <sub>DD</sub>	5	0.61	-	0.51	1.2	-	0.42	-	mA
			10	1.5	-	1.3	3.2	-	1.1	-	
			15	4.0	-	3.4	12.0	-	2.8	-	

STATIC ELECTRICAL CHARACTERISTICS (Continued)

CHARACTERISTIC	SYMBOL	TEST CONDITIONS	V <sub>DD</sub> (V)	-40°C		25°C			85°C		UNITS	
				MIN.	MAX.	MIN.	TYP.	MAX.	MIN.	MAX.		
Input High Voltage	V <sub>IH</sub>	V <sub>OUT</sub> =0.5V, 4.5V	5	3.5	-	3.5	2.75	-	3.5	-	V	
		V <sub>OUT</sub> =1.0V, 9.0V	10	7.0	-	7.0	5.5	-	7.0	-		
		V <sub>OUT</sub> =1.5V, 13.5V	15	11.0	-	11.0	8.25	-	11.0	-		
		I <sub>OUT</sub>   < 1μA										
Input Low Voltage	V <sub>IL</sub>	V <sub>OUT</sub> =0.5V, 4.5V	5	-	1.5	-	2.25	1.5	-	1.5	V	
		V <sub>OUT</sub> =1.0V, 9.0V	10	-	3.0	-	4.5	3.0	-	3.0		
		V <sub>OUT</sub> =1.5V, 13.5V	15	-	4.0	-	6.75	4.0	-	4.0		
		I <sub>OUT</sub>   < 1μA										
Input Current	"H" Level	I <sub>IH</sub>	V <sub>IH</sub> =18V	18	-	0.1	-	10 <sup>-5</sup>	0.1	-	1.0	μA
	"L" Level	I <sub>IL</sub>	V <sub>IL</sub> =0V	18	-	-0.1	-	-10 <sup>-5</sup>	-0.1	-	-1.0	
Quiescent Device Current	I <sub>DD</sub>	V <sub>IN</sub> =V <sub>SS</sub> , V <sub>DD</sub> *	5	-	5	-	0.005	5	-	150	μA	
			10	-	10	-	0.010	10	-	300		
			15	-	20	-	0.015	20	-	600		

\* All valid input combinations.

DYNAMIC ELECTRICAL CHARACTERISTICS (T<sub>a</sub>=25°C, V<sub>SS</sub>=0V, C<sub>L</sub>=50pF)

CHARACTERISTIC	SYMBOL	TEST CONDITIONS	V <sub>DD</sub> (V)	MIN.	TYP.	MAX.	UNITS
Output Transition Time (Low to High)	t <sub>TLH</sub>		5	-	70	200	ns
			10	-	35	100	
			15	-	30	80	
Output Transition Time (High to Low)	t <sub>THL</sub>		5	-	70	200	ns
			10	-	35	100	
			15	-	30	80	
Propagation Delay Time (A, B - Q, Q̄)	t <sub>pLH</sub>	R <sub>X</sub> =5kΩ C <sub>X</sub> =15pF	5	-	230	650	μs
			10	-	110	240	
			15	-	80	180	
	t <sub>pHL</sub>	R <sub>X</sub> =10kΩ C <sub>X</sub> =1000pF	5	-	440	-	
			10	-	220	-	
			15	-	160	-	
R <sub>X</sub> =10kΩ C <sub>X</sub> =10000pF	5	-	2.2	5			
	10	-	1.1	3			
	15	-	0.9	2			
Propagation Delay Time (CD - Q, Q̄)	t <sub>pLH</sub>	R <sub>X</sub> =5kΩ C <sub>X</sub> =15pF	5	-	150	600	ns
			10	-	70	225	
			15	-	50	170	
Propagation Delay Time (CD - Q, Q̄)	t <sub>pLH</sub>	R <sub>X</sub> =10kΩ C <sub>X</sub> =1000pF	5	-	260	-	ns
			10	-	130	-	
			15	-	100	-	
	t <sub>pHL</sub>	R <sub>X</sub> =10kΩ C <sub>X</sub> =10000pF	5	-	700	-	
			10	-	400	-	
			15	-	320	-	

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## DYNAMIC ELECTRICAL CHARACTERISTICS (Continued)

CHARACTERISTIC	SYMBOL	TEST CONDITION	V <sub>DD</sub> (V)	MIN.	TYP.	MAX.	UNITS
Min. Input Pulse Width (A, B)	t <sub>WH</sub>	R <sub>X</sub> =5kΩ	5	-	40	150	ns
	t <sub>WL</sub>	C <sub>X</sub> =15pF	10	-	20	75	
			15	-	15	55	
Min. Retrigger Time	t <sub>rr</sub>	R <sub>X</sub> =5kΩ C <sub>X</sub> =15pF	5	0	-	-	
			10	0	-	-	
			15	0	-	-	
		R <sub>X</sub> =10kΩ C <sub>X</sub> =1000pF	5	0	-	-	
			10	0	-	-	
			15	0	-	-	
Output Pulse Width	t <sub>w</sub> OUT	R <sub>X</sub> =5kΩ C <sub>X</sub> =15pF	5	-	190	-	μs
			10	-	140	-	
			15	-	140	-	
		R <sub>X</sub> =10kΩ C <sub>X</sub> =10000pF	5	20	35	45	
			10	35	45	55	
			15	40	50	60	
Input Capacitance	C <sub>IN</sub>			-	5	7.5	pF

## WAVEFORM FOR MEASUREMENT OF DYNAMIC CHARACTERISTICS

