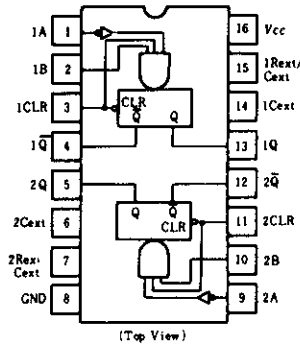


# HD74LS123 ● Dual Retriggerable Monostable Multivibrators (with Clear)

This d-c triggered multivibrator features output pulse width control by three method. The basic pulse time is programmed by selection of external resistance and capacitance values. Once triggered, the basic pulse width may be extended by re-triggering the gated low-level-active (A) or high-level-active (B) inputs, or be reduced by use of the overriding clear. Fig. 1 illustrates pulse control by retriggering and early clear. This device is provided enough Schmitt hysteresis to ensure jitter-free triggering from the B input with transition rates as slow as 0.1 mV/ns.

## ■ PIN ARRANGEMENT



## ■ BLOCK DIAGRAM (1/2)

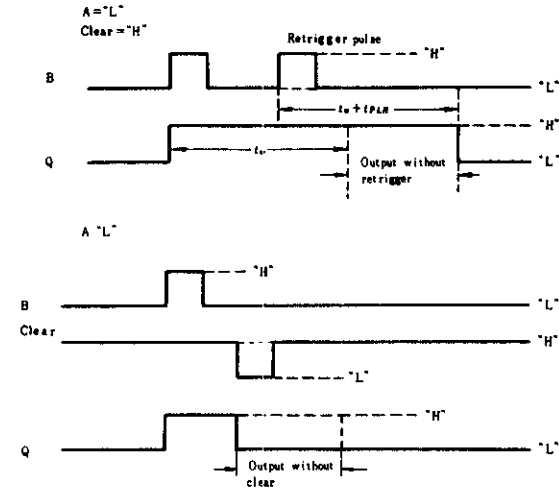
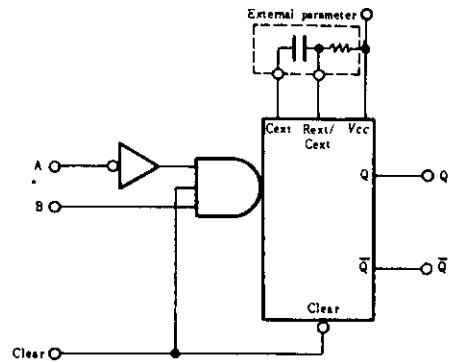


Fig.1 Typical Input/Output Pulses

## ■ RECOMMENDED OPERATING CONDITIONS

Item	Symbol	min	typ	max	Unit
Input pulse width	A, B "H"	40	—	—	ns
	A, B "L"	40	—	—	ns
	CLR "L"	40	—	—	ns
External timing resistance	$R_{ext}$	5	—	260	k $\Omega$
External capacitance	$C_{ext}$	Non restriction			
Wiring capacitance at Rext/Cext terminal		—	—	50	pF

## ■ FUNCTION TABLE

Inputs			Outputs	
CLEAR	A	B	Q	$\bar{Q}$
L	X	X	L	H
X	H	X	L	H
X	X	L	L	H
H	L	↑		
H	↓	H		
↑	L	H		

Notes) H; high level, L; low level, X; irrelevant  
 ↓; transition from high to low level  
 ↑; transition from low to high level  
; one high-level pulse  
; one low-level pulse

# HD74LS123

## ELECTRICAL CHARACTERISTICS ( $T_a = -20 \sim +75^\circ\text{C}$ )

Item	Symbol	Test Conditions	min	typ*	max	Unit
Input voltage	$V_{IH}$		2.0	—	—	V
	$V_{IL}$		—	—	0.8	V
Output voltage	$V_{OH}$	$V_{CC} = 4.75\text{V}, V_{IH} = 2\text{V}, V_{IL} = 0.8\text{V}, I_{OH} = -400\mu\text{A}$	2.7	—	—	V
	$V_{OL}$	$V_{CC} = 4.75\text{V}, V_{IH} = 2\text{V}, V_{IL} = 0.8\text{V}$	—	—	0.4	V
		$I_{OL} = 4\text{mA}$ $I_{OL} = 8\text{mA}$	—	—	0.5	
Input current	$I_{IH}$	$V_{CC} = 5.25\text{V}, V_I = 2.7\text{V}$	—	—	20	$\mu\text{A}$
	$I_{IL}$	$V_{CC} = 5.25\text{V}, V_I = 0.4\text{V}$	—	—	-0.4	mA
	$I_I$	$V_{CC} = 5.25\text{V}, V_I = 7\text{V}$	—	—	0.1	mA
Short-circuit output current	$I_{OS}$	$V_{CC} = 5.25\text{V}$	-20	—	-100	mA
Supply current**	$I_{CC}$	$V_{CC} = 5.25\text{V}$	—	12	20	mA
Input clamp voltage	$V_{IK}$	$V_{CC} = 4.75\text{V}, I_{IN} = -18\text{mA}$	—	—	-1.5	V

\*  $V_{CC} = 5\text{V}, T_a = 25^\circ\text{C}$

\*\* With all outputs open and 4.5V applied to all data and clear inputs,  $I_{CC}$  is measured after a momentary ground, then 4.5V, is applied clock.

Note) To measure  $V_{OH}$  at Q,  $V_{OL}$  at  $\bar{Q}$ , or  $I_{OS}$  at Q, ground  $R_{ext}/C_{ext}$ , apply 2V to B and clear, and pulse A from 2V to 0V.

## SWITCHING CHARACTERISTICS ( $V_{CC} = 5\text{V}, T_a = 25^\circ\text{C}$ )

Item	Symbol	Inputs	Outputs	Test Conditions	min	typ	max	Unit
Propagation delay time	$t_{PLH}$	A	Q	$C_{ext} = 0\text{pF}$ $R_{ext} = 5\text{k}\Omega$ $C_L = 15\text{pF}$ $R_L = 2\text{k}\Omega$	—	23	33	ns
	$t_{PHL}$		$\bar{Q}$		—	32	45	
	$t_{PLH}$	B	Q		—	23	44	
	$t_{PHL}$		$\bar{Q}$		—	34	56	
	$t_{PHL}$	CLR	Q		—	20	27	
	$t_{PLH}$		$\bar{Q}$		—	28	45	
Output pulse width	$t_{w(out)min}$	A, B	Q	$C_{ext} = 1,000\text{pF}, R_{ext} = 10\text{k}\Omega$ $C_L = 15\text{pF}, R_L = 2\text{k}\Omega$	—	116	200	$\mu\text{s}$
	$t_{w(out)}$				4	4.5	5	

## TYPICAL APPLICATION DATA FOR HD74LS123

For pulse widths when  $C_{ext} < 1000\text{pF}$ , See Fig. 3.

The output pulse is primarily a function of the external capacitor and resistor. For  $C_{ext} > 1000\text{pF}$ , the output pulse width ( $t_w$ ) is defined as:  $t_w(out) = K \cdot R_{ext} \cdot C_{ext}$ ; See Fig. 4

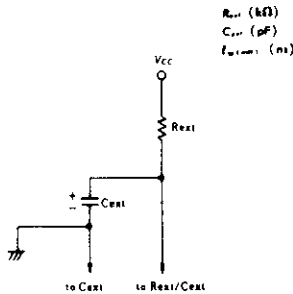


Fig.2 Timing Component Connections

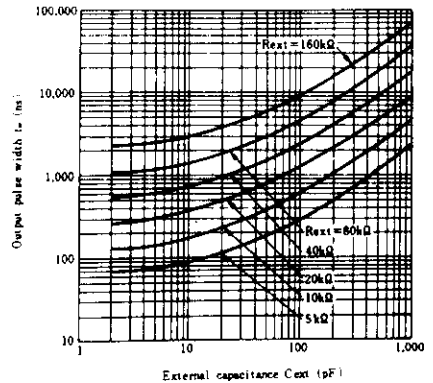
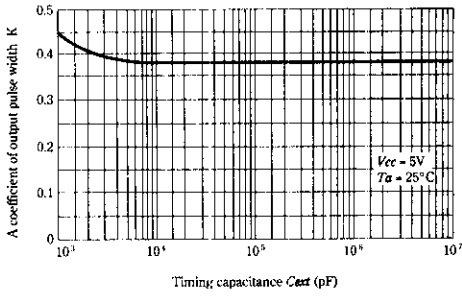


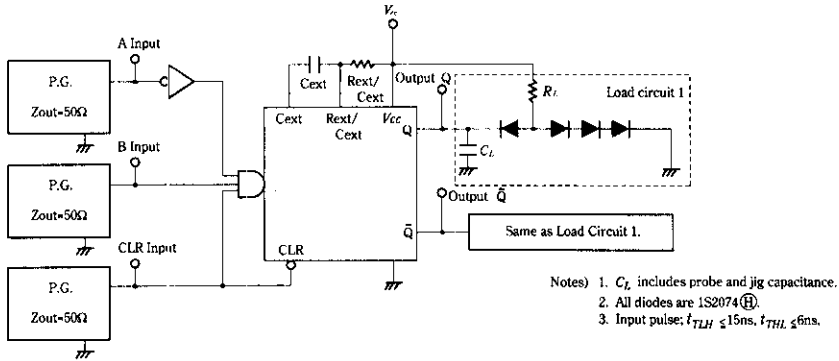
Fig.3 Typical Output Pulse Width ( $C_{ext} \leq 1000\text{pF}$ )



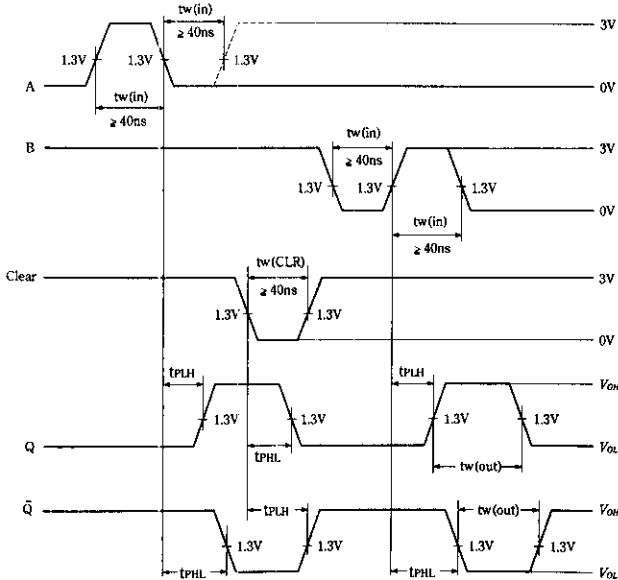
**Fig.4 Cext vs K (Cext > 1000pF)**

## ■ TESTING METHOD

### 1) Test Circuit



### Waveform



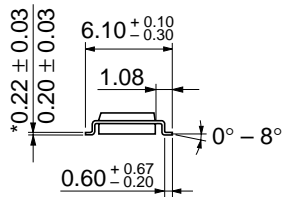
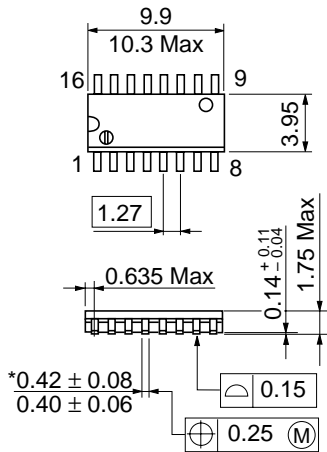


Hitachi Code	DP-16
JEDEC	Conforms
EIAJ	Conforms
Weight (reference value)	1.07 g



\*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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