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.

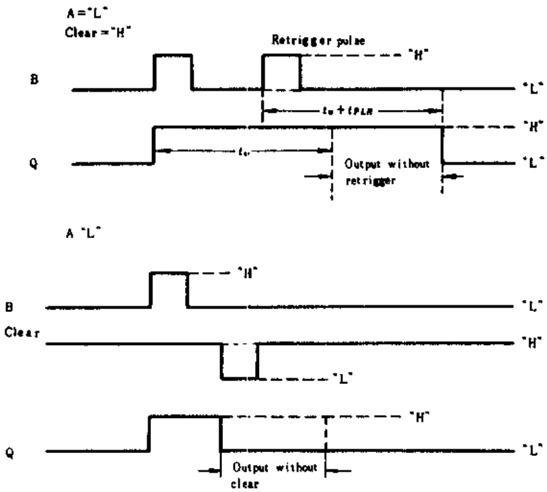
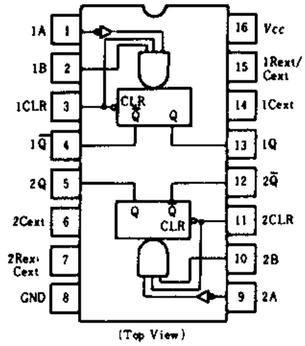
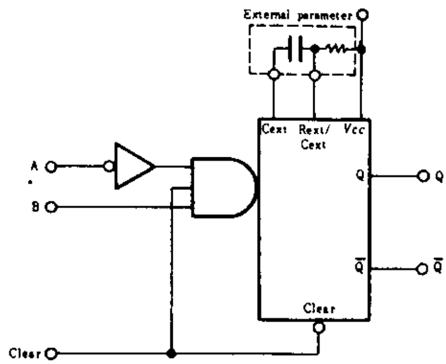


Fig.1 Typical Input/Output Pulses

■PIN ARRANGEMENT



■BLOCK DIAGRAM(½)



■RECOMMENDED OPERATING CONDITIONS

Item			Symbol	min	typ	max	Unit
Input pulse width	A, B	"H"	$t_{w(in)}$	40	–	–	ns
		"L"		40	–	–	ns
	CLR	"L"		40	–	–	ns
External timing resistance			R_{ext}	5	–	260	kΩ
External capacitance			C_{ext}	Non restriction			
Wiring capacitance at Rext/Cext terminal				–	–	50	pF

■FUNCTION TABLE

Inputs			Outputs	
CLEAR	A	B	Q	Q̄
L	×	×	L	H
×	H	×	L	H
×	×	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

■ELECTRICAL CHARACTERISTICS ($Ta = -20 \sim +75^\circ C$)

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}=4.75V, V_{IH}=2V, V_{IL}=0.8V, I_{OH}=−400μA		2.7	–	–	V
	V_{OL}	V_{CC}=4.75V, V_{IH}=2V,	I_{OL}=4mA	–	–	0.4	V
		V_{IL}=0.8V	I_{OL}=8mA	–	–	0.5	
Input current	I_{IH}	V_{CC}=5.25V, V_I=2.7V		–	–	20	μA
	I_{IL}	V_{CC}=5.25V, V_I=0.4V		–	–	−0.4	mA
	I_I	V_{CC}=5.25V, V_I=7V		–	–	0.1	mA
Short-circuit output current	I_{OS}	V_{CC}=5.25V		−20	–	−100	mA
Supply current**	I_{CC}	V_{CC}=5.25V		–	12	20	mA
Input clamp voltage	V_{IK}	V_{CC}=4.75V, I_{IN}=−18mA		–	–	−1.5	V

* V_{CC}=5V, Ta=25°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 ($V_{CC}=5V$, $Ta=25^\circ C$)

Item	Symbol	Inputs	Outputs	Test Conditions	min	typ	max	Unit
Propagation delay time	t_{PLH}	A	Q	C_{ext}=0pF R_{ext}=5kΩ C_L=15pF R_L=2kΩ	–	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		–	116	200	
	$t_{w(out)}$			C_{ext}=1,000pF, R_{ext}=10kΩ C_L=15pF, R_L=2kΩ	4	4.5	5	μs

■TYPICAL APPLICATION DATA FOR HD74LS123

For pulse widths when *Cext*<1000pF, See Fig. 3.

The output pulse is primarily a function of the external capacitor and resistor. For C_{ext}>1000pF, the output pulse width (*tw*) is defined as : *tw*(*out*) = K・*Rext*・*Cext* ; See Fig. 4

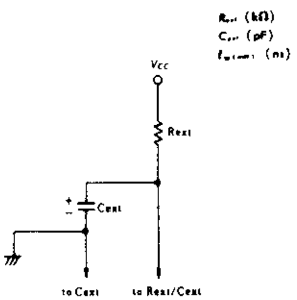


Fig.2 Timing Component Connections

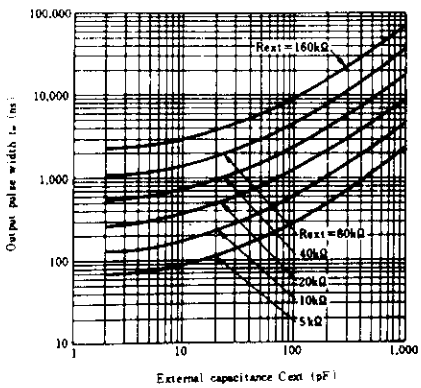


Fig.3 Typical Output Pulse Width (Cext≦1000pF)

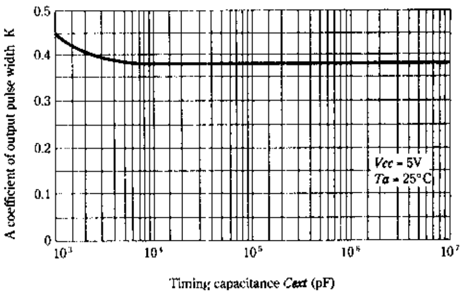
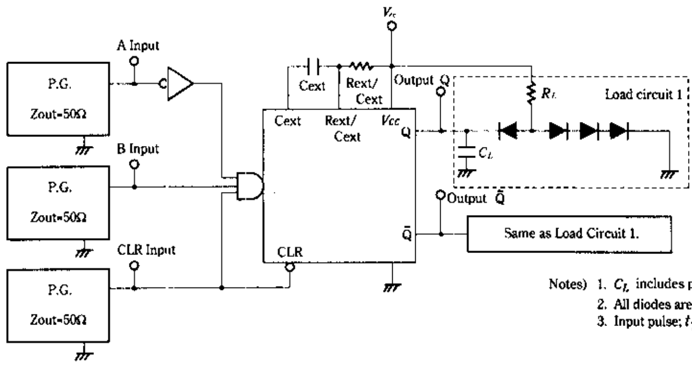


Fig.4 Cext vs K (Cext > 1000pF)

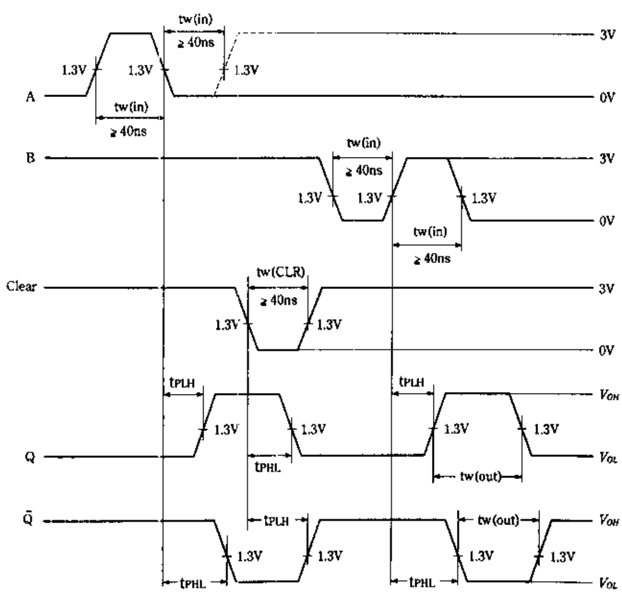
■TESTING METHOD

1) Test Circuit

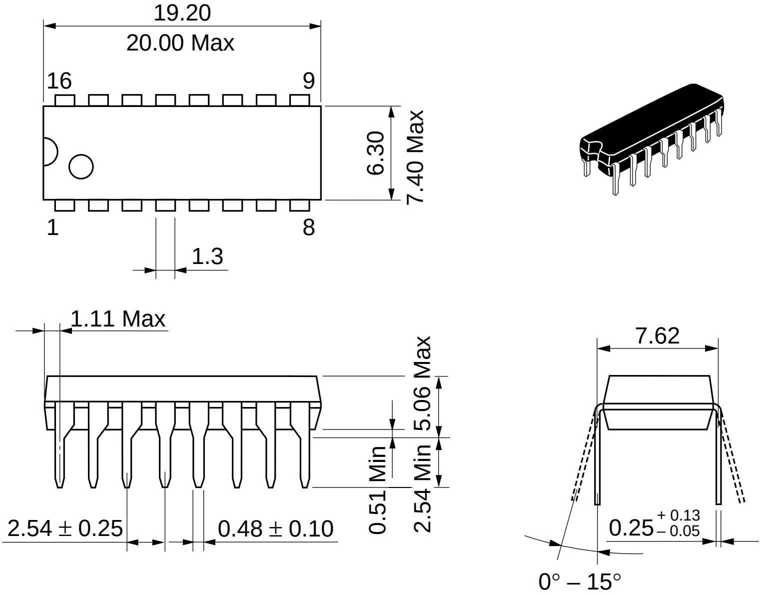


Notes) 1. C_L includes probe and jig capacitance.
2. All diodes are 1S2074Ⓗ.
3. Input pulse; $t_{TLH} \leq 15ns$, $t_{THL} \leq 6ns$.

Waveform

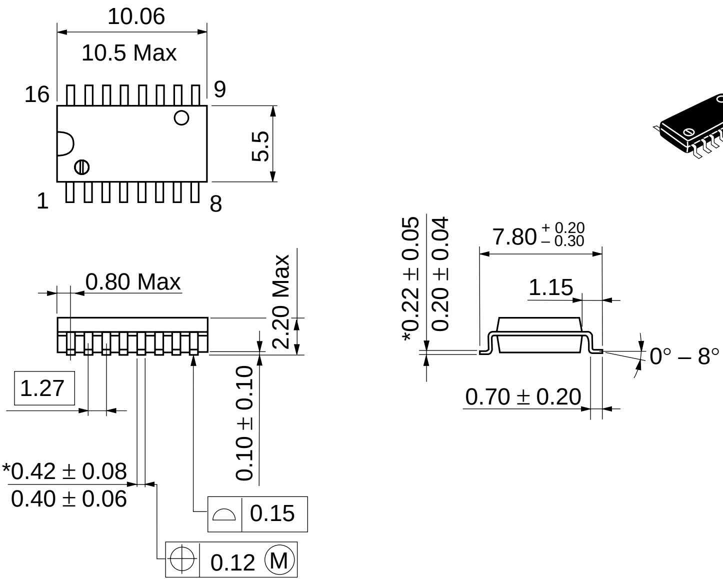


Unit: mm



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

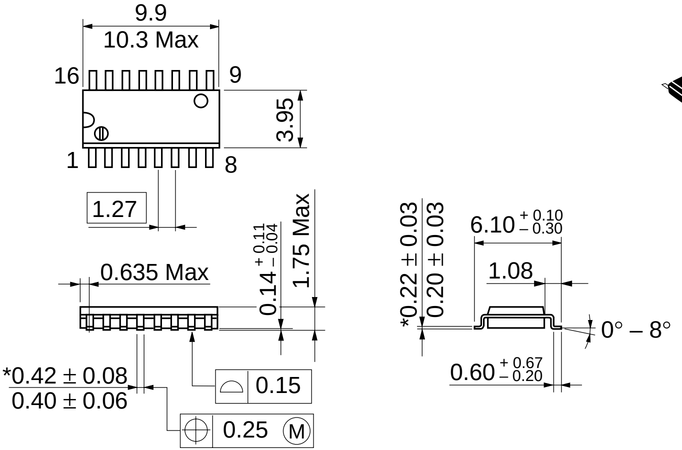
Unit: mm

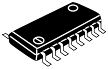


*Dimension including the plating thickness
Base material dimension

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

Unit: mm





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

*Dimension including the plating thickness
Base material dimension

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