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Renesas Technology Corp.
Customer Support Dept.
April 1, 2003

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HD74LS122 ●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. The HD74LS122 has internal timing resistor that allows the circuit to be used with only an external capacitor, if so desired. Once triggered, the basic pulse width may be extended by retriggering 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 tirggering from the B input with transition rates as slow as 0.1 mV/ns.

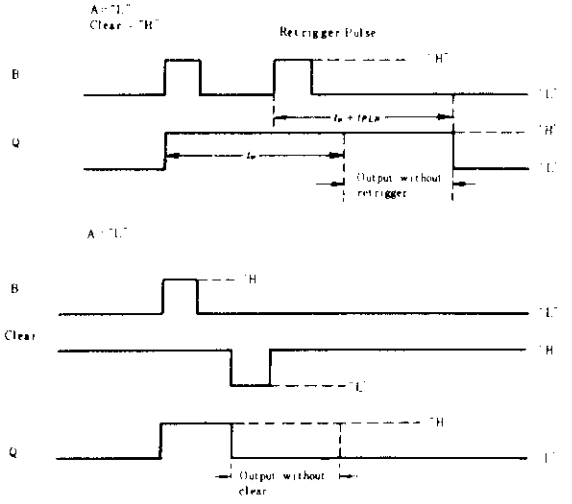
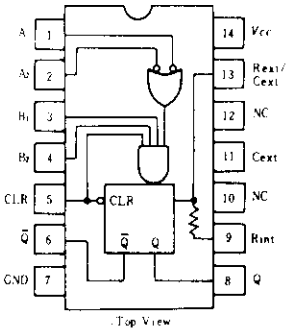
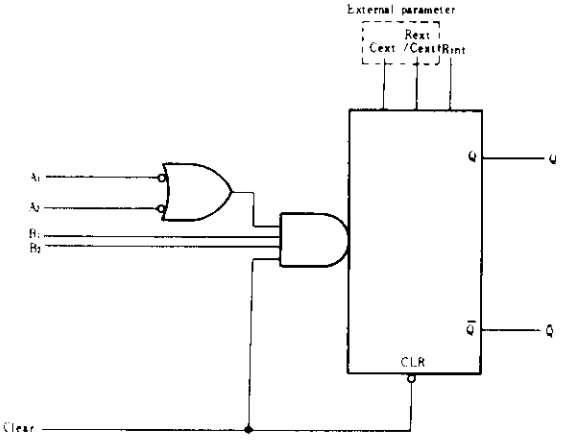


Fig.1 Typical Input/Output Pulses

■PIN ARRANGEMENT



■BLOCK DIAGRAM



■RECOMMENDED OPERATING CONDITIONS

Item	Symbol	min	typ	max	Unit
Input pulse width	t_w	40	—	—	ns
External timing resistance	R_{ext}	5	—	260	kΩ
External capacitance	C_{ext}	Non restriction			
Wiring capacitance at Rext/Cext terminal	R_{ext}/ C_{ext}	—	—	50	pF

■FUNCTION TABLE

Inputs					Outputs	
Clear	A_1	A_2	B_1	B_2	Q	$\bar{Q}$
L	×	×	×	×	L	H
×	H	H	×	×	L	H
×	×	×	L	×	L	H
×	×	×	×	L	L	H
H	L	×	↑	H	⎍	⎍
H	L	×	H	↑	⎍	⎍
H	×	L	↑	H	⎍	⎍
H	×	L	H	↑	⎍	⎍
H	H	↓	H	H	⎍	⎍
H	↓	↓	H	H	⎍	⎍
H	↓	H	H	H	⎍	⎍
↑	L	×	H	H	⎍	⎍
↑	×	L	H	H	⎍	⎍

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

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

Item	Symbol	Test Conditions		min	typ*	max	Unit
Input voltage	V_{IH}			2.0	—	—	V
	V_{IL}			—	—	0.8	V
Output voltage	V_{OH}	$V_{CC}=4.75V$, $V_{IH}=2V$, $V_{IL}=0.8V$, $I_{OH}=-400\mu A$		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}	$V_{CC}=5.25V$		—	6	11	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 to clock.

Note) To measure V_{OH} at Q, V_{OL} at $\overline{Q}$, 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 ($V_{CC}=5V$, $Ta=25°C$)

Item	Symbol	Inputs	Outputs	Test Conditions	min	typ	max	Unit
Propagation delay time	t_{PLH}	A	Q	$C_{ext}=0$ $R_{ext}=5k\Omega$ $C_L=15pF$ $R_L=2k\Omega$	—	23	33	ns
	t_{PHL}		$\overline{Q}$		—	32	45	
	t_{PLH}	B	Q		—	23	44	
	t_{PHL}		$\overline{Q}$		—	34	56	
	t_{PHL}	Clear	Q		—	20	27	
	t_{PLH}		$\overline{Q}$		—	28	45	
Output pulse width	$t_{w(out)min}$	A or B	Q		—	116	200	
	$t_{w(out)}$	A or B	Q	$C_{ext}=1000pF$, $R_{ext}=10k\Omega$ $C_L=15pF$, $R_L=2k\Omega$	4	4.5	5	μs

■TYPICAL APPLICATION DATA FOR HD74LS122

For pulse widths when $Cext \leqq 1000pF$, See Fig. 3.
The output pulse is primarily a function of the external capacitor and resistor. For $Cext > 1000pF$, the output pulse width (tw) is defined as : $tw(out) = K \cdot Rext \cdot Cext$; See Fig. 4

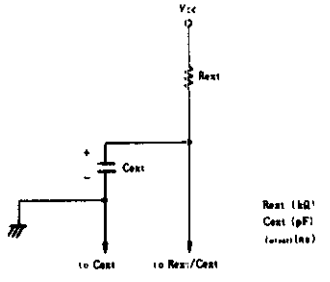


Fig.2 Timing Component Connections

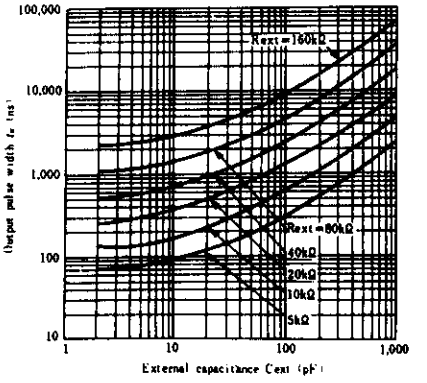
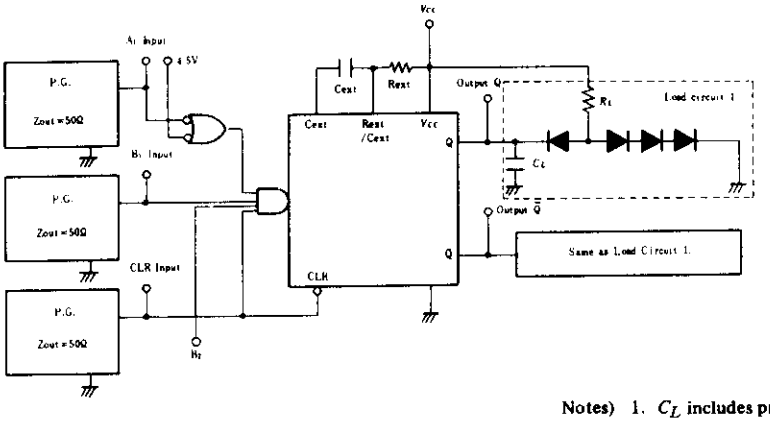


Fig.3 Typical Output Pulse Width (Cext≦1000pF)

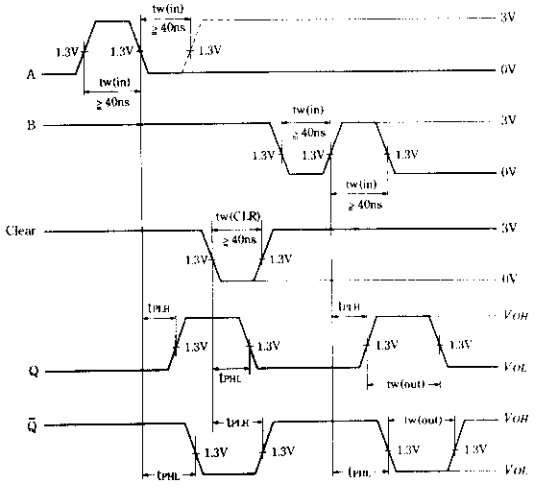
■TESTING METHOD

1) Test Circuit



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

Waveform



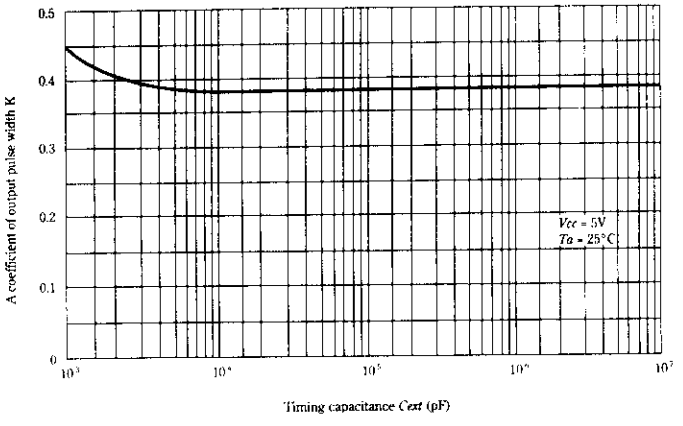
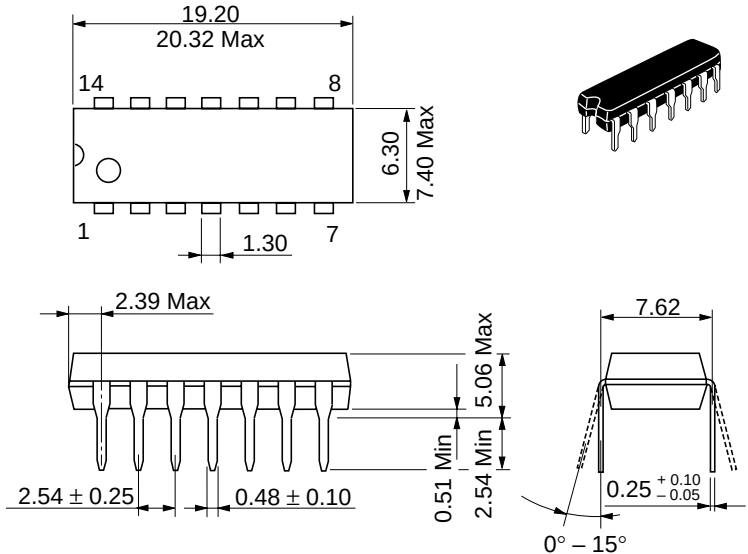


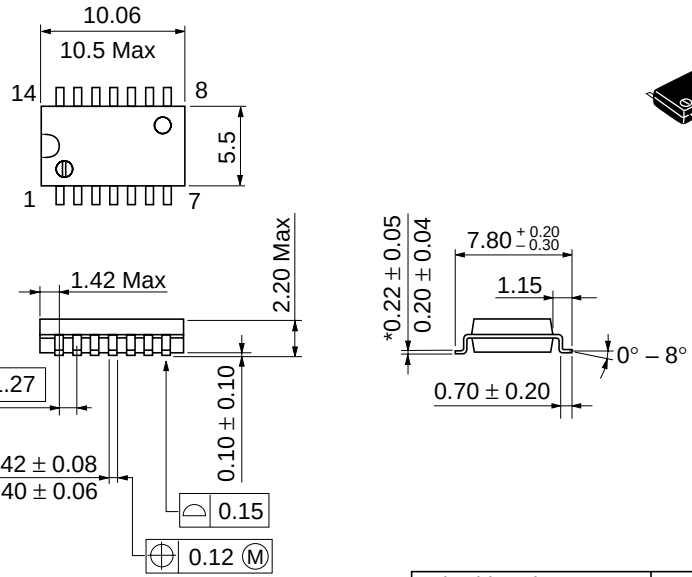
Fig.4 Cext vs K (Cext > 1000pF)

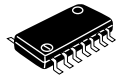
Unit: mm



Hitachi Code	DP-14
JEDEC	Conforms
EIAJ	Conforms
Weight (reference value)	0.97 g

Unit: mm

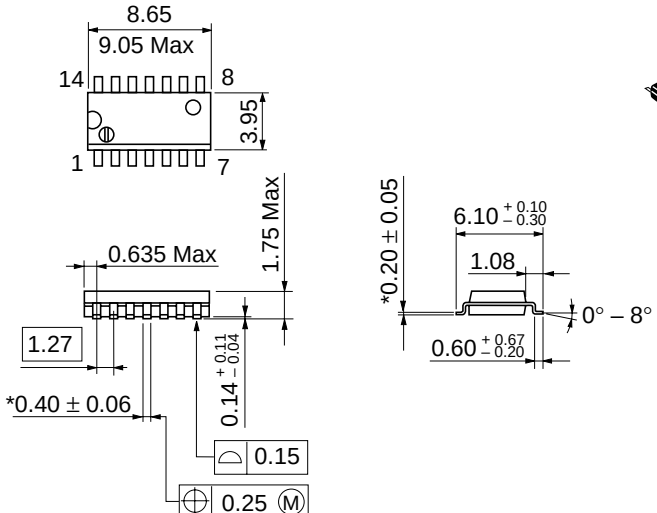




Hitachi Code	FP-14DA
JEDEC	—
EIAJ	Conforms
Weight (reference value)	0.23 g

*Dimension including the plating thickness
Base material dimension

Unit: mm



Hitachi Code	FP-14DN
JEDEC	Conforms
EIAJ	Conforms
Weight (reference value)	0.13 g

*Pd plating

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