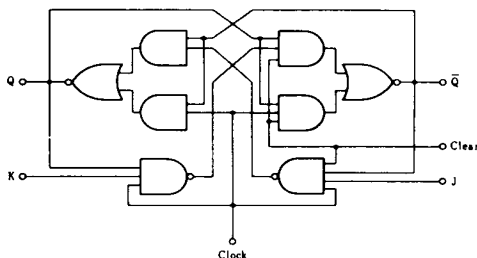
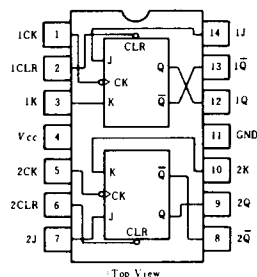


HD74LS73A • Dual J-K Flip-Flops (with Clear)

■ BLOCK DIAGRAM (1/2)



■ PIN ARRANGEMENT



■ FUNCTION TABLE

Inputs				Outputs	
Clear	Clock	J	K	Q	\bar{Q}
L	X	X	X	L	H
H	↓	L	L	Q_0	\bar{Q}_0
H	↓	H	L	H	L
H	↓	L	H	L	H
H	↓	H	H	Toggle	
H	H	X	X	Q_0	\bar{Q}_0

Notes) H; high level, L; low level, X; irrelevant

↓; transition from high to low level

Q_0 ; level of Q before the indicated steady-state input conditions were established.

\bar{Q}_0 ; complement of Q_0 or level of Q before the indicated steady-state input conditions were established.

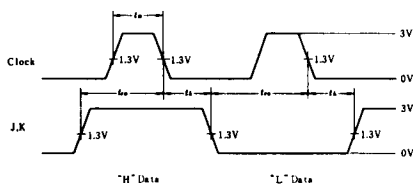
Toggle; each output changes to the complement of its previous level on each active transition indicated by ↓.

■ RECOMMENDED OPERATING CONDITION

Item		Symbol	min	typ	max	Unit
Clock frequency		f_{clock}	0	—	30	MHz
Pulse width	Clock High	t_w	20	—	—	ns
	Clear Low	t_w	25	—	—	ns
Setup time	"H" Data	t_{su}	20	—	—	ns
	"L" Data	t_{su}	20	—	—	ns
Hold time		t_h	0	—	—	ns

Note) ↓; The arrow indicates the falling edge.

■ TIMING DEFINITION



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}	$V_{CC} = 4.75\text{V}$, $V_{IH} = 2\text{V}$	—	—	0.5	V
		$V_{IL} = 0.8\text{V}$	—	—	0.4	
Input current	J, K		—	—	20	μA
	Clear		—	—	60	
	Clock		—	—	80	
	J, K		—	—	-0.4	mA
	Clear		—	—	-0.8	
	Clock		—	—	-0.8	
	J, K		—	—	0.1	mA
	Clear		—	—	0.3	
	Clock		—	—	0.4	
Short-circuit output current	I_{OS}	$V_{CC} = 5.25\text{V}$	-20	—	-100	mA
Supply current **	I_{CC}	$V_{CC} = 5.25\text{V}$	—	4	6	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, I_{CC} is measured with the Q and \bar{Q} outputs high in turn. At the time of measurement, the clock input is grounded.

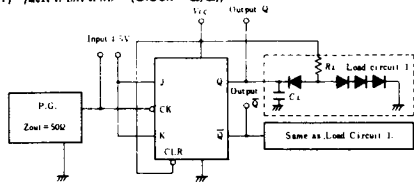
SWITCHING CHARACTERISTICS ($V_{CC} = 5\text{V}$, $T_a = 25^\circ\text{C}$)

Item	Symbol	Inputs	Outputs	Test Conditions	min	typ	max	Unit
Maximum clock frequency	f_{max}				30	45	—	MHz
Propagation delay time	t_{PLH}	Clear	Q, \bar{Q}	$C_L = 15\text{pF}$, $R_L = 2\text{k}\Omega$	—	15	20	ns
	t_{PHL}	Clock			—	15	20	

TESTING METHOD

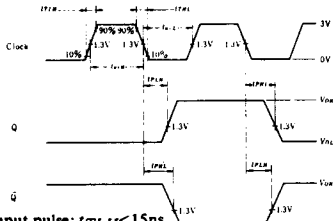
1) Test Circuit

1.1) f_{max} , t_{PLH} , t_{PHL} (Clock \rightarrow Q, \bar{Q})



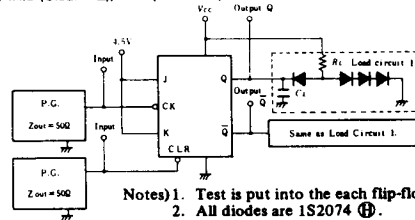
- Notes) 1. Test is put into the each flip flop
2. All diodes are 1S2074 \oplus .
3. C_L includes probe and jig capacitance.

Waveform



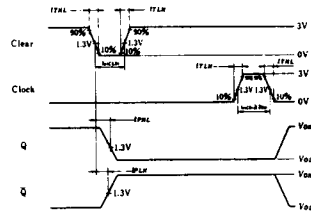
Note) Clock input pulse: $t_{TLH} \leq 15\text{ns}$,
 $t_{THL} \leq 6\text{ns}$, $PRR = 1\text{MHz}$, duty
cycle = 50% and: for f_{max} ,
 $t_{TLH} = t_{THL} \leq 2.5\text{ns}$.

1.2) t_{PHL} (Clear \rightarrow Q), t_{PLH} (Clear \rightarrow \bar{Q})



- Notes) 1. Test is put into the each flip-flop
2. All diodes are 1S2074 \oplus .
3. C_L includes probe and jig capacitance.

Waveform



Note) Clear and clock input pulse:
 $t_{TLH} \leq 15\text{ns}$, $t_{THL} \leq 6\text{ns}$,
 $PRR = 1\text{MHz}$



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