



U74HC74

CMOS IC

DUAL D FLIP-FLOP WITH SET AND RESET, POSITIVE-EDGE TRIGGER

DESCRIPTION

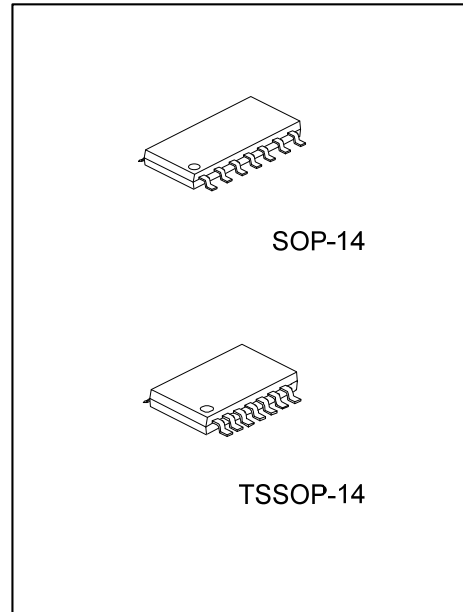
The **U74HC74** contains dual D flip-flops and each flip-flop has independent DATA, $\overline{\text{SET}}$, $\overline{\text{RESET}}$ and clock inputs and complementary outputs Q and $\overline{\text{Q}}$. A low level at appropriate input helps $\overline{\text{SET}}$ and $\overline{\text{RESET}}$ adjust the output. Data will be transferred to the output during the low-to-high transition of the CLK while $\overline{\text{SET}}$ and $\overline{\text{RESET}}$ are high.

FEATURES

- * Operation Voltage Range: 2~6V
- * Buffered Inputs
- * Asynchronous Set and Reset
- * Complementary Outputs
- * High Noise Immunity

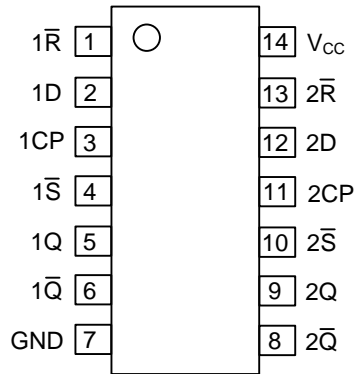
ORDERING INFORMATION

Ordering Number	Package	Packing
U74HC74G-P14-R	TSSOP-14	Tape Reel
U74HC74G-S14-R	SOP-14	Tape Reel



<p>U74HC74G-P14-R</p> <p>(1) Packing Type</p> <p>(2) Package Type</p> <p>(3) Halogen Free</p>	<p>(1) R: Tape Reel</p> <p>(2) P14: TSSOP-14, S14: SOP-14</p> <p>(3) G: Halogen Free</p>
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■ PIN CONFIGURATION



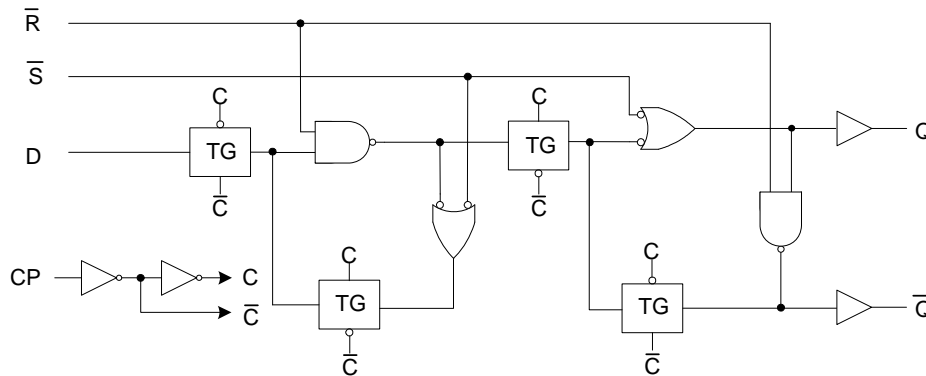
■ FUNCTION TABLE (each gate)

INPUT			OUTPUT		
SET	RESET	CP	D	Q	Q-bar
L	H	x	x	H	L
H	L	x	x	L	H
H	H	↑	H	H	L
H	H	↑	L	L	H
H	H	L	x	Q0	Q0-bar
L	L	x	x	H (note)	H (note)

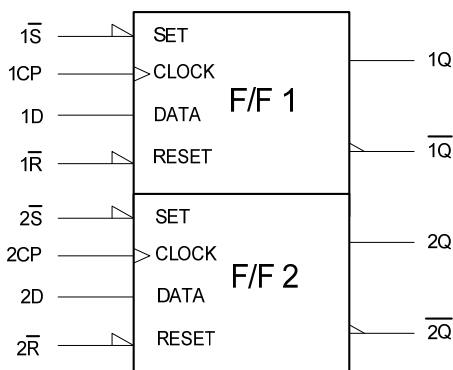
Note: Unstable state, it will not persist when set and reset inputs return to their inactive level.

■ FUNCTIONAL DIAGRAM

Logic Diagram



IEC logic symbol



■ ABSOLUTE MAXIMUM RATING (unless otherwise specified)(Note 1)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V_{CC}	-0.5 ~ +7	V
Input Voltage	V_{IN}	0 ~ V_{CC}	V
Output Voltage	V_{OUT}	0 ~ V_{CC}	V
Input Clamp Current	I_{IK}	±20	mA
Output Clamp Current	I_{OK}	±20	mA
Output Current	I_{OUT}	±25	mA
V_{CC} or GND Current	I_{CC}	±50	mA
Storage Temperature	T_{STG}	-65 ~ +150	°C

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Absolute maximum ratings are stress ratings only and functional device operation is not implied.

■ RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT
Supply Voltage	V_{CC}	2		6	V
Input Voltage	V_{IN}	0		V_{CC}	V
Output Voltage	V_{OUT}	0		V_{CC}	V
Input Transition Rise or Fall Rate	t_R, t_F	$V_{CC}=2V$		1000	ns
		$V_{CC}=4.5V$		500	
		$V_{CC}=6V$		400	
Operating Temperature	T_A	-55		125	°C

■ STATIC CHARACTERISTICS ($T_A=25^\circ\text{C}$)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
High-Level Input Voltage	V_{IH}	$V_{CC}=2.0V$	1.5			V
		$V_{CC}=4.5V$	3.15			
		$V_{CC}=6.0V$	4.2			
Low-Level Input Voltage	V_{IL}	$V_{CC}=2.0V$			0.5	V
		$V_{CC}=4.5V$			1.35	
		$V_{CC}=6.0V$			1.8	
High-Level Output Voltage	V_{OH}	$V_{CC}=2.0V, I_{OH}=-20\mu A$	1.9			V
		$V_{CC}=4.5V, I_{OH}=-20\mu A$	4.4			
		$V_{CC}=6.0V, I_{OH}=-20\mu A$	5.9			
		$V_{CC}=4.5V, I_{OH}=-4mA$	3.98			
		$V_{CC}=6V, I_{OH}=-5.2mA$	5.48			
Low-Level Output Voltage	V_{OL}	$V_{CC}=2.0V, I_{OL}=20\mu A$			0.1	V
		$V_{CC}=4.5V, I_{OL}=20\mu A$			0.1	
		$V_{CC}=6.0V, I_{OL}=20\mu A$			0.1	
		$V_{CC}=4.5, I_{OL}=4mA$			0.26	
		$V_{CC}=6, I_{OL}=5.2mA$			0.26	
Input Leakage Current	$I_{I(LEAK)}$	$V_{CC}=6.0V, V_{IN}=V_{CC}$ or GND			±0.1	μA
Quiescent Supply Current	I_Q	$V_{CC}=6.0V, V_{IN}=V_{CC}$ or GND, $I_{OUT}=0$			4	μA
Input Capacitance	C_{IN}	$V_{CC}=6.0V, V_{IN}=V_{CC}$ or GND			10	pF

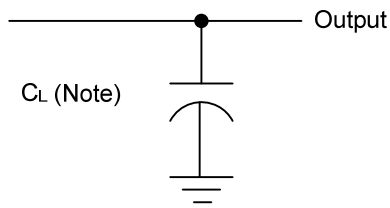
■ DYNAMIC CHARACTERISTICS($T_a=25^\circ\text{C}$) (Input: $t_R, t_F=6\text{ns}$)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation delay from input (CP) to output(Q, \bar{Q})	t_{PLH}/t_{PHL}	$V_{CC}=2.0\text{V}, C_L=50\text{pF}$			175	ns
		$V_{CC}=4.5\text{V}, C_L=50\text{pF}$			35	ns
		$V_{CC}=6.0\text{V}, C_L=50\text{pF}$			30	ns
Propagation delay from input (\bar{R}, \bar{S}) to output(Q, \bar{Q})	t_{PLH}/t_{PHL}	$V_{CC}=2.0\text{V}, C_L=50\text{pF}$			200	ns
		$V_{CC}=4.5\text{V}, C_L=50\text{pF}$			40	ns
		$V_{CC}=6.0\text{V}, C_L=50\text{pF}$			34	ns
Output Transition Time	t_{TLH}/t_{THL}	$V_{CC}=2.0\text{V}, C_L=50\text{pF}$			75	ns
		$V_{CC}=4.5\text{V}, C_L=50\text{pF}$			15	ns
		$V_{CC}=6.0\text{V}, C_L=50\text{pF}$			13	ns
CP frequency	f_{MAX}	$V_{CC}=5\text{V}, C_L=15\text{pF}$		50		MHZ

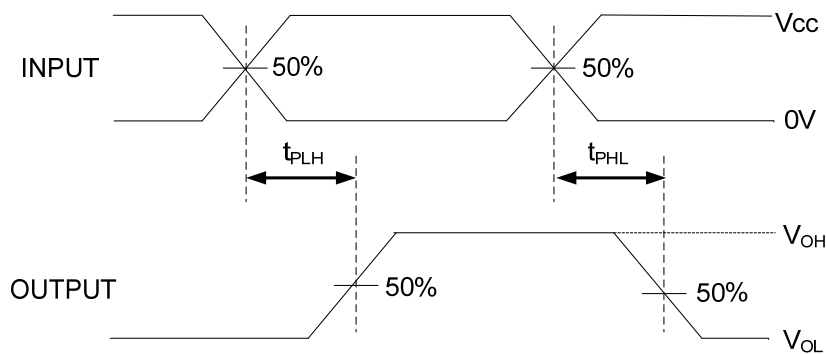
■ OPERATING CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	Cpd	No load		25		pF

■ TEST CIRCUIT AND WAVEFORMS



Note : CL includes probe and jig capacitance.



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