



## U74HC574

CMOS IC

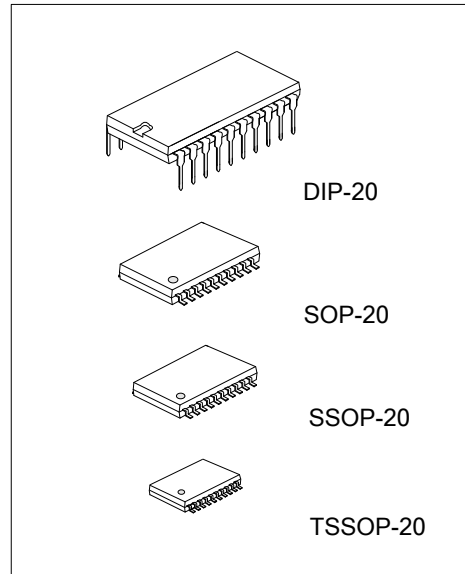
### OCTAL EDGE-TRIGGERED D-TYPE FLIP-FLOPS WITH 3-STATE OUTPUTS

#### DESCRIPTION

The **U74HC574** is a octal edge-triggered D-type flip-flops with 3-state outputs, and it has 8 channels.

#### FEATURES

- \* Operate from 2V to 6V
- \* Max  $t_{pd}$  of 66ns at 4.5 V
- \* Typical  $V_{OL} < 0.17V$  at  $V_{CC}=4.5V, T_A=25^\circ C$
- \* Typical  $V_{OH} > 4.3V$  at  $V_{CC}=4.5V, T_A=25^\circ C$

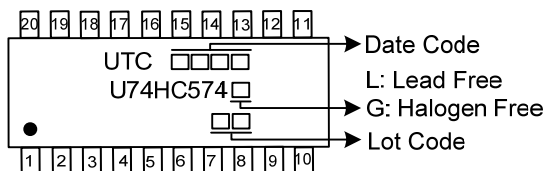


#### ORDERING INFORMATION

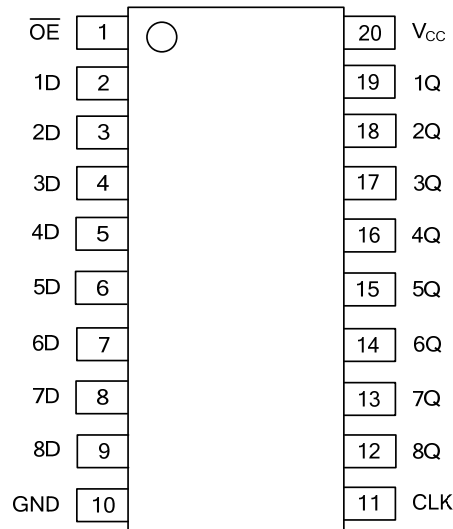
Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74HC574L-D20-T	U74HC574G-D20-T	DIP-20	Tube
U74HC574L-S20-R	U74HC574G-S20-R	SOP-20	Tape Reel
U74HC574L-R20-R	U74HC574G-R20-R	SSOP-20	Tape Reel
U74HC574L-P20-R	U74HC574G-P20-R	TSSOP-20	Tape Reel

<p>U74HC574G-D20-T</p> <p>(1) Packing Type</p> <p>(2) Package Type</p> <p>(3) Green Package</p>	<p>(1) R: Tape Reel, T: Tube</p> <p>(2) D20: DIP-20, P20: TSSOP-20, R20: SSOP-20, S20: SOP-20</p> <p>(3) G: Halogen Free and Lead Free, L: Lead Free</p>
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#### MARKING



### PIN CONFIGURATION

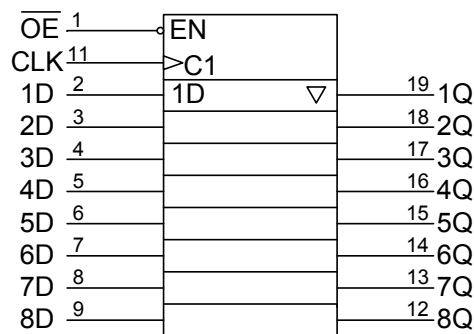


### FUNCTION TABLE

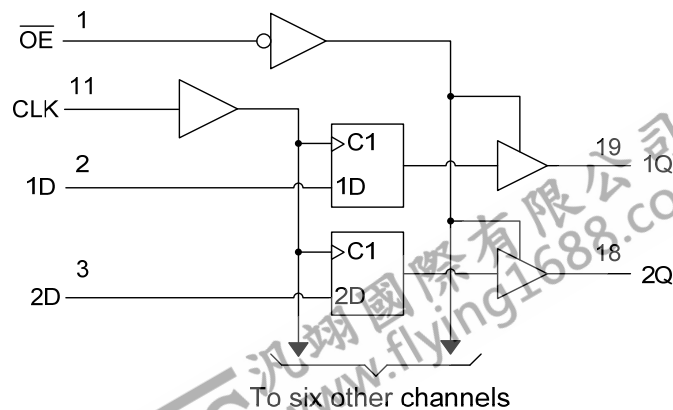
INPUTS(OE)	INPUTS(CLK)	INPUTS(D)	OUTPUT(Q)
L	↑	H	H
L	↑	L	L
L	L/H	X	Q <sub>0</sub>
H	X	X	Z

Note: H: HIGH voltage level; L: LOW voltage level.

### LOGIC SYMBOL



### LOGIC DIAGRAM



■ ABSOLUTE MAXIMUM RATING (T<sub>A</sub>=25°C, unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V <sub>CC</sub>	-0.5 ~ +7	V
V <sub>CC</sub> or GND Current	I <sub>CC</sub>	±70	mA
Output Current	I <sub>OUT</sub>	±35	mA
Input Clamp Current	I <sub>IK</sub>	±20	mA
Output Clamp Current	I <sub>OK</sub>	±20	mA
Operating Temperature	T <sub>OPR</sub>	-40 ~ + 85	°C
Storage Temperature	T <sub>STG</sub>	-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.

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	DIP-20	52	°C/W
	SOP-20	80	°C/W
	SSOP-20	96	°C/W
	TSSOP-20	103	°C/W

■ RECOMMENDED OPERATING CONDITIONS (T<sub>A</sub>=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	V <sub>CC</sub>		2	5	6	V
High-level Input Voltage	V <sub>IH</sub>	V <sub>CC</sub> =2.0V	1.5			V
		V <sub>CC</sub> =4.5V	3.15			
		V <sub>CC</sub> =6.0V	4.2			
Low-level Input Voltage	V <sub>IL</sub>	V <sub>CC</sub> =2.0V			0.5	V
		V <sub>CC</sub> =4.5V			1.35	
		V <sub>CC</sub> =6.0V			1.8	
Input Voltage	V <sub>IN</sub>		0		V <sub>CC</sub>	V
Output Voltage	V <sub>OUT</sub>	High or low state	0		V <sub>CC</sub>	V
Input Rise or Fall Times	t <sub>R</sub> , t <sub>F</sub>	V <sub>CC</sub> =2.0V	0		1	μs
		V <sub>CC</sub> =4.5V	0		0.5	
		V <sub>CC</sub> =6.0V	0		0.4	

■ ELECTRICAL CHARACTERISTICS (T<sub>A</sub>=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage High-Level	V <sub>OH</sub>	V <sub>CC</sub> =2.0V, I <sub>OH</sub> =-20μA	1.9	1.998		V
		V <sub>CC</sub> =4.5V, I <sub>OH</sub> =-20μA	4.4	4.499		
		V <sub>CC</sub> =6.0V, I <sub>OH</sub> =-20μA	5.9	5.999		
		V <sub>CC</sub> =4.5V, I <sub>OH</sub> =-6mA	3.98	4.3		
		V <sub>CC</sub> =6.0V, I <sub>OH</sub> =-7.8mA	5.48	5.8		
Output Voltage Low-Level	V <sub>OL</sub>	V <sub>CC</sub> =2.0V, I <sub>OL</sub> =20μA		0.002	0.1	V
		V <sub>CC</sub> =4.5V, I <sub>OL</sub> =20μA		0.001	0.1	
		V <sub>CC</sub> =6.0V, I <sub>OL</sub> =20μA		0.001	0.1	
		V <sub>CC</sub> =4.5V, I <sub>OL</sub> =6mA		0.17	0.26	
		V <sub>CC</sub> =6.0V, I <sub>OL</sub> =7.8mA		0.15	0.26	
Input Leakage Current	I <sub>I(LEAK)</sub>	V <sub>CC</sub> =6.0V, V <sub>IN</sub> =V <sub>CC</sub> or GND		±0.1	±100	nA
Disable Output Leakage Current	I <sub>OZ</sub>	V <sub>CC</sub> =6.0V, V <sub>OUT</sub> =V <sub>CC</sub> or GND		±0.01	±0.5	μA
Quiescent Supply Current	I <sub>Q</sub>	V <sub>CC</sub> =6.0V, V <sub>IN</sub> =V <sub>CC</sub> or GND, I <sub>OUT</sub> =0			8	μA
Input Capacitance	C <sub>IN</sub>	V <sub>CC</sub> =2.0V~6.0V		3	10	pF

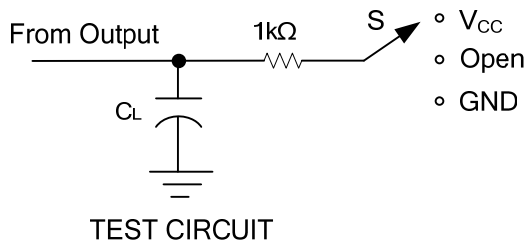
■ SWITCHING CHARACTERISTICS (See TEST CIRCUIT AND WAVEFORMS)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation delay from input (CLK) to output (Q)	$t_{PLH}/t_{PHL}$	$V_{CC}=2.0V, C_L=50pF$		90	180	ns
		$V_{CC}=4.5V, C_L=50pF$		28	36	
		$V_{CC}=6.0V, C_L=50pF$		24	31	
		$V_{CC}=2.0V, C_L=150pF$		105	265	
		$V_{CC}=4.5V, C_L=150pF$		36	53	
		$V_{CC}=6.0V, C_L=150pF$		31	46	
Output enable time from input ( $\overline{OE}$ ) to output (Q)	$t_{PZL}/t_{PZH}$	$V_{CC}=2.0V, C_L=50pF$		77	150	ns
		$V_{CC}=4.5V, C_L=50pF$		26	30	
		$V_{CC}=6.0V, C_L=50pF$		23	26	
		$V_{CC}=2.0V, C_L=150pF$		95	235	
		$V_{CC}=4.5V, C_L=150pF$		32	47	
		$V_{CC}=6.0V, C_L=150pF$		28	41	
Output disable time from input ( $\overline{OE}$ ) to output (Q)	$t_{PLZ}/t_{PHZ}$	$V_{CC}=2.0V, C_L=50pF$		52	150	ns
		$V_{CC}=4.5V, C_L=50pF$		24	30	
		$V_{CC}=6.0V, C_L=50pF$		22	26	
Maximum Clock Frequency	$f_{MAX}$	$V_{CC}=2.0V, C_L=50pF$	6	11		MHz
		$V_{CC}=4.5V, C_L=50pF$	30	36		
		$V_{CC}=6.0V, C_L=50pF$	36	40		
		$V_{CC}=2.0V, C_L=150pF$	6			
		$V_{CC}=4.5V, C_L=150pF$	30			
		$V_{CC}=6.0V, C_L=150pF$	36			
Clock Frequency	$f_{CLOCK}$	$V_{CC}=2.0V$			6	MHz
		$V_{CC}=4.5V$			30	
		$V_{CC}=6.0V$			38	
Pulse Width	$t_w$	$V_{CC}=2.0V$	80			ns
		$V_{CC}=4.5V$	16			
		$V_{CC}=6.0V$	14			
Setup Time	$t_{SU}$	$V_{CC}=2.0V$	100			ns
		$V_{CC}=4.5V$	20			
		$V_{CC}=6.0V$	17			
Hold Time	$t_H$	$V_{CC}=2.0V$	5			ns
		$V_{CC}=4.5V$	5			
		$V_{CC}=6.0V$	5			

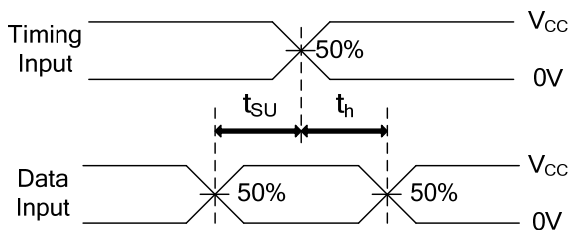
■ OPERATING CHARACTERISTICS ( $T_A=25^\circ C$ , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	$C_{PD}$	No Load		100		pF

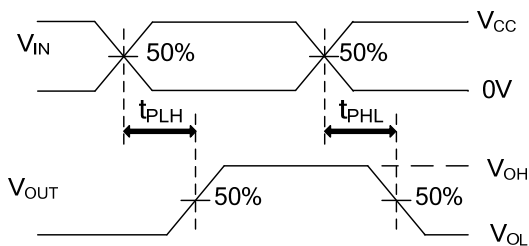
## ■ TEST CIRCUIT AND WAVEFORMS



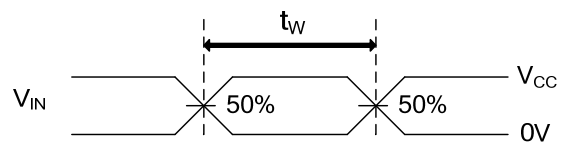
TEST	S
t <sub>PLH</sub> /t <sub>PHL</sub>	Open
t <sub>PHZ</sub> /t <sub>PZH</sub>	GND
t <sub>PLZ</sub> /t <sub>PZL</sub>	V <sub>CC</sub>



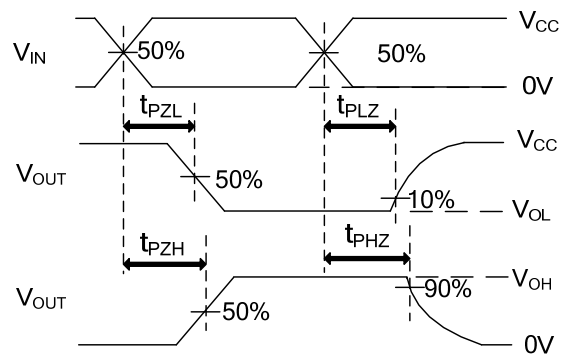
SETUP TIME AND HOLD TIME



PROPAGATION DELAY TIMES



PULSE WIDTH



ENABLE AND DISABLE TIMES

Note: C<sub>L</sub> includes probe and jig capacitance.  
 PRR ≤ 1MHz, Z<sub>o</sub> = 50Ω, t<sub>R</sub> ≤ 6ns, t<sub>F</sub> ≤ 6ns.

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