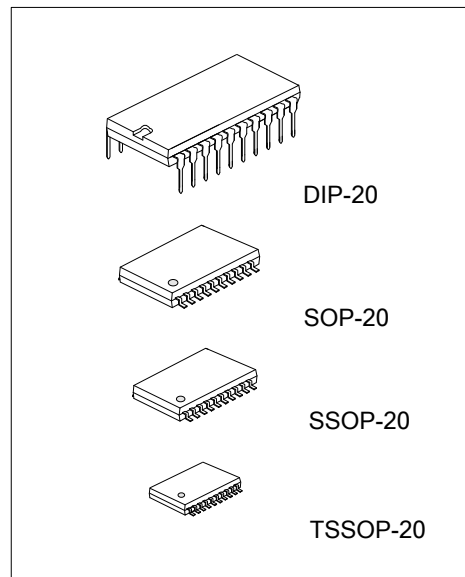




# U74HC574

**CMOS IC**

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



■ **DESCRIPTION**

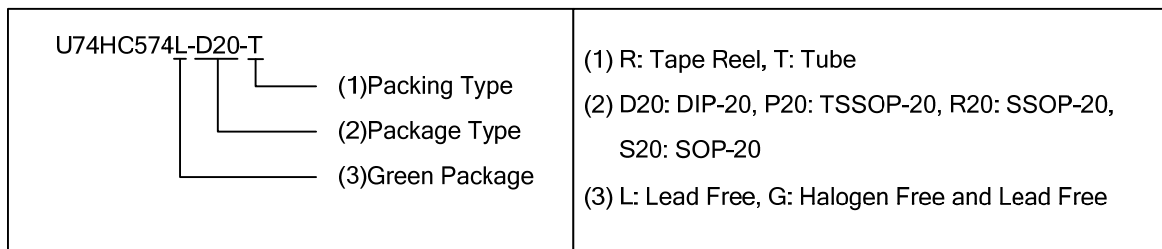
The **U74HC574** is a octal edge-triggered D-type flip-flops with 3-state outputs, and it has 8 channels.

■ **FEATURES**

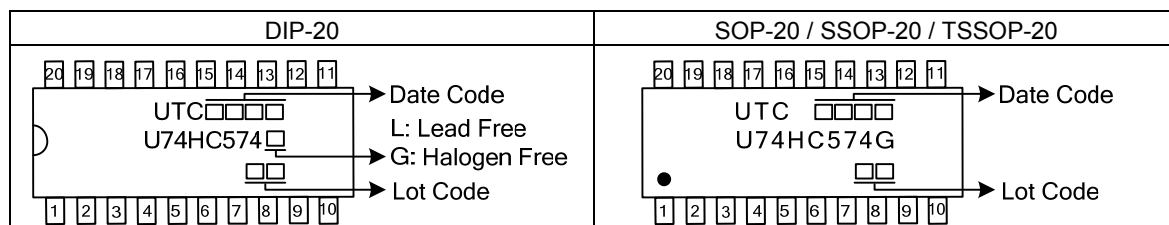
- \* Operate from 2V to 6V
- \* Max  $t_{pd}$  of 66ns at 4.5 V
- \* Typical  $V_{OL} < 0.17V$  at  $V_{CC}=4.5V, T_A=25^\circ C$
- \* Typical  $V_{OH} > 4.3V$  at  $V_{CC}=4.5V, T_A=25^\circ C$

■ **ORDERING INFORMATION**

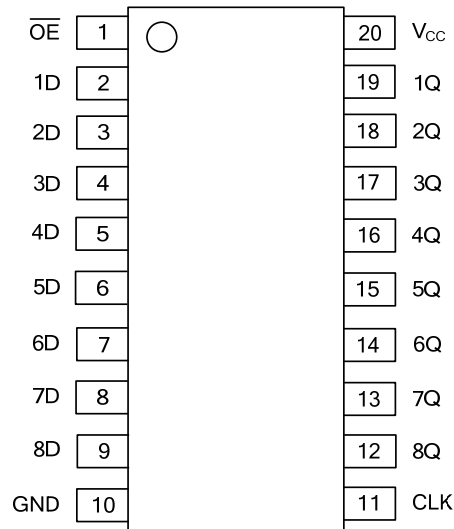
Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74HC574L-D20-T	U74HC574G-D20-T	DIP-20	Tube
-	U74HC574G-S20-R	SOP-20	Tape Reel
-	U74HC574G-R20-R	SSOP-20	Tape Reel
-	U74HC574G-P20-R	TSSOP-20	Tape Reel



■ **MARKING**



■ PIN CONFIGURATION

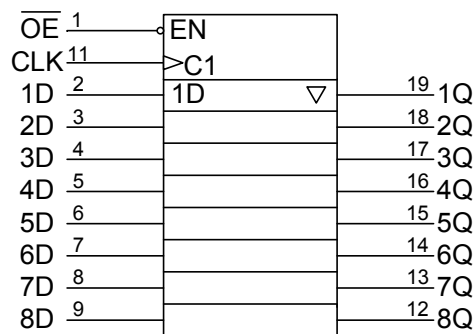


■ FUNCTION TABLE

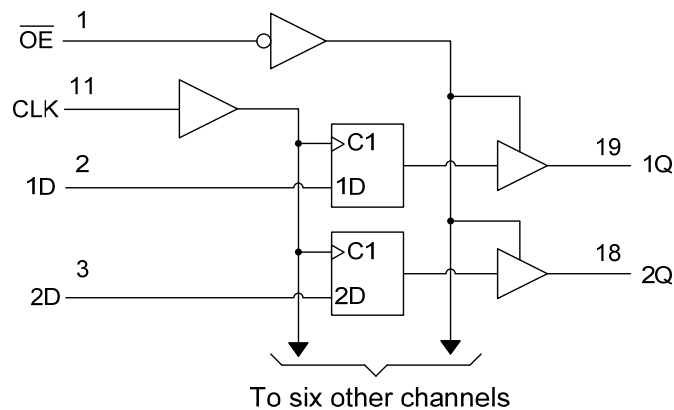
INPUTS(OE)	INPUTS(CLK)	INPUTS(D)	OUTPUT(Q)
L	↑	H	H
L	↑	L	L
L	L/H	X	Q <sub>0</sub>
H	X	X	Z

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

■ LOGIC SYMBOL



■ LOGIC DIAGRAM



■ ABSOLUTE MAXIMUM RATING ( $T_A=25^\circ\text{C}$ , unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	$V_{CC}$	-0.5 ~ +7	V
$V_{CC}$ or GND Current	$I_{CC}$	$\pm 70$	mA
Output Current	$I_{OUT}$	$\pm 35$	mA
Input Clamp Current	$I_{IK}$	$\pm 20$	mA
Output Clamp Current	$I_{OK}$	$\pm 20$	mA
Operating Temperature	$T_{OPR}$	-40 ~ + 85	$^\circ\text{C}$
Storage Temperature	$T_{STG}$	-65 ~ + 150	$^\circ\text{C}$

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	$\theta_{JA}$	52	$^\circ\text{C/W}$
	SOP-20		80	$^\circ\text{C/W}$
	SSOP-20		96	$^\circ\text{C/W}$
	TSSOP-20		103	$^\circ\text{C/W}$

■ RECOMMENDED OPERATING CONDITIONS ( $T_A=25^\circ\text{C}$ , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	$V_{CC}$		2	5	6	V
High-level Input Voltage	$V_{IH}$	$V_{CC}=2.0\text{V}$	1.5			V
		$V_{CC}=4.5\text{V}$	3.15			
		$V_{CC}=6.0\text{V}$	4.2			
Low-level Input Voltage	$V_{IL}$	$V_{CC}=2.0\text{V}$			0.5	V
		$V_{CC}=4.5\text{V}$			1.35	
		$V_{CC}=6.0\text{V}$			1.8	
Input Voltage	$V_{IN}$		0		$V_{CC}$	V
Output Voltage	$V_{OUT}$	High or low state	0		$V_{CC}$	V
Input Rise or Fall Times	$t_R, t_F$	$V_{CC}=2.0\text{V}$	0		1	$\mu\text{s}$
		$V_{CC}=4.5\text{V}$	0		0.5	
		$V_{CC}=6.0\text{V}$	0		0.4	

■ ELECTRICAL CHARACTERISTICS ( $T_A=25^\circ\text{C}$ , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage High-Level	$V_{OH}$	$V_{CC}=2.0\text{V}, I_{OH}=-20\mu\text{A}$	1.9	1.998		V
		$V_{CC}=4.5\text{V}, I_{OH}=-20\mu\text{A}$	4.4	4.499		
		$V_{CC}=6.0\text{V}, I_{OH}=-20\mu\text{A}$	5.9	5.999		
		$V_{CC}=4.5\text{V}, I_{OH}=-6\text{mA}$	3.98	4.3		
		$V_{CC}=6.0\text{V}, I_{OH}=-7.8\text{mA}$	5.48	5.8		
Output Voltage Low-Level	$V_{OL}$	$V_{CC}=2.0\text{V}, I_{OL}=20\mu\text{A}$		0.002	0.1	V
		$V_{CC}=4.5\text{V}, I_{OL}=20\mu\text{A}$		0.001	0.1	
		$V_{CC}=6.0\text{V}, I_{OL}=20\mu\text{A}$		0.001	0.1	
		$V_{CC}=4.5\text{V}, I_{OL}=6\text{mA}$		0.17	0.26	
		$V_{CC}=6.0\text{V}, I_{OL}=7.8\text{mA}$		0.15	0.26	
Input Leakage Current	$I_{I(LEAK)}$	$V_{CC}=6.0\text{V}, V_{IN}=V_{CC}$ or GND		$\pm 0.1$	$\pm 100$	nA
Disable Output Leakage Current	$I_{OZ}$	$V_{CC}=6.0\text{V}, V_{OUT}=V_{CC}$ or GND		$\pm 0.01$	$\pm 0.5$	$\mu\text{A}$
Quiescent Supply Current	$I_Q$	$V_{CC}=6.0\text{V}, V_{IN}=V_{CC}$ or GND, $I_{OUT}=0$			8	$\mu\text{A}$
Input Capacitance	$C_{IN}$	$V_{CC}=2.0\text{V} \sim 6.0\text{V}$		3	10	pF

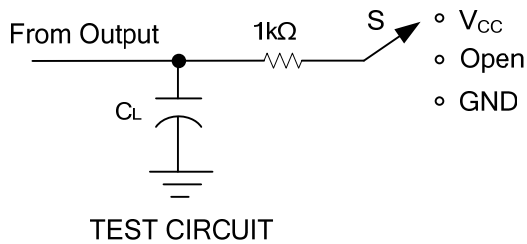
■ SWITCHING CHARACTERISTICS (See TEST CIRCUIT AND WAVEFORMS)

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			

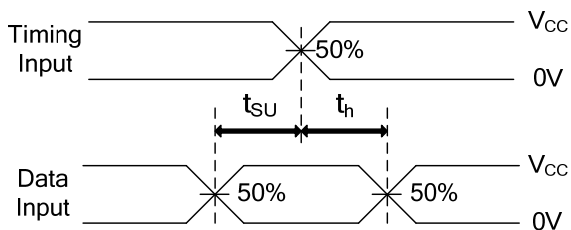
■ OPERATING CHARACTERISTICS ( $T_A=25^\circ C$ , unless otherwise specified)

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

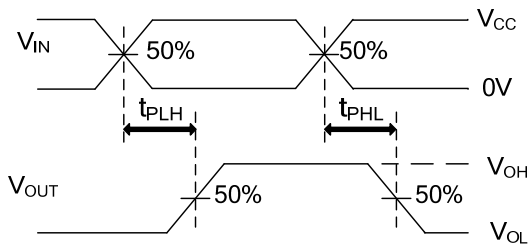
■ TEST CIRCUIT AND WAVEFORMS



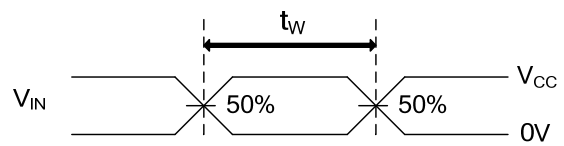
TEST	S
t <sub>PLH</sub> /t <sub>PHL</sub>	Open
t <sub>PHZ</sub> /t <sub>PZH</sub>	GND
t <sub>PLZ</sub> /t <sub>PZL</sub>	V <sub>CC</sub>



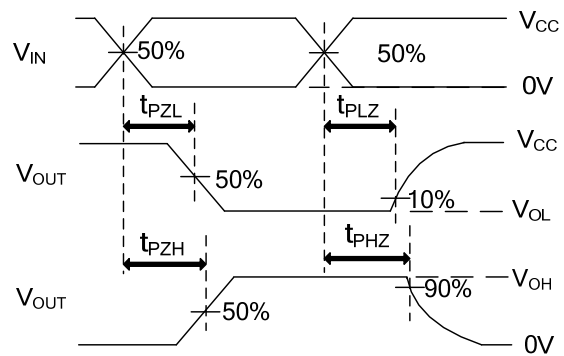
SETUP TIME AND HOLD TIME



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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