



U74HC574E

CMOS IC

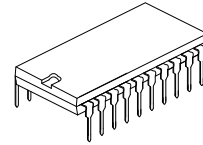
OCTAL EDGE-TRIGGERED D-TYPE FLIP-FLOPS WITH 3-STATE OUTPUTS

DESCRIPTION

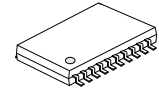
The **U74HC574E** is a octal edge-triggered D-type flip-flops with 3-state outputs, and it has 8 channels.

FEATURES

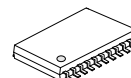
- * Operate from 2V to 6V
- * Max t_{pd} of 31ns at 6V
- * 8-bit positive, edge-triggered register



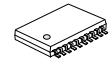
DIP-20



SOP-20



SSOP-20

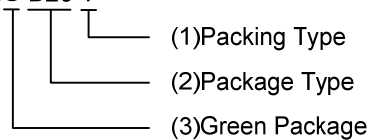


TSSOP-20U

ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74HC574EL-D20-T	U74HC574EG-D20-T	DIP-20	Tube
U74HC574EL-S20-R	U74HC574EG-S20-R	SOP-20	Tape Reel
U74HC574EL-R20-R	U74HC574EG-R20-R	SSOP-20	Tape Reel
U74HC574EL-ULA-R	U74HC574EG-ULA-R	TSSOP-20U	Tape Reel

U74HC574EG-D20-T

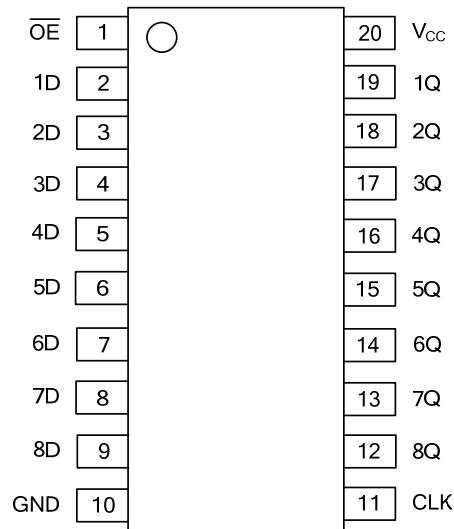


- (1) T: Tube, R: Tape Reel
(2) D20: DIP-20, S20: SOP-20, R20: SSOP-20,
ULA: TSSOP-20U
(3) G: Halogen Free and Lead Free, L: Lead Free

MARKING

DIP-20	SOP-20 / SSOP-20 / TSSOP-20U
→ Date Code → L: Lead Free → G: Halogen Free → Lot Code	→ Date Code → L: Lead Free → G: Halogen Free → Lot Code

PIN CONFIGURATION

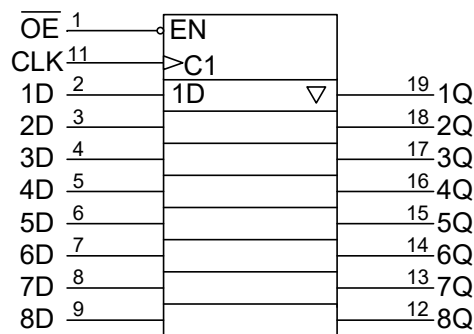


FUNCTION TABLE

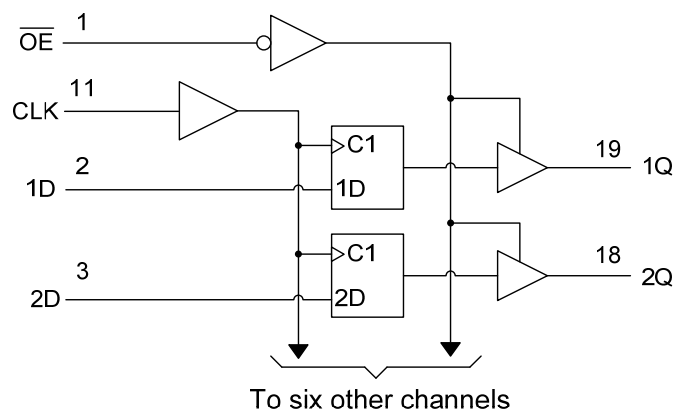
INPUTS(OE)	INPUTS(CLK)	INPUTS(D)	OUTPUT(Q)
L	↑	H	H
L	↑	L	L
L	L / H	X	Q ₀
H	X	X	Z

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

LOGIC SYMBOL



LOGIC DIAGRAM



■ ABSOLUTE MAXIMUM RATING (Unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V_{CC}	-0.5 ~ +7	V
V_{CC} or GND Current	I_{CC}	±70	mA
Output Current	I_{OUT}	±35	mA
Input Clamp Current	I_{IK}	±20	mA
Output Clamp Current	I_{OK}	±20	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 (Unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	V_{CC}		2		6	V
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	$V_{CC}=2.0V$	0		1	μs
		$V_{CC}=4.5V$	0		0.5	μs
		$V_{CC}=6.0V$	0		0.4	μs
Operating Temperature	T_A		-40		+125	°C

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	DIP-20	90	°C/W
	SOP-20	115	°C/W
	SSOP-20	130	°C/W
	TSSOP-20U	145	°C/W

■ ELECTRICAL CHARACTERISTICS (Unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	$T_A=25^{\circ}C$			$T_A=-40 \sim +125^{\circ}C$			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
High-Level Input Voltage	V_{IH}	$V_{CC}=2.0V$	1.5			1.5			V
		$V_{CC}=4.5V$	3.15			3.15			V
		$V_{CC}=6.0V$	4.2			4.2			V
Low-Level Input Voltage	V_{IL}	$V_{CC}=2.0V$			0.5			0.5	V
		$V_{CC}=4.5V$			1.35			1.35	V
		$V_{CC}=6.0V$			1.8			1.8	V
High-Level Output Voltage	V_{OH}	$V_{CC}=2.0V, I_{OH}=-20\mu A$	1.9	1.998		1.9			V
		$V_{CC}=4.5V, I_{OH}=-20\mu A$	4.4	4.499		4.4			V
		$V_{CC}=6.0V, I_{OH}=-20\mu A$	5.9	5.999		5.9			V
		$V_{CC}=4.5V, I_{OH}=-6mA$	3.98	4.16		3.7			V
		$V_{CC}=6.0V, I_{OH}=-7.8mA$	5.48	5.65		5.2			V
Low-Level Output Voltage	V_{OL}	$V_{CC}=2.0V, I_{OL}=20\mu A$		0.002	0.1			0.1	V
		$V_{CC}=4.5V, I_{OL}=20\mu A$		0.001	0.1			0.1	V
		$V_{CC}=6.0V, I_{OL}=20\mu A$		0.001	0.1			0.1	V
		$V_{CC}=4.5V, I_{OL}=6mA$		0.19	0.26			0.4	V
		$V_{CC}=6.0V, I_{OL}=7.8mA$		0.2	0.26			0.4	V
Input Leakage Current	$I_{I(LEAK)}$	$V_{CC}=6.0V, V_{IN}=V_{CC}$ or GND			±100			±1000	nA
Disable Output Leakage Current	I_{OZ}	$V_{CC}=6.0V, V_{OUT}=V_{CC}$ or GND			±0.5			±10	μA
Quiescent Supply Current	I_Q	$V_{CC}=6.0V, V_{IN}=V_{CC}$ or GND, $I_{OUT}=0$			8			160	μA

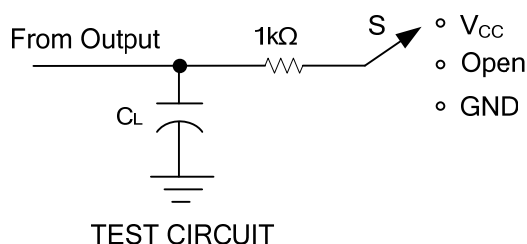
■ SWITCHING CHARACTERISTICS (See TEST CIRCUIT AND WAVEFORMS)

PARAMETER	SYMBOL	TEST CONDITIONS	T _A =25°C			T _A = -40 ~ +125°C			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
Propagation delay from input (CLK) to output (Q)	t _{PLH} /t _{PHL}	V _{CC} =2.0V, C _L =50pF			180			225	ns
		V _{CC} =4.5V, C _L =50pF			36			45	ns
		V _{CC} =6.0V, C _L =50pF			31			38	ns
		V _{CC} =2.0V, C _L =150pF			265			330	ns
		V _{CC} =4.5V, C _L =150pF			53			66	ns
		V _{CC} =6.0V, C _L =150pF			46			57	ns
Output enable time from input ($\overline{OE}$) to output (Q)	t _{PZL} /t _{PZH}	V _{CC} =2.0V, C _L =50pF			150			210	ns
		V _{CC} =4.5V, C _L =50pF			30			42	ns
		V _{CC} =6.0V, C _L =50pF			26			36	ns
		V _{CC} =2.0V, C _L =150pF			235			315	ns
		V _{CC} =4.5V, C _L =150pF			47			63	ns
		V _{CC} =6.0V, C _L =150pF			41			55	ns
Output disable time from input ($\overline{OE}$) to output (Q)	t _{PLZ} /t _{PHZ}	V _{CC} =2.0V, C _L =50pF			150			190	ns
		V _{CC} =4.5V, C _L =50pF			30			38	ns
		V _{CC} =6.0V, C _L =50pF			26			32	ns
Maximum Clock Frequency	f _{MAX}	V _{CC} =2.0V, C _L =50pF	6			4			MHz
		V _{CC} =4.5V, C _L =50pF	30			20			MHz
		V _{CC} =6.0V, C _L =50pF	35			24			MHz
		V _{CC} =2.0V, C _L =150pF	6			4			MHz
		V _{CC} =4.5V, C _L =150pF	30			20			MHz
		V _{CC} =6.0V, C _L =150pF	35			24			MHz
Pulse Width	t _w	V _{CC} =2.0V	80			120			ns
		V _{CC} =4.5V	16			24			ns
		V _{CC} =6.0V	14			20			ns
Setup Time	t _{SU}	V _{CC} =2.0V	100			125			ns
		V _{CC} =4.5V	20			25			ns
		V _{CC} =6.0V	17			21			ns
Hold Time	t _H	V _{CC} =2.0V	5			5			ns
		V _{CC} =4.5V	5			5			ns
		V _{CC} =6.0V	5			5			ns

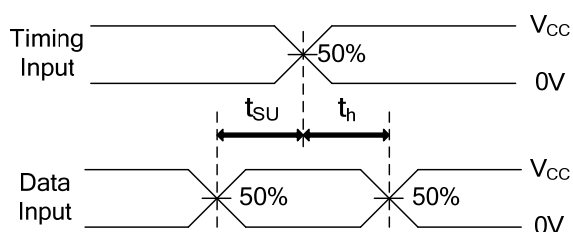
■ OPERATING CHARACTERISTICS (Unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Input Capacitance	C _{IN}	V _{CC} =2.0V~ 6.0V		5		pF
Power Dissipation Capacitance	C _{PD}	No Load		100		pF

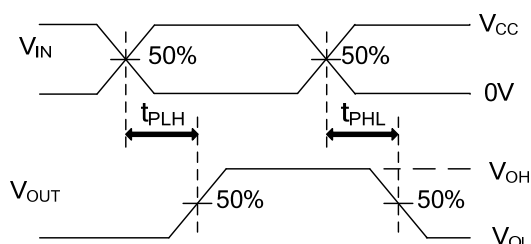
■ TEST CIRCUIT AND WAVEFORMS



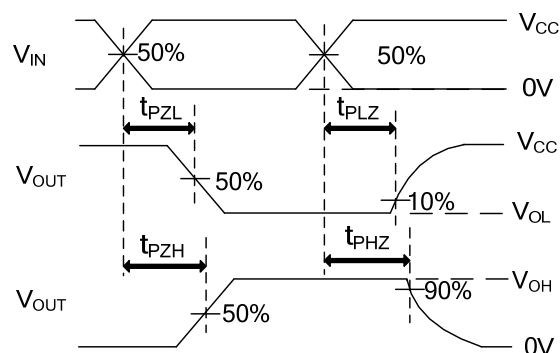
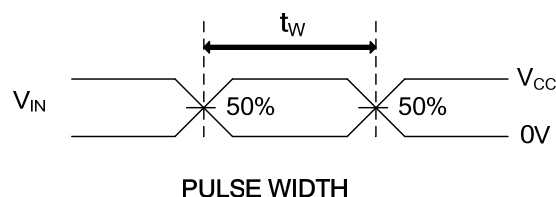
TEST	S
t_{PLH}/t_{PHL}	Open
t_{PHZ}/t_{PZH}	GND
t_{PLZ}/t_{PZL}	V_{CC}



SETUP TIME AND HOLD TIME



PROPAGATION DELAY TIMES



ENABLE AND DISABLE TIMES

Note: C_L includes probe and jig capacitance.
 $PRR \leq 1\text{MHz}$, $Z_o = 50\Omega$, $t_R \leq 6\text{ns}$, $t_F \leq 6\text{ns}$.

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