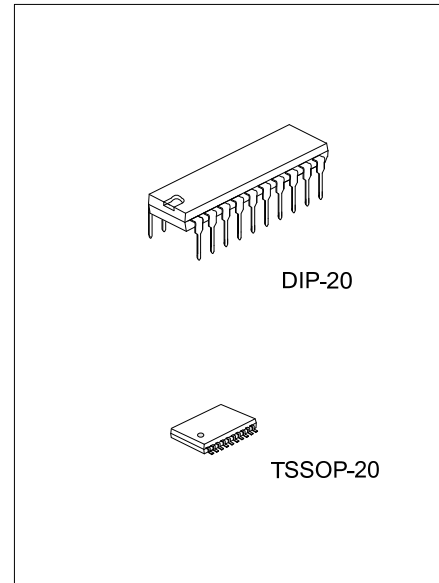




U74AHCT374

CMOS IC

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



DESCRIPTION

The **U74AHCT374** is a octal edge-triggered D-type flip-flops with 3-state outputs and 8 channels.

When the \overline{OE} input is low, on the positive transition of the clock (CLK) input, the Q outputs are set to the logic levels of the data (D) inputs.

When the \overline{OE} input is high, the outputs are in the high-impedance.

To ensure the high-impedance state during power up or power down, \overline{OE} should be tied to V_{CC} through a pull-up resistor; the minimum value of the resistor is determined by the current-sinking capability of the driver.

FEATURES

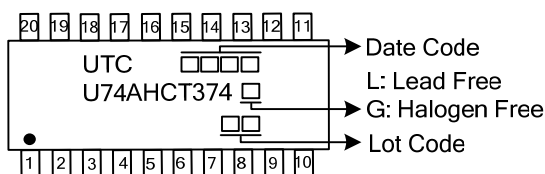
- * Inputs are TTL-Voltage Compatible
- * Operate from 4.5V to 5.5V
- * Inputs Accept Voltages to 5.5V
- * Max t_{PD} of 9.4ns at $V_{CC}=5V$, $C_L=15pF$
- * Typical $V_{OL} < 0.36V$ at $V_{CC}=4.5V$, $I_{OL}=8mA$, $T_A=25^\circ C$
- * Typical $V_{OH} > 3.94V$ at $V_{CC}=4.5V$, $I_{OH}=-8mA$, $T_A=25^\circ C$

ORDERING INFORMATION

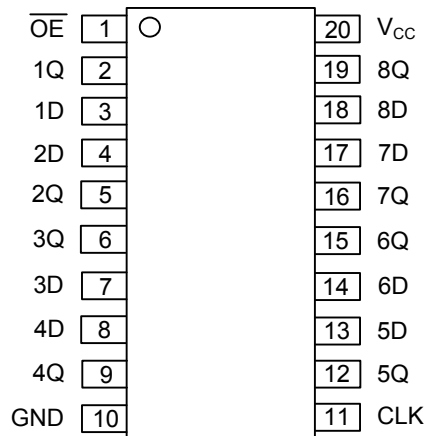
Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74AHCT374L-D20-T	U74AHCT374G-D20-T	DIP-20	Tube
U74AHCT374L-P20-R	U74AHCT374G-P20-R	TSSOP-20	Tape Reel

<p>U74AHCT374G-D20-T</p> <p>(1)Packing Type (2)Package Type (3)Green Package</p>	<p>(1) T: Tube, R: Tape Reel (2) D20: DIP-20, P20: TSSOP-20 (3) G: Halogen Free and Lead Free, L: Lead Free</p>
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MARKING



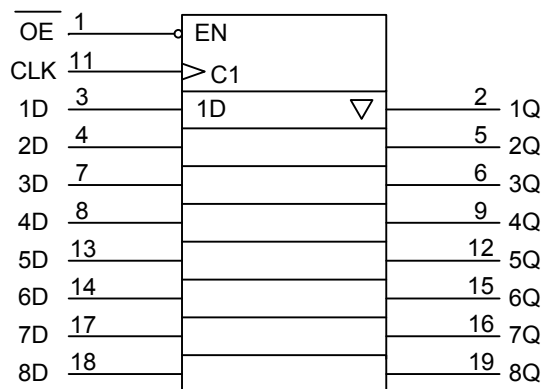
■ PIN CONFIGURATION



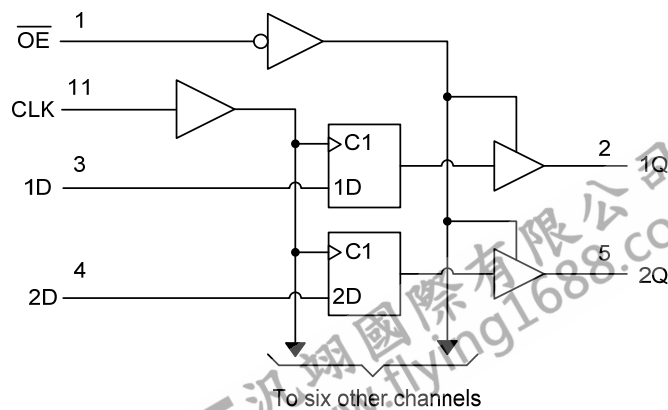
■ FUNCTION TABLE

INPUTS(\overline{OE})	INPUTS(CLK)	INPUTS(D)	OUTPUT(Q)
L	\uparrow	H	H
L	\uparrow	L	L
L	H or L	X	Q_0
H	X	X	Z

■ LOGIC SYMBOL



■ LOGIC DIAGRAM



■ ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V_{CC}	-0.5 ~ 7	V
Input Voltage	V_{IN}	-0.5 ~ 7	V
Output Voltage	V_{OUT}	-0.5 ~ $V_{CC} + 0.5$	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
Operating Temperature	T_{OPR}	-40 ~ + 85	°C
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}	4.5		5.5	V
High-level Input Voltage	V_{IH}	2			V
Low-level Input Voltage	V_{IL}			0.8	V
Input Voltage	V_{IN}	0		5.5	V
Output Voltage	V_{OUT}	0		V_{CC}	V
High-Level Output Current	I_{OH}			-8	mA
Low-Level Output Current	I_{OL}			8	mA
Input Rise or Fall Times	t_R, t_F			20	ns/V
Operating free-Air Temperature	T_A	-40		85	°C

■ ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage High-Level	V_{OH}	$V_{CC}=4.5V, I_{OH}=-50\mu A$	4.4	4.5		V
		$V_{CC}=4.5V, I_{OH}=-8mA$	3.94			
Output Voltage Low-Level	V_{OL}	$V_{CC}=4.5V, I_{OL}=50\mu A$			0.1	V
		$V_{CC}=4.5V, I_{OL}=8mA$			0.36	
Input Leakage Current	$I_{I(LEAK)}$	$V_{CC}=0V$ to 5.5V, $V_{IN}=0$ or 5.5V			±0.1	μA
Leakage Current (For Output in High-Impedance State)	I_{OZ}	$V_{CC}=5.5V, V_{IN}=V_{IH}$ or $V_{IH}, V_{OUT}=0$ or 5.5V			±0.25	μA
Quiescent Supply Current	I_{CC}	$V_{CC}=5.5V, V_{IN}=V_{CC}$ or GND, $I_{OUT}=0$			4	μA
Additional Quiescent Supply Current	ΔI_{CC}	$V_{CC}=5.5V$, one input at 3.4V, Other inputs at V_{CC} or GND			1.35	mA
Input Capacitance	C_I	$V_{CC}=5V, V_{IN}=V_{CC}$ or GND		4	10	pF
Output Capacitance	C_O	$V_{CC}=5V, V_{OUT}=V_{CC}$ or GND		9		pF

■ SWITCHING CHARACTERISTICS ($T_A = 25^\circ\text{C}$, See TEST CIRCUIT AND WAVEFORMS)

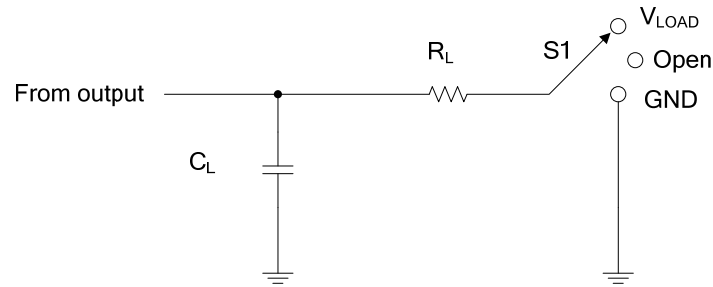
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
From CLK to Q	t_{PLH}/t_{PHL}	$V_{CC} = 5\text{ V} \pm 0.5\text{ V}$	$C_L = 15\text{pF}$	5.6	9.4	ns
			$C_L = 50\text{pF}$	6.4	10.4	
From \overline{OE} to Q	t_{PZL}/t_{PZH}	$V_{CC} = 5\text{ V} \pm 0.5\text{ V}$	$C_L = 15\text{pF}$	6.5	10.2	ns
			$C_L = 50\text{pF}$	7.3	11.2	
From \overline{OE} to Q	t_{PLZ}/t_{PHZ}	$V_{CC} = 5\text{ V} \pm 0.5\text{ V}$	$C_L = 15\text{pF}$	6.2	10.2	ns
			$C_L = 50\text{pF}$	7	11.2	
Maximum Clock Frequency	f_{MAX}	$V_{CC} = 5\text{ V} \pm 0.5\text{ V}$	$C_L = 15\text{pF}$	90	140	MHz
			$C_L = 50\text{pF}$	85	130	
Pulse Width	t_W	$V_{CC} = 5\text{ V} \pm 0.5\text{ V}$		6.5		ns
Setup Time	t_{SU}	$V_{CC} = 5\text{ V} \pm 0.5\text{ V}$		2.5		ns
Hold Time	t_H	$V_{CC} = 5\text{ V} \pm 0.5\text{ V}$		2.5		ns

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

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	C_{PD}	No load, $V_{CC} = 5\text{ V}$, $f = 1\text{MHz}$		27		pF

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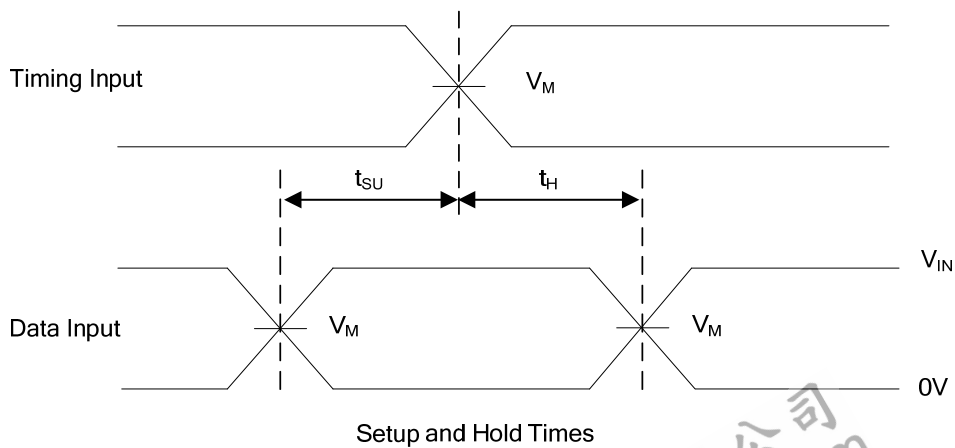
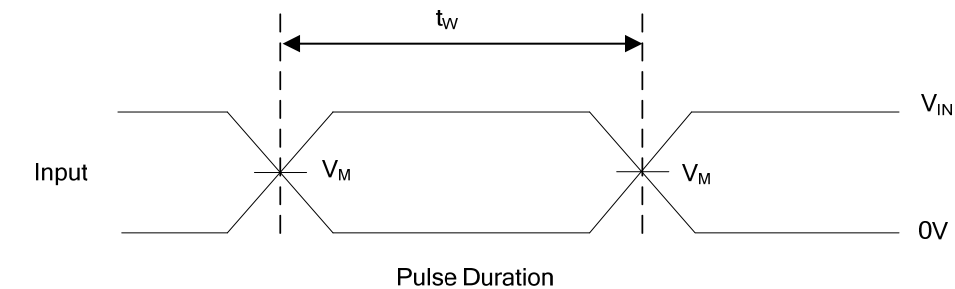
■ TEST CIRCUIT AND WAVEFORMS



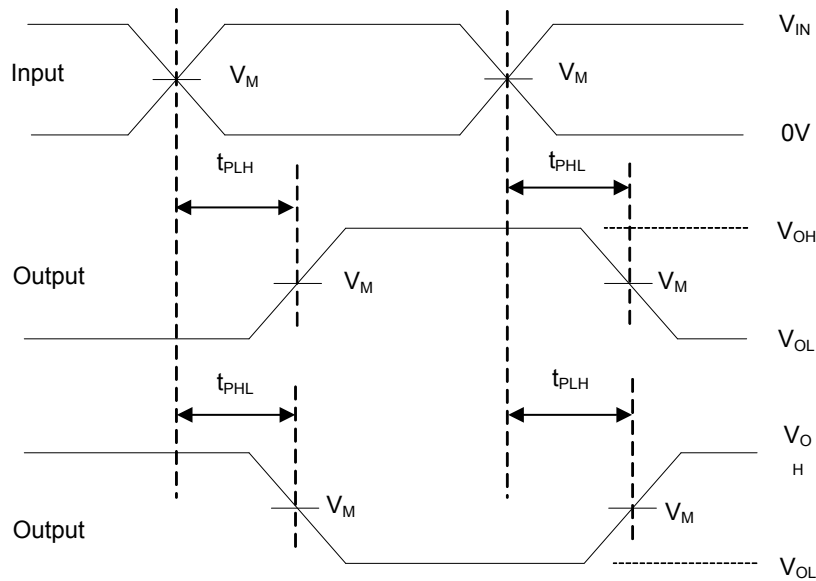
Test Circuit

TEST	S1
t_{PLH}/t_{PHL}	Open
t_{PLZ}/t_{PZL}	V_{LOAD}
t_{PHZ}/t_{PZH}	GND

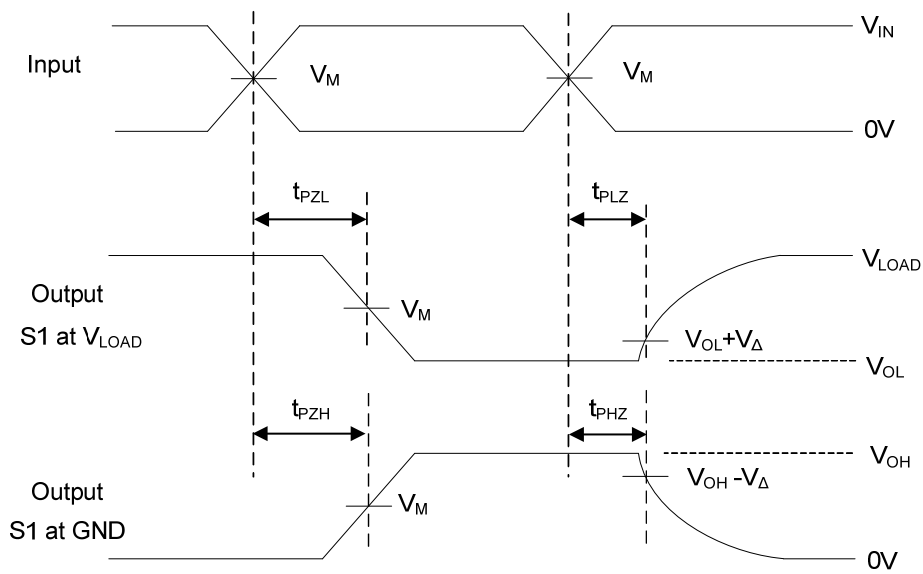
V_{CC}	Input		V_M	V_{LOAD}	C_L	R_L	V_{Δ}
	V_{IN}	t_R, t_F					
$5V \pm 0.5V$	V_{CC}	$\leq 3ns$	$V_{CC}/2$	V_{CC}	15pF	$1k\Omega$	0.5V
					50pF		



■ TEST CIRCUIT AND WAVEFORMS(Cont.)



Voltage Waveforms Propagation Delay Times



Voltage Waveforms Enable and Disable Times

Note: A. C_L includes probe and jig capacitance.

B. $P_{RR} \leq 1\text{MHz}$, $Z_O = 50\Omega$, $t_R \leq 3\text{ns}$, $t_F \leq 3\text{ns}$.

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