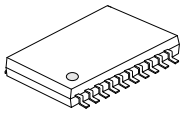
U74LVC273

CMOS IC

OCTAL D-TYPE FLIP-FLOP WITH CLEAR ; POSITIVE-EDGE TRIGGER



SOP-20

■ DESCRIPTION

The **U74LVC273** is a octal D-type Flip-Flop with 3-state outputs, and it has 8 channels with individual D inputs and Q outputs.

The state of each D input, one set-up time before the Low-to-High clock transition, is transferred to the corresponding output (Qn) of the flip-flop.

All outputs will be forced LOW independently of clock or data inputs by a Low voltage level on the $\overline{MR}$ input.

The device is useful for applications where the true output only is required and the clock and master reset are common to all storage elements.

■ FEATURES

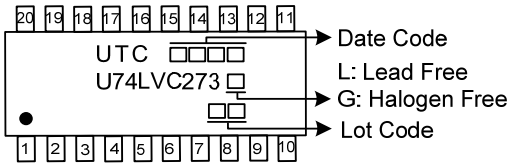
* Operate From 1.2V to 3.6V
* Inputs Accept Voltages to 5.5 V
* Max tpd of 6.8 ns at 3.3 V
* I_{off} Supports Partial-Power-Down Mode Operation

■ ORDERING INFORMATION

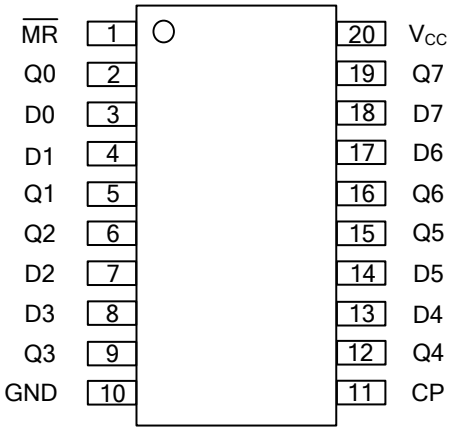
Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74LVC273L-S20-R	U74LVC273G-S20-R	SOP-20	Tape Reel

U74LVC273G-S20-R
- (1)Packing Type — (1) R: Tape Reel
- (2)Package Type — (2) S20: SOP-20
- (3)Green Package — (3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING



■ PIN CONFIGURATION



■ FUNCTION TABLE

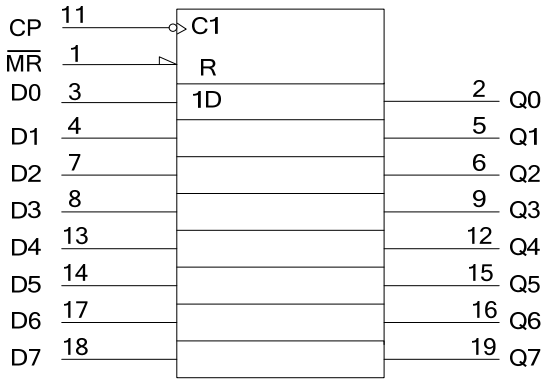
MODE	INPUTS			OUTPUT
	INPUT($\overline{MR}$)	CP	Dn	Qn
Reset (clear)	L	X	X	L
Load " 1 "	H	↑	h	H
Load " 0 "	H	↑	l	L

H = High voltage level；L = Low voltage level；X = Don't care；↑ = LOW-to-HIGH clock transition

h = HIGH voltage level one set-up time prior to the LOW-to-HIGH CP transition

l = LOW voltage level one set-up time prior to the LOW-to-HIGH CP transition

■ LOGIC SYMBOL



■ ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	CONDITIONS	RATINGS	UNIT
Supply Voltage	V_{CC}		-0.5 ~ +6.5	V
Input Voltage (Note 2)	V_{IN}		-0.5 ~ +6.5	V
Output Voltage	V_{OUT}	Output in the high or low state	-0.5 ~ V_{CC}+0.5	V
Continuous V_{CC} or GND Current	I_{CC}		±100	mA
Continuous Output Current	I_{OUT}	V_{OUT}=0V ~ V_{CC}	±50	mA
Input Clamp Current	I_{IK}	V_{IN}<0V	-50	mA
Output Clamp Current	I_{OK}	V_{OUT}>V_{CC} or V_{OUT}<0V	50	mA
Storage Temperature Range	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	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	V_{CC}		1.65		3.6	V
		Functional	1.2			V
Input Voltage	V_{IN}		0		5.5	V
Output Voltage	V_{OUT}		0		V_{CC}	V
Input Transition Rise or Fall Rate	Δt/Δv	V_{CC}=1.65V ~ 2.7V	0		20	ns/V
		V_{CC}=2.7V ~ 3.6V	0		10	ns/V
Operating Temperature	T_A		-40		+85	°C

■ ELECTRICAL CHARACTERISTICS (T_A =25°C , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
High-level Input Voltage	V_{IH}	V_{CC}=1.2V		1.08			V
		V_{CC}=1.8V±0.15V		0.65×V_{CC}			V
		V_{CC}=2.5V±0.2V		1.7			V
		V_{CC}=3.3V±0.3V		2.0			V
Low-level Input Voltage	V_{IL}	V_{CC}=1.2V				0.12	V
		V_{CC}=1.8V±0.15V				0.35×V_{CC}	V
		V_{CC}=2.5V±0.2V				0.7	V
		V_{CC}=3.3V±0.3V				0.8	V
High-Level Output Voltage	V_{OH}	V_{CC}=1.65V ~ 3.6V, I_{OH}=-100μA		V_{CC}-0.2			V
		V_{CC}=1.65V, I_{OH}=-4mA		1.2			V
		V_{CC}=2.3V, I_{OH}=-8mA		1.8			V
		V_{CC}=2.7V, I_{OH}=-12mA		2.2			V
		V_{CC}=3.0V	I_{OH}=-18mA	2.4			V
			I_{OH}=-24mA	2.2			V
Low-Level Output Voltage	V_{OL}	V_{CC}=1.65V ~ 3.6V, I_{OH}=100μA				0.2	V
		V_{CC}=1.65V, I_{OH}=4mA				0.45	V
		V_{CC}=2.3V, I_{OH}=8mA				0.6	V
		V_{CC}=2.7V, I_{OH}=12mA				0.4	V
		V_{CC}=3.0V, I_{OH}=24mA				0.55	V
Input Leakage Current	$I_{I(LEAK)}$	V_{CC}=3.6V, V_{IN}=5.5V or GND			±0.1	±5	μA
Quiescent Supply Current	I_{CC}	V_{CC}=3.6V, V_{IN}=V_{CC} or GND, I_{OUT}=0A			0.1	10	μA
Additional Quiescent Supply Current Per Input Pin	$ΔI_{CC}$	V_{CC}=2.7V~3.6V, V_{CC}-0.6V, I_{OUT}=0A			5.0	500	μA
Input Capacitance	C_I	V_{CC}= 0V~3.6V, V_{IN}= V_{CC} or GND			5.0		pF

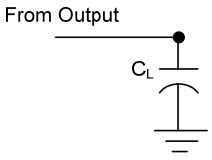
■ SWITCHING CHARACTERISTICS (T_A =25°C , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Maximum Clock Pulse Frequency	f_{MAX}	V_{CC}=1.8V±0.15V	80			MHz
		V_{CC}=2.5V±0.2V	100			MHz
		V_{CC}=2.7V	150			MHz
		V_{CC}=3.3V±0.3V	150	230		MHz
Propagation delay from input (CP) to output(Qn)	t_{PD}	V_{CC}=1.2V		18		ns
		V_{CC}=1.8V±0.15V	2.5	9.7	19.2	ns
		V_{CC}=2.5V±0.2V	1.8	4.9	9.9	ns
		V_{CC}=2.7V	1.5	4.5	8.4	ns
		V_{CC}=3.3V±0.3V	1.5	4.1	8.2	ns
Propagation delay from input ($\overline{MR}$) to output(Qn)	t_{PHL}	V_{CC}=1.2V		18		ns
		V_{CC}=1.8V±0.15V	2.4	10.2	20.4	ns
		V_{CC}=2.5V±0.2V	1.7	5.2	10.5	ns
		V_{CC}=2.7V	1.5	4.7	8.9	ns
		V_{CC}=3.3V±0.3V	1.5	4.3	8.7	ns
Pulse Width Clock HIGH or LOW	t_W	V_{CC}=1.8V±0.15V	6.0			ns
		V_{CC}=2.5V±0.2V	5.0			ns
		V_{CC}=2.7V	5.0	1.8		ns
		V_{CC}=3.3V±0.3V	4.0	1.2		ns
Pulse Width Master Reset LOW		V_{CC}=1.8V±0.15V	6.0			ns
		V_{CC}=2.5V±0.2V	5.0			ns
		V_{CC}=2.7V	5.0	1.7		ns
		V_{CC}=3.3V±0.3V	4.0	1.2		ns
Recovery Time $\overline{MR}$ to CP	t_{REC}	V_{CC}=1.8V±0.15V	2.0			ns
		V_{CC}=2.5V±0.2V	2.0			ns
		V_{CC}=2.7V	2.0	-1.0		ns
		V_{CC}=3.3V±0.3V	2.0	-1.0		ns
Setup Time Dn to CP	t_{SU}	V_{CC}=1.8V±0.15V	5.0			ns
		V_{CC}=2.5V±0.2V	3.5			ns
		V_{CC}=2.7V	3.0	1.0		ns
		V_{CC}=3.3V±0.3V	1.0	0.0		ns
Hold Time Dn to CP	t_H	V_{CC}=1.8V±0.15V	3.0			ns
		V_{CC}=2.5V±0.2V	2.5			ns
		V_{CC}=2.7V	2.0	-2.0		ns
		V_{CC}=3.3V±0.3V	1.0	0.0		ns
Propagation delay	$t_{SK(O)}$	V_{CC}=3.3V±0.3V			1.0	ns

■ OPERATING CHARACTERISTICS (f=10MHz, T_A =25°C , unless otherwise specified)

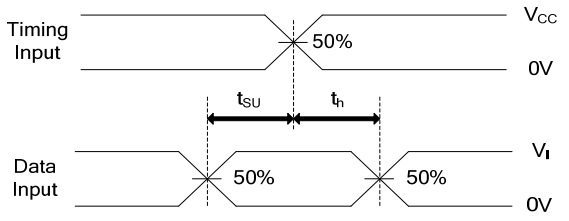
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	C_{PD}	V_{CC}=1.8V±0.15V		14		pF
		V_{CC}=2.5V±0.2V		17.7		pF
		V_{CC}=3.3V±0.3V		21		pF

■ TEST CIRCUIT AND WAVEFORMS

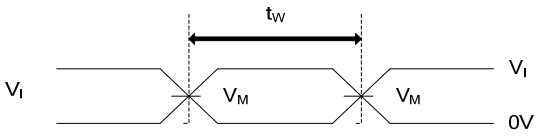


TEST CIRCUIT

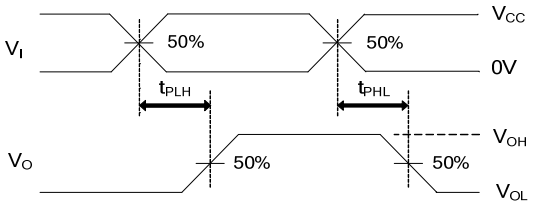
V_{CC}	INPUTS		L_{OAD}		V_{EXT}		
	V_{IN}	t_R/t_F	C_L	R_L	t_{PLH}/t_{PHL}	t_{PLZ}/t_{PZL}	t_{PHZ}/t_{PZH}
1.2V	V_{CC}	≤2ns	30pF	1KΩ	OPEN	$2\times V_{CC}$	GND
1.8V±0.15V	V_{CC}	≤2ns	30pF	1KΩ	OPEN	$2\times V_{CC}$	GND
2.5V±0.2V	V_{CC}	≤2ns	30pF	500Ω	OPEN	$2\times V_{CC}$	GND
2.7V	2.7V	≤2.5ns	50pF	500Ω	OPEN	$2\times V_{CC}$	GND
3.3V±0.3V	2.7V	≤2.5ns	50pF	500Ω	OPEN	$2\times V_{CC}$	GND



VOLTAGE WAVEFORMS SETUP AND HOLD TIMES



VOLTAGE WAVEFORMS PULSE DURATION



PROPAGATION DELAY TIMES

Notes: 1. C_L includes probe and jig capacitance.

2. All input pulses are supplied by generators having the following characteristics: PRR ≤10MHz, Z_O = 50Ω.