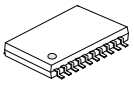
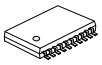
U74LVC373

CMOS IC

OCTAL TRANSPARENT D-TYPE LATCHES WITH 3-STATE OUTPUTS



SSOP-20



TSSOP-20U

■ DESCRIPTION

The UTC **U74LVC373** is a octal transparent D-type latch with 3-state outputs, and it has 8 channels.

■ FEATURES

* Operate from 1.65V to 3.6V
* Inputs accept voltages to 5.5V
* Max t_{pd} of 6.8ns @ 3.3V
* Typical V_{OL} < 0.8V @ V_{CC}=3.3V, T_A=25°C
* Typical V_{OH} > 2.0V @ V_{CC}=3.3V, T_A=25°C
* Support mixed-mode signal operation on all ports (5V input/output voltage with 3.3V V_{CC})
* I_{OFF} supports partial-power-down mode operation

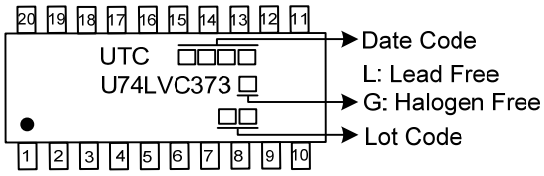
■ ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74LVC373L-R20-R	U74LVC373G-R20-R	SSOP-20	Tape Reel
U74LVC373L-ULA-R	U74LVC373G-ULA-R	TSSOP-20U	Tape Reel

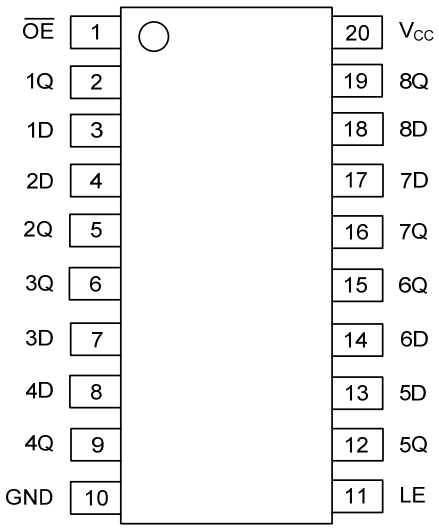
U74LVC373G-R20-R
(1)Packing Type
(2)Package Type
(3)Green Package

(1) R: Tape Reel
(2) R20: SSOP-20, ULA: TSSOP-20U
(3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING



■ PIN CONFIGURATION

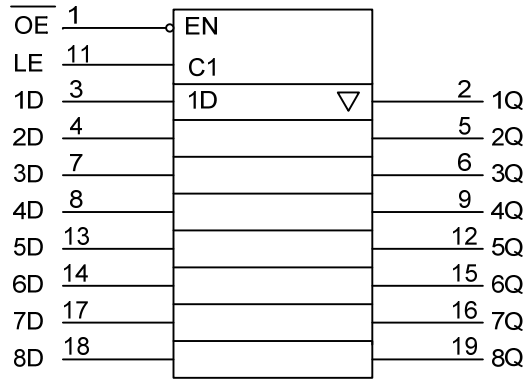


■ FUNCTION TABLE

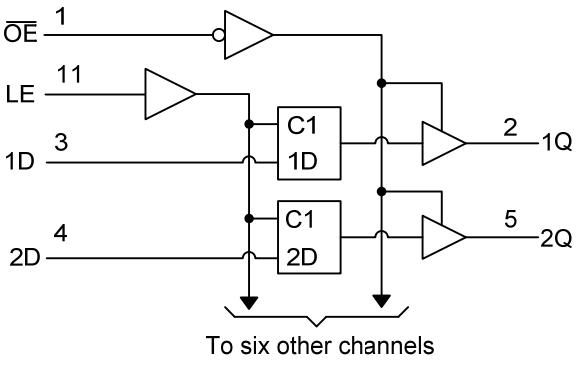
INPUTS($\overline{OE}$)	INPUTS(LE)	INPUTS(D)	OUTPUT(Q)
L	H	H	H
L	H	L	L
L	L	X	Q0
H	X	X	Z

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

■ LOGIC SYMBOL



■ LOGIC DIAGRAM



■ ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V_{CC}	-0.5 ~ 6.5	V
Input Voltage	V_{IN}	-0.5 ~ 6.5	V
Output Voltage	V_{OUT}	-0.5 ~ 6.5 (Note 2)	V
		-0.5 ~ V_{CC} +0.5 (Note 3)	V
V_{CC} or GND Current	I_{CC}	±100	mA
Output Current	I_{OUT}	±50	mA
Input Clamp Current	I_{IK}	-50	mA
Output Clamp Current	I_{OK}	-50	mA
Operating Temperature	T_{OPR}	-40 ~ + 85	°C
Storage Temperature	T_{STG}	-65 ~ + 150	°C

Notes: 1. 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.
2. Voltage range applied to any output in the high-impedance or power-off state.
3. Voltage range applied to any output in the high or low state, and V_{CC} is provided in the recommended operating conditions table.

■ THERMAL CHARACTERISTICS

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	SSOP-20	θ_{JA}	105	°C/W
	TSSOP-20U		110	°C/W

■ RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	V_{CC}	Operating	1.65		3.6	V
		Data retention only	1.5			V
High-level Input Voltage	V_{IH}	V_{CC}=1.65V to 1.95V	0.65 ×V_{CC}			V
		V_{CC}=2.3V to 2.7V	1.7			V
		V_{CC}=2.7V to 3.6V	2			V
Low-level Input Voltage	V_{IL}	V_{CC}=1.65V to 1.95V			0.35 ×V_{CC}	V
		V_{CC}=2.3V to 2.7V			0.7	V
		V_{CC}=2.7V to 3.6V			0.8	V
Input Voltage	V_{IN}		0		5.5	V
Output Voltage	V_{OUT}	High or low state	0		V_{CC}	V
		3 state	0		5.5	V
High-level Output Current	I_{OH}	V_{CC}=1.65V			-4	mA
		V_{CC}=2.3V			-8	mA
		V_{CC}=2.7V			-12	mA
		V_{CC}=3V			-24	mA
Low-level Output Current	I_{OL}	V_{CC}=1.65V			4	mA
		V_{CC}=2.3V			8	mA
		V_{CC}=2.7V			12	mA
		V_{CC}=3V			24	mA
Input Rise or Fall Times	t_R, t_F		0		10	ns/V

■ ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP (Note 1)	MAX	UNIT
Output Voltage High-Level	V_{OH}	V_{CC}=1.65~3.6V, 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	1.7			V
		V_{CC}=2.7V, I_{OH}=-12mA	2.2			V
		V_{CC}=3V, I_{OH}=-12mA	2.4			V
		V_{CC}=3V, I_{OH}=-24mA	2.2			V
Output Voltage Low-Level	V_{OL}	V_{CC}=1.65~3.6V, I_{OL}=100μA			0.2	V
		V_{CC}=1.65V, I_{OL}=4mA			0.45	V
		V_{CC}=2.3V, I_{OL}=8mA			0.7	V
		V_{CC}=2.7V, I_{OL}=12mA			0.4	V
		V_{CC}=3V, I_{OL}=24mA			0.55	V
Input Leakage Current	$I_{I(LEAK)}$	V_{CC}=3.6V, V_{IN}=0 to 5.5V			±5	μA
Power OFF Leakage Current	I_{OFF}	V_{CC}=0V, V_{IN} or V_{OUT}=5.5V			±10	μA
Disable Output Leakage Current	I_{OZ}	V_{CC}=3.6V, V_{OUT}=0 to 5.5V			±10	μA
Quiescent Supply Current	I_Q	V_{CC}=3.6V, V_{IN}=V_{CC} or GND, I_{OUT}=0			10	μA
		V_{CC}=3.6V, 3.6V≤V_{IN}≤5.5V , I_{OUT}=0(Note 2)			10	μA
Additional Quiescent Supply Current	ΔI_Q	V_{CC}=2.7~3.6V, One input at V_{CC}-0.6V, Other inputs at V_{CC} or GND			500	μA
Input Capacitance	C_I	V_{CC}=3.3V, V_{IN}=V_{CC} or GND		4		pF
Output Capacitance	C_O	V_{CC}=3.3V, V_{OUT}=V_{CC} or GND		5.5		pF

Notes: 1. V_{CC}=3.3V, T_A=25°C.
2. This applies in the disabled state only.

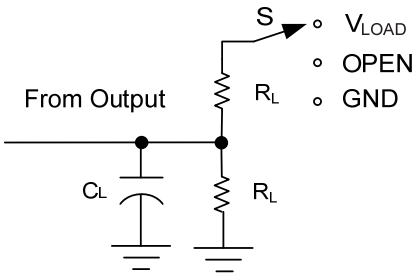
■ SWITCHING CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
From D to Q	t_{PLH}/t_{PHL}	V_{CC}=2.7V			7.8	ns
		V_{CC}=3.3V±0.3V	1.5		6.8	ns
From LE to Q		V_{CC}=2.7V			8.2	ns
		V_{CC}=3.3V±0.3V	2		7.6	ns
From $\overline{OE}$ to Q	t_{PZL}/t_{PZH}	V_{CC}=2.7V			8.7	ns
		V_{CC}=3.3V±0.3V	1.5		7.7	ns
From $\overline{OE}$ to Q	t_{PLZ}/t_{PHZ}	V_{CC}=2.7V			7.6	ns
		V_{CC}=3.3V±0.3V	1.5		7	ns
Pulse Width	t_W	V_{CC}=2.7V	3.3			ns
		V_{CC}=3.3V±0.3V	3.3			ns
Setup Time	t_{SU}	V_{CC}=2.7V	2			ns
		V_{CC}=3.3V±0.3V	2			ns
Hold Time	t_h	V_{CC}=2.7V	1.5			ns
		V_{CC}=3.3V±0.3V	1.5			ns

■ OPERATING CHARACTERISTICS

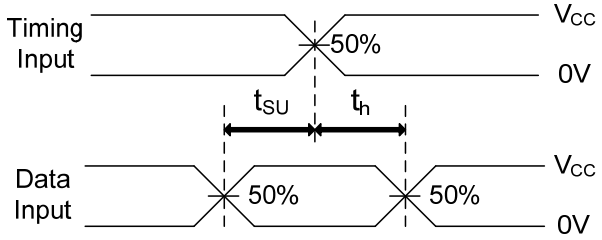
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	C_{PD}	$\overline{OE}$=0, f=10MHz, V_{CC}=3.3V±0.3V		46		pF
		$\overline{OE}$=1, f=10MHz, V_{CC}=3.3V±0.3V		3		

■ TEST CIRCUIT AND WAVEFORMS

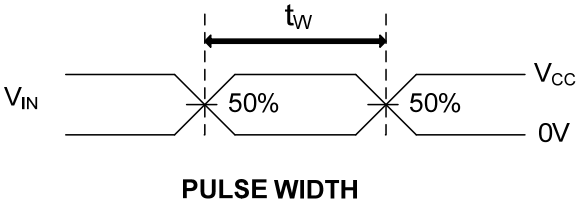


TEST CIRCUIT

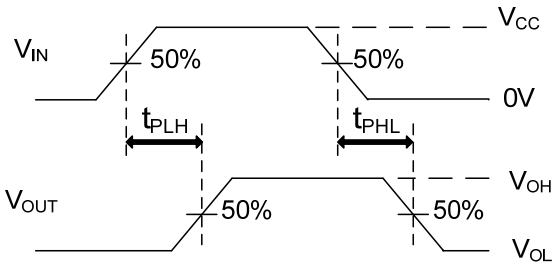
V_{CC}	V_{IN}	t_{PLZ}/t_{PZL} (V_{LOAD})	t_{PLH}/t_{PHL}	t_{PHZ}/t_{PZH}	C_L	R_L (Note 1)	△V
1.8V±0.15V	V_{CC}	2×V_{CC}	OPEN	OPEN	30pF	1kΩ	0.15V
2.5V±0.2V	V_{CC}	2×V_{CC}	OPEN	GND	30pF	500Ω	0.15V
2.7V	2.7V	6V	OPEN	GND	50pF	500Ω	0.3V
3.3V±0.3V	2.7V	6V	OPEN	GND	50pF	500Ω	0.3V



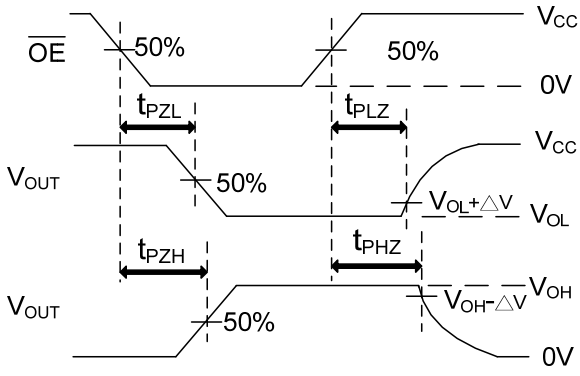
SETUP TIME AND HOLD TIME



PULSE WIDTH



PROPAGATION DELAY TIMES



ENABLE AND DISABLE 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, t_r = 2ns, t_f = 2ns.