

TC74LVX373F, TC74LVX373FW, TC74LVX373FT

OCTAL D-TYPE LATCH WITH 3-STATE OUTPUT

The TC74LVX373 is a high speed CMOS OCTAL LATCH with 3-STATE OUTPUT fabricated with silicon gate C²MOS technology.

Designed for use in 3.3 Volt systems, it achieves high speed operation while maintaining the CMOS low power dissipation.

This device is suitable for low voltage and battery operated systems.

This 8bit D-type latch is controlled by a latch enable input (LE) and a output enable input ($\overline{OE}$).

When the $\overline{OE}$ input is high, the eight outputs are in a high impedance state.

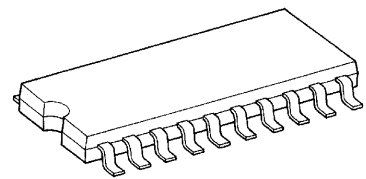
An input protection circuit ensures that 0 to 7V can be applied to the input pins without regard to the supply voltage. This device can be used to interface 5V to 3V systems and two supply systems such as battery back up. This circuit prevents device destruction due to mismatched supply and input voltages.

FEATURES

- High speed : $t_{pd} = 5.8\text{ns}$ (Typ.) ($V_{CC} = 3.3\text{V}$)
- Low power dissipation : $I_{CC} = 4\mu\text{A}$ (Max.) ($T_a = 25^\circ\text{C}$)
- Input voltage level : $V_{IL} = 0.8\text{V}$ (Max.) ($V_{CC} = 3\text{V}$)
 $V_{IH} = 2.0\text{V}$ (Min.) ($V_{CC} = 3\text{V}$)
- Power down protection is provided on all inputs.
- Balanced propagation delays : $t_{pLH} \approx t_{pHL}$
- Low noise : $V_{OLP} = 0.8\text{V}$ (Max.)
- Pin and function compatible with 74HC373

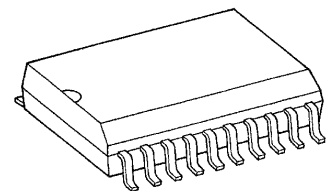
(Note) The JEDEC SOP (FW) is not available in Japan.

TC74LVX373F



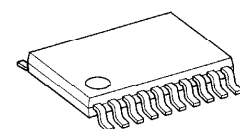
SOP20-P-300-1.27

TC74LVX373FW



SOL20-P-300-1.27

TC74LVX373FT

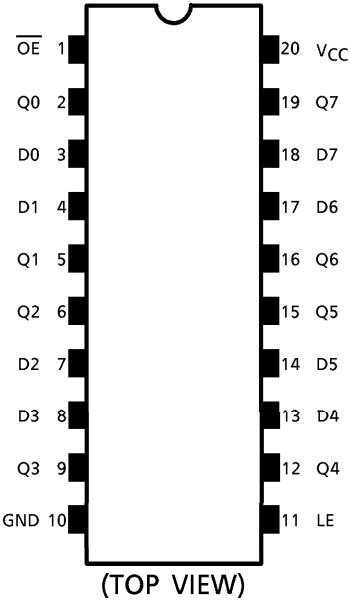


TSSOP20-P-0044-0.65

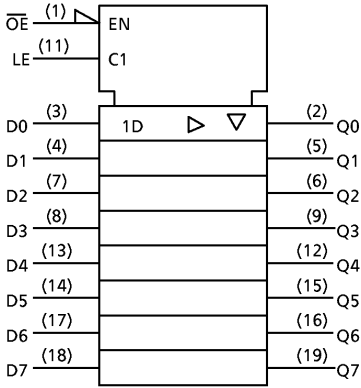
Weight

SOP20-P-300-1.27	: 0.22g (Typ.)
SOL20-P-300-1.27	: 0.46g (Typ.)
TSSOP20-P-0044-0.65	: 0.08g (Typ.)

PIN ASSIGNMENT



IEC LOGIC SYMBOL

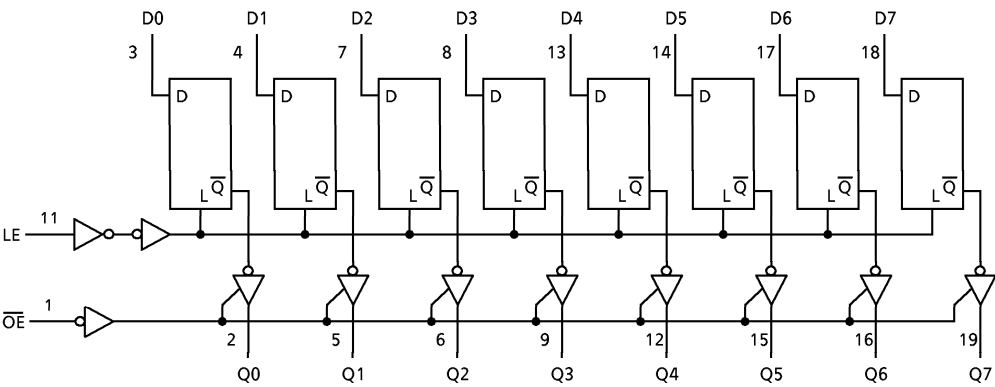


TRUTH TABLE

INPUTS			OUTPUTS
OE	LE	D	
H	X	X	Z
L	L	X	Qn
L	H	L	L
L	H	H	H

X : Don't Care
Z : High Impedance
Qn : Q outputs are latched at the time when the LE input is taken to a low logic level.

SYSTEM DIAGRAM



MAXIMUM RATINGS

PARAMETER	SYMBOL	RATING	UNIT
Supply Voltage Range	V_{CC}	-0.5~7.0	V
DC Input Voltage	V_{IN}	-0.5~7.0	V
DC Output Voltage	V_{OUT}	-0.5~ V_{CC} +0.5	V
Input Diode Current	I_{IK}	-20	mA
Output Diode Current	I_{OK}	±20	mA
DC Output Current	I_{OUT}	±25	mA
DC V_{CC} / Ground Current	I_{CC}	±75	mA
Power Dissipation	P_D	180	mW
Storage Temperature	T_{stg}	-65~150	°C

RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	RATING	UNIT
Supply Voltage	V_{CC}	2.0~3.6	V
Input Voltage	V_{IN}	0~5.5	V
Output Voltage	V_{OUT}	0~ V_{CC}	V
Operating Temperature	T_{opr}	-40~85	°C
Input Rise And Fall Time	dt/dv	0~100	ns/V

ELECTRICAL CHARACTERISTICS

DC characteristics

PARAMETER		SYM-BOL	TEST CONDITION		V _{CC} (V)	Ta = 25°C			Ta = - 40~85°C		UNIT
						MIN.	TYP.	MAX.	MIN.	MAX.	
Input Voltage	“H” Level	V _{IH}			2.0	1.5	—	—	1.5	—	V
					3.0	2.0	—	—	2.0	—	
					3.6	2.4	—	—	2.4	—	
	“L” Level	V _{IL}			2.0	—	—	0.5	—	0.5	
					3.0	—	—	0.8	—	0.8	
					3.6	—	—	0.8	—	0.8	
Output Voltage	“H” Level	V _{OH}	V _{IN} = V _{IH}	I _{OH} = - 50μA	2.0	1.9	2.0	—	1.9	—	V
			or V _{IL}	I _{OH} = - 50μA	3.0	2.9	3.0	—	2.9	—	
				I _{OH} = - 4mA	3.0	2.58	—	—	2.48	—	
	“L” Level	V _{OL}	V _{IN} = V _{IH}	I _{OL} = 50μA	2.0	—	0.0	0.1	—	0.1	
			or V _{IL}	I _{OL} = 50μA	3.0	—	0.0	0.1	—	0.1	
				I _{OL} = 4mA	3.0	—	—	0.36	—	0.44	
3-state Output Off-state Current		I _{OZ}	V _{IN} = V _{IH} or V _{IL} V _{OUT} = V _{CC} or GND		3.6	—	—	± 0.25	—	± 2.5	μA
Input Leakage Current		I _{IN}	V _{IN} = 5.5V or GND		3.6	—	—	± 0.1	—	± 1.0	μA
Quiescent Supply Current		I _{CC}	V _{IN} = V _{CC} or GND		3.6	—	—	4.0	—	40.0	μA

TIMING REQUIREMENTS (Input $t_r = t_f = 3\text{ns}$)

PARAMETER	SYM-BOL	TEST CONDITION	V _{CC} (V)	Ta = 25°C	Ta = - 40~85°C	UNIT
			LIMIT	LIMIT		
Minimum Pulse Width (LE)	t _W (H)		2.7	6.5	7.5	ns
			3.3 ± 0.3	5.0	5.0	
Minimum Set-up Time	t _s		2.7	6.0	6.0	ns
			3.3 ± 0.3	4.0	4.0	
Minimum Hold Time	t _h		2.7	1.0	1.0	ns
			3.3 ± 0.3	1.0	1.0	

AC characteristics (Input $t_r = t_f = 3\text{ns}$)

PARAMETER	SYM- BOL	TEST CONDITION			Ta = 25°C			Ta = - 40~85°C		UNIT
			V _{CC} (V)	C _L (pF)	MIN.	TYP.	MAX.	MIN.	MAX.	
Propagation Delay Time (LE-Q)	t _{pLH}		2.7	15	—	7.5	14.5	1.0	17.5	ns
				50	—	10.0	18.0	1.0	21.0	
	t _{pHL}		3.3 ± 0.3	15	—	5.8	9.3	1.0	11.0	
				50	—	8.3	12.8	1.0	14.5	
Propagation Delay Time (D-Q)	t _{pLH}		2.7	15	—	7.7	15.0	1.0	18.5	ns
				50	—	10.2	18.5	1.0	22.0	
	t _{pHL}		3.3 ± 0.3	15	—	6.0	9.7	1.0	11.5	
				50	—	8.5	13.2	1.0	15.0	
Output Enable Time	t _{pZL}	R _L = 1kΩ	2.7	15	—	7.7	15.0	1.0	18.5	ns
				50	—	10.2	18.5	1.0	22.0	
	t _{pZH}		3.3 ± 0.3	15	—	6.0	9.7	1.0	11.5	
				50	—	8.5	13.2	1.0	15.0	
Output Disable Time	t _{pLZ}	R _L = 1kΩ	2.7	50	—	9.8	18.0	1.0	21.0	ns
	t _{pHZ}		3.3 ± 0.3	50	—	8.2	12.8	1.0	14.5	
Output To Output Skew	t _{osLH}	(Note 1)	2.7	50	—	—	1.5	—	1.5	ns
	t _{osHL}		3.3 ± 0.3	50	—	—	1.5	—	1.5	
Input Capacitance	C _{IN}	(Note 2)			—	4	10	—	10	pF
Output Capacitance	C _{OUT}				—	6	—	—	—	pF
Power Dissipation Capacitance	C _{PD}	(Note 3)			—	27	—	—	—	pF

(Note 1) Parameter guaranteed by design.

$$(t_{osLH} = |t_{pLHm} - t_{pLHn}|, t_{osHL} = |t_{pHLm} - t_{pHLn}|)$$

(Note 2) Parameter guaranteed by design.

(Note 3) C_{pD} is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption.

Average operating current can be obtained by the equation :

$$I_{CC(opr.)} = C_{pD} \cdot V_{CC} \cdot f_{iN} + I_{CC}/8 \text{ (per Latch)}$$

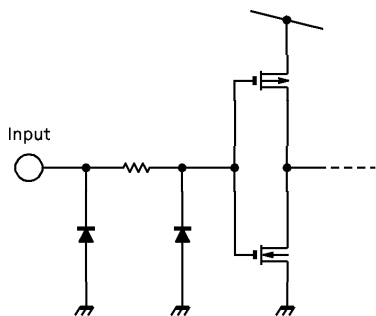
And the total C_{pD} when n pcs. of Latch operate can be gained by the following equation :

$$C_{pD}(\text{total}) = 14 + 13 \cdot n$$

Noise characteristics (Ta = 25°C, Input tr = tf = 3ns, CL = 50pF)

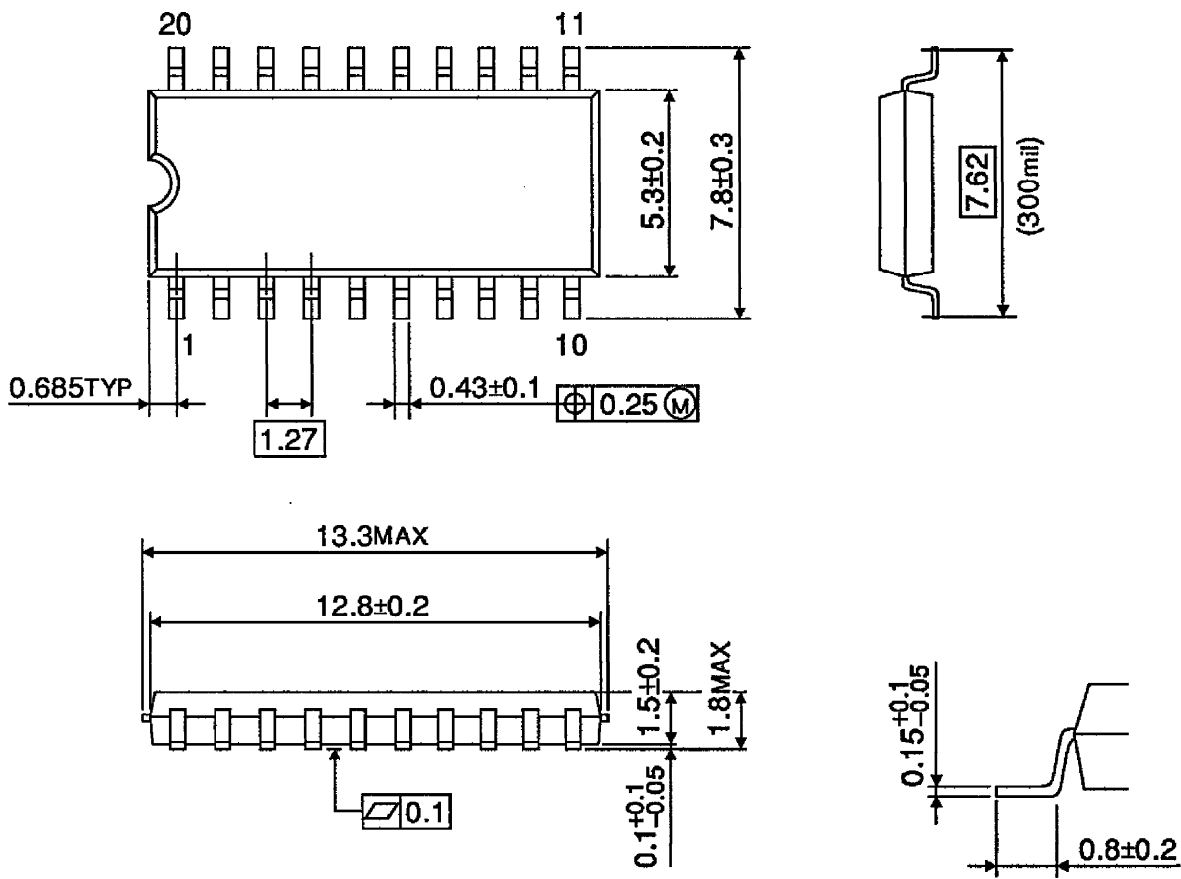
PARAMETER	SYMBOL	TEST CONDITION	VCC (V)	TYP.	LIMIT	UNIT
Quiet Output Maximum Dynamic VOL	VOLP		3.3	0.5	0.8	V
Quiet Output Minimum Dynamic VOL	VOLV		3.3	-0.5	-0.8	V
Minimum High Level Dynamic Input Voltage	VIHD		3.3	—	2.0	V
Maximum Low Level Dynamic Input Voltage	VILD		3.3	—	0.8	V

INPUT EQUIVALENT CIRCUIT



PACKAGE DIMENSIONS
SOP20-P-300-1.27

Unit : mm

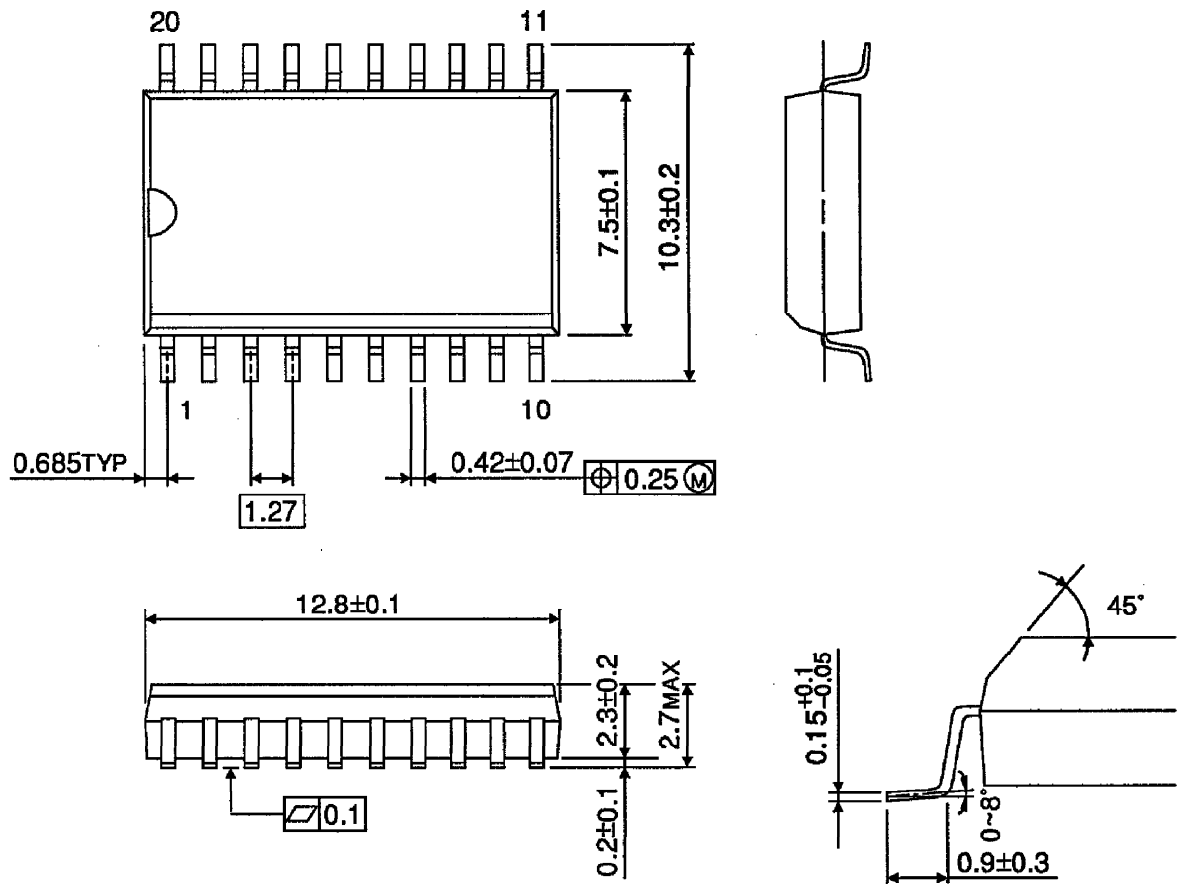


Weight : 0.22g (Typ.)

PACKAGE DIMENSIONS
SOL20-P-300-1.27

Unit : mm

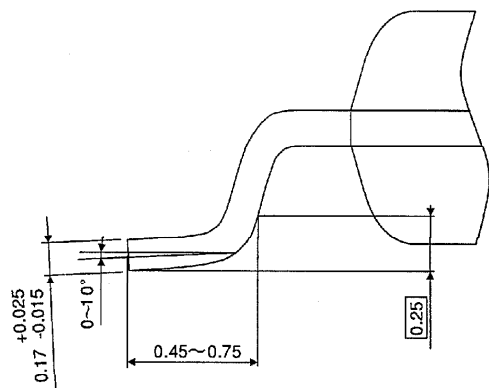
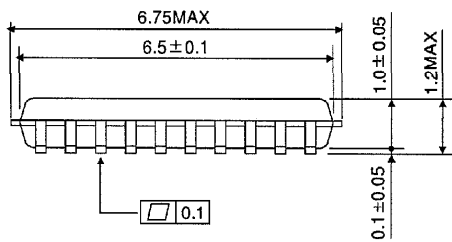
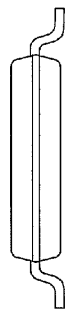
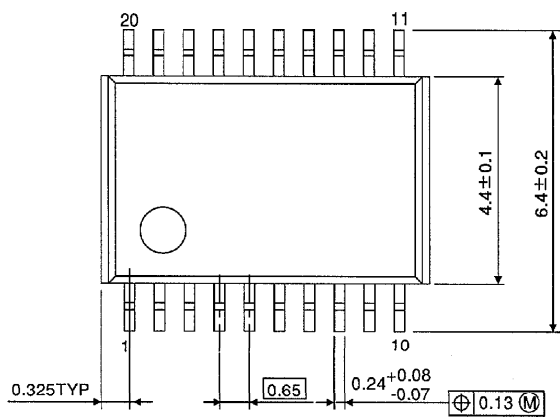
(Note) This package is not available in Japan.



Weight : 0.46g (Typ.)

PACKAGE DIMENSIONS
TSSOP20-P-0044-0.65

Unit : mm



Weight : 0.08g (Typ.)

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