74HC373D-HX/74HC373N-HX 3-TO-8 LINE DECODERS / DEMULTIPLEXERS

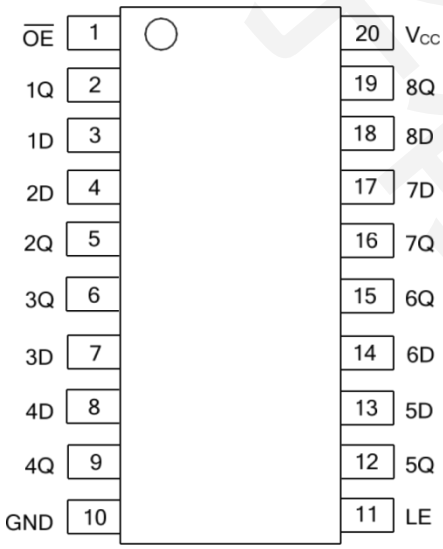
DESCRIPTION

The 74HC373D-HX/74HC373N-HX comprises eight D-type transparent latches with three-state outputs. When the latch-enable (LE) input is high, the latches operate in transparent mode: the outputs (Q0 to Q7) follow the data present at the corresponding D0 to D7 inputs. When the output-enable (OE) input is low, the stored latch contents appear on the outputs. When OE is high, the outputs enter a high-impedance state.

FEATURES

- Operation Voltage Range: 2 ~ 6V
- Drive Up to 15 LSTTL Loads
- 3-State Outputs
- Output Capability Suitable for Bus Driving
- Latch-up performance ≤ 250 mA
- Packaging information: DIP14 and SOP14

PIN CONFIGURATION

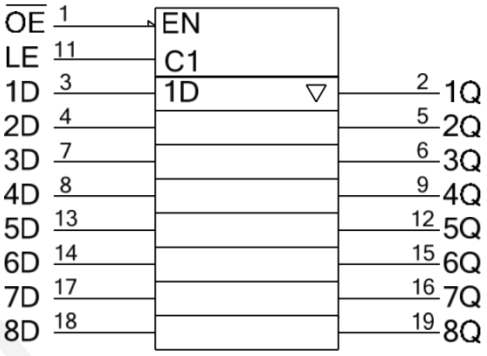


FUNCTION TABLE

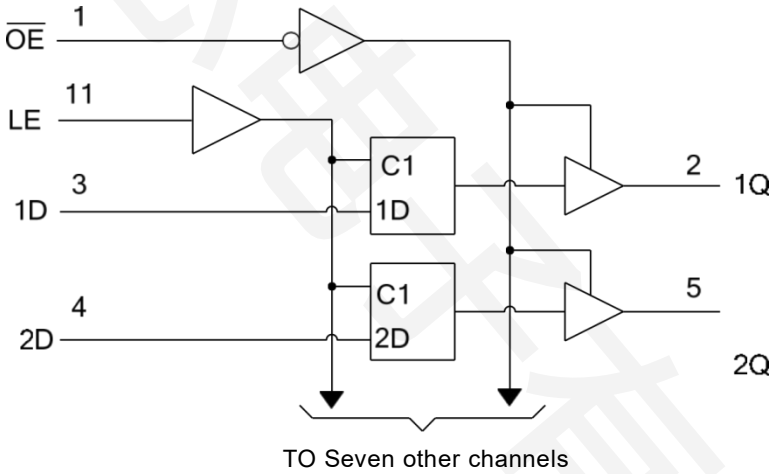
INPUTS($\overline{OE}$)	INPUTS(LE)	INPUTS(D)	OUTPUT(Q)
L	H	H	H
L	H	L	L
L	L	X	Q_0
H	X	X	Z

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
VCC 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	5	6	V
High-level Input Voltage	V_{IH}	V_{CC}=2.0V	1.5	-	-	V
		V_{CC}=4.5V	3.15	-	-	V
		V_{CC}=6.0V	4.2	-	-	V
Low-level Input Voltage	V_{IL}	V_{CC}=2.0V	0	-	0.5	V
		V_{CC}=4.5V	0	-	1.35	V
		V_{CC}=6.0V	0	-	1.8	V
Input Voltage	V_{IN}	-	0	-	VCC	V
Output Voltage	V_{OUT}	High or low state	0	-	VCC	V
Input Rise or Fall Times	t_R, t_F	V_{CC}=2.0V	-	-	1	μs
		V_{CC}=4.5V	-	-	0.5	μs
		V_{CC}=6.0V	-	-	0.4	μs
Operating Temperature	T_A	-	-40	-	+125	°C

THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	DIP-20	θ_{JA}	75	°C/W
	SOP-20		100	°C/W
	SSOP-20		115	°C/W
	TSSOP-20 TSSOP-20U		120	°C/W

ELECTRICAL CHARACTERISTICS (Unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Output Voltage High-Level	V_{OH}	V_{CC}=2.0V	I_{OH}=-20μA, V_{IN}=V_{IH} or V_{IL}	1.9	2	-	V
		V_{CC}=4.5V		4.4	4.5	-	V
		V_{CC}=6.0V		5.9	6	-	V
		V_{CC}=4.5V, I_{OH}=-6mA, V_{IN}=V_{IH} or V_{IL}		3.98	4.32	-	V
		V_{CC}=6.0V, I_{OH}=-7.8mA, V_{IN}=V_{IH} or V_{IL}		5.48	5.81	-	V
Output Voltage Low-Level	V_{OL}	V_{CC}=2.0V	I_{OL}=-20μA, V_{IN}=V_{IH} or V_{IL}	-	1	100	mV
		V_{CC}=4.5V		-	1	100	mV
		V_{CC}=6.0V		-	1	100	mV
		V_{CC}=4.5V, I_{OL}=6mA, V_{IN}=V_{IH} or V_{IL}		-	150	260	mV
		V_{CC}=6.0V, I_{OL}=7.8mA, V_{IN}=V_{IH} or V_{IL}		-	160	260	mV
Input Leakage Current	$I_{I(LEAK)}$	V_{CC}=6.0V, V_{IN}=V_{CC} or 0		-	±0.1	±100	nA
Disable Output Leakage Current	I_{OZ}	V_{CC}=6.0V, V_{OUT}=V_{CC} or 0		-	±0.01	±0.5	μA
Quiescent Supply Current	I_Q	V_{CC}=6.0V, V_{IN}=V_{CC} or 0, I_{OUT}=0		-	-	8	μA
Input Capacitance	C_{IN}	V_{CC}=2.0V~6.0V		-	3	10	pF

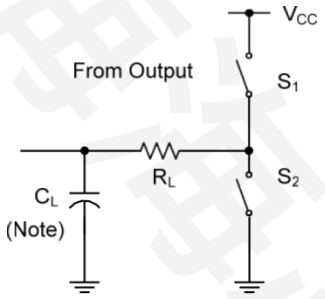
SWITCHING CHARACTERISTICS (see test circuit and waveforms)

PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Propagation delay from input (D) to output (Q)	t_{PLH}/t_{PHL}	V_{CC}=2.0V	C_L=50pF	-	41	150	ns
		V_{CC}=4.5V		-	15	30	ns
		V_{CC}=6.0V		-	12	26	ns
		V_{CC}=2.0V	C_L=150pF	-	82	200	ns
		V_{CC}=4.5V		-	22	40	ns
		V_{CC}=6.0V		-	19	34	ns
Propagation delay from input (LE) to output (Q)		V_{CC}=2.0V	C_L=50pF	-	50	175	ns
		V_{CC}=4.5V		-	18	35	ns
		V_{CC}=6.0V		-	14	30	ns
		V_{CC}=2.0V	C_L=150pF	-	100	225	ns
		V_{CC}=4.5V		-	24	45	ns
		V_{CC}=6.0V		-	20	38	ns
Output enable time from input (OE) to output (Q)	t_{PZL}/t_{PZH}	V_{CC}=2.0V	C_L=50pF	-	44	150	ns
		V_{CC}=4.5V		-	16	30	ns
		V_{CC}=6.0V		-	13	26	ns
		V_{CC}=2.0V	C_L=150pF	-	90	200	ns
		V_{CC}=4.5V		-	23	40	ns
		V_{CC}=6.0V		-	19	34	ns
Output disable time from input (OE) to output (Q)	t_{PLZ}/t_{PHZ}	V_{CC}=2.0V	C_L=50pF	-	47	150	ns
		V_{CC}=4.5V		-	15	30	ns
		V_{CC}=6.0V		-	13	26	ns
transition time	t_T	V_{CC}=2.0V	C_L=50pF	-	14	60	ns
		V_{CC}=4.5V		-	5	12	ns
		V_{CC}=6.0V		-	4	10	ns
Pulse Width	t_W	V_{CC}=2.0V		-	-	-	ns
		V_{CC}=4.5V		-	-	-	ns
		V_{CC}=6.0V		-	-	-	ns
Setup Time	t_{SU}	V_{CC}=2.0V		-	-	-	ns
		V_{CC}=4.5V		-	-	-	ns
		V_{CC}=6.0V		-	-	-	ns
Hold Time	t_H	V_{CC}=2.0V		-	-	-	ns
		V_{CC}=4.5V		-	--	-	ns
		V_{CC}=6.0V		-	-	-	ns

OPERATING CHARACTERISTICS (Unless otherwise specified)

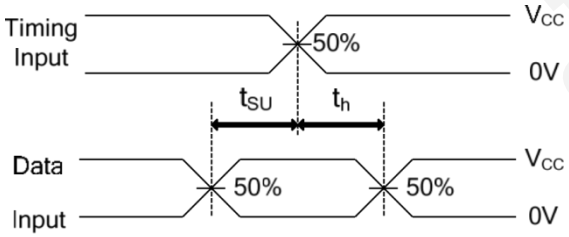
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	C_{PD}	No Load	-	100	-	pF

TEST CIRCUIT AND WAVEFORMS

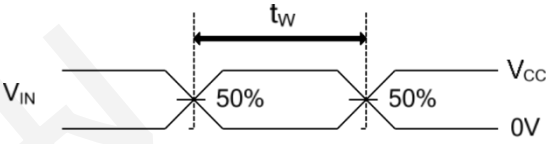


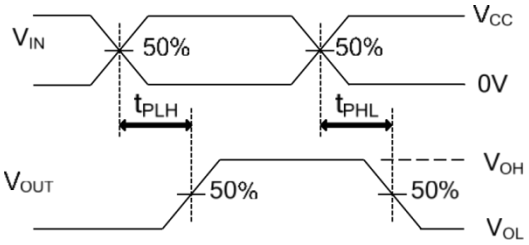
TEST CIRCUIT

	RL	CL	S1	S2
tPZH	1kΩ	50pF, 150pF	Open	Closed
tPZL			Closed	Open
tPHZ	1kΩ	50pF	Open	Closed
tPLZ			Closed	Open
tPHL	-	50pF, 150pF	Open	Open
tPLH				

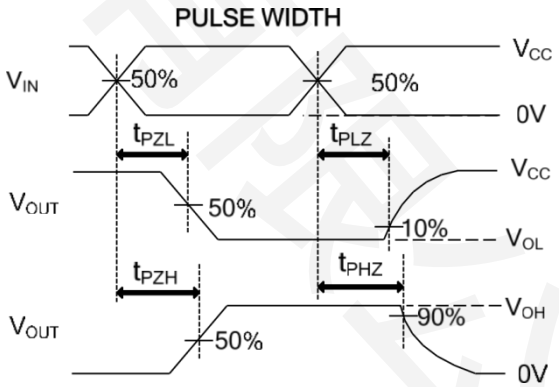


SETUP TIME ANDHOLD TIME





PROPAGATION DELAY TIMES

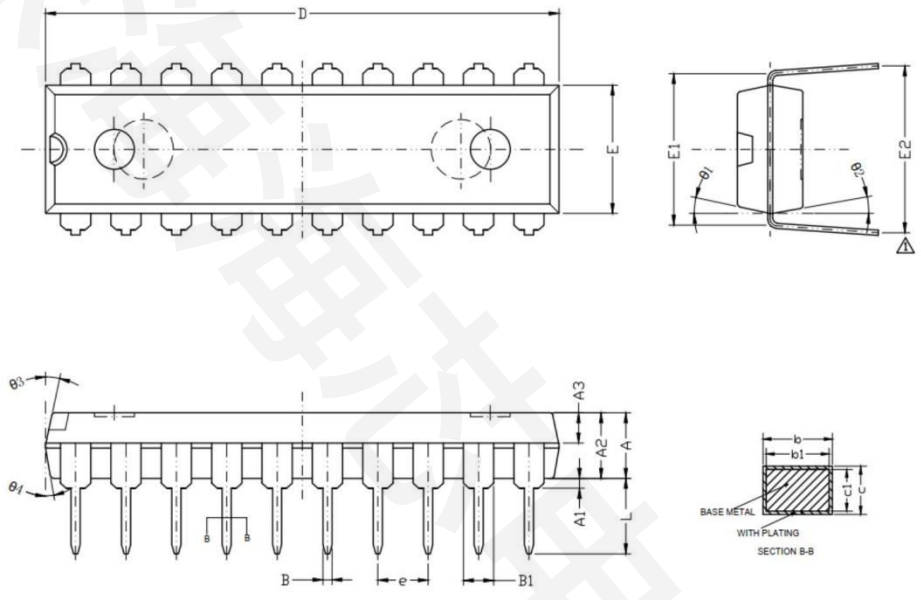


ENABLE AND DISABLE TIMES

Notes: 1. CL includes probe and jig capacitance.
2. All input pulses are supplied by generators having the following characteristics: PRR ≤1MHz, ZO= 50Ω, tr=6ns, tf=6ns.

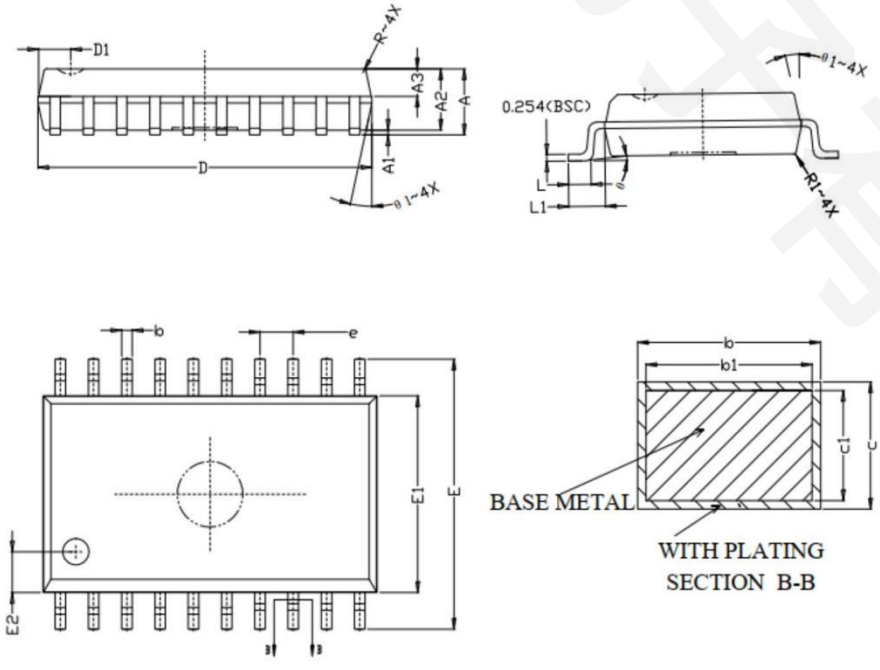
PACKAGE INFORMATION

74HC373N-HX DIP 20 package information



SYMBOL	MILLIMETER		
	MIN	MIN	MAX
A	3.60	3.80	4.00
A1	0.51	--	--
A2	3.20	3.30	3.40
A3	1.47	1.52	1.57
B	0.44	--	0.53
B1	1.52(BSC)		
b	0.44	--	0.53
b1	0.43	0.46	0.48
c	0.25	--	0.31
c1	0.24	0.25	0.26
D	25.7	25.9	26.1
E	6.35	6.55	6.75
E1	7.62(BSC)		
E2	8.00	8.40	8.80
e	2.54(BSC)		
L	3.00	--	3.60
θ1	8°	~	14°
θ2	6°	~	12°
θ3	8°	~	14°
θ4	6°	~	12°

74HC373D-HX SOP 20 package information



SYMBOL	MILLIMETER		
	MIN	MIN	MAX
A	--	--	2.615
A1	0.10	--	0.30
A2	2.29	2.34	2.39
A3	0.99	1.043	1.07
b	0.39	--	0.47
b1	0.38	0.41	0.44
c	0.25	--	0.29
c1	0.24	0.25	0.26
D	12.65	12.75	12.85
D1	1.225(BSC)		
E	10.10	10.30	10.50
E1	7.40	7.50	7.60
E2	1.55(BSC)		
e	1.27(BSC)		
L	0.854	0.864	0.874
L1	1.403(REF)		
θ	0°	~	8°
θ1	6°	~	15°
R/R1	R1.27(BSC)		