74HC541D-HX 3-TO-8 LINE DECODERS / DEMULTIPLEXERS

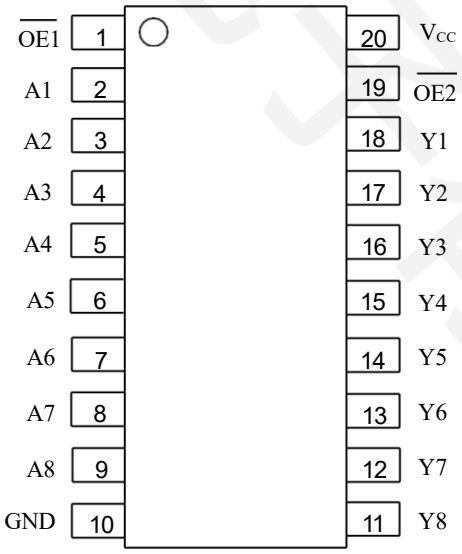
DESCRIPTION

The 74HC541D-HX is a octal buffers and line drivers with 3- state outputs and 8 channels.Packaged as SOP-20.

FEATURES

- Operate from 2V to 6V
- Max t_{PD} of 23ns at 4.5 V (C_L=50pF)
- Typical V_{IH}< 3.15V at V_{CC}=4.5V, T_A=25°C
- Typical V_{IL}> 1.35V at V_{CC}=4.5V, T_A=25°C

PIN CONFIGURATION

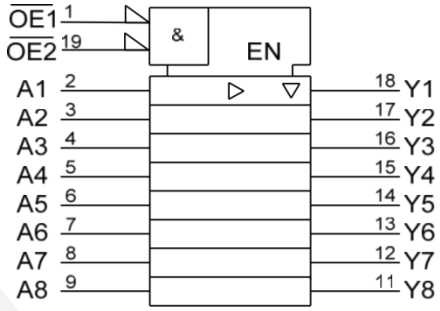


FUNCTION TABLE

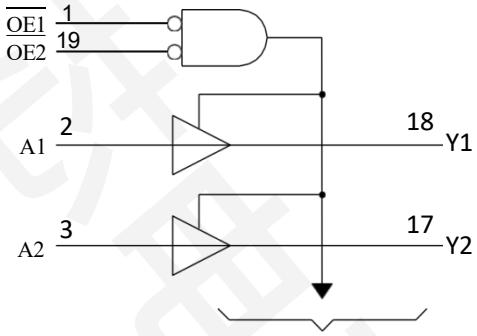
INPUTS OE1	INPUTS OE2	INPUTS(A)	OUTPUT(Y)
L	L	L	L
L	L	H	H
H	X	X	Z
X	H	X	Z

Note: H: HIGH voltage level L: LOW voltage level Z: High impedance X: Don't care

LOGIC SYMBOL



LOGIC DIAGRAM



To six other channels

ABSOLUTE MAXIMUM RATING

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

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	V_{CC}	-	2	-	6	V
High-Level Input Voltage	V_{IH}	V_{CC}=2V	1.5	-	-	V
		V_{CC}=4.5V	3.15	-	-	V
		V_{CC}=6V	4.2	-	-	V
Low-Level Input Voltage	V_{IL}	V_{CC}=2V	-	-	0.5	V
		V_{CC}=4.5V	-	-	1.35	V
		V_{CC}=6V	-	-	1.8	V
Input Voltage	V_{IN}	-	0	-	V_{CC}	V
Output Voltage	V_{OUT}	-	0	-	V_{CC}	V
Input Transition Rise or Fall Rate	t_R,t_F	V_{CC}=2V	-	-	1000	ns
		V_{CC}=4.5V	-	-	500	ns
		V_{CC}=6V	-	-	400	ns
Operating Temperature	T_A	-	-40	-	+125	°C

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

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage High-Level	V_{OH}	V_{CC}=2V, I_{OH}=-20μA	1.9	1.998	-	V
		V_{CC}=4.5V, I_{OH}=-20μA	4.4	4.499	-	V
		V_{CC}=6V, I_{OH}=-20μA	5.9	5.999	-	V
		V_{CC}=4.5V, I_{OH}=-6mA	3.98	4.3	-	V
		V_{CC}=6V, I_{OH}=-7.8mA	5.48	5.8	-	V
Output Voltage Low-Level	V_{OL}	V_{CC}=2V, I_{OL}=20μA	-	0.002	0.1	V
		V_{CC}=4.5V, I_{OL}=20μA	-	0.001	0.1	V
		V_{CC}=6V, I_{OL}=20μA	-	0.001	0.1	V
		V_{CC}=4.5V, I_{OL}=6mA	-	0.17	0.26	V
		V_{CC}=6V, I_{OL}=7.8mA	-	0.15	0.26	V
Input Leakage Current	$I_{I(LEAK)}$	V_{CC}=6V, V_{IN}= V_{CC} or GND	-	±0.1	±100	nA
Output Off-state Current	I_{OZ}	V_{CC}=6V, V_{OUT}= V_{CC} or GND	-	±0.01	±0.5	μA
Quiescent Supply Current	I_Q	V_{CC}=6V, V_{IN}=V_{CC} or GND, I_{OUT}=0	-	-	8	μA
Input Capacitance	C_{IN}	V_{CC}=2V to 6V	-	3	10	pF

SWITCHING CHARACTERISTICS (C_L=50pF, T_A=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation Delay From Input (A) to Output (Y)	t_{PLH}/t_{PHL}	V_{CC}=2V	-	40	115	ns
		V_{CC}=4.5V	-	12	23	ns
		V_{CC}=6V	-	10	20	ns
Output Enable Time From $\overline{OE}$ to Y	t_{PZL}/t_{PZH}	V_{CC}=2V	-	80	150	ns
		V_{CC}=4.5V	-	17	30	ns
		V_{CC}=6V	-	15	26	ns
Output Disable Time From $\overline{OE}$ to Y	t_{PLZ}/t_{PHZ}	V_{CC}=2V	-	40	150	ns
		V_{CC}=4.5V	-	18	30	ns
		V_{CC}=6V	-	17	26	ns
Output Y	t_t	V_{CC}=2V	-	28	60	ns
		V_{CC}=4.5V	-	8	12	ns
		V_{CC}=6V	-	6	10	ns

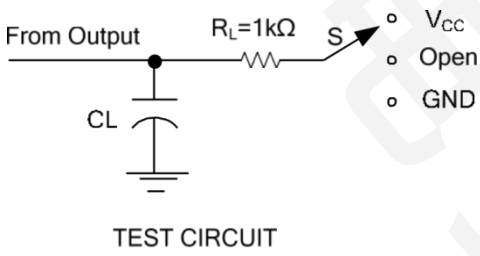
SWITCHING CHARACTERISTICS (C_L=150pF, T_A=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation Delay From Input (A) to Output (Y)	t_{PLH}/t_{PHL}	V_{CC}=2V	-	65	165	ns
		V_{CC}=4.5V	-	16	33	ns
		V_{CC}=6V	-	14	28	ns
Output Enable Time From $\overline{OE}$ to Y	t_{PZL}/t_{PZH}	V_{CC}=2V	-	100	200	ns
		V_{CC}=4.5V	-	20	40	ns
		V_{CC}=6V	-	17	34	ns
Output Y	t_t	V_{CC}=2V	-	45	210	ns
		V_{CC}=4.5V	-	17	42	ns
		V_{CC}=6V	-	13	36	ns

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

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	C_{PD}	No Load	-	35	-	pF

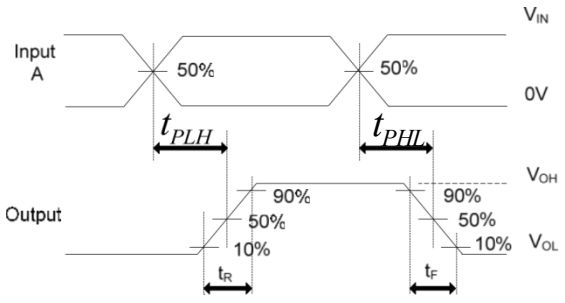
TEST CIRCUIT AND WAVEFORMS



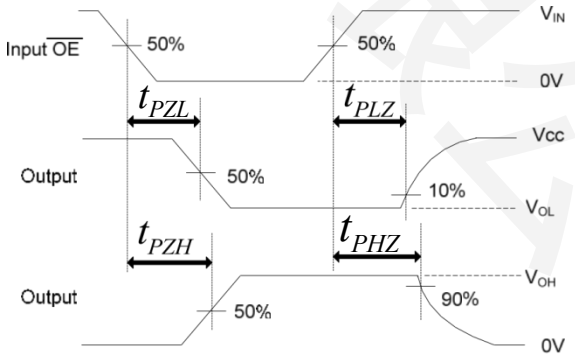
TEST CIRCUIT

TEST	S
t_{PLH}/t_{PHL}	Open
t_{PHZ}/t_{PZH}	GND
t_{PLZ}/t_{PZL}	Vcc

Parameter		RL	CL
t_{en}	t_{PZH}	1KΩ	50 pF or 150 pF
	t_{PZL}		
t_{dis}	t_{PZH}	1KΩ	50 pF
	t_{PZL}		
t_{PD} or t_t		—	50 pF or 150 pF



PROPAGATION DELAY TIMES



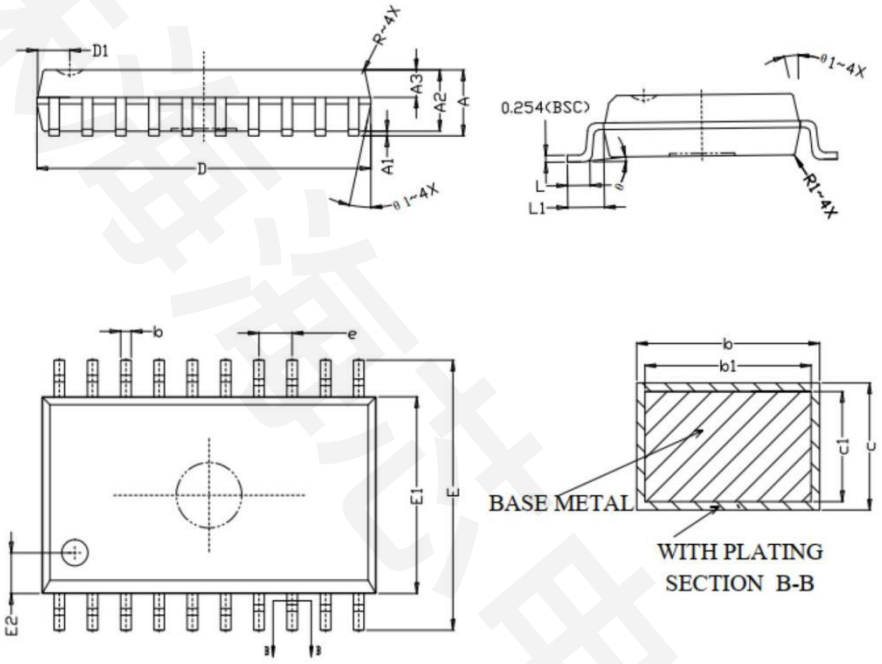
ENABLE AND DISABLE TIMES

Notes: 1. C_L includes probe and jig capacitance.

2. All input pulses are supplied by generators having the following characteristics: PRR ≤1MHz, Z_O = 50Ω, t_r = 6ns, t_f = 6ns.

PACKAGE INFORMATION

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)		