

74HC244D-HX/74HC244N-HX OCTAL BUFFER AND LINE DRIVER WITH 3-STATE OUTPUT

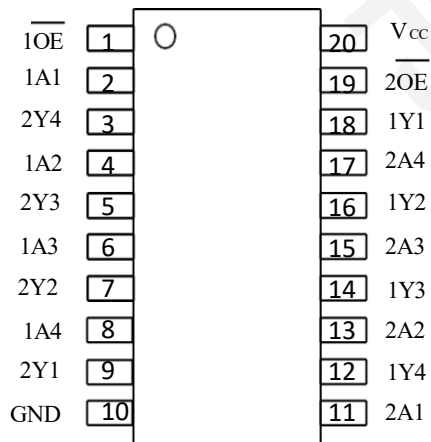
DESCRIPTION

The 74HC244D-HX/74HC244N-HX is an 8-bit buffer/line driver featuring three-state outputs. It can be configured either as two independent 4-bit buffers or as a single 8-bit buffer. The device incorporates two output-enable inputs (1OE and 2OE), each controlling a group of four three-state outputs. A logic HIGH applied to either nOE input places the corresponding outputs into a high-impedance (OFF) state. Input pins include integrated clamp diodes, enabling the use of current-limiting resistors when interfacing with signal sources operating at voltages exceeding VCC.

FEATURES

- ★ Operation voltage range: 2 ~ 6V
- ★ 3-state output
- ★ Output Drive Capability: 15 LSTTL Loads
- ★ Latch-up performance ≤ 250 mA
- ★ ESD protection:
 - HBM: ANSI/ESDA/JEDEC JS-001 2023 exceeds 2000 V
 - CDM: ANSI/ESDA/JEDEC JS-002 2022 exceeds 1000 V
- ★ Package option: DIP-20 and SOP-20

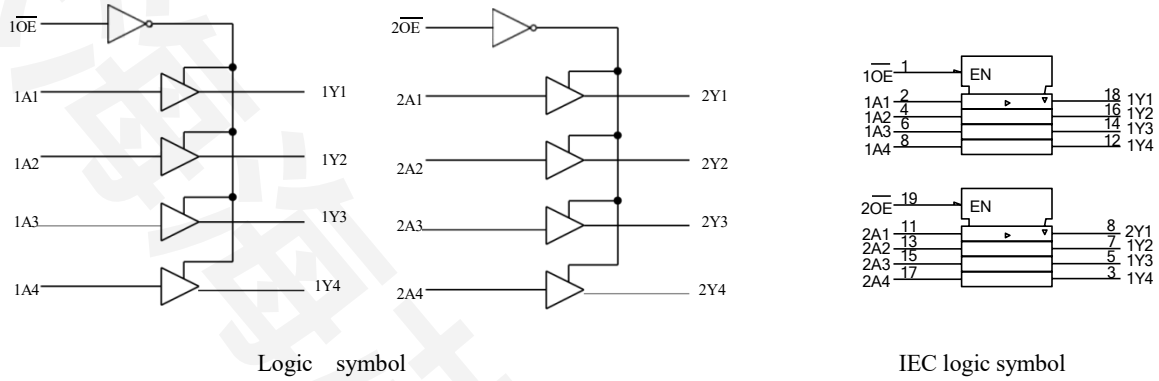
PIN CONFIGURATION



FUNCTION TABLE

INPUT(nOE)	INPUT(nAn)	OUTPUT(nYn)
H	×	Z
L	H	H
L	L	L

LOGIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS (T_A=25°C, unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V _{CC}	-0.5 ~ 7	V
Input Clamp Current	I _{IK}	±20	mA
Output Clamp Current	I _{OK}	±20	mA
Output Current	I _{OUT}	±35	mA
VCC or GND Current	I _{CC}	±70	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	CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	V _{CC}		2	-	6	V
Input Voltage	V _{IN}		0	-	V _{CC}	V
Output Voltage	V _{OUT}		0	-	V _{CC}	V
Input Rise or Fall Times	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

STATIC CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	T _A =25°C			T _A =-40~+125°C			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
High-Level Input Voltage	V _{IH}	V _{CC} =2V	1.5	-	-	1.5	-	-	V
		V _{CC} =4.5V	3.15	-	-	3.15	-	-	V
		V _{CC} =6V	4.2	-	-	4.2	-	-	V
Low-Level Input Voltage	V _{IL}	V _{CC} =2V	-	-	0.5	-	-	0.5	V
		V _{CC} =4.5V	-	-	1.35	-	-	1.35	V
		V _{CC} =6V	-	-	1.8	-	-	1.8	V
High-Level Output Voltage	V _{OH}	V _{CC} =2V, I _{OH} =-20μA	1.9	1.995	-	1.9	-	-	V
		V _{CC} =4.5V, I _{OH} =-20μA	4.4	4.490	-	4.4	-	-	V
		V _{CC} =6V, I _{OH} =-20μA	5.9	5.980	-	5.9	-	-	V
		V _{CC} =4.5V, I _{OH} =-6mA	3.98	4.37	-	3.7	-	-	V
		V _{CC} =6V, I _{OH} =-7.8mA	5.48	5.85	-	5.2	-	-	V
Low-Level Output Voltage	V _{OL}	V _{CC} =2V, I _{OL} =20μA	-	0.002	0.1	-	-	0.1	V
		V _{CC} =4.5V, I _{OL} =20μA	-	0.002	0.1	-	-	0.1	V
		V _{CC} =6V, I _{OL} =20μA	-	0.003	0.1	-	-	0.1	V
		V _{CC} =4.5V, I _{OL} =6mA	-	0.11	0.26	-	-	0.4	V
		V _{CC} =6V, I _{OL} =7.8mA	-	0.14	0.26	-	-	0.4	V
Input Leakage Current	I _{I(LEAK)}	V _{CC} =6V, V _{IN} =V _{CC} or 0	-	-	±100	-	-	±1000	nA
Output OFF-State Current	I _{OZ}	V _{CC} =6V, V _{OUT} =V _{CC} or 0, V _{IN} =V _{IH} or V _{IL}	-	-	±0.5	-	-	±10	μA
Quiescent Supply Current	I _Q	V _{CC} =6V, V _{IN} =V _{CC} or 0, I _{OUT} =0	-	-	8	-	-	160	μA

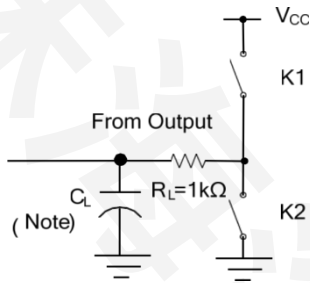
DYNAMIC CHARACTERISTICS (Input: t_R, t_F=6ns, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	T _A =25°C			T _A =-40~+125°C			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
Propagation delay from input (A) to output(Y)	t _{PLH} /t _{PHL}	V _{CC} =2V, C _L =50pF	-	30	115	-	-	145	ns
		V _{CC} =2V, C _L =150pF	-	56	165	-	-	245	ns
		V _{CC} =4.5V, C _L =50pF	-	17	23	-	-	34	ns
		V _{CC} =4.5V, C _L =150pF	-	25	33	-	-	49	ns
		V _{CC} =6V, C _L =50pF	-	11	20	-	-	25	ns
		V _{CC} =6V, C _L =150pF	-	15	28	-	-	42	ns
3-state output enable time n OE to nYn	t _{PZH} /t _{PZL}	V _{CC} =2V, C _L =50pF	-	30	150	-	-	190	ns
		V _{CC} =2V, C _L =150pF	-	100	200	-	-	300	ns
		V _{CC} =4.5V, C _L =50pF	-	15	30	-	-	45	ns
		V _{CC} =4.5V, C _L =150pF	-	20	40	-	-	60	ns
		V _{CC} =6V, C _L =50pF	-	10	26	-	-	32	ns
		V _{CC} =6V, C _L =150pF	-	17	34	-	-	51	ns
3-state output disable time n OE to nYn	t _{PHZ} /t _{PLZ}	V _{CC} =2V, C _L =50pF	-	26	150	-	-	190	ns
		V _{CC} =4.5V, C _L =50pF	-	17	30	-	-	45	ns
		V _{CC} =6V, C _L =50pF	-	14	26	-	-	32	ns

OPERATING CHARACTERISTICS

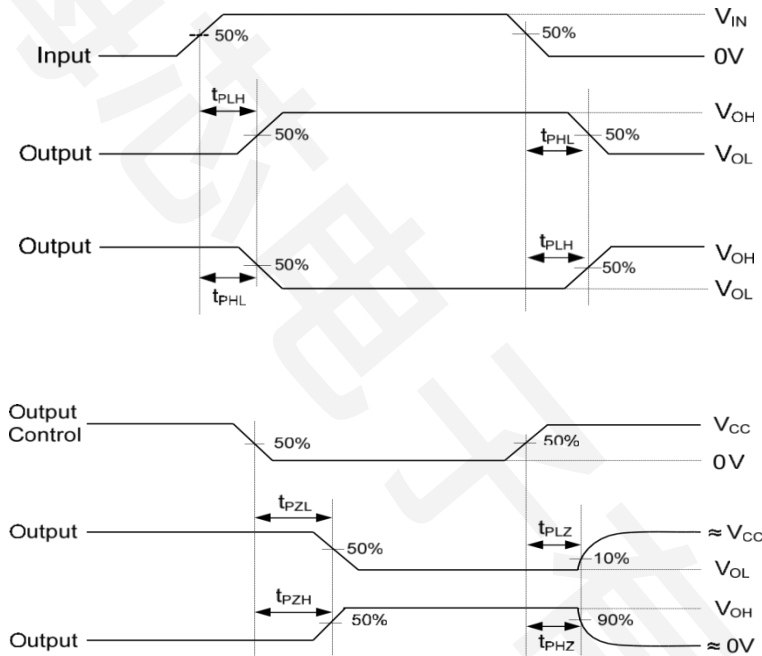
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Input Capacitance	C _{IN}	V _{CC} =2V~6V	-	3	10	pF
Power Dissipation Capacitance	C _{PD}	No load	-	35	-	pF

TEST CIRCUIT AND WAVEFORMS



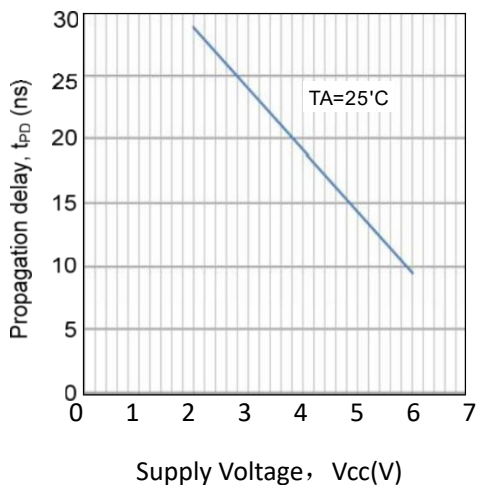
TEST	K1	K2
t_{PLH}/t_{PHL}	Open	Open
t_{PHZ}/t_{PZH}	open	Close
t_{pLz}/t_{pZL}	close	Open

Note: C_L includes probe and jig capacitance.

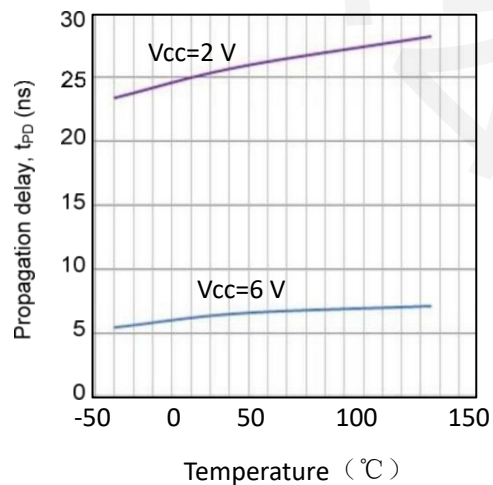


TYPICAL CHARACTERISTICS

propagation delay Vs. supply voltage

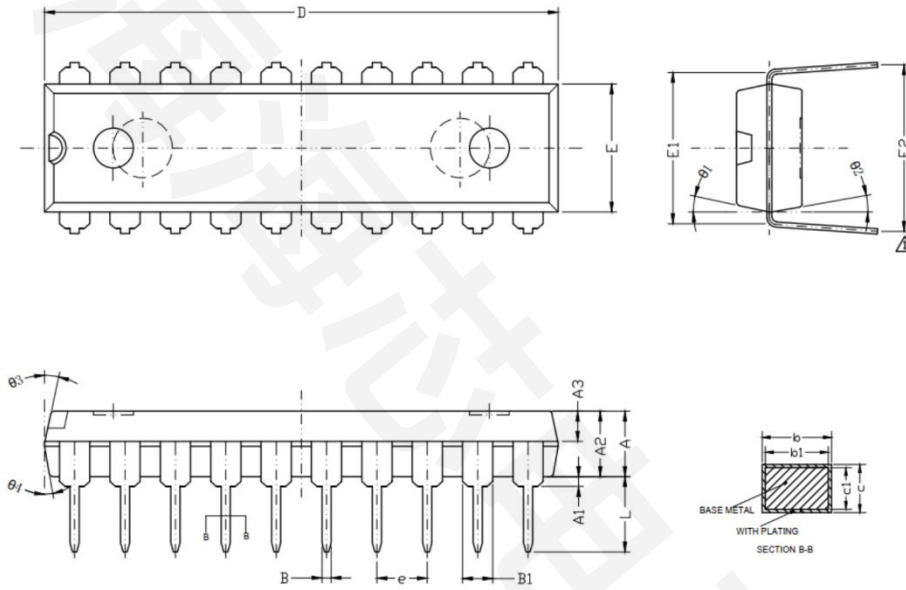


propagation delay Vs. supply voltage



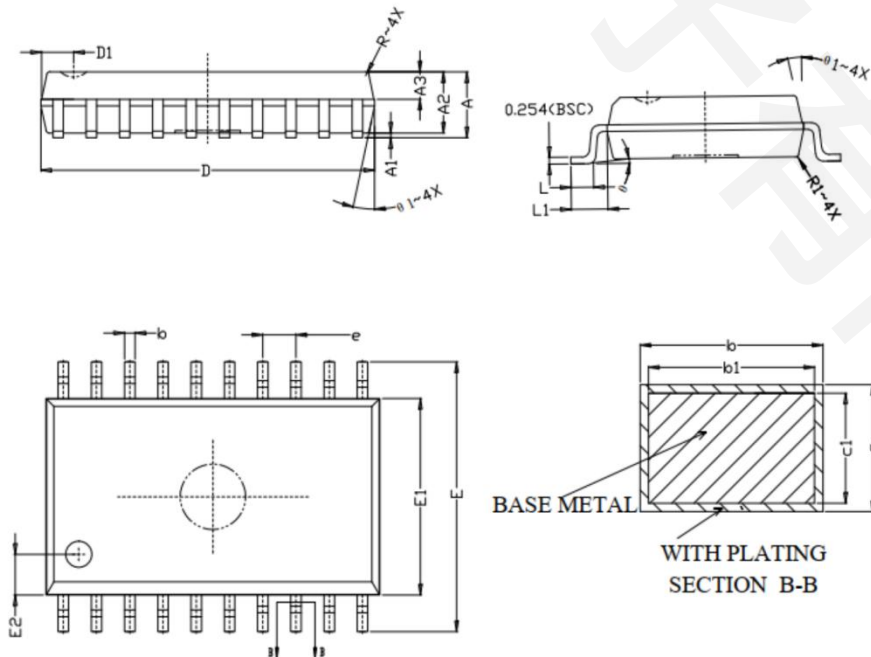
PACKAGE INFORMATION

74HC244N-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
theta1	8°	~	14°
theta2	6°	~	12°
theta3	8°	~	14°
theta4	6°	~	12°

74HC244D-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)		
theta	0°	~	8°
theta1	6°	~	15°
R/R1	R1.27(BSC)		