74HC08D-HX/74HC08N-HX Quad 2-input and gates

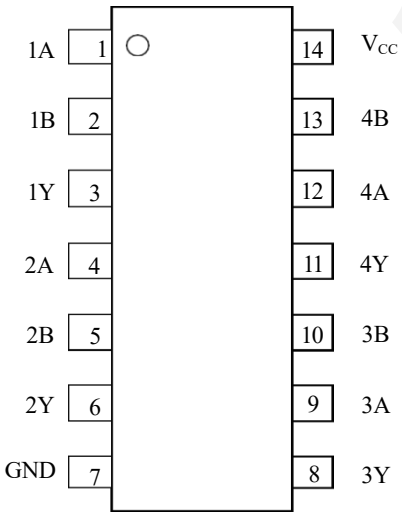
Description

The 74HC08D-HX/74HC08N-HX contains four independent 2-input AND gates,perform the Boolean function $Y = A \cdot B$ or $Y = \overline{\overline{A} + \overline{B}}$ in positive logic.

Features

- ★ Operation Voltage Range:2~6V
- ★ Low Quiescent Current:ICC=2μA (Max)
- ★ High Speed:tPD=8ns(Typ)
- ★ Low Input Current:100nA (Max)
- ★ ESD protection:
  - HBM: ANSI/ESDA/JEDEC JS-001 2023 exceeds 1000 V
  - CDM: ANSI/ESDA/JEDEC JS-002 2022 exceeds 2000 V
- ★ Latch-up performance ≤ 250 mA
- ★ Package Option：DIP-14 and SOP-14

Pin Configuration



DIP-14 and SOP-14

Function Tables (Each Gate)

INPUT(A)	INPUT(B)	OUTPUT(Y)
H	H	H
H	L	L
L	H	L
L	L	L

LOGIC DIAGRAM (Positive Logic)

ABSOLUTE MAXIMUM RATING (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}	±25	mA
VCC or GND Current	I_{CC}	±50	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
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	
		V_{CC}=6V	-	-	400	
Operating Temperature	T_A	-	-40	-	+125	°C

Thermal Data

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	DIP-14	θ_{JA}	100	°C/W
	SOP-14		125	°C/W

Static Characteristics (TA=25°C ,unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
High-Level Input Voltage	V_{IH}	V_{CC}=2V	1.5	-	-	V
		V_{CC}=4.5V	3.15	-	-	
		V_{CC}=6V	4.2	-	-	
Low-Level Input Voltage	V_{IL}	V_{CC}=2V	-	-	0.5	V
		V_{CC}=4.5V	-	-	1.35	
		V_{CC}=6V	-	-	1.8	
High-Level Output Voltage	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_{CC}=6V, I_{OH}=20μA	5.9	5.999	-	
		V_{CC}=4.5V, I_{OH}=4mA	3.98	4.32	-	
		V_{CC}=6V, I_{OH}=5.2mA	5.48	5.81	-	
Low-Level Output Voltage	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_{CC}=6V, I_{OL}=20μA	-	0.001	0.1	
		V_{CC}=4.5V, I_{OL}=4mA	-	0.15	0.26	
		V_{CC}=6V, I_{OL}=5.2mA	-	0.16	0.26	
Input Leakage Current	$I_{I(LEAK)}$	V_{CC}= 6V, V_{IN}=V_{CC} or GND	-	±0.1	±100	nA
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~6V	-	3	10	pF

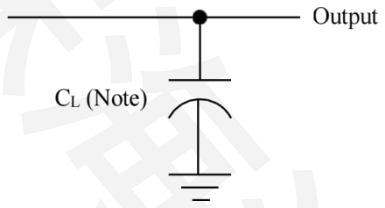
Dynamic Characteristics (T_A=25OC, Input: t_R=t_F=6ns, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation delay from Input(A or B) to Output(Y)	t_{PLH}, t_{PHL}	V_{CC}=2V, C_L=50pF	-	25	90	ns
		V_{CC}=4.5V, C_L=50pF	-	9	18	
		V_{CC}=6V, C_L=50pF	-	7	15	
Output Transition Time	t_T	V_{CC}=2V	-	19	75	ns
		V_{CC}=4.5V	-	7	15	
		V_{CC}=6V	-	6	13	

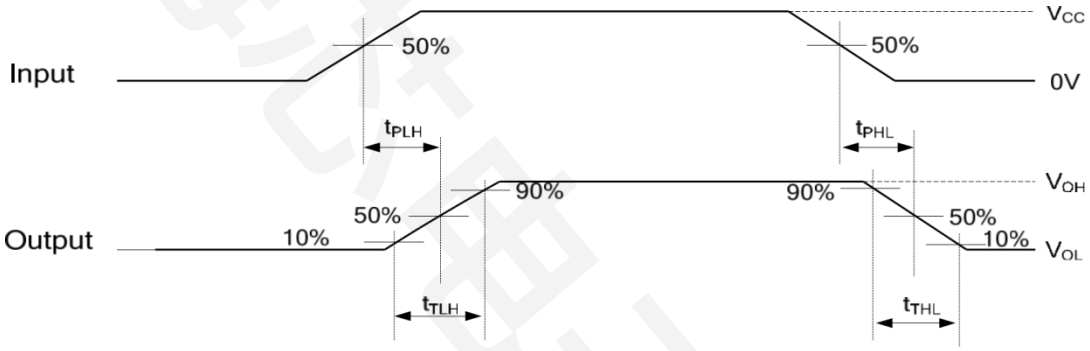
Operating Characteristics (T_A=25OC, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITION	RATINGS	UNIT
Power Dissipation Capacitance	C_{PD}	No Load	20	pF

Test Circuit and Waveforms

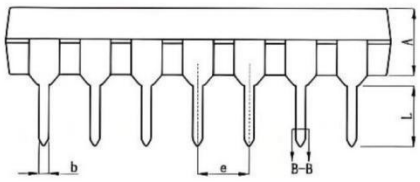


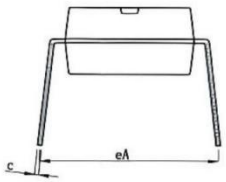
Note: CL includes probe and jig capacitance.



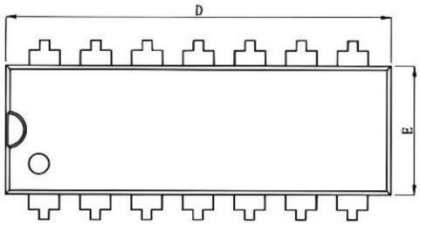
Package Information

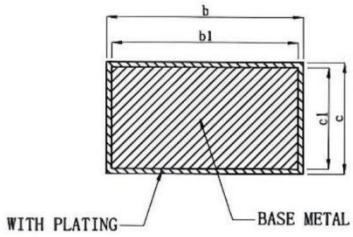
74HC08N-HX DIP 14 package information





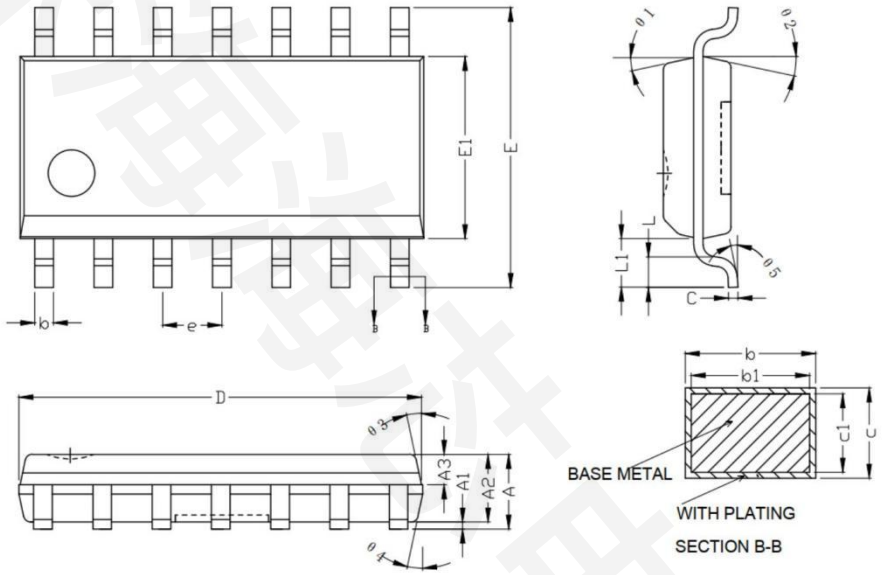
Symbol	Millimeter		
	Min	Nom	Max
A	3.20	3.30	3.40
b	0.44	----	0.53
b1	0.43	0.46	0.49
c	0.25	----	0.30
c1	0.24	0.25	0.26
D	18.95	19.05	19.15
E	6.25	6.35	6.45
e	2.54BSC		
eA	7.62	----	9.50
L	3.00	----	----





SECTION B-B

74HC08D-HX SOP 14 package information



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	--	--	1.70
A1	0.10	0.15	0.21
A2	1.40	1.45	1.50
A3	0.60	0.65	0.70
b	0.33	--	0.47
b1	0.32	0.41	0.44
c	0.20	--	0.24
c1	0.19	0.20	0.21
D	8.45	8.60	8.75
E	5.80	6.00	6.20
E1	3.85	3.90	4.00
e	1.27(BSC)		
L	0.50	0.60	0.70
L1	1.10(BSC)		
θ1	8°	~	15°
θ2	8°	~	15°
θ3	8°	~	15°
θ4	8°	~	15°
θ5	0°	~	6°