



# U74HC08

**CMOS IC**

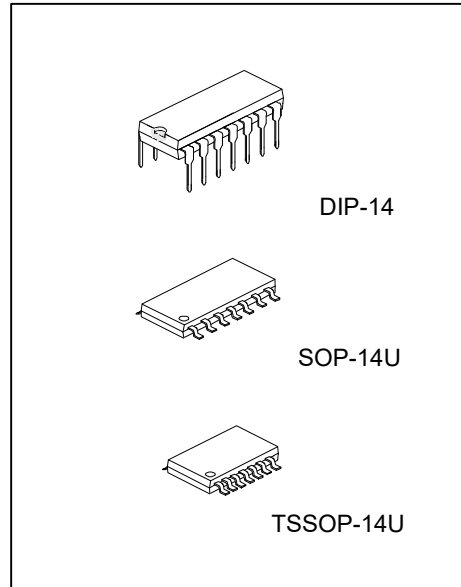
## QUAD 2-INPUT AND GATES

### DESCRIPTION

The **U74HC08** contains four independent 2-input AND gates, perform the Boolean function  $Y = A \cdot B$  or  $Y = \overline{A + B}$  in positive logic.

### FEATURES

- \* Operation Voltage Range: 2~6V
- \* Low Quiescent Current:  $I_{CC}=2\mu A$  (Max)
- \* High Speed:  $t_{PD}=8ns$ (Typ)
- \* Low Input Current: 100nA (Max)



### ORDERING INFORMATION

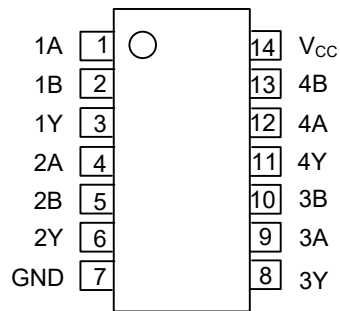
Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74HC08L-D14-T	U74HC08G-D14-T	DIP-14	Tube
U74HC08L-UEA-R	U74HC08G-UEA-R	SOP-14U	Tape Reel
U74HC08L-UEB-R	U74HC08G-UEB-R	TSSOP-14U	Tape Reel

<p>U74HC08G-D14-T</p> <ul style="list-style-type: none"> <li>(1) Packing Type</li> <li>(2) Package Type</li> <li>(3) Green Package</li> </ul>	<ul style="list-style-type: none"> <li>(1) T: Tube, R: Tape Reel</li> <li>(2) D14: DIP-14, UEA: SOP-14U, UEB: TSSOP-14U</li> <li>(3) G: Halogen Free and Lead Free, L: Lead Free</li> </ul>
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### MARKING

DIP-14	SOP-14U / TSSOP-14U
<p>Pin 14 to 8: Date Code            UTC □□□□: L: Lead Free            U74HC08 □: G: Halogen Free            □□: Lot Code</p>	<p>Pin 14 to 8: Date Code            UTC □□□□: L: Lead Free            U74HC08 □: G: Halogen Free            □□: Lot Code</p>

■ PIN CONFIGURATION



■ FUNCTION TABLE (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

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	$V_{CC}$	-0.5~7	V
Input Clamp Current	$I_{IK}$	$\pm 20$	mA
Output Clamp Current	$I_{OK}$	$\pm 20$	mA
Output Current	$I_{OUT}$	$\pm 25$	mA
$V_{CC}$ or GND Current	$I_{CC}$	$\pm 50$	mA
Storage Temperature	$T_{STG}$	-65 ~ +150	$^{\circ}C$

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	$^{\circ}C$

## ■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	DIP-14	100	$^{\circ}C/W$
	SOP-14U	125	$^{\circ}C/W$
	TSSOP-14U	150	$^{\circ}C/W$

## ■ STATIC CHARACTERISTICS ( $T_A=25^{\circ}C$ , 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	$V_{OH}$	$V_{CC}=2V, I_{OH}=20\mu A$	1.9	1.998		V
		$V_{CC}=4.5V, I_{OH}=20\mu A$	4.4	4.499		
		$V_{CC}=6V, I_{OH}=20\mu A$	5.9	5.999		
		$V_{CC}=4.5V, I_{OH}=4mA$	3.98	4.3		
		$V_{CC}=6V, I_{OH}=5.2mA$	5.48	5.8		
Low-Level Output Voltage	$V_{OL}$	$V_{CC}=2V, I_{OL}=20\mu A$		0.002	0.1	V
		$V_{CC}=4.5V, I_{OL}=20\mu A$		0.001	0.1	
		$V_{CC}=6V, I_{OL}=20\mu A$		0.001	0.1	
		$V_{CC}=4.5V, I_{OL}=4mA$		0.17	0.26	
		$V_{CC}=6V, I_{OL}=5.2mA$		0.15	0.26	
Input Leakage Current	$I_{I(LEAK)}$	$V_{CC}=6V, V_{IN}=V_{CC}$ or GND		$\pm 0.1$	$\pm 100$	nA
Quiescent Supply Current	$I_Q$	$V_{CC}=6V, V_{IN}=V_{CC}$ or GND, $I_{OUT}=0$			2	$\mu A$
Input Capacitance	$C_{IN}$	$V_{CC}=2V\sim 6V$		3	10	pF

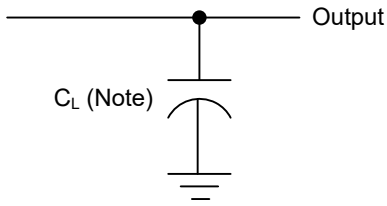
■ DYNAMIC CHARACTERISTICS ( $T_A=25^\circ\text{C}$ , Input:  $t_R=t_F=6\text{ns}$ , unless otherwise specified )

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation delay from Input(A or B) to Output(Y)	$t_{PLH}, t_{PHL}$	$V_{CC}=2\text{V}, C_L=50\text{pF}$		50	100	ns
		$V_{CC}=4.5\text{V}, C_L=50\text{pF}$		10	20	
		$V_{CC}=6\text{V}, C_L=50\text{pF}$		8	17	
Output Transition Time	$t_T$	$V_{CC}=2\text{V}$		38	75	ns
		$V_{CC}=4.5\text{V}$		8	15	
		$V_{CC}=6\text{V}$		6	13	

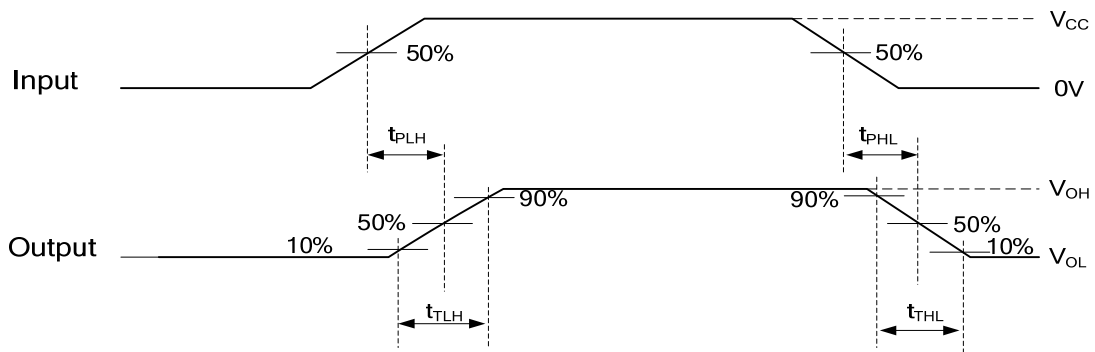
■ OPERATING CHARACTERISTICS ( $T_A=25^\circ\text{C}$ , unless otherwise specified)

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

■ TEST CIRCUIT AND WAVEFORMS



Note:  $C_L$  includes probe and jig capacitance.



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