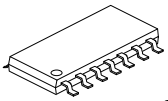
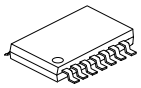
U74HCT08

CMOS IC

QUAD 2-INPUT AND GATES



SOP-14U



TSSOP-14U

■ DESCRIPTION

The **U74HCT08** contains four independent 2-input AND gates, perform the Boolean function $Y = A \bullet B$ or $Y = \overline{\overline{A} + \overline{B}}$ in positive logic.

■ FEATURES

* Operation Voltage Range: 4.5 ~ 5.5V
* Low Power Dissipation: I_{CC}=20μA (Max.)
* High Speed: t_{PD}=13ns (Typ.)
* Low Input Current: 1μA (Max.)
* Input are TTL-Voltage Compatible

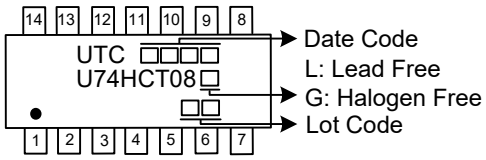
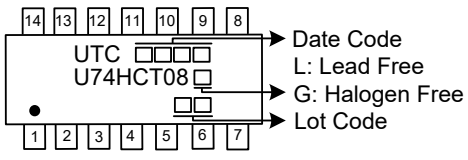
■ ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74HCT08L-UEA-R	U74HCT08G-UEA-R	SOP-14U	Tape Reel
U74HCT08L-UEB-R	U74HCT08G-UEB-R	TSSOP-14U	Tape Reel

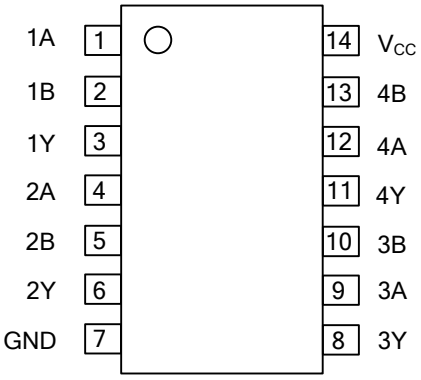
U74HCT08G-UEA-R
(1)Packing Type
(2)Package Type
(3)Green Package

(1) R: Tape Reel
(2) UEA: SOP-14U, UEB: TSSOP-14U
(3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING

SOP-14U	TSSOP-14U
	

■ 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}	±20	mA
Output Clamp Current	I_{OK}	±20	mA
Output Current	I_{OUT}	±25	mA
V_{CC} 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	ONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	V_{CC}		4.5	5.0	5.5	V
Input Voltage	V_{IN}		0		V_{CC}	V
Output Voltage	V_{OUT}		0		V_{CC}	V
Input Transition Rise or Fall Times	Δt/Δv				500	ns
Operating Ambient Temperature	T_A		-40		+125	°C

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	SOP-14U	θ_{JA}	95	°C/W
	TSSOP-14U		120	°C/W

■ ELECTRICAL CHARACTERISTICS (T_A = 25°C)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
High-Level Input Voltage	V_{IH}	V_{CC}=4.5V~5.5V	2			V
Low-Level Input Voltage	V_{IL}	V_{CC}=4.5V~5.5V			0.8	V
High-Level Output Voltage	V_{OH}	V_{CC}=4.5V, I_{OH}=-20μA	4.4	4.499		V
		V_{CC}=4.5V, I_{OH}=-4mA	3.98	4.3		V
Low-Level Output Voltage	V_{OL}	V_{CC}=4.5V, I_{OL}=20μA		0.001	0.1	V
		V_{CC}=4.5V, I_{OL}=4mA		0.17	0.26	V
Input Leakage Current	$I_{I(LEAK)}$	V_{CC}=5.5V, V_{IN}=V_{CC} or GND		±0.1	±100	nA
Quiescent Supply Current	I_Q	V_{CC}=5.5V, V_{IN}=V_{CC} or GND, I_{OUT}=0			2	μA
Additional Quiescent Supply Current	ΔI_Q	V_{CC}=5.5V, One input at 0.5V or 2.4V, other inputs at 0 or V_{CC}		1.4	2.4	mA
Input Capacitance	C_{IN}	V_{CC}=4.5V~5.5V		3	10	pF

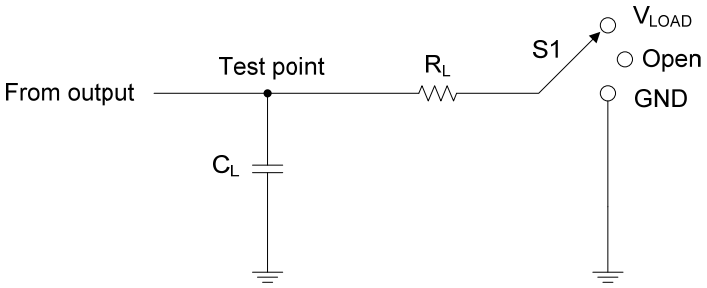
■ SWITCHING CHARACTERISTICS (T_A=25°C, Input: t_R=t_F=6ns, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Propagation delay from input (nA) and (nB) to output(nY)	t_{PHL} /t_{PLH}	C_L = 50pF	V_{CC}=4.5V		15	24	ns
			V_{CC}=5.5V		13	22	ns
Output Transition Time	t_{THL} /t_{TLH}	C_L = 50pF	V_{CC}=4.5V		9	15	ns
			V_{CC}=5.5V		8	14	ns

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

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

■ TEST CIRCUIT AND WAVEFORMS

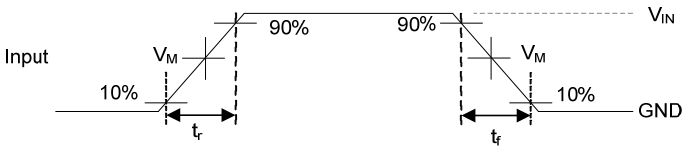


TEST CIRCUIT

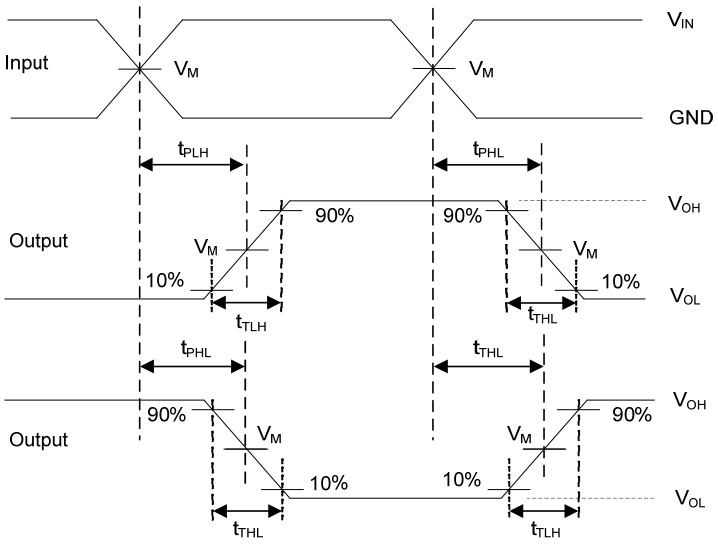
TEST	S1
t_{PLH}/t_{PHL}	Open

Note: t_{PD} is the same as t_{PHL} and t_{PLH}.

V_{CC}	Inputs		V_M	V_{LOAD}	C_L
5V±0.5V	V_{IN}	t_r, t_f			
	3.0 V	6 ns	1.3V	V_{CC}	50 pF



VOLTAGE WAVEFORMS
INPUT RISE AND FALL TIMES



VOLTAGE WAVEFORMS
PROPAGATION DELAY AND OUTPUT TRANSITION TIMES