



U74HCT08

CMOS IC

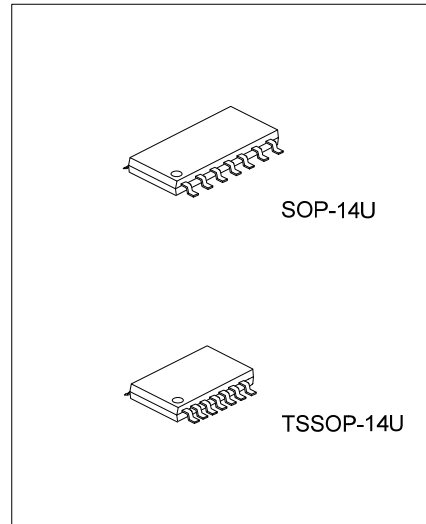
QUAD 2-INPUT AND GATES

DESCRIPTION

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

FEATURES

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



ORDERING INFORMATION

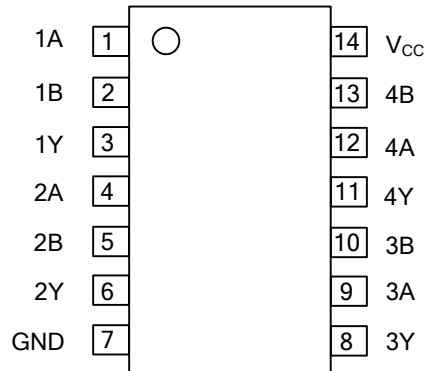
| Ordering Number | | Package | Packing |
|-----------------|-----------------|-----------|-----------|
| Lead Free | Halogen Free | | |
| U74HCT08L-UEA-R | U74HCT08G-UEA-R | SOP-14U | Tape Reel |
| U74HCT08L-UEB-R | U74HCT08G-UEB-R | TSSOP-14U | Tape Reel |

| | |
|--|--|
| <p>U74HCT08G-UEA-R</p> <pre> (1)Packing Type (2)Package Type (3)Green Package </pre> | <p>(1) R: Tape Reel (2) UEA: SOP-14U, UEB: TSSOP-14U (3) G: Halogen Free and Lead Free, L: Lead Free</p> |
|--|--|

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 | $^{\circ}C$ |

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 | CONDITIONS | 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 | $\Delta t/\Delta v$ | | | | 500 | ns |
| Operating Ambient Temperature | T_A | | -40 | | +125 | $^{\circ}C$ |

■ THERMAL DATA

| PARAMETER | SYMBOL | RATINGS | UNIT |
|---------------------|-----------|---------|---------------|
| Junction to Ambient | SOP-14U | 95 | $^{\circ}C/W$ |
| | TSSOP-14U | 120 | $^{\circ}C/W$ |

■ ELECTRICAL CHARACTERISTICS ($T_A = 25^{\circ}C$)

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|-------------------------------------|---------------|--|------|-----------|-----------|---------|
| High-Level Input Voltage | V_{IH} | $V_{CC}=4.5V\sim 5.5V$ | 2 | | | V |
| Low-Level Input Voltage | V_{IL} | $V_{CC}=4.5V\sim 5.5V$ | | | 0.8 | V |
| High-Level Output Voltage | V_{OH} | $V_{CC}=4.5V, I_{OH}=-20\mu A$ | 4.4 | 4.499 | | V |
| | | $V_{CC}=4.5V, I_{OH}=-4mA$ | 3.98 | 4.3 | | V |
| Low-Level Output Voltage | V_{OL} | $V_{CC}=4.5V, I_{OL}=20\mu A$ | | 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} | $V_{CC}=4.5V\sim 5.5V$ | | 3 | 10 | pF |

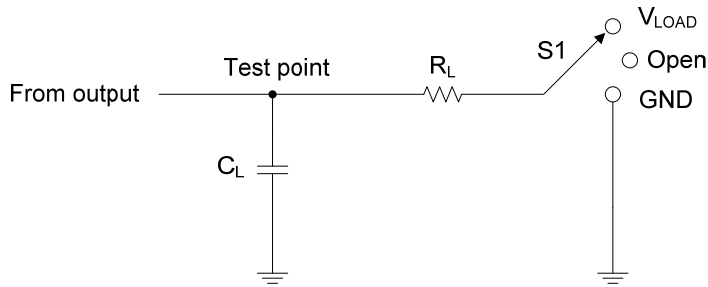
■ SWITCHING CHARACTERISTICS ($T_A=25^{\circ}C$, Input: $t_R=t_F=6ns$, unless otherwise specified)

| 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 ($T_A=25^{\circ}C$, unless otherwise specified)

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

■ TEST CIRCUIT AND WAVEFORMS

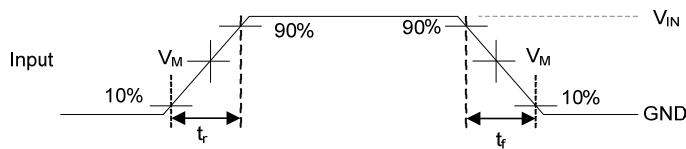


| TEST | S1 |
|-------------------|------|
| t_{PLH}/t_{PHL} | Open |

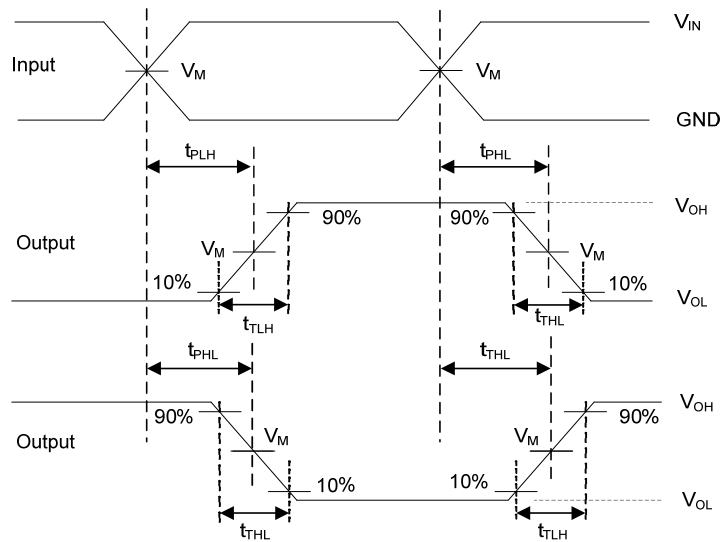
Note: t_{PD} is the same as t_{PHL} and t_{PLH} .

TEST CIRCUIT

| V_{CC} | Inputs | | V_M | V_{LOAD} | C_L |
|---------------|----------|------------|-------|------------|-------|
| $5V \pm 0.5V$ | V_{IN} | t_r, t_f | 1.3V | V_{CC} | 50 pF |
| | 3.0 V | 6 ns | | | |



VOLTAGE WAVEFORMS
INPUT RISE AND FALL TIMES



VOLTAGE WAVEFORMS
PROPAGATION DELAY AND OUTPUT TRANSITION TIMES

UTC assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all UTC products described or contained herein. UTC products are not designed for use in life support appliances, devices or systems where malfunction of these products can be reasonably expected to result in personal injury. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner. UTC reserves the right to make changes to information published in this document, including without limitation specifications and product descriptions, at any time and without notice. This document supersedes and replaces all information supplied prior to the publication hereof.