

**UCD4081B**

Preliminary

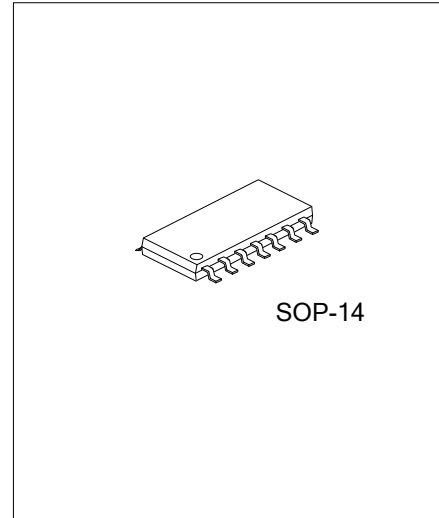
CMOS IC

**QUAD 2-INPUT AND  
BUFFERED B SERIES GATE****DESCRIPTION**

The **UTC UCD4081B** contains four independent 2-input AND gates, they perform the function  $Y=A \bullet B$  in positive logic.

**FEATURES**

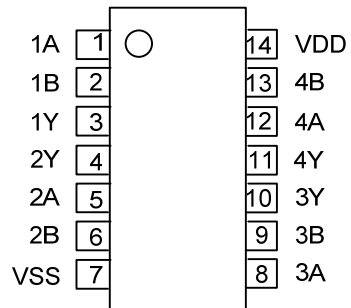
- \* 5V-10V-15V Parametric Ratings
- \* Quad 2-Input AND Gate
- \* Symmetrical Output Characteristics
- \* Maximum Input Current of 1uA at 15V Over Full Package Temperature Range
- \* Low Power TTL:  
Fan Out of 2 Driving 74L or 1 Driving 74LS Compatibility

**ORDERING INFORMATION**

| Ordering Number |                 | Package | Packing   |
|-----------------|-----------------|---------|-----------|
| Lead Free       | Halogen Free    |         |           |
| UCD4081BL-S14-R | UCD4081BG-S14-R | SOP-14  | Tape Reel |

|                 |                  |                                   |
|-----------------|------------------|-----------------------------------|
| UCD4081BL-S14-R | (1) Packing Type | (1) R: Tape Reel                  |
|                 | (2) Package Type | (2) S14: SOP-14                   |
|                 | (3) Lead Free    | (3) L: Lead Free, G: Halogen Free |

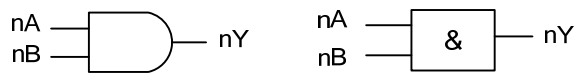
## ■ PIN CONFIGURATION



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

| PARAMETER           | SYMBOL     | RATINGS               | UNIT               |
|---------------------|------------|-----------------------|--------------------|
| Supply Voltage      | $V_{DD}$   | -0.5 ~ 18             | V                  |
| Input Voltage       | $V(nA,nB)$ | -0.5 ~ $V_{DD} + 0.5$ | V                  |
| Storage Temperature | $T_{STG}$  | -65 ~ + 150           | $^{\circ}\text{C}$ |

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    | RATINGS    | UNIT               |
|-----------------------|-----------|------------|--------------------|
| Supply Voltage        | $V_{DD}$  | 3 ~ 15     | V                  |
| Operating Temperature | $T_{OPR}$ | -40 ~ +125 | $^{\circ}\text{C}$ |

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

| PARAMETER                |      | SYMBOL               | TEST CONDITIONS                                                                                     | MIN   | TYP   | MAX  | UNIT |
|--------------------------|------|----------------------|-----------------------------------------------------------------------------------------------------|-------|-------|------|------|
| Input Voltage            | High | V <sub>IH</sub>      | V <sub>DD</sub> = 5.0V, V <sub>O</sub> =0.5V                                                        | 3.5   | 3     |      | V    |
|                          |      |                      | V <sub>DD</sub> = 10V, V <sub>O</sub> =1.0V                                                         | 7.0   | 6     |      |      |
|                          |      |                      | V <sub>DD</sub> = 15V, V <sub>O</sub> =1.5V                                                         | 11.0  | 9     |      |      |
|                          | Low  | V <sub>IL</sub>      | V <sub>DD</sub> = 5.0V, V <sub>O</sub> =4.5V                                                        |       | 2     | 1.5  | V    |
|                          |      |                      | V <sub>DD</sub> = 10V, V <sub>O</sub> =9.0V                                                         |       | 4     | 3.0  |      |
|                          |      |                      | V <sub>DD</sub> = 15V, V <sub>O</sub> =13.5V                                                        |       | 6     | 4.0  |      |
| Output Voltage           | High | V <sub>OH</sub>      | V <sub>DD</sub> = 5.0V, I <sub>OH</sub> =1μA                                                        | 4.95  | 5     |      | V    |
|                          |      |                      | V <sub>DD</sub> = 10V, I <sub>OH</sub> =1μA                                                         | 9.95  | 10    |      |      |
|                          |      |                      | V <sub>DD</sub> = 15V, I <sub>OH</sub> =1μA                                                         | 14.95 | 15    |      |      |
|                          | Low  | V <sub>OL</sub>      | V <sub>DD</sub> = 5.0V, I <sub>OL</sub> =1μA                                                        |       | 0     | 0.05 | V    |
|                          |      |                      | V <sub>DD</sub> = 10V, I <sub>OL</sub> =1μA                                                         |       | 0     | 0.05 |      |
|                          |      |                      | V <sub>DD</sub> = 15V, I <sub>OL</sub> =1μA                                                         |       | 0     | 0.05 |      |
| Output Current (Note 1)  | High | I <sub>OH</sub>      | V <sub>DD</sub> = 5.0V, V <sub>O</sub> =4.6V                                                        | 0.51  | 0.88  |      | mA   |
|                          |      |                      | V <sub>DD</sub> = 10V, V <sub>O</sub> =9.5V                                                         | 1.3   | 2.25  |      |      |
|                          |      |                      | V <sub>DD</sub> = 15V, V <sub>O</sub> =13.5V                                                        | 3.4   | 8.8   |      |      |
|                          | Low  | I <sub>OL</sub>      | V <sub>DD</sub> = 5.0V, V <sub>O</sub> =0.4V                                                        | 0.51  | 0.88  |      |      |
|                          |      |                      | V <sub>DD</sub> = 10V, V <sub>O</sub> =0.5V                                                         | 1.3   | 2.25  |      |      |
|                          |      |                      | V <sub>DD</sub> = 15V, V <sub>O</sub> =1.5V                                                         | 3.4   | 8.8   |      |      |
| Input Leakage Current    |      | I <sub>I(LEAK)</sub> | V <sub>DD</sub> = 15V ,V <sub>IN</sub> = V <sub>DD</sub> or GND                                     |       |       | 0.1  | μA   |
| Quiescent Supply Current |      | I <sub>Q</sub>       | V <sub>DD</sub> = 5.0V, V <sub>IN</sub> = V <sub>DD</sub> or V <sub>SS</sub> , I <sub>OUT</sub> = 0 |       | 0.004 | 0.25 | μA   |
|                          |      |                      | V <sub>DD</sub> = 10V, V <sub>IN</sub> = V <sub>DD</sub> or V <sub>SS</sub> , I <sub>OUT</sub> = 0  |       | 0.005 | 0.5  |      |
|                          |      |                      | V <sub>DD</sub> = 15V, V <sub>IN</sub> = V <sub>DD</sub> or V <sub>SS</sub> , I <sub>OUT</sub> = 0  |       | 0.006 | 1.0  |      |

Note: 1.  $I_{OL}$  and  $I_{OH}$  are tested one output at a time

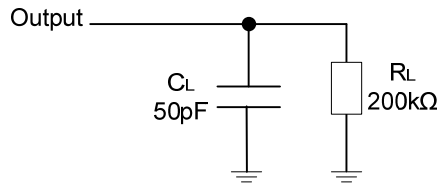
■ **SWITCHING CHARACTERISTICS**( $T_A=25^\circ\text{C}$ , Input:  $t_R=t_F=20\text{ns}$ , unless otherwise specified)

| PARAMETER                                         | SYMBOL    | TEST CONDITIONS                                                    | MIN | TYP | MAX | UNIT |
|---------------------------------------------------|-----------|--------------------------------------------------------------------|-----|-----|-----|------|
| Propagation delay from Input(A or B) to Output(Y) | $t_{PLH}$ | $V_{DD}=5.0\text{V}$ , $C_L=50\text{pF}$ , $R_L=200\text{k}\Omega$ |     | 120 | 250 | ns   |
|                                                   |           | $V_{DD}=10\text{V}$ , $C_L=50\text{pF}$ , $R_L=200\text{k}\Omega$  |     | 50  | 100 |      |
|                                                   |           | $V_{DD}=15\text{V}$ , $C_L=50\text{pF}$ , $R_L=200\text{k}\Omega$  |     | 35  | 70  |      |
|                                                   | $t_{PHL}$ | $V_{DD}=5.0\text{V}$ , $C_L=50\text{pF}$ , $R_L=200\text{k}\Omega$ |     | 100 | 250 |      |
|                                                   |           | $V_{DD}=10\text{V}$ , $C_L=50\text{pF}$ , $R_L=200\text{k}\Omega$  |     | 40  | 100 |      |
|                                                   |           | $V_{DD}=15\text{V}$ , $C_L=50\text{pF}$ , $R_L=200\text{k}\Omega$  |     | 30  | 70  |      |
| Transition Time                                   | $t_{TLH}$ | $V_{DD}=5.0\text{V}$ , $C_L=50\text{pF}$ , $R_L=200\text{k}\Omega$ |     | 90  | 200 | ns   |
|                                                   | $t_{THL}$ | $V_{DD}=10\text{V}$ , $C_L=50\text{pF}$ , $R_L=200\text{k}\Omega$  |     | 50  | 100 |      |
|                                                   |           | $V_{DD}=15\text{V}$ , $C_L=50\text{pF}$ , $R_L=200\text{k}\Omega$  |     | 40  | 80  |      |

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

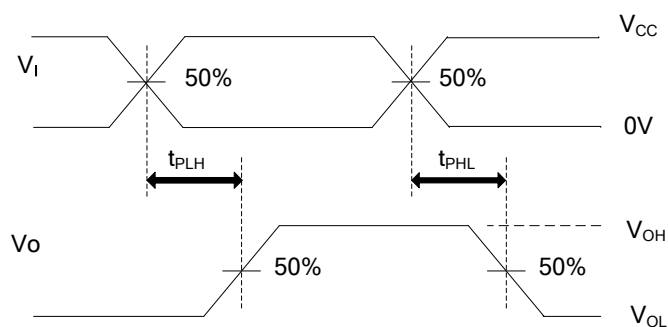
| PARAMETER                     | SYMBOL   | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|-------------------------------|----------|-----------------|-----|-----|-----|------|
| Average Input Capacitance     | $C_{IN}$ | Any Input       |     | 5   | 7.5 | pF   |
| Power Dissipation Capacitance | $C_{PD}$ | Any Gate        |     | 18  |     |      |

## ■ TEST CIRCUIT AND WAVEFORMS



Definitions for test circuit

Note:  $C_L$  includes probe and jig capacitance.



Propagation Delay 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. The information presented in this document does not form part of any quotation or contract, is believed to be accurate and reliable and may be changed without notice.