

# XC74UL86AA



## CMOS Logic

### CMOS 2-Input Exclusive-OR Gate

High Speed Operation :  $t_{pd} = 3.1\text{ns}$  (TYP.)

Operating Voltage Range : 2V ~ 5.5V

Low Power Consumption : 1  $\mu\text{A}$  (MAX.)

### ■ APPLICATIONS

- Palmtops
- Digital equipment

### ■ GENERAL DESCRIPTION

The XC74UL86AA is a 2-input CMOS exclusive-OR Gate, manufactured using silicon gate CMOS fabrication.

CMOS low power circuit operation makes high speed LS-TTL operation achievable.

With a wave forming buffer connected internally, stabilized output can be achieved as the circuit offers high noise immunity.

As the XC74UL86AA is integrated into mini molded, SSOT-25 and SOT-25 packages, high density mounting is possible.

### ■ FEATURES

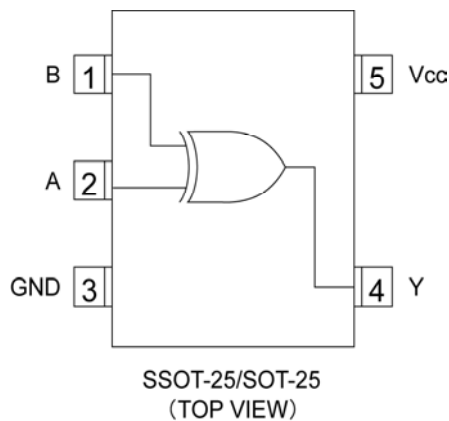
**High Speed Operation** :  $t_{pd} = 3.1\text{ns}$  (TYP.)

**Operating Voltage Range** : 2V ~ 5.5V

**Low Power Consumption**: 1  $\mu\text{A}$  (MAX.)

**Ultra Small Packages** : SSOT-25 and SOT-25

### ■ PIN CONFIGURATION



### ■ FUNCTIONS

| INPUT |   | OUTPUT |
|-------|---|--------|
| A     | B | Y      |
| L     | L | L      |
| L     | H | H      |
| H     | L | H      |
| H     | H | L      |

H=High level

L=Low level

### ■ ABSOLUTE MAXIMUM RATINGS

$T_a = -40 \sim 85$

| PARAMETER                     | SYMBOL            | RATINGS            | UNITS |
|-------------------------------|-------------------|--------------------|-------|
| Supply Voltage                | $V_{CC}$          | -0.5~+6.0          | V     |
| Input Voltage                 | $V_{IN}$          | -0.5~+6.0          | V     |
| Output Voltage                | $V_{OUT}$         | -0.5~ $V_{CC}+0.5$ | V     |
| Input Diode Current           | $I_{IK}$          | -20                | mA    |
| Output Diode Current          | $I_{OK}$          | $\pm 20$           | mA    |
| Output Current                | $I_{OUT}$         | $\pm 25$           | mA    |
| $V_{CC}, GND$ Current         | $I_{CC}, I_{GND}$ | $\pm 50$           | mA    |
| Power Dissipation( $T_a=55$ ) | $P_d$             | 150                | mW    |
| Storage Temperature Range     | $T_{stg}$         | -65~+150           |       |

\* Voltage is all ground standardized.

## ■ RECOMMENDED OPERATING CONDITIONS

| PARAMETER                   | SYMBOL                         | V <sub>CC</sub> (V) | CONDITIONS        | UNITS |
|-----------------------------|--------------------------------|---------------------|-------------------|-------|
| Supply Voltage              | V <sub>CC</sub>                | -                   | 2~5.5             | V     |
| Input Voltage               | V <sub>IN</sub>                | -                   | 0~5.5             | V     |
| Output Voltage              | V <sub>OUT</sub>               | -                   | 0~V <sub>CC</sub> | V     |
| Operating Temperature Range | T <sub>opr</sub>               | -                   | -40~+85           |       |
| Output Current              | I <sub>OH</sub>                | 3.0                 | -4                | mA    |
|                             |                                | 4.5                 | -8                |       |
|                             | I <sub>OL</sub>                | 3.0                 | 4                 |       |
|                             |                                | 4.5                 | 8                 |       |
| Input Rise and Fall Time    | t <sub>r</sub> ,t <sub>f</sub> | 3.3                 | 0~100             | ns    |
|                             |                                | 5.0                 | 0~20              |       |

## ■ DC ELECTRICAL CHARACTERISTICS

| PARAMETER             | SYMBOL        |        | CONDITIONS                |                | Ta=25          |            |      | Ta=-40 | ~85  | UNITS |
|-----------------------|---------------|--------|---------------------------|----------------|----------------|------------|------|--------|------|-------|
|                       |               | VCC(V) |                           |                | MIN.           | TYP.       | MAX. | MIN.   | MAX. |       |
| Input Voltage         | VIH           | 2.0    |                           |                | 1.5            | -          | -    | 1.5    | -    | V     |
|                       |               | 3.0    |                           |                | 2.1            | -          | -    | 2.1    | -    |       |
|                       |               | 5.5    |                           |                | 3.85           | -          | -    | 3.85   | -    |       |
|                       | VIL           | 2.0    |                           |                | -              | -          | 0.5  | -      | 0.5  | V     |
|                       |               | 3.0    |                           |                | -              | -          | 0.9  | -      | 0.9  |       |
|                       |               | 5.5    |                           |                | -              | -          | 1.65 | -      | 1.65 |       |
| Output Voltage        | VOH           | 2.0    | VIN=VIH or VIL            | IOH=-50 μ A    | 1.9            | 2.0        | -    | 1.9    | -    | V     |
|                       |               | 3.0    |                           |                | 2.9            | 3.0        | -    | 2.9    | -    |       |
|                       |               | 4.5    |                           |                | 4.4            | 4.5        | -    | 4.4    | -    |       |
|                       |               | 3.0    |                           | IOH=-4mA       | 2.58           | -          | -    | 2.48   | -    |       |
|                       |               | 4.5    |                           | IOH=-8mA       | 3.94           | -          | -    | 3.80   | -    |       |
|                       |               | VOL    |                           | 2.0            | VIN=VIH or VIL | IOL=50 μ A | -    | -      | 0.1  |       |
|                       | 3.0           |        | -                         | -              |                |            | 0.1  | -      | 0.1  |       |
|                       | 4.5           |        | -                         | -              |                |            | 0.1  | -      | 0.1  |       |
|                       | 3.0           |        | IOL=4mA                   | -              |                | -          | 0.36 | -      | 0.44 |       |
|                       | 4.5           |        | IOL=8mA                   | -              |                | -          | 0.36 | -      | 0.44 |       |
|                       |               |        |                           |                |                |            |      |        |      |       |
|                       | Input Current | IIN    | 5.5                       | VIN=VCC or GND |                | -0.1       | -    | 0.1    | -1.0 | 1.0   |
| Static Supply Current | ICC           | 5.5    | VIN=VCC or GND,IOUT=0 μ A |                | -              | -          | 1.0  | -      | 10.0 |       |

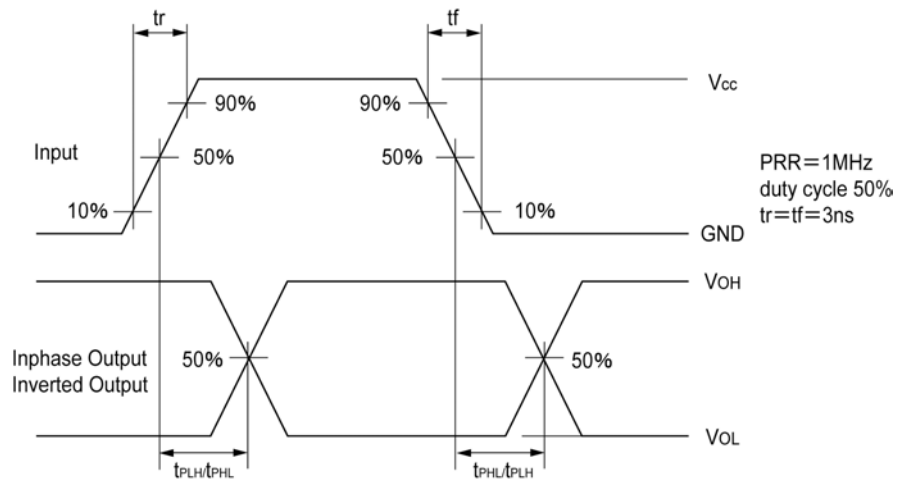
## ■ SWITCHING ELECTRICAL CHARACTERISTICS

t<sub>r</sub>=t<sub>f</sub>=3ns

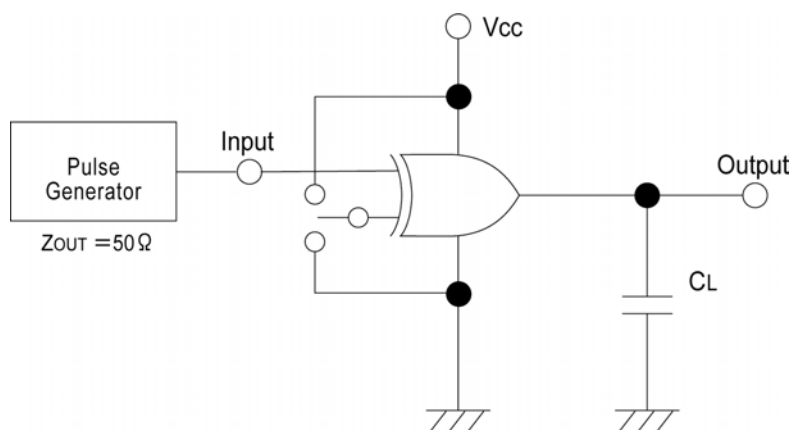
| PARAMETER                     | SYMBOL           | C <sub>L</sub>  | V <sub>CC</sub> (V) | CONDITIONS                              | Ta=25 |      |      | Ta=-40 ~85 |      | UNITS |
|-------------------------------|------------------|-----------------|---------------------|-----------------------------------------|-------|------|------|------------|------|-------|
|                               |                  |                 |                     |                                         | MIN.  | TYP. | MAX. | MIN.       | MAX. |       |
| Delay Time                    | t <sub>PLH</sub> | 15pF            | 3.3                 |                                         | -     | 4.4  | 11.0 | 1.0        | 13.0 | ns    |
|                               |                  |                 | 5.0                 |                                         | -     | 3.3  | 6.8  | 1.0        | 8.0  |       |
|                               |                  | 50pF            | 3.3                 |                                         | -     | 6.1  | 14.5 | 1.0        | 16.5 | ns    |
|                               |                  |                 | 5.0                 |                                         | -     | 4.4  | 8.8  | 1.0        | 10.0 |       |
|                               | t <sub>PHL</sub> | 15pF            | 3.3                 |                                         | -     | 4.0  | 11.0 | 1.0        | 13.0 | ns    |
|                               |                  |                 | 5.0                 |                                         | -     | 2.9  | 6.8  | 1.0        | 8.0  |       |
|                               |                  | 50pF            | 3.3                 |                                         | -     | 5.6  | 14.5 | 1.0        | 16.5 | ns    |
|                               |                  |                 | 5.0                 |                                         | -     | 4.1  | 8.8  | 1.0        | 10.0 |       |
| Input Capacitance             | C <sub>IN</sub>  | -               | 5.0                 | V <sub>IN</sub> =V <sub>CC</sub> or GND | -     | 4    | 10   | -          | 10   | pF    |
| Power Dissipation Capacitance | C <sub>pd</sub>  | No Load, f=1MHz |                     |                                         | -     | 12   | -    | -          | -    | pF    |

# XC74UL86AA

## ■ WAVEFORM



## ■ TEST CIRCUIT



Note: Open output when measuring supply current