



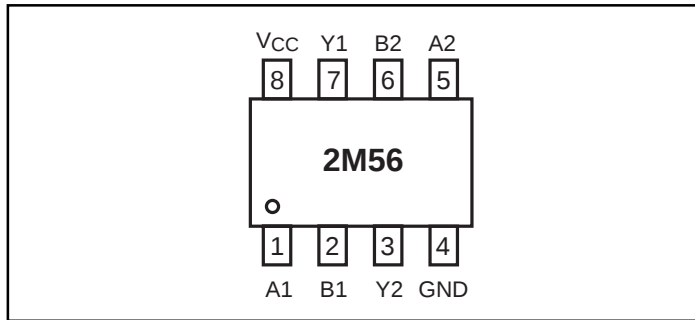
## PI74STX2G86

### SOTiny™ Logic STX Dual 2-Input Exclusive-OR Gate

#### Features

- High-Speed:  $t_{PD} = 2.4ns$  typical into  $50pF$  @  $5V V_{CC}$
- Broad Operating Range:  $V_{CC} = 1.65V - 5.5V$
- Power down high-impedance inputs/outputs
- High Output Drive:  $\pm 24mA$  at  $3V V_{CC}$
- Package: 8-pin space saving MSOP (U)

#### Pinout

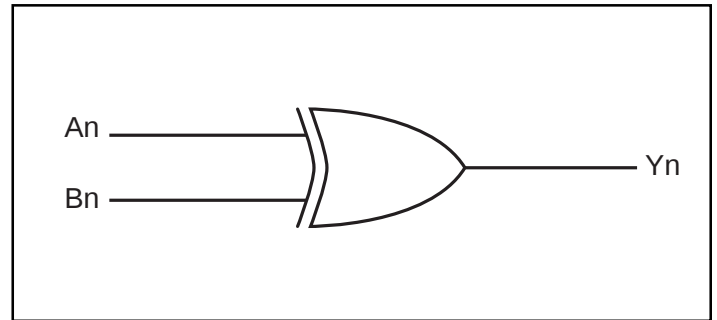


#### Description

The PI74STX2G86 is a dual 2-Input Exclusive-OR gate that operates over the  $1.65V$  to  $5.5V V_{CC}$  operating range.

Pericom's PI74STX series of products are produced using the Company's advanced submicron technology.

#### Block Diagram



#### Pin Description

| Pin Names | Description |
|-----------|-------------|
| An        | Inputs      |
| Bn        | Inputs      |
| Yn        | Outputs     |

#### Function Table

| Inputs |   | Output |
|--------|---|--------|
| A      | B | Y      |
| L      | L | L      |
| L      | H | H      |
| H      | L | H      |
| H      | H | L      |

#### Note:

H = HIGH Logic Level  
L = LOW Logic Level

#### Recommended Operating Conditions<sup>(1)</sup>

| Parameter                               | Condition                      | Min. | Max.     | Units |
|-----------------------------------------|--------------------------------|------|----------|-------|
| Supply Voltage ( $V_{CC}$ )             |                                | 1.65 | 5.5      | V     |
| Input Voltage ( $V_{IN}$ )              |                                | 0    | 5.5      |       |
| Output Voltage ( $V_{OUT}$ )            |                                | 0    | $V_{CC}$ |       |
| Operating Temperature                   |                                | -40  | 85       | °C    |
| Input Rise and Fall Time ( $t_r, t_f$ ) | $V_{CC} = 1.8V, 2.5V \pm 0.2V$ | 0    | 20       | ns/V  |
|                                         | $V_{CC} = 3.3V, \pm 0.3V$      | 0    | 10       |       |
|                                         | $V_{CC} = 5.0V, \pm 0.5V$      | 0    | 5        |       |

#### Note:

1. Unused inputs must be held HIGH or LOW. They may not float.

### Absolute Maximum Ratings

|                                            |               |                                                     |                 |
|--------------------------------------------|---------------|-----------------------------------------------------|-----------------|
| Supply Voltage ( $V_{CC}$ ) .....          | -0.5V to +6V  | DC Output Current ( $I_{OUT}$ ) .....               | ±50mA           |
| DC Input Voltage ( $V_{IN}$ ) .....        | -0.5V to +6V  | DC $V_{CC}$ /GND Current ( $I_{CC}/I_{GND}$ ) ..... | ±50mA           |
| DC Output Voltage ( $V_{OUT}$ ) .....      | -0.5V to +6V  | Storage Temperature ( $T_{STG}$ ) .....             | -65°C to +150°C |
| DC Input Diode Current ( $I_{IK}$ ) .....  | -50mA to 20mA | Junction Lead Temperature ( $I_{OS}$ ) .....        | 260°C           |
| DC Output Diode Current ( $I_{OK}$ ) ..... | -50mA to 20mA | Power Dissipation .....                             | 300mW           |

#### Note:

Absolute maximum ratings are DC values beyond which the device may be damaged or have its useful life impaired. The datasheet specifications should be met, without exception, to ensure that the system design is reliable over its power supply, temperature, and output/input loading variables. Pericom does not recommend operation outside datasheet specifications.

### DC Electrical Characteristics (Over supply voltage and operating temperature ranges, unless otherwise specified)

| Symbol    | Parameter                 | $V_{CC}$ (V)         | Conditions                                 |                            | $T_A = +25^\circ\text{C}$   |      |                             | $T_A = -40 \text{ to } +85^\circ\text{C}$ |                              | Units         |
|-----------|---------------------------|----------------------|--------------------------------------------|----------------------------|-----------------------------|------|-----------------------------|-------------------------------------------|------------------------------|---------------|
|           |                           |                      |                                            |                            | Min.                        | Typ. | Max.                        | Min.                                      | Max.                         |               |
| $V_{IH}$  | HIGH Level Input Voltage  | 1.65-1.95<br>2.3-5.5 |                                            |                            | $0.75V_{CC}$<br>$0.7V_{CC}$ |      |                             | $0.75V_{CC}$<br>$0.7V_{CC}$               |                              | V             |
| $V_{IL}$  | LOW Level Input Voltage   | 1.65-1.95<br>2.3-5.5 |                                            |                            |                             |      | $0.25V_{CC}$<br>$0.3V_{CC}$ |                                           | $0.25V_{CC}$<br>$0.30V_{CC}$ |               |
| $V_{OH}$  | HIGH Level Output Voltage | 1.65                 | $V_{IN} = V_{IL}$                          | $I_{OH} = -100\mu\text{A}$ | 1.55                        | 1.65 |                             | 1.55                                      |                              |               |
|           |                           | 2.3                  |                                            |                            | 2.2                         | 2.3  |                             | 2.2                                       |                              |               |
|           |                           | 3.0                  |                                            |                            | 2.9                         | 3.0  |                             | 2.9                                       |                              |               |
|           |                           | 4.5                  |                                            |                            | 4.4                         | 4.5  |                             | 4.4                                       |                              |               |
|           |                           | 1.65                 |                                            |                            | 1.29                        | 1.52 |                             | 1.29                                      |                              |               |
|           |                           | 2.3                  |                                            | $I_{OH} = -4\text{mA}$     | 1.9                         | 2.15 |                             | 1.9                                       |                              |               |
|           |                           | 3.0                  |                                            | $I_{OH} = -8\text{mA}$     | 2.4                         | 2.80 |                             | 2.4                                       |                              |               |
|           |                           | 3.0                  |                                            | $I_{OH} = -16\text{mA}$    | 2.3                         | 2.68 |                             | 2.3                                       |                              |               |
|           |                           | 4.5                  |                                            | $I_{OH} = -24\text{mA}$    | 3.8                         | 4.20 |                             | 3.8                                       |                              |               |
|           |                           | 4.5                  |                                            | $I_{OH} = -32\text{mA}$    |                             |      |                             |                                           |                              |               |
| $V_{OL}$  | LOW Level Output Voltage  | 1.65                 | $V_{IN} = V_{IH}$                          | $I_{OL} = 100\mu\text{A}$  |                             | 0.0  | 0.1                         |                                           | 0.1                          | $\mu\text{A}$ |
|           |                           | 2.3                  |                                            |                            |                             | 0.0  | 0.1                         |                                           | 0.1                          |               |
|           |                           | 3.0                  |                                            |                            |                             | 0.0  | 0.1                         |                                           | 0.1                          |               |
|           |                           | 4.5                  |                                            |                            |                             | 0.0  | 0.1                         |                                           | 0.1                          |               |
|           |                           | 1.65                 |                                            |                            |                             | 0.08 | 0.24                        |                                           | 0.24                         |               |
|           |                           | 2.3                  |                                            | $I_{OL} = 4\text{mA}$      |                             | 0.10 | 0.3                         |                                           | 0.3                          |               |
|           |                           | 3.0                  |                                            | $I_{OL} = 8\text{mA}$      |                             | 0.15 | 0.4                         |                                           | 0.4                          |               |
|           |                           | 3.0                  |                                            | $I_{OL} = 16\text{mA}$     |                             | 0.22 | 0.55                        |                                           | 0.55                         |               |
|           |                           | 4.5                  |                                            | $I_{OL} = 24\text{mA}$     |                             | 0.22 | 0.55                        |                                           | 0.55                         |               |
|           |                           | 4.5                  |                                            | $I_{OL} = 32\text{mA}$     |                             |      |                             |                                           |                              |               |
| $I_{IN}$  | Input Leakage Current     | 0-5.5                | $V_{IN} = 5.5\text{V}, \text{GND}$         |                            |                             |      | ±0.1                        |                                           | ±0.1                         | $\mu\text{A}$ |
| $I_{OFF}$ | Power Off Leakage Current | 0.0                  | $V_{IN} \text{ or } V_{OUT} = 5.5\text{V}$ |                            |                             |      | 1                           |                                           | 10                           |               |
| $I_{CC}$  | Quiescent Supply Current  | 1.65-5.5             | $V_{IN} = 5.5\text{V}, \text{GND}$         |                            |                             |      | 1                           |                                           | 10                           |               |

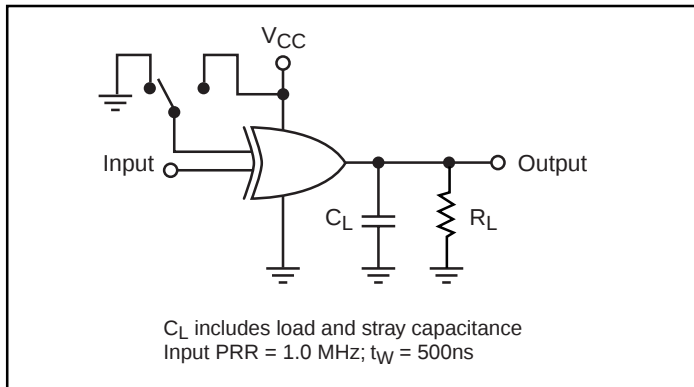
## AC Electrical Characteristics

| Symbol                                 | Parameter                                    | V <sub>CC</sub> (V)                           | Conditions                                      | T <sub>A</sub> = +25°C   |                          |                           | T <sub>A</sub> = -40°C to +85°C |                           | Units | Fig. No. |
|----------------------------------------|----------------------------------------------|-----------------------------------------------|-------------------------------------------------|--------------------------|--------------------------|---------------------------|---------------------------------|---------------------------|-------|----------|
|                                        |                                              |                                               |                                                 | Min.                     | Typ.                     | Max.                      | Min.                            | Max.                      |       |          |
| t <sub>PLH</sub> ,<br>t <sub>PHL</sub> | Propagation Delay                            | 1.8 ±0.15<br>2.5 ±0.2<br>3.3 ±0.3<br>5.0 ±0.5 | C <sub>L</sub> = 15pF,<br>R <sub>L</sub> = 1MΩ  | 2.0<br>1.2<br>0.8<br>0.5 | 6.7<br>4.1<br>3.0<br>2.2 | 12.5<br>7.0<br>4.8<br>3.5 | 2.0<br>1.2<br>0.8<br>0.5        | 13.0<br>7.5<br>5.2<br>3.8 | ns    | 1<br>3   |
| t <sub>PLH</sub> ,<br>t <sub>PHL</sub> | Propagation Delay                            | 3.3 ±0.3<br>5.0 ±0.5                          | C <sub>L</sub> = 50pF,<br>R <sub>L</sub> = 500Ω | 1.2<br>0.8               | 3.8<br>2.9               | 5.4<br>4.2                | 1.2<br>1.0                      | 5.9<br>4.6                |       | 1<br>3   |
| C <sub>IN</sub>                        | Input Capacitance                            | 0                                             |                                                 |                          | 2.5                      |                           |                                 |                           | pF    |          |
| C <sub>PD</sub>                        | Power Dissipation Capacitance <sup>(2)</sup> | 3.3<br>5.0                                    |                                                 |                          | 15<br>19                 |                           |                                 |                           |       | 2        |

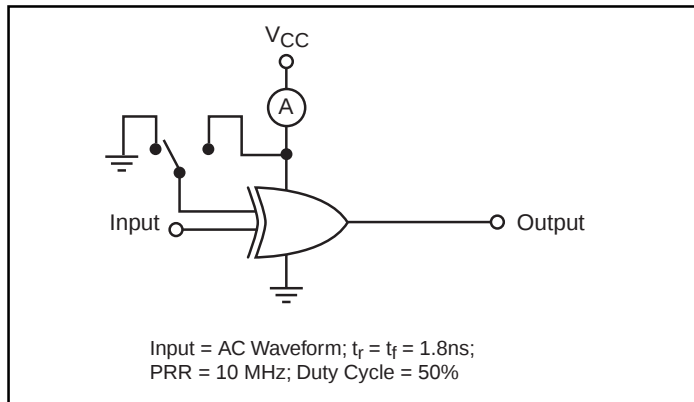
### Notes:

- C<sub>PD</sub> is defined as the value of the internal equivalent capacitance which is derived from dynamic operating current consumption (I<sub>CCD</sub>) at no output loading and operating at 50% duty cycle (see Figure 2). C<sub>PD</sub> is related to I<sub>CCD</sub> dynamic operating current by the expression: I<sub>CCD</sub> = (C<sub>PD</sub>)(V<sub>CC</sub>)(f<sub>IN</sub>) + (I<sub>CC</sub> static).

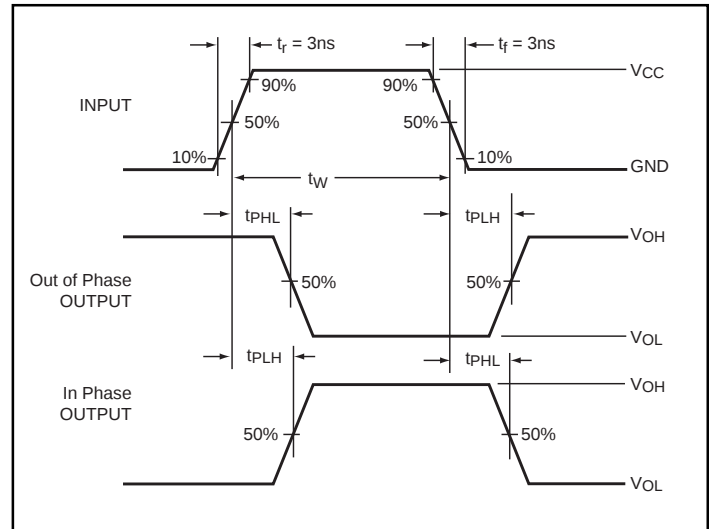
## AC Loading and Waveforms



**Figure 1. AC Test Circuit**

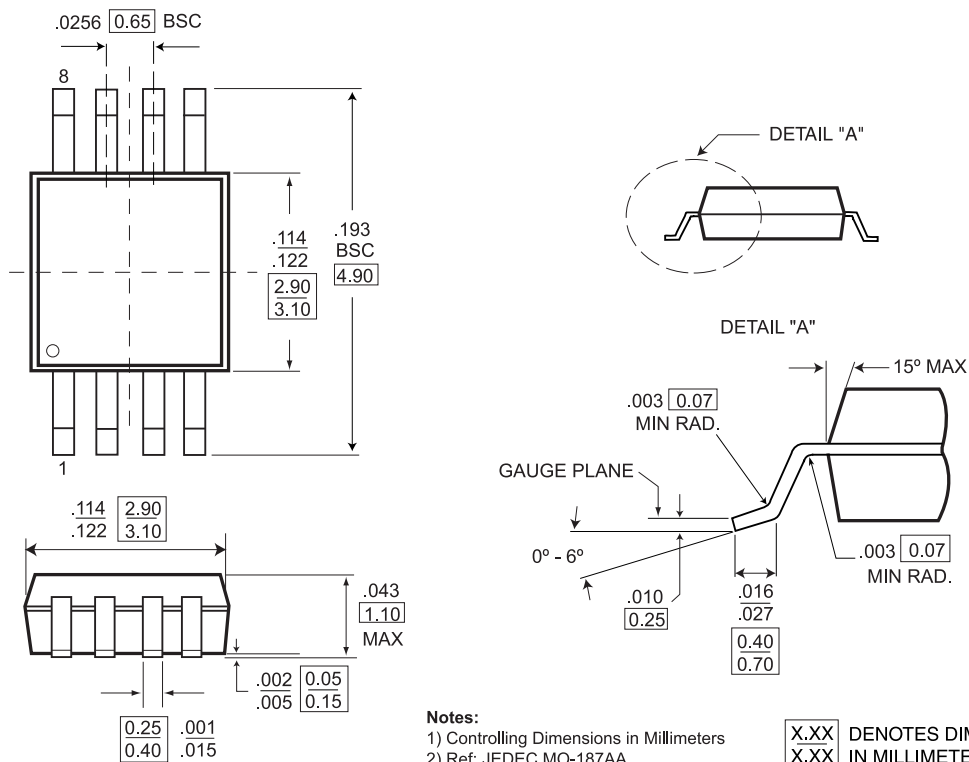


**Figure 2. I<sub>CCD</sub> Test Circuit**



**Figure 3. AC Waveforms**

### 8-Pin MSOP (U) Package



### Ordering Information

| Part          | Pin-Package  | Top Marking | Operating Range |
|---------------|--------------|-------------|-----------------|
| PI74STX2G86UX | 8-Pin - MSOP | 2M56        | -40°C to 85°C   |