

## Features

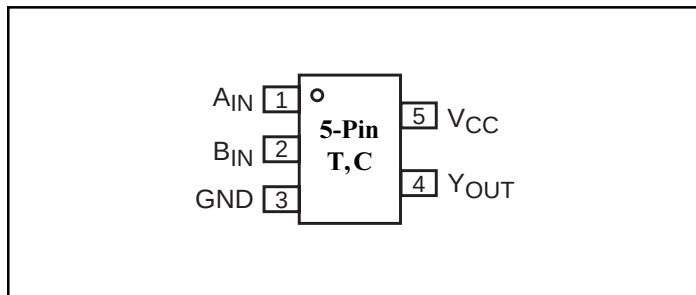
- High-speed:  $t_{PD} = 2.6\text{ns}$  typical into  $50\text{pF}$  @  $5\text{V } V_{CC}$
- Broad operating range:  $V_{CC} = 1.65\text{V} - 5.5\text{V}$
- Power down high-impedance inputs/outputs
- High output drive:  $\pm 24\text{mA}$  at  $3\text{V } V_{CC}$
- Package: 5-pin space saving SOT23 and SC70

## Description

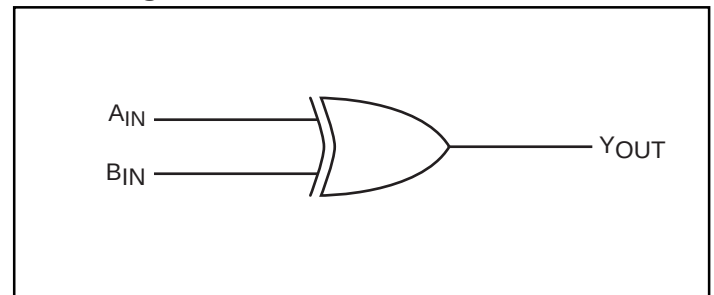
The PI74STX1G86 is a 2-input exclusive OR gate that operates over the  $1.65\text{V}$  to  $5.5\text{V } V_{CC}$  operating range.

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

## Pinout



## Block Diagram



## Pin Description

| Pin Names | Description |
|-----------|-------------|
| $A_{IN}$  | Input       |
| $B_{IN}$  | Input       |
| $Y_{OUT}$ | Output      |

## Function Table

| Inputs   |          | Output    |
|----------|----------|-----------|
| $A_{IN}$ | $B_{IN}$ | $Y_{OUT}$ |
| 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 ( $t_r, t_f$ ) | $V_{CC} = 1.8\text{V}, 2.5\text{V} \pm 0.2\text{V}$ | 0    | 20       | ns/V  |
|                                         | $V_{CC} = 3.3\text{V}, \pm 0.3\text{V}$             | 0    | 10       |       |
|                                         | $V_{CC} = 5.0\text{V}, \pm 0.5\text{V}$             | 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 $V_{CC}$ /GND Current ( $I_{CC}/I_{GND}$ ) | ±50mA           |
| DC Input Voltage ( $V_{IN}$ )        | –0.5V to +6V  | Storage Temperature ( $T_{STG}$ )             | –65°C to +150°C |
| DC Output Voltage ( $V_{OUT}$ )      | –0.5V to +6V  | Junction Lead Temperature (IOS)               | 200°C           |
| DC Input Diode Current ( $I_{IK}$ )  | –50mA to 20mA | Power Dissipation SOT23                       | 200mW           |
| DC Output Diode Current ( $I_{OK}$ ) | –50mA to 20mA | SC70                                          | 150mW           |
| DC Output Current ( $I_{OUT}$ )      | ±50mA         |                                               |                 |

#### 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>$0.70V_{CC}$ |      |                              | $0.75V_{CC}$<br>$0.70V_{CC}$              |                              | V             |
| $V_{IL}$  | LOW Level Input Voltage   | 1.65-1.95<br>2.3-5.5 |                                     |                            |                              |      | $0.25V_{CC}$<br>$0.30V_{CC}$ |                                           | $0.25V_{CC}$<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                                      |                              |               |
|           |                           | 1.8                  |                                     |                            | 1.7                          | 1.79 |                              | 1.9                                       |                              |               |
|           |                           | 2.3                  |                                     |                            | 2.2                          | 2.29 |                              | 2.4                                       |                              |               |
|           |                           | 3.0                  |                                     |                            | 2.                           | 2.99 |                              | 2.3                                       |                              |               |
|           |                           | 4.5                  |                                     |                            | 4.4                          | 4.5  |                              | 4.4                                       |                              |               |
|           |                           | 1.65                 |                                     | $I_{OH} = -4\text{mA}$     | 1.29                         | 1.52 |                              | 1.29                                      |                              |               |
|           |                           | 2.3                  |                                     | $I_{OH} = -8\text{mA}$     | 1.9                          | 2.13 |                              | 1.9                                       |                              |               |
|           |                           | 3.0                  |                                     | $I_{OH} = -16\text{mA}$    | 2.4                          | 2.71 |                              | 2.4                                       |                              |               |
|           |                           | 3.0                  |                                     | $I_{OH} = -24\text{mA}$    | 2.3                          | 2.55 |                              | 2.3                                       |                              |               |
|           |                           | 4.5                  |                                     | $I_{OH} = -32\text{mA}$    | 3.8                          | 4.20 |                              | 3.8                                       |                              |               |
| $V_{OL}$  | LOW Level Output Voltage  | 1.65                 | $V_{IN} = V_{IH}$                   | $I_{OL} = 100\mu\text{A}$  |                              | 0.01 | 0.1                          |                                           | 0.1                          | $\mu\text{A}$ |
|           |                           | 1.8                  |                                     |                            |                              | 0.01 | 0.1                          |                                           | 0.1                          |               |
|           |                           | 2.3                  |                                     |                            |                              | 0.01 | 0.1                          |                                           | 0.1                          |               |
|           |                           | 3.0                  |                                     |                            |                              | 0.00 | 0.1                          |                                           | 0.1                          |               |
|           |                           | 4.5                  |                                     |                            |                              | 0.00 | 0.1                          |                                           | 0.1                          |               |
|           |                           | 1.65                 |                                     | $I_{OL} = 4\text{mA}$      |                              | 0.08 | 0.24                         |                                           | 0.24                         |               |
|           |                           | 2.3                  |                                     | $I_{OL} = 8\text{mA}$      |                              | 0.10 | 0.3                          |                                           | 0.3                          |               |
|           |                           | 3.0                  |                                     | $I_{OL} = 16\text{mA}$     |                              | 0.18 | 0.4                          |                                           | 0.4                          |               |
|           |                           | 3.0                  |                                     | $I_{OL} = 24\text{mA}$     |                              | 0.28 | 0.55                         |                                           | 0.55                         |               |
|           |                           | 4.5                  |                                     | $I_{OL} = 32\text{mA}$     |                              | 0.28 | 0.55                         |                                           | 0.55                         |               |
| $I_{IN}$  | Input Leakage Current     | 0-5.5                | $V_{IN} = 5.5\text{V}, \text{GND}$  |                            | –1                           |      | 1                            | –1                                        | 1                            | $\mu\text{A}$ |
| $I_{OFF}$ | Power Off Leakage Current | 0.0                  | $V_{IN}$ or $V_{OUT} = 5.5\text{V}$ |                            | –1                           |      | 1                            | –1                                        | 1                            |               |
| $I_{CC}$  | Quiescent Supply Current  | 1.65-5.5             | $V_{IN} = 5.5\text{V}, \text{GND}$  |                            |                              |      | 2.0                          |                                           | 20                           |               |

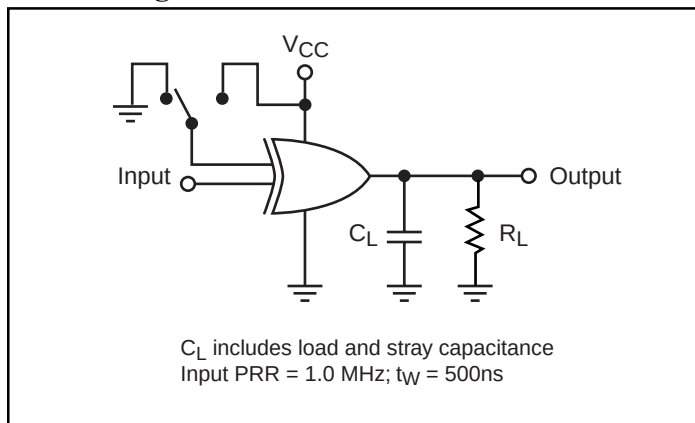
## AC Electrical Characteristics

| Symbol                                 | Parameter                                    | V <sub>CC</sub> (V)                     | Conditions                                          | T <sub>A</sub> = +25°C   |                          |                           | T <sub>A</sub> = -40 to +85°C |                           | Units | Fig. No. |
|----------------------------------------|----------------------------------------------|-----------------------------------------|-----------------------------------------------------|--------------------------|--------------------------|---------------------------|-------------------------------|---------------------------|-------|----------|
|                                        |                                              |                                         |                                                     | Min.                     | Typ.                     | Max.                      | Min.                          | Max.                      |       |          |
| t <sub>PLH</sub> ,<br>t <sub>PHL</sub> | Propagation Delay                            | 1.8<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> = 1Mohm    | 0.7<br>0.5<br>0.5<br>0.5 | 8.1<br>3.5<br>2.6<br>2.0 | 11.2<br>4.4<br>3.4<br>2.5 | 0.7<br>0.5<br>0.5<br>0.5      | 12.3<br>4.8<br>3.7<br>2.8 | 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> = 500 ohms | 0.5<br>0.5               | 3.4<br>2.6               | 4.7<br>3.6                | 1.5<br>0.8                    | 5.2<br>4.0                |       | 1<br>3   |
| C <sub>IN</sub>                        | Input Capacitance                            | 0                                       | V <sub>IN</sub> = 0                                 |                          | 4                        |                           |                               |                           | pF    |          |
| C <sub>PD</sub>                        | Power Dissipation Capacitance <sup>(3)</sup> | 3.3<br>5.0                              |                                                     |                          | 24<br>30                 |                           |                               |                           |       | 2        |

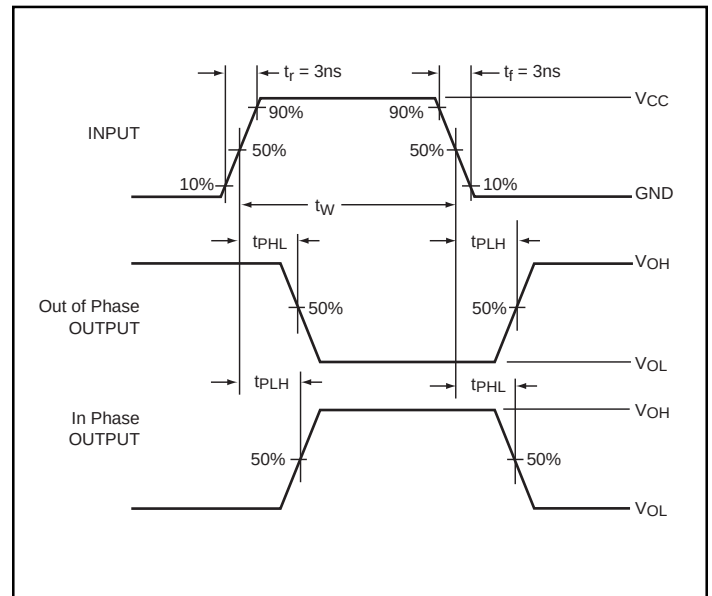
### Notes:

3. 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).

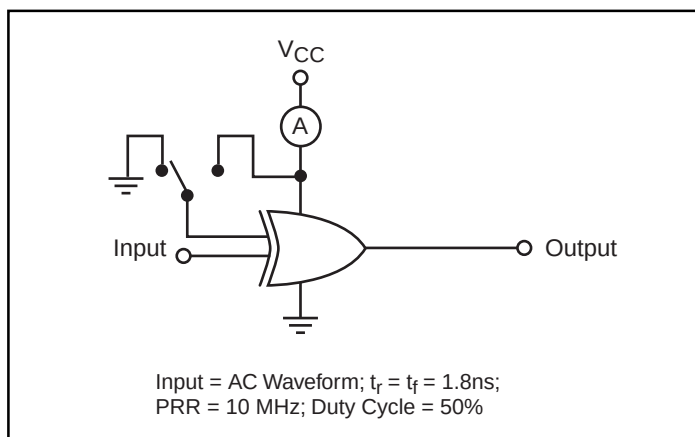
## AC Loading and Waveforms



**Figure 1. AC Test Circuit**

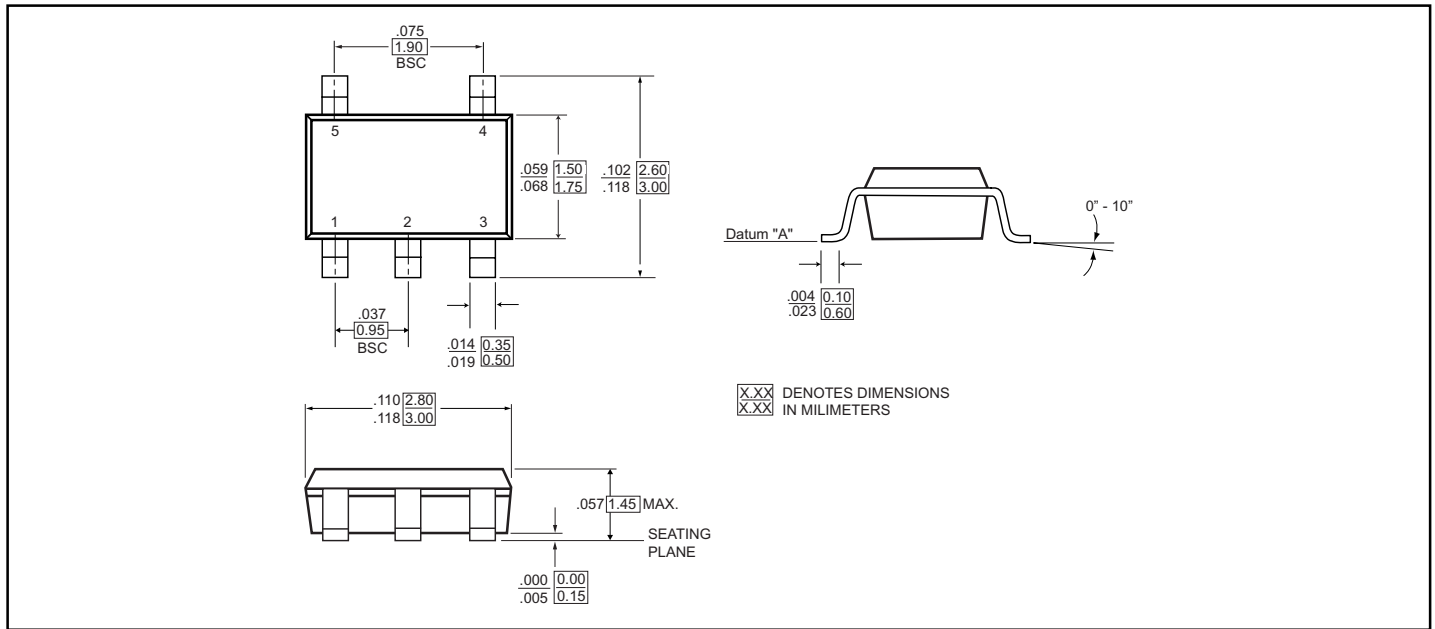


**Figure 3. AC Waveforms**

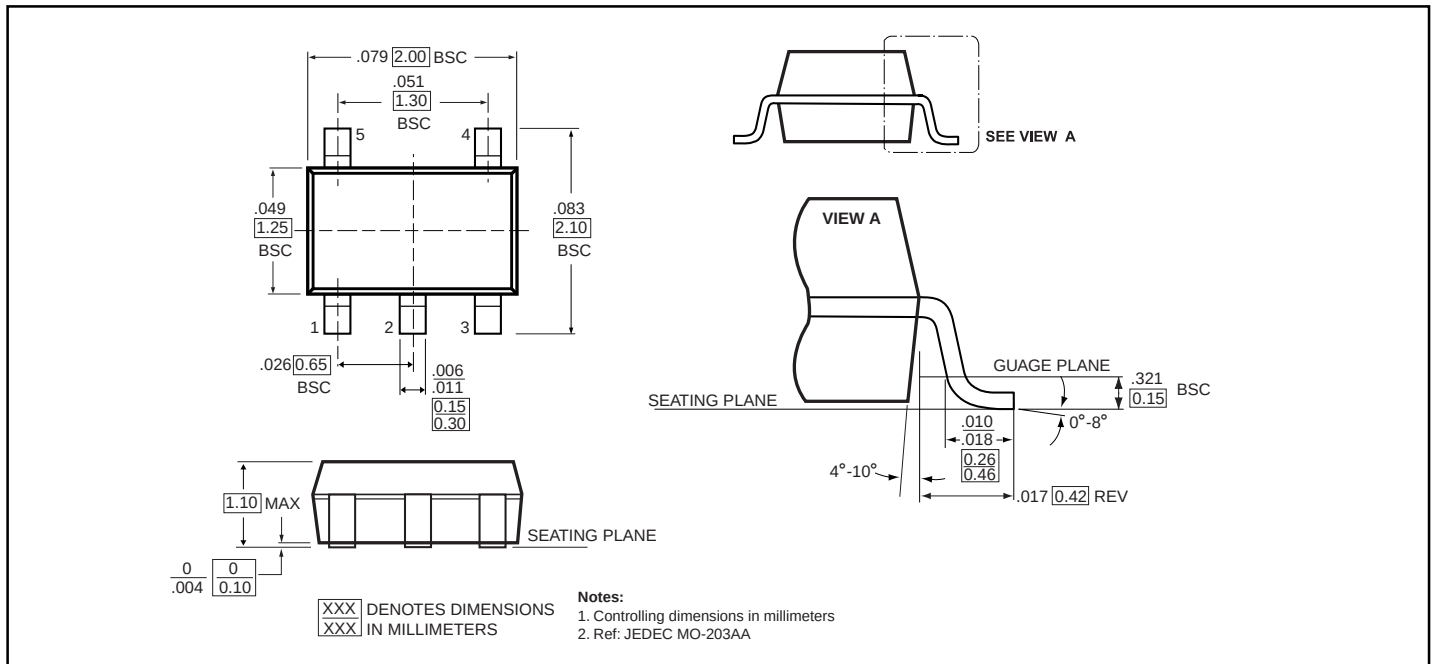


**Figure 2. I<sub>CCD</sub> Test Circuit**

## 5-Pin SOT23 (T) Package



## 5-Pin SC70 Package (C)



## Ordering Information

| Part          | Pin-Package   | Top Marking | Operating Range |
|---------------|---------------|-------------|-----------------|
| PI74STX1G86TX | 5-Pin - SOT23 | M56         | -40°C to 85°C   |
| PI74STX1G86CX | 5-Pin - SC70  | M56         | -40°C to 85°C   |

## Pericom Semiconductor Corporation

2380 Bering Drive • San Jose, CA 95131 • 1-800-435-2336 • Fax (408) 435-1100 • <http://www.pericom.com>