

### Features

- Support XTAL or Clock input
- Three buffered outputs support  $V_{DD}$  operation
- Very low phase jitter(RMS) : < 0.5ps
- Very low additive jitter: <300fs (typ)
- 3.3V supply voltage for Core
- 1.8V ~ 3.3V supply voltage for two outputs
- Packaging: 16-pin TSSOP
- Commercial & Industrial Temperature support

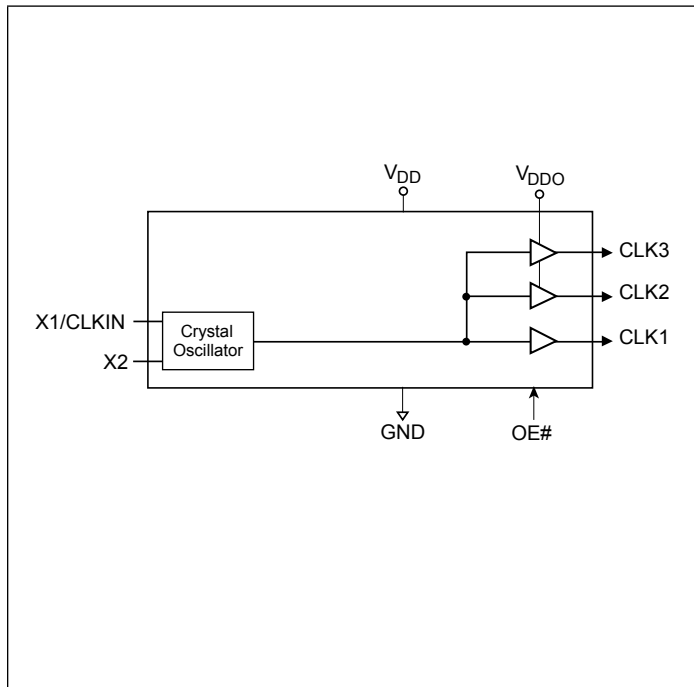
### Applications

- Networking Systems
- Femtocell BTS
- Peripheral

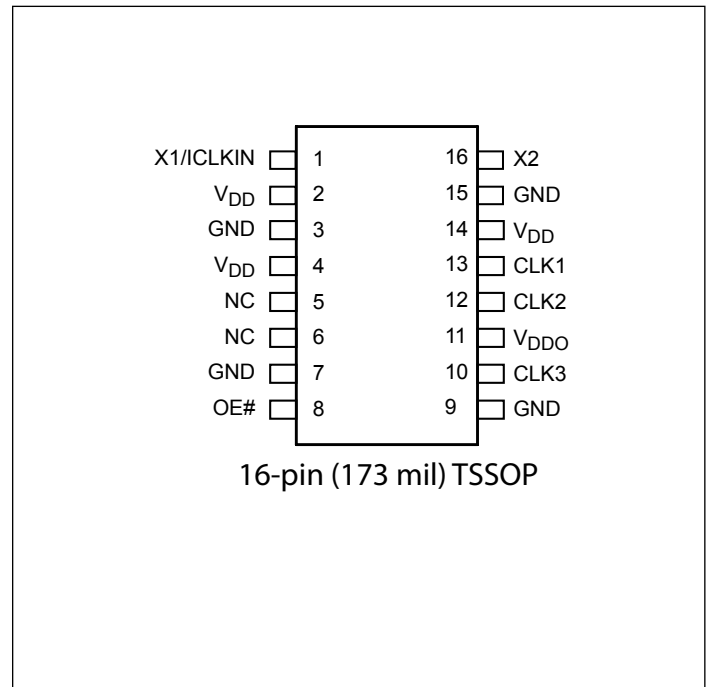
### Description

The PI6C490098 is a low jitter clock buffer supporting either XTAL or reference input. Two of its outputs can support wide operating voltage from 1.8V to 3.3V. It is a cost effective way to generate multiple outputs for all kinds of applications that need multiple CMOS outputs with different power supplies.

### Block Diagram



### Pin Configuration (16-Pin TSSOP)



| Pin number | Pin Name         | Type   | Description   |
|------------|------------------|--------|---|
| 1          | X1/CLKIN         | Input  | Crystal connection or clock input                           |
| 2, 4, 14   | V <sub>DD</sub>  | Power  | 3.3V Supply voltage for core and CLK1                       |
| 5, 6,      | NC               |        | No connect  |
| 7, 9, 15   | GND              | Power  | Connect to Ground   |
| 8          | OE#              | Input  | Global output enable when low. Internal pull-down resistor. |
| 10         | CLK3             | Output | Clock Output 3  |
| 11         | V <sub>DDO</sub> | Power  | Supply voltage from 1.8V to 3.3V for CLK2 and CLK3          |
| 12         | CLK2             | Output | Clock Output 2  |
| 13         | CLK1             | Output | Clock Output 1  |
| 16         | X2               | Output | Crystal connection  |

### Function Table

| OE# | CLK1/CLK2/CLK3       |
|-----|----------------------|
| 0   | Enabled              |
| 1   | Hi-Z, weak pull down |

## Maximum Ratings

(Above which useful life may be impaired. For user guidelines, not tested.)

|   |                 |
|---|-----------------|
| Storage Temperature.....                                  | -65°C to +150°C |
| Supply Voltage to Ground Potential, V <sub>DD</sub> ..... | -0.5V to +4.6V  |

**Note:** Stresses greater than those listed under MAXIMUM RATINGS may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability.

## Power Requirements (Over operating free-air temperature range)

| Symbol           | Parameter                        | Min.  | Typ. | Max.  | Units |
|------------------|----------------------------------|-------|------|-------|-------|
| V <sub>DD</sub>  | Power Supply Voltage             | 3.135 | 3.3  | 3.465 | V     |
| V <sub>DDO</sub> | Power Supply Voltage for outputs | 1.71  |      | 3.465 | V     |
| I <sub>DD</sub>  | Power supply current, no load    |       | 5    |       | mA    |
| T <sub>A</sub>   | Ambient Operating Temperature    | 0     |      | +70   | °C    |
|                  |                                  | -40   |      | +85   |       |
| t <sub>UP</sub>  | Power Supply Ramp Time           |       |      | 4     | ms    |

## DC Electrical Characteristics

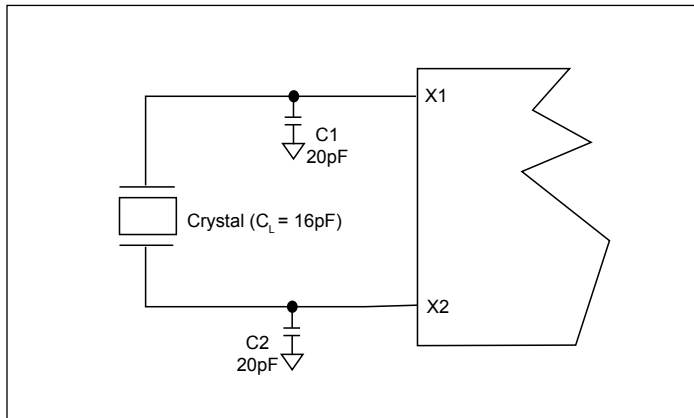
| Symbol          | Parameter                   | Condition              | Min.                   | Typ. | Max.                 | Units |
|-----------------|-----------------------------|------------------------|------------------------|------|----------------------|-------|
| V <sub>IH</sub> | Input High Voltage          | CLKIN, OE#             | V <sub>DD</sub> /2+1   |      |                      | V     |
| V <sub>IL</sub> | Input Low Voltage           | CLKIN, OE#             |                        |      | V <sub>DD</sub> /2-1 | V     |
| V <sub>OH</sub> | Output High Voltage         | I <sub>OH</sub> = -8mA | V <sub>DDO</sub> - 0.4 |      |                      | V     |
| V <sub>OL</sub> | Output Low Voltage          | I <sub>OL</sub> = 8mA  |                        |      | 0.4                  | V     |
| Z <sub>O</sub>  | Nominal Output Impedance    |                        |                        | 20   |                      | Ω     |
| R <sub>PD</sub> | Internal Pull-down Resistor | OE#                    |                        | 230  |                      | kΩ    |
|                 |                             | CLKIN                  |                        | 320  |                      |       |
| C <sub>IN</sub> | Input Capacitance           | OE#                    |                        | 5    |                      | pF    |
|                 |                             | CLKIN                  |                        | 7    |                      |       |

**AC Electrical Characteristics (Note 4)**

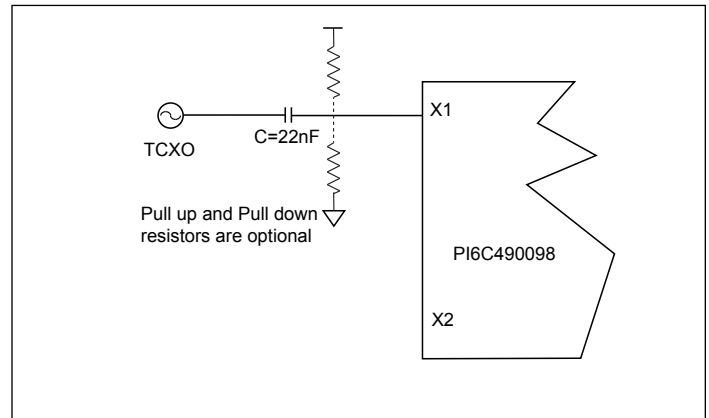
| Symbol             | Parameter                        | Conditions                       | Min. | Typ. | Max. | Units |
|--------------------|----------------------------------|----------------------------------|------|------|------|-------|
| F <sub>IN</sub>    | Input Frequency                  | Fundamental Crystal              | 10   | 25   | 52   | MHz   |
|                    |                                  | Input Clock                      | 1    | 25   | 125  | MHz   |
| t <sub>R</sub>     | Output Rise Time                 | 20% to 80% 25MHz, Note 1,        |      | 1    |      | ns    |
| t <sub>F</sub>     | Output Fall Time                 | 80% to 20% 25MHz, Note 1,        |      | 1    |      | ns    |
| t <sub>DC</sub>    | Duty Cycle                       | V <sub>DDO</sub> = 2.5V and 3.3V | 47   | 50   | 53   | %     |
|                    |                                  | V <sub>DDO</sub> = 1.8V          | 45   |      | 55   | %     |
| F <sub>error</sub> | Output Frequency Synthesis Error |                                  | 0    |      |      | ppm   |
| J <sub>phase</sub> | Clock Phase Jitter (RMS)         | 25MHz, Note 2                    |      | 0.5  | 1.5  | ps    |
| J <sub>add</sub>   | Additive Jitter                  | 25MHz, Note 3,                   |      | 300  |      | fs    |

- Note 1: Measured with 7 pF lump load.
- Note 2: 12 kHz to 20 MHz offset frequency using a crystal input.
- Note 3: CLKIN input with X2 floating.
- Note 4: Do not drive this device without a crystal or valid clock input

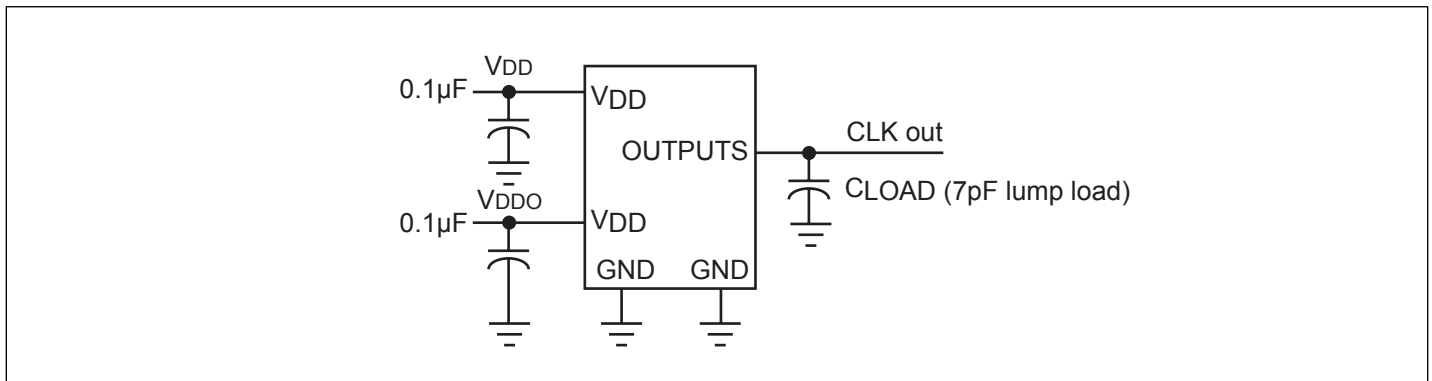
**Crystal Oscillator Circuit**



**Input AC Coupling Application**



**CMOS Test Configuration**



**Packaging Mechanical: 16-Pin TSSOP (L)**

VARIATIONS (ALL DIMENSIONS SHOWN IN MM)

| SYMBOLS  | MIN.     | NOM. | MAX. |
|----------|----------|------|------|
| A        | —        | —    | 1.20 |
| A1       | 0.05     | —    | 0.15 |
| A2       | 0.80     | —    | 1.05 |
| b        | 0.19     | —    | 0.30 |
| c        | 0.09     | —    | 0.20 |
| D        | 4.90     | 5.00 | 5.10 |
| E1       | 4.30     | 4.40 | 4.50 |
| E        | 6.40 BSC |      |      |
| [e]      | 0.65 BSC |      |      |
| L1       | 1.00 REF |      |      |
| L        | 0.45     | 0.60 | 0.75 |
| S        | 0.20     | —    | —    |
| $\theta$ | 0°       | —    | 8°   |

**Notes:**  
 1. Refer JEDEC MO-153F/AB  
 2. Controlling dimensions in millimeters  
 3. Package outline exclusive of mold flash and metal burr

|  |  |                |
|--|--|----------------|
|  |  | DATE: 05/03/12 |
| DESCRIPTION: 16-Pin, 173mil Wide TSSOP |  |                |
| PACKAGE CODE: L                        |  |                |
| DOCUMENT CONTROL #: PD-1310            |  | REVISION: F    |

12-0372

**Ordering Information**

| Ordering Code | Package Code | Package Type                  | Operating Temperature |
|---------------|--------------|-------------------------------|-----------------------|
| PI6C490098LE  | L            | Pb-free & Green, 16-pin TSSOP | Commercial            |
| PI6C490098LIE | L            | Pb-free & Green, 16-pin TSSOP | Industrial            |

**Notes:**

- Thermal characteristics can be found on the company web site at [www.pericom.com/packaging/](http://www.pericom.com/packaging/)
- E = Pb-free and Green
- X suffix = Tape/Reel