# PERICOM

# Phase-Locked Loop Clock Driver with 4 Clock Outputs

## Product Features

- High-Performance Phase-Locked-Loop Clock Distribution for Networking

- Registered DIMM Synchronous DRAM modules for server/workstation/PC applications

- Allows Clock Input to have Spread Spectrum modulation for EMI reduction

- Zero Input-to-Output delay

- Low jitter: Cycle-to-Cycle jitter ±75ps max.

- On-chip series damping resistor at clock output drivers for low noise and EMI reduction

- Operates at 3.3V $V_{CC}$

- Wide range of Clock Frequencies 80 to 134 MHz

- Package: Plastic 16-pin QSOP Package (Q)

    Plastic 16-pin QSOP Package (QE) Pb-free

## Product Description

The PI6C2504A features a low-skew, low-jitter, phase-locked loop (PLL) clock driver, distributing high-frequency clock signals for SDRAM and server applications. By connecting the feedback FB_OUT output to the feedback FB_IN input, the propagation delay from the CLK_IN input to any clock output will be nearly zero.
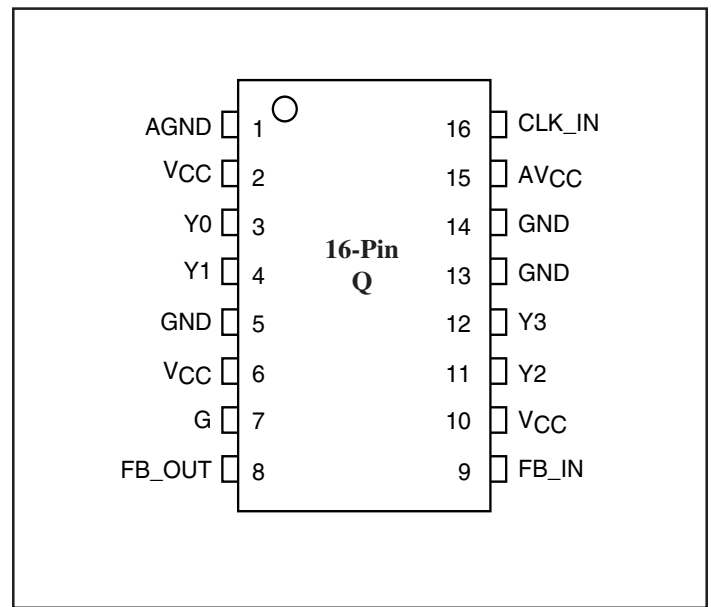
## Logic Block Diagram



## Product Pin Configuration
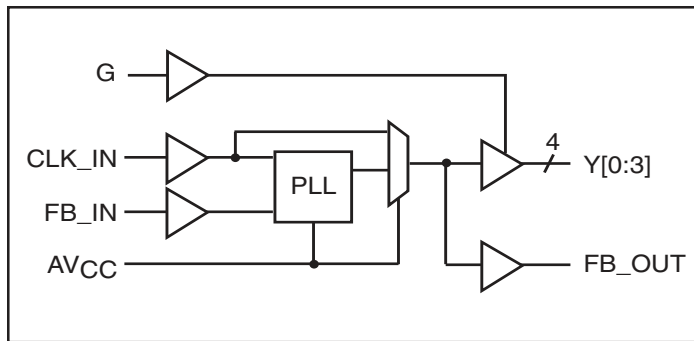


## Functional Table

| Inputs | Outputs | |
|---|---|---|
| G | Y[0:3] | FB_OUT |
| L | L | CLK_IN |
| H | CLK_IN | CLK_IN |

## Pin Functions

| Pin Name | Pin No. | Type | Description |
|----------|---------|------|-------------|
| CLK_IN | 16 | I | Reference Clock input. CLK_IN allows spread spectrum clock input. |
| FB_IN | 9 | I | Feedback input. FB_IN provides the feedback signal to the internal PLL. |
| G | 7 | I | Output bank enable. When G is LOW, outputs Y[0:3] are disabled to a logic low state. |
| FB_OUT | 8 | O | Feedback output. FB_OUT is dedicated for external feedback. FB_OUT has an embedded series-damping resistor of the same value as the clock outputs Yx. |
| Y[0:3] | 3,4,11,12 | O | Clock outputs. These outputs provide low-skew copies of CLK_IN. Each output has an embedded series-damping resistor. |
| $AV_{CC}$ | 15 | Power | Analog power supply. For test purposes, $AV_{CC}$ can be also used to bypass the PLL. When $AV_{CC}$ is strapped to ground, PLL is bypassed and CLK_IN is buffered directly to the device outputs. |
| AGND | 1 | Ground | Analog ground. AGND provides the ground reference for the analog circuitry. |
| $V_{CC}$ | 2, 6, 10 | Power | Power supply. |
| GND | 5, 13, 14 | Ground | Ground |

## DC Specifications[1] (Absolute maximum ratings over operating free-air temperature range)

| Symbol | Parameter | Min. | Max. | Units |
|--------|-----------|------|------|-------|
| $V_I$ | Input voltage range | –0.5 | $V_{CC}$ +0.5 | V |
| $V_O$ | Output voltage range | | | |
| $V_{I\_DC}$ | DC input voltage | | 3.8 | |
| $I_{O\_DC}$ | DC output current | | 100 | mA |
| Power | Maximum power dissipation at $T_A$ = 55°C in still air | | 1.0 | W |
| $T_{STG}$ | Storage temperature | –65 | 150 | °C |

**Note:**

1. Stress beyond those listed under "absolute maximum ratings" may cause permanent damage to the device.

| Parameter | Test Conditions | $V_{CC}$ | Min. | Typ. | Max. | Units |
|-----------|-----------------|----------|------|------|------|-------|
| $I_{CC}$ | $V_I$ = $V_{CC}$ or GND; $I_O$ = 0[2]  Standby Current | 3.6V | | | 10 | µA |
| $C_I$ | $V_I$ = $V_{CC}$ or GND | 3.3V | | 4 | | pF |
| $C_O$ | $V_O$ = $V_{CC}$ or GND | | | 6 | | |

**Note:**

2. Continuous Output Current

## Recommended Operating Conditions

| Symbol | Parameter | Min. | Max. | Units |
|--------|-----------|------|------|-------|
| $V_{CC}$ | Supply voltage | 3.0 | 3.6 | V |
| $V_{IH}$ | High level input voltage | 2.0 | | |
| $V_{IL}$ | Low level input voltage | | 0.8 | |
| $V_I$ | Input voltage | 0 | $V_{CC}$ | |
| $T_A$ | Operating free-air temperature | 0 | 70 | °C |

## Electrical Characteristics (Over Recommended Operating Free-Air Temperature Range

Pull Up/Down Currents of PI6C2504A, $V_{CC}$ = 3.0V)

| Symbol | Parameter | Condition | Min. | Max. | Units |
|---|---|---|---|---|---|
| $I_{OH}$ | Pull-up current | Vout = 2.4V | | −13.6 | mA |
| | Pull-up current | Vout = 2.0V | | −22 | |
| $I_{OL}$ | Pull-down current | Vout = 0.8V | 19 | | |
| | Pull-down current | Vout = 0.55V | 13 | | |

## AC Specifications

(Timing requirements over recommended ranges of supply voltage and operating free-air temperature)

| Symbol | Parameter | Min. | Max. | Units |
|---|---|---|---|---|
| $F_{CLK}$ | Clock frequency PI6C2504A | 80 | 134 | MHz |
| $D_{CYI}$ | Input clock duty cycle | 40 | 60 | % |
| | Stabilization Time after power up | | 1 | ms |

## Switching Characteristics[3]

(Over recommended ranges of supply voltage and operating free-air temperature, CL = 30pF)

| Parameter | From (Input) | To (Output) | $V_{CC}$ = 3.3V ±0.3V, 0-70°C | | | Units |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| tphase error without jitter | CLK_IN↑ at 100 & 66 MHz | FB_IN↑ | −150 | | +150 | ps |
| Jitter, cycle-to-cycle | At 100 & 66 MHz | CLK_OUT | −75 | | +75 | |
| Duty cycle | | | 45 | | 55 | % |
| tr, rise-time, 0.4V to 2.0V | | | | 1.0 | | ns |
| tf, fall-time, 2.0V to 0.4V | | | | 1.1 | | |

**Note:**

3. These switching parameters are guaranteed by design.

**Package Mechanical Information: 16-pin QSOP Package (Q).**
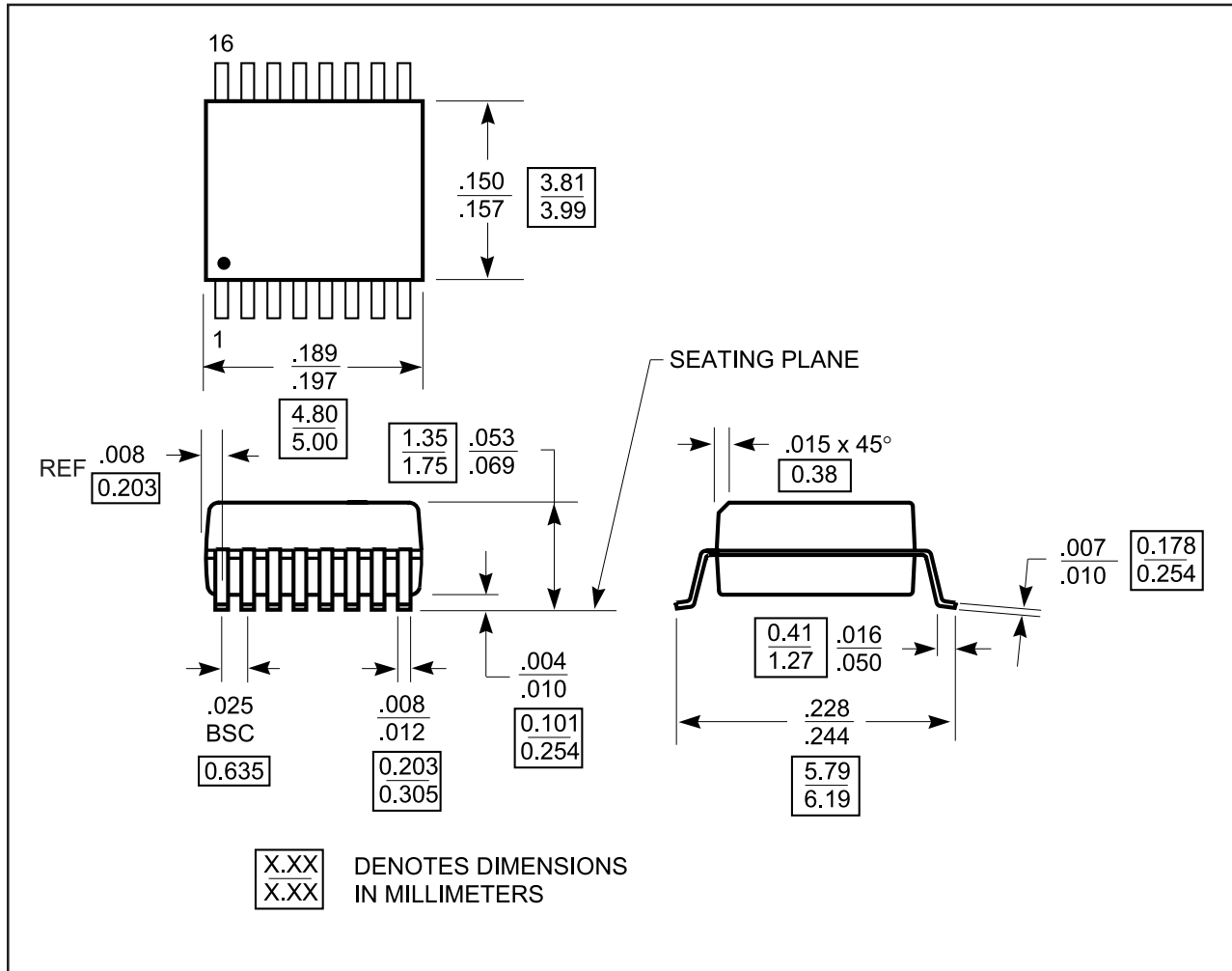


## Ordering Information

| Ordering Code | Package Name | Package Type | Operating Range |
|---|---|---|---|
| PI6C2504AQ | Q | 16-pin QSOP | Commercial |
| PI6C2504AQE | QE | 16-pin QSOP | Commercial |