

**Phase-Locked Loop Clock Driver
with 4 Clock Outputs**

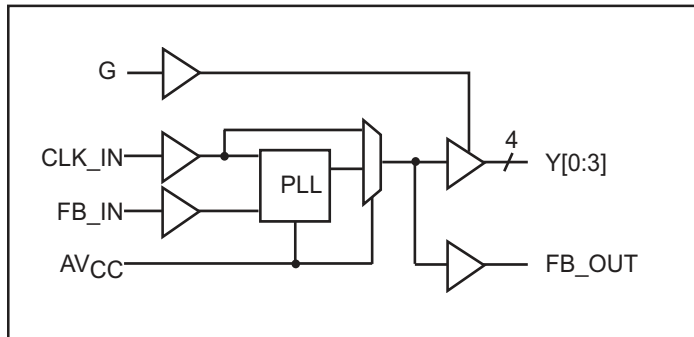
Product Features

- 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 $\pm 100\text{ps}$ max.
- On-chip series damping resistor at clock output drivers for low noise and EMI reduction
- Operates at $3.3\text{V } V_{CC}$
- Wide range of Clock Frequencies up to 80 MHz
- Package: Plastic 16-pin QSOP Package (Q)

Product Description

The PI6C2504 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.

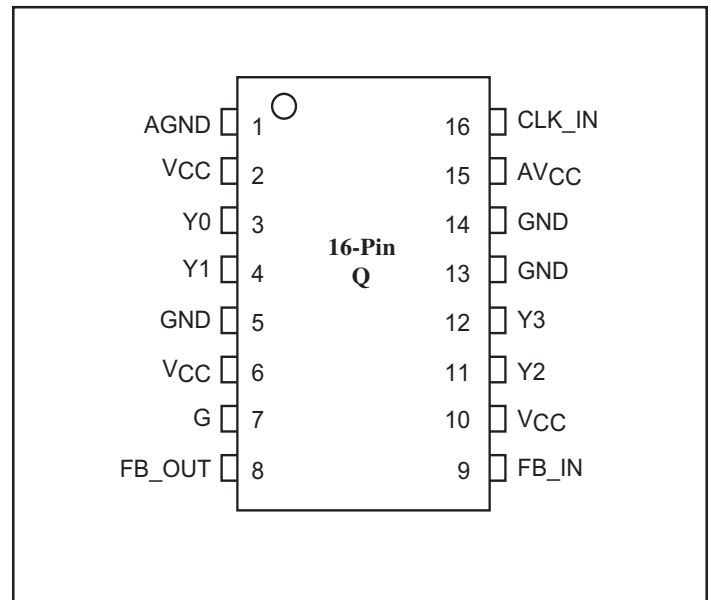
Logic Block Diagram



Functional Table

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

Product Pin Configuration



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 (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 | | | |
| 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: 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 ⁽¹⁾ | 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: 1. 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, $V_{CC} = 3.0V$)

| Symbol | Parameter | Condition | Min. | Max. | Units |
|----------|-------------------|-------------------|------|------|-------|
| I_{OH} | Pull-up current | $V_{OUT} = 2.4V$ | | -18 | mA |
| | | $V_{OUT} = 2.0V$ | | -30 | |
| I_{OL} | Pull-down current | $V_{OUT} = 0.8V$ | 25 | | |
| | | $V_{OUT} = 0.55V$ | 17 | | |

AC Specifications

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

| Symbol | Parameter | Min. | Max. | Units |
|-----------|-----------------------------------|------|------|-------|
| F_{CLK} | Clock frequency | 25 | 80 | MHz |
| DC_{VI} | Input clock duty cycle | 40 | 60 | % |
| | Stabilization Time after power up | | 1 | ms |

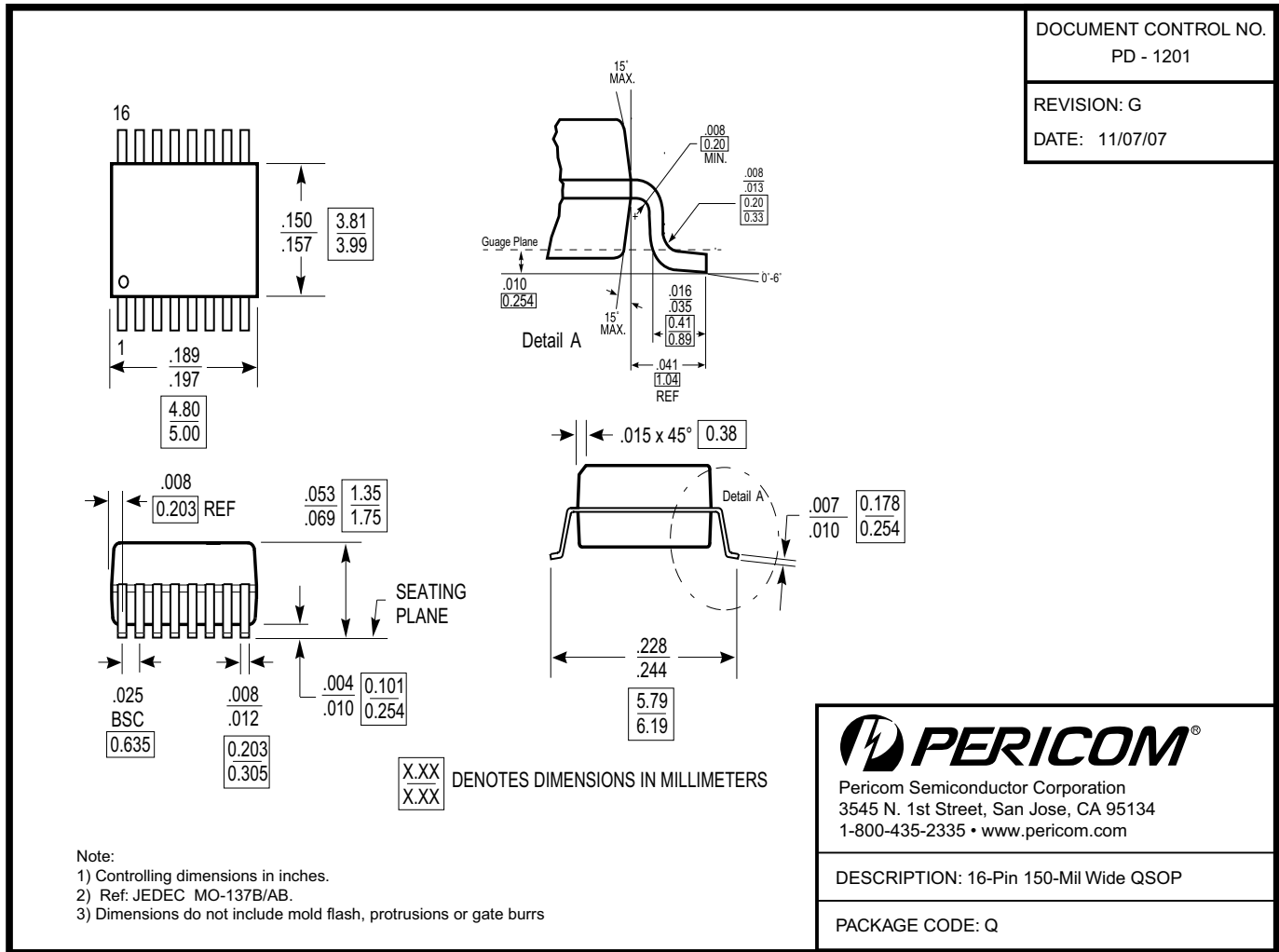
Switching Characteristics

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

| Parameter | From (Input) | To (Output) | $V_{CC} = 3.3V \pm 0.3V, 0-70^\circ C$ | | | Units |
|---------------------------------|--|------------------|--|------|------|-------|
| | | | Min. | Typ. | Max. | |
| tphase error without jitter | CLK_IN \uparrow at 100MHz and 66MHz | FB_IN \uparrow | -150 | | +150 | ps |
| Jitter, cycle-to-cycle | At 100 MHz and 66 MHz | Any Y or FB_OUT | -100 | | +100 | |
| Skew, at 100 MHz and 66 MHz | Any Y or FB_OUT | | | | 200 | |
| Duty cycle | | | 45 | | 55 | % |
| t_r , rise-time, 0.4V to 2.0V | | | | 1.0 | | ns |
| t_f , fall-time, 2.0V to 0.4V | | | | 1.1 | | |

Note: 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 |
|---------------|--------------|-----------------------------|-----------------|
| PI6C2504QE | Q16 | Pb-Free & Green 16-pin QSOP | Commercial |

Notes:

1. Thermal characteristics and package top marking information can be found at <http://www.pericom.com/packaging/>
2. E = Pb-free and Green
3. X suffix = tape/reel