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### Understanding [Embedded - FPGAs \(Field Programmable Gate Array\)](#)

Embedded - FPGAs, or Field Programmable Gate Arrays, are advanced integrated circuits that offer unparalleled flexibility and performance for digital systems. Unlike traditional fixed-function logic devices, FPGAs can be programmed and reprogrammed to execute a wide array of logical operations, enabling customized functionality tailored to specific applications. This reprogrammability allows developers to iterate designs quickly and implement complex functions without the need for custom hardware.

### Applications of Embedded - FPGAs

The versatility of Embedded - FPGAs makes them indispensable in numerous fields. In telecommunications.

#### Details

|                                |                                                                                                                                                               |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Product Status                 | Active                                                                                                                                                        |
| Number of LABs/CLBs            | 18144                                                                                                                                                         |
| Number of Logic Elements/Cells | -                                                                                                                                                             |
| Total RAM Bits                 | 165888                                                                                                                                                        |
| Number of I/O                  | 418                                                                                                                                                           |
| Number of Gates                | 1000000                                                                                                                                                       |
| Voltage - Supply               | 1.425V ~ 1.575V                                                                                                                                               |
| Mounting Type                  | Surface Mount                                                                                                                                                 |
| Operating Temperature          | -55°C ~ 125°C (TA)                                                                                                                                            |
| Package / Case                 | 676-BGA                                                                                                                                                       |
| Supplier Device Package        | 676-FBGA (27x27)                                                                                                                                              |
| Purchase URL                   | <a href="https://www.e-xfl.com/product-detail/microchip-technology/ax1000-fg676m">https://www.e-xfl.com/product-detail/microchip-technology/ax1000-fg676m</a> |

**Table 2-22 • 3.3 V LVTTL I/O Module**

**Worst-Case Commercial Conditions VCCA = 1.425 V, VCCI = 3.0 V, T<sub>J</sub> = 70°C (continued)**

|                                                          |                                                                           | –2 Speed |      | –1 Speed |      | Std Speed |      |       |
|----------------------------------------------------------|---------------------------------------------------------------------------|----------|------|----------|------|-----------|------|-------|
| Parameter                                                | Description                                                               | Min.     | Max. | Min.     | Max. | Min.      | Max. | Units |
| LVTTTL Output Drive Strength =3 (16 mA) / High Slew Rate |                                                                           |          |      |          |      |           |      |       |
| t <sub>DP</sub>                                          | Input Buffer                                                              |          | 1.68 |          | 1.92 |           | 2.26 | ns    |
| t <sub>PY</sub>                                          | Output Buffer                                                             |          | 3.12 |          | 3.56 |           | 4.18 | ns    |
| t <sub>ENZL</sub>                                        | Enable to Pad Delay through the Output Buffer—Z to Low                    |          | 3.54 |          | 4.04 |           | 4.75 | ns    |
| t <sub>ENZH</sub>                                        | Enable to Pad Delay through the Output Buffer—Z to High                   |          | 2.78 |          | 3.17 |           | 3.72 | ns    |
| t <sub>ENLZ</sub>                                        | Enable to Pad Delay through the Output Buffer—Low to Z                    |          | 1.91 |          | 1.93 |           | 1.93 | ns    |
| t <sub>ENHZ</sub>                                        | Enable to Pad Delay through the Output Buffer—High to Z                   |          | 2.58 |          | 2.59 |           | 2.60 | ns    |
| t <sub>IOCLKQ</sub>                                      | Sequential Clock-to-Q for the I/O Input Register                          |          | 0.67 |          | 0.77 |           | 0.90 | ns    |
| t <sub>IOCLKY</sub>                                      | Clock-to-output Y for the I/O Output Register and the I/O Enable Register |          | 0.67 |          | 0.77 |           | 0.90 | ns    |
| t <sub>SUD</sub>                                         | Data Input Set-Up                                                         |          | 0.23 |          | 0.27 |           | 0.31 | ns    |
| t <sub>SUE</sub>                                         | Enable Input Set-Up                                                       |          | 0.26 |          | 0.30 |           | 0.35 | ns    |
| t <sub>HD</sub>                                          | Data Input Hold                                                           |          | 0.00 |          | 0.00 |           | 0.00 | ns    |
| t <sub>HE</sub>                                          | Enable Input Hold                                                         |          | 0.00 |          | 0.00 |           | 0.00 | ns    |
| t <sub>CPWHL</sub>                                       | Clock Pulse Width High to Low                                             | 0.39     |      | 0.39     |      | 0.39      |      | ns    |
| t <sub>CPWLH</sub>                                       | Clock Pulse Width Low to High                                             | 0.39     |      | 0.39     |      | 0.39      |      | ns    |
| t <sub>WASYN</sub>                                       | Asynchronous Pulse Width                                                  | 0.37     |      | 0.37     |      | 0.37      |      | ns    |
| t <sub>REASYN</sub>                                      | Asynchronous Recovery Time                                                |          | 0.13 |          | 0.15 |           | 0.17 | ns    |
| t <sub>HASYN</sub>                                       | Asynchronous Removal Time                                                 |          | 0.00 |          | 0.00 |           | 0.00 | ns    |
| t <sub>CLR</sub>                                         | Asynchronous Clear-to-Q                                                   |          | 0.23 |          | 0.27 |           | 0.31 | ns    |
| t <sub>PRESET</sub>                                      | Asynchronous Preset-to-Q                                                  |          | 0.23 |          | 0.27 |           | 0.31 | ns    |

## Timing Characteristics

**Table 2-28 • 1.8V LVCMOS I/O Module**

**Worst-Case Commercial Conditions VCCA = 1.425 V, VCCI = 1.7 V, TJ = 70°C**

|                               |                                                                           | –2 Speed |      | –1 Speed |      | Std Speed |      |       |
|-------------------------------|---------------------------------------------------------------------------|----------|------|----------|------|-----------|------|-------|
| Parameter                     | Description                                                               | Min.     | Max. | Min.     | Max. | Min.      | Max. | Units |
| LVCMOS18 Output Module Timing |                                                                           |          |      |          |      |           |      |       |
| t <sub>DP</sub>               | Input Buffer                                                              |          | 3.26 |          | 3.71 |           | 4.37 | ns    |
| t <sub>PY</sub>               | Output Buffer                                                             |          | 4.55 |          | 5.18 |           | 6.09 | ns    |
| t <sub>ENZL</sub>             | Enable to Pad Delay through the Output Buffer—Z to Low                    |          | 2.82 |          | 2.83 |           | 2.84 | ns    |
| t <sub>ENZH</sub>             | Enable to Pad Delay through the Output Buffer—Z to High                   |          | 3.43 |          | 3.45 |           | 3.46 | ns    |
| t <sub>ENLZ</sub>             | Enable to Pad Delay through the Output Buffer—Low to Z                    |          | 6.01 |          | 6.85 |           | 8.05 | ns    |
| t <sub>ENHZ</sub>             | Enable to Pad Delay through the Output Buffer—High to Z                   |          | 6.73 |          | 7.67 |           | 9.01 | ns    |
| t <sub>IOCLKQ</sub>           | Sequential Clock-to-Q for the I/O Input Register                          |          | 0.67 |          | 0.77 |           | 0.90 | ns    |
| t <sub>IOCLKY</sub>           | Clock-to-output Y for the I/O Output Register and the I/O Enable Register |          | 0.67 |          | 0.77 |           | 0.90 | ns    |
| t <sub>SUD</sub>              | Data Input Set-Up                                                         |          | 0.23 |          | 0.27 |           | 0.31 | ns    |
| t <sub>SUE</sub>              | Enable Input Set-Up                                                       |          | 0.26 |          | 0.30 |           | 0.35 | ns    |
| t <sub>HD</sub>               | Data Input Hold                                                           |          | 0.00 |          | 0.00 |           | 0.00 | ns    |
| t <sub>HE</sub>               | Enable Input Hold                                                         |          | 0.00 |          | 0.00 |           | 0.00 | ns    |
| t <sub>CPWHL</sub>            | Clock Pulse Width High to Low                                             | 0.39     |      | 0.39     |      | 0.39      |      | ns    |
| t <sub>CPWLH</sub>            | Clock Pulse Width Low to High                                             | 0.39     |      | 0.39     |      | 0.39      |      | ns    |
| t <sub>WASYN</sub>            | Asynchronous Pulse Width                                                  | 0.37     |      | 0.37     |      | 0.37      |      | ns    |
| t <sub>REASYN</sub>           | Asynchronous Recovery Time                                                |          | 0.13 |          | 0.15 |           | 0.17 | ns    |
| t <sub>HASYN</sub>            | Asynchronous Removal Time                                                 |          | 0.00 |          | 0.00 |           | 0.00 | ns    |
| t <sub>CLR</sub>              | Asynchronous Clear-to-Q                                                   |          | 0.23 |          | 0.27 |           | 0.31 | ns    |
| t <sub>PRESET</sub>           | Asynchronous Preset-to-Q                                                  |          | 0.23 |          | 0.27 |           | 0.31 | ns    |

## SSTL3

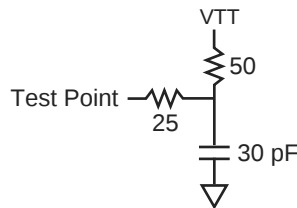
Stub Series Terminated Logic for 3.3 V is a general-purpose 3.3 V memory bus standard (JESD8-8). The Axcelerator devices support both classes of this standard. This requires a differential amplifier input buffer and a push-pull output buffer.

### Class I

**Table 2-50 • DC Input and Output Levels**

| VIL     |            | VIH        |         | VOL        | VOH        | IOL | IOH |
|---------|------------|------------|---------|------------|------------|-----|-----|
| Min., V | Max., V    | Min., V    | Max., V | Max., V    | Min., V    | mA  | mA  |
| -0.3    | VREF – 0.2 | VREF + 0.2 | 3.6     | VREF – 0.6 | VREF + 0.6 | 8   | –8  |

### AC Loadings



**Figure 2-23 • AC Test Loads**

**Table 2-51 • AC Waveforms, Measuring Points, and Capacitive Loads**

| Input Low (V) | Input High (V) | Measuring Point* (V) | VREF (typ) (V) | C <sub>load</sub> (pF) |
|---------------|----------------|----------------------|----------------|------------------------|
| VREF – 1.0    | VREF + 1.0     | VREF                 | 1.50           | 30                     |

Note: \*Measuring Point = VTRIP

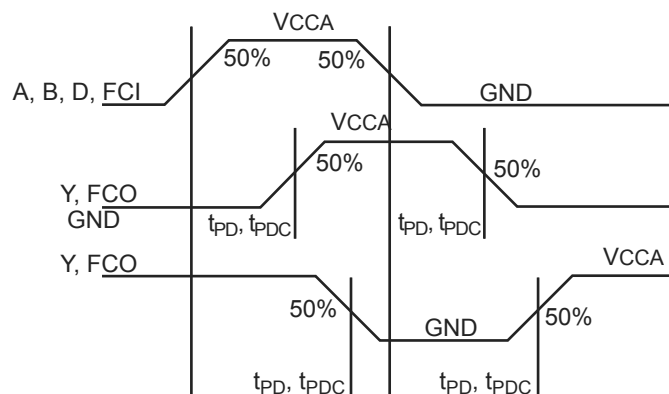
### Timing Characteristics

**Table 2-52 • 3.3 V SSTL3 Class I I/O Module**

Worst-Case Commercial Conditions VCCA = 1.425 V, VCCI = 3.0 V, T<sub>J</sub> = 70°C

|                                       |                                                                    | –2 Speed |      | –1 Speed |      | Std Speed |      |       |
|---------------------------------------|--------------------------------------------------------------------|----------|------|----------|------|-----------|------|-------|
| Parameter                             | Description                                                        | Min.     | Max. | Min.     | Max. | Min.      | Max. | Units |
| 3.3 V SSTL3 Class I I/O Module Timing |                                                                    |          |      |          |      |           |      |       |
| t <sub>DP</sub>                       | Input Buffer                                                       |          | 1.78 |          | 2.03 |           | 2.39 | ns    |
| t <sub>PY</sub>                       | Output Buffer                                                      |          | 2.17 |          | 2.47 |           | 2.91 | ns    |
| t <sub>CLKQ</sub>                     | Clock-to-Q for the I/O input register                              |          | 0.67 |          | 0.77 |           | 0.90 | ns    |
| t <sub>OCLKQ</sub>                    | Clock-to-Q for the I/O output register and the I/O enable register |          | 0.67 |          | 0.77 |           | 0.90 | ns    |
| t <sub>SUD</sub>                      | Data Input Set-Up                                                  |          | 0.23 |          | 0.27 |           | 0.31 | ns    |
| t <sub>SUE</sub>                      | Enable Input Set-Up                                                |          | 0.26 |          | 0.30 |           | 0.35 | ns    |
| t <sub>HD</sub>                       | Data Input Hold                                                    |          | 0.00 |          | 0.00 |           | 0.00 | ns    |
| t <sub>HE</sub>                       | Enable Input Hold                                                  |          | 0.00 |          | 0.00 |           | 0.00 | ns    |
| t <sub>CPWHL</sub>                    | Clock Pulse Width High to Low                                      | 0.39     |      | 0.39     |      | 0.39      |      | ns    |
| t <sub>CPWLH</sub>                    | Clock Pulse Width Low to High                                      | 0.39     |      | 0.39     |      | 0.39      |      | ns    |
| t <sub>WASYN</sub>                    | Asynchronous Pulse Width                                           | 0.37     |      | 0.37     |      | 0.37      |      | ns    |
| t <sub>REASYN</sub>                   | Asynchronous Recovery Time                                         |          | 0.13 |          | 0.15 |           | 0.17 | ns    |
| t <sub>HASYN</sub>                    | Asynchronous Removal Time                                          |          | 0.00 |          | 0.00 |           | 0.00 | ns    |
| t <sub>CLR</sub>                      | Asynchronous Clear-to-Q                                            |          | 0.23 |          | 0.27 |           | 0.31 | ns    |
| t <sub>PRESET</sub>                   | Asynchronous Preset-to-Q                                           |          | 0.23 |          | 0.27 |           | 0.31 | ns    |

## Timing Model and Waveforms



**Figure 2-28 • C-Cell Timing Model and Waveforms**

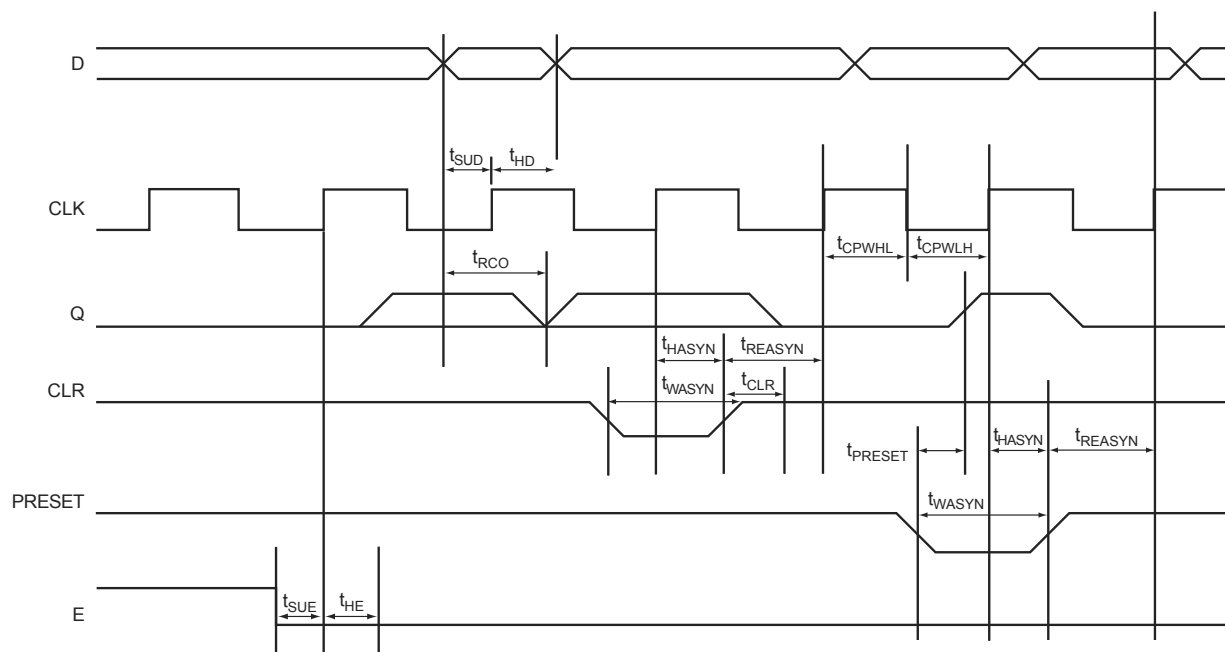
## Timing Characteristics

**Table 2-62 • C-Cell**

Worst-Case Commercial Conditions  $V_{CCA} = 1.425\text{ V}$ ,  $V_{CCI} = 3.0\text{ V}$ ,  $T_J = 70^\circ\text{C}$

|                           |                                                        | –2 Speed |      | –1 Speed |      | Std Speed |      | Units |
|---------------------------|--------------------------------------------------------|----------|------|----------|------|-----------|------|-------|
| Parameter                 | Description                                            | Min.     | Max. | Min.     | Max. | Min.      | Max. |       |
| C-Cell Propagation Delays |                                                        |          |      |          |      |           |      |       |
| t <sub>PD</sub>           | Any input to output Y                                  | 0.74     |      | 0.84     |      | 0.99      |      | ns    |
| t <sub>PDC</sub>          | Any input to carry chain output (FCO)                  | 0.57     |      | 0.64     |      | 0.76      |      | ns    |
| t <sub>PDB</sub>          | Any input through DB when one input is used            | 0.95     |      | 1.09     |      | 1.28      |      | ns    |
| t <sub>CCY</sub>          | Input to carry chain (FCI) to Y                        | 0.61     |      | 0.69     |      | 0.82      |      | ns    |
| t <sub>CC</sub>           | Input to carry chain (FCI) to carry chain output (FCO) | 0.08     |      | 0.09     |      | 0.11      |      | ns    |

## Timing Models and Waveforms



**Figure 2-32 • R-Cell Delays**

### Timing Characteristics

**Table 2-63 • R-Cell**

Worst-Case Commercial Conditions  $V_{CCA} = 1.425\text{ V}$ ,  $V_{CCI} = 3.0\text{ V}$ ,  $T_J = 70^\circ\text{C}$

|                           |                               | –2 Speed |      | –1 Speed |      | Std Speed |      | Units |
|---------------------------|-------------------------------|----------|------|----------|------|-----------|------|-------|
| Parameter                 | Description                   | Min.     | Max. | Min.     | Max. | Min.      | Max. |       |
| R-Cell Propagation Delays |                               |          |      |          |      |           |      |       |
| t <sub>RCO</sub>          | Sequential Clock-to-Q         |          | 0.67 |          | 0.77 |           | 0.90 | ns    |
| t <sub>CLR</sub>          | Asynchronous Clear-to-Q       |          | 0.67 |          | 0.77 |           | 0.90 | ns    |
| t <sub>PRESET</sub>       | Asynchronous Preset-to-Q      |          | 0.36 |          | 0.36 |           | 0.36 | ns    |
| t <sub>SUD</sub>          | Flip-Flop Data Input Set-Up   |          | 0.34 |          | 0.34 |           | 0.34 | ns    |
| t <sub>SUE</sub>          | Flip-Flop Enable Input Set-Up |          | 0.00 |          | 0.00 |           | 0.00 | ns    |
| t <sub>HD</sub>           | Flip-Flop Data Input Hold     |          | 0.67 |          | 0.77 |           | 0.90 | ns    |
| t <sub>HE</sub>           | Flip-Flop Enable Input Hold   |          | 0.67 |          | 0.77 |           | 0.90 | ns    |
| t <sub>WASYN</sub>        | Asynchronous Pulse Width      | 0.48     |      | 0.48     |      | 0.48      |      | ns    |
| t <sub>REASYN</sub>       | Asynchronous Recovery Time    |          | 0.23 |          | 0.27 |           | 0.31 | ns    |
| t <sub>HASYN</sub>        | Asynchronous Removal Time     |          | 0.36 |          | 0.36 |           | 0.36 | ns    |
| t <sub>CPWHL</sub>        | Clock Pulse Width High to Low | 0.36     |      | 0.36     |      | 0.36      |      | ns    |
| t <sub>CPWLH</sub>        | Clock Pulse Width Low to High | 0.36     |      | 0.36     |      | 0.36      |      | ns    |

**Table 2-69 • AX2000 Predicted Routing Delays**  
**Worst-Case Commercial Conditions VCCA = 1.425 V, T<sub>J</sub> = 70°C**

|                                 |                                  | -2 Speed | -1 Speed | Std Speed |       |
|---------------------------------|----------------------------------|----------|----------|-----------|-------|
| Parameter                       | Description                      | Typical  | Typical  | Typical   | Units |
| <b>Predicted Routing Delays</b> |                                  |          |          |           |       |
| t <sub>DC</sub>                 | DirectConnect Routing Delay, FO1 | 0.12     | 0.13     | 0.15      | ns    |
| t <sub>FC</sub>                 | FastConnect Routing Delay, FO1   | 0.35     | 0.39     | 0.46      | ns    |
| t <sub>RD1</sub>                | Routing delay for FO1            | 0.50     | 0.56     | 0.66      | ns    |
| t <sub>RD2</sub>                | Routing delay for FO2            | 0.59     | 0.67     | 0.79      | ns    |
| t <sub>RD3</sub>                | Routing delay for FO3            | 0.70     | 0.80     | 0.94      | ns    |
| t <sub>RD4</sub>                | Routing delay for FO4            | 0.76     | 0.87     | 1.02      | ns    |
| t <sub>RD5</sub>                | Routing delay for FO5            | 0.98     | 1.11     | 1.31      | ns    |
| t <sub>RD6</sub>                | Routing delay for FO6            | 1.48     | 1.68     | 1.97      | ns    |
| t <sub>RD7</sub>                | Routing delay for FO7            | 1.65     | 1.87     | 2.20      | ns    |
| t <sub>RD8</sub>                | Routing delay for FO8            | 1.73     | 1.96     | 2.31      | ns    |
| t <sub>RD16</sub>               | Routing delay for FO16           | 2.58     | 2.92     | 3.44      | ns    |
| t <sub>RD32</sub>               | Routing delay for FO32           | 4.24     | 4.81     | 5.65      | ns    |

# Axcelerator Clock Management System

## Introduction

Each member of the Axcelerator family<sup>6</sup> contains eight phase-locked loop (PLL) blocks which perform the following functions:

- Programmable Delay (32 steps of 250 ps)
- Clock Skew Minimization
- Clock Frequency Synthesis

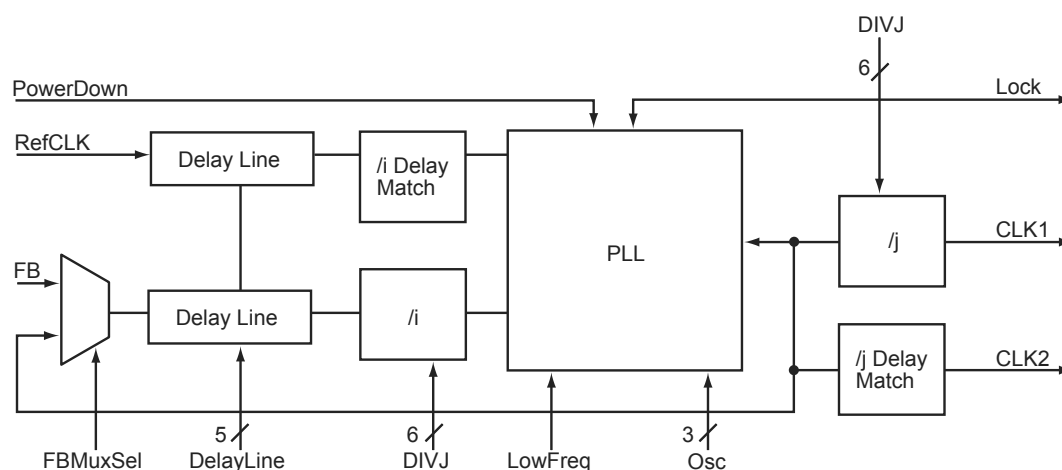
Each PLL has the following key features:

- Input Frequency Range – 14 to 200 MHz
- Output Frequency Range – 20 MHz to 1 GHz
- Output Duty Cycle Range – 45% to 55%
- Maximum Long-Term Jitter – 1% or 100ps (whichever is greater)
- Maximum Short-Term Jitter – 50ps + 1% of Output Frequency
- Maximum Acquisition Time (lock) – 20 $\mu$ s

## Physical Implementation

The eight PLL blocks are arranged in two groups of four. One group is located in the center of the northern edge of the chip, while the second group is centered on the southern edge. The northern group is associated with the four HCLK networks (e.g. PLLA can drive HCLKA), while the southern group is associated with the four CLK networks (e.g. PLLE can drive CLKE).

Each PLL cell is connected to two I/O pads and a PLL Cluster that interfaces with the FPGA core. Figure 2-48 illustrates a PLL block. The VCCPLL pin should be connected to a 1.5V power supply through a 250  $\Omega$  resistor. Furthermore, 0.1  $\mu$ F and 10  $\mu$ F decoupling capacitors should be connected across the VCCPLL and VCOMPPLL pins.



**Figure 2-48 • PLL Block Diagram**

Note: The VCOMPPLL pin should never be grounded (Figure 2-2 on page 2-9)!

The I/O pads associated with the PLL can also be configured for regular I/O functions except when it is used as a clock buffer. The I/O pads can be configured in all the modes available to the regular I/O pads in the same I/O bank. In particular, the [H]CLKxP pad can be configured as a differential pair,

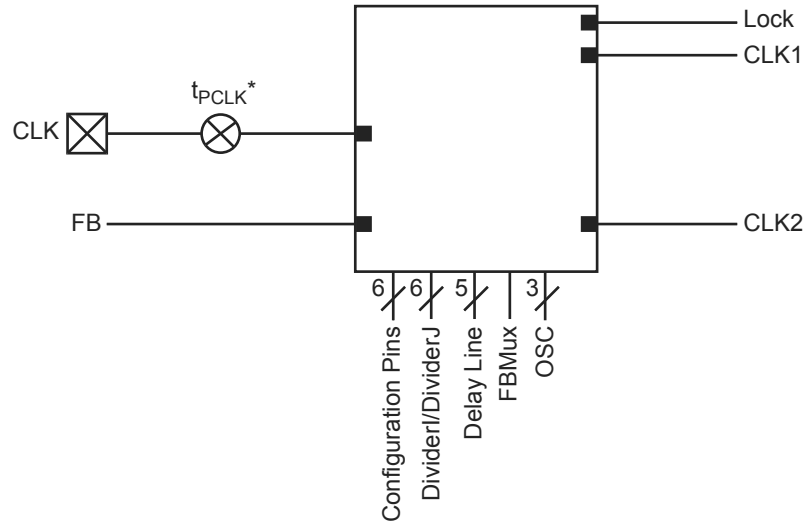
6. AX2000-CQ256 does not support operation of the phase-locked loops. This is in order to support full pin compatibility with RTAX2000S/SL-CQ256.

## User Flow

There are two methods of including a PLL in a design:

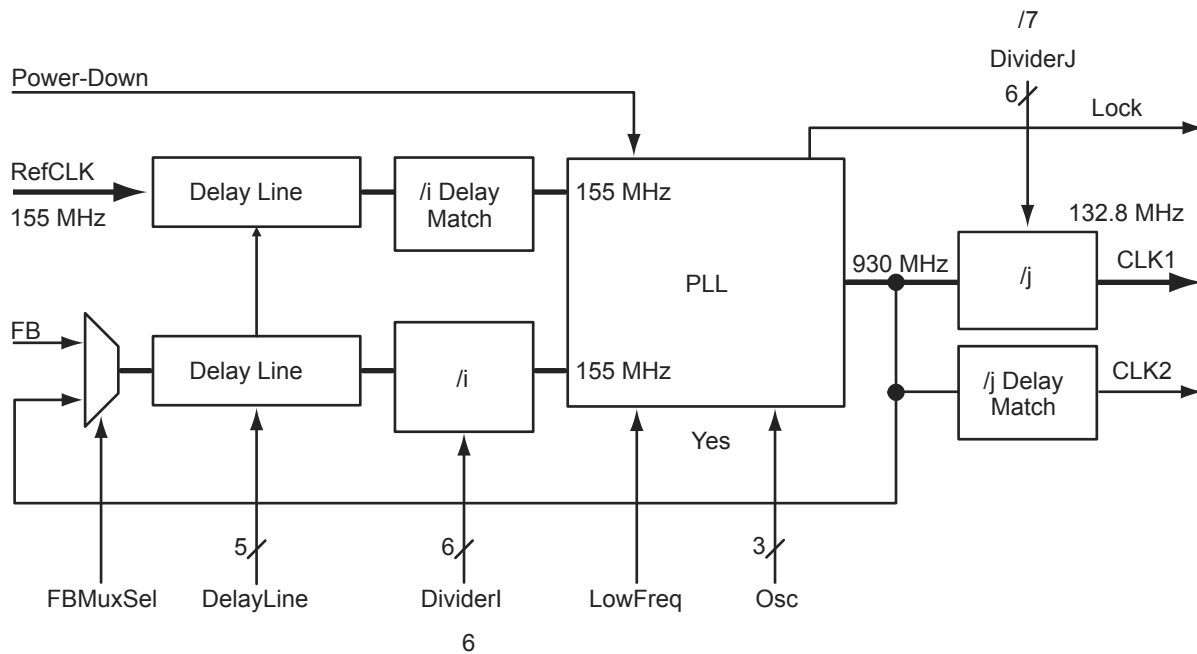
- The recommended method of using a PLL is to create custom PLL blocks using Microsemi's macro generator, SmartGen, that can be instantiated in a design.
- The alternative method is to instantiate one of the generic library primitives (PLL or PLLFB) into either a schematic or HDL netlist, using inverters for polarity control and tying all unused address and data bits to ground.

## Timing Model

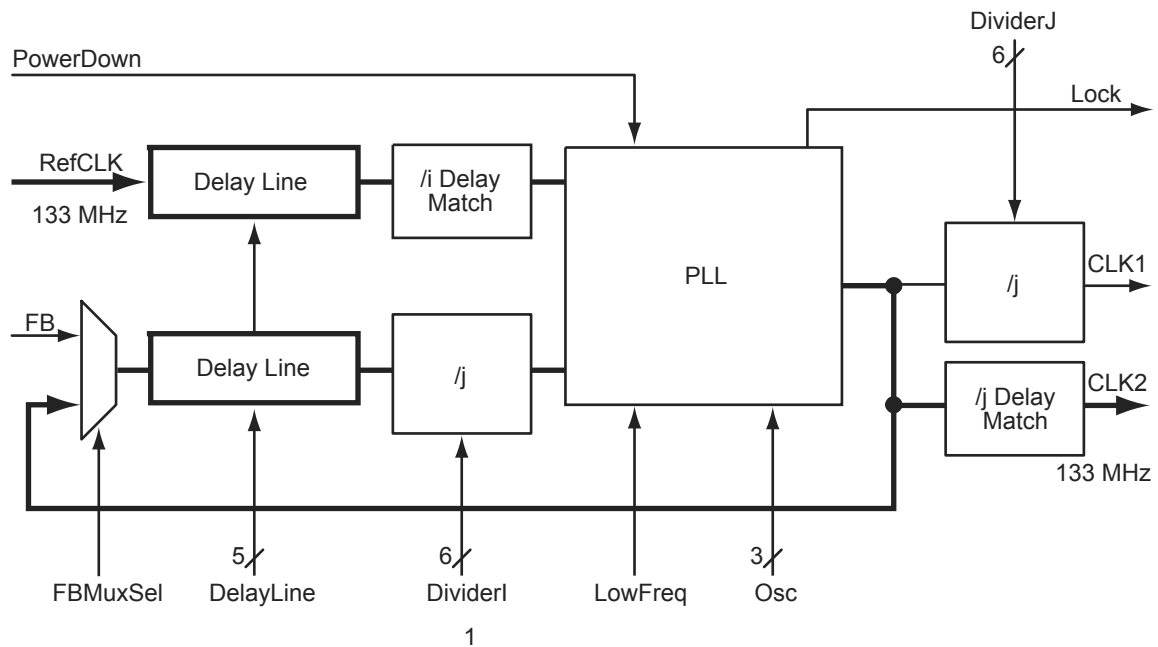


Note:  $t_{PCLK}$  is the delay in the clock signal

**Figure 2-52 • PLL Model**



**Figure 2-54 • Using the PLL 155 MHz In, 133 MHz Out**



**Figure 2-55 • Using the PLL Delaying the Reference Clock**

**Table 2-89 • One RAM Block**

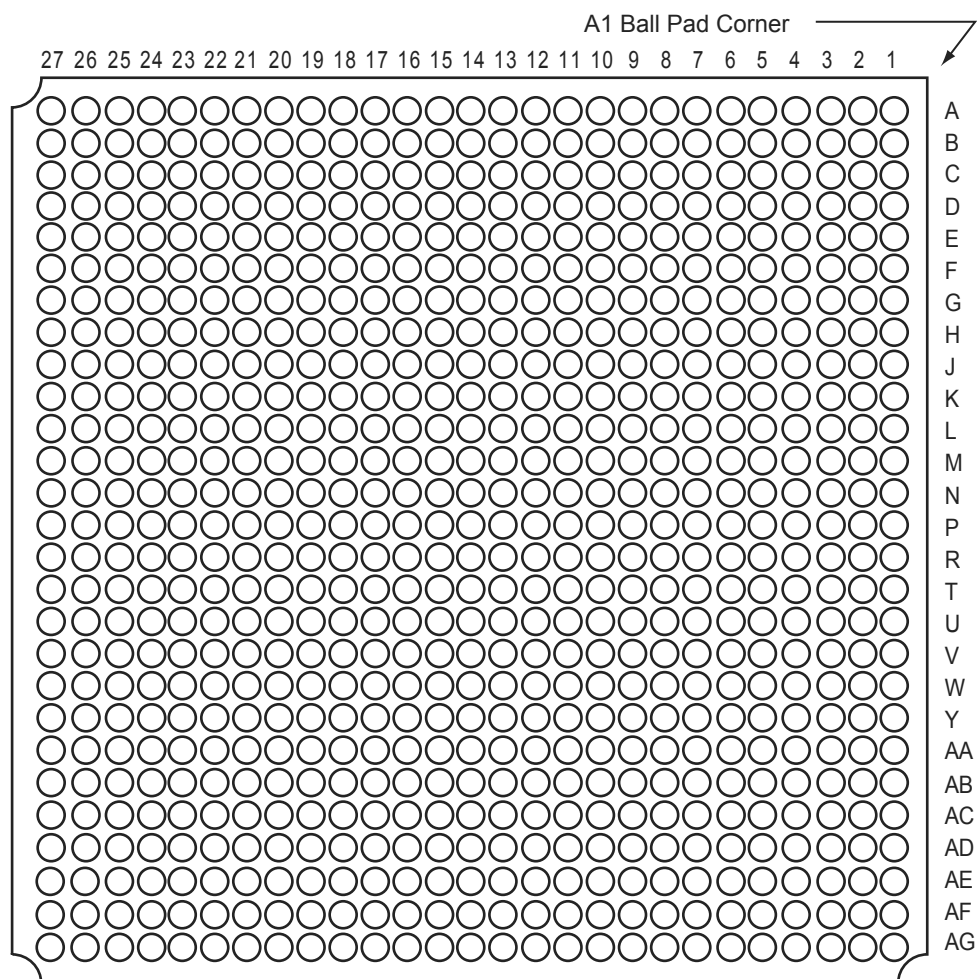
**Worst-Case Commercial Conditions VCCA = 1.425 V, VCCI = 3.0 V, T<sub>J</sub> = 70°C**

|                      |                               | –2 Speed |      | –1 Speed |      | Std Speed |      | Units |
|----------------------|-------------------------------|----------|------|----------|------|-----------|------|-------|
| Parameter            | Description                   | Min.     | Max. | Min.     | Max. | Min.      | Max. |       |
| Write Mode           |                               |          |      |          |      |           |      |       |
| t <sub>WDASU</sub>   | Write Data Setup vs. WCLK     |          | 1.08 |          | 1.23 |           | 1.45 | ns    |
| t <sub>WDAHD</sub>   | Write Data Hold vs. WCLK      |          | 0.22 |          | 0.25 |           | 0.30 | ns    |
| t <sub>WADSU</sub>   | Write Address Setup vs. WCLK  |          | 1.08 |          | 1.23 |           | 1.45 | ns    |
| t <sub>WADHD</sub>   | Write Address Hold vs. WCLK   |          | 0.00 |          | 0.00 |           | 0.00 | ns    |
| t <sub>WENSU</sub>   | Write Enable Setup vs. WCLK   |          | 1.08 |          | 1.23 |           | 1.45 | ns    |
| t <sub>WENHD</sub>   | Write Enable Hold vs. WCLK    |          | 0.22 |          | 0.25 |           | 0.30 | ns    |
| t <sub>WCKH</sub>    | WCLK Minimum High Pulse Width | 0.75     |      | 0.75     |      | 0.75      |      | ns    |
| t <sub>WCLK</sub>    | WCLK Minimum Low Pulse Width  | 0.88     |      | 0.88     |      | 0.88      |      | ns    |
| t <sub>WCKP</sub>    | WCLK Minimum Period           | 1.63     |      | 1.63     |      | 1.63      |      | ns    |
| Read Mode            |                               |          |      |          |      |           |      |       |
| t <sub>RADSU</sub>   | Read Address Setup vs. RCLK   |          | 0.81 |          | 0.92 |           | 1.08 | ns    |
| t <sub>RADHD</sub>   | Read Address Hold vs. RCLK    |          | 0.00 |          | 0.00 |           | 0.00 | ns    |
| t <sub>RENSU</sub>   | Read Enable Setup vs. RCLK    |          | 0.81 |          | 0.92 |           | 1.08 | ns    |
| t <sub>RENHD</sub>   | Read Enable Hold vs. RCLK     |          | 0.00 |          | 0.00 |           | 0.00 | ns    |
| t <sub>RCK2RD1</sub> | RCLK-to-OUT (Pipelined)       |          | 1.32 |          | 1.51 |           | 1.77 | ns    |
| t <sub>RCK2RD2</sub> | RCLK-to-OUT (Non-Pipelined)   |          | 2.16 |          | 2.46 |           | 2.90 | ns    |
| t <sub>RCLKH</sub>   | RCLK Minimum High Pulse Width | 0.77     |      | 0.77     |      | 0.77      |      | ns    |
| t <sub>RCLKL</sub>   | RCLK Minimum Low Pulse Width  | 0.93     |      | 0.93     |      | 0.93      |      | ns    |
| t <sub>RCKP</sub>    | RCLK Minimum Period           | 1.70     |      | 1.70     |      | 1.70      |      | ns    |

*Note: Timing data for this single block RAM has a depth of 4,096. For all other combinations, use Microsemi's timing software.*

## 3 – Package Pin Assignments

### BG729



#### Note

For Package Manufacturing and Environmental information, visit Resource center at <http://www.microsemi.com/soc/products/rescenter/package/index.html>.

| FG256          |            | FG256          |            |
|----------------|------------|----------------|------------|
| AX250 Function | Pin Number | AX250 Function | Pin Number |
| VCCA           | L9         | VCCIB4         | M11        |
| VCCA           | N3         | VCCIB4         | M9         |
| VCCA           | P14        | VCCIB5         | M6         |
| VCCPLA         | C7         | VCCIB5         | M7         |
| VCCPLB         | D6         | VCCIB5         | M8         |
| VCCPLC         | A10        | VCCIB6         | J5         |
| VCCPLD         | D10        | VCCIB6         | K5         |
| VCCPLE         | P10        | VCCIB6         | L5         |
| VCCPLF         | N11        | VCCIB7         | F5         |
| VCCPLG         | T7         | VCCIB7         | G5         |
| VCCPLH         | N7         | VCCIB7         | H5         |
| VCCDA          | A11        | VCOMPLA        | A7         |
| VCCDA          | A2         | VCOMPLB        | D7         |
| VCCDA          | C13        | VCOMPLC        | B9         |
| VCCDA          | D9         | VCOMPLD        | D11        |
| VCCDA          | H1         | VCOMPLE        | T10        |
| VCCDA          | J15        | VCOMPLF        | N10        |
| VCCDA          | N14        | VCOMPLG        | R8         |
| VCCDA          | N8         | VCOMPLH        | N6         |
| VCCDA          | P4         | VPUMP          | A14        |
| VCCDA          | R11        |                |            |
| VCCDA          | R5         |                |            |
| VCCIB0         | E6         |                |            |
| VCCIB0         | E7         |                |            |
| VCCIB0         | E8         |                |            |
| VCCIB1         | E10        |                |            |
| VCCIB1         | E11        |                |            |
| VCCIB1         | E9         |                |            |
| VCCIB2         | F12        |                |            |
| VCCIB2         | G12        |                |            |
| VCCIB2         | H12        |                |            |
| VCCIB3         | J12        |                |            |
| VCCIB3         | K12        |                |            |
| VCCIB3         | L12        |                |            |
| VCCIB4         | M10        |                |            |

| FG484           |            |
|-----------------|------------|
| AX1000 Function | Pin Number |
| <b>Bank 0</b>   |            |
| IO01NB0F0       | E3         |
| IO01PB0F0       | D3         |
| IO02NB0F0       | E7         |
| IO02PB0F0       | E6         |
| IO05NB0F0       | D2         |
| IO05PB0F0       | E2         |
| IO06NB0F0       | C5         |
| IO06PB0F0       | C4         |
| IO12NB0F1       | D7         |
| IO12PB0F1       | D6         |
| IO13NB0F1       | B5         |
| IO13PB0F1       | B4         |
| IO14NB0F1       | E9         |
| IO14PB0F1       | E8         |
| IO15NB0F1       | C7         |
| IO15PB0F1       | C6         |
| IO16NB0F1       | A5         |
| IO16PB0F1       | A4         |
| IO17NB0F1       | B7         |
| IO17PB0F1       | B6         |
| IO18NB0F1       | A7         |
| IO18PB0F1       | A6         |
| IO19NB0F1       | C9         |
| IO19PB0F1       | C8         |
| IO20NB0F1       | D9         |
| IO20PB0F1       | D8         |
| IO21NB0F1       | B9         |
| IO21PB0F1       | B8         |
| IO22NB0F2       | A9         |
| IO22PB0F2       | A8         |
| IO23NB0F2       | B10        |
| IO23PB0F2       | A10        |
| IO26NB0F2       | A14        |
| IO26PB0F2       | A13        |

| FG484            |            |
|------------------|------------|
| AX1000 Function  | Pin Number |
| IO29NB0F2        | B12        |
| IO29PB0F2        | B11        |
| IO30NB0F2/HCLKAN | E11        |
| IO30PB0F2/HCLKAP | E10        |
| IO31NB0F2/HCLKBN | D12        |
| IO31PB0F2/HCLKBP | D11        |
| <b>Bank 1</b>    |            |
| IO32NB1F3/HCLKCN | F13        |
| IO32PB1F3/HCLKCP | F12        |
| IO33NB1F3/HCLKDN | E14        |
| IO33PB1F3/HCLKDP | E13        |
| IO34NB1F3        | C13        |
| IO34PB1F3        | C12        |
| IO37NB1F3        | B14        |
| IO37PB1F3        | B13        |
| IO38NB1F3        | A16        |
| IO38PB1F3        | A15        |
| IO40NB1F3        | C15        |
| IO42NB1F4        | A18        |
| IO42PB1F4        | A17        |
| IO43NB1F4        | B16        |
| IO43PB1F4        | B15        |
| IO44NB1F4        | B18        |
| IO44PB1F4        | B17        |
| IO45NB1F4        | B19        |
| IO45PB1F4        | A19        |
| IO46NB1F4        | C19        |
| IO46PB1F4        | C18        |
| IO48NB1F4        | F15        |
| IO48PB1F4        | F14        |
| IO49NB1F4        | D16        |
| IO49PB1F4        | D15        |
| IO50NB1F4        | C17        |
| IO50PB1F4        | C16        |
| IO51NB1F4        | E22        |

| FG484           |            |
|-----------------|------------|
| AX1000 Function | Pin Number |
| IO51PB1F4       | D22        |
| IO52NB1F4       | E16        |
| IO52PB1F4       | E15        |
| IO57NB1F5       | E21        |
| IO57PB1F5       | D21        |
| IO60NB1F5       | G16        |
| IO60PB1F5       | G15        |
| IO61NB1F5       | D18        |
| IO61PB1F5       | E17        |
| IO63NB1F5       | E20        |
| IO63PB1F5       | D20        |
| <b>Bank 2</b>   |            |
| IO64NB2F6       | F18        |
| IO64PB2F6       | F17        |
| IO67NB2F6       | F19        |
| IO67PB2F6       | E19        |
| IO68NB2F6       | J16        |
| IO68PB2F6       | H16        |
| IO70NB2F6       | J17        |
| IO70PB2F6       | H17        |
| IO74NB2F7       | J18        |
| IO74PB2F7       | H18        |
| IO75NB2F7       | G20        |
| IO75PB2F7       | F20        |
| IO79NB2F7       | H19        |
| IO79PB2F7       | G19        |
| IO80NB2F7       | L16        |
| IO80PB2F7       | K16        |
| IO84NB2F7       | L17        |
| IO84PB2F7       | K17        |
| IO85NB2F8       | G21        |
| IO85PB2F8       | F21        |
| IO86NB2F8       | G22        |
| IO86PB2F8       | F22        |
| IO87NB2F8       | J20        |

| FG896           |            | FG896            |            | FG896           |            |
|-----------------|------------|------------------|------------|-----------------|------------|
| AX1000 Function | Pin Number | AX1000 Function  | Pin Number | AX1000 Function | Pin Number |
| <b>Bank 0</b>   |            | IO17NB0F1        | B11        | IO34NB1F3       | A17        |
| IO00NB0F0       | D6         | IO17PB0F1        | B10        | IO34PB1F3       | B17        |
| IO00PB0F0       | E6         | IO18NB0F1        | D11        | IO35NB1F3       | D18        |
| IO01NB0F0       | A5         | IO18PB0F1        | E11        | IO35PB1F3       | C18        |
| IO01PB0F0       | B5         | IO19NB0F1        | C12        | IO36NB1F3       | H17        |
| IO02NB0F0       | G9         | IO19PB0F1        | C11        | IO36PB1F3       | J17        |
| IO02PB0F0       | G8         | IO20NB0F1        | F12        | IO37NB1F3       | B19        |
| IO03NB0F0       | F8         | IO20PB0F1        | G12        | IO37PB1F3       | A19        |
| IO03PB0F0       | F7         | IO21NB0F1        | D12        | IO38NB1F3       | H18        |
| IO04NB0F0       | D7         | IO21PB0F1        | E12        | IO38PB1F3       | J18        |
| IO04PB0F0       | E7         | IO22NB0F2        | H13        | IO39NB1F3       | B20        |
| IO05NB0F0       | C7         | IO22PB0F2        | J13        | IO39PB1F3       | A20        |
| IO05PB0F0       | C6         | IO23NB0F2        | A12        | IO40NB1F3       | C20        |
| IO06NB0F0       | H9         | IO23PB0F2        | A11        | IO40PB1F3       | C19        |
| IO06PB0F0       | H8         | IO24NB0F2        | F13        | IO41NB1F4       | E20        |
| IO07NB0F0       | D8         | IO24PB0F2        | G13        | IO41PB1F4       | E19        |
| IO07PB0F0       | E8         | IO25NB0F2        | B13        | IO42NB1F4       | F18        |
| IO08NB0F0       | E9         | IO25PB0F2        | B12        | IO42PB1F4       | G18        |
| IO08PB0F0       | F9         | IO26NB0F2        | E14        | IO43NB1F4       | A22        |
| IO09NB0F0       | A7         | IO26PB0F2        | E13        | IO43PB1F4       | A21        |
| IO09PB0F0       | B7         | IO27NB0F2        | B14        | IO44NB1F4       | F20        |
| IO10NB0F0       | H10        | IO27PB0F2        | A14        | IO44PB1F4       | F19        |
| IO10PB0F0       | G10        | IO28NB0F2        | H14        | IO45NB1F4       | D21        |
| IO11NB0F0       | C9         | IO28PB0F2        | J14        | IO45PB1F4       | D20        |
| IO11PB0F0       | C8         | IO29NB0F2        | B15        | IO46NB1F4       | D22        |
| IO12NB0F1       | E10        | IO29PB0F2        | A15        | IO46PB1F4       | C22        |
| IO12PB0F1       | F10        | IO30NB0F2/HCLKAN | C14        | IO47NB1F4       | A25        |
| IO13NB0F1       | D10        | IO30PB0F2/HCLKAP | D14        | IO47PB1F4       | A24        |
| IO13PB0F1       | D9         | IO31NB0F2/HCLKBN | E15        | IO48NB1F4       | H19        |
| IO14NB0F1       | F11        | IO31PB0F2/HCLKBP | D15        | IO48PB1F4       | G19        |
| IO14PB0F1       | G11        | <b>Bank 1</b>    |            | IO49NB1F4       | C24        |
| IO15NB0F1       | A10        | IO32NB1F3/HCLKCN | E17        | IO49PB1F4       | C23        |
| IO15PB0F1       | A9         | IO32PB1F3/HCLKCP | E16        | IO50NB1F4       | G20        |
| IO16NB0F1       | H12        | IO33NB1F3/HCLKDN | C17        | IO50PB1F4       | H20        |
| IO16PB0F1       | H11        | IO33PB1F3/HCLKDP | D17        | IO51NB1F4       | F21        |

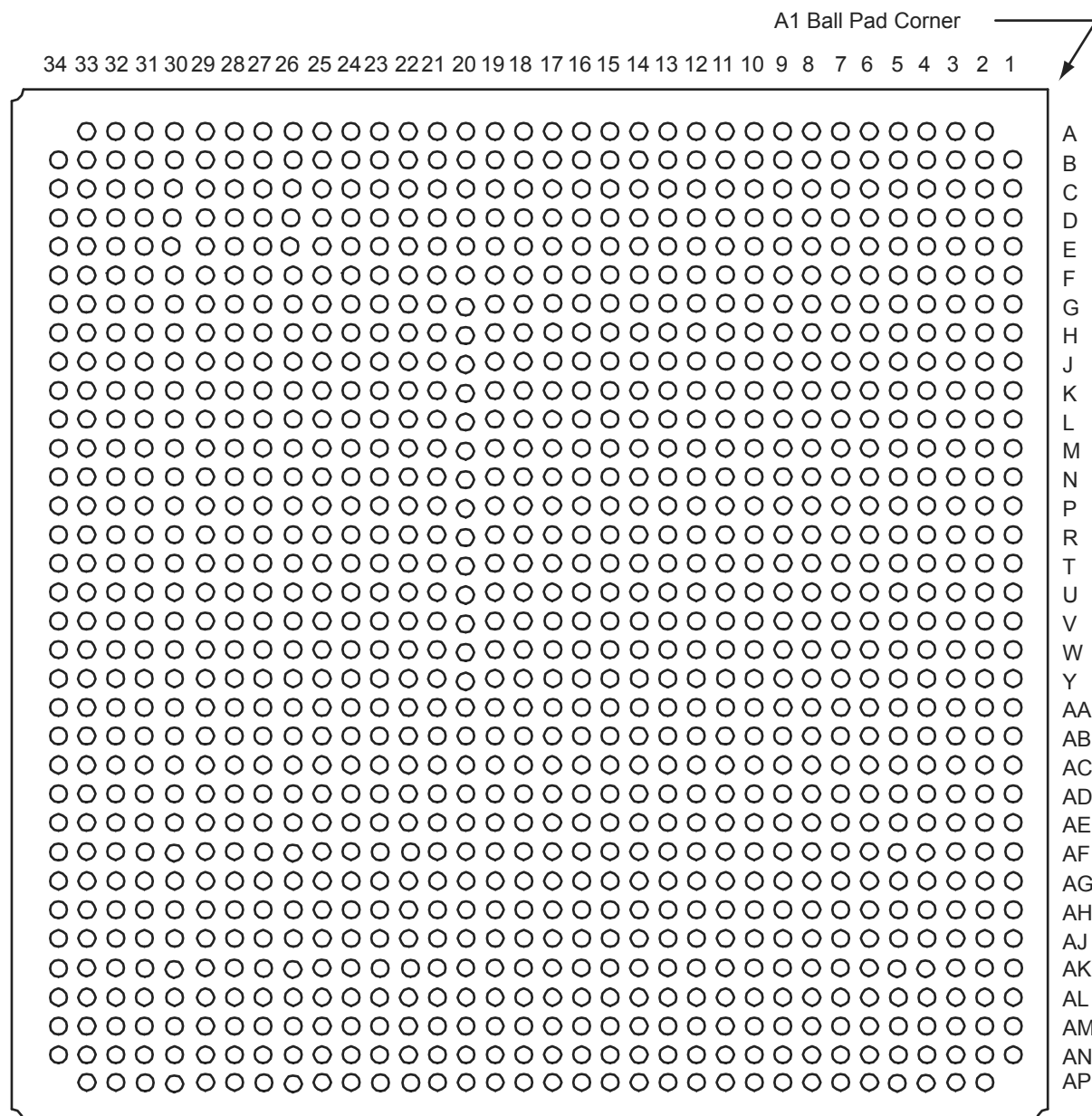
| FG896           |            | FG896           |            | FG896           |            |
|-----------------|------------|-----------------|------------|-----------------|------------|
| AX2000 Function | Pin Number | AX2000 Function | Pin Number | AX2000 Function | Pin Number |
| IO65PB1F6       | H20        | IO85NB1F7       | F25        | IO102PB2F9      | D30        |
| IO66NB1F6       | B23        | IO85PB1F7       | E25        | IO103NB2F9      | L26        |
| IO66PB1F6       | B21        | Bank 2          |            | IO103PB2F9      | K26        |
| IO67NB1F6       | H21        | IO86NB2F8       | G26        | IO104NB2F9      | F29        |
| IO67PB1F6       | G21        | IO86PB2F8       | G25        | IO105NB2F9      | M25        |
| IO68NB1F6       | D22        | IO87NB2F8       | K23        | IO105PB2F9      | L25        |
| IO68PB1F6       | C22        | IO87PB2F8       | J23        | IO106NB2F9      | K30        |
| IO69NB1F6       | A25        | IO88NB2F8       | J24        | IO106PB2F9      | K29        |
| IO69PB1F6       | A24        | IO88PB2F8       | H24        | IO107NB2F10     | M23        |
| IO70NB1F6       | F22        | IO89NB2F8       | E29        | IO107PB2F10     | M24        |
| IO70PB1F6       | E22        | IO89PB2F8       | D29        | IO109NB2F10     | M27        |
| IO71NB1F6       | F21        | IO90NB2F8       | F27        | IO109PB2F10     | L27        |
| IO71PB1F6       | E21        | IO90PB2F8       | E27        | IO110NB2F10     | M28        |
| IO73NB1F6       | C24        | IO91NB2F8       | H26        | IO110PB2F10     | L28        |
| IO73PB1F6       | C23        | IO91PB2F8       | H25        | IO111NB2F10     | N22        |
| IO74NB1F6       | D24        | IO92NB2F8       | G28        | IO111PB2F10     | N23        |
| IO74PB1F6       | D23        | IO92PB2F8       | F28        | IO112NB2F10     | M29        |
| IO75NB1F6       | H23        | IO93NB2F8       | J26        | IO112PB2F10     | L29        |
| IO75PB1F6       | H22        | IO93PB2F8       | J25        | IO113NB2F10     | N26        |
| IO76NB1F7       | B25        | IO94NB2F8       | H27        | IO113PB2F10     | M26        |
| IO76PB1F7       | B24        | IO94PB2F8       | G27        | IO114NB2F10     | M30        |
| IO78NB1F7       | B26        | IO95NB2F8       | H29        | IO114PB2F10     | L30        |
| IO78PB1F7       | A26        | IO95PB2F8       | G29        | IO115NB2F10     | N28        |
| IO79NB1F7       | F23        | IO96NB2F9       | G30        | IO115PB2F10     | N27        |
| IO79PB1F7       | E23        | IO96PB2F9       | F30        | IO117NB2F10     | N25        |
| IO80NB1F7       | D25        | IO97NB2F9       | K25        | IO117PB2F10     | N24        |
| IO80PB1F7       | C25        | IO97PB2F9       | K24        | IO118NB2F11     | N29        |
| IO81NB1F7       | G23        | IO98NB2F9       | J28        | IO119NB2F11     | P22        |
| IO81PB1F7       | G22        | IO98PB2F9       | H28        | IO119PB2F11     | P23        |
| IO82NB1F7       | B27        | IO99NB2F9       | L23        | IO121NB2F11     | P25        |
| IO82PB1F7       | A27        | IO99PB2F9       | L24        | IO121PB2F11     | P24        |
| IO83NB1F7       | F24        | IO100NB2F9      | K27        | IO122NB2F11     | P28        |
| IO83PB1F7       | E24        | IO100PB2F9      | J27        | IO122PB2F11     | P27        |
| IO84NB1F7       | D26        | IO101PB2F9      | J30        | IO123NB2F11     | R26        |
| IO84PB1F7       | C26        | IO102NB2F9      | E30        | IO123PB2F11     | P26        |

| FG896           |            |
|-----------------|------------|
| AX2000 Function | Pin Number |
| IO180PB4F16     | AG24       |
| IO181NB4F17     | AK24       |
| IO181PB4F17     | AK25       |
| IO182NB4F17     | AD22       |
| IO182PB4F17     | AC22       |
| IO183NB4F17     | AF22       |
| IO183PB4F17     | AF23       |
| IO184NB4F17     | AE21       |
| IO184PB4F17     | AE22       |
| IO185NB4F17     | AJ23       |
| IO185PB4F17     | AJ24       |
| IO187NB4F17     | AH22       |
| IO187PB4F17     | AH23       |
| IO188NB4F17     | AD21       |
| IO188PB4F17     | AC21       |
| IO189PB4F17     | AK22       |
| IO190NB4F17     | AF20       |
| IO190PB4F17     | AF21       |
| IO191NB4F17     | AG21       |
| IO191PB4F17     | AG22       |
| IO192NB4F17     | AE19       |
| IO192PB4F17     | AE20       |
| IO195NB4F18     | AK21       |
| IO195PB4F18     | AJ21       |
| IO196NB4F18     | AD19       |
| IO196PB4F18     | AD20       |
| IO197NB4F18     | AJ20       |
| IO197PB4F18     | AK20       |
| IO198NB4F18     | AC19       |
| IO198PB4F18     | AC20       |
| IO199NB4F18     | AG19       |
| IO199PB4F18     | AG20       |
| IO200NB4F18     | AH19       |
| IO200PB4F18     | AH20       |
| IO201NB4F18     | AK19       |

| FG896             |            |
|-------------------|------------|
| AX2000 Function   | Pin Number |
| IO201PB4F18       | AJ19       |
| IO202NB4F18       | AC18       |
| IO202PB4F18       | AB18       |
| IO206NB4F19       | AE18       |
| IO206PB4F19       | AD18       |
| IO207NB4F19       | AJ17       |
| IO207PB4F19       | AJ18       |
| IO208NB4F19       | AE17       |
| IO208PB4F19       | AD17       |
| IO209NB4F19       | AK17       |
| IO210NB4F19       | AC17       |
| IO210PB4F19       | AB17       |
| IO211NB4F19       | AJ16       |
| IO211PB4F19       | AK16       |
| IO212NB4F19/CLKEN | AG18       |
| IO212PB4F19/CLKEP | AH18       |
| IO213NB4F19/CLKFN | AG16       |
| IO213PB4F19/CLKFP | AG17       |
| <b>Bank 5</b>     |            |
| IO214NB5F20/CLKGN | AG14       |
| IO214PB5F20/CLKGP | AG15       |
| IO215NB5F20/CLKHN | AG13       |
| IO215PB5F20/CLKHP | AH13       |
| IO216NB5F20       | AB14       |
| IO216PB5F20       | AC15       |
| IO217NB5F20       | AK15       |
| IO217PB5F20       | AJ15       |
| IO218NB5F20       | AE14       |
| IO218PB5F20       | AD14       |
| IO219NB5F20       | AK14       |
| IO219PB5F20       | AJ14       |
| IO222NB5F20       | AB13       |
| IO222PB5F20       | AC14       |
| IO223NB5F21       | AJ12       |
| IO223PB5F21       | AJ13       |

| FG896           |            |
|-----------------|------------|
| AX2000 Function | Pin Number |
| IO225NB5F21     | AH11       |
| IO225PB5F21     | AH12       |
| IO226NB5F21     | AC13       |
| IO226PB5F21     | AD13       |
| IO227NB5F21     | AE12       |
| IO227PB5F21     | AE13       |
| IO228NB5F21     | AG11       |
| IO228PB5F21     | AG12       |
| IO229NB5F21     | AK11       |
| IO229PB5F21     | AK12       |
| IO230NB5F21     | AC12       |
| IO230PB5F21     | AD12       |
| IO232NB5F21     | AE11       |
| IO232PB5F21     | AF11       |
| IO233NB5F21     | AJ10       |
| IO233PB5F21     | AJ11       |
| IO234NB5F21     | AC11       |
| IO234PB5F21     | AD11       |
| IO236NB5F22     | AK9        |
| IO236PB5F22     | AK10       |
| IO237NB5F22     | AG9        |
| IO237PB5F22     | AG10       |
| IO238NB5F22     | AF9        |
| IO238PB5F22     | AF10       |
| IO239NB5F22     | AH8        |
| IO239PB5F22     | AH9        |
| IO240NB5F22     | AC10       |
| IO240PB5F22     | AD10       |
| IO242NB5F22     | AE9        |
| IO242PB5F22     | AE10       |
| IO243NB5F22     | AJ7        |
| IO243PB5F22     | AJ8        |
| IO244NB5F22     | AK6        |
| IO244PB5F22     | AK7        |
| IO245NB5F23     | AF8        |

## FG1152



### Note

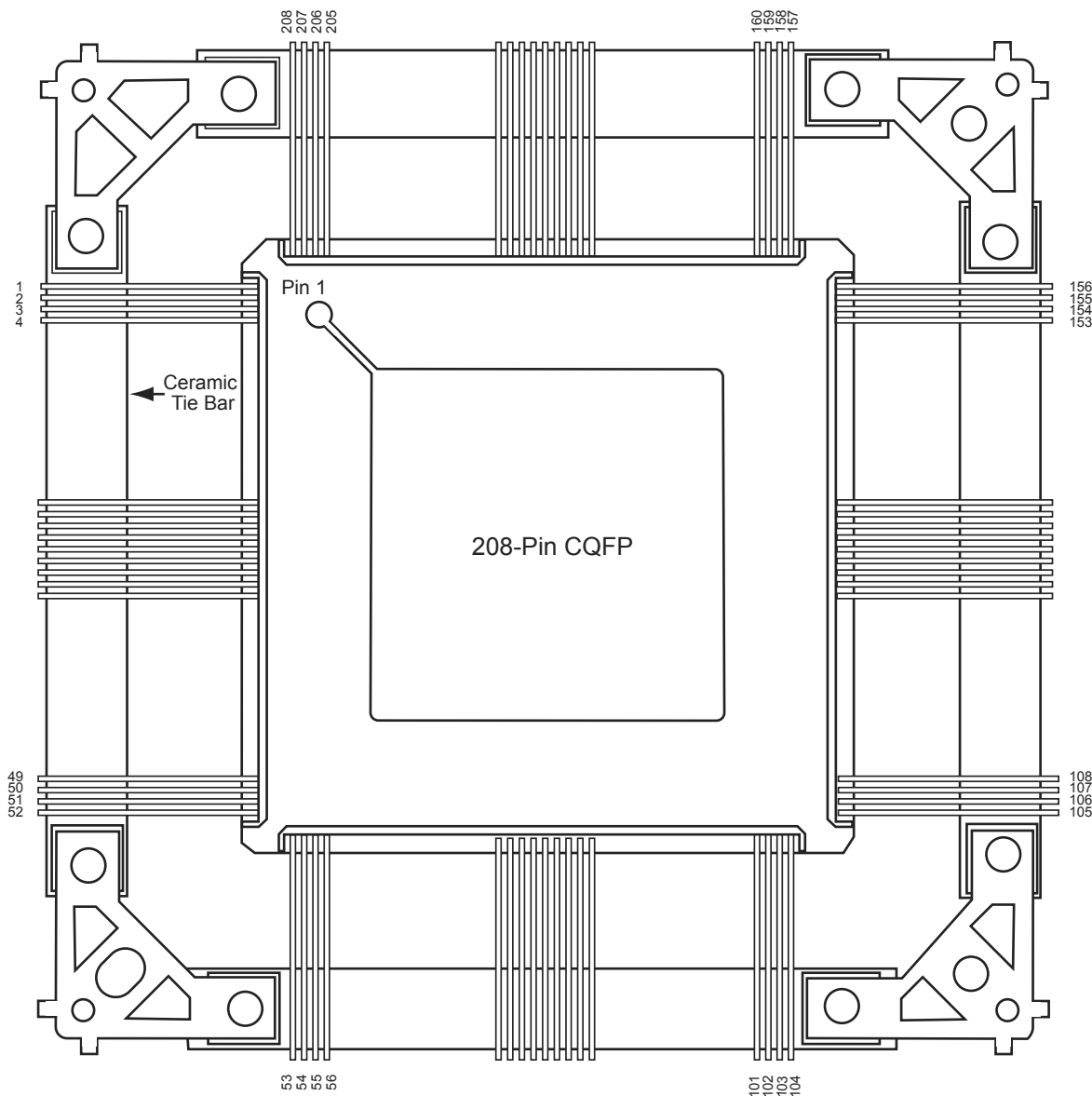
For Package Manufacturing and Environmental information, visit Resource center at <http://www.microsemi.com/soc/products/rescenter/package/index.html>.

| PQ208                |            |
|----------------------|------------|
| AX250 Function       | Pin Number |
| IO110PB7F7           | 19         |
| IO112NB7F7           | 16         |
| IO112PB7F7           | 17         |
| IO117NB7F7           | 12         |
| IO117PB7F7           | 13         |
| IO119NB7F7           | 10         |
| IO119PB7F7           | 11         |
| IO121PB7F7           | 7          |
| IO122NB7F7           | 5          |
| IO122PB7F7           | 6          |
| IO123NB7F7           | 3          |
| IO123PB7F7           | 4          |
| <b>Dedicated I/O</b> |            |
| VCCDA                | 1          |
| VCCDA                | 26         |
| VCCDA                | 53         |
| VCCDA                | 63         |
| VCCDA                | 78         |
| VCCDA                | 95         |
| VCCDA                | 105        |
| VCCDA                | 130        |
| VCCDA                | 157        |
| VCCDA                | 167        |
| VCCDA                | 182        |
| VCCDA                | 202        |
| GND                  | 104        |
| GND                  | 9          |
| GND                  | 15         |
| GND                  | 21         |
| GND                  | 32         |
| GND                  | 39         |
| GND                  | 46         |
| GND                  | 51         |
| GND                  | 59         |
| GND                  | 65         |
| GND                  | 69         |
| GND                  | 90         |

| PQ208          |            |
|----------------|------------|
| AX250 Function | Pin Number |
| GND            | 94         |
| GND            | 99         |
| GND            | 113        |
| GND            | 119        |
| GND            | 125        |
| GND            | 136        |
| GND            | 143        |
| GND            | 150        |
| GND            | 155        |
| GND            | 164        |
| GND            | 169        |
| GND            | 173        |
| GND            | 194        |
| GND            | 196        |
| GND            | 201        |
| GND/LP         | 208        |
| PRA            | 184        |
| PRB            | 183        |
| PRC            | 80         |
| PRD            | 79         |
| TCK            | 205        |
| TDI            | 204        |
| TDO            | 203        |
| TMS            | 206        |
| TRST           | 207        |
| VCCA           | 2          |
| VCCA           | 52         |
| VCCA           | 156        |
| VCCA           | 14         |
| VCCA           | 38         |
| VCCA           | 64         |
| VCCA           | 93         |
| VCCA           | 118        |
| VCCA           | 142        |
| VCCA           | 168        |
| VCCA           | 195        |
| VCCPLA         | 189        |

| PQ208          |            |
|----------------|------------|
| AX250 Function | Pin Number |
| VCCPLB         | 187        |
| VCCPLC         | 178        |
| VCCPLD         | 176        |
| VCCPLE         | 85         |
| VCCPLF         | 83         |
| VCCPLG         | 74         |
| VCCPLH         | 72         |
| VCCIB0         | 193        |
| VCCIB0         | 200        |
| VCCIB1         | 163        |
| VCCIB1         | 172        |
| VCCIB2         | 135        |
| VCCIB2         | 149        |
| VCCIB3         | 112        |
| VCCIB3         | 124        |
| VCCIB4         | 89         |
| VCCIB4         | 98         |
| VCCIB5         | 58         |
| VCCIB5         | 68         |
| VCCIB6         | 31         |
| VCCIB6         | 45         |
| VCCIB7         | 8          |
| VCCIB7         | 20         |
| VCOMPLA        | 190        |
| VCOMPLB        | 188        |
| VCOMPLC        | 179        |
| VCOMPLD        | 177        |
| VCOMPLE        | 86         |
| VCOMPLF        | 84         |
| VCOMPLG        | 75         |
| VCOMPLH        | 73         |
| VPUMP          | 158        |

## CQ208



### Note

For Package Manufacturing and Environmental information, visit Resource center at <http://www.microsemi.com/soc/products/rescenter/package/index.html>.

| CQ352             |            |
|-------------------|------------|
| AX2000 Function   | Pin Number |
| IO182PB4F17       | 171        |
| IO183NB4F17       | 166        |
| IO183PB4F17       | 167        |
| IO184NB4F17       | 164        |
| IO184PB4F17       | 165        |
| IO185NB4F17       | 160        |
| IO185PB4F17       | 161        |
| IO190NB4F17       | 158        |
| IO190PB4F17       | 159        |
| IO191NB4F17       | 154        |
| IO191PB4F17       | 155        |
| IO192NB4F17       | 152        |
| IO192PB4F17       | 153        |
| IO207NB4F19       | 146        |
| IO207PB4F19       | 147        |
| IO212NB4F19/CLKEN | 142        |
| IO212PB4F19/CLKEP | 143        |
| IO213NB4F19/CLKFN | 136        |
| IO213PB4F19/CLKFP | 137        |
| <b>Bank 5</b>     |            |
| IO214NB5F20/CLKGN | 128        |
| IO214PB5F20/CLKGP | 129        |
| IO215NB5F20/CLKHN | 122        |
| IO215PB5F20/CLKHP | 123        |
| IO217NB5F20       | 118        |
| IO217PB5F20       | 119        |
| IO236NB5F22       | 110        |
| IO236PB5F22       | 111        |
| IO237NB5F22       | 112        |
| IO237PB5F22       | 113        |
| IO238NB5F22       | 104        |
| IO238PB5F22       | 105        |
| IO239NB5F22       | 106        |
| IO239PB5F22       | 107        |
| IO240NB5F22       | 100        |

| CQ352           |            |
|-----------------|------------|
| AX2000 Function | Pin Number |
| IO240PB5F22     | 101        |
| IO242NB5F22     | 94         |
| IO242PB5F22     | 95         |
| IO243NB5F22     | 98         |
| IO243PB5F22     | 99         |
| IO244NB5F22     | 92         |
| IO244PB5F22     | 93         |
| <b>Bank 6</b>   |            |
| IO257PB6F24     | 86         |
| IO258NB6F24     | 84         |
| IO258PB6F24     | 85         |
| IO261NB6F24     | 82         |
| IO261PB6F24     | 83         |
| IO262NB6F24     | 78         |
| IO262PB6F24     | 79         |
| IO265NB6F24     | 76         |
| IO265PB6F24     | 77         |
| IO279NB6F26     | 72         |
| IO279PB6F26     | 73         |
| IO280NB6F26     | 70         |
| IO280PB6F26     | 71         |
| IO281NB6F26     | 66         |
| IO281PB6F26     | 67         |
| IO282NB6F26     | 64         |
| IO282PB6F26     | 65         |
| IO284NB6F26     | 60         |
| IO284PB6F26     | 61         |
| IO285NB6F26     | 58         |
| IO285PB6F26     | 59         |
| IO286NB6F26     | 54         |
| IO286PB6F26     | 55         |
| IO287NB6F26     | 52         |
| IO287PB6F26     | 53         |
| IO294NB6F27     | 48         |
| IO294PB6F27     | 49         |

| CQ352                |            |
|----------------------|------------|
| AX2000 Function      | Pin Number |
| IO296NB6F27          | 46         |
| IO296PB6F27          | 47         |
| <b>Bank 7</b>        |            |
| IO300NB7F28          | 42         |
| IO300PB7F28          | 43         |
| IO303NB7F28          | 40         |
| IO303PB7F28          | 41         |
| IO310NB7F29          | 34         |
| IO310PB7F29          | 35         |
| IO311NB7F29          | 36         |
| IO311PB7F29          | 37         |
| IO312NB7F29          | 28         |
| IO312PB7F29          | 29         |
| IO315NB7F29          | 30         |
| IO315PB7F29          | 31         |
| IO316NB7F29          | 22         |
| IO316PB7F29          | 23         |
| IO317NB7F29          | 24         |
| IO317PB7F29          | 25         |
| IO318NB7F29          | 18         |
| IO318PB7F29          | 19         |
| IO320NB7F29          | 16         |
| IO320PB7F29          | 17         |
| IO334NB7F31          | 10         |
| IO334PB7F31          | 11         |
| IO335NB7F31          | 12         |
| IO335PB7F31          | 13         |
| IO338NB7F31          | 6          |
| IO338PB7F31          | 7          |
| IO341NB7F31          | 4          |
| IO341PB7F31          | 5          |
| <b>Dedicated I/O</b> |            |
| GND                  | 1          |
| GND                  | 9          |
| GND                  | 15         |