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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.

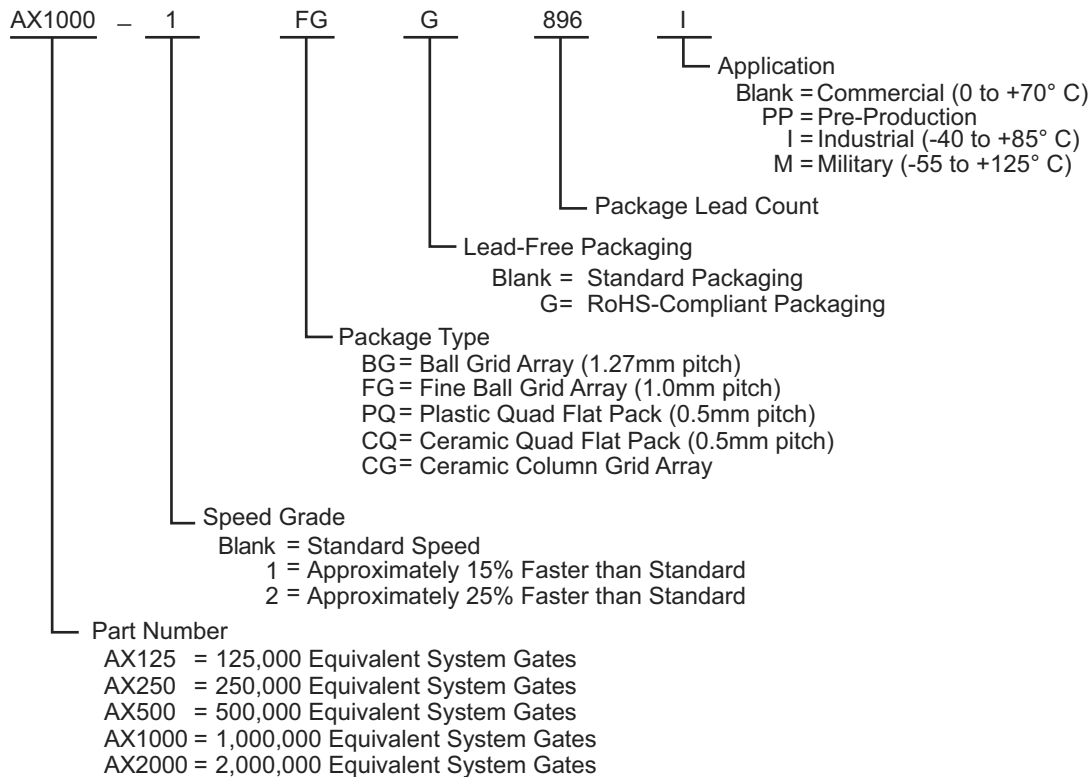
### Applications of Embedded - FPGAs

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

#### Details

|                                |                                                                                                                                                             |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Product Status                 | Active                                                                                                                                                      |
| Number of LABs/CLBs            | 4224                                                                                                                                                        |
| Number of Logic Elements/Cells | -                                                                                                                                                           |
| Total RAM Bits                 | 55296                                                                                                                                                       |
| Number of I/O                  | 248                                                                                                                                                         |
| Number of Gates                | 250000                                                                                                                                                      |
| Voltage - Supply               | 1.425V ~ 1.575V                                                                                                                                             |
| Mounting Type                  | Surface Mount                                                                                                                                               |
| Operating Temperature          | -55°C ~ 125°C (TA)                                                                                                                                          |
| Package / Case                 | 484-BGA                                                                                                                                                     |
| Supplier Device Package        | 484-FPBGA (23x23)                                                                                                                                           |
| Purchase URL                   | <a href="https://www.e-xfl.com/product-detail/microchip-technology/ax250-fg484m">https://www.e-xfl.com/product-detail/microchip-technology/ax250-fg484m</a> |

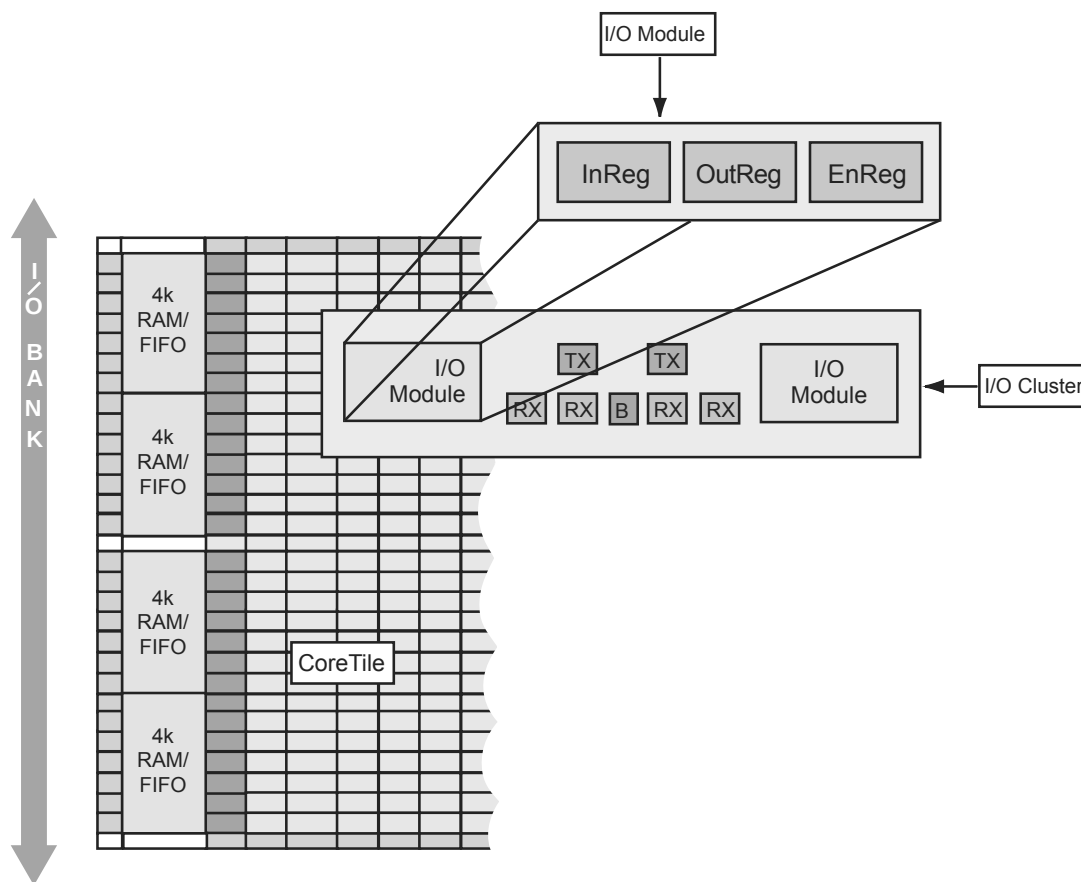
## Ordering Information



## Device Resources

| User I/Os (Including Clock Buffers) |       |       |       |        |        |
|-------------------------------------|-------|-------|-------|--------|--------|
| Package                             | AX125 | AX250 | AX500 | AX1000 | AX2000 |
| PQ208                               | –     | 115   | 115   | –      | –      |
| CQ208                               | –     | 115   | 115   | –      | –      |
| CQ256                               | –     | –     | –     | –      | 136    |
| FG256                               | 138   | 138   | –     | –      | –      |
| FG324                               | 168   | –     | –     | –      | –      |
| CQ352                               | –     | 198   | 198   | 198    | 198    |
| FG484                               | –     | 248   | 317   | 317    | –      |
| CG624                               | –     | –     | –     | 418    | 418    |
| FG676                               | –     | –     | 336   | 418    | –      |
| BG729                               | –     | –     | –     | 516    | –      |
| FG896                               | –     | –     | –     | 516    | 586    |
| FG1152                              | –     | –     | –     | –      | 684    |

*Note: The FG256, FG324, and FG484 are footprint compatible with one another. The FG676, FG896, and FG1152 are also footprint compatible with one another.*



**Figure 1-7 • I/O Cluster Arrangement**

## Routing

The AX hierarchical routing structure ties the logic modules, the embedded memory blocks, and the I/O modules together (Figure 1-8 on page 1-6). At the lowest level, in and between SuperClusters, there are three local routing structures: FastConnect, DirectConnect, and CarryConnect routing. DirectConnects provide the highest performance routing inside the SuperClusters by connecting a C-cell to the adjacent R-cell. DirectConnects do not require an antifuse to make the connection and achieve a signal propagation time of less than 0.1 ns.

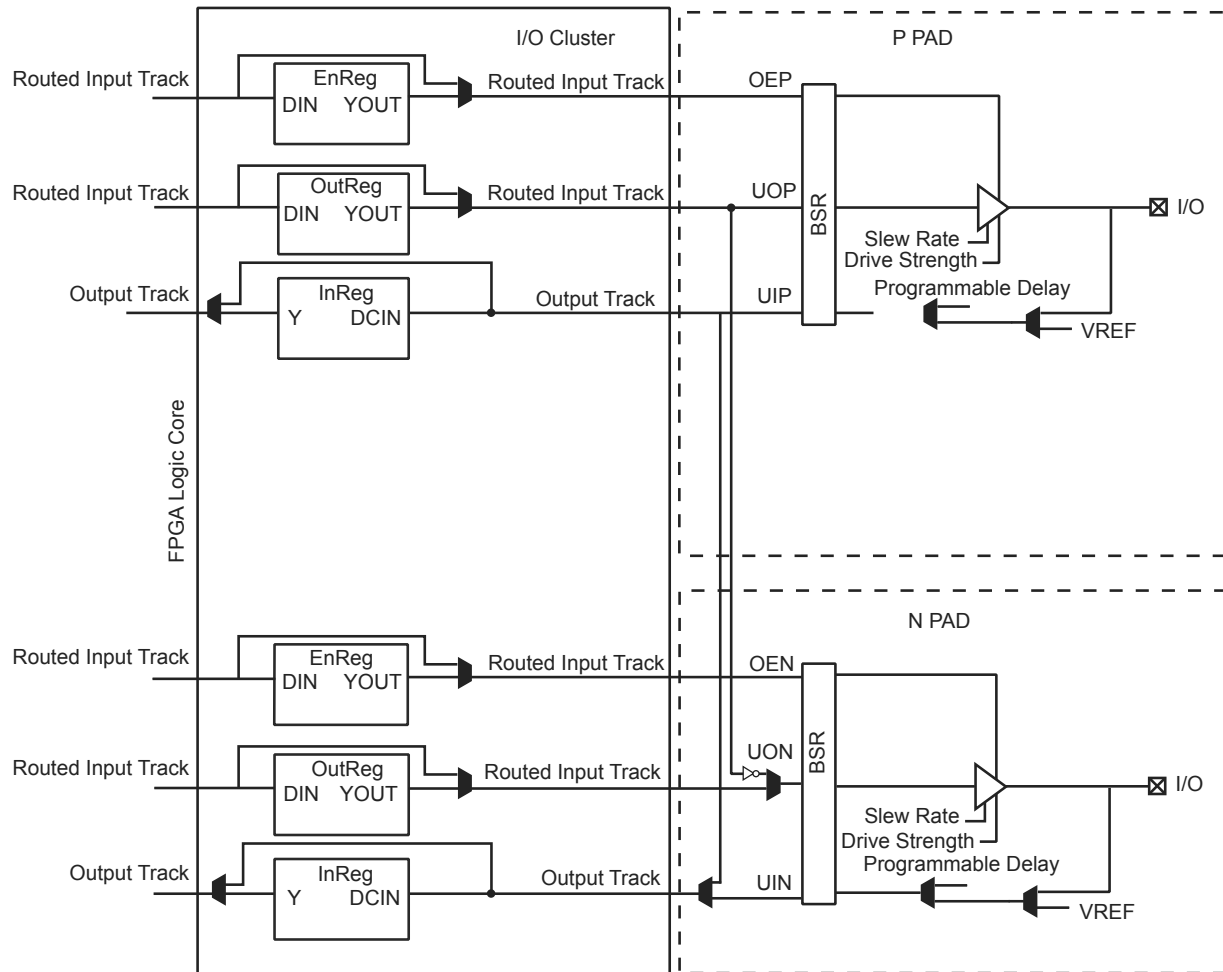
FastConnects provide high-performance, horizontal routing inside the SuperCluster and vertical routing to the SuperCluster immediately below it. Only one programmable connection is used in a FastConnect path, delivering a maximum routing delay of 0.4 ns.

CarryConnects are used for routing carry logic between adjacent SuperClusters. They connect the FCO output of one two-bit, C-cell carry logic to the FCI input of the two-bit, C-cell carry logic of the SuperCluster below it. CarryConnects do not require an antifuse to make the connection and achieve a signal propagation time of less than 0.1 ns.

The next level contains the core tile routing. Over the SuperClusters within a core tile, both vertical and horizontal tracks run across rows or columns, respectively. At the chip level, vertical and horizontal tracks extend across the full length of the device, both north-to-south and east-to-west. These tracks are composed of highway routing that extend the entire length of the device (segmented at core tile boundaries) as well as segmented routing of varying lengths.

## I/O Clusters

Each I/O cluster incorporates two I/O modules, four RX modules, two TX modules, and a buffer module. In turn, each I/O module contains one Input Register (InReg), one Output Register (OutReg), and one Enable Register (EnReg) (Figure 2-5).



**Figure 2-5 • I/O Cluster Interface**

### Using an I/O Register

To access the I/O registers, registers must be instantiated in the netlist and then connected to the I/Os. Usage of each I/O register (register combining) is individually controlled and can be selected/deselected using the PinEditor tool in the Designer software. I/O register combining can also be controlled at the device level, affecting all I/Os. Please note, the I/O register option is deselected by default in any given design.<sup>4</sup>

In addition, Designer software provides a global option to enable/disable the usage of registers in the I/Os. This option is design-specific. The setting for each individual I/O overrides this global option. Furthermore, the *global set fuse* option in the Designer software, when checked, causes all I/O registers to output logic High at device power-up.

4. Please note that register combining for multi fanout nets is not supported.

## Using the Differential I/O Standards

Differential I/O macros should be instantiated in the netlist. The settings for these I/O standards cannot be changed inside Designer. Note that there are no tristated or bidirectional I/O buffers for differential standards.

## Using the Voltage-Referenced I/O Standards

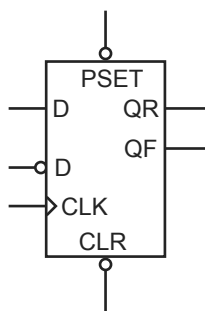
Using these I/O standards is similar to that of single-ended I/O standards. Their settings can be changed in Designer.

## Using DDR (Double Data Rate)

In Double Data Rate mode, new data is present on every transition of the clock signal. Clock and data lines have identical bandwidth and signal integrity requirements, making it very efficient for implementing very high-speed systems.

To implement a DDR, users need to:

1. Instantiate an input buffer (with the required I/O standard)
2. Instantiate the DDR\_REG macro (Figure 2-6)
3. Connect the output from the Input buffer to the input of the DDR macro



**Figure 2-6 • DDR Register**

## Macros for Specific I/O Standards

There are different macro types for any I/O standard or feature that determine the required VCCI and VREF voltages for an I/O. The generic buffer macros require the LVTTTL standard with slow slew rate and 24 mA-drive strength. LVTTTL can support high slew rate but this should only be used for critical signals.

Most of the macro symbols represent variations of the six generic symbol types:

- CLKBUF: Clock Buffer
- HCLKBUF: Hardwired Clock Buffer
- INBUF: Input Buffer
- OUTBUF: Output Buffer
- TRIBUF: Tristate Buffer
- BIBUF: Bidirectional Buffer

Other macros include the following:

- Differential I/O standard macros: The LVDS and LVPECL macros either have a pair of differential inputs (e.g. INBUF\_LVDS) or a pair of differential outputs (e.g. OUTBUF\_LVPECL).
- Pull-up and pull-down variations of the INBUF, BIBUF, and TRIBUF macros. These are available only with TTL and LVCMOS thresholds. They can be used to model the behavior of the pull-up and pull-down resistors available in the architecture. Whenever an input pin is left unconnected, the output pin will either go high or low rather than unknown. This allows users to leave inputs unconnected without having the negative effect on simulation of propagating unknowns.
- DDR\_REG macro. It can be connected to any I/O standard input buffers (i.e. INBUF) to implement a double data rate register. Designer software will map it to the I/O module in the same way it maps the other registers to the I/O module.

**Table 2-22 • 3.3 V LVTTTL 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) / Low Slew Rate |                                                                           |          |       |          |       |           |       |       |
| t <sub>DP</sub>                                         | Input Buffer                                                              |          | 1.68  |          | 1.92  |           | 2.26  | ns    |
| t <sub>PY</sub>                                         | Output Buffer                                                             |          | 11.03 |          | 12.56 |           | 14.77 | ns    |
| t <sub>ENZL</sub>                                       | Enable to Pad Delay through the Output Buffer—Z to Low                    |          | 11.42 |          | 13.01 |           | 15.29 | ns    |
| t <sub>ENZH</sub>                                       | Enable to Pad Delay through the Output Buffer—Z to High                   |          | 11.04 |          | 12.58 |           | 14.79 | ns    |
| t <sub>ENLZ</sub>                                       | Enable to Pad Delay through the Output Buffer—Low to Z                    |          | 1.86  |          | 1.88  |           | 1.88  | ns    |
| t <sub>ENHZ</sub>                                       | Enable to Pad Delay through the Output Buffer—High to Z                   |          | 2.50  |          | 2.51  |           | 2.52  | 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    |

**Table 2-67 • AX500 Predicted Routing Delays**  
Worst-Case Commercial Conditions  $V_{CCA} = 1.425\text{ V}$ ,  $T_J = 70^\circ\text{C}$

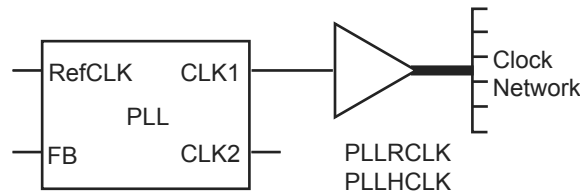
|                                 |                                  | -2 Speed | -1 Speed | Std Speed |       |
|---------------------------------|----------------------------------|----------|----------|-----------|-------|
| Parameter                       | Description                      | Typical  | Typical  | Typical   | Units |
| <b>Predicted Routing Delays</b> |                                  |          |          |           |       |
| $t_{DC}$                        | DirectConnect Routing Delay, FO1 | 0.11     | 0.12     | 0.15      | ns    |
| $t_{FC}$                        | FastConnect Routing Delay, FO1   | 0.35     | 0.39     | 0.46      | ns    |
| $t_{RD1}$                       | Routing delay for FO1            | 0.39     | 0.45     | 0.53      | ns    |
| $t_{RD2}$                       | Routing delay for FO2            | 0.41     | 0.46     | 0.54      | ns    |
| $t_{RD3}$                       | Routing delay for FO3            | 0.48     | 0.55     | 0.64      | ns    |
| $t_{RD4}$                       | Routing delay for FO4            | 0.56     | 0.63     | 0.75      | ns    |
| $t_{RD5}$                       | Routing delay for FO5            | 0.60     | 0.68     | 0.80      | ns    |
| $t_{RD6}$                       | Routing delay for FO6            | 0.84     | 0.96     | 1.13      | ns    |
| $t_{RD7}$                       | Routing delay for FO7            | 0.90     | 1.02     | 1.20      | ns    |
| $t_{RD8}$                       | Routing delay for FO8            | 1.00     | 1.13     | 1.33      | ns    |
| $t_{RD16}$                      | Routing delay for FO16           | 2.17     | 2.46     | 2.89      | ns    |
| $t_{RD32}$                      | Routing delay for FO32           | 3.55     | 4.03     | 4.74      | ns    |

**Table 2-68 • AX1000 Predicted Routing Delays**  
Worst-Case Commercial Conditions  $V_{CCA} = 1.425\text{ V}$ ,  $T_J = 70^\circ\text{C}$

|                                 |                                  | -2 Speed | -1 Speed | Std Speed |       |
|---------------------------------|----------------------------------|----------|----------|-----------|-------|
| Parameter                       | Description                      | Typical  | Typical  | Typical   | Units |
| <b>Predicted Routing Delays</b> |                                  |          |          |           |       |
| $t_{DC}$                        | DirectConnect Routing Delay, FO1 | 0.12     | 0.13     | 0.15      | ns    |
| $t_{FC}$                        | FastConnect Routing Delay, FO1   | 0.35     | 0.39     | 0.46      | ns    |
| $t_{RD1}$                       | Routing delay for FO1            | 0.45     | 0.51     | 0.60      | ns    |
| $t_{RD2}$                       | Routing delay for FO2            | 0.53     | 0.60     | 0.71      | ns    |
| $t_{RD3}$                       | Routing delay for FO3            | 0.56     | 0.63     | 0.74      | ns    |
| $t_{RD4}$                       | Routing delay for FO4            | 0.63     | 0.71     | 0.84      | ns    |
| $t_{RD5}$                       | Routing delay for FO5            | 0.73     | 0.82     | 0.97      | ns    |
| $t_{RD6}$                       | Routing delay for FO6            | 0.99     | 1.13     | 1.32      | ns    |
| $t_{RD7}$                       | Routing delay for FO7            | 1.02     | 1.15     | 1.36      | ns    |
| $t_{RD8}$                       | Routing delay for FO8            | 1.48     | 1.68     | 1.97      | ns    |
| $t_{RD16}$                      | Routing delay for FO16           | 2.57     | 2.91     | 3.42      | ns    |
| $t_{RD32}$                      | Routing delay for FO32           | 4.24     | 4.81     | 5.65      | ns    |

## PLLCLK and PLLHCLK

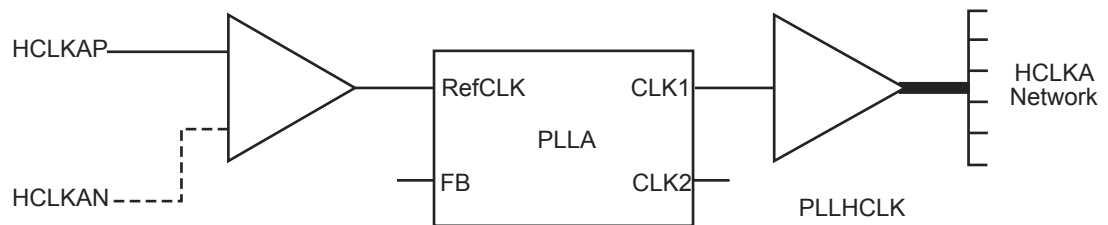
PLLCLK (PLLHCLK) is used to drive global resource CLK (HCLK) from a PLL (Figure 2-44).



**Figure 2-44 • PLLRCLK and PLLHCLK**

## Using Global Resources with PLLs

Each global resource has an associated PLL at its root. For example, PLLA can drive HCLKA, PLLE can drive CLKE, etc. (Figure 2-45).



**Figure 2-45 • Example of HCLKA Driven from a PLL with External Clock Source**

In addition, each clock pin of the package can be used to drive either its associated global resource or PLL. For example, package pins CLKEP and CLKEN can drive either the RefCLK input of PLLE or CLKE.

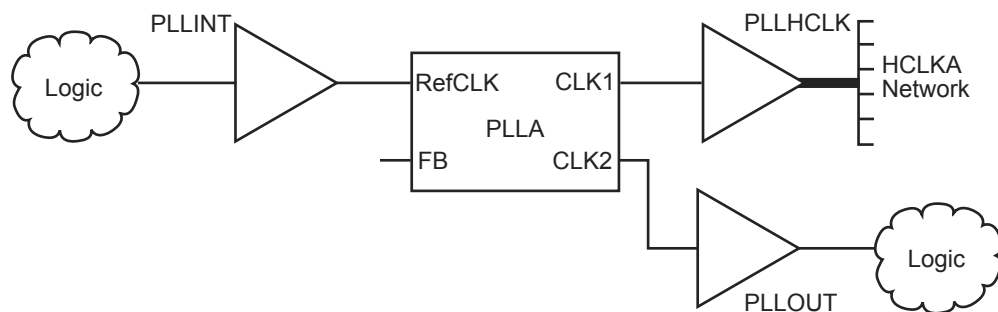
There are two macros required when interfacing the embedded PLLs with the global resources: PLLINT and PLLOUT.

### PLLINT

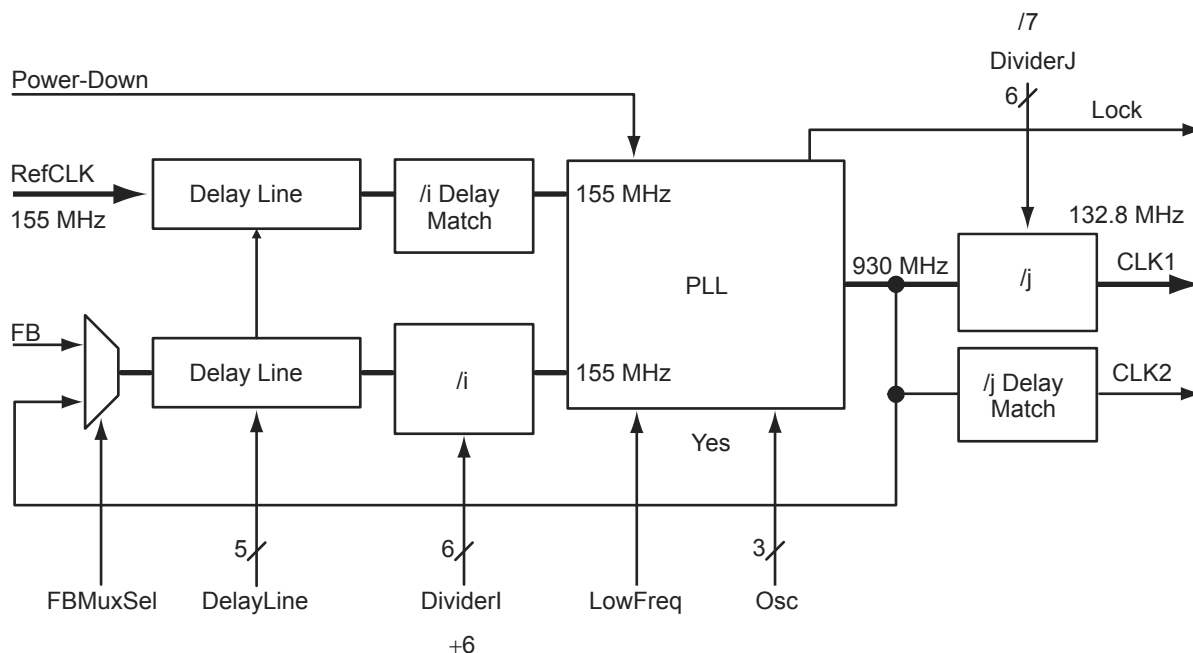
This macro is used to drive the RefCLK input of the PLL internally from user signals.

### PLLOUT

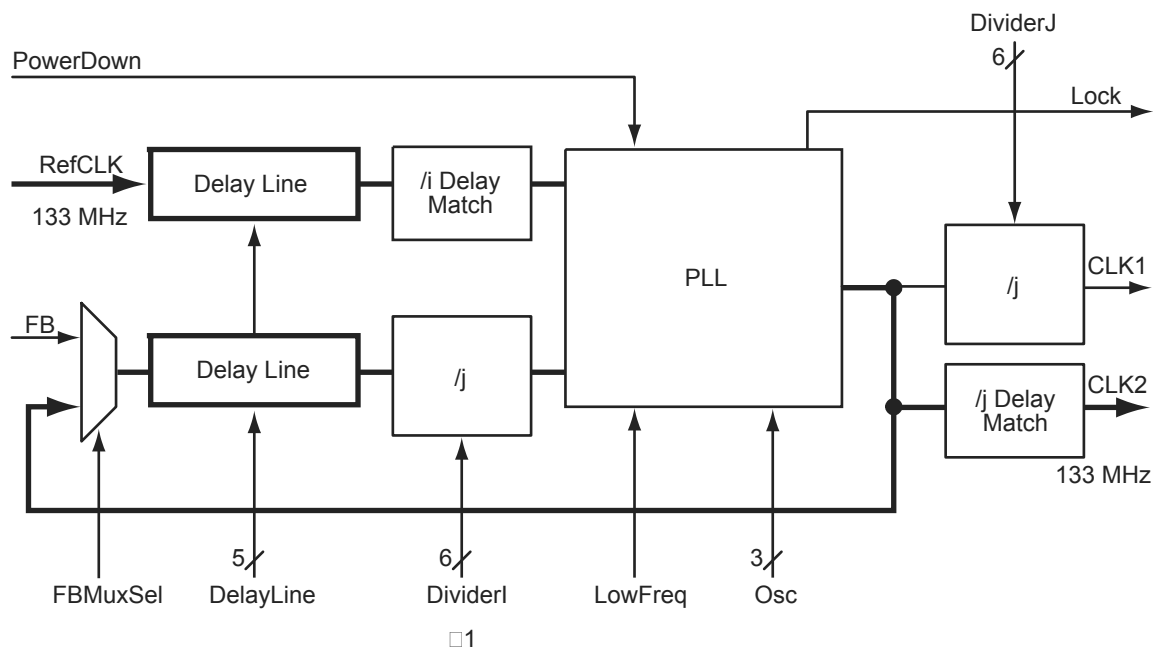
This macro is used to connect either the CLK1 or CLK2 output of a PLL to the regular routing network (Figure 2-46).



**Figure 2-46 • Example of PLLINT and PLLOUT Usage**



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



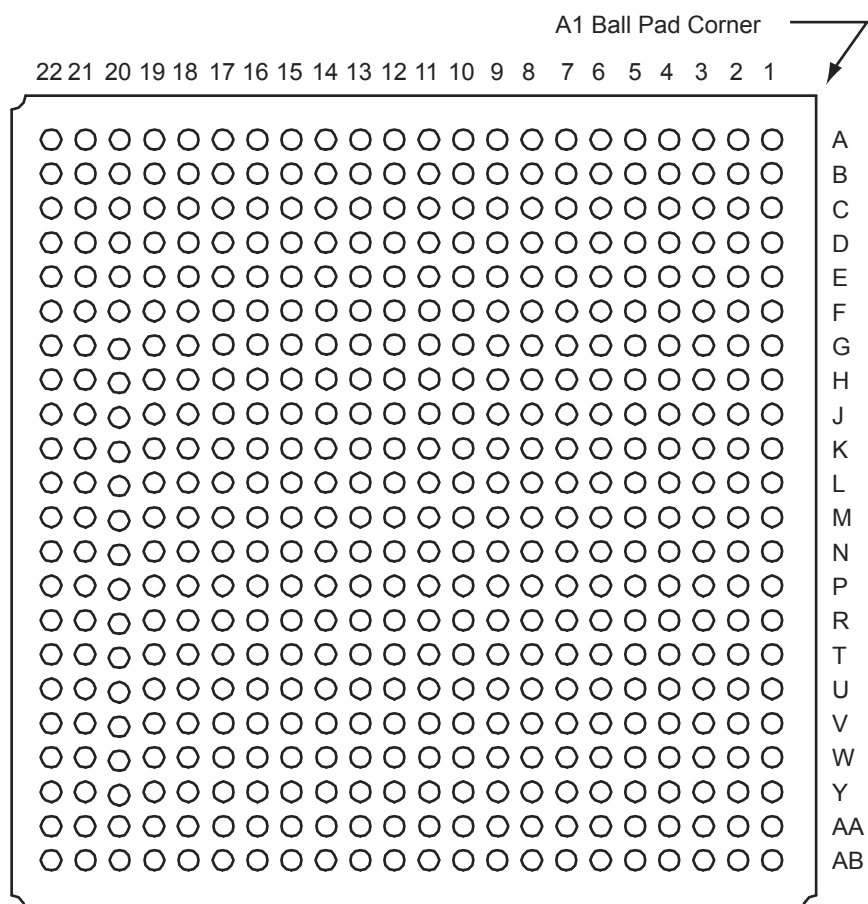
**Figure 2-55 • Using the PLL Delaying the Reference Clock**

| FG256-Pin FBGA    |            |
|-------------------|------------|
| AX125 Function    | Pin Number |
| VCCA              | L10        |
| VCCA              | L7         |
| VCCA              | L8         |
| VCCA              | L9         |
| VCCA              | N3         |
| VCCA              | P14        |
| VCCPLA            | C7         |
| VCCPLB            | D6         |
| VCCPLC            | A10        |
| VCCPLD            | D10        |
| VCCPLE            | P10        |
| VCCPLF            | N11        |
| VCCPLG            | T7         |
| VCCPLH            | N7         |
| VCCDA             | A2         |
| VCCDA             | C13        |
| VCCDA             | D9         |
| V <sub>CCDA</sub> | H1         |
| VCCDA             | J15        |
| VCCDA             | N14        |
| VCCDA             | N8         |
| VCCDA             | P4         |
| 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        |

| FG256-Pin FBGA |            |
|----------------|------------|
| AX125 Function | Pin Number |
| VCCIB4         | M11        |
| VCCIB4         | M9         |
| VCCIB5         | M6         |
| VCCIB5         | M7         |
| VCCIB5         | M8         |
| VCCIB6         | J5         |
| VCCIB6         | K5         |
| VCCIB6         | L5         |
| VCCIB7         | F5         |
| VCCIB7         | G5         |
| VCCIB7         | H5         |
| VCOMPLA        | A7         |
| VCOMPLB        | D7         |
| VCOMPLC        | B9         |
| VCOMPLD        | D11        |
| VCOMPLE        | T10        |
| VCOMPLF        | N10        |
| VCOMPLG        | R8         |
| VCOMPLH        | N6         |
| VPUMP          | A14        |

| FG324          |            | FG324          |            | FG324          |            |
|----------------|------------|----------------|------------|----------------|------------|
| AX125 Function | Pin Number | AX125 Function | Pin Number | AX125 Function | Pin Number |
| GND            | R4         | NC             | N4         | VCCA           | M8         |
| GND            | T16        | NC             | N5         | VCCA           | M9         |
| GND            | T3         | NC             | R12        | VCCA           | P4         |
| GND            | U17        | NC             | R13        | VCCA           | R15        |
| GND            | U2         | NC             | R6         | VCCPLA         | D8         |
| GND            | V1         | NC             | R7         | VCCPLB         | E7         |
| GND            | V18        | NC             | T12        | VCCPLC         | B11        |
| GND/LP         | E5         | NC             | T6         | VCCPLD         | E11        |
| NC             | A10        | NC             | U16        | VCCPLE         | R11        |
| NC             | A11        | NC             | V17        | VCCPLF         | P12        |
| NC             | A12        | PRA            | E9         | VCCPLG         | U8         |
| NC             | A13        | PRB            | D9         | VCCPLH         | P8         |
| NC             | A8         | PRC            | P10        | VCCDA          | B3         |
| NC             | A9         | PRD            | R10        | VCCDA          | D14        |
| NC             | B12        | TCK            | E6         | VCCDA          | E10        |
| NC             | F15        | TDI            | D7         | VCCDA          | J2         |
| NC             | F4         | TDO            | D5         | VCCDA          | K16        |
| NC             | G15        | TMS            | D4         | VCCDA          | P15        |
| NC             | G4         | TRST           | D6         | VCCDA          | P9         |
| NC             | H14        | VCCA           | E15        | VCCDA          | R5         |
| NC             | H15        | VCCA           | G10        | VCCIB0         | F7         |
| NC             | H5         | VCCA           | G11        | VCCIB0         | F8         |
| NC             | J1         | VCCA           | G5         | VCCIB0         | F9         |
| NC             | J14        | VCCA           | G8         | VCCIB1         | F10        |
| NC             | J15        | VCCA           | G9         | VCCIB1         | F11        |
| NC             | J5         | VCCA           | H12        | VCCIB1         | F12        |
| NC             | K14        | VCCA           | H7         | VCCIB2         | G13        |
| NC             | K15        | VCCA           | J12        | VCCIB2         | H13        |
| NC             | K5         | VCCA           | J7         | VCCIB2         | J13        |
| NC             | L14        | VCCA           | K12        | VCCIB3         | K13        |
| NC             | L15        | VCCA           | K7         | VCCIB3         | L13        |
| NC             | L5         | VCCA           | L12        | VCCIB3         | M13        |
| NC             | M4         | VCCA           | L7         | VCCIB4         | N10        |
| NC             | M5         | VCCA           | M10        | VCCIB4         | N11        |
| NC             | N17        | VCCA           | M11        | VCCIB4         | N12        |

## FG484



### Note

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

| FG676          |            | FG676          |            | FG676          |            |
|----------------|------------|----------------|------------|----------------|------------|
| AX500 Function | Pin Number | AX500 Function | Pin Number | AX500 Function | Pin Number |
| NC             | J5         | VCCA           | J10        | VCCDA          | AD10       |
| NC             | J6         | VCCA           | J11        | VCCDA          | AD13       |
| NC             | P22        | VCCA           | J12        | VCCDA          | AD17       |
| NC             | R20        | VCCA           | J13        | VCCDA          | B1         |
| NC             | R21        | VCCA           | J14        | VCCDA          | B17        |
| NC             | R22        | VCCA           | J15        | VCCDA          | D24        |
| NC             | R4         | VCCA           | J16        | VCCDA          | E14        |
| NC             | R5         | VCCA           | J17        | VCCDA          | P2         |
| NC             | T22        | VCCA           | K18        | VCCDA          | P23        |
| NC             | T24        | VCCA           | K9         | VCCIB0         | G10        |
| NC             | U22        | VCCA           | L18        | VCCIB0         | G8         |
| NC             | U24        | VCCA           | L9         | VCCIB0         | G9         |
| NC             | V22        | VCCA           | M18        | VCCIB0         | H10        |
| NC             | V5         | VCCA           | M9         | VCCIB0         | H11        |
| NC             | W21        | VCCA           | N18        | VCCIB0         | H12        |
| NC             | W22        | VCCA           | N9         | VCCIB0         | H13        |
| NC             | W5         | VCCA           | P18        | VCCIB0         | H9         |
| NC             | W6         | VCCA           | P9         | VCCIB1         | G17        |
| NC             | Y21        | VCCA           | R18        | VCCIB1         | G18        |
| NC             | Y4         | VCCA           | R9         | VCCIB1         | G19        |
| NC             | Y5         | VCCA           | T18        | VCCIB1         | H14        |
| NC             | Y6         | VCCA           | T9         | VCCIB1         | H15        |
| PRA            | E13        | VCCA           | U18        | VCCIB1         | H16        |
| PRB            | B14        | VCCA           | U9         | VCCIB1         | H17        |
| PRC            | Y14        | VCCA           | V10        | VCCIB1         | H18        |
| PRD            | AD14       | VCCA           | V11        | VCCIB2         | H20        |
| TCK            | E5         | VCCA           | V12        | VCCIB2         | J19        |
| TDI            | B3         | VCCA           | V13        | VCCIB2         | J20        |
| TDO            | G6         | VCCA           | V14        | VCCIB2         | K19        |
| TMS            | D4         | VCCA           | V15        | VCCIB2         | K20        |
| TRST           | A2         | VCCA           | V16        | VCCIB2         | L19        |
| VCCA           | AB4        | VCCA           | V17        | VCCIB2         | M19        |
| VCCA           | AF24       | VCCDA          | A3         | VCCIB2         | N19        |
| VCCA           | C1         | VCCDA          | AB22       | VCCIB3         | P19        |
| VCCA           | C26        | VCCDA          | AB5        | VCCIB3         | R19        |

| FG676           |            |
|-----------------|------------|
| AX1000 Function | Pin Number |
| IO129PB4F12     | AA21       |
| IO131NB4F12     | AD22       |
| IO131PB4F12     | AD23       |
| IO132NB4F12     | AE23       |
| IO132PB4F12     | AE24       |
| IO133NB4F12     | AB20       |
| IO133PB4F12     | AA20       |
| IO134NB4F12     | AC21       |
| IO134PB4F12     | AC22       |
| IO135NB4F12     | AF22       |
| IO135PB4F12     | AF23       |
| IO137NB4F12     | AB19       |
| IO137PB4F12     | AA19       |
| IO139NB4F13     | AC19       |
| IO139PB4F13     | AC20       |
| IO140NB4F13     | AE21       |
| IO140PB4F13     | AE22       |
| IO141NB4F13     | AD20       |
| IO141PB4F13     | AD21       |
| IO143NB4F13     | AB17       |
| IO143PB4F13     | AB18       |
| IO144NB4F13     | AE19       |
| IO144PB4F13     | AE20       |
| IO145NB4F13     | AC17       |
| IO145PB4F13     | AC18       |
| IO146NB4F13     | AD18       |
| IO146PB4F13     | AD19       |
| IO147NB4F13     | AA17       |
| IO147PB4F13     | AA18       |
| IO148NB4F13     | AF20       |
| IO148PB4F13     | AF21       |
| IO149NB4F13     | AA16       |
| IO149PB4F13     | Y16        |
| IO151NB4F13     | AC16       |
| IO151PB4F13     | AB16       |
| IO153NB4F14     | AE17       |

| FG676             |            |
|-------------------|------------|
| AX1000 Function   | Pin Number |
| IO153PB4F14       | AE18       |
| IO154NB4F14       | AF17       |
| IO154PB4F14       | AF18       |
| IO155NB4F14       | AA15       |
| IO155PB4F14       | Y15        |
| IO157NB4F14       | AC15       |
| IO157PB4F14       | AB15       |
| IO159NB4F14/CLKEN | AE16       |
| IO159PB4F14/CLKEP | AF16       |
| IO160NB4F14/CLKFN | AE14       |
| IO160PB4F14/CLKFP | AE15       |
| Bank 5            |            |
| IO161NB5F15/CLKGN | AE12       |
| IO161PB5F15/CLKGP | AE13       |
| IO162NB5F15/CLKHN | AE11       |
| IO162PB5F15/CLKHP | AF11       |
| IO163NB5F15       | AC12       |
| IO163PB5F15       | AB12       |
| IO165NB5F15       | Y12        |
| IO165PB5F15       | AA13       |
| IO167NB5F15       | Y11        |
| IO167PB5F15       | AA12       |
| IO168NB5F15       | AF9        |
| IO168PB5F15       | AF10       |
| IO169NB5F15       | AB11       |
| IO169PB5F15       | AA11       |
| IO171NB5F16       | AE9        |
| IO171PB5F16       | AE10       |
| IO173NB5F16       | AC10       |
| IO173PB5F16       | AC11       |
| IO174NB5F16       | AE7        |
| IO174PB5F16       | AE8        |
| IO175NB5F16       | AC9        |
| IO175PB5F16       | AD9        |
| IO176NB5F16       | AF6        |
| IO176PB5F16       | AF7        |

| FG676           |            |
|-----------------|------------|
| AX1000 Function | Pin Number |
| IO177NB5F16     | AA10       |
| IO177PB5F16     | AB10       |
| IO179NB5F16     | AD7        |
| IO179PB5F16     | AD8        |
| IO180NB5F16     | AC7        |
| IO180PB5F16     | AC8        |
| IO181NB5F17     | AA9        |
| IO181PB5F17     | AB9        |
| IO183NB5F17     | AD6        |
| IO183PB5F17     | AE6        |
| IO184NB5F17     | AE5        |
| IO184PB5F17     | AF5        |
| IO185NB5F17     | AA8        |
| IO185PB5F17     | AB8        |
| IO187NB5F17     | AC5        |
| IO187PB5F17     | AC6        |
| IO188NB5F17     | AD4        |
| IO188PB5F17     | AD5        |
| IO189NB5F17     | AB6        |
| IO189PB5F17     | AB7        |
| IO190NB5F17     | AF4        |
| IO190PB5F17     | AE4        |
| IO191NB5F17     | AE3        |
| IO191PB5F17     | AF3        |
| IO192NB5F17     | AA6        |
| IO192PB5F17     | AA7        |
| Bank 6          |            |
| IO193NB6F18     | Y5         |
| IO193PB6F18     | AA5        |
| IO194NB6F18     | AB3        |
| IO194PB6F18     | AC3        |
| IO195NB6F18     | Y4         |
| IO195PB6F18     | AA4        |
| IO196NB6F18     | AC2        |
| IO196PB6F18     | AD2        |
| IO197NB6F18     | W6         |

| FG896           |            |
|-----------------|------------|
| AX2000 Function | Pin Number |
| <b>Bank 0</b>   |            |
| IO00NB0F0       | B4         |
| IO00PB0F0       | A4         |
| IO01NB0F0       | F8         |
| IO01PB0F0       | F7         |
| IO02NB0F0       | D6         |
| IO02PB0F0       | E6         |
| IO04NB0F0       | A5         |
| IO04PB0F0       | B5         |
| IO05NB0F0       | H8         |
| IO05PB0F0       | G8         |
| IO06NB0F0       | D7         |
| IO06PB0F0       | E7         |
| IO07NB0F0       | D8         |
| IO07PB0F0       | E8         |
| IO08NB0F0       | C7         |
| IO08PB0F0       | C6         |
| IO09NB0F0       | G9         |
| IO09PB0F0       | H9         |
| IO10NB0F0       | A6         |
| IO10PB0F0       | B6         |
| IO11NB0F0       | H10        |
| IO11PB0F0       | G10        |
| IO12NB0F1       | E9         |
| IO12PB0F1       | F9         |
| IO13NB0F1       | E10        |
| IO13PB0F1       | F10        |
| IO15NB0F1       | F11        |
| IO15PB0F1       | G11        |
| IO16NB0F1       | A7         |
| IO16PB0F1       | B7         |
| IO17NB0F1       | D10        |
| IO17PB0F1       | D9         |
| IO18NB0F1       | C9         |
| IO18PB0F1       | C8         |

| FG896            |            |
|------------------|------------|
| AX2000 Function  | Pin Number |
| IO19NB0F1        | D11        |
| IO19PB0F1        | E11        |
| IO20PB0F1        | B8         |
| IO21NB0F1        | H12        |
| IO21PB0F1        | H11        |
| IO23NB0F2        | A10        |
| IO23PB0F2        | A9         |
| IO25NB0F2        | F12        |
| IO25PB0F2        | G12        |
| IO26NB0F2        | B11        |
| IO26PB0F2        | B10        |
| IO27NB0F2        | D12        |
| IO27PB0F2        | E12        |
| IO28NB0F2        | C12        |
| IO28PB0F2        | C11        |
| IO30NB0F2        | A12        |
| IO30PB0F2        | A11        |
| IO31NB0F2        | F13        |
| IO31PB0F2        | G13        |
| IO33NB0F2        | H13        |
| IO33PB0F2        | J13        |
| IO34NB0F3        | B13        |
| IO34PB0F3        | B12        |
| IO37NB0F3        | E14        |
| IO37PB0F3        | E13        |
| IO38NB0F3        | B14        |
| IO38PB0F3        | A14        |
| IO39NB0F3        | H14        |
| IO39PB0F3        | J14        |
| IO40NB0F3        | B15        |
| IO40PB0F3        | A15        |
| IO41NB0F3/HCLKAN | C14        |
| IO41PB0F3/HCLKAP | D14        |
| IO42NB0F3/HCLKBN | E15        |
| IO42PB0F3/HCLKBP | D15        |

| FG896            |            |
|------------------|------------|
| AX2000 Function  | Pin Number |
| <b>Bank 1</b>    |            |
| IO43NB1F4/HCLKCN | E17        |
| IO43PB1F4/HCLKCP | E16        |
| IO44NB1F4/HCLKDN | C17        |
| IO44PB1F4/HCLKDP | D17        |
| IO45NB1F4        | A16        |
| IO45PB1F4        | B16        |
| IO47NB1F4        | H17        |
| IO47PB1F4        | J17        |
| IO48NB1F4        | A17        |
| IO48PB1F4        | B17        |
| IO49NB1F4        | H18        |
| IO49PB1F4        | J18        |
| IO51NB1F4        | F18        |
| IO51PB1F4        | G18        |
| IO52NB1F4        | B18        |
| IO53NB1F4        | D18        |
| IO53PB1F4        | C18        |
| IO55NB1F5        | H19        |
| IO55PB1F5        | G19        |
| IO56NB1F5        | B19        |
| IO56PB1F5        | A19        |
| IO57NB1F5        | E20        |
| IO57PB1F5        | E19        |
| IO58NB1F5        | C20        |
| IO58PB1F5        | C19        |
| IO59NB1F5        | B20        |
| IO59PB1F5        | A20        |
| IO61NB1F5        | F20        |
| IO61PB1F5        | F19        |
| IO62NB1F5        | A22        |
| IO62PB1F5        | A21        |
| IO63NB1F5        | D21        |
| IO63PB1F5        | D20        |
| IO65NB1F6        | G20        |

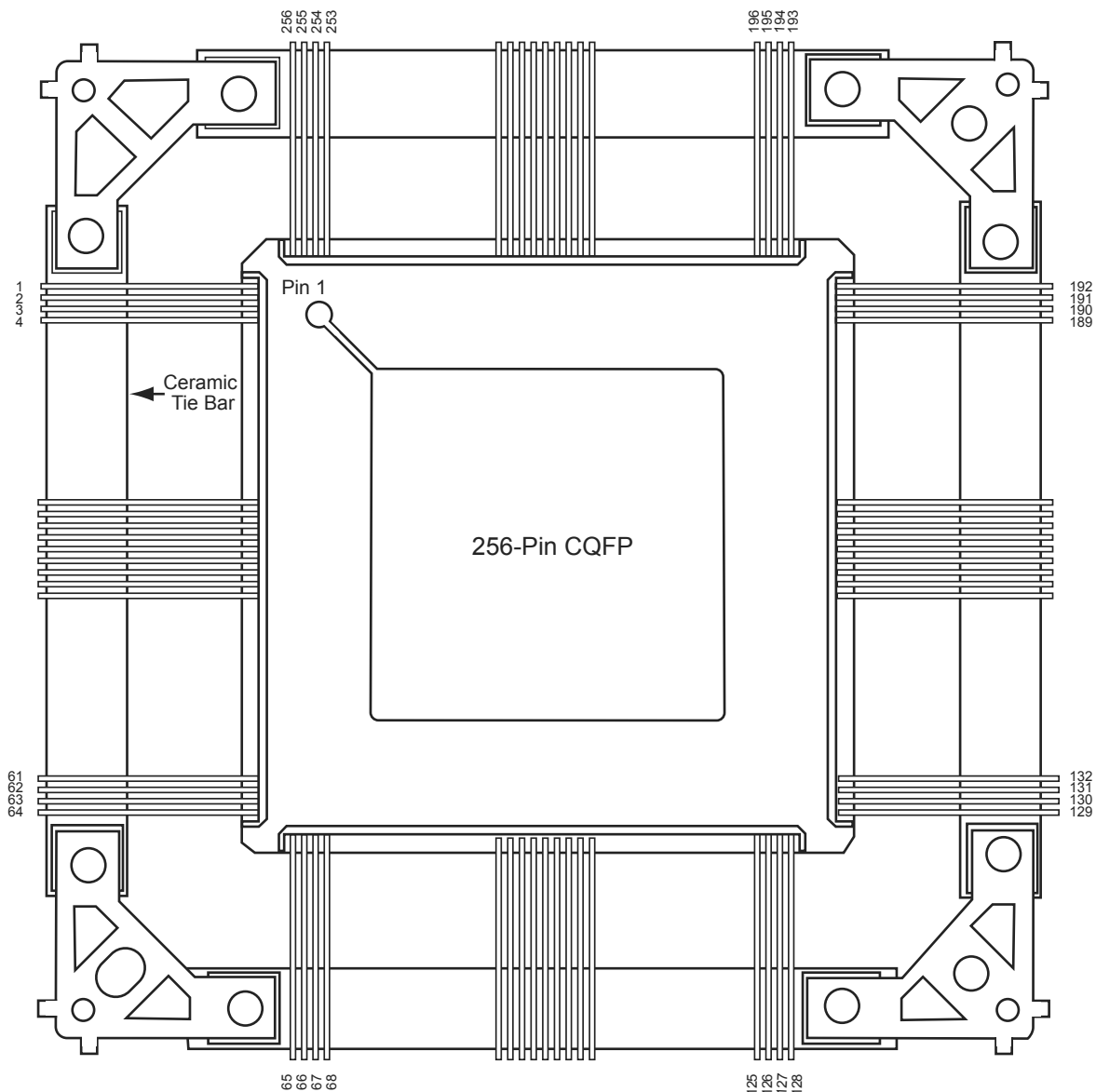
| FG1152          |            | FG1152          |            | FG1152          |            |
|-----------------|------------|-----------------|------------|-----------------|------------|
| AX2000 Function | Pin Number | AX2000 Function | Pin Number | AX2000 Function | Pin Number |
| GND             | AK12       | GND             | AN34       | GND             | D1         |
| GND             | AK17       | GND             | AN4        | GND             | D11        |
| GND             | AK18       | GND             | AN9        | GND             | D2         |
| GND             | AK23       | GND             | AP13       | GND             | D24        |
| GND             | AK30       | GND             | AP2        | GND             | D3         |
| GND             | AK5        | GND             | AP22       | GND             | D31        |
| GND             | AL1        | GND             | AP27       | GND             | D32        |
| GND             | AL11       | GND             | AP3        | GND             | D33        |
| GND             | AL2        | GND             | AP31       | GND             | D34        |
| GND             | AL24       | GND             | AP32       | GND             | D4         |
| GND             | AL3        | GND             | AP33       | GND             | E12        |
| GND             | AL31       | GND             | AP4        | GND             | E17        |
| GND             | AL32       | GND             | AP8        | GND             | E18        |
| GND             | AL33       | GND             | B1         | GND             | E23        |
| GND             | AL34       | GND             | B2         | GND             | E30        |
| GND             | AL4        | GND             | B26        | GND             | E5         |
| GND             | AM1        | GND             | B3         | GND             | F29        |
| GND             | AM10       | GND             | B31        | GND             | F30        |
| GND             | AM15       | GND             | B32        | GND             | F6         |
| GND             | AM2        | GND             | B33        | GND             | G28        |
| GND             | AM20       | GND             | B34        | GND             | G7         |
| GND             | AM25       | GND             | B4         | GND             | H1         |
| GND             | AM3        | GND             | B9         | GND             | H34        |
| GND             | AM31       | GND             | C1         | GND             | J2         |
| GND             | AM32       | GND             | C10        | GND             | J33        |
| GND             | AM33       | GND             | C15        | GND             | K3         |
| GND             | AM34       | GND             | C2         | GND             | K32        |
| GND             | AM4        | GND             | C20        | GND             | L11        |
| GND             | AN1        | GND             | C25        | GND             | L24        |
| GND             | AN2        | GND             | C3         | GND             | L31        |
| GND             | AN26       | GND             | C31        | GND             | L4         |
| GND             | AN3        | GND             | C32        | GND             | M12        |
| GND             | AN31       | GND             | C33        | GND             | M23        |
| GND             | AN32       | GND             | C34        | GND             | M30        |
| GND             | AN33       | GND             | C4         | GND             | M5         |

| PQ208            |            |
|------------------|------------|
| AX250 Function   | Pin Number |
| <b>Bank 0</b>    |            |
| IO02NB0F0        | 197        |
| IO03NB0F0        | 198        |
| IO03PB0F0        | 199        |
| IO12NB0F0/HCLKAN | 191        |
| IO12PB0F0/HCLKAP | 192        |
| IO13NB0F0/HCLKBN | 185        |
| IO13PB0F0/HCLKBP | 186        |
| <b>Bank 1</b>    |            |
| IO14NB1F1/HCLKCN | 180        |
| IO14PB1F1/HCLKCP | 181        |
| IO15NB1F1/HCLKDN | 174        |
| IO15PB1F1/HCLKDP | 175        |
| IO16NB1F1        | 170        |
| IO16PB1F1        | 171        |
| IO24NB1F1        | 165        |
| IO24PB1F1        | 166        |
| IO26NB1F1        | 161        |
| IO26PB1F1        | 162        |
| IO27NB1F1        | 159        |
| IO27PB1F1        | 160        |
| <b>Bank 2</b>    |            |
| IO29NB2F2        | 151        |
| IO29PB2F2        | 153        |
| IO30NB2F2        | 152        |
| IO30PB2F2        | 154        |
| IO31PB2F2        | 148        |
| IO32NB2F2        | 146        |
| IO32PB2F2        | 147        |
| IO34NB2F2        | 144        |
| IO34PB2F2        | 145        |
| IO39NB2F2        | 139        |
| IO39PB2F2        | 140        |
| IO40PB2F2        | 141        |
| IO41NB2F2        | 137        |
| IO41PB2F2        | 138        |
| IO43NB2F2        | 132        |

| PQ208           |            |
|-----------------|------------|
| AX250 Function  | Pin Number |
| IO43PB2F2       | 134        |
| IO44NB2F2       | 131        |
| IO44PB2F2       | 133        |
| <b>Bank 3</b>   |            |
| IO45NB3F3       | 127        |
| IO45PB3F3       | 129        |
| IO46NB3F3       | 126        |
| IO46PB3F3       | 128        |
| IO48NB3F3       | 122        |
| IO48PB3F3       | 123        |
| IO50NB3F3       | 120        |
| IO50PB3F3       | 121        |
| IO55NB3F3       | 116        |
| IO55PB3F3       | 117        |
| IO57NB3F3       | 114        |
| IO57PB3F3       | 115        |
| IO59NB3F3       | 110        |
| IO59PB3F3       | 111        |
| IO60NB3F3       | 108        |
| IO60PB3F3       | 109        |
| IO61NB3F3       | 106        |
| IO61PB3F3       | 107        |
| <b>Bank 4</b>   |            |
| IO62NB4F4       | 100        |
| IO62PB4F4       | 103        |
| IO63NB4F4       | 101        |
| IO63PB4F4       | 102        |
| IO64NB4F4       | 96         |
| IO64PB4F4       | 97         |
| IO72NB4F4       | 91         |
| IO72PB4F4       | 92         |
| IO74NB4F4/CLKEN | 87         |
| IO74PB4F4/CLKEP | 88         |
| IO75NB4F4/CLKFN | 81         |
| IO75PB4F4/CLKFP | 82         |
| <b>Bank 5</b>   |            |
| IO76NB5F5/CLKGN | 76         |

| PQ208           |            |
|-----------------|------------|
| AX250 Function  | Pin Number |
| IO76PB5F5/CLKGP | 77         |
| IO77NB5F5/CLKHN | 70         |
| IO77PB5F5/CLKHP | 71         |
| IO78NB5F5       | 66         |
| IO78PB5F5       | 67         |
| IO86NB5F5       | 62         |
| IO87NB5F5       | 60         |
| IO87PB5F5       | 61         |
| IO88NB5F5       | 56         |
| IO88PB5F5       | 57         |
| IO89NB5F5       | 54         |
| IO89PB5F5       | 55         |
| <b>Bank 6</b>   |            |
| IO91NB6F6       | 47         |
| IO91PB6F6       | 49         |
| IO92NB6F6       | 48         |
| IO92PB6F6       | 50         |
| IO93NB6F6       | 42         |
| IO93PB6F6       | 43         |
| IO94PB6F6       | 44         |
| IO96NB6F6       | 40         |
| IO96PB6F6       | 41         |
| IO101NB6F6      | 35         |
| IO101PB6F6      | 36         |
| IO102PB6F6      | 37         |
| IO103NB6F6      | 33         |
| IO103PB6F6      | 34         |
| IO105NB6F6      | 28         |
| IO105PB6F6      | 30         |
| IO106NB6F6      | 27         |
| IO106PB6F6      | 29         |
| <b>Bank 7</b>   |            |
| IO107NB7F7      | 23         |
| IO107PB7F7      | 25         |
| IO108NB7F7      | 22         |
| IO108PB7F7      | 24         |
| IO110NB7F7      | 18         |

## CQ256



### Note

For Package Manufacturing and Environmental information, visit the Resource center at <http://www.microsemi.com/soc/products/solutions/package/docs.aspx>.

| CQ352           |            | CQ352           |            | CQ352           |            |
|-----------------|------------|-----------------|------------|-----------------|------------|
| AX1000 Function | Pin Number | AX1000 Function | Pin Number | AX1000 Function | Pin Number |
| GND             | 21         | GND             | 240        | VCCA            | 14         |
| GND             | 27         | GND             | 246        | VCCA            | 32         |
| GND             | 33         | GND             | 252        | VCCA            | 56         |
| GND             | 39         | GND             | 258        | VCCA            | 74         |
| GND             | 45         | GND             | 264        | VCCA            | 87         |
| GND             | 51         | GND             | 265        | VCCA            | 102        |
| GND             | 57         | GND             | 274        | VCCA            | 114        |
| GND             | 63         | GND             | 280        | VCCA            | 150        |
| GND             | 69         | GND             | 286        | VCCA            | 162        |
| GND             | 75         | GND             | 292        | VCCA            | 175        |
| GND             | 81         | GND             | 298        | VCCA            | 191        |
| GND             | 88         | GND             | 310        | VCCA            | 209        |
| GND             | 89         | GND             | 322        | VCCA            | 233        |
| GND             | 97         | GND             | 330        | VCCA            | 251        |
| GND             | 103        | GND             | 334        | VCCA            | 263        |
| GND             | 109        | GND             | 340        | VCCA            | 279        |
| GND             | 115        | GND             | 345        | VCCA            | 291        |
| GND             | 121        | GND             | 352        | VCCA            | 329        |
| GND             | 133        | NC              | 91         | VCCA            | 339        |
| GND             | 145        | NC              | 130        | VCCDA           | 2          |
| GND             | 151        | NC              | 131        | VCCDA           | 44         |
| GND             | 157        | NC              | 174        | VCCDA           | 90         |
| GND             | 163        | NC              | 268        | VCCDA           | 116        |
| GND             | 169        | NC              | 307        | VCCDA           | 117        |
| GND             | 176        | NC              | 308        | VCCDA           | 132        |
| GND             | 177        | PRA             | 312        | VCCDA           | 148        |
| GND             | 186        | PRB             | 311        | VCCDA           | 149        |
| GND             | 192        | PRC             | 135        | VCCDA           | 178        |
| GND             | 198        | PRD             | 134        | VCCDA           | 221        |
| GND             | 204        | TCK             | 349        | VCCDA           | 266        |
| GND             | 210        | TDI             | 348        | VCCDA           | 293        |
| GND             | 216        | TDO             | 347        | VCCDA           | 294        |
| GND             | 222        | TMS             | 350        | VCCDA           | 309        |
| GND             | 228        | TRST            | 351        | VCCDA           | 327        |
| GND             | 234        | VCCA            | 3          | VCCDA           | 328        |

| CG624           |            |
|-----------------|------------|
| AX2000 Function | Pin Number |
| IO157PB3F14     | U20        |
| IO158NB3F14     | AB25       |
| IO158PB3F14     | AA25       |
| IO160PB3F14     | W24        |
| IO161NB3F15     | U24        |
| IO161PB3F15     | U23        |
| IO162NB3F15     | AA24       |
| IO162PB3F15     | Y24        |
| IO163NB3F15     | V22        |
| IO163PB3F15     | U22        |
| IO164NB3F15     | V23        |
| IO164PB3F15     | V24        |
| IO166NB3F15     | AB24       |
| IO167NB3F15     | V21        |
| IO167PB3F15     | U21        |
| IO168NB3F15     | Y23        |
| IO168PB3F15     | AA23       |
| IO169NB3F15     | W22*       |
| IO169PB3F15     | W23*       |
| IO170NB3F15     | Y22        |
| IO170PB3F15     | Y21        |
| <b>Bank 4</b>   |            |
| IO171NB4F16     | AC20*      |
| IO171PB4F16     | AC21*      |
| IO172NB4F16     | W20        |
| IO172PB4F16     | Y20        |
| IO173NB4F16     | AD21       |
| IO173PB4F16     | AD22       |
| IO174NB4F16     | AA19       |
| IO176NB4F16     | Y18        |
| IO176PB4F16     | Y19        |
| IO177NB4F16     | AB19       |

Note: \*Not routed on the same package layer and to adjacent LGA pads as its differential pair complement. Recommended to be used as a single-ended I/O.

| CG624           |            |
|-----------------|------------|
| AX2000 Function | Pin Number |
| IO177PB4F16     | AB18       |
| IO182NB4F17     | V19        |
| IO182PB4F17     | W19        |
| IO183PB4F17     | AC19       |
| IO184NB4F17     | AB17       |
| IO184PB4F17     | AC17       |
| IO185NB4F17     | AD19       |
| IO185PB4F17     | AD20       |
| IO187PB4F17     | AC18       |
| IO188NB4F17     | Y17        |
| IO188PB4F17     | AA17       |
| IO189PB4F17     | AE22       |
| IO191NB4F17     | W18        |
| IO191PB4F17     | V18        |
| IO192PB4F17     | U18        |
| IO195PB4F18     | AE21       |
| IO196NB4F18     | AB16       |
| IO197NB4F18     | AD17       |
| IO197PB4F18     | AD18       |
| IO198NB4F18     | V17        |
| IO198PB4F18     | W17        |
| IO199NB4F18     | AE19       |
| IO199PB4F18     | AE20       |
| IO200NB4F18     | AC15       |
| IO201NB4F18     | AD15       |
| IO201PB4F18     | AD16       |
| IO202NB4F18     | Y15        |
| IO202PB4F18     | Y16        |
| IO206NB4F19     | AB14       |
| IO206PB4F19     | AB15       |
| IO207NB4F19     | AE15       |
| IO207PB4F19     | AE16       |

Note: \*Not routed on the same package layer and to adjacent LGA pads as its differential pair complement. Recommended to be used as a single-ended I/O.

| CG624             |            |
|-------------------|------------|
| AX2000 Function   | Pin Number |
| IO208PB4F19       | W16        |
| IO209NB4F19       | AE14       |
| IO210NB4F19       | V15        |
| IO210PB4F19       | V16        |
| IO211NB4F19       | AD14       |
| IO211PB4F19       | AC14       |
| IO212NB4F19/CLKEN | W14        |
| IO212PB4F19/CLKEP | W15        |
| IO213NB4F19/CLKFN | AC13       |
| IO213PB4F19/CLKFP | AD13       |
| <b>Bank 5</b>     |            |
| IO214NB5F20/CLKGN | W13        |
| IO214PB5F20/CLKGP | Y13        |
| IO215NB5F20/CLKHN | AC12       |
| IO215PB5F20/CLKHP | AD12       |
| IO216NB5F20       | U13        |
| IO216PB5F20       | V13        |
| IO217NB5F20       | AE10       |
| IO217PB5F20       | AE11       |
| IO218NB5F20       | W11        |
| IO218PB5F20       | W12        |
| IO222NB5F20       | AA11       |
| IO222PB5F20       | Y11        |
| IO223PB5F21       | AE9        |
| IO225NB5F21       | AE6        |
| IO225PB5F21       | AE7        |
| IO226NB5F21       | Y10        |
| IO226PB5F21       | W10        |
| IO227PB5F21       | T13        |
| IO228NB5F21       | AB10       |
| IO228PB5F21       | AB11       |
| IO229NB5F21       | AD9        |

Note: \*Not routed on the same package layer and to adjacent LGA pads as its differential pair complement. Recommended to be used as a single-ended I/O.

| CG624           |            |
|-----------------|------------|
| AX2000 Function | Pin Number |
| IO310NB7F29     | N10        |
| IO310PB7F29     | N9         |
| IO311NB7F29     | K1         |
| IO311PB7F29     | L1         |
| IO313NB7F29     | M5         |
| IO316NB7F29     | L6         |
| IO316PB7F29     | L5         |
| IO317NB7F29     | K2         |
| IO317PB7F29     | L2         |
| IO318NB7F29     | K4         |
| IO318PB7F29     | L4         |
| IO320NB7F29     | J3         |
| IO321NB7F30     | J2         |
| IO321PB7F30     | J1         |
| IO323NB7F30     | L7         |
| IO323PB7F30     | M7         |
| IO324NB7F30     | M9         |
| IO324PB7F30     | M8         |
| IO327NB7F30     | F1         |
| IO327PB7F30     | G1         |
| IO328NB7F30     | K7         |
| IO328PB7F30     | K6         |
| IO329NB7F30     | D1         |
| IO329PB7F30     | E1         |
| IO331PB7F30     | G2         |
| IO332NB7F31     | H3         |
| IO332PB7F31     | H2         |
| IO333NB7F31     | E2         |
| IO333PB7F31     | F2         |
| IO334NB7F31     | H4         |
| IO334PB7F31     | J4         |
| IO335NB7F31     | H5         |

Note: *\*Not routed on the same package layer and to adjacent LGA pads as its differential pair complement. Recommended to be used as a single-ended I/O.*

| CG624           |            |
|-----------------|------------|
| AX2000 Function | Pin Number |
| IO335PB7F31     | H6         |
| IO337NB7F31     | D2         |
| IO338NB7F31     | J6         |
| IO338PB7F31     | J5         |
| IO339NB7F31     | F3         |
| IO339PB7F31     | E3         |
| IO340NB7F31     | G4*        |
| IO340PB7F31     | G3*        |
| IO341NB7F31     | K8         |
| IO341PB7F31     | L8         |
| Dedicated I/O   |            |
| GND             | K5         |
| GND             | A18        |
| GND             | A2         |
| GND             | A24        |
| GND             | A25        |
| GND             | A8         |
| GND             | AA10       |
| GND             | AA16       |
| GND             | AA18       |
| GND             | AA21       |
| GND             | AA5        |
| GND             | AB22       |
| GND             | AB4        |
| GND             | AC10       |
| GND             | AC16       |
| GND             | AC23       |
| GND             | AC3        |
| GND             | AD1        |
| GND             | AD2        |
| GND             | AD24       |
| GND             | AD25       |

Note: *\*Not routed on the same package layer and to adjacent LGA pads as its differential pair complement. Recommended to be used as a single-ended I/O.*

| CG624           |            |
|-----------------|------------|
| AX2000 Function | Pin Number |
| GND             | AE1        |
| GND             | AE18       |
| GND             | AE2        |
| GND             | AE24       |
| GND             | AE25       |
| GND             | AE8        |
| GND             | B1         |
| GND             | B2         |
| GND             | B24        |
| GND             | B25        |
| GND             | C10        |
| GND             | C16        |
| GND             | C23        |
| GND             | C3         |
| GND             | D22        |
| GND             | D4         |
| GND             | E10        |
| GND             | E16        |
| GND             | E21        |
| GND             | E5         |
| GND             | E8         |
| GND             | H1         |
| GND             | H21        |
| GND             | H25        |
| GND             | K21        |
| GND             | K23        |
| GND             | K3         |
| GND             | L11        |
| GND             | L12        |
| GND             | L13        |
| GND             | L14        |
| GND             | L15        |

Note: *\*Not routed on the same package layer and to adjacent LGA pads as its differential pair complement. Recommended to be used as a single-ended I/O.*