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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                 | Obsolete                                                                                                                                                            |
| Number of LABs/CLBs            | -                                                                                                                                                                   |
| Number of Logic Elements/Cells | 10200                                                                                                                                                               |
| Total RAM Bits                 | 282624                                                                                                                                                              |
| Number of I/O                  | 288                                                                                                                                                                 |
| Number of Gates                | -                                                                                                                                                                   |
| Voltage - Supply               | 1.14V ~ 1.26V                                                                                                                                                       |
| Mounting Type                  | Surface Mount                                                                                                                                                       |
| Operating Temperature          | -40°C ~ 100°C (TJ)                                                                                                                                                  |
| Package / Case                 | 484-BBGA                                                                                                                                                            |
| Supplier Device Package        | 484-FPBGA (23x23)                                                                                                                                                   |
| Purchase URL                   | <a href="https://www.e-xfl.com/product-detail/lattice-semiconductor/lfec10e-3fn484i">https://www.e-xfl.com/product-detail/lattice-semiconductor/lfec10e-3fn484i</a> |

## **Introduction**

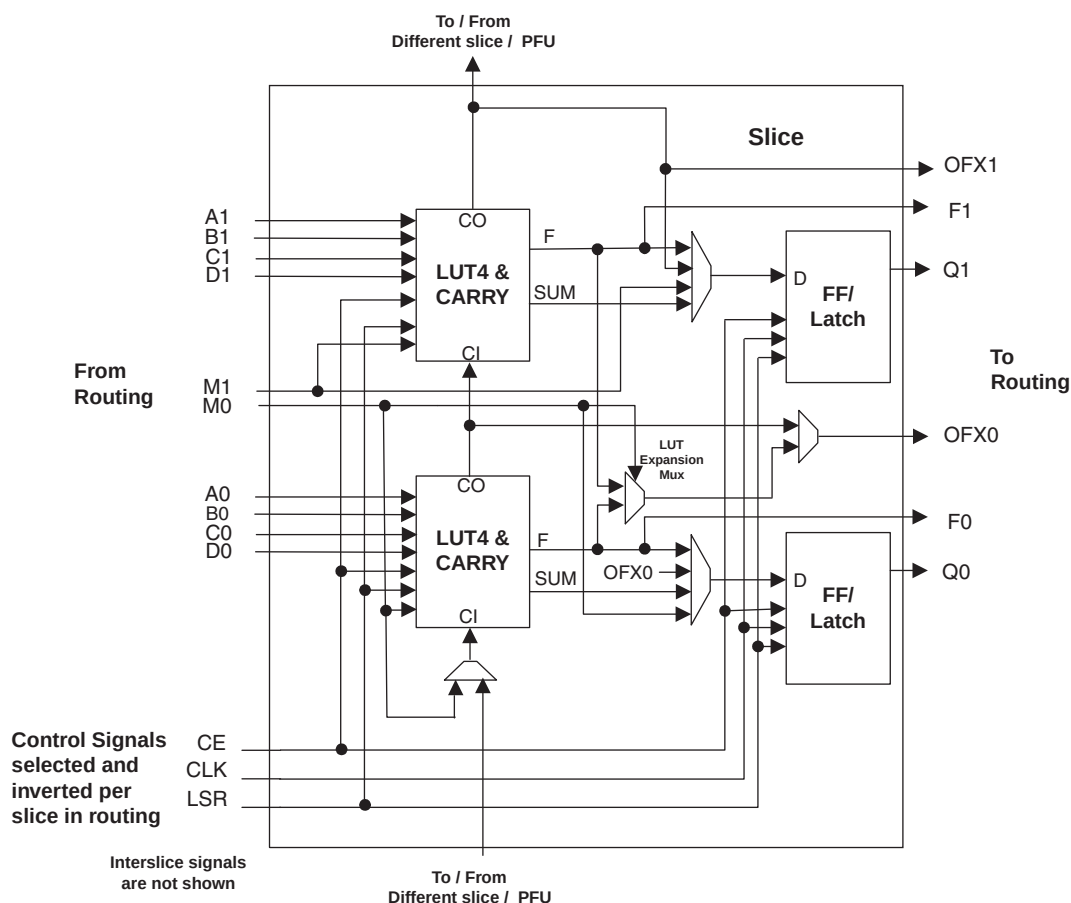
The LatticeECP/EC family of FPGA devices is optimized to deliver mainstream FPGA features at low cost. For maximum performance and value, the LatticeECP™ (Economy Plus) FPGA concept combines an efficient FPGA fabric with high-speed dedicated functions. Lattice's first family to implement this approach is the LatticeECP-DSP™ (Economy Plus DSP) family, providing dedicated high-performance DSP blocks on-chip. The LatticeEC™ (Economy) family supports all the general purpose features of LatticeECP devices without dedicated function blocks to achieve lower cost solutions.

The LatticeECP/EC FPGA fabric, which was designed from the outset with low cost in mind, contains all the critical FPGA elements: LUT-based logic, distributed and embedded memory, PLLs and support for mainstream I/Os. Dedicated DDR memory interface logic is also included to support this memory that is becoming increasingly prevalent in cost-sensitive applications.

The ispLEVER® design tool suite from Lattice allows large complex designs to be efficiently implemented using the LatticeECP/EC FPGA family. Synthesis library support for LatticeECP/EC is available for popular logic synthesis tools. The ispLEVER tool uses the synthesis tool output along with the constraints from its floor planning tools to place and route the design in the LatticeECP/EC device. The ispLEVER tool extracts the timing from the routing and back-annotates it into the design for timing verification.

Lattice provides many pre-designed IP (Intellectual Property) ispLeverCORE™ modules for the LatticeECP/EC family. By using these IPs as standardized blocks, designers are free to concentrate on the unique aspects of their design, increasing their productivity.

**Figure 2-4. Slice Diagram**



**Table 2-1. Slice Signal Descriptions**

| Function | Type             | Signal Names   | Description                                                          |
|----------|------------------|----------------|----------------------------------------------------------------------|
| Input    | Data signal      | A0, B0, C0, D0 | Inputs to LUT4                                                       |
| Input    | Data signal      | A1, B1, C1, D1 | Inputs to LUT4                                                       |
| Input    | Multi-purpose    | M0             | Multipurpose Input                                                   |
| Input    | Multi-purpose    | M1             | Multipurpose Input                                                   |
| Input    | Control signal   | CE             | Clock Enable                                                         |
| Input    | Control signal   | LSR            | Local Set/Reset                                                      |
| Input    | Control signal   | CLK            | System Clock                                                         |
| Input    | Inter-PFU signal | FCIN           | Fast Carry In <sup>1</sup>                                           |
| Output   | Data signals     | F0, F1         | LUT4 output register bypass signals                                  |
| Output   | Data signals     | Q0, Q1         | Register Outputs                                                     |
| Output   | Data signals     | OFX0           | Output of a LUT5 MUX                                                 |
| Output   | Data signals     | OFX1           | Output of a LUT6, LUT7, LUT8 <sup>2</sup> MUX depending on the slice |
| Output   | Inter-PFU signal | FCO            | For the right most PFU the fast carry chain output <sup>1</sup>      |

1. See Figure 2-3 for connection details.

2. Requires two PFUs.

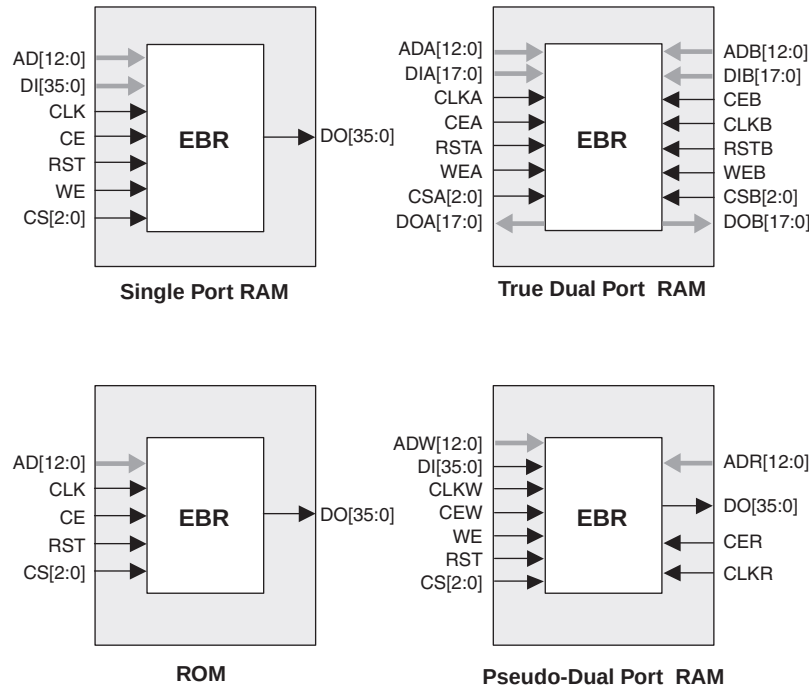
## Memory Cascading

Larger and deeper blocks of RAM can be created using EBR sysMEM Blocks. Typically, the Lattice design tools cascade memory transparently, based on specific design inputs.

## Single, Dual and Pseudo-Dual Port Modes

Figure 2-15 shows the four basic memory configurations and their input/output names. In all the sysMEM RAM modes the input data and address for the ports are registered at the input of the memory array. The output data of the memory is optionally registered at the output.

**Figure 2-15. sysMEM EBR Primitives**



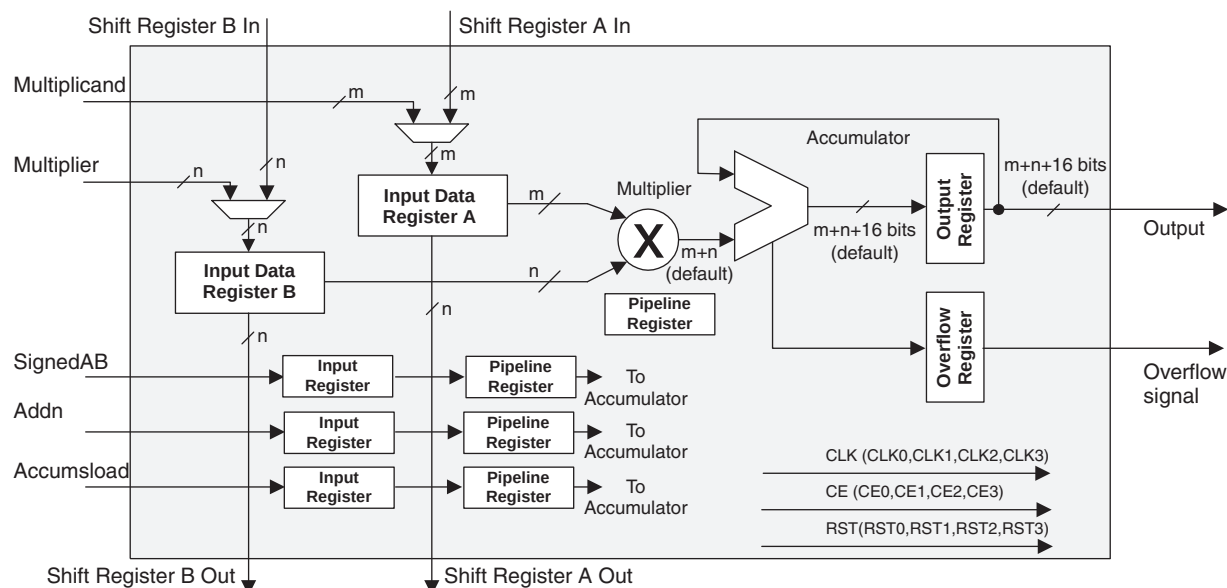
The EBR memory supports three forms of write behavior for single port or dual port operation:

1. **Normal** – data on the output appears only during read cycle. During a write cycle, the data (at the current address) does not appear on the output. This mode is supported for all data widths.
2. **Write Through** – a copy of the input data appears at the output of the same port during a write cycle. This mode is supported for all data widths.
3. **Read-Before-Write** – when new data is being written, the old content of the address appears at the output. This mode is supported for x9, x18 and x36 data widths.

## Memory Core Reset

The memory array in the EBR utilizes latches at the A and B output ports. These latches can be reset asynchronously or synchronously. RSTA and RSTB are local signals, which reset the output latches associated with Port A and Port B, respectively. The Global Reset (GSRN) signal resets both ports. The output data latches and associated resets for both ports are as shown in Figure 2-16.

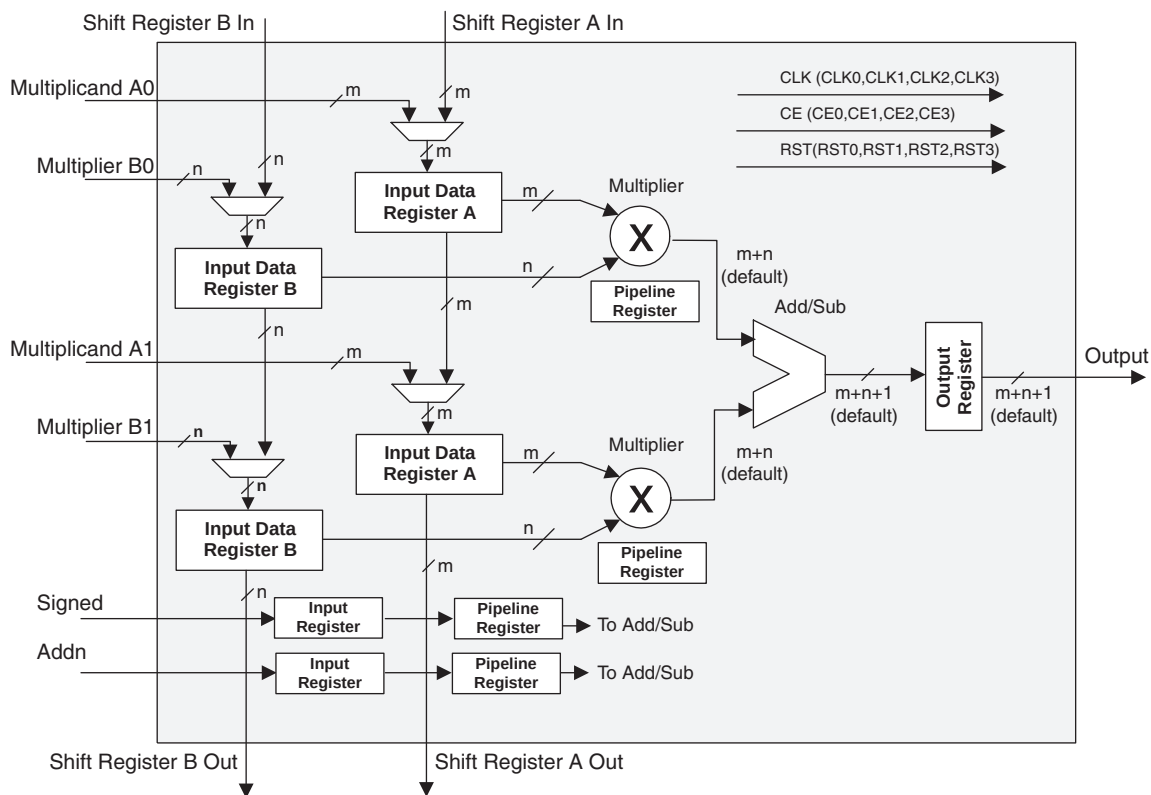
**Figure 2-20. MAC sysDSP Element**



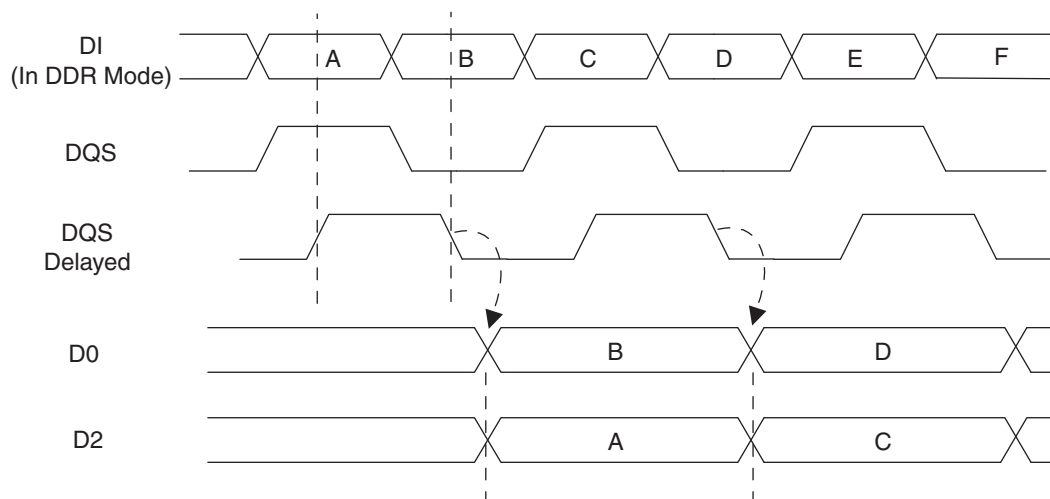
## MULTADD sysDSP Element

In this case, the operands A0 and B0 are multiplied and the result is added/subtracted with the result of the multiplier operation of operands A1 and A2. The user can enable the input, output and pipeline registers. Figure 2-21 shows the MULTADD sysDSP element.

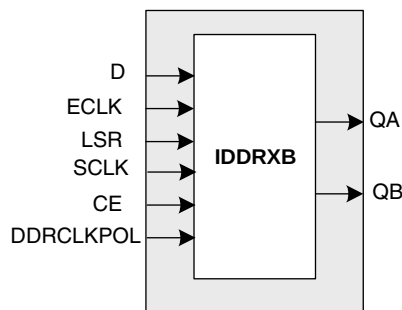
**Figure 2-21. MULTADD**



**Figure 2-27. Input Register DDR Waveforms**



**Figure 2-28. INDDRxB Primitive**



### Output Register Block

The output register block provides the ability to register signals from the core of the device before they are passed to the sys/O buffers. The block contains a register for SDR operation that is combined with an additional latch for DDR operation. Figure 2-29 shows the diagram of the Output Register Block.

In SDR mode, ONEG0 feeds one of the flip-flops that then feeds the output. The flip-flop can be configured a D-type or latch. In DDR mode, ONEG0 is fed into one register on the positive edge of the clock and OPOS0 is latched. A multiplexer running off the same clock selects the correct register for feeding to the output (D0).

Figure 2-30 shows the design tool DDR primitives. The SDR output register has reset and clock enable available. The additional register for DDR operation does not have reset or clock enable available.

## LatticeECP/EC Internal Switching Characteristics

Over Recommended Operating Conditions

| Parameter                        | Description                                     | -5    |      | -4    |      | -3    |      | Units |
|----------------------------------|-------------------------------------------------|-------|------|-------|------|-------|------|-------|
|                                  |                                                 | Min.  | Max. | Min.  | Max. | Min.  | Max. |       |
| PFU/PFF Logic Mode Timing        |                                                 |       |      |       |      |       |      |       |
| t <sub>LUT4_PFU</sub>            | LUT4 Delay (A to D Inputs to F Output)          | —     | 0.25 | —     | 0.31 | —     | 0.36 | ns    |
| t <sub>LUT6_PFU</sub>            | LUT6 Delay (A to D Inputs to OFX Output)        | —     | 0.40 | —     | 0.48 | —     | 0.56 | ns    |
| t <sub>LSR_PFU</sub>             | Set/Reset to Output of PFU                      | —     | 0.81 | —     | 0.98 | —     | 1.14 | ns    |
| t <sub>SUM_PFU</sub>             | Clock to Mux (M0,M1) Input Setup Time           | 0.12  | —    | 0.14  | —    | 0.16  | —    | ns    |
| t <sub>HM_PFU</sub>              | Clock to Mux (M0,M1) Input Hold Time            | -0.05 | —    | -0.06 | —    | -0.06 | —    | ns    |
| t <sub>SUD_PFU</sub>             | Clock to D Input Setup Time                     | 0.12  | —    | 0.14  | —    | 0.16  | —    | ns    |
| t <sub>HD_PFU</sub>              | Clock to D Input Hold time                      | -0.03 | —    | -0.03 | —    | -0.04 | —    | ns    |
| t <sub>CK2Q_PFU</sub>            | Clock to Q Delay, D-type Register Configuration | —     | 0.36 | —     | 0.44 | —     | 0.51 | ns    |
| t <sub>LE2Q_PFU</sub>            | Clock to Q Delay Latch Configuration            | —     | 0.48 | —     | 0.58 | —     | 0.68 | ns    |
| t <sub>LD2Q_PFU</sub>            | D to Q Throughput Delay when Latch is Enabled   | —     | 0.50 | —     | 0.60 | —     | 0.69 | ns    |
| PFU Dual Port Memory Mode Timing |                                                 |       |      |       |      |       |      |       |
| t <sub>CORAM_PFU</sub>           | Clock to Output                                 | —     | 0.36 | —     | 0.44 | —     | 0.51 | ns    |
| t <sub>SUDATA_PFU</sub>          | Data Setup Time                                 | -0.20 | —    | -0.24 | —    | -0.28 | —    | ns    |
| t <sub>HDATA_PFU</sub>           | Data Hold Time                                  | 0.26  | —    | 0.31  | —    | 0.36  | —    | ns    |
| t <sub>SUADDR_PFU</sub>          | Address Setup Time                              | -0.51 | —    | -0.62 | —    | -0.72 | —    | ns    |
| t <sub>HADDR_PFU</sub>           | Address Hold Time                               | 0.64  | —    | 0.77  | —    | 0.90  | —    | ns    |
| t <sub>SUWREN_PFU</sub>          | Write/Read Enable Setup Time                    | -0.24 | —    | -0.29 | —    | -0.34 | —    | ns    |
| t <sub>HWREN_PFU</sub>           | Write/Read Enable Hold Time                     | 0.30  | —    | 0.36  | —    | 0.42  | —    | ns    |
| PIC Timing                       |                                                 |       |      |       |      |       |      |       |
| PIO Input/Output Buffer Timing   |                                                 |       |      |       |      |       |      |       |
| t <sub>IN_PIO</sub>              | Input Buffer Delay                              | —     | 0.56 | —     | 0.67 | —     | 0.78 | ns    |
| t <sub>OUT_PIO</sub>             | Output Buffer Delay                             | —     | 1.92 | —     | 2.31 | —     | 2.69 | ns    |
| IOLOGIC Input/Output Timing      |                                                 |       |      |       |      |       |      |       |
| t <sub>SUI_PIO</sub>             | Input Register Setup Time (Data Before Clock)   | 0.90  | —    | 1.08  | —    | 1.26  | —    | ns    |
| t <sub>HI_PIO</sub>              | Input Register Hold Time (Data after Clock)     | 0.62  | —    | 0.74  | —    | 0.87  | —    | ns    |
| t <sub>COO_PIO</sub>             | Output Register Clock to Output Delay           | —     | 0.33 | —     | 0.40 | —     | 0.46 | ns    |
| t <sub>SUCE_PIO</sub>            | Input Register Clock Enable Setup Time          | -0.10 | —    | -0.12 | —    | -0.14 | —    | ns    |
| t <sub>HCE_PIO</sub>             | Input Register Clock Enable Hold Time           | 0.12  | —    | 0.14  | —    | 0.17  | —    | ns    |
| t <sub>SULSR_PIO</sub>           | Set/Reset Setup Time                            | 0.18  | —    | 0.21  | —    | 0.25  | —    | ns    |
| t <sub>HLSR_PIO</sub>            | Set/Reset Hold Time                             | -0.15 | —    | -0.18 | —    | -0.21 | —    | ns    |
| EBR Timing                       |                                                 |       |      |       |      |       |      |       |
| t <sub>CO_EBR</sub>              | Clock to Output from Address or Data            | —     | 3.64 | —     | 4.37 | —     | 5.10 | ns    |
| t <sub>COO_EBR</sub>             | Clock to Output from EBR output Register        | —     | 0.74 | —     | 0.88 | —     | 1.03 | ns    |
| t <sub>SUDATA_EBR</sub>          | Setup Data to EBR Memory                        | -0.29 | —    | -0.35 | —    | -0.41 | —    | ns    |
| t <sub>HDATA_EBR</sub>           | Hold Data to EBR Memory                         | 0.37  | —    | 0.44  | —    | 0.52  | —    | ns    |
| t <sub>SUADDR_EBR</sub>          | Setup Address to EBR Memory                     | -0.29 | —    | -0.35 | —    | -0.41 | —    | ns    |
| t <sub>HADDR_EBR</sub>           | Hold Address to EBR Memory                      | 0.37  | —    | 0.45  | —    | 0.52  | —    | ns    |
| t <sub>SUWREN_EBR</sub>          | Setup Write/Read Enable to EBR Memory           | -0.18 | —    | -0.22 | —    | -0.26 | —    | ns    |
| t <sub>HWREN_EBR</sub>           | Hold Write/Read Enable to EBR Memory            | 0.23  | —    | 0.28  | —    | 0.33  | —    | ns    |

## PICs and DDR Data (DQ) Pins Associated with the DDR Strobe (DQS) Pin

| PICs Associated with DQS Strobe | PIO Within PIC | DDR Strobe (DQS) and Data (DQ) Pins |
|---------------------------------|----------------|-------------------------------------|
| P[Edge] [n-4]                   | A              | DQ                                  |
|                                 | B              | DQ                                  |
| P[Edge] [n-3]                   | A              | DQ                                  |
|                                 | B              | DQ                                  |
| P[Edge] [n-2]                   | A              | DQ                                  |
|                                 | B              | DQ                                  |
| P[Edge] [n-1]                   | A              | DQ                                  |
|                                 | B              | DQ                                  |
| P[Edge] [n]                     | A              | [Edge]DQSn                          |
|                                 | B              | DQ                                  |
| P[Edge] [n+1]                   | A              | DQ                                  |
|                                 | B              | DQ                                  |
| P[Edge] [n+2]                   | A              | DQ                                  |
|                                 | B              | DQ                                  |
| P[Edge] [n+3]                   | A              | DQ                                  |
|                                 | B              | DQ                                  |

Notes:

1. "n" is a Row/Column PIC number
2. The DDR interface is designed for memories that support one DQS strobe per eight bits of data. In some packages, all the potential DDR data (DQ) pins may not be available.
3. PIC numbering definitions are provided in the "Signal Names" column of the Signal Descriptions table.



**LFEC6/EC6, LFEC6/EC10 Logic Signal Connections: 208 PQFP**

| Pin Number | LFEC6/LFEC6  |      |      |                | LFEC10/LFEC10 |      |      |                |
|------------|--------------|------|------|----------------|---------------|------|------|----------------|
|            | Pin Function | Bank | LVDS | Dual Function  | Pin Function  | Bank | LVDS | Dual Function  |
| 1*         | GND0<br>GND7 | -    |      |                | GND0<br>GND7  | -    |      |                |
| 2          | VCCIO7       | 7    |      |                | VCCIO7        | 7    |      |                |
| 3          | PL2A         | 7    | T    | VREF2_7        | PL2A          | 7    | T    | VREF2_7        |
| 4          | PL2B         | 7    | C    | VREF1_7        | PL2B          | 7    | C    | VREF1_7        |
| 5          | NC           | -    |      |                | VCC           | -    |      |                |
| 6          | NC           | -    |      |                | GND           | -    |      |                |
| 7          | PL3B         | 7    |      |                | PL12B         | 7    |      |                |
| 8          | PL4A         | 7    | T    |                | PL13A         | 7    | T    |                |
| 9          | PL4B         | 7    | C    |                | PL13B         | 7    | C    |                |
| 10         | PL5A         | 7    | T    |                | PL14A         | 7    | T    |                |
| 11         | PL5B         | 7    | C    |                | PL14B         | 7    | C    |                |
| 12         | PL6A         | 7    | T    | LDQS6          | PL15A         | 7    | T    | LDQS15         |
| 13         | VCCIO7       | 7    |      |                | VCCIO7        | 7    |      |                |
| 14         | PL6B         | 7    | C    |                | PL15B         | 7    | C    |                |
| 15         | PL7A         | 7    | T    |                | PL16A         | 7    | T    |                |
| 16         | PL7B         | 7    | C    |                | PL16B         | 7    | C    |                |
| 17         | PL8A         | 7    | T    |                | PL17A         | 7    | T    |                |
| 18         | GND7         | 7    |      |                | GND7          | 7    |      |                |
| 19         | PL8B         | 7    | C    |                | PL17B         | 7    | C    |                |
| 20         | PL9A         | 7    | T    | PCLKT7_0       | PL18A         | 7    | T    | PCLKT7_0       |
| 21         | PL9B         | 7    | C    | PCLKC7_0       | PL18B         | 7    | C    | PCLKC7_0       |
| 22         | VCCAUX       | -    |      |                | VCCAUX        | -    |      |                |
| 23         | XRES         | 6    |      |                | XRES          | 6    |      |                |
| 24         | VCC          | -    |      |                | VCC           | -    |      |                |
| 25         | GND          | -    |      |                | GND           | -    |      |                |
| 26         | VCC          | -    |      |                | VCC           | -    |      |                |
| 27         | TCK          | 6    |      |                | TCK           | 6    |      |                |
| 28         | GND          | -    |      |                | GND           | -    |      |                |
| 29         | TDI          | 6    |      |                | TDI           | 6    |      |                |
| 30         | TMS          | 6    |      |                | TMS           | 6    |      |                |
| 31         | TDO          | 6    |      |                | TDO           | 6    |      |                |
| 32         | VCCJ         | 6    |      |                | VCCJ          | 6    |      |                |
| 33         | PL20A        | 6    | T    | LLM0_PLLT_IN_A | PL29A         | 6    | T    | LLM0_PLLT_IN_A |
| 34         | PL20B        | 6    | C    | LLM0_PLLC_IN_A | PL29B         | 6    | C    | LLM0_PLLC_IN_A |
| 35         | PL21A        | 6    | T    | LLM0_PLLT_FB_A | PL30A         | 6    | T    | LLM0_PLLT_FB_A |
| 36         | PL21B        | 6    | C    | LLM0_PLLC_FB_A | PL30B         | 6    | C    | LLM0_PLLC_FB_A |
| 37         | VCCIO6       | 6    |      |                | VCCIO6        | 6    |      |                |
| 38         | PL22A        | 6    | T    |                | PL31A         | 6    | T    |                |
| 39         | PL22B        | 6    | C    |                | PL31B         | 6    | C    |                |
| 40         | PL23A        | 6    | T    |                | PL32A         | 6    | T    |                |
| 41         | GND6         | 6    |      |                | GND6          | 6    |      |                |
| 42         | PL23B        | 6    | C    |                | PL32B         | 6    | C    |                |

**LFEC3 and LFEC6/EC6 Logic Signal Connections: 256 fpBGA (Cont.)**

| Ball Number | LFEC3         |      |      |                | LFEC6/EC6     |      |      |                |
|-------------|---------------|------|------|----------------|---------------|------|------|----------------|
|             | Ball Function | Bank | LVDS | Dual Function  | Ball Function | Bank | LVDS | Dual Function  |
| K2          | PL11A         | 6    | T    | LLM0_PLLT_IN_A | PL20A         | 6    | T    | LLM0_PLLT_IN_A |
| K1          | PL11B         | 6    | C    | LLM0_PLLC_IN_A | PL20B         | 6    | C    | LLM0_PLLC_IN_A |
| L2          | PL12A         | 6    | T    | LLM0_PLLT_FB_A | PL21A         | 6    | T    | LLM0_PLLT_FB_A |
| L1          | PL12B         | 6    | C    | LLM0_PLLC_FB_A | PL21B         | 6    | C    | LLM0_PLLC_FB_A |
| M2          | PL13A         | 6    | T    |                | PL22A         | 6    | T    |                |
| M1          | PL13B         | 6    | C    |                | PL22B         | 6    | C    |                |
| N1          | PL14A         | 6    | T    |                | PL23A         | 6    | T    |                |
| GND         | GND6          | 6    |      |                | GND6          | 6    |      |                |
| N2          | PL14B         | 6    | C    |                | PL23B         | 6    | C    |                |
| M4          | PL15A         | 6    | T    | LDQS15         | PL24A         | 6    | T    | LDQS24         |
| M3          | PL15B         | 6    | C    |                | PL24B         | 6    | C    |                |
| P1          | PL16A         | 6    | T    |                | PL25A         | 6    | T    |                |
| R1          | PL16B         | 6    | C    |                | PL25B         | 6    | C    |                |
| P2          | PL17A         | 6    | T    |                | PL26A         | 6    | T    |                |
| P3          | PL17B         | 6    | C    |                | PL26B         | 6    | C    |                |
| N3          | PL18A         | 6    | T    | VREF1_6        | PL27A         | 6    | T    | VREF1_6        |
| N4          | PL18B         | 6    | C    | VREF2_6        | PL27B         | 6    | C    | VREF2_6        |
| GND         | GND6          | 6    |      |                | GND6          | 6    |      |                |
| GND         | GND5          | 5    |      |                | GND5          | 5    |      |                |
| P4          | PB2A          | 5    | T    |                | PB2A          | 5    | T    |                |
| N5          | PB2B          | 5    | C    |                | PB2B          | 5    | C    |                |
| P5          | PB3A          | 5    | T    |                | PB3A          | 5    | T    |                |
| P6          | PB3B          | 5    | C    |                | PB3B          | 5    | C    |                |
| R4          | PB4A          | 5    | T    |                | PB4A          | 5    | T    |                |
| R3          | PB4B          | 5    | C    |                | PB4B          | 5    | C    |                |
| T2          | PB5A          | 5    | T    |                | PB5A          | 5    | T    |                |
| T3          | PB5B          | 5    | C    |                | PB5B          | 5    | C    |                |
| R5          | PB6A          | 5    | T    | BDQS6          | PB6A          | 5    | T    | BDQS6          |
| R6          | PB6B          | 5    | C    |                | PB6B          | 5    | C    |                |
| T4          | PB7A          | 5    | T    |                | PB7A          | 5    | T    |                |
| T5          | PB7B          | 5    | C    |                | PB7B          | 5    | C    |                |
| N6          | PB8A          | 5    | T    |                | PB8A          | 5    | T    |                |
| M6          | PB8B          | 5    | C    |                | PB8B          | 5    | C    |                |
| T6          | PB9A          | 5    | T    |                | PB9A          | 5    | T    |                |
| GND         | GND5          | 5    |      |                | GND5          | 5    |      |                |
| T7          | PB9B          | 5    | C    |                | PB9B          | 5    | C    |                |
| P7          | PB10A         | 5    | T    |                | PB10A         | 5    | T    |                |
| N7          | PB10B         | 5    | C    |                | PB10B         | 5    | C    |                |
| R7          | PB11A         | 5    | T    |                | PB11A         | 5    | T    |                |
| R8          | PB11B         | 5    | C    |                | PB11B         | 5    | C    |                |
| M7          | PB12A         | 5    | T    |                | PB12A         | 5    | T    |                |
| M8          | PB12B         | 5    | C    |                | PB12B         | 5    | C    |                |
| T8          | PB13A         | 5    | T    |                | PB13A         | 5    | T    |                |

**LFEC3 and LFEC6/EC6 Logic Signal Connections: 256 fpBGA (Cont.)**

| Ball Number | LFEC3         |      |      |               | LFEC6/LFEC6   |      |      |               |
|-------------|---------------|------|------|---------------|---------------|------|------|---------------|
|             | Ball Function | Bank | LVDS | Dual Function | Ball Function | Bank | LVDS | Dual Function |
| D7          | PT11B         | 0    | C    |               | PT11B         | 0    | C    |               |
| C7          | PT11A         | 0    | T    |               | PT11A         | 0    | T    |               |
| A7          | PT10B         | 0    | C    |               | PT10B         | 0    | C    |               |
| A6          | PT10A         | 0    | T    |               | PT10A         | 0    | T    |               |
| E7          | PT9B          | 0    | C    |               | PT9B          | 0    | C    |               |
| GND         | GND0          | 0    |      |               | GND0          | 0    |      |               |
| E6          | PT9A          | 0    | T    |               | PT9A          | 0    | T    |               |
| D6          | PT8B          | 0    | C    |               | PT8B          | 0    | C    |               |
| C6          | PT8A          | 0    | T    |               | PT8A          | 0    | T    |               |
| B6          | PT7B          | 0    | C    |               | PT7B          | 0    | C    |               |
| B5          | PT7A          | 0    | T    |               | PT7A          | 0    | T    |               |
| A5          | PT6B          | 0    | C    |               | PT6B          | 0    | C    |               |
| A4          | PT6A          | 0    | T    | TDQS6         | PT6A          | 0    | T    | TDQS6         |
| A3          | PT5B          | 0    | C    |               | PT5B          | 0    | C    |               |
| A2          | PT5A          | 0    | T    |               | PT5A          | 0    | T    |               |
| B2          | PT4B          | 0    | C    |               | PT4B          | 0    | C    |               |
| B3          | PT4A          | 0    | T    |               | PT4A          | 0    | T    |               |
| D5          | PT3B          | 0    | C    |               | PT3B          | 0    | C    |               |
| C5          | PT3A          | 0    | T    |               | PT3A          | 0    | T    |               |
| C4          | PT2B          | 0    | C    |               | PT2B          | 0    | C    |               |
| B4          | PT2A          | 0    | T    |               | PT2A          | 0    | T    |               |
| GND         | GND0          | 0    |      |               | GND0          | 0    |      |               |
| A1          | GND           | -    |      |               | GND           | -    |      |               |
| A16         | GND           | -    |      |               | GND           | -    |      |               |
| G10         | GND           | -    |      |               | GND           | -    |      |               |
| G7          | GND           | -    |      |               | GND           | -    |      |               |
| G8          | GND           | -    |      |               | GND           | -    |      |               |
| G9          | GND           | -    |      |               | GND           | -    |      |               |
| H10         | GND           | -    |      |               | GND           | -    |      |               |
| H7          | GND           | -    |      |               | GND           | -    |      |               |
| H8          | GND           | -    |      |               | GND           | -    |      |               |
| H9          | GND           | -    |      |               | GND           | -    |      |               |
| J10         | GND           | -    |      |               | GND           | -    |      |               |
| J7          | GND           | -    |      |               | GND           | -    |      |               |
| J8          | GND           | -    |      |               | GND           | -    |      |               |
| J9          | GND           | -    |      |               | GND           | -    |      |               |
| K10         | GND           | -    |      |               | GND           | -    |      |               |
| K7          | GND           | -    |      |               | GND           | -    |      |               |
| K8          | GND           | -    |      |               | GND           | -    |      |               |
| K9          | GND           | -    |      |               | GND           | -    |      |               |
| T1          | GND           | -    |      |               | GND           | -    |      |               |
| T16         | GND           | -    |      |               | GND           | -    |      |               |
| E12         | VCC           | -    |      |               | VCC           | -    |      |               |

**LFEC10/EC10 and LFEC15/EC15 Logic Signal Connections: 256 fpBGA (Cont.)**

| Ball Number | LFEC10/LFEC10 |      |      |               | LFEC15/LFEC15 |      |      |               |
|-------------|---------------|------|------|---------------|---------------|------|------|---------------|
|             | Ball Function | Bank | LVDS | Dual Function | Ball Function | Bank | LVDS | Dual Function |
| N7          | PB18B         | 5    | C    |               | PB18B         | 5    | C    |               |
| R7          | PB19A         | 5    | T    |               | PB19A         | 5    | T    |               |
| R8          | PB19B         | 5    | C    |               | PB19B         | 5    | C    |               |
| M7          | PB20A         | 5    | T    |               | PB20A         | 5    | T    |               |
| M8          | PB20B         | 5    | C    |               | PB20B         | 5    | C    |               |
| T8          | PB21A         | 5    | T    |               | PB21A         | 5    | T    |               |
| GND         | GND5          | 5    |      |               | GND5          | 5    |      |               |
| T9          | PB21B         | 5    | C    |               | PB21B         | 5    | C    |               |
| P8          | PB22A         | 5    | T    | BDQS22        | PB22A         | 5    | T    | BDQS22        |
| N8          | PB22B         | 5    | C    |               | PB22B         | 5    | C    |               |
| R9          | PB23A         | 5    | T    |               | PB23A         | 5    | T    |               |
| R10         | PB23B         | 5    | C    |               | PB23B         | 5    | C    |               |
| P9          | PB24A         | 5    | T    | VREF2_5       | PB24A         | 5    | T    | VREF2_5       |
| N9          | PB24B         | 5    | C    | VREF1_5       | PB24B         | 5    | C    | VREF1_5       |
| T10         | PB25A         | 5    | T    | PCLKT5_0      | PB25A         | 5    | T    | PCLKT5_0      |
| GND         | GND5          | 5    |      |               | GND5          | 5    |      |               |
| T11         | PB25B         | 5    | C    | PCLKC5_0      | PB25B         | 5    | C    | PCLKC5_0      |
| T12         | PB26A         | 4    | T    | WRITEN        | PB26A         | 4    | T    | WRITEN        |
| T13         | PB26B         | 4    | C    | CS1N          | PB26B         | 4    | C    | CS1N          |
| P10         | PB27A         | 4    | T    | VREF1_4       | PB27A         | 4    | T    | VREF1_4       |
| N10         | PB27B         | 4    | C    | CSN           | PB27B         | 4    | C    | CSN           |
| T14         | PB28A         | 4    | T    | VREF2_4       | PB28A         | 4    | T    | VREF2_4       |
| T15         | PB28B         | 4    | C    | D0/SPID7      | PB28B         | 4    | C    | D0/SPID7      |
| M10         | PB29A         | 4    | T    | D2/SPID5      | PB29A         | 4    | T    | D2/SPID5      |
| GND         | GND4          | 4    |      |               | GND4          | 4    |      |               |
| M11         | PB29B         | 4    | C    | D1/SPID6      | PB29B         | 4    | C    | D1/SPID6      |
| R11         | PB30A         | 4    | T    | BDQS30        | PB30A         | 4    | T    | BDQS30        |
| P11         | PB30B         | 4    | C    | D3/SPID4      | PB30B         | 4    | C    | D3/SPID4      |
| R13         | PB31A         | 4    | T    |               | PB31A         | 4    | T    |               |
| R14         | PB31B         | 4    | C    | D4/SPID3      | PB31B         | 4    | C    | D4/SPID3      |
| P12         | PB32A         | 4    | T    |               | PB32A         | 4    | T    |               |
| P13         | PB32B         | 4    | C    | D5/SPID2      | PB32B         | 4    | C    | D5/SPID2      |
| N11         | PB33A         | 4    | T    |               | PB33A         | 4    | T    |               |
| GND         | GND4          | 4    |      |               | GND4          | 4    |      |               |
| N12         | PB33B         | 4    | C    | D6/SPID1      | PB33B         | 4    | C    | D6/SPID1      |
| R12         | PB34A         | 4    |      |               | PB34A         | 4    |      |               |
| GND         | GND4          | 4    |      |               | GND4          | 4    |      |               |
| GND         | GND4          | 4    |      |               | GND4          | 4    |      |               |
| -           | -             | -    |      |               | GND4          | 4    |      |               |
| -           | -             | -    |      |               | GND4          | 4    |      |               |
| GND         | GND3          | 3    |      |               | GND3          | 3    |      |               |
| N13         | PR36B         | 3    | C    | VREF2_3       | PR44B         | 3    | C    | VREF2_3       |
| N14         | PR36A         | 3    | T    | VREF1_3       | PR44A         | 3    | T    | VREF1_3       |

## LFEC6P/EC6, LFEC6P/EC10, LFEC6P/EC15 Logic Signal Connections: 484 fpBGA (Cont.)

| LFEC6P/EC6  |               |      |      |               | LFEC6P/EC10 |               |      |      |               | LFEC6P/EC15 |               |      |      |               |
|-------------|---------------|------|------|---------------|-------------|---------------|------|------|---------------|-------------|---------------|------|------|---------------|
| Ball Number | Ball Function | Bank | LVDS | Dual Function | Ball Number | Ball Function | Bank | LVDS | Dual Function | Ball Number | Ball Function | Bank | LVDS | Dual Function |
| N13         | GND           | -    |      |               | N13         | GND           | -    |      |               | N13         | GND           | -    |      |               |
| N14         | GND           | -    |      |               | N14         | GND           | -    |      |               | N14         | GND           | -    |      |               |
| N9          | GND           | -    |      |               | N9          | GND           | -    |      |               | N9          | GND           | -    |      |               |
| P10         | GND           | -    |      |               | P10         | GND           | -    |      |               | P10         | GND           | -    |      |               |
| P11         | GND           | -    |      |               | P11         | GND           | -    |      |               | P11         | GND           | -    |      |               |
| P12         | GND           | -    |      |               | P12         | GND           | -    |      |               | P12         | GND           | -    |      |               |
| P13         | GND           | -    |      |               | P13         | GND           | -    |      |               | P13         | GND           | -    |      |               |
| P14         | GND           | -    |      |               | P14         | GND           | -    |      |               | P14         | GND           | -    |      |               |
| P9          | GND           | -    |      |               | P9          | GND           | -    |      |               | P9          | GND           | -    |      |               |
| R15         | GND           | -    |      |               | R15         | GND           | -    |      |               | R15         | GND           | -    |      |               |
| R8          | GND           | -    |      |               | R8          | GND           | -    |      |               | R8          | GND           | -    |      |               |
| J16         | VCC           | -    |      |               | J16         | VCC           | -    |      |               | J16         | VCC           | -    |      |               |
| J7          | VCC           | -    |      |               | J7          | VCC           | -    |      |               | J7          | VCC           | -    |      |               |
| K16         | VCC           | -    |      |               | K16         | VCC           | -    |      |               | K16         | VCC           | -    |      |               |
| K17         | VCC           | -    |      |               | K17         | VCC           | -    |      |               | K17         | VCC           | -    |      |               |
| K6          | VCC           | -    |      |               | K6          | VCC           | -    |      |               | K6          | VCC           | -    |      |               |
| K7          | VCC           | -    |      |               | K7          | VCC           | -    |      |               | K7          | VCC           | -    |      |               |
| L17         | VCC           | -    |      |               | L17         | VCC           | -    |      |               | L17         | VCC           | -    |      |               |
| L6          | VCC           | -    |      |               | L6          | VCC           | -    |      |               | L6          | VCC           | -    |      |               |
| M17         | VCC           | -    |      |               | M17         | VCC           | -    |      |               | M17         | VCC           | -    |      |               |
| M6          | VCC           | -    |      |               | M6          | VCC           | -    |      |               | M6          | VCC           | -    |      |               |
| N16         | VCC           | -    |      |               | N16         | VCC           | -    |      |               | N16         | VCC           | -    |      |               |
| N17         | VCC           | -    |      |               | N17         | VCC           | -    |      |               | N17         | VCC           | -    |      |               |
| N6          | VCC           | -    |      |               | N6          | VCC           | -    |      |               | N6          | VCC           | -    |      |               |
| N7          | VCC           | -    |      |               | N7          | VCC           | -    |      |               | N7          | VCC           | -    |      |               |
| P16         | VCC           | -    |      |               | P16         | VCC           | -    |      |               | P16         | VCC           | -    |      |               |
| P7          | VCC           | -    |      |               | P7          | VCC           | -    |      |               | P7          | VCC           | -    |      |               |
| G11         | VCCIO0        | 0    |      |               | G11         | VCCIO0        | 0    |      |               | G11         | VCCIO0        | 0    |      |               |
| H10         | VCCIO0        | 0    |      |               | H10         | VCCIO0        | 0    |      |               | H10         | VCCIO0        | 0    |      |               |
| H11         | VCCIO0        | 0    |      |               | H11         | VCCIO0        | 0    |      |               | H11         | VCCIO0        | 0    |      |               |
| H9          | VCCIO0        | 0    |      |               | H9          | VCCIO0        | 0    |      |               | H9          | VCCIO0        | 0    |      |               |
| G12         | VCCIO1        | 1    |      |               | G12         | VCCIO1        | 1    |      |               | G12         | VCCIO1        | 1    |      |               |
| H12         | VCCIO1        | 1    |      |               | H12         | VCCIO1        | 1    |      |               | H12         | VCCIO1        | 1    |      |               |
| H13         | VCCIO1        | 1    |      |               | H13         | VCCIO1        | 1    |      |               | H13         | VCCIO1        | 1    |      |               |
| H14         | VCCIO1        | 1    |      |               | H14         | VCCIO1        | 1    |      |               | H14         | VCCIO1        | 1    |      |               |
| J15         | VCCIO2        | 2    |      |               | J15         | VCCIO2        | 2    |      |               | J15         | VCCIO2        | 2    |      |               |
| K15         | VCCIO2        | 2    |      |               | K15         | VCCIO2        | 2    |      |               | K15         | VCCIO2        | 2    |      |               |
| L15         | VCCIO2        | 2    |      |               | L15         | VCCIO2        | 2    |      |               | L15         | VCCIO2        | 2    |      |               |
| L16         | VCCIO2        | 2    |      |               | L16         | VCCIO2        | 2    |      |               | L16         | VCCIO2        | 2    |      |               |
| M15         | VCCIO3        | 3    |      |               | M15         | VCCIO3        | 3    |      |               | M15         | VCCIO3        | 3    |      |               |
| M16         | VCCIO3        | 3    |      |               | M16         | VCCIO3        | 3    |      |               | M16         | VCCIO3        | 3    |      |               |
| N15         | VCCIO3        | 3    |      |               | N15         | VCCIO3        | 3    |      |               | N15         | VCCIO3        | 3    |      |               |
| P15         | VCCIO3        | 3    |      |               | P15         | VCCIO3        | 3    |      |               | P15         | VCCIO3        | 3    |      |               |
| R12         | VCCIO4        | 4    |      |               | R12         | VCCIO4        | 4    |      |               | R12         | VCCIO4        | 4    |      |               |
| R13         | VCCIO4        | 4    |      |               | R13         | VCCIO4        | 4    |      |               | R13         | VCCIO4        | 4    |      |               |
| R14         | VCCIO4        | 4    |      |               | R14         | VCCIO4        | 4    |      |               | R14         | VCCIO4        | 4    |      |               |
| T12         | VCCIO4        | 4    |      |               | T12         | VCCIO4        | 4    |      |               | T12         | VCCIO4        | 4    |      |               |
| R10         | VCCIO5        | 5    |      |               | R10         | VCCIO5        | 5    |      |               | R10         | VCCIO5        | 5    |      |               |
| R11         | VCCIO5        | 5    |      |               | R11         | VCCIO5        | 5    |      |               | R11         | VCCIO5        | 5    |      |               |
| R9          | VCCIO5        | 5    |      |               | R9          | VCCIO5        | 5    |      |               | R9          | VCCIO5        | 5    |      |               |

**LFEC20/EC20 and LFEC20/EC33 Logic Signal Connections: 484 fpBGA (Cont.)**

| LFEC20/LFEC20 |               |      |       |                | LFEC20/LFEC33 |               |      |       |                |
|---------------|---------------|------|-------|----------------|---------------|---------------|------|-------|----------------|
| Ball Number   | Ball Function | Bank | LVD S | Dual Function  | Ball Number   | Ball Function | Bank | LVD S | Dual Function  |
| K3            | PL21A         | 7    | T     |                | K3            | PL33A         | 7    | T     |                |
| K2            | PL21B         | 7    | C     |                | K2            | PL33B         | 7    | C     |                |
| J1            | PL22A         | 7    | T     | PCLKT7_0       | J1            | PL34A         | 7    | T     | PCLKT7_0       |
| GND           | GND7          | 7    |       |                | GND           | GND7          | 7    |       |                |
| K1            | PL22B         | 7    | C     | PCLKC7_0       | K1            | PL34B         | 7    | C     | PCLKC7_0       |
| L3            | XRES          | 6    |       |                | L3            | XRES          | 6    |       |                |
| L4            | PL24A         | 6    | T     |                | L4            | PL36A         | 6    | T     |                |
| L5            | PL24B         | 6    | C     |                | L5            | PL36B         | 6    | C     |                |
| L2            | PL25A         | 6    | T     |                | L2            | PL37A         | 6    | T     |                |
| L1            | PL25B         | 6    | C     |                | L1            | PL37B         | 6    | C     |                |
| M4            | PL26A         | 6    | T     |                | M4            | PL38A         | 6    | T     |                |
| M5            | PL26B         | 6    | C     |                | M5            | PL38B         | 6    | C     |                |
| M1            | PL27A         | 6    | T     |                | M1            | PL39A         | 6    | T     |                |
| GND           | GND6          | 6    |       |                | GND           | GND6          | 6    |       |                |
| M2            | PL27B         | 6    | C     |                | M2            | PL39B         | 6    | C     |                |
| N3            | PL28A         | 6    | T     | LDQS28         | N3            | PL40A         | 6    | T     | LDQS40         |
| M3            | PL28B         | 6    | C     |                | M3            | PL40B         | 6    | C     |                |
| N5            | PL29A         | 6    | T     |                | N5            | PL41A         | 6    | T     |                |
| N4            | PL29B         | 6    | C     |                | N4            | PL41B         | 6    | C     |                |
| N1            | PL30A         | 6    | T     |                | N1            | PL42A         | 6    | T     |                |
| N2            | PL30B         | 6    | C     |                | N2            | PL42B         | 6    | C     |                |
| P1            | PL31A         | 6    | T     |                | P1            | PL43A         | 6    | T     |                |
| GND           | GND6          | 6    |       |                | GND           | GND6          | 6    |       |                |
| P2            | PL31B         | 6    | C     |                | P2            | PL43B         | 6    | C     |                |
| R6            | PL32A         | 6    | T     |                | R6            | PL44A         | 6    | T     |                |
| P5            | PL32B         | 6    | C     |                | P5            | PL44B         | 6    | C     |                |
| P3            | PL33A         | 6    | T     |                | P3            | PL45A         | 6    | T     |                |
| P4            | PL33B         | 6    | C     |                | P4            | PL45B         | 6    | C     |                |
| R1            | PL34A         | 6    | T     |                | R1            | PL46A         | 6    | T     |                |
| R2            | PL34B         | 6    | C     |                | R2            | PL46B         | 6    | C     |                |
| R5            | PL35A         | 6    | T     |                | R5            | PL47A         | 6    | T     |                |
| GND           | GND6          | 6    |       |                | GND           | GND6          | 6    |       |                |
| R4            | PL35B         | 6    | C     |                | R4            | PL47B         | 6    | C     |                |
| T1            | PL36A         | 6    | T     | LDQS36         | T1            | PL48A         | 6    | T     | LDQS48         |
| T2            | PL36B         | 6    | C     |                | T2            | PL48B         | 6    | C     |                |
| R3            | PL37A         | 6    | T     |                | R3            | PL49A         | 6    | T     |                |
| T3            | PL37B         | 6    | C     |                | T3            | PL49B         | 6    | C     |                |
| GND           | GND6          | 6    |       |                | GND           | GND6          | 6    |       |                |
| T5            | TCK           | 6    |       |                | T5            | TCK           | 6    |       |                |
| U5            | TDI           | 6    |       |                | U5            | TDI           | 6    |       |                |
| T4            | TMS           | 6    |       |                | T4            | TMS           | 6    |       |                |
| U1            | TDO           | 6    |       |                | U1            | TDO           | 6    |       |                |
| U2            | VCCJ          | 6    |       |                | U2            | VCCJ          | 6    |       |                |
| V1            | PL41A         | 6    | T     | LLM0_PLLT_IN_A | V1            | PL53A         | 6    | T     | LLM0_PLLT_IN_A |

**LFEC20/EC20 and LFEC20/EC33 Logic Signal Connections: 484 fpBGA (Cont.)**

| LFEC20/LFEC20 |               |      |       |                | LFEC20/LFEC33 |               |      |       |                |
|---------------|---------------|------|-------|----------------|---------------|---------------|------|-------|----------------|
| Ball Number   | Ball Function | Bank | LVD S | Dual Function  | Ball Number   | Ball Function | Bank | LVD S | Dual Function  |
| W20           | PR48B         | 3    | C     | VREF2_3        | W20           | PR68B         | 3    | C     | VREF2_3        |
| Y20           | PR48A         | 3    | T     | VREF1_3        | Y20           | PR68A         | 3    | T     | VREF1_3        |
| GND           | -             | -    |       |                | GND           | GND3          | 3    |       |                |
| GND           | -             | -    |       |                | GND           | GND3          | 3    |       |                |
| AA21          | PR47B         | 3    | C     |                | AA21          | PR59B         | 3    | C     |                |
| AB21          | PR47A         | 3    | T     |                | AB21          | PR59A         | 3    | T     |                |
| W19           | PR46B         | 3    | C     |                | W19           | PR58B         | 3    | C     |                |
| V19           | PR46A         | 3    | T     |                | V19           | PR58A         | 3    | T     |                |
| Y21           | PR45B         | 3    | C     |                | Y21           | PR57B         | 3    | C     |                |
| AA22          | PR45A         | 3    | T     | RDQS45         | AA22          | PR57A         | 3    | T     | RDQS57         |
| V20           | PR44B         | 3    | C     | RLM0_PLLC_IN_A | V20           | PR56B         | 3    | C     | RLM0_PLLC_IN_A |
| GND           | GND3          | 3    |       |                | GND           | GND3          | 3    |       |                |
| U20           | PR44A         | 3    | T     | RLM0_PLLT_IN_A | U20           | PR56A         | 3    | T     | RLM0_PLLT_IN_A |
| W21           | PR43B         | 3    | C     | RLM0_PLLC_FB_A | W21           | PR55B         | 3    | C     | RLM0_PLLC_FB_A |
| Y22           | PR43A         | 3    | T     | RLM0_PLLT_FB_A | Y22           | PR55A         | 3    | T     | RLM0_PLLT_FB_A |
| V21           | PR42B         | 3    | C     | DI/CSSPIN      | V21           | PR54B         | 3    | C     | DI/CSSPIN      |
| W22           | PR42A         | 3    | T     | DOUT/CSON      | W22           | PR54A         | 3    | T     | DOUT/CSON      |
| U21           | PR41B         | 3    | C     | BUSY/SISPI     | U21           | PR53B         | 3    | C     | BUSY/SISPI     |
| V22           | PR41A         | 3    | T     | D7/SPID0       | V22           | PR53A         | 3    | T     | D7/SPID0       |
| T19           | CFG2          | 3    |       |                | T19           | CFG2          | 3    |       |                |
| U19           | CFG1          | 3    |       |                | U19           | CFG1          | 3    |       |                |
| U18           | CFG0          | 3    |       |                | U18           | CFG0          | 3    |       |                |
| V18           | PROGRAMN      | 3    |       |                | V18           | PROGRAMN      | 3    |       |                |
| T20           | CCLK          | 3    |       |                | T20           | CCLK          | 3    |       |                |
| T21           | INITN         | 3    |       |                | T21           | INITN         | 3    |       |                |
| R20           | DONE          | 3    |       |                | R20           | DONE          | 3    |       |                |
| GND           | GND3          | 3    |       |                | GND           | GND3          | 3    |       |                |
| T18           | PR37B         | 3    | C     |                | T18           | PR49B         | 3    | C     |                |
| R17           | PR37A         | 3    | T     |                | R17           | PR49A         | 3    | T     |                |
| R19           | PR36B         | 3    | C     |                | R19           | PR48B         | 3    | C     |                |
| R18           | PR36A         | 3    | T     | RDQS36         | R18           | PR48A         | 3    | T     | RDQS48         |
| U22           | PR35B         | 3    | C     |                | U22           | PR47B         | 3    | C     |                |
| GND           | GND3          | 3    |       |                | GND           | GND3          | 3    |       |                |
| T22           | PR35A         | 3    | T     |                | T22           | PR47A         | 3    | T     |                |
| R21           | PR34B         | 3    | C     |                | R21           | PR46B         | 3    | C     |                |
| R22           | PR34A         | 3    | T     |                | R22           | PR46A         | 3    | T     |                |
| P20           | PR33B         | 3    | C     |                | P20           | PR45B         | 3    | C     |                |
| N20           | PR33A         | 3    | T     |                | N20           | PR45A         | 3    | T     |                |
| P19           | PR32B         | 3    | C     |                | P19           | PR44B         | 3    | C     |                |
| P18           | PR32A         | 3    | T     |                | P18           | PR44A         | 3    | T     |                |
| P21           | PR31B         | 3    | C     |                | P21           | PR43B         | 3    | C     |                |
| GND           | GND3          | 3    |       |                | GND           | GND3          | 3    |       |                |
| P22           | PR31A         | 3    | T     |                | P22           | PR43A         | 3    | T     |                |
| N21           | PR30B         | 3    | C     |                | N21           | PR42B         | 3    | C     |                |

**LFECP/EC20, LFECP/EC33 Logic Signal Connections: 672 fpBGA (Cont.)**

| LFEC20/LFEC20 |               |      |      |               | LFECP/EC33  |               |      |      |               |
|---------------|---------------|------|------|---------------|-------------|---------------|------|------|---------------|
| Ball Number   | Ball Function | Bank | LVDS | Dual Function | Ball Number | Ball Function | Bank | LVDS | Dual Function |
| K6            | PL13B         | 7    | C    |               | K6          | PL25B         | 7    | C    |               |
| F1            | PL14A         | 7    | T    |               | F1          | PL26A         | 7    | T    |               |
| GND           | GND7          | 7    |      |               | GND         | GND7          | 7    |      |               |
| G1            | PL14B         | 7    | C    |               | G1          | PL26B         | 7    | C    |               |
| H1            | PL15A         | 7    | T    |               | H1          | PL27A         | 7    | T    |               |
| J1            | PL15B         | 7    | C    |               | J1          | PL27B         | 7    | C    |               |
| K2            | PL16A         | 7    | T    |               | K2          | PL28A         | 7    | T    |               |
| K1            | PL16B         | 7    | C    |               | K1          | PL28B         | 7    | C    |               |
| K3            | PL17A         | 7    | T    |               | K3          | PL29A         | 7    | T    |               |
| L3            | PL17B         | 7    | C    |               | L3          | PL29B         | 7    | C    |               |
| L2            | PL18A         | 7    | T    |               | L2          | PL30A         | 7    | T    |               |
| GND           | GND7          | 7    |      |               | GND         | GND7          | 7    |      |               |
| L1            | PL18B         | 7    | C    |               | L1          | PL30B         | 7    | C    |               |
| M3            | PL19A         | 7    | T    | LDQS19        | M3          | PL31A         | 7    | T    | LDQS31        |
| M4            | PL19B         | 7    | C    |               | M4          | PL31B         | 7    | C    |               |
| M1            | PL20A         | 7    | T    |               | M1          | PL32A         | 7    | T    |               |
| M2            | PL20B         | 7    | C    |               | M2          | PL32B         | 7    | C    |               |
| L4            | PL21A         | 7    | T    |               | L4          | PL33A         | 7    | T    |               |
| L5            | PL21B         | 7    | C    |               | L5          | PL33B         | 7    | C    |               |
| N2            | PL22A         | 7    | T    | PCLKT7_0      | N2          | PL34A         | 7    | T    | PCLKT7_0      |
| GND           | GND7          | 7    |      |               | GND         | GND7          | 7    |      |               |
| N1            | PL22B         | 7    | C    | PCLKC7_0      | N1          | PL34B         | 7    | C    | PCLKC7_0      |
| N3            | XRES          | 6    |      |               | N3          | XRES          | 6    |      |               |
| P1            | PL24A         | 6    | T    |               | P1          | PL36A         | 6    | T    |               |
| P2            | PL24B         | 6    | C    |               | P2          | PL36B         | 6    | C    |               |
| L7            | PL25A         | 6    | T    |               | L7          | PL37A         | 6    | T    |               |
| L6            | PL25B         | 6    | C    |               | L6          | PL37B         | 6    | C    |               |
| N4            | PL26A         | 6    | T    |               | N4          | PL38A         | 6    | T    |               |
| N5            | PL26B         | 6    | C    |               | N5          | PL38B         | 6    | C    |               |
| R1            | PL27A         | 6    | T    |               | R1          | PL39A         | 6    | T    |               |
| GND           | GND6          | 6    |      |               | GND         | GND6          | 6    |      |               |
| R2            | PL27B         | 6    | C    |               | R2          | PL39B         | 6    | C    |               |
| P4            | PL28A         | 6    | T    | LDQS28        | P4          | PL40A         | 6    | T    | LDQS40        |
| P3            | PL28B         | 6    | C    |               | P3          | PL40B         | 6    | C    |               |
| M5            | PL29A         | 6    | T    |               | M5          | PL41A         | 6    | T    |               |
| M6            | PL29B         | 6    | C    |               | M6          | PL41B         | 6    | C    |               |
| T1            | PL30A         | 6    | T    |               | T1          | PL42A         | 6    | T    |               |
| T2            | PL30B         | 6    | C    |               | T2          | PL42B         | 6    | C    |               |
| R4            | PL31A         | 6    | T    |               | R4          | PL43A         | 6    | T    |               |
| GND           | GND6          | 6    |      |               | GND         | GND6          | 6    |      |               |
| R3            | PL31B         | 6    | C    |               | R3          | PL43B         | 6    | C    |               |
| N6            | PL32A         | 6    | T    |               | N6          | PL44A         | 6    | T    |               |



**LFECP/EC20, LFECP/EC33 Logic Signal Connections: 672 fpBGA (Cont.)**

| LFEC20/LFECP20 |               |      |      |               | LFECP/EC33  |               |      |      |               |
|----------------|---------------|------|------|---------------|-------------|---------------|------|------|---------------|
| Ball Number    | Ball Function | Bank | LVDS | Dual Function | Ball Number | Ball Function | Bank | LVDS | Dual Function |
| AF22           | PB51A         | 4    | T    |               | AF22        | PB51A         | 4    | T    |               |
| AB17           | PB51B         | 4    | C    |               | AB17        | PB51B         | 4    | C    |               |
| AE22           | PB52A         | 4    | T    |               | AE22        | PB52A         | 4    | T    |               |
| AA18           | PB52B         | 4    | C    |               | AA18        | PB52B         | 4    | C    |               |
| AE19           | PB53A         | 4    | T    |               | AE19        | PB53A         | 4    | T    |               |
| GND            | GND4          | 4    |      |               | GND         | GND4          | 4    |      |               |
| AE20           | PB53B         | 4    | C    |               | AE20        | PB53B         | 4    | C    |               |
| AA19           | PB54A         | 4    | T    | BDQS54        | AA19        | PB54A         | 4    | T    | BDQS54        |
| Y18            | PB54B         | 4    | C    |               | Y18         | PB54B         | 4    | C    |               |
| AF23           | PB55A         | 4    | T    |               | AF23        | PB55A         | 4    | T    |               |
| AA20           | PB55B         | 4    | C    |               | AA20        | PB55B         | 4    | C    |               |
| AC18           | PB56A         | 4    | T    |               | AC18        | PB56A         | 4    | T    |               |
| AB18           | PB56B         | 4    | C    |               | AB18        | PB56B         | 4    | C    |               |
| AF24           | PB57A         | 4    | T    |               | AF24        | PB57A         | 4    | T    |               |
| -              | -             | -    |      |               | GND         | GND4          | 4    |      |               |
| AE23           | PB57B         | 4    | C    |               | AE23        | PB57B         | 4    | C    |               |
| AD19           | NC            | -    |      |               | AD19        | PB58A         | 4    | T    |               |
| AD20           | NC            | -    |      |               | AD20        | PB58B         | 4    | C    |               |
| AC19           | NC            | -    |      |               | AC19        | PB59A         | 4    | T    |               |
| AB19           | NC            | -    |      |               | AB19        | PB59B         | 4    | C    |               |
| AD21           | NC            | -    |      |               | AD21        | PB60A         | 4    | T    |               |
| AC20           | NC            | -    |      |               | AC20        | PB60B         | 4    | C    |               |
| AF25           | NC            | -    |      |               | AF25        | PB61A         | 4    | T    |               |
| -              | -             | -    |      |               | GND         | GND4          | 4    |      |               |
| AE25           | NC            | -    |      |               | AE25        | PB61B         | 4    | C    |               |
| AB21           | NC            | -    |      |               | AB21        | PB62A         | 4    | T    | BDQS62        |
| AB20           | NC            | -    |      |               | AB20        | PB62B         | 4    | C    |               |
| AE24           | NC            | -    |      |               | AE24        | PB63A         | 4    | T    |               |
| AD23           | NC            | -    |      |               | AD23        | PB63B         | 4    | C    |               |
| AD22           | NC            | -    |      |               | AD22        | PB64A         | 4    | T    |               |
| AC21           | NC            | -    |      |               | AC21        | PB64B         | 4    | C    |               |
| AC22           | NC            | -    |      |               | AC22        | PB65A         | 4    | T    |               |
| AB22           | NC            | -    |      |               | AB22        | PB65B         | 4    | C    |               |
| GND            | GND4          | 4    |      |               | GND         | GND4          | 4    |      |               |
| GND            | GND3          | 3    |      |               | GND         | GND3          | 3    |      |               |
| AC23           | PR48B         | 3    | C    | VREF2_3       | AC23        | PR68B         | 3    | C    | VREF2_3       |
| AC24           | PR48A         | 3    | T    | VREF1_3       | AC24        | PR68A         | 3    | T    | VREF1_3       |
| AD24           | NC            | -    |      |               | AD24        | PR67B         | 3    | C    |               |
| AD25           | NC            | -    |      |               | AD25        | PR67A         | 3    | T    |               |
| AE26           | NC            | -    |      |               | AE26        | PR66B         | 3    | C    |               |
| AD26           | NC            | -    |      |               | AD26        | PR66A         | 3    | T    |               |
| Y20            | NC            | -    |      |               | Y20         | PR65B         | 3    | C    |               |

**LFECP/EC20, LFECP/EC33 Logic Signal Connections: 672 fpBGA (Cont.)**

| LFEC20/LFECP20 |               |      |      |                | LFECP/EC33  |               |      |      |                |
|----------------|---------------|------|------|----------------|-------------|---------------|------|------|----------------|
| Ball Number    | Ball Function | Bank | LVDS | Dual Function  | Ball Number | Ball Function | Bank | LVDS | Dual Function  |
| Y19            | NC            | -    |      |                | Y19         | PR65A         | 3    | T    | RDQS65         |
| AA23           | NC            | -    |      |                | AA23        | PR64B         | 3    | C    |                |
| -              | -             | -    |      |                | GND         | GND3          | 3    |      |                |
| AA22           | NC            | -    |      |                | AA22        | PR64A         | 3    | T    |                |
| AB23           | NC            | -    |      |                | AB23        | PR63B         | 3    | C    |                |
| AB24           | NC            | -    |      |                | AB24        | PR63A         | 3    | T    |                |
| Y21            | NC            | -    |      |                | Y21         | PR62B         | 3    | C    |                |
| AA21           | NC            | -    |      |                | AA21        | PR62A         | 3    | T    |                |
| Y23            | NC            | -    |      |                | Y23         | PR61B         | 3    | C    |                |
| Y22            | NC            | -    |      |                | Y22         | PR61A         | 3    | T    |                |
| AA24           | NC            | -    |      |                | AA24        | PR60B         | 3    | C    |                |
| -              | -             | -    |      |                | GND         | GND3          | 3    |      |                |
| Y24            | NC            | -    |      |                | Y24         | PR60A         | 3    | T    |                |
| AC25           | PR47B         | 3    | C    |                | AC25        | PR59B         | 3    | C    |                |
| AC26           | PR47A         | 3    | T    |                | AC26        | PR59A         | 3    | T    |                |
| AB25           | PR46B         | 3    | C    |                | AB25        | PR58B         | 3    | C    |                |
| AA25           | PR46A         | 3    | T    |                | AA25        | PR58A         | 3    | T    |                |
| AB26           | PR45B         | 3    | C    |                | AB26        | PR57B         | 3    | C    |                |
| AA26           | PR45A         | 3    | T    | RDQS45         | AA26        | PR57A         | 3    | T    | RDQS57         |
| W23            | PR44B         | 3    | C    | RLM0_PLLC_IN_A | W23         | PR56B         | 3    | C    | RLM0_PLLC_IN_A |
| GND            | GND3          | 3    |      |                | GND         | GND3          | 3    |      |                |
| W24            | PR44A         | 3    | T    | RLM0_PLLT_IN_A | W24         | PR56A         | 3    | T    | RLM0_PLLT_IN_A |
| W22            | PR43B         | 3    | C    | RLM0_PLLC_FB_A | W22         | PR55B         | 3    | C    | RLM0_PLLC_FB_A |
| W21            | PR43A         | 3    | T    | RLM0_PLLT_FB_A | W21         | PR55A         | 3    | T    | RLM0_PLLT_FB_A |
| Y25            | PR42B         | 3    | C    | DI/CSSPIN      | Y25         | PR54B         | 3    | C    | DI/CSSPIN      |
| Y26            | PR42A         | 3    | T    | DOUT/CSON      | Y26         | PR54A         | 3    | T    | DOUT/CSON      |
| W25            | PR41B         | 3    | C    | BUSY/SISPI     | W25         | PR53B         | 3    | C    | BUSY/SISPI     |
| W26            | PR41A         | 3    | T    | D7/SPID0       | W26         | PR53A         | 3    | T    | D7/SPID0       |
| V24            | CFG2          | 3    |      |                | V24         | CFG2          | 3    |      |                |
| V21            | CFG1          | 3    |      |                | V21         | CFG1          | 3    |      |                |
| V23            | CFG0          | 3    |      |                | V23         | CFG0          | 3    |      |                |
| V22            | PROGRAMN      | 3    |      |                | V22         | PROGRAMN      | 3    |      |                |
| V20            | CCLK          | 3    |      |                | V20         | CCLK          | 3    |      |                |
| V25            | INITN         | 3    |      |                | V25         | INITN         | 3    |      |                |
| U20            | DONE          | 3    |      |                | U20         | DONE          | 3    |      |                |
| V26            | PR39B         | 3    | C    |                | V26         | PR51B         | 3    | C    |                |
| GND            | GND3          | 3    |      |                | GND         | GND3          | 3    |      |                |
| U26            | PR39A         | 3    | T    |                | U26         | PR51A         | 3    | T    |                |
| U24            | PR38B         | 3    | C    |                | U24         | PR50B         | 3    | C    |                |
| U25            | PR38A         | 3    | T    |                | U25         | PR50A         | 3    | T    |                |
| U23            | PR37B         | 3    | C    |                | U23         | PR49B         | 3    | C    |                |
| U22            | PR37A         | 3    | T    |                | U22         | PR49A         | 3    | T    |                |

**LFECP/EC20, LFECP/EC33 Logic Signal Connections: 672 fpBGA (Cont.)**

| LFEC20/LFEC20 |               |      |      |               | LFECP/EC33  |               |      |      |               |
|---------------|---------------|------|------|---------------|-------------|---------------|------|------|---------------|
| Ball Number   | Ball Function | Bank | LVDS | Dual Function | Ball Number | Ball Function | Bank | LVDS | Dual Function |
| D13           | PT32B         | 0    | C    | VREF1_0       | D13         | PT32B         | 0    | C    | VREF1_0       |
| C13           | PT32A         | 0    | T    | VREF2_0       | C13         | PT32A         | 0    | T    | VREF2_0       |
| A13           | PT31B         | 0    | C    |               | A13         | PT31B         | 0    | C    |               |
| B13           | PT31A         | 0    | T    |               | B13         | PT31A         | 0    | T    |               |
| F13           | PT30B         | 0    | C    |               | F13         | PT30B         | 0    | C    |               |
| F12           | PT30A         | 0    | T    | TDQS30        | F12         | PT30A         | 0    | T    | TDQS30        |
| A12           | PT29B         | 0    | C    |               | A12         | PT29B         | 0    | C    |               |
| GND           | GND0          | 0    |      |               | GND         | GND0          | 0    |      |               |
| B12           | PT29A         | 0    | T    |               | B12         | PT29A         | 0    | T    |               |
| A11           | PT28B         | 0    | C    |               | A11         | PT28B         | 0    | C    |               |
| B11           | PT28A         | 0    | T    |               | B11         | PT28A         | 0    | T    |               |
| D12           | PT27B         | 0    | C    |               | D12         | PT27B         | 0    | C    |               |
| C12           | PT27A         | 0    | T    |               | C12         | PT27A         | 0    | T    |               |
| B10           | PT26B         | 0    | C    |               | B10         | PT26B         | 0    | C    |               |
| A10           | PT26A         | 0    | T    |               | A10         | PT26A         | 0    | T    |               |
| G12           | PT25B         | 0    | C    |               | G12         | PT25B         | 0    | C    |               |
| GND           | GND0          | 0    |      |               | GND         | GND0          | 0    |      |               |
| A9            | PT25A         | 0    | T    |               | A9          | PT25A         | 0    | T    |               |
| E12           | PT24B         | 0    | C    |               | E12         | PT24B         | 0    | C    |               |
| B9            | PT24A         | 0    | T    |               | B9          | PT24A         | 0    | T    |               |
| F11           | PT23B         | 0    | C    |               | F11         | PT23B         | 0    | C    |               |
| A8            | PT23A         | 0    | T    |               | A8          | PT23A         | 0    | T    |               |
| D11           | PT22B         | 0    | C    |               | D11         | PT22B         | 0    | C    |               |
| C11           | PT22A         | 0    | T    | TDQS22        | C11         | PT22A         | 0    | T    | TDQS22        |
| B8            | PT21B         | 0    | C    |               | B8          | PT21B         | 0    | C    |               |
| GND           | GND0          | 0    |      |               | GND         | GND0          | 0    |      |               |
| B7            | PT21A         | 0    | T    |               | B7          | PT21A         | 0    | T    |               |
| E11           | PT20B         | 0    | C    |               | E11         | PT20B         | 0    | C    |               |
| A7            | PT20A         | 0    | T    |               | A7          | PT20A         | 0    | T    |               |
| G11           | PT19B         | 0    | C    |               | G11         | PT19B         | 0    | C    |               |
| C7            | PT19A         | 0    | T    |               | C7          | PT19A         | 0    | T    |               |
| G10           | PT18B         | 0    | C    |               | G10         | PT18B         | 0    | C    |               |
| C6            | PT18A         | 0    | T    |               | C6          | PT18A         | 0    | T    |               |
| C10           | PT17B         | 0    | C    |               | C10         | PT17B         | 0    | C    |               |
| GND           | GND0          | 0    |      |               | GND         | GND0          | 0    |      |               |
| D10           | PT17A         | 0    | T    |               | D10         | PT17A         | 0    | T    |               |
| F10           | PT16B         | 0    | C    |               | F10         | PT16B         | 0    | C    |               |
| A6            | PT16A         | 0    | T    |               | A6          | PT16A         | 0    | T    |               |
| E10           | PT15B         | 0    | C    |               | E10         | PT15B         | 0    | C    |               |
| C9            | PT15A         | 0    | T    |               | C9          | PT15A         | 0    | T    |               |
| G9            | PT14B         | 0    | C    |               | G9          | PT14B         | 0    | C    |               |
| D9            | PT14A         | 0    | T    | TDQS14        | D9          | PT14A         | 0    | T    | TDQS14        |

**LatticeECP Commercial**

| Part Number    | I/Os | Grade | Package | Pins | Temp. | LUTs |
|----------------|------|-------|---------|------|-------|------|
| LFCEP6E-3F484C | 224  | -3    | fpBGA   | 484  | COM   | 6.1K |
| LFCEP6E-4F484C | 224  | -4    | fpBGA   | 484  | COM   | 6.1K |
| LFCEP6E-5F484C | 224  | -5    | fpBGA   | 484  | COM   | 6.1K |
| LFCEP6E-3F256C | 195  | -3    | fpBGA   | 256  | COM   | 6.1K |
| LFCEP6E-4F256C | 195  | -4    | fpBGA   | 256  | COM   | 6.1K |
| LFCEP6E-5F256C | 195  | -5    | fpBGA   | 256  | COM   | 6.1K |
| LFCEP6E-3Q208C | 147  | -3    | PQFP    | 208  | COM   | 6.1K |
| LFCEP6E-4Q208C | 147  | -4    | PQFP    | 208  | COM   | 6.1K |
| LFCEP6E-5Q208C | 147  | -5    | PQFP    | 208  | COM   | 6.1K |
| LFCEP6E-3T144C | 97   | -3    | TQFP    | 144  | COM   | 6.1K |
| LFCEP6E-4T144C | 97   | -4    | TQFP    | 144  | COM   | 6.1K |
| LFCEP6E-5T144C | 97   | -5    | TQFP    | 144  | COM   | 6.1K |

| Part Number     | I/Os | Grade | Package | Pins | Temp. | LUTs  |
|-----------------|------|-------|---------|------|-------|-------|
| LFCEP10E-3F484C | 288  | -3    | fpBGA   | 484  | COM   | 10.2K |
| LFCEP10E-4F484C | 288  | -4    | fpBGA   | 484  | COM   | 10.2K |
| LFCEP10E-5F484C | 288  | -5    | fpBGA   | 484  | COM   | 10.2K |
| LFCEP10E-3F256C | 195  | -3    | fpBGA   | 256  | COM   | 10.2K |
| LFCEP10E-4F256C | 195  | -4    | fpBGA   | 256  | COM   | 10.2K |
| LFCEP10E-5F256C | 195  | -5    | fpBGA   | 256  | COM   | 10.2K |
| LFCEP10E-3Q208C | 147  | -3    | PQFP    | 208  | COM   | 10.2K |
| LFCEP10E-4Q208C | 147  | -4    | PQFP    | 208  | COM   | 10.2K |
| LFCEP10E-5Q208C | 147  | -5    | PQFP    | 208  | COM   | 10.2K |

| Part Number     | I/Os | Grade | Package | Pins | Temp. | LUTs  |
|-----------------|------|-------|---------|------|-------|-------|
| LFCEP15E-3F484C | 352  | -3    | fpBGA   | 484  | COM   | 15.3K |
| LFCEP15E-4F484C | 352  | -4    | fpBGA   | 484  | COM   | 15.3K |
| LFCEP15E-5F484C | 352  | -5    | fpBGA   | 484  | COM   | 15.3K |
| LFCEP15E-3F256C | 195  | -3    | fpBGA   | 256  | COM   | 15.3K |
| LFCEP15E-4F256C | 195  | -4    | fpBGA   | 256  | COM   | 15.3K |
| LFCEP15E-5F256C | 195  | -5    | fpBGA   | 256  | COM   | 15.3K |

| Part Number     | I/Os | Grade | Package | Pins | Temp. | LUTs  |
|-----------------|------|-------|---------|------|-------|-------|
| LFCEP20E-3F672C | 400  | -3    | fpBGA   | 672  | COM   | 19.7K |
| LFCEP20E-4F672C | 400  | -4    | fpBGA   | 672  | COM   | 19.7K |
| LFCEP20E-5F672C | 400  | -5    | fpBGA   | 672  | COM   | 19.7K |
| LFCEP20E-3F484C | 360  | -3    | fpBGA   | 484  | COM   | 19.7K |
| LFCEP20E-4F484C | 360  | -4    | fpBGA   | 484  | COM   | 19.7K |
| LFCEP20E-5F484C | 360  | -5    | fpBGA   | 484  | COM   | 19.7K |

| Part Number     | I/Os | Grade | Package | Pins | Temp. | LUTs  |
|-----------------|------|-------|---------|------|-------|-------|
| LFCEP33E-3F672C | 496  | -3    | fpBGA   | 672  | COM   | 32.8K |
| LFCEP33E-4F672C | 496  | -4    | fpBGA   | 672  | COM   | 32.8K |
| LFCEP33E-5F672C | 496  | -5    | fpBGA   | 672  | COM   | 32.8K |

**LatticeECP Commercial (Continued)**

| Part Number     | I/Os | Grade | Package | Pins | Temp. | LUTs  |
|-----------------|------|-------|---------|------|-------|-------|
| LFECP33E-3F484C | 360  | -3    | fpBGA   | 484  | COM   | 32.8K |
| LFECP33E-4F484C | 360  | -4    | fpBGA   | 484  | COM   | 32.8K |
| LFECP33E-5F484C | 360  | -5    | fpBGA   | 484  | COM   | 32.8K |

**LatticeEC Industrial**

| Part Number   | I/Os | Grade | Package | Pins | Temp. | LUTs |
|---------------|------|-------|---------|------|-------|------|
| LFEC1E-3Q208I | 112  | -3    | PQFP    | 208  | IND   | 1.5K |
| LFEC1E-4Q208I | 112  | -4    | PQFP    | 208  | IND   | 1.5K |
| LFEC1E-3T144I | 97   | -3    | TQFP    | 144  | IND   | 1.5K |
| LFEC1E-4T144I | 97   | -4    | TQFP    | 144  | IND   | 1.5K |
| LFEC1E-3T100I | 67   | -3    | TQFP    | 100  | IND   | 1.5K |
| LFEC1E-4T100I | 67   | -4    | TQFP    | 100  | IND   | 1.5K |

| Part Number   | I/Os | Grade | Package | Pins | Temp. | LUTs |
|---------------|------|-------|---------|------|-------|------|
| LFEC3E-3F256I | 160  | -3    | fpBGA   | 256  | IND   | 3.1K |
| LFEC3E-4F256I | 160  | -4    | fpBGA   | 256  | IND   | 3.1K |
| LFEC3E-3Q208I | 145  | -3    | PQFP    | 208  | IND   | 3.1K |
| LFEC3E-4Q208I | 145  | -4    | PQFP    | 208  | IND   | 3.1K |
| LFEC3E-3T144I | 97   | -3    | TQFP    | 144  | IND   | 3.1K |
| LFEC3E-4T144I | 97   | -4    | TQFP    | 144  | IND   | 3.1K |
| LFEC3E-3T100I | 67   | -3    | TQFP    | 100  | IND   | 3.1K |
| LFEC3E-4T100I | 67   | -4    | TQFP    | 100  | IND   | 3.1K |

| Part Number   | I/Os | Grade | Package | Pins | Temp. | LUTs |
|---------------|------|-------|---------|------|-------|------|
| LFEC6E-3F484I | 224  | -3    | fpBGA   | 484  | IND   | 6.1K |
| LFEC6E-4F484I | 224  | -4    | fpBGA   | 484  | IND   | 6.1K |
| LFEC6E-3F256I | 195  | -3    | fpBGA   | 256  | IND   | 6.1K |
| LFEC6E-4F256I | 195  | -4    | fpBGA   | 256  | IND   | 6.1K |
| LFEC6E-3Q208I | 147  | -3    | PQFP    | 208  | IND   | 6.1K |
| LFEC6E-4Q208I | 147  | -4    | PQFP    | 208  | IND   | 6.1K |
| LFEC6E-3T144I | 97   | -3    | TQFP    | 144  | IND   | 6.1K |
| LFEC6E-4T144I | 97   | -4    | TQFP    | 144  | IND   | 6.1K |

| Part Number     | I/Os | Grade | Package | Pins | Temp. | LUTs  |
|-----------------|------|-------|---------|------|-------|-------|
| LFEC10E-3F484I  | 288  | -3    | fpBGA   | 484  | IND   | 10.2K |
| LFEC10E-4F484I  | 288  | -4    | fpBGA   | 484  | IND   | 10.2K |
| LFEC10E-3F256I  | 195  | -3    | fpBGA   | 256  | IND   | 10.2K |
| LFEC10E-4F256I  | 195  | -4    | fpBGA   | 256  | IND   | 10.2K |
| LFEC10E-3 P208I | 147  | -3    | PQFP    | 208  | IND   | 10.2K |
| LFEC10E-4 P208I | 147  | -4    | PQFP    | 208  | IND   | 10.2K |