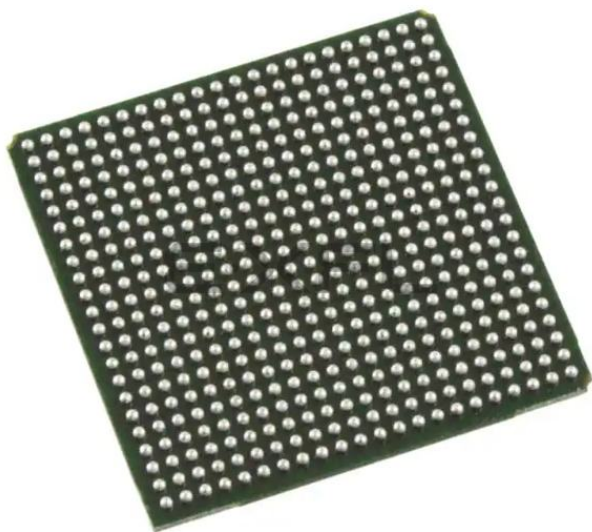




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### Understanding [Embedded - FPGAs \(Field Programmable Gate Array\)](#)

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            | 2625                                                                                                                                                                |
| Number of Logic Elements/Cells | 21000                                                                                                                                                               |
| Total RAM Bits                 | 282624                                                                                                                                                              |
| Number of I/O                  | 331                                                                                                                                                                 |
| 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/lfe2-20e-6f484i">https://www.e-xfl.com/product-detail/lattice-semiconductor/lfe2-20e-6f484i</a> |

## Architecture Overview

Each LatticeECP2/M device contains an array of logic blocks surrounded by Programmable I/O Cells (PIC). Interspersed between the rows of logic blocks are rows of sysMEM™ Embedded Block RAM (EBR) and rows of sys-DSP™ Digital Signal Processing blocks, as shown in Figure 2-1. In addition, the LatticeECP2M family contains SERDES Quads in one or more of the corners. Figure 2-2 shows the block diagram of ECP2M20 with one quad.

There are two kinds of logic blocks, the Programmable Functional Unit (PFU) and Programmable Functional Unit without RAM (PFF). The PFU contains the building blocks for logic, arithmetic, RAM and ROM functions. The PFF block contains building blocks for logic, arithmetic and ROM functions. Both PFU and PFF blocks are optimized for flexibility, allowing complex designs to be implemented quickly and efficiently. Logic Blocks are arranged in a two-dimensional array. Only one type of block is used per row.

The LatticeECP2/M devices contain one or more rows of sysMEM EBR blocks. sysMEM EBRs are large dedicated 18K fast memory blocks. Each sysMEM block can be configured in a variety of depths and widths of RAM or ROM. In addition, LatticeECP2/M devices contain up to two rows of DSP Blocks. Each DSP block has multipliers and adder/accumulators, which are the building blocks for complex signal processing capabilities.

The LatticeECP2M devices feature up to 16 embedded 3.125Gbps SERDES (Serializer / Deserializer) channels. Each SERDES channel contains independent 8b/10b encoding / decoding, polarity adjust and elastic buffer logic. Each group of four SERDES channels along with its Physical Coding Sub-layer (PCS) block, creates a quad. The functionality of the SERDES/PCS Quads can be controlled by memory cells set during device configuration or by registers that are addressable during device operation. The registers in every quad can be programmed by a soft IP interface, referred to as the SERDES Client Interface (SCI). These quads (up to four) are located at the corners of the devices.

Each PIC block encompasses two PIOs (PIO pairs) with their respective sysI/O buffers. The sysI/O buffers of the LatticeECP2/M devices are arranged in eight banks, allowing the implementation of a wide variety of I/O standards. In addition, a separate I/O bank is provided for the programming interfaces. PIO pairs on the left and right edges of the device can be configured as LVDS transmit/receive pairs. The PIC logic also includes pre-engineered support to aid in the implementation of high speed source synchronous standards such as SPI4.2, along with memory interfaces including DDR2.

The LatticeECP2/M registers in PFU and sysI/O can be configured to be SET or RESET. After power up and the device is configured, it enters into user mode with these registers SET/RESET according to the configuration setting, allowing the device entering to a known state for predictable system function.

Other blocks provided include PLLs, DLLs and configuration functions. The LatticeECP2/M architecture provides two General PLLs (GPLL) and up to six Standard PLLs (SPLL) per device. In addition, each LatticeECP2/M family member provides two DLLs per device. The GPLLs and DLLs blocks are located in pairs at the end of the bottom-most EBR row; the DLL block is located towards the edge of the device. The SPLL blocks are located at the end of the other EBR/DSP rows.

The configuration block that supports features such as configuration bit-stream decryption, transparent updates and dual boot support is located toward the center of this EBR row. The Ball Grid Array (BGA) package devices in the LatticeECP2/M family supports a sysCONFIG™ port located in the corner between banks four and five, which allows for serial or parallel device configuration.

In addition, every device in the family has a JTAG port. This family also provides an on-chip oscillator. The LatticeECP2/M devices use 1.2V as their core voltage.

one clock is selected for each input register, pipeline register and output register. Similarly Clock enable (CE) and Reset (RST) are selected from their four respective sources (CE0, CE1, CE2, CE3 and RST0, RST1, RST2, RST3) at each input register, pipeline register and output register.

### Signed and Unsigned with Different Widths

The DSP block supports different widths of signed and unsigned multipliers besides x9, x18 and x36 widths. For unsigned operands, unused upper data bits should be filled to create a valid x9, x18 or x36 operand. For signed two's complement operands, sign extension of the most significant bit should be performed until x9, x18 or x36 width is reached. Table 2-8 provides an example of this.

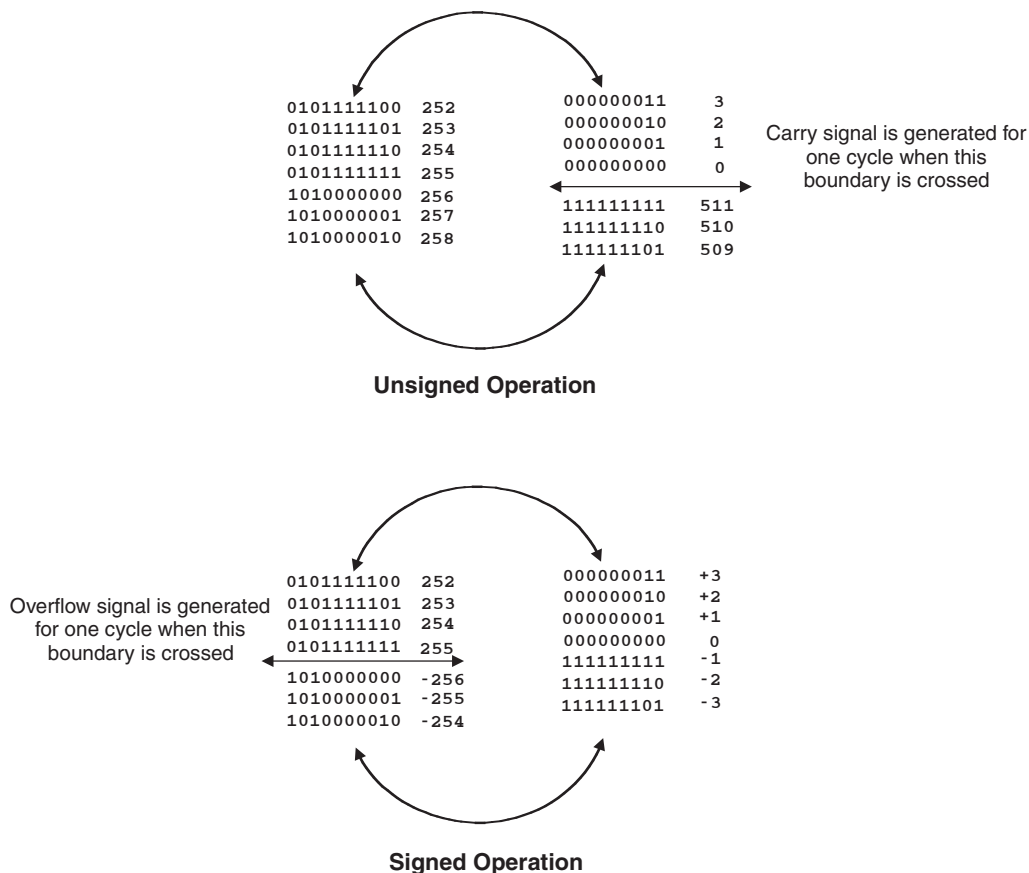
**Table 2-8. Sign Extension Example**

| Number | Unsigned | Unsigned 9-bit | Unsigned 18-bit     | Signed | Two's Complement Signed 9 Bits | Two's Complement Signed 18 Bits |
|--------|----------|----------------|---------------------|--------|--------------------------------|---------------------------------|
| +5     | 0101     | 000000101      | 0000000000000000101 | 0101   | 000000101                      | 0000000000000000101             |
| -6     | N/A      | N/A            | N/A                 | 1010   | 111111010                      | 1111111111111111010             |

### OVERFLOW Flag from MAC

The sysDSP block provides an overflow output to indicate that the accumulator has overflowed. When two unsigned numbers are added and the result is a smaller number than the accumulator, “roll-over” is said to have occurred and an overflow signal is indicated. When two positive numbers are added with a negative sum and when two negative numbers are added with a positive sum, then the accumulator “roll-over” is said to have occurred and an overflow signal is indicated. Note that when overflow occurs the overflow flag is present for only one cycle. By counting these overflow pulses in FPGA logic, larger accumulators can be constructed. The conditions overflow signals for signed and unsigned operands are listed in Figure 2-27.

**Figure 2-27. Accumulator Overflow/Underflow**



**LatticeECP2 Initialization Supply Current<sup>1, 2, 3, 4</sup>**
**Over Recommended Operating Conditions**

| Symbol       | Parameter                            | Device                 | Typ. <sup>5, 6, 7</sup> | Units |
|--------------|--------------------------------------|------------------------|-------------------------|-------|
| $I_{CC}$     | Core Power Supply Current            | ECP2-6                 | 34                      | mA    |
|              |                                      | ECP2-12                | 54                      | mA    |
|              |                                      | ECP2-20                | 82                      | mA    |
|              |                                      | ECP2-35                | 135                     | mA    |
|              |                                      | ECP2-50                | 187                     | mA    |
|              |                                      | ECP2-70                | 267                     | mA    |
| $I_{CCAUx}$  | Auxiliary Power Supply Current       | ECP2-6                 | 30                      | mA    |
|              |                                      | ECP2-12                | 30                      | mA    |
|              |                                      | ECP2-20                | 30                      | mA    |
|              |                                      | ECP2-35                | 30                      | mA    |
|              |                                      | ECP2-50                | 30                      | mA    |
|              |                                      | ECP2-70                | 30                      | mA    |
| $I_{CCGPLL}$ | GPLL Power Supply Current (per GPLL) | ECP2-35, -50, -70 Only | 0.5                     | mA    |
| $I_{CCSPLL}$ | SPLL Power Supply Current (per SPLL) | ECP2-35, -50, -70 Only | 0.5                     | mA    |
| $I_{CCIO}$   | Bank Power Supply Current (per Bank) | All Devices            | 3                       | mA    |
| $I_{CCJ}$    | VCCJ Power Supply Current            | All Devices            | 4                       | mA    |

1. Until DONE signal is active.

2. For further information about supply current, please see the list of additional technical documentation at the end of this data sheet.

3. Assumes all outputs are tristated, all inputs are configured as LVCMOS and held at the  $V_{CCIO}$  or GND.

4. Frequency 0MHz.

5.  $T_J = 25^{\circ}\text{C}$ , power supplies at nominal voltage.

6. A specific configuration pattern is used that scales with the size of the device; consists of 75% PFU utilization, 50% EBR, and 25% I/O configuration.

7. Values shown in this column are the typical average DC current during configuration. Use the Power Calculator tool to find the peak startup current.

**Table 3-9. Channel Output Jitter - x20 Mode**

| Description   | Frequency  | Min. | Typ. | Max. | Units   |
|---------------|------------|------|------|------|---------|
| Deterministic | 3.125 Gbps | —    | 0.08 | 0.12 | UI, p-p |
| Random        | 3.125 Gbps | —    | 0.27 | 0.51 | UI, p-p |
| Total         | 3.125 Gbps | —    | 0.35 | 0.59 | UI, p-p |
| Deterministic | 2.5 Gbps   | —    | 0.09 | 0.19 | UI, p-p |
| Random        | 2.5 Gbps   | —    | 0.23 | 0.34 | UI, p-p |
| Total         | 2.5 Gbps   | —    | 0.29 | 0.45 | UI, p-p |
| Deterministic | 1.25 Gbps  | —    | 0.05 | 0.11 | UI, p-p |
| Random        | 1.25 Gbps  | —    | 0.16 | 0.22 | UI, p-p |
| Total         | 1.25 Gbps  | —    | 0.20 | 0.28 | UI, p-p |

Note: Values are measured with PRBS 2<sup>7</sup>-1, all channels operating, FPGA Logic active, I/Os around SERDES pins quiet, reference clock at x20 mode.

**Table 3-10. SERDES/PCS Latency Breakdown (Parallel Clock Cycle)**

| Item                         | Description                       | Min. | Average | Max. | Fixed   | Bypass | Units    |
|------------------------------|-----------------------------------|------|---------|------|---------|--------|----------|
| <b>Transmit Data Latency</b> |                                   |      |         |      |         |        |          |
| T1                           | FPGA Bridge Transmit <sup>2</sup> | 1    | 3       | 5    |         | 1      | word clk |
| T2                           | 8b10b Encoder                     | —    | —       | —    | 2       | 1      | word clk |
| T3                           | SERDES Bridge Transmit            | —    | —       | —    | 2       | 1      | word clk |
| T4 <sup>3</sup>              | Serializer: 8-bit mode            | —    | —       | —    | 15 + Δ1 | —      | UI + ps  |
|                              | Serializer: 10-bit mode           | —    | —       | —    | 18 + Δ1 | —      | UI + ps  |
| <b>Receive Data Latency</b>  |                                   |      |         |      |         |        |          |
| R1 <sup>3</sup>              | Deserializer: 8-bit mode          | —    | —       | —    | 10 + Δ2 | —      | UI + ps  |
|                              | Deserializer: 10-bit mode         | —    | —       | —    | 12 + Δ2 | —      | UI + ps  |
| R2                           | SERDES Bridge Receive             | —    | —       | —    | 2       | 1      | word clk |
| R3                           | Word Alignment                    | 3.1  | —       | 4    | —       | 0      | word clk |
| R4                           | 8b10b Decoder                     | —    | —       | —    | 1       | 1      | word clk |
| R5                           | Clock Tolerance Compensation      | 7    | 15      | 23   |         | 1      | word clk |
| R6                           | FPGA Bridge Receive <sup>2</sup>  | 1    | 3       | 5    |         | 1      | word clk |

1. PCS internal parallel clock. This clock rate is the same as rxfullclk.

2. FPGA Bridge latency varies by the upsample/downsample FIFO read/write. The numbers given are for the 8b10b interface. The depth of the downsample/upsample FIFO is 4. The earliest read can be done after the write clock cycle (one clock) in downsample FIFO. The latest read will be done after the FIFO is full (4 + 1 = 5). For the 16b20b interface, the numbers are doubled: min. = 2, max. = 10. This latency depends on the internal FIFO flag operation.

3. Δ1 = -245ps, Δ2 = 700ps

## LFE2-12E/SE and LFE2-20E/SE Logic Signal Connections: 484 fpBGA (Cont.)

| LFE2-12E/12SE |                   |      |               |              | LFE2-20E/20SE     |      |               |              |
|---------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|
| Ball Number   | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |
| B15           | PT40B             | 1    |               | C            | PT49B             | 1    |               | C            |
| GNDIO         | GNDIO1            | -    |               |              | GNDIO1            | -    |               |              |
| A15           | PT40A             | 1    |               | T            | PT49A             | 1    |               | T            |
| VCCIO         | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |
| A14           | PT39A             | 1    |               | T            | PT48A             | 1    |               | T            |
| B14           | PT39B             | 1    |               | C            | PT48B             | 1    |               | C            |
| D14           | PT37B             | 1    |               | C            | PT46B             | 1    |               | C            |
| E14           | PT36B             | 1    |               | C            | PT45B             | 1    |               | C            |
| GNDIO         | GNDIO1            | -    |               |              | GNDIO1            | -    |               |              |
| C13           | PT37A             | 1    |               | T            | PT46A             | 1    |               | T            |
| F14           | PT36A             | 1    |               | T            | PT45A             | 1    |               | T            |
| A13           | PT35B             | 1    |               | C            | PT44B             | 1    |               | C            |
| E13           | PT34B             | 1    |               | C            | PT43B             | 1    |               | C            |
| VCCIO         | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |
| B13           | PT35A             | 1    |               | T            | PT44A             | 1    |               | T            |
| D13           | PT34A             | 1    |               | T            | PT43A             | 1    |               | T            |
| E12           | PT33B             | 1    |               | C            | PT42B             | 1    |               | C            |
| GNDIO         | GNDIO1            | -    |               |              | GNDIO1            | -    |               |              |
| D12           | PT33A             | 1    |               | T            | PT42A             | 1    |               | T            |
| A12           | PT31B             | 1    |               | C            | PT40B             | 1    |               | C            |
| B12           | PT30B             | 1    | PCLKC1_0      | C            | PT39B             | 1    | PCLKC1_0      | C            |
| VCCIO         | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |
| A11           | PT31A             | 1    |               | T            | PT40A             | 1    |               | T            |
| C12           | PT30A             | 1    | PCLKT1_0      | T            | PT39A             | 1    | PCLKT1_0      | T            |
| F12           | XRES              | 1    |               |              | XRES              | 1    |               |              |
| B10           | PT28B             | 0    | PCLKC0_0      | C            | PT37B             | 0    | PCLKC0_0      | C            |
| GNDIO         | GNDIO0            | -    |               |              | GNDIO0            | -    |               |              |
| B11           | PT28A             | 0    | PCLKT0_0      | T            | PT37A             | 0    | PCLKT0_0      | T            |
| C11           | PT26B             | 0    |               | C            | PT35B             | 0    |               | C            |
| A10           | PT27B             | 0    |               | C            | PT36B             | 0    |               | C            |
| C10           | PT26A             | 0    |               | T            | PT35A             | 0    |               | T            |
| VCCIO         | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |
| A9            | PT27A             | 0    |               | T            | PT36A             | 0    |               | T            |
| A8            | PT24B             | 0    |               | C            | PT33B             | 0    |               | C            |
| E11           | PT25B             | 0    |               | C            | PT34B             | 0    |               | C            |
| A7            | PT24A             | 0    |               | T            | PT33A             | 0    |               | T            |
| F11           | PT25A             | 0    |               | T            | PT34A             | 0    |               | T            |
| GNDIO         | GNDIO0            | -    |               |              | GNDIO0            | -    |               |              |
| B8            | PT23B             | 0    |               | C            | PT32B             | 0    |               | C            |
| VCCIO         | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |
| B9            | PT23A             | 0    |               | T            | PT32A             | 0    |               | T            |
| C8            | PT20B             | 0    |               | C            | PT29B             | 0    |               | C            |
| B7            | PT21B             | 0    |               | C            | PT30B             | 0    |               | C            |
| D8            | PT20A             | 0    |               | T            | PT29A             | 0    |               | T            |

## LFE2-12E/SE and LFE2-20E/SE Logic Signal Connections: 484 fpBGA (Cont.)

| LFE2-12E/12SE |                   |      |               |              | LFE2-20E/20SE     |      |               |              |  |
|---------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|--|
| Ball Number   | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |  |
| C2            | PT3A              | 0    |               | T            | PT3A              | 0    |               | T            |  |
| J10           | VCC               | -    |               |              | VCC               | -    |               |              |  |
| J11           | VCC               | -    |               |              | VCC               | -    |               |              |  |
| J12           | VCC               | -    |               |              | VCC               | -    |               |              |  |
| J13           | VCC               | -    |               |              | VCC               | -    |               |              |  |
| K14           | VCC               | -    |               |              | VCC               | -    |               |              |  |
| K9            | VCC               | -    |               |              | VCC               | -    |               |              |  |
| L14           | VCC               | -    |               |              | VCC               | -    |               |              |  |
| L9            | VCC               | -    |               |              | VCC               | -    |               |              |  |
| M14           | VCC               | -    |               |              | VCC               | -    |               |              |  |
| M9            | VCC               | -    |               |              | VCC               | -    |               |              |  |
| N14           | VCC               | -    |               |              | VCC               | -    |               |              |  |
| N9            | VCC               | -    |               |              | VCC               | -    |               |              |  |
| P10           | VCC               | -    |               |              | VCC               | -    |               |              |  |
| P11           | VCC               | -    |               |              | VCC               | -    |               |              |  |
| P12           | VCC               | -    |               |              | VCC               | -    |               |              |  |
| P13           | VCC               | -    |               |              | VCC               | -    |               |              |  |
| G10           | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |  |
| G9            | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |  |
| H9            | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |  |
| H8            | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |  |
| G11           | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |  |
| G12           | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |  |
| G13           | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |  |
| G14           | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |  |
| H14           | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |  |
| H15           | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |  |
| J15           | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |  |
| K16           | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |  |
| L16           | VCCIO3            | 3    |               |              | VCCIO3            | 3    |               |              |  |
| M16           | VCCIO3            | 3    |               |              | VCCIO3            | 3    |               |              |  |
| N16           | VCCIO3            | 3    |               |              | VCCIO3            | 3    |               |              |  |
| P16           | VCCIO3            | 3    |               |              | VCCIO3            | 3    |               |              |  |
| R14           | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |  |
| T12           | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |  |
| T13           | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |  |
| T14           | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |  |
| R9            | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |  |
| T10           | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |  |
| T11           | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |  |
| T9            | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |  |
| N7            | VCCIO6            | 6    |               |              | VCCIO6            | 6    |               |              |  |
| P7            | VCCIO6            | 6    |               |              | VCCIO6            | 6    |               |              |  |
| P8            | VCCIO6            | 6    |               |              | VCCIO6            | 6    |               |              |  |

## LFE2-35E/SE and LFE2-50E/SE Logic Signal Connections: 484 fpBGA (Cont.)

| LFE2-35E/SE |                   |      |               |              | LFE2-50E/SE       |      |               |              |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |
| J10         | VCC               | -    |               |              | VCC               | -    |               |              |
| J11         | VCC               | -    |               |              | VCC               | -    |               |              |
| J12         | VCC               | -    |               |              | VCC               | -    |               |              |
| J13         | VCC               | -    |               |              | VCC               | -    |               |              |
| K14         | VCC               | -    |               |              | VCC               | -    |               |              |
| K9          | VCC               | -    |               |              | VCC               | -    |               |              |
| L14         | VCC               | -    |               |              | VCC               | -    |               |              |
| L9          | VCC               | -    |               |              | VCC               | -    |               |              |
| M14         | VCC               | -    |               |              | VCC               | -    |               |              |
| M9          | VCC               | -    |               |              | VCC               | -    |               |              |
| N14         | VCC               | -    |               |              | VCC               | -    |               |              |
| N9          | VCC               | -    |               |              | VCC               | -    |               |              |
| P10         | VCC               | -    |               |              | VCC               | -    |               |              |
| P11         | VCC               | -    |               |              | VCC               | -    |               |              |
| P12         | VCC               | -    |               |              | VCC               | -    |               |              |
| P13         | VCC               | -    |               |              | VCC               | -    |               |              |
| G5          | VCCAUX            | -    |               |              | VCCAUX            | 0    |               |              |
| K5          | VCCAUX            | -    |               |              | VCCAUX            | 0    |               |              |
| R5          | VCCAUX            | -    |               |              | VCCAUX            | 1    |               |              |
| V7          | VCCAUX            | -    |               |              | VCCAUX            | 1    |               |              |
| V11         | VCCAUX            | -    |               |              | VCCAUX            | 2    |               |              |
| V8          | VCCAUX            | -    |               |              | VCCAUX            | 2    |               |              |
| V13         | VCCAUX            | -    |               |              | VCCAUX            | 3    |               |              |
| V15         | VCCAUX            | -    |               |              | VCCAUX            | 3    |               |              |
| M17         | VCCAUX            | -    |               |              | VCCAUX            | 4    |               |              |
| P17         | VCCAUX            | -    |               |              | VCCAUX            | 4    |               |              |
| E17         | VCCAUX            | -    |               |              | VCCAUX            | 5    |               |              |
| G18         | VCCAUX            | -    |               |              | VCCAUX            | 5    |               |              |
| D11         | VCCAUX            | -    |               |              | VCCAUX            | 6    |               |              |
| F13         | VCCAUX            | -    |               |              | VCCAUX            | 6    |               |              |
| C5          | VCCAUX            | -    |               |              | VCCAUX            | 7    |               |              |
| E6          | VCCAUX            | -    |               |              | VCCAUX            | 7    |               |              |
| G10         | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |
| G9          | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |
| H8          | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |
| H9          | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |
| G11         | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |
| G12         | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |
| G13         | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |
| G14         | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |
| H14         | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |
| H15         | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |
| J15         | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |
| K16         | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |
| L16         | VCCIO3            | 3    |               |              | VCCIO3            | 3    |               |              |
| M16         | VCCIO3            | 3    |               |              | VCCIO3            | 3    |               |              |



## LFE2-50E/SE and LFE2-70E/SE Logic Signal Connections: 672 fpBGA (Cont.)

| LFE2-50E/SE |                   |      |                |              | LFE2-70E/SE       |      |                |              |  |
|-------------|-------------------|------|----------------|--------------|-------------------|------|----------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function  | Differential | Ball/Pad Function | Bank | Dual Function  | Differential |  |
| AA14        | PB38B             | 5    | BDQ42          | C            | PB47B             | 5    | BDQ51          | C            |  |
| AE10        | PB39A             | 5    | BDQ42          | T            | PB48A             | 5    | BDQ51          | T            |  |
| AF10        | PB39B             | 5    | BDQ42          | C            | PB48B             | 5    | BDQ51          | C            |  |
| W14         | PB40A             | 5    | BDQ42          | T            | PB49A             | 5    | BDQ51          | T            |  |
| AB13        | PB40B             | 5    | BDQ42          | C            | PB49B             | 5    | BDQ51          | C            |  |
| VCCIO       | VCCIO5            | 5    |                |              | VCCIO5            | 5    |                |              |  |
| Y14         | PB41A             | 5    | BDQ42          | T            | PB50A             | 5    | BDQ51          | T            |  |
| AB14        | PB41B             | 5    | BDQ42          | C            | PB50B             | 5    | BDQ51          | C            |  |
| GND         | GNDIO5            | -    |                |              | GNDIO5            | -    |                |              |  |
| AE11        | PB42A             | 5    | BDQS42         | T            | PB51A             | 5    | BDQS51         | T            |  |
| AF11        | PB42B             | 5    | BDQ42          | C            | PB51B             | 5    | BDQ51          | C            |  |
| AD14        | PB43A             | 5    | BDQ42          | T            | PB52A             | 5    | BDQ51          | T            |  |
| AA15        | PB43B             | 5    | BDQ42          | C            | PB52B             | 5    | BDQ51          | C            |  |
| AE12        | PB44A             | 5    | PCLKT5_0/BDQ42 | T            | PB53A             | 5    | PCLKT5_0/BDQ51 | T            |  |
| AF12        | PB44B             | 5    | PCLKC5_0/BDQ42 | C            | PB53B             | 5    | PCLKC5_0/BDQ51 | C            |  |
| VCCIO       | VCCIO5            | 5    |                |              | VCCIO5            | 5    |                |              |  |
| GND         | GNDIO5            | -    |                |              | GNDIO5            | -    |                |              |  |
| AD15        | PB49A             | 4    | PCLKT4_0/BDQ51 | T            | PB58A             | 4    | PCLKT4_0/BDQ60 | T            |  |
| VCCIO       | VCCIO4            | 4    |                |              | VCCIO4            | 4    |                |              |  |
| AC15        | PB49B             | 4    | PCLKC4_0/BDQ51 | C            | PB58B             | 4    | PCLKC4_0/BDQ60 | C            |  |
| AE13        | PB50A             | 4    | BDQ51          | T            | PB59A             | 4    | BDQ60          | T            |  |
| AF13        | PB50B             | 4    | BDQ51          | C            | PB59B             | 4    | BDQ60          | C            |  |
| AB17        | PB51A             | 4    | BDQS51         | T            | PB60A             | 4    | BDQS60         | T            |  |
| GND         | GNDIO4            | -    |                |              | GNDIO4            | -    |                |              |  |
| Y15         | PB51B             | 4    | BDQ51          | C            | PB60B             | 4    | BDQ60          | C            |  |
| AE14        | PB52A             | 4    | BDQ51          | T            | PB61A             | 4    | BDQ60          | T            |  |
| AF14        | PB52B             | 4    | BDQ51          | C            | PB61B             | 4    | BDQ60          | C            |  |
| AA16        | PB53A             | 4    | BDQ51          | T            | PB62A             | 4    | BDQ60          | T            |  |
| VCCIO       | VCCIO4            | 4    |                |              | VCCIO4            | 4    |                |              |  |
| W15         | PB53B             | 4    | BDQ51          | C            | PB62B             | 4    | BDQ60          | C            |  |
| AC17        | PB54A             | 4    | BDQ51          | T            | PB63A             | 4    | BDQ60          | T            |  |
| AB16        | PB54B             | 4    | BDQ51          | C            | PB63B             | 4    | BDQ60          | C            |  |
| AE15        | PB55A             | 4    | BDQ51          | T            | PB64A             | 4    | BDQ60          | T            |  |
| GND         | GNDIO4            | -    |                |              | GNDIO4            | -    |                |              |  |
| AF15        | PB55B             | 4    | BDQ51          | C            | PB64B             | 4    | BDQ60          | C            |  |
| AE16        | PB56A             | 4    | BDQ60          | T            | PB65A             | 4    | BDQ69          | T            |  |
| AF16        | PB56B             | 4    | BDQ60          | C            | PB65B             | 4    | BDQ69          | C            |  |
| Y16         | PB57A             | 4    | BDQ60          | T            | PB66A             | 4    | BDQ69          | T            |  |
| AB18        | PB57B             | 4    | BDQ60          | C            | PB66B             | 4    | BDQ69          | C            |  |
| AD17        | PB58A             | 4    | BDQ60          | T            | PB67A             | 4    | BDQ69          | T            |  |
| AD18        | PB58B             | 4    | BDQ60          | C            | PB67B             | 4    | BDQ69          | C            |  |
| VCCIO       | VCCIO4            | 4    |                |              | VCCIO4            | 4    |                |              |  |
| AC18        | PB59A             | 4    | BDQ60          | T            | PB68A             | 4    | BDQ69          | T            |  |
| AD19        | PB59B             | 4    | BDQ60          | C            | PB68B             | 4    | BDQ69          | C            |  |
| GND         | GNDIO4            | -    |                |              | GNDIO4            | -    |                |              |  |
| AC19        | PB60A             | 4    | BDQS60         | T            | PB69A             | 4    | BDQS69         | T            |  |

**LFE2-70E/SE Logic Signal Connections: 900 fpBGA (Cont.)**

| LFE2-70E/SE |                   |      |                          |              |
|-------------|-------------------|------|--------------------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function            | Differential |
| AB24        | PR87B             | 8    | D3                       | C            |
| GND         | GNDIO4            | -    |                          |              |
| AB23        | PR87A             | 8    | D4                       | T            |
| AB25        | PR86B             | 8    | D5                       | C            |
| AB26        | PR86A             | 8    | D6                       | T            |
| AC27        | PR85B             | 8    | D7/SPID0                 | C            |
| VCCIO       | VCCIO8            | 8    |                          |              |
| AB27        | PR85A             | 8    | DI/CSSPION               | T            |
| AD29        | PR84B             | 8    | DOUT/CSON                | C            |
| AD30        | PR84A             | 8    | BUSY/SISPI               | T            |
| AA25        | PR83B             | 3    | RDQ80                    | C            |
| GND         | GNDIO3            | -    |                          |              |
| AA23        | PR83A             | 3    | RDQ80                    | T            |
| AC29        | PR82B             | 3    | RDQ80                    | C (LVDS)*    |
| AC30        | PR82A             | 3    | RDQ80                    | T (LVDS)*    |
| AA26        | PR81B             | 3    | RDQ80                    | C            |
| VCCIO       | VCCIO3            | 3    |                          |              |
| AA24        | PR81A             | 3    | RDQ80                    | T            |
| AB29        | PR80B             | 3    | RDQ80                    | C (LVDS)*    |
| AB30        | PR80A             | 3    | RDQS80                   | T (LVDS)*    |
| GND         | GNDIO3            | -    |                          |              |
| Y23         | PR79B             | 3    | RDQ80                    | C            |
| Y25         | PR79A             | 3    | RDQ80                    | T            |
| AA27        | PR78B             | 3    | RDQ80                    | C (LVDS)*    |
| AA28        | PR78A             | 3    | RDQ80                    | T (LVDS)*    |
| VCCIO       | VCCIO3            | 3    |                          |              |
| Y24         | PR77B             | 3    | RLM0_GPLL_C_FB_A/RDQ80   | C            |
| Y26         | PR77A             | 3    | RLM0_GPLLT_FB_A/RDQ80    | T            |
| AA29        | PR76B             | 3    | RLM0_GPLL_C_IN_A**/RDQ80 | C (LVDS)*    |
| AA30        | PR76A             | 3    | RLM0_GPLLT_IN_A**/RDQ80  | T (LVDS)*    |
| R22         | RLM0_PLLCAP       | 3    |                          |              |
| W23         | PR74B             | 3    | RLM0_GDLL_C_FB_A/RDQ71   | C            |
| W25         | PR74A             | 3    | RLM0_GDLLT_FB_A/RDQ71    | T            |
| GND         | GNDIO3            | -    |                          |              |
| Y27         | PR73B             | 3    | RLM0_GDLL_C_IN_A**/RDQ71 | C (LVDS)*    |
| Y28         | PR73A             | 3    | RLM0_GDLLT_IN_A**/RDQ71  | T (LVDS)*    |
| W24         | PR72B             | 3    | RDQ71                    | C            |
| W26         | PR72A             | 3    | RDQ71                    | T            |
| VCCIO       | VCCIO3            | 3    |                          |              |
| Y29         | PR71B             | 3    | RDQ71                    | C (LVDS)*    |
| Y30         | PR71A             | 3    | RDQS71                   | T (LVDS)*    |
| V25         | PR70B             | 3    | RDQ71                    | C            |
| GND         | GNDIO3            | -    |                          |              |

**LFE2-70E/SE Logic Signal Connections: 900 fpBGA (Cont.)**

| LFE2-70E/SE |                   |      |                       |              |
|-------------|-------------------|------|-----------------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function         | Differential |
| P25         | PR51B             | 2    | RDQ54                 | C            |
| VCCIO       | VCCIO2            | 2    |                       |              |
| P23         | PR51A             | 2    | RDQ54                 | T            |
| P27         | PR50B             | 2    | RDQ54                 | C (LVDS)*    |
| P28         | PR50A             | 2    | RDQ54                 | T (LVDS)*    |
| GND         | GNDIO2            | -    |                       |              |
| VCCIO       | VCCIO2            | 2    |                       |              |
| N24         | PR39B             | 2    | RUM0_SPLLC_FB_A/RDQ37 | C            |
| N26         | PR39A             | 2    | RUM0_SPLLT_FB_A/RDQ37 | T            |
| N23         | PR38B             | 2    | RUM0_SPLLC_IN_A/RDQ37 | C            |
| N25         | PR38A             | 2    | RUM0_SPLLT_IN_A/RDQ37 | T            |
| VCCIO       | VCCIO2            | 2    |                       |              |
| P29         | PR37B             | 2    | RDQ37                 | C (LVDS)*    |
| P30         | PR37A             | 2    | RDQS37                | T (LVDS)*    |
| M26         | PR36B             | 2    | RDQ37                 | C            |
| GND         | GNDIO2            | -    |                       |              |
| M24         | PR36A             | 2    | RDQ37                 | T            |
| N29         | PR35B             | 2    | RDQ37                 | C (LVDS)*    |
| N30         | PR35A             | 2    | RDQ37                 | T (LVDS)*    |
| M25         | PR34B             | 2    | RDQ37                 | C            |
| VCCIO       | VCCIO2            | 2    |                       |              |
| M23         | PR34A             | 2    | RDQ37                 | T            |
| M27         | PR33B             | 2    | RDQ37                 | C (LVDS)*    |
| M28         | PR33A             | 2    | RDQ37                 | T (LVDS)*    |
| L26         | PR32B             | 2    | RDQ29                 | C            |
| GND         | GNDIO2            | -    |                       |              |
| L24         | PR32A             | 2    | RDQ29                 | T            |
| M29         | PR31B             | 2    | RDQ29                 | C (LVDS)*    |
| M30         | PR31A             | 2    | RDQ29                 | T (LVDS)*    |
| L25         | PR30B             | 2    | RDQ29                 | C            |
| VCCIO       | VCCIO2            | 2    |                       |              |
| L23         | PR30A             | 2    | RDQ29                 | T            |
| L27         | PR29B             | 2    | RDQ29                 | C (LVDS)*    |
| L28         | PR29A             | 2    | RDQS29                | T (LVDS)*    |
| GND         | GNDIO2            | -    |                       |              |
| K24         | PR28B             | 2    | RDQ29                 | C            |
| K26         | PR28A             | 2    | RDQ29                 | T            |
| L29         | PR27B             | 2    | RDQ29                 | C (LVDS)*    |
| L30         | PR27A             | 2    | RDQ29                 | T (LVDS)*    |
| VCCIO       | VCCIO2            | 2    |                       |              |
| K23         | PR26B             | 2    | RDQ29                 | C            |
| K25         | PR26A             | 2    | RDQ29                 | T            |
| K27         | PR25B             | 2    | RDQ29                 | C (LVDS)*    |

**LFE2-70E/SE Logic Signal Connections: 900 fpBGA (Cont.)**

| LFE2-70E/SE |                   |      |               |              |
|-------------|-------------------|------|---------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential |
| D25         | PT99A             | 1    |               | T            |
| J22         | PT98B             | 1    |               | C            |
| J21         | PT98A             | 1    |               | T            |
| VCCIO       | VCCIO1            | 1    |               |              |
| B25         | PT97B             | 1    |               | C            |
| A25         | PT97A             | 1    |               | T            |
| E24         | PT96B             | 1    |               | C            |
| F24         | PT96A             | 1    |               | T            |
| GND         | GNDIO1            | -    |               |              |
| F23         | PT95B             | 1    |               | C            |
| H22         | PT95A             | 1    |               | T            |
| D24         | PT94B             | 1    |               | C            |
| C24         | PT94A             | 1    |               | T            |
| VCCIO       | VCCIO1            | 1    |               |              |
| E23         | PT93B             | 1    |               | C            |
| G23         | PT93A             | 1    |               | T            |
| B24         | PT92B             | 1    |               | C            |
| A24         | PT92A             | 1    |               | T            |
| C27         | PT91B             | 1    |               | C            |
| GND         | GNDIO1            | -    |               |              |
| D27         | PT91A             | 1    |               | T            |
| C26         | PT90B             | 1    |               | C            |
| D26         | PT90A             | 1    |               | T            |
| A27         | PT89B             | 1    |               | C            |
| VCCIO       | VCCIO1            | 1    |               |              |
| B27         | PT89A             | 1    |               | T            |
| A28         | PT88B             | 1    |               | C            |
| B28         | PT88A             | 1    |               | T            |
| A29         | PT87B             | 1    |               | C            |
| B29         | PT87A             | 1    |               | T            |
| GND         | GNDIO1            | -    |               |              |
| VCCIO       | VCCIO1            | 1    |               |              |
| H21         | PT80B             | 1    |               | C            |
| F22         | PT80A             | 1    |               | T            |
| VCCIO       | VCCIO1            | 1    |               |              |
| B23         | PT79B             | 1    |               | C            |
| A23         | PT79A             | 1    |               | T            |
| G24         | PT78B             | 1    |               | C            |
| E22         | PT78A             | 1    |               | T            |
| GND         | GNDIO1            | -    |               |              |
| D22         | PT77B             | 1    |               | C            |
| C22         | PT77A             | 1    |               | T            |
| G22         | PT76B             | 1    |               | C            |

**LFE2-70E/SE Logic Signal Connections: 900 fpBGA (Cont.)**

| LFE2-70E/SE |                   |      |               |              |
|-------------|-------------------|------|---------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential |
| C17         | PT58B             | 1    |               | C            |
| A18         | PT58A             | 1    |               | T            |
| VCCIO       | VCCIO1            | 1    |               |              |
| H16         | PT57B             | 1    | PCLKC1_0      | C            |
| F16         | PT57A             | 1    | PCLKT1_0      | T            |
| K16         | XRES              | 1    |               |              |
| E16         | PT55B             | 0    | PCLKC0_0      | C            |
| GND         | GNDIO0            | -    |               |              |
| G16         | PT55A             | 0    | PCLKT0_0      | T            |
| B17         | PT54B             | 0    |               | C            |
| A17         | PT54A             | 0    |               | T            |
| J15         | PT53B             | 0    |               | C            |
| VCCIO       | VCCIO0            | 0    |               |              |
| J16         | PT53A             | 0    |               | T            |
| C16         | PT52B             | 0    |               | C            |
| D16         | PT52A             | 0    |               | T            |
| F15         | PT51B             | 0    |               | C            |
| H15         | PT51A             | 0    |               | T            |
| E15         | PT50B             | 0    |               | C            |
| GND         | GNDIO0            | -    |               |              |
| G15         | PT50A             | 0    |               | T            |
| C15         | PT49B             | 0    |               | C            |
| VCCIO       | VCCIO0            | 0    |               |              |
| D15         | PT49A             | 0    |               | T            |
| B16         | PT48B             | 0    |               | C            |
| A16         | PT48A             | 0    |               | T            |
| E14         | PT47B             | 0    |               | C            |
| G14         | PT47A             | 0    |               | T            |
| B15         | PT46B             | 0    |               | C            |
| A15         | PT46A             | 0    |               | T            |
| GND         | GNDIO0            | -    |               |              |
| H14         | PT45B             | 0    |               | C            |
| F14         | PT45A             | 0    |               | T            |
| D14         | PT44B             | 0    |               | C            |
| C14         | PT44A             | 0    |               | T            |
| VCCIO       | VCCIO0            | 0    |               |              |
| G13         | PT43B             | 0    |               | C            |
| E13         | PT43A             | 0    |               | T            |
| B14         | PT42B             | 0    |               | C            |
| A14         | PT42A             | 0    |               | T            |
| GND         | GNDIO0            | -    |               |              |
| H13         | PT41B             | 0    |               | C            |
| F13         | PT41A             | 0    |               | T            |

## LFE2M20E/SE and LFE2M35E/SE Logic Signal Connections: 484 fpBGA (Cont.)

| LFE2M20E/SE |                   |      |               |              | LFE2M35E/SE       |      |               |              |  |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |  |
| V5          | PL51A             | 6    | LDQS51        | T (LVDS)*    | PL66A             | 6    | LDQS66        | T (LVDS)*    |  |
| U4          | PL51B             | 6    | LDQ51         | C (LVDS)*    | PL66B             | 6    | LDQ66         | C (LVDS)*    |  |
| V1          | PL52A             | 6    | LDQ51         | T            | PL67A             | 6    | LDQ66         | T            |  |
| VCCIO       | VCCIO6            | 6    |               |              | VCCIO6            | 6    |               |              |  |
| V3          | PL52B             | 6    | LDQ51         | C            | PL67B             | 6    | LDQ66         | C            |  |
| W1          | PL53A             | 6    | LDQ51         | T (LVDS)*    | PL68A             | 6    | LDQ66         | T (LVDS)*    |  |
| Y1          | PL53B             | 6    | LDQ51         | C (LVDS)*    | PL68B             | 6    | LDQ66         | C (LVDS)*    |  |
| AA1         | PL54A             | 6    | LDQ51         | T            | PL69A             | 6    | LDQ66         | T            |  |
| GNDIO       | GNDIO6            | -    |               |              | GNDIO6            | -    |               |              |  |
| AA2         | PL54B             | 6    | LDQ51         | C            | PL69B             | 6    | LDQ66         | C            |  |
| V4          | TCK               | -    |               |              | TCK               | -    |               |              |  |
| Y2          | TDI               | -    |               |              | TDI               | -    |               |              |  |
| Y3          | TMS               | -    |               |              | TMS               | -    |               |              |  |
| W3          | TDO               | -    |               |              | TDO               | -    |               |              |  |
| W4          | VCCJ              | -    |               |              | VCCJ              | -    |               |              |  |
| W5          | PB2A              | 5    | BDQ6          | T            | PB2A              | 5    | BDQ6          | T            |  |
| Y4          | PB2B              | 5    | BDQ6          | C            | PB2B              | 5    | BDQ6          | C            |  |
| W6          | PB3A              | 5    | BDQ6          | T            | PB3A              | 5    | BDQ6          | T            |  |
| V6          | PB3B              | 5    | BDQ6          | C            | PB3B              | 5    | BDQ6          | C            |  |
| AA3         | PB4A              | 5    | BDQ6          | T            | PB4A              | 5    | BDQ6          | T            |  |
| VCCIO       | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |  |
| AB2         | PB4B              | 5    | BDQ6          | C            | PB4B              | 5    | BDQ6          | C            |  |
| T8          | PB5A              | 5    | BDQ6          | T            | PB5A              | 5    | BDQ6          | T            |  |
| U7          | PB5B              | 5    | BDQ6          | C            | PB5B              | 5    | BDQ6          | C            |  |
| U8          | PB6A              | 5    | BDQS6         | T            | PB6A              | 5    | BDQS6         | T            |  |
| GNDIO       | GNDIO5            | -    |               |              | GNDIO5            | -    |               |              |  |
| T9          | PB6B              | 5    | BDQ6          | C            | PB6B              | 5    | BDQ6          | C            |  |
| V8          | PB7A              | 5    | BDQ6          | T            | PB7A              | 5    | BDQ6          | T            |  |
| W8          | PB7B              | 5    | BDQ6          | C            | PB7B              | 5    | BDQ6          | C            |  |
| Y6          | PB8A              | 5    | BDQ6          | T            | PB8A              | 5    | BDQ6          | T            |  |
| VCCIO       | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |  |
| Y5          | PB8B              | 5    | BDQ6          | C            | PB8B              | 5    | BDQ6          | C            |  |
| AB3         | PB9A              | 5    | BDQ6          | T            | PB9A              | 5    | BDQ6          | T            |  |
| AB4         | PB9B              | 5    | BDQ6          | C            | PB9B              | 5    | BDQ6          | C            |  |
| AB5         | PB10A             | 5    | BDQ6          | T            | PB10A             | 5    | BDQ6          | T            |  |
| GNDIO       | GNDIO5            | -    |               |              | GNDIO5            | -    |               |              |  |
| AA6         | PB10B             | 5    | BDQ6          | C            | PB10B             | 5    | BDQ6          | C            |  |
| V9          | PB13A             | 5    | BDQ15         | T            | PB31A             | 5    | BDQ33         | T            |  |
| U9          | PB13B             | 5    | BDQ15         | C            | PB31B             | 5    | BDQ33         | C            |  |
| VCCIO       | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |  |
| -           | -                 | -    |               |              | GNDIO5            | -    |               |              |  |
| U10         | PB14A             | 5    | BDQ15         | T            | PB32A             | 5    | BDQ33         | T            |  |
| T10         | PB14B             | 5    | BDQ15         | C            | PB32B             | 5    | BDQ33         | C            |  |
| GNDIO       | GNDIO5            | -    |               |              | GNDIO5            | -    |               |              |  |
| W9          | PB15A             | 5    | BDQS15****    | T            | PB33A             | 5    | BDQS33****    | T            |  |
| Y8          | PB15B             | 5    | BDQ15         | C            | PB33B             | 5    | BDQ33         | C            |  |
| AA7         | PB16A             | 5    | VREF2_5/BDQ15 | T            | PB34A             | 5    | VREF2_5/BDQ33 | T            |  |
| Y7          | PB16B             | 5    | VREF1_5/BDQ15 | C            | PB34B             | 5    | VREF1_5/BDQ33 | C            |  |

**LFE2M50E/SE Logic Signal Connections: 484 fpBGA (Cont.)**

| LFE2M50E/SE |                   |      |               |              |
|-------------|-------------------|------|---------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential |
| D9          | PT45A             | 0    | VREF1_0       | T            |
| A2          | PT44B             | 0    |               | C            |
| VCCIO       | VCCIO0            | 0    |               |              |
| A3          | PT44A             | 0    |               | T            |
| B3          | PT43B             | 0    |               | C            |
| C4          | PT43A             | 0    |               | T            |
| E10         | PT42B             | 0    |               | C            |
| F10         | PT42A             | 0    |               | T            |
| C7          | PT41B             | 0    |               | C            |
| GNDIO       | GNDIO0            | -    |               |              |
| B6          | PT41A             | 0    |               | T            |
| C6          | PT40B             | 0    |               | C            |
| VCCIO       | VCCIO0            | 0    |               |              |
| C5          | PT40A             | 0    |               | T            |
| C8          | PT39B             | 0    |               | C            |
| D8          | PT39A             | 0    |               | T            |
| E8          | PT38B             | 0    |               | C            |
| E9          | PT38A             | 0    |               | T            |
| GNDIO       | GNDIO0            | -    |               |              |
| VCCIO       | VCCIO0            | 0    |               |              |
| F8          | PT10B             | 0    |               | C            |
| GNDIO       | GNDIO0            | -    |               |              |
| G8          | PT10A             | 0    |               | T            |
| F7          | PT9B              | 0    |               | C            |
| G7          | PT9A              | 0    |               | T            |
| C3          | PT8B              | 0    |               | C            |
| VCCIO       | VCCIO0            | 0    |               |              |
| D4          | PT8A              | 0    |               | T            |
| F6          | PT7B              | 0    |               | C            |
| E6          | PT7A              | 0    |               | T            |
| E5          | PT6B              | 0    |               | C            |
| D6          | PT6A              | 0    |               | T            |
| D3          | PT5B              | 0    |               | C            |
| GNDIO       | GNDIO0            | -    |               |              |
| E3          | PT5A              | 0    |               | T            |
| D5          | PT4B              | 0    |               | C            |
| VCCIO       | VCCIO0            | 0    |               |              |
| E4          | PT4A              | 0    |               | T            |
| C2          | PT3B              | 0    |               | C            |
| B2          | PT3A              | 0    |               | T            |
| B1          | PT2B              | 0    |               | C            |
| C1          | PT2A              | 0    |               | T            |
| J10         | VCC               | -    |               |              |

## LFE2M35E/SE and LFE2M50E/SE Logic Signal Connections: 672 fpBGA (Cont.)

| LFE2M35E/SE |                   |      |               |              | LFE2M50E/SE       |      |               |              |  |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |  |
| C15         | URC_SQ_VCCIB2     | 12   |               |              | URC_SQ_VCCIB2     | 12   |               |              |  |
| B15         | URC_SQ_HDINN2     | 12   |               | C            | URC_SQ_HDINN2     | 12   |               | C            |  |
| C14         | URC_SQ_VCCRX2     | 12   |               |              | URC_SQ_VCCRX2     | 12   |               |              |  |
| A18         | URC_SQ_HDOUP2     | 12   |               | T            | URC_SQ_HDOUP2     | 12   |               | T            |  |
| C18         | URC_SQ_VCCOB2     | 12   |               |              | URC_SQ_VCCOB2     | 12   |               |              |  |
| B18         | URC_SQ_HDOUPN2    | 12   |               | C            | URC_SQ_HDOUPN2    | 12   |               | C            |  |
| C17         | URC_SQ_VCCTX2     | 12   |               |              | URC_SQ_VCCTX2     | 12   |               |              |  |
| B17         | URC_SQ_HDOUPN3    | 12   |               | C            | URC_SQ_HDOUPN3    | 12   |               | C            |  |
| A16         | URC_SQ_VCCOB3     | 12   |               |              | URC_SQ_VCCOB3     | 12   |               |              |  |
| A17         | URC_SQ_HDOUP3     | 12   |               | T            | URC_SQ_HDOUP3     | 12   |               | T            |  |
| C16         | URC_SQ_VCCTX3     | 12   |               |              | URC_SQ_VCCTX3     | 12   |               |              |  |
| B14         | URC_SQ_HDINN3     | 12   |               | C            | URC_SQ_HDINN3     | 12   |               | C            |  |
| B13         | URC_SQ_VCCIB3     | 12   |               |              | URC_SQ_VCCIB3     | 12   |               |              |  |
| A14         | URC_SQ_HDINP3     | 12   |               | T            | URC_SQ_HDINP3     | 12   |               | T            |  |
| C13         | URC_SQ_VCCRX3     | 12   |               |              | URC_SQ_VCCRX3     | 12   |               |              |  |
| -           | -                 | -    |               |              | GNDIO1            | -    |               |              |  |
| -           | -                 | -    |               |              | VCCIO1            | 1    |               |              |  |
| E17         | PT46B             | 1    |               | C            | PT55B             | 1    |               | C            |  |
| D17         | PT46A             | 1    |               | T            | PT55A             | 1    |               | T            |  |
| GNDIO       | GNDIO1            | -    |               |              | GNDIO1            | -    |               |              |  |
| F17         | PT45B             | 1    |               | C            | PT54B             | 1    |               | C            |  |
| D16         | PT45A             | 1    |               | T            | PT54A             | 1    |               | T            |  |
| F19         | PT44B             | 1    |               | C            | PT53B             | 1    |               | C            |  |
| F18         | PT44A             | 1    |               | T            | PT53A             | 1    |               | T            |  |
| VCCIO       | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |  |
| E16         | PT43B             | 1    |               | C            | PT52B             | 1    |               | C            |  |
| D15         | PT43A             | 1    |               | T            | PT52A             | 1    |               | T            |  |
| G18         | PT42B             | 1    |               | C            | PT51B             | 1    |               | C            |  |
| E15         | PT42A             | 1    |               | T            | PT51A             | 1    |               | T            |  |
| GNDIO       | GNDIO1            | -    |               |              | GNDIO1            | -    |               |              |  |
| G17         | PT41B             | 1    |               | C            | PT50B             | 1    |               | C            |  |
| E14         | PT41A             | 1    |               | T            | PT50A             | 1    |               | T            |  |
| D14         | PT40B             | 1    |               | C            | PT49B             | 1    |               | C            |  |
| D13         | PT40A             | 1    |               | T            | PT49A             | 1    |               | T            |  |
| VCCIO       | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |  |
| F15         | PT39B             | 1    | VREF2_1       | C            | PT48B             | 1    | VREF2_1       | C            |  |
| E12         | PT39A             | 1    | VREF1_1       | T            | PT48A             | 1    | VREF1_1       | T            |  |
| H17         | PT38B             | 1    | PCLKC1_0      | C            | PT47B             | 1    | PCLKC1_0      | C            |  |
| E13         | PT38A             | 1    | PCLKT1_0      | T            | PT47A             | 1    | PCLKT1_0      | T            |  |
| C12         | PT37B             | 0    | PCLKC0_0      | C            | PT46B             | 0    | PCLKC0_0      | C            |  |
| GNDIO       | GNDIO0            | -    |               |              | GNDIO0            | -    |               |              |  |
| G15         | PT37A             | 0    | PCLKT0_0      | T            | PT46A             | 0    | PCLKT0_0      | T            |  |
| C11         | PT36B             | 0    | VREF2_0       | C            | PT45B             | 0    | VREF2_0       | C            |  |
| F14         | PT36A             | 0    | VREF1_0       | T            | PT45A             | 0    | VREF1_0       | T            |  |



**LFE2M50E/SE and LFE2M70E/SE Logic Signal Connections: 900 fpBGA**

| LFE2M50E/SE |                   |      |                 |              | LFE2M70E/SE       |      |                       |              |  |
|-------------|-------------------|------|-----------------|--------------|-------------------|------|-----------------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function   | Differential | Ball/Pad Function | Bank | Dual Function         | Differential |  |
| D2          | PL9A              | 7    | VREF2_7/LDQ6    | T            | PL9A              | 7    | VREF2_7               | T            |  |
| D3          | PL9B              | 7    | VREF1_7/LDQ6    | C            | PL9B              | 7    | VREF1_7               | C            |  |
| GNDIO       | GNDIO7            | -    |                 |              | GNDIO7            | -    |                       |              |  |
| J8          | PL11A             | 7    | LUM0_SPLLT_IN_A | T (LVDS)*    | PL11A             | 7    | LUM0_SPLLT_IN_A/LDQ15 | T (LVDS)*    |  |
| H7          | PL11B             | 7    | LUM0_SPLLC_IN_A | C (LVDS)*    | PL11B             | 7    | LUM0_SPLLC_IN_A/LDQ15 | C (LVDS)*    |  |
| E3          | PL12A             | 7    | LUM0_SPLLT_FB_A | T            | PL12A             | 7    | LUM0_SPLLT_FB_A/LDQ15 | T            |  |
| E4          | PL12B             | 7    | LUM0_SPLLC_FB_A | C            | PL12B             | 7    | LUM0_SPLLC_FB_A/LDQ15 | C            |  |
| GNDIO       | GNDIO7            | -    |                 |              | -                 | -    |                       |              |  |
| G6          | PL13A             | 7    |                 | T (LVDS)*    | PL13A             | 7    | LDQ15                 | T (LVDS)*    |  |
| F5          | PL13B             | 7    |                 | C (LVDS)*    | PL13B             | 7    | LDQ15                 | C (LVDS)*    |  |
| E2          | PL14A             | 7    |                 | T            | PL14A             | 7    | LDQ15                 | T            |  |
| D1          | PL14B             | 7    |                 | C            | PL14B             | 7    | LDQ15                 | C            |  |
| -           | -                 | -    |                 |              | GNDIO7            | -    |                       |              |  |
| G5          | NC                | -    |                 |              | PL15A             | 7    | LDQS15                | T (LVDS)*    |  |
| G4          | NC                | -    |                 |              | PL15B             | 7    | LDQ15                 | C (LVDS)*    |  |
| K7          | NC                | -    |                 |              | PL16A             | 7    | LDQ15                 | T            |  |
| K8          | NC                | -    |                 |              | PL16B             | 7    | LDQ15                 | C            |  |
| E1          | NC                | -    |                 |              | PL17A             | 7    | LDQ15                 | T (LVDS)*    |  |
| F2          | NC                | -    |                 |              | PL17B             | 7    | LDQ15                 | C (LVDS)*    |  |
| F1          | NC                | -    |                 |              | PL18A             | 7    | LDQ15                 | T            |  |
| -           | -                 | -    |                 |              | GNDIO7            | -    |                       |              |  |
| G3          | NC                | -    |                 |              | PL18B             | 7    | LDQ15                 | C            |  |
| H5          | PL15A             | 7    |                 | T (LVDS)*    | PL21A             | 7    |                       | T (LVDS)*    |  |
| H4          | PL15B             | 7    |                 | C (LVDS)*    | PL21B             | 7    |                       | C (LVDS)*    |  |
| J5          | PL16A             | 7    |                 | T            | PL22A             | 7    |                       | T            |  |
| J4          | PL16B             | 7    |                 | C            | PL22B             | 7    |                       | C            |  |
| GNDIO       | GNDIO7            | -    |                 |              | GNDIO7            | -    |                       |              |  |
| G2          | NC                | -    |                 |              | PL24A             | 7    | LDQ28                 | T (LVDS)*    |  |
| G1          | NC                | -    |                 |              | PL24B             | 7    | LDQ28                 | C (LVDS)*    |  |
| L9          | NC                | -    |                 |              | PL25A             | 7    | LDQ28                 | T            |  |
| L7          | NC                | -    |                 |              | PL25B             | 7    | LDQ28                 | C            |  |
| K6          | NC                | -    |                 |              | PL26A             | 7    | LDQ28                 | T (LVDS)*    |  |
| K5          | NC                | -    |                 |              | PL26B             | 7    | LDQ28                 | C (LVDS)*    |  |
| L8          | NC                | -    |                 |              | PL27A             | 7    | LDQ28                 | T            |  |
| L6          | NC                | -    |                 |              | PL27B             | 7    | LDQ28                 | C            |  |
| -           | -                 | -    |                 |              | GNDIO7            | -    |                       |              |  |
| H3          | PL18A             | 7    |                 | T (LVDS)*    | PL28A             | 7    | LDQS28                | T (LVDS)*    |  |
| H2          | PL18B             | 7    |                 | C (LVDS)*    | PL28B             | 7    | LDQ28                 | C (LVDS)*    |  |
| N8          | PL19A             | 7    |                 | T            | PL29A             | 7    | LDQ28                 | T            |  |
| M9          | PL19B             | 7    |                 | C            | PL29B             | 7    | LDQ28                 | C            |  |
| J3          | PL20A             | 7    |                 | T (LVDS)*    | PL30A             | 7    | LDQ28                 | T (LVDS)*    |  |
| VCCIO       | VCCIO7            | 7    |                 |              | -                 | -    |                       |              |  |
| J2          | PL20B             | 7    |                 | C (LVDS)*    | PL30B             | 7    | LDQ28                 | C (LVDS)*    |  |
| H1          | PL21A             | 7    |                 | T            | PL31A             | 7    | LDQ28                 | T            |  |
| GNDIO       | GNDIO7            | -    |                 |              | GNDIO7            | -    |                       |              |  |
| J1          | PL21B             | 7    |                 | C            | PL31B             | 7    | LDQ28                 | C            |  |
| -           | -                 | -    |                 |              | -                 | -    |                       |              |  |
| -           | -                 | -    |                 |              | -                 | -    |                       |              |  |

**LFE2M100E/SE Logic Signal Connections: 900 fpBGA (Cont.)**

| LFE2M100E/SE |                   |      |                       |              |
|--------------|-------------------|------|-----------------------|--------------|
| Ball Number  | Ball/Pad Function | Bank | Dual Function         | Differential |
| K26          | PR26A             | 2    | RDQ23                 | T            |
| K23          | PR25B             | 2    | RDQ23                 | C (LVDS)*    |
| K22          | PR25A             | 2    | RDQ23                 | T (LVDS)*    |
| J22          | PR24B             | 2    | RDQ23                 | C            |
| VCCIO        | VCCIO2            | 2    |                       |              |
| J23          | PR24A             | 2    | RDQ23                 | T            |
| GNDIO        | GNDIO2            | -    |                       |              |
| VCCIO        | VCCIO2            | 2    |                       |              |
| J26          | PR17B             | 2    | RDQ15                 | C (LVDS)*    |
| H26          | PR17A             | 2    | RDQ15                 | T (LVDS)*    |
| H27          | PR16B             | 2    | RDQ15                 | C            |
| G26          | PR16A             | 2    | RDQ15                 | T            |
| VCCIO        | VCCIO2            | 2    |                       |              |
| H23          | PR15B             | 2    | RDQ15                 | C (LVDS)*    |
| H24          | PR15A             | 2    | RDQS15                | T (LVDS)*    |
| D28          | PR14B             | 2    | RDQ15                 | C            |
| GNDIO        | GNDIO2            | -    |                       |              |
| E28          | PR14A             | 2    | RDQ15                 | T            |
| G24          | PR13B             | 2    | RDQ15                 | C (LVDS)*    |
| H25          | PR13A             | 2    | RDQ15                 | T (LVDS)*    |
| D27          | PR12B             | 2    | RUM0_SPLLC_FB_A/RDQ15 | C            |
| VCCIO        | VCCIO2            | 2    |                       |              |
| E27          | PR12A             | 2    | RUM0_SPLLT_FB_A/RDQ15 | T            |
| F26          | PR11B             | 2    | RUM0_SPLLC_IN_A/RDQ15 | C (LVDS)*    |
| G25          | PR11A             | 2    | RUM0_SPLLT_IN_A/RDQ15 | T (LVDS)*    |
| F24          | PR9B              | 2    | VREF2_2               | C            |
| -            | -                 | -    |                       |              |
| GNDIO        | GNDIO2            | -    |                       |              |
| F25          | PR9A              | 2    | VREF1_2               | T            |
| VCCIO        | VCCIO2            | 2    |                       |              |
| G23          | XRES              | 1    |                       |              |
| C30          | URC_SQ_VCCR0      | 12   |                       |              |
| A29          | URC_SQ_HDINP0     | 12   |                       | T            |
| B30          | URC_SQ_VCCIB0     | 12   |                       |              |
| B29          | URC_SQ_HDINN0     | 12   |                       | C            |
| C27          | URC_SQ_VCCTX0     | 12   |                       |              |
| A26          | URC_SQ_HDOUTP0    | 12   |                       | T            |
| A27          | URC_SQ_VCCOB0     | 12   |                       |              |
| B26          | URC_SQ_HDOUTN0    | 12   |                       | C            |
| C26          | URC_SQ_VCCTX1     | 12   |                       |              |
| B25          | URC_SQ_HDOUTN1    | 12   |                       | C            |
| C25          | URC_SQ_VCCOB1     | 12   |                       |              |
| A25          | URC_SQ_HDOUTP1    | 12   |                       | T            |

## LFE2M70E/SE and LFE2M100E/SE Logic Signal Connections: 1152 fpBGA (Cont.)

| LFE2M70E/SE |                   |      |                       | LFE2M100E/SE |                   |      |                       |              |
|-------------|-------------------|------|-----------------------|--------------|-------------------|------|-----------------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function         | Differential | Ball/Pad Function | Bank | Dual Function         | Differential |
| U8          | PL43B             | 7    | LUM3_SPLLC_FB_A/LDQ46 | C            | PL51B             | 7    | LUM3_SPLLC_FB_A/LDQ54 | C            |
| VCCIO       | VCCIO7            | 7    |                       |              | VCCIO7            | 7    |                       |              |
| T6          | PL44A             | 7    | LDQ46                 | T (LVDS)*    | PL52A             | 7    | LDQ54                 | T (LVDS)*    |
| R6          | PL44B             | 7    | LDQ46                 | C (LVDS)*    | PL52B             | 7    | LDQ54                 | C (LVDS)*    |
| U9          | PL45A             | 7    | LDQ46                 | T            | PL53A             | 7    | LDQ54                 | T            |
| T7          | PL45B             | 7    | LDQ46                 | C            | PL53B             | 7    | LDQ54                 | C            |
| GNDIO       | GNDIO7            | -    |                       |              | GNDIO7            | -    |                       |              |
| U5          | PL46A             | 7    | LDQS46                | T (LVDS)*    | PL54A             | 7    | LDQS54                | T (LVDS)*    |
| U6          | PL46B             | 7    | LDQ46                 | C (LVDS)*    | PL54B             | 7    | LDQ54                 | C (LVDS)*    |
| U7          | PL47A             | 7    | LDQ46                 | T            | PL55A             | 7    | LDQ54                 | T            |
| VCCIO       | VCCIO7            | 7    |                       |              | VCCIO7            | 7    |                       |              |
| V9          | PL47B             | 7    | LDQ46                 | C            | PL55B             | 7    | LDQ54                 | C            |
| V11         | PL48A             | 7    | LDQ46                 | T (LVDS)*    | PL56A             | 7    | LDQ54                 | T (LVDS)*    |
| V10         | PL48B             | 7    | LDQ46                 | C (LVDS)*    | PL56B             | 7    | LDQ54                 | C (LVDS)*    |
| U4          | PL49A             | 7    | PCLKT7_0/LDQ46        | T            | PL57A             | 7    | PCLKT7_0/LDQ54        | T            |
| GNDIO       | GNDIO7            | -    |                       |              | GNDIO7            | -    |                       |              |
| U3          | PL49B             | 7    | PCLKC7_0/LDQ46        | C            | PL57B             | 7    | PCLKC7_0/LDQ54        | C            |
| U2          | PL51A             | 6    | PCLKT6_0/LDQ55        | T (LVDS)*    | PL59A             | 6    | PCLKT6_0/LDQ63        | T (LVDS)*    |
| U1          | PL51B             | 6    | PCLKC6_0/LDQ55        | C (LVDS)*    | PL59B             | 6    | PCLKC6_0/LDQ63        | C (LVDS)*    |
| V5          | PL52A             | 6    | VREF2_6/LDQ55         | T            | PL60A             | 6    | VREF2_6/LDQ63         | T            |
| V6          | PL52B             | 6    | VREF1_6/LDQ55         | C            | PL60B             | 6    | VREF1_6/LDQ63         | C            |
| V7          | PL53A             | 6    | LDQ55                 | T (LVDS)*    | PL61A             | 6    | LDQ63                 | T (LVDS)*    |
| VCCIO       | VCCIO6            | 6    |                       |              | VCCIO6            | 6    |                       |              |
| V8          | PL53B             | 6    | LDQ55                 | C (LVDS)*    | PL61B             | 6    | LDQ63                 | C (LVDS)*    |
| V4          | PL54A             | 6    | LDQ55                 | T            | PL62A             | 6    | LDQ63                 | T            |
| V3          | PL54B             | 6    | LDQ55                 | C            | PL62B             | 6    | LDQ63                 | C            |
| V2          | PL55A             | 6    | LDQS55                | T (LVDS)*    | PL63A             | 6    | LDQS63                | T (LVDS)*    |
| GNDIO       | GNDIO6            | -    |                       |              | GNDIO6            | -    |                       |              |
| V1          | PL55B             | 6    | LDQ55                 | C (LVDS)*    | PL63B             | 6    | LDQ63                 | C (LVDS)*    |
| W7          | PL56A             | 6    | LDQ55                 | T            | PL64A             | 6    | LDQ63                 | T            |
| W5          | PL56B             | 6    | LDQ55                 | C            | PL64B             | 6    | LDQ63                 | C            |
| VCCIO       | VCCIO6            | 6    |                       |              | VCCIO6            | 6    |                       |              |
| W2          | PL57A             | 6    | LLM3_SPLLT_IN_A/LDQ55 | T (LVDS)*    | PL65A             | 6    | LLM4_SPLLT_IN_A/LDQ63 | T (LVDS)*    |
| W1          | PL57B             | 6    | LLM3_SPLLC_IN_A/LDQ55 | C (LVDS)*    | PL65B             | 6    | LLM4_SPLLC_IN_A/LDQ63 | C (LVDS)*    |
| Y6          | PL58A             | 6    | LLM3_SPLLT_FB_A/LDQ55 | T            | PL66A             | 6    | LLM4_SPLLT_FB_A/LDQ63 | T            |
| W6          | PL58B             | 6    | LLM3_SPLLC_FB_A/LDQ55 | C            | PL66B             | 6    | LLM4_SPLLC_FB_A/LDQ63 | C            |
| GNDIO       | GNDIO6            | -    |                       |              | GNDIO6            | -    |                       |              |
| Y1          | PL60A             | 6    | LDQ64                 | T (LVDS)*    | PL68A             | 6    | LDQ72                 | T (LVDS)*    |
| Y2          | PL60B             | 6    | LDQ64                 | C (LVDS)*    | PL68B             | 6    | LDQ72                 | C (LVDS)*    |
| Y7          | PL61A             | 6    | LDQ64                 | T            | PL69A             | 6    | LDQ72                 | T            |
| Y5          | PL61B             | 6    | LDQ64                 | C            | PL69B             | 6    | LDQ72                 | C            |
| VCCIO       | VCCIO6            | 6    |                       |              | VCCIO6            | 6    |                       |              |
| W10         | PL62A             | 6    | LDQ64                 | T (LVDS)*    | PL70A             | 6    | LDQ72                 | T (LVDS)*    |
| Y8          | PL62B             | 6    | LDQ64                 | C (LVDS)*    | PL70B             | 6    | LDQ72                 | C (LVDS)*    |
| Y4          | PL63A             | 6    | LDQ64                 | T            | PL71A             | 6    | LDQ72                 | T            |
| Y3          | PL63B             | 6    | LDQ64                 | C            | PL71B             | 6    | LDQ72                 | C            |
| GNDIO       | GNDIO6            | -    |                       |              | GNDIO6            | -    |                       |              |
| AA1         | PL64A             | 6    | LDQS64                | T (LVDS)*    | PL72A             | 6    | LDQS72                | T (LVDS)*    |
| AA2         | PL64B             | 6    | LDQ64                 | C (LVDS)*    | PL72B             | 6    | LDQ72                 | C (LVDS)*    |

## LFE2M70E/SE and LFE2M100E/SE Logic Signal Connections: 1152 fpBGA (Cont.)

| LFE2M70E/SE |                   |      |               | LFE2M100E/SE |                   |      |               |              |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |
| AK20        | PB66B             | 4    | BDQ69         | C            | PB75B             | 4    | BDQ78         | C            |
| AN22        | PB67A             | 4    | BDQ69         | T            | PB76A             | 4    | BDQ78         | T            |
| AL21        | PB67B             | 4    | BDQ69         | C            | PB76B             | 4    | BDQ78         | C            |
| VCCIO       | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |
| GNDIO       | GNDIO4            | -    |               |              | GNDIO4            | -    |               |              |
| AH19        | PB69A             | 4    | BDQS69        | T            | PB78A             | 4    | BDQS78        | T            |
| AJ20        | PB69B             | 4    | BDQ69         | C            | PB78B             | 4    | BDQ78         | C            |
| AD20        | PB71A             | 4    | BDQ69         | T            | PB80A             | 4    | BDQ78         | T            |
| AF20        | PB71B             | 4    | BDQ69         | C            | PB80B             | 4    | BDQ78         | C            |
| VCCIO       | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |
| AJ19        | PB72A             | 4    | BDQ69         | T            | PB81A             | 4    | BDQ78         | T            |
| AH20        | PB72B             | 4    | BDQ69         | C            | PB81B             | 4    | BDQ78         | C            |
| AE20        | PB73A             | 4    | BDQ69         | T            | PB82A             | 4    | BDQ78         | T            |
| AG20        | PB73B             | 4    | BDQ69         | C            | PB82B             | 4    | BDQ78         | C            |
| GNDIO       | GNDIO4            | -    |               |              | GNDIO4            | -    |               |              |
| AH22        | NC                | -    |               |              | PB89A             | 4    | BDQ87         | T            |
| -           | -                 | -    |               |              | VCCIO4            | 4    |               |              |
| AH21        | NC                | -    |               |              | PB89B             | 4    | BDQ87         | C            |
| AG22        | NC                | -    |               |              | PB90A             | 4    | BDQ87         | T            |
| AG21        | NC                | -    |               |              | PB90B             | 4    | BDQ87         | C            |
| -           | -                 | -    |               |              | GNDIO4            | -    |               |              |
| AM22        | PB74A             | 4    | BDQ78         | T            | PB92A             | 4    | BDQ96         | T            |
| AL22        | PB74B             | 4    | BDQ78         | C            | PB92B             | 4    | BDQ96         | C            |
| VCCIO       | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |
| AP23        | PB77A             | 4    | BDQ78         | T            | PB95A             | 4    | BDQ96         | T            |
| AN23        | PB77B             | 4    | BDQ78         | C            | PB95B             | 4    | BDQ96         | C            |
| GNDIO       | GNDIO4            | -    |               |              | GNDIO4            | -    |               |              |
| AM24        | PB78A             | 4    | BDQS78        | T            | PB96A             | 4    | BDQS96        | T            |
| AL24        | PB78B             | 4    | BDQ78         | C            | PB96B             | 4    | BDQ96         | C            |
| AK22        | PB79A             | 4    | BDQ78         | T            | PB97A             | 4    | BDQ96         | T            |
| AJ22        | PB79B             | 4    | BDQ78         | C            | PB97B             | 4    | BDQ96         | C            |
| AL23        | PB80A             | 4    | BDQ78         | T            | PB98A             | 4    | BDQ96         | T            |
| AK23        | PB80B             | 4    | BDQ78         | C            | PB98B             | 4    | BDQ96         | C            |
| VCCIO       | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |
| AJ23        | PB81A             | 4    | BDQ78         | T            | PB99A             | 4    | BDQ96         | T            |
| AH23        | PB81B             | 4    | BDQ78         | C            | PB99B             | 4    | BDQ96         | C            |
| GNDIO       | GNDIO4            | -    |               |              | GNDIO4            | -    |               |              |
| AL28        | LRC_SQ_VCCRX3     | 13   |               |              | LRC_SQ_VCCRX3     | 13   |               |              |
| AM26        | LRC_SQ_HDINP3     | 13   |               | T            | LRC_SQ_HDINP3     | 13   |               | T            |
| AN26        | LRC_SQ_VCCIB3     | 13   |               |              | LRC_SQ_VCCIB3     | 13   |               |              |
| AM27        | LRC_SQ_HDINN3     | 13   |               | C            | LRC_SQ_HDINN3     | 13   |               | C            |
| AN27        | LRC_SQ_VCCTX3     | 13   |               |              | LRC_SQ_VCCTX3     | 13   |               |              |
| AP26        | LRC_SQ_HDOUTP3    | 13   |               | T            | LRC_SQ_HDOUTP3    | 13   |               | T            |
| AL26        | LRC_SQ_VCCOB3     | 13   |               |              | LRC_SQ_VCCOB3     | 13   |               |              |
| AP27        | LRC_SQ_HDOUTN3    | 13   |               | C            | LRC_SQ_HDOUTN3    | 13   |               | C            |
| AN28        | LRC_SQ_VCCTX2     | 13   |               |              | LRC_SQ_VCCTX2     | 13   |               |              |
| AP28        | LRC_SQ_HDOUTN2    | 13   |               | C            | LRC_SQ_HDOUTN2    | 13   |               | C            |
| AK28        | LRC_SQ_VCCOB2     | 13   |               |              | LRC_SQ_VCCOB2     | 13   |               |              |
| AP29        | LRC_SQ_HDOUTP2    | 13   |               | T            | LRC_SQ_HDOUTP2    | 13   |               | T            |

| Date                 | Version         | Section                             | Change Summary                                                                                            |
|----------------------|-----------------|-------------------------------------|-----------------------------------------------------------------------------------------------------------|
| June 2013<br>(cont.) | 04.0<br>(cont.) | DC and Switching<br>Characteristics | sysCLOCK SPLL Timing table – Corrected signal names for $t_{RST}$ parameter.                              |
|                      |                 |                                     | LatticeECP2/M sysCONFIG Port Timing Specifications table – added $t_{SUMCDI}$ and $t_{HMCDI}$ parameters. |
| September 2013       | 04.1            | Architecture                        | Updated Selectable Master Clock (CCLK) Frequencies during Configuration table.                            |
|                      |                 | DC and Switching<br>Characteristics | Added information on $f_{MAXSPI}$ parameter in LatticeECP2/M sys-CONFIG Port Timing Specifications table. |