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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            | 6000                                                                                                                                                                |
| Number of Logic Elements/Cells | 48000                                                                                                                                                               |
| Total RAM Bits                 | 4246528                                                                                                                                                             |
| Number of I/O                  | 270                                                                                                                                                                 |
| Number of Gates                | -                                                                                                                                                                   |
| Voltage - Supply               | 1.14V ~ 1.26V                                                                                                                                                       |
| Mounting Type                  | Surface Mount                                                                                                                                                       |
| Operating Temperature          | 0°C ~ 85°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/lfe2m50e-7f484c">https://www.e-xfl.com/product-detail/lattice-semiconductor/lfe2m50e-7f484c</a> |

- MULT (Multiply)
- MAC (Multiply, Accumulate)
- MULTADDSUB (Multiply, Addition/Subtraction)
- MULTADDSUBSUM (Multiply, Addition/Subtraction, Accumulate)

The number of elements available on each block depends in the width selected from the three available options x9, x18, and x36. A number of these elements are concatenated for highly parallel implementations of DSP functions. Table 2-7 shows the capabilities of the block.

**Table 2-7. Maximum Number of Elements in a Block**

| Width of Multiply | x9 | x18 | x36 |
|-------------------|----|-----|-----|
| MULT              | 8  | 4   | 1   |
| MAC               | 2  | 2   | —   |
| MULTADDSUB        | 4  | 2   | —   |
| MULTADDSUBSUM     | 2  | 1   | —   |

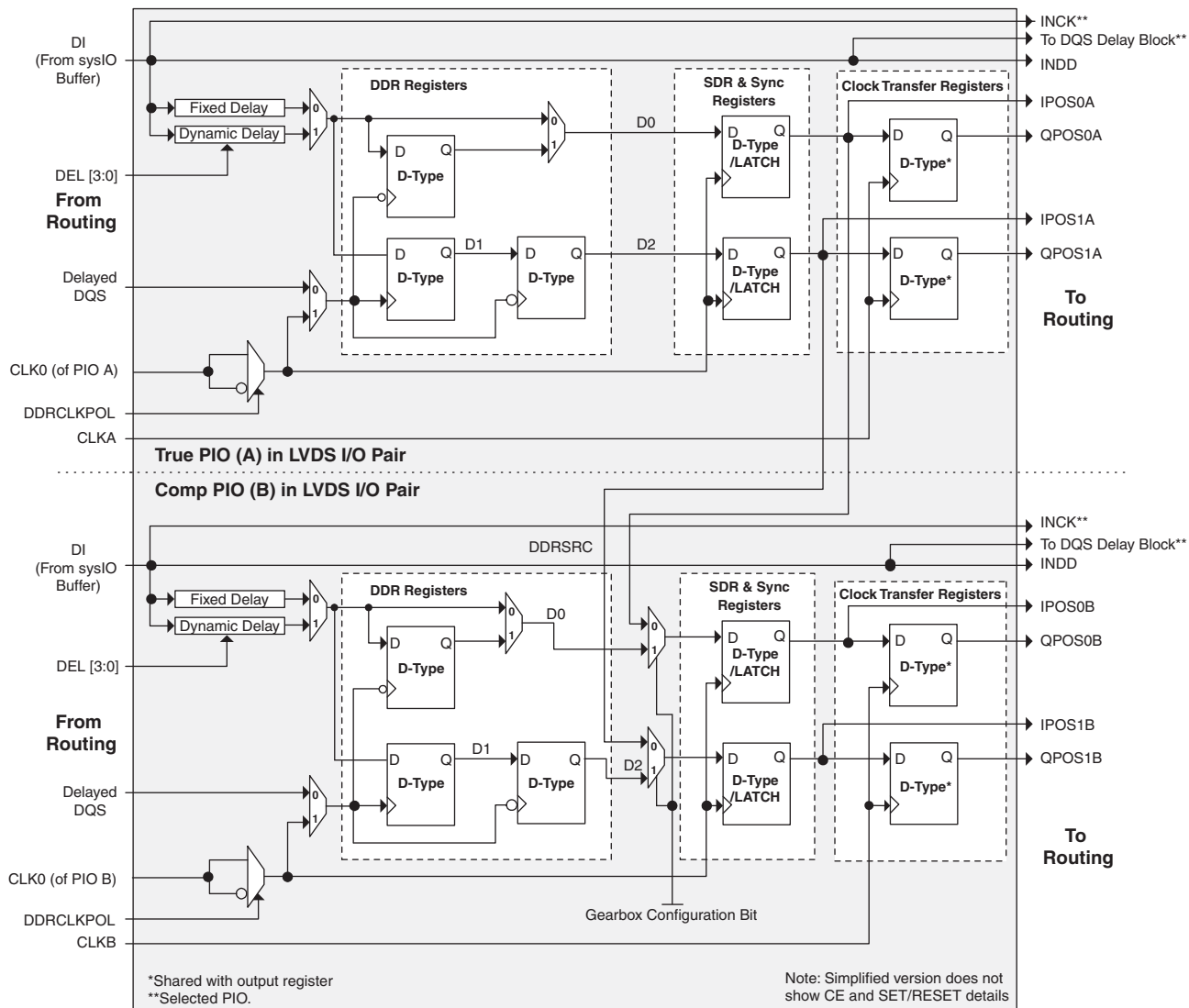
Some options are available in four elements. The input register in all the elements can be directly loaded or can be loaded as a shift register from previous operand registers. By selecting “dynamic operation” the following operations are possible:

- In the ‘Signed/Unsigned’ options the operands can be switched between signed and unsigned on every cycle.
- In the ‘Add/Sub’ option the Accumulator can be switched between addition and subtraction on every cycle.
- The loading of operands can switch between parallel and serial operations.

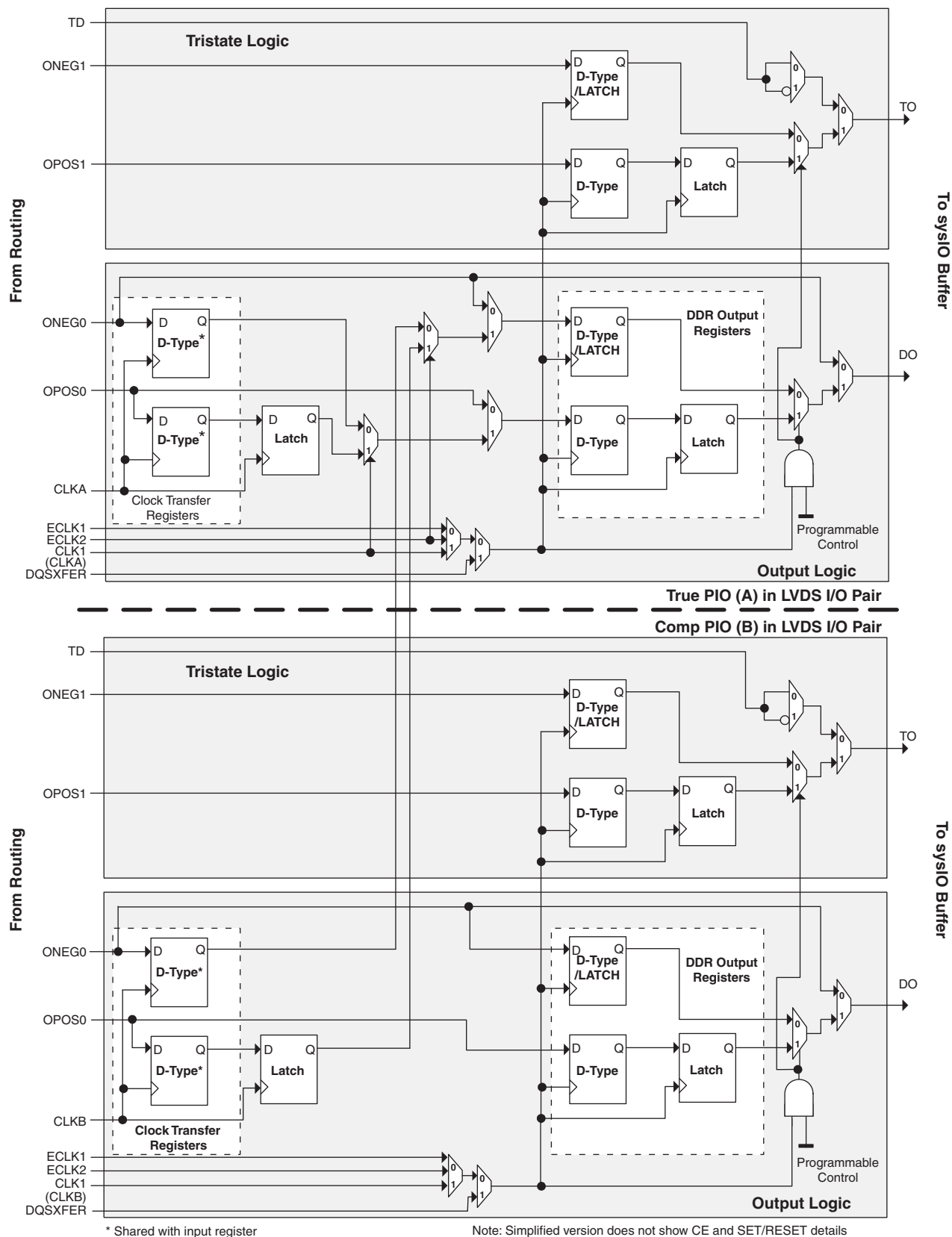
By combining input blocks of the complementary PIOs and sharing some registers from output blocks, a gearbox function can be implemented, which takes a double data rate signal applied to PIOA and converts it as four data streams, IPOS0A, IPOS1A, IPOS0B and IPOS1B. Figure 2-29 shows the diagram using this gearbox function. For more information about this topic, please see information regarding additional documentation at the end of this data sheet.

The signal DDRCLKPOL controls the polarity of the clock used in the synchronization registers. It ensures adequate timing when data is transferred from the DQS to the system clock domain. For further information about this topic, see the DDR Memory section of this data sheet.

**Figure 2-29. Input Register Block for Left, Right and Bottom Edges**



**Figure 2-31. Output and Tristate Block for Left, Right and Bottom Edges**



**LatticeECP2/M External Switching Characteristics<sup>9</sup> (Continued)**

Over Recommended Operating Conditions

| Parameter              | Description                                                    | Device   | -7   |      | -6   |      | -5   |      | Units |
|------------------------|----------------------------------------------------------------|----------|------|------|------|------|------|------|-------|
|                        |                                                                |          | Min. | Max. | Min. | Max. | Min. | Max. |       |
| t <sub>HPLL</sub>      | Clock to Data Hold - PIO Input Register                        | LFE2-6   | 1.00 | —    | 1.20 | —    | 1.40 | —    | ns    |
|                        |                                                                | LFE2-12  | 1.00 | —    | 1.20 | —    | 1.40 | —    | ns    |
|                        |                                                                | LFE2-20  | 1.00 | —    | 1.20 | —    | 1.40 | —    | ns    |
|                        |                                                                | LFE2-35  | 1.00 | —    | 1.20 | —    | 1.40 | —    | ns    |
|                        |                                                                | LFE2-50  | 1.00 | —    | 1.20 | —    | 1.40 | —    | ns    |
|                        |                                                                | LFE2-70  | 1.00 | —    | 1.20 | —    | 1.40 | —    | ns    |
|                        |                                                                | LFE2M20  | 1.00 | —    | 1.20 | —    | 1.40 | —    | ns    |
|                        |                                                                | LFE2M35  | 1.00 | —    | 1.20 | —    | 1.40 | —    | ns    |
|                        |                                                                | LFE2M50  | 1.00 | —    | 1.20 | —    | 1.40 | —    | ns    |
|                        |                                                                | LFE2M70  | 1.00 | —    | 1.20 | —    | 1.40 | —    | ns    |
|                        |                                                                | LFE2M100 | 1.00 | —    | 1.20 | —    | 1.40 | —    | ns    |
| t <sub>SU_DELPLL</sub> | Clock to Data Setup - PIO Input Register with Data Input Delay | LFE2-6   | 1.80 | —    | 2.00 | —    | 2.20 | —    | ns    |
|                        |                                                                | LFE2-12  | 1.80 | —    | 2.00 | —    | 2.20 | —    | ns    |
|                        |                                                                | LFE2-20  | 1.80 | —    | 2.00 | —    | 2.20 | —    | ns    |
|                        |                                                                | LFE2-35  | 1.80 | —    | 2.00 | —    | 2.20 | —    | ns    |
|                        |                                                                | LFE2-50  | 1.80 | —    | 2.00 | —    | 2.20 | —    | ns    |
|                        |                                                                | LFE2-70  | 1.80 | —    | 2.00 | —    | 2.20 | —    | ns    |
|                        |                                                                | LFE2M20  | 1.80 | —    | 2.00 | —    | 2.20 | —    | ns    |
|                        |                                                                | LFE2M35  | 1.80 | —    | 2.00 | —    | 2.20 | —    | ns    |
|                        |                                                                | LFE2M50  | 1.90 | —    | 2.10 | —    | 2.30 | —    | ns    |
|                        |                                                                | LFE2M70  | 1.90 | —    | 2.10 | —    | 2.30 | —    | ns    |
|                        |                                                                | LFE2M100 | 2.00 | —    | 2.20 | —    | 2.40 | —    | ns    |
| t <sub>H_DELPLL</sub>  | Clock to Data Hold - PIO Input Register with Input Data Delay  | LFE2-6   | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
|                        |                                                                | LFE2-12  | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
|                        |                                                                | LFE2-20  | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
|                        |                                                                | LFE2-35  | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
|                        |                                                                | LFE2-50  | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
|                        |                                                                | LFE2-70  | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
|                        |                                                                | LFE2M20  | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
|                        |                                                                | LFE2M35  | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
|                        |                                                                | LFE2M50  | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
|                        |                                                                | LFE2M70  | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
|                        |                                                                | LFE2M100 | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |

**DDR I/O Pin Parameters<sup>2</sup>**

|                      |                                   |        |       |       |       |       |       |       |     |
|----------------------|-----------------------------------|--------|-------|-------|-------|-------|-------|-------|-----|
| t <sub>DVADQ</sub>   | Data Valid After DQS (DDR Read)   | ECP2/M | —     | 0.225 | —     | 0.225 | —     | 0.225 | UI  |
| t <sub>DVEDQ</sub>   | Data Hold After DQS (DDR Read)    | ECP2/M | 0.640 | —     | 0.640 | —     | 0.640 | —     | UI  |
| t <sub>DQVBS</sub>   | Data Valid Before DQS (DDR Write) | ECP2/M | 0.250 | —     | 0.250 | —     | 0.250 | —     | UI  |
| t <sub>DQVAS</sub>   | Data Valid After DQS (DDR Write)  | ECP2/M | 0.250 | —     | 0.250 | —     | 0.250 | —     | UI  |
| f <sub>MAX_DDR</sub> | DDR Clock Frequency <sup>6</sup>  | ECP2/M | 95    | 200   | 95    | 166   | 95    | 133   | MHz |

**DDR2 I/O Pin Parameters<sup>3</sup>**

|                    |                                 |        |       |       |       |       |       |       |    |
|--------------------|---------------------------------|--------|-------|-------|-------|-------|-------|-------|----|
| t <sub>DVADQ</sub> | Data Valid After DQS (DDR Read) | ECP2/M | —     | 0.225 | —     | 0.225 | —     | 0.225 | UI |
| t <sub>DVEDQ</sub> | Data Hold After DQS (DDR Read)  | ECP2/M | 0.640 | —     | 0.640 | —     | 0.640 | —     | UI |

## LatticeECP2/M sysCONFIG Port Timing Specifications (Continued)

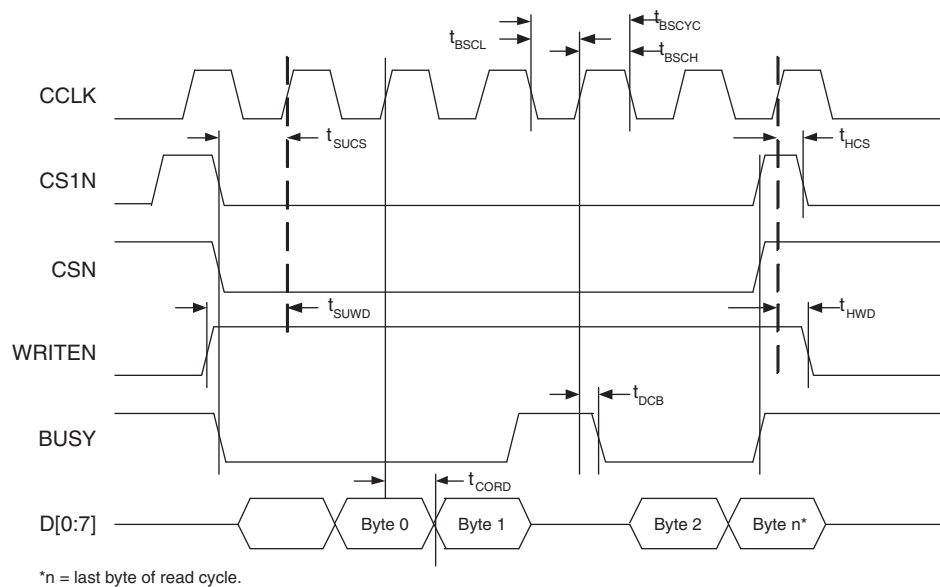
Over Recommended Operating Conditions

| Parameter           | Description                                                            | Min. | Max. | Units |
|---------------------|------------------------------------------------------------------------|------|------|-------|
| $f_{\text{MAXSPI}}$ | Max. CCLK Frequency - SPI Flash Read Opcode (0x03) (SPIFASTN = 1)      | —    | 20   | MHz   |
|                     | Max. CCLK Frequency - SPI Flash Fast Read Opcode (0x0B) (SPIFASTN = 0) | —    | 50   | MHz   |
|                     | Max. CCLK Frequency - Encrypted Bitstream                              | —    | 10   | MHz   |
| $t_{\text{SUSPI}}$  | SOSPI Data Setup Time Before CCLK                                      | 7    | —    | ns    |
| $t_{\text{HSPI}}$   | SOSPI Data Hold Time After CCLK                                        | 2    | —    | ns    |
| $t_{\text{SUMCDI}}$ | DI Setup to CCLK                                                       | 7    | —    | ns    |
| $t_{\text{HMCDI}}$  | DI Hold from CCLK                                                      | 1    | —    | ns    |

1. Re-toggling the PROGRAMN pin is not permitted until the INITN pin is high. Avoid consecutive toggling of the PROGRAMN.
2. For SED (Soft Error Detect), the SEDCLKIN operating frequency must be at least 20MHz. SEDCLKIN is derived from Master Clock Frequency that has a +/-30% variation..

| Parameter              | Min.                 | Max.                 | Units |
|------------------------|----------------------|----------------------|-------|
| Master Clock Frequency | Selected value - 30% | Selected value + 30% | MHz   |
| Duty Cycle             | 40                   | 60                   | %     |

Figure 3-14. sysCONFIG Parallel Port Read Cycle



**LatticeECP2M Pin Information Summary, LFE2M20 and LFE2M35**

| Pin Type                                                                          |                          | LFE2M20   |           | LFE2M35   |           |           |
|-----------------------------------------------------------------------------------|--------------------------|-----------|-----------|-----------|-----------|-----------|
|                                                                                   |                          | 256 fpBGA | 484 fpBGA | 256 fpBGA | 484 fpBGA | 672 fpBGA |
| Single Ended User I/O                                                             |                          | 140       | 304       | 140       | 303       | 410       |
| Differential Pair User I/O                                                        |                          | 70        | 152       | 70        | 151       | 199       |
| Configuration                                                                     | TAP Pins                 | 5         | 5         | 5         | 5         | 5         |
|                                                                                   | Muxed Pins               | 14        | 14        | 14        | 14        | 14        |
|                                                                                   | Dedicated Pins (Non TAP) | 7         | 7         | 7         | 7         | 7         |
| Non Configuration                                                                 | Muxed Pins               | 64        | 84        | 60        | 84        | 89        |
|                                                                                   | Dedicated Pins           | 3         | 3         | 3         | 3         | 3         |
| VCC                                                                               |                          | 6         | 16        | 6         | 16        | 29        |
| VCCAUX                                                                            |                          | 4         | 8         | 4         | 8         | 17        |
| VCCPLL                                                                            |                          | 1         | 4         | 1         | 4         | 8         |
| VCCIO                                                                             | Bank0                    | 1         | 4         | 1         | 4         | 5         |
|                                                                                   | Bank1                    | 1         | 3         | 1         | 3         | 4         |
|                                                                                   | Bank2                    | 2         | 4         | 2         | 4         | 5         |
|                                                                                   | Bank3                    | 2         | 4         | 2         | 4         | 5         |
|                                                                                   | Bank4                    | 2         | 4         | 2         | 4         | 4         |
|                                                                                   | Bank5                    | 2         | 4         | 2         | 4         | 5         |
|                                                                                   | Bank6                    | 2         | 4         | 2         | 4         | 5         |
|                                                                                   | Bank7                    | 2         | 4         | 2         | 4         | 5         |
|                                                                                   | Bank8                    | 1         | 2         | 1         | 2         | 2         |
| GND, GND0 to GND7                                                                 |                          | 22        | 57        | 22        | 57        | 80        |
| NC                                                                                |                          | 17        | 11        | 17        | 12        | 37        |
| Single Ended/ Differential I/O Pairs per Bank (including emulated with resistors) | Bank0                    | 0/0       | 36/18     | 0/0       | 36/18     | 63/31     |
|                                                                                   | Bank1                    | 0/0       | 18/9      | 0/0       | 18/9      | 18/9      |
|                                                                                   | Bank2                    | 14/7      | 30/15     | 14/7      | 30/15     | 50/25     |
|                                                                                   | Bank3                    | 16/8      | 36/18     | 16/8      | 36/18     | 43/21     |
|                                                                                   | Bank4                    | 32/16     | 62/31     | 32/16     | 62/31     | 50/21     |
|                                                                                   | Bank5                    | 20/10     | 28/14     | 20/10     | 28/14     | 60/30     |
|                                                                                   | Bank6                    | 16/8      | 40/20     | 16/8      | 39/19     | 52/25     |
|                                                                                   | Bank7                    | 28/14     | 40/20     | 28/14     | 40/20     | 60/30     |
|                                                                                   | Bank8                    | 14/7      | 14/7      | 14/7      | 14/7      | 14/7      |
| True LVDS I/O Pairs per Bank                                                      | Bank0 (Top Edge)         | 0         | 0         | 0         | 0         | 0         |
|                                                                                   | Bank1 (Top Edge)         | 0         | 0         | 0         | 0         | 0         |
|                                                                                   | Bank2 (Right Edge)       | 3         | 7         | 3         | 7         | 12        |
|                                                                                   | Bank3 (Right Edge)       | 4         | 9         | 4         | 9         | 11        |
|                                                                                   | Bank4 (Bottom Edge)      | 0         | 0         | 0         | 0         | 0         |
|                                                                                   | Bank5 (Bottom Edge)      | 0         | 0         | 0         | 0         | 0         |
|                                                                                   | Bank6 (Left Edge)        | 4         | 10        | 4         | 10        | 14        |
|                                                                                   | Bank7 (Left Edge)        | 7         | 10        | 7         | 10        | 15        |
|                                                                                   | Bank8 (Right Edge)       | 0         | 0         | 0         | 0         | 0         |

**LFE2-6E/SE and LFE2-12E/SE Logic Signal Connections: 256 fpBGA (Cont.)**

| LFE2-6E/SE  |                   |      |               |              | LFE2-12E/SE       |      |               |              |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |
| R12         | GND               | -    |               |              | GND               | -    |               |              |
| R5          | GND               | -    |               |              | GND               | -    |               |              |
| T1          | GND               | -    |               |              | GND               | -    |               |              |
| T16         | GND               | -    |               |              | GND               | -    |               |              |

\* Supports true LVDS. Other differential signals must be emulated with external resistors.

\*\* These dedicated input pins can be used for GPLLs or GDLLs within the respective quadrant.

Note: VCCIO and GND pads are used to determine the average DC current drawn by I/Os between GND/VCCIO connections, or between the last GND/VCCIO in an I/O bank and the end of an I/O bank. The substrate pads listed in the Pin Table do not necessarily have a one to one connection with a package ball or pin.

**LFE2-20E/SE Logic Signal Connections: 256 fpBGA (Cont.)**

| LFE2-20E/SE |             |                   |      |                          |              |
|-------------|-------------|-------------------|------|--------------------------|--------------|
| Ball Number | Ball Number | Ball/Pad Function | Bank | Dual Function            | Differential |
| L11         | L11         | PB61B             | 4    | BDQ60                    | C            |
| T13         | T13         | PB62A             | 4    | BDQ60                    | T            |
| R13         | R13         | PB63A             | 4    | BDQ60                    | T            |
| VCCIO       | VCCIO       | VCCIO4            | 4    |                          |              |
| T14         | T14         | PB62B             | 4    | BDQ60                    | C            |
| P13         | P13         | PB63B             | 4    | BDQ60                    | C            |
| GND         | GND         | GNDIO4            | -    |                          |              |
| N12         | N12         | PB64A             | 4    | VREF2_4/BDQ60            | T            |
| M12         | M12         | PB64B             | 4    | VREF1_4/BDQ60            | C            |
| R15         | R15         | CFG2              | 8    |                          |              |
| N14         | N14         | CFG1              | 8    |                          |              |
| N13         | N13         | PROGRAMN          | 8    |                          |              |
| N15         | N15         | CFG0              | 8    |                          |              |
| P15         | P15         | PR44B             | 8    | WRITEN                   | C            |
| L12         | L12         | INITN             | 8    |                          |              |
| N16         | N16         | PR43B             | 8    | CSN                      | C            |
| GND         | GND         | GNDIO8            | -    |                          |              |
| R14         | R14         | CCLK              | 8    |                          |              |
| P14         | P14         | PR44A             | 8    | CS1N                     | T            |
| M13         | M13         | DONE              | 8    |                          |              |
| R16         | R16         | PR42B             | 8    | D1                       | C            |
| VCCIO       | VCCIO       | VCCIO8            | 8    |                          |              |
| M16         | M16         | PR43A             | 8    | D0/SPIFASTN              | T            |
| P16         | P16         | PR42A             | 8    | D2                       | T            |
| L15         | L15         | PR41B             | 8    | D3                       | C            |
| GND         | GND         | GNDIO8            | -    |                          |              |
| L14         | L14         | PR40A             | 8    | D6                       | T            |
| L16         | L16         | PR41A             | 8    | D4                       | T            |
| L10         | L10         | PR39B             | 8    | D7/SPID0                 | C            |
| L13         | L13         | PR40B             | 8    | D5                       | C            |
| VCCIO       | VCCIO       | VCCIO8            | 8    |                          |              |
| K11         | K11         | PR39A             | 8    | DI/CSSPI0N               | T            |
| K14         | K14         | PR38B             | 8    | DOU/CSON                 | C            |
| K13         | K13         | PR38A             | 8    | BUSY/SISPI               | T            |
| GND         | GND         | GNDIO8            | -    |                          |              |
| K15         | K15         | PR31B             | 3    | RLM0_GPLL_C_FB_A/RDQ34   | C            |
| VCCIO       | VCCIO       | VCCIO3            | 3    |                          |              |
| K16         | K16         | PR31A             | 3    | RLM0_GPLL_T_FB_A/RDQ34   | T            |
| GND         | GND         | GNDIO3            | -    |                          |              |
| J16         | J16         | PR30B             | 3    | RLM0_GPLL_C_IN_A**/RDQ34 | C (LVDS)*    |
| J15         | J15         | PR30A             | 3    | RLM0_GPLL_T_IN_A**/RDQ34 | T (LVDS)*    |
| J14         | J14         | RLM0_PLLCAP       | 3    |                          |              |

## 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 |
| AA14          | PB35B             | 4    | BDQ33         | C            | PB44B             | 4    | BDQ42         | C            |
| W13           | PB37A             | 4    | BDQ33         | T            | PB46A             | 4    | BDQ42         | T            |
| GNDIO         | GNDIO4            | -    |               |              | GNDIO4            | -    |               |              |
| W14           | PB37B             | 4    | BDQ33         | C            | PB46B             | 4    | BDQ42         | C            |
| AB18          | PB39A             | 4    | BDQ42         | T            | PB48A             | 4    | BDQ51         | T            |
| AB19          | PB39B             | 4    | BDQ42         | C            | PB48B             | 4    | BDQ51         | C            |
| Y15           | PB41A             | 4    | BDQ42         | T            | PB50A             | 4    | BDQ51         | T            |
| V14           | PB40A             | 4    | BDQ42         | T            | PB49A             | 4    | BDQ51         | T            |
| VCCIO         | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |
| AA15          | PB41B             | 4    | BDQ42         | C            | PB50B             | 4    | BDQ51         | C            |
| W15           | PB40B             | 4    | BDQ42         | C            | PB49B             | 4    | BDQ51         | C            |
| GNDIO         | GNDIO4            | -    |               |              | GNDIO             | -    |               |              |
| AB20          | PB43A             | 4    | BDQ42         | T            | PB52A             | 4    | BDQ51         | T            |
| AA16          | PB42A             | 4    | BDQS42        | T            | PB51A             | 4    | BDQS51        | T            |
| AB21          | PB43B             | 4    | BDQ42         | C            | PB52B             | 4    | BDQ51         | C            |
| AA17          | PB42B             | 4    | BDQ42         | C            | PB51B             | 4    | BDQ51         | C            |
| Y16           | PB45A             | 4    | BDQ42         | T            | PB54A             | 4    | BDQ51         | T            |
| U15           | PB44A             | 4    | BDQ42         | T            | PB53A             | 4    | BDQ51         | T            |
| VCCIO         | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |
| W16           | PB45B             | 4    | BDQ42         | C            | PB54B             | 4    | BDQ51         | C            |
| U16           | PB44B             | 4    | BDQ42         | C            | PB53B             | 4    | BDQ51         | C            |
| AA18          | PB46A             | 4    | BDQ42         | T            | PB55A             | 4    | BDQ51         | T            |
| AA20          | PB46B             | 4    | BDQ42         | C            | PB55B             | 4    | BDQ51         | C            |
| GNDIO         | GNDIO4            | -    |               |              | GNDIO             | -    |               |              |
| V16           | PB49A             | 4    | BDQ51         | T            | PB58A             | 4    | BDQ60         | T            |
| V17           | PB49B             | 4    | BDQ51         | C            | PB58B             | 4    | BDQ60         | C            |
| AA21          | PB48A             | 4    | BDQ51         | T            | PB57A             | 4    | BDQ60         | T            |
| VCCIO         | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |
| Y19           | PB51A             | 4    | BDQS51        | T            | PB60A             | 4    | BDQS60        | T            |
| AA22          | PB48B             | 4    | BDQ51         | C            | PB57B             | 4    | BDQ60         | C            |
| Y20           | PB51B             | 4    | BDQ51         | C            | PB60B             | 4    | BDQ60         | C            |
| Y18           | PB50A             | 4    | BDQ51         | T            | PB59A             | 4    | BDQ60         | T            |
| GNDIO         | GNDIO4            | -    |               |              | GNDIO4            | -    |               |              |
| Y21           | PB53A             | 4    | BDQ51         | T            | PB62A             | 4    | BDQ60         | T            |
| Y17           | PB50B             | 4    | BDQ51         | C            | PB59B             | 4    | BDQ60         | C            |
| Y22           | PB53B             | 4    | BDQ51         | C            | PB62B             | 4    | BDQ60         | C            |
| W17           | PB52A             | 4    | BDQ51         | T            | PB61A             | 4    | BDQ60         | T            |
| VCCIO         | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |
| U18           | PB54A             | 4    | BDQ51         | T            | PB63A             | 4    | BDQ60         | T            |
| W18           | PB52B             | 4    | BDQ51         | C            | PB61B             | 4    | BDQ60         | C            |
| V18           | PB54B             | 4    | BDQ51         | C            | PB63B             | 4    | BDQ60         | C            |
| GNDIO         | GNDIO4            | -    |               |              | GNDIO4            | -    |               |              |
| T15           | PB55A             | 4    | VREF2_4/BDQ51 | T            | PB64A             | 4    | VREF2_4/BDQ60 | T            |
| T16           | PB55B             | 4    | VREF1_4/BDQ51 | C            | PB64B             | 4    | VREF1_4/BDQ60 | C            |

**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            |

## LFE2-20E/SE and LFE2-35E/SE Logic Signal Connections: 672 fpBGA (Cont.)

| LFE2-20E/20SE |                   |      |                |              | LFE2-35E/35SE     |      |                |              |
|---------------|-------------------|------|----------------|--------------|-------------------|------|----------------|--------------|
| Ball Number   | Ball/Pad Function | Bank | Dual Function  | Differential | Ball/Pad Function | Bank | Dual Function  | Differential |
| L2            | NC                | -    |                |              | NC                | -    |                |              |
| L1            | NC                | -    |                |              | NC                | -    |                |              |
| VCCIO         | VCCIO7            | 7    |                |              | VCCIO7            | 7    |                |              |
| M2            | NC                | -    |                |              | NC                | -    |                |              |
| M1            | NC                | -    |                |              | NC                | -    |                |              |
| N2            | NC                | -    |                |              | NC                | -    |                |              |
| GND           | GNDIO7            | -    |                |              | GNDIO7            | -    |                |              |
| M8            | VCC               | -    |                |              | NC                | -    |                |              |
| VCCIO         | VCCIO7            | 7    |                |              | VCCIO7            | 7    |                |              |
| GND           | GNDIO7            | -    |                |              | GNDIO7            | -    |                |              |
| N1            | PL12A             | 7    | LDQ16          |              | PL18A             | 7    | LDQ22          |              |
| L8            | PL13A             | 7    | LDQ16          | T            | PL19A             | 7    | LDQ22          | T            |
| K8            | PL13B             | 7    | LDQ16          | C            | PL19B             | 7    | LDQ22          | C            |
| VCCIO         | VCCIO7            | 7    |                |              | VCCIO7            | 7    |                |              |
| L6            | PL14A             | 7    | LDQ16          | T (LVDS)*    | PL20A             | 7    | LDQ22          | T (LVDS)*    |
| K5            | PL14B             | 7    | LDQ16          | C (LVDS)*    | PL20B             | 7    | LDQ22          | C (LVDS)*    |
| L7            | PL15A             | 7    | LDQ16          | T            | PL21A             | 7    | LDQ22          | T            |
| L5            | PL15B             | 7    | LDQ16          | C            | PL21B             | 7    | LDQ22          | C            |
| GND           | GNDIO7            | -    |                |              | GNDIO7            | -    |                |              |
| P1            | PL16A             | 7    | LDQS16         | T (LVDS)*    | PL22A             | 7    | LDQS22         | T (LVDS)*    |
| P2            | PL16B             | 7    | LDQ16          | C (LVDS)*    | PL22B             | 7    | LDQ22          | C (LVDS)*    |
| M6            | PL17A             | 7    | LDQ16          | T            | PL23A             | 7    | LDQ22          | T            |
| VCCIO         | VCCIO7            | 7    |                |              | VCCIO7            | 7    |                |              |
| N8            | PL17B             | 7    | LDQ16          | C            | PL23B             | 7    | LDQ22          | C            |
| R1            | PL18A             | 7    | LDQ16          | T (LVDS)*    | PL24A             | 7    | LDQ22          | T (LVDS)*    |
| R2            | PL18B             | 7    | LDQ16          | C (LVDS)*    | PL24B             | 7    | LDQ22          | C (LVDS)*    |
| M7            | PL19A             | 7    | PCLKT7_0/LDQ16 | T            | PL25A             | 7    | PCLKT7_0/LDQ22 | T            |
| GND           | GNDIO7            | -    |                |              | GNDIO7            | -    |                |              |
| N9            | PL19B             | 7    | PCLKC7_0/LDQ16 | C            | PL25B             | 7    | PCLKC7_0/LDQ22 | C            |
| M4            | PL21A             | 6    | PCLKT6_0/LDQ25 | T (LVDS)*    | PL27A             | 6    | PCLKT6_0/LDQ31 | T (LVDS)*    |
| M5            | PL21B             | 6    | PCLKC6_0/LDQ25 | C (LVDS)*    | PL27B             | 6    | PCLKC6_0/LDQ31 | C (LVDS)*    |
| N7            | PL22A             | 6    | VREF2_6/LDQ25  | T            | PL28A             | 6    | VREF2_6/LDQ31  | T            |
| P9            | PL22B             | 6    | VREF1_6/LDQ25  | C            | PL28B             | 6    | VREF1_6/LDQ31  | C            |
| N3            | PL23A             | 6    | LDQ25          | T (LVDS)*    | PL29A             | 6    | LDQ31          | T (LVDS)*    |
| VCCIO         | VCCIO6            | 6    |                |              | VCCIO6            | 6    |                |              |
| N4            | PL23B             | 6    | LDQ25          | C (LVDS)*    | PL29B             | 6    | LDQ31          | C (LVDS)*    |
| N5            | PL24A             | 6    | LDQ25          | T            | PL30A             | 6    | LDQ31          | T            |
| P7            | PL24B             | 6    | LDQ25          | C            | PL30B             | 6    | LDQ31          | C            |
| T1            | NC                | -    |                |              | PL31A             | 6    | LDQS31         | T (LVDS)*    |
| GND           | GNDIO6            | -    |                |              | GNDIO6            | -    |                |              |
| T2            | NC                | -    |                |              | PL31B             | 6    | LDQ31          | C (LVDS)*    |
| P8            | NC                | -    |                |              | PL32A             | 6    | LDQ31          | T            |
| P6            | NC                | -    |                |              | PL32B             | 6    | LDQ31          | C            |
| VCCIO         | VCCIO6            | 6    |                |              | VCCIO6            | 6    |                |              |
| P5            | NC                | -    |                |              | PL33A             | 6    | LDQ31          | T (LVDS)*    |
| P4            | NC                | -    |                |              | PL33B             | 6    | LDQ31          | C (LVDS)*    |

**LFE2-70E/SE Logic Signal Connections: 900 fpBGA**

| LFE2-70E/SE |                   |      |                       |              |
|-------------|-------------------|------|-----------------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function         | Differential |
| VCCIO       | VCCIO7            | 7    |                       |              |
| F4          | PL2A              | 7    | VREF2_7               | T (LVDS)*    |
| F3          | PL2B              | 7    | VREF1_7               | C (LVDS)*    |
| H4          | PL3A              | 7    |                       | T            |
| G5          | PL3B              | 7    |                       | C            |
| GND         | GNDIO7            | -    |                       |              |
| D2          | PL4A              | 7    |                       | T (LVDS)*    |
| D1          | PL4B              | 7    |                       | C (LVDS)*    |
| E2          | PL5A              | 7    |                       | T            |
| VCCIO       | VCCIO7            | 7    |                       |              |
| E1          | PL5B              | 7    |                       | C            |
| GND         | GNDIO7            | -    |                       |              |
| VCCIO       | VCCIO7            | 7    |                       |              |
| F1          | PL14A             | 7    | LUM1_SPLLT_IN_A/LDQ12 | T (LVDS)*    |
| F2          | PL14B             | 7    | LUM1_SPLLC_IN_A/LDQ12 | C (LVDS)*    |
| G1          | PL15A             | 7    | LUM1_SPLLT_FB_A/LDQ12 | T            |
| G2          | PL15B             | 7    | LUM1_SPLLC_FB_A/LDQ12 | C            |
| GND         | GNDIO7            | -    |                       |              |
| H8          | PL18A             | 7    | LDQ21                 | T            |
| H6          | PL18B             | 7    | LDQ21                 | C            |
| VCCIO       | VCCIO7            | 7    |                       |              |
| G4          | PL19A             | 7    | LDQ21                 | T (LVDS)*    |
| G3          | PL19B             | 7    | LDQ21                 | C (LVDS)*    |
| H7          | PL20A             | 7    | LDQ21                 | T            |
| H5          | PL20B             | 7    | LDQ21                 | C            |
| GND         | GNDIO7            | -    |                       |              |
| H2          | PL21A             | 7    | LDQS21                | T (LVDS)*    |
| H1          | PL21B             | 7    | LDQ21                 | C (LVDS)*    |
| J6          | PL22A             | 7    | LDQ21                 | T            |
| VCCIO       | VCCIO7            | 7    |                       |              |
| J8          | PL22B             | 7    | LDQ21                 | C            |
| J2          | PL23A             | 7    | LDQ21                 | T (LVDS)*    |
| J1          | PL23B             | 7    | LDQ21                 | C (LVDS)*    |
| J5          | PL24A             | 7    | LDQ21                 | T            |
| GND         | GNDIO7            | -    |                       |              |
| J7          | PL24B             | 7    | LDQ21                 | C            |
| J4          | PL25A             | 7    | LDQ29                 | T (LVDS)*    |
| J3          | PL25B             | 7    | LDQ29                 | C (LVDS)*    |
| K6          | PL26A             | 7    | LDQ29                 | T            |
| K8          | PL26B             | 7    | LDQ29                 | C            |
| VCCIO       | VCCIO7            | 7    |                       |              |
| K2          | PL27A             | 7    | LDQ29                 | T (LVDS)*    |

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

| LFE2-70E/SE |                   |      |               |              |
|-------------|-------------------|------|---------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential |
| AD18        | PB66A             | 4    | BDQ69         | T            |
| AF18        | PB66B             | 4    | BDQ69         | C            |
| AC18        | PB67A             | 4    | BDQ69         | T            |
| AE18        | PB67B             | 4    | BDQ69         | C            |
| VCCIO       | VCCIO4            | 4    |               |              |
| AG19        | PB68A             | 4    | BDQ69         | T            |
| AH19        | PB68B             | 4    | BDQ69         | C            |
| GND         | GNDIO4            | -    |               |              |
| AE19        | PB69A             | 4    | BDQS69        | T            |
| AF19        | PB69B             | 4    | BDQ69         | C            |
| AC19        | PB70A             | 4    | BDQ69         | T            |
| AD19        | PB70B             | 4    | BDQ69         | C            |
| AJ19        | PB71A             | 4    | BDQ69         | T            |
| AK19        | PB71B             | 4    | BDQ69         | C            |
| VCCIO       | VCCIO4            | 4    |               |              |
| AF20        | PB72A             | 4    | BDQ69         | T            |
| AH20        | PB72B             | 4    | BDQ69         | C            |
| AE20        | PB73A             | 4    | BDQ69         | T            |
| AG20        | PB73B             | 4    | BDQ69         | C            |
| GND         | GNDIO4            | -    |               |              |
| AD20        | PB74A             | 4    | BDQ78         | T            |
| AC20        | PB74B             | 4    | BDQ78         | C            |
| AH21        | PB75A             | 4    | BDQ78         | T            |
| AF21        | PB75B             | 4    | BDQ78         | C            |
| AJ20        | PB76A             | 4    | BDQ78         | T            |
| VCCIO       | VCCIO4            | 4    |               |              |
| AK20        | PB76B             | 4    | BDQ78         | C            |
| AG21        | PB77A             | 4    | BDQ78         | T            |
| AE21        | PB77B             | 4    | BDQ78         | C            |
| AD21        | PB78A             | 4    | BDQS78        | T            |
| GND         | GNDIO4            | -    |               |              |
| AC21        | PB78B             | 4    | BDQ78         | C            |
| AD22        | PB79A             | 4    | BDQ78         | T            |
| AB21        | PB79B             | 4    | BDQ78         | C            |
| AJ21        | PB80A             | 4    | BDQ78         | T            |
| VCCIO       | VCCIO4            | 4    |               |              |
| AK21        | PB80B             | 4    | BDQ78         | C            |
| GND         | GNDIO4            | -    |               |              |
| VCCIO       | VCCIO4            | 4    |               |              |
| AJ25        | PB87A             | 4    | BDQS87***     | T            |
| AK24        | PB87B             | 4    | BDQ87         | C            |
| AJ24        | PB88A             | 4    | BDQ87         | T            |
| AK25        | PB88B             | 4    | BDQ87         | C            |

## LFE2M-20E/SE and LFE2M-35E/SE Logic Signal Connections: 256 fpBGA (Cont.)

| LFE2M20E/SE |                   |      |                |              | LFE2M35E/SE       |      |                |              |
|-------------|-------------------|------|----------------|--------------|-------------------|------|----------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function  | Differential | Ball/Pad Function | Bank | Dual Function  | Differential |
| T7          | PB22A             | 4    | PCLKT4_0/BDQ24 | T            | PB40A             | 4    | PCLKT4_0/BDQ42 | T            |
| VCCIO       | VCCIO4            | 4    |                |              | VCCIO4            | 4    |                |              |
| T8          | PB22B             | 4    | PCLKC4_0/BDQ24 | C            | PB40B             | 4    | PCLKC4_0/BDQ42 | C            |
| L7          | PB23A             | 4    | VREF2_4/BDQ24  | T            | PB41A             | 4    | VREF2_4/BDQ42  | T            |
| L8          | PB23B             | 4    | VREF1_4/BDQ24  | C            | PB41B             | 4    | VREF1_4/BDQ42  | C            |
| GNDIO       | GNDIO4            | -    |                |              | GNDIO4            | -    |                |              |
| VCCIO       | VCCIO4            | 4    |                |              | VCCIO4            | 4    |                |              |
| GNDIO       | GNDIO4            | -    |                |              | GNDIO4            | -    |                |              |
| P8          | PB29A             | 4    | BDQ33          | T            | PB47A             | 4    | BDQ51          | T            |
| N8          | PB29B             | 4    | BDQ33          | C            | PB47B             | 4    | BDQ51          | C            |
| R7          | PB30A             | 4    | BDQ33          | T            | PB48A             | 4    | BDQ51          | T            |
| R8          | PB30B             | 4    | BDQ33          | C            | PB48B             | 4    | BDQ51          | C            |
| N7          | PB31A             | 4    | BDQ33          | T            | PB49A             | 4    | BDQ51          | T            |
| M8          | PB31B             | 4    | BDQ33          | C            | PB49B             | 4    | BDQ51          | C            |
| VCCIO       | VCCIO4            | 4    |                |              | VCCIO4            | 4    |                |              |
| R9          | PB32A             | 4    | BDQ33          | T            | PB50A             | 4    | BDQ51          | T            |
| T9          | PB32B             | 4    | BDQ33          | C            | PB50B             | 4    | BDQ51          | C            |
| GNDIO       | GNDIO4            | -    |                |              | GNDIO4            | -    |                |              |
| T10         | PB33A             | 4    | BDQS33         | T            | PB51A             | 4    | BDQS51         | T            |
| R10         | PB33B             | 4    | BDQ33          | C            | PB51B             | 4    | BDQ51          | C            |
| N9          | PB34A             | 4    | BDQ33          | T            | PB52A             | 4    | BDQ51          | T            |
| P10         | PB34B             | 4    | BDQ33          | C            | PB52B             | 4    | BDQ51          | C            |
| VCCIO       | VCCIO4            | 4    |                |              | VCCIO4            | 4    |                |              |
| GNDIO       | GNDIO4            | -    |                |              | GNDIO4            | -    |                |              |
| L9          | PB47A             | 4    | BDQ51          | T            | PB65A             | 4    | BDQ69          | T            |
| M9          | PB47B             | 4    | BDQ51          | C            | PB65B             | 4    | BDQ69          | C            |
| T11         | PB49A             | 4    | BDQ51          | T            | PB67A             | 4    | BDQ69          | T            |
| R11         | PB49B             | 4    | BDQ51          | C            | PB67B             | 4    | BDQ69          | C            |
| VCCIO       | VCCIO4            | 4    |                |              | VCCIO4            | 4    |                |              |
| T12         | PB50A             | 4    | BDQ51          | T            | PB68A             | 4    | BDQ69          | T            |
| T13         | PB50B             | 4    | BDQ51          | C            | PB68B             | 4    | BDQ69          | C            |
| GNDIO       | GNDIO4            | -    |                |              | GNDIO4            | -    |                |              |
| P11         | PB51A             | 4    | BDQS51         | T            | PB69A             | 4    | BDQS69         | T            |
| N10         | PB51B             | 4    | BDQ51          | C            | PB69B             | 4    | BDQ69          | C            |
| T14         | PB52A             | 4    | BDQ51          | T            | PB70A             | 4    | BDQ69          | T            |
| R13         | PB52B             | 4    | BDQ51          | C            | PB70B             | 4    | BDQ69          | C            |
| R15         | PB53A             | 4    | BDQ51          | T            | PB71A             | 4    | BDQ69          | T            |
| R16         | PB53B             | 4    | BDQ51          | C            | PB71B             | 4    | BDQ69          | C            |
| VCCIO       | VCCIO4            | 4    |                |              | VCCIO4            | 4    |                |              |
| R14         | PB54A             | 4    | BDQ51          | T            | PB72A             | 4    | BDQ69          | T            |
| P15         | PB54B             | 4    | BDQ51          | C            | PB72B             | 4    | BDQ69          | C            |
| P16         | PB55A             | 4    | BDQ51          | T            | PB73A             | 4    | BDQ69          | T            |
| P14         | PB55B             | 4    | BDQ51          | C            | PB73B             | 4    | BDQ69          | C            |
| GNDIO       | GNDIO4            | -    |                |              | GNDIO4            | -    |                |              |
| L11         | CFG2              | 8    |                |              | CFG2              | 8    |                |              |
| L10         | CFG1              | 8    |                |              | CFG1              | 8    |                |              |
| P13         | CFG0              | 8    |                |              | CFG0              | 8    |                |              |
| N12         | PROGRAMN          | 8    |                |              | PROGRAMN          | 8    |                |              |

## LFE2M-20E/SE and LFE2M-35E/SE Logic Signal Connections: 256 fpBGA (Cont.)

| LFE2M20E/SE |                   |      |                 |              | LFE2M35E/SE       |      |                       |              |  |
|-------------|-------------------|------|-----------------|--------------|-------------------|------|-----------------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function   | Differential | Ball/Pad Function | Bank | Dual Function         | Differential |  |
| F14         | PR24B             | 2    | RDQ22           | C (LVDS)*    | PR34B             | 2    | RDQ32                 | C(LVDS)*     |  |
| F13         | PR24A             | 2    | RDQ22           | T (LVDS)*    | PR34A             | 2    | RDQ32                 | T (LVDS)*    |  |
| VCCIO       | VCCIO2            | 2    |                 |              | VCCIO2            | 2    |                       |              |  |
| GNDIO       | GNDIO2            | -    |                 |              | GNDIO2            | -    |                       |              |  |
| H11         | PR14B             | 2    |                 | C            | PR14B             | 2    | RDQ15                 | C            |  |
| G11         | PR14A             | 2    |                 | T            | PR14A             | 2    | RDQ15                 | T            |  |
| E13         | PR13B             | 2    |                 | C (LVDS)*    | PR13B             | 2    | RDQ15                 | C(LVDS)*     |  |
| F12         | PR13A             | 2    |                 | T (LVDS)*    | PR13A             | 2    | RDQ15                 | T (LVDS)*    |  |
| VCCIO       | VCCIO2            | 2    |                 |              | VCCIO2            | 2    |                       |              |  |
| F11         | PR12B             | 2    | RUM0_SPLLC_FB_A | C            | PR12B             | 2    | RUM0_SPLLC_FB_A/RDQ15 | C            |  |
| E12         | PR12A             | 2    | RUM0_SPLLT_FB_A | T            | PR12A             | 2    | RUM0_SPLLT_FB_A/RDQ15 | T            |  |
| D16         | PR11B             | 2    | RUM0_SPLLC_IN_A | C (LVDS)*    | PR11B             | 2    | RUM0_SPLLC_IN_A/RDQ15 | C(LVDS)*     |  |
| D15         | PR11A             | 2    | RUM0_SPLLT_IN_A | T (LVDS)*    | PR11A             | 2    | RUM0_SPLLT_IN_A/RDQ15 | T (LVDS)*    |  |
| C16         | PR9B              | 2    | VREF2_2         | C            | PR9B              | 2    | VREF2_2               | C            |  |
| GNDIO       | GNDIO2            | -    |                 |              | GNDIO2            | -    |                       |              |  |
| B16         | PR9A              | 2    | VREF1_2         | T            | PR9A              | 2    | VREF1_2               | T            |  |
| VCCIO       | VCCIO2            | 2    |                 |              | VCCIO2            | 2    |                       |              |  |
| F4          | XRES              | -    |                 |              | XRES              | -    |                       |              |  |
| C15         | URC_SQ_VCCRX0     | 12   |                 |              | URC_SQ_VCCRX0     | 12   |                       |              |  |
| A14         | URC_SQ_HDINP0     | 12   |                 | T            | URC_SQ_HDINP0     | 12   |                       | T            |  |
| B15         | URC_SQ_VCCIB0     | 12   |                 |              | URC_SQ_VCCIB0     | 12   |                       |              |  |
| B14         | URC_SQ_HDINN0     | 12   |                 | C            | URC_SQ_HDINN0     | 12   |                       | C            |  |
| C12         | URC_SQ_VCCTX0     | 12   |                 |              | URC_SQ_VCCTX0     | 12   |                       |              |  |
| A11         | URC_SQ_HDOUTP0    | 12   |                 | T            | URC_SQ_HDOUTP0    | 12   |                       | T            |  |
| A12         | URC_SQ_VCCOB0     | 12   |                 |              | URC_SQ_VCCOB0     | 12   |                       |              |  |
| B11         | URC_SQ_HDOUTN0    | 12   |                 | C            | URC_SQ_HDOUTN0    | 12   |                       | C            |  |
| C11         | URC_SQ_VCCTX1     | 12   |                 |              | URC_SQ_VCCTX1     | 12   |                       |              |  |
| B10         | URC_SQ_HDOUTN1    | 12   |                 | C            | URC_SQ_HDOUTN1    | 12   |                       | C            |  |
| C10         | URC_SQ_VCCOB1     | 12   |                 |              | URC_SQ_VCCOB1     | 12   |                       |              |  |
| A10         | URC_SQ_HDOUTP1    | 12   |                 | T            | URC_SQ_HDOUTP1    | 12   |                       | T            |  |
| C14         | URC_SQ_VCCRX1     | 12   |                 |              | URC_SQ_VCCRX1     | 12   |                       |              |  |
| B13         | URC_SQ_HDINN1     | 12   |                 | C            | URC_SQ_HDINN1     | 12   |                       | C            |  |
| C13         | URC_SQ_VCCIB1     | 12   |                 |              | URC_SQ_VCCIB1     | 12   |                       |              |  |
| A13         | URC_SQ_HDINP1     | 12   |                 | T            | URC_SQ_HDINP1     | 12   |                       | T            |  |
| B9          | URC_SQ_VCCAUX33   | 12   |                 |              | URC_SQ_VCCAUX33   | 12   |                       |              |  |
| D8          | URC_SQ_REFCLKN    | 12   |                 | C            | URC_SQ_REFCLKN    | 12   |                       | C            |  |
| D9          | URC_SQ_REFCLKP    | 12   |                 | T            | URC_SQ_REFCLKP    | 12   |                       | T            |  |
| C9          | URC_SQ_VCCP       | 12   |                 |              | URC_SQ_VCCP       | 12   |                       |              |  |
| A5          | URC_SQ_HDINP2     | 12   |                 | T            | URC_SQ_HDINP2     | 12   |                       | T            |  |
| C5          | URC_SQ_VCCIB2     | 12   |                 |              | URC_SQ_VCCIB2     | 12   |                       |              |  |
| B5          | URC_SQ_HDINN2     | 12   |                 | C            | URC_SQ_HDINN2     | 12   |                       | C            |  |
| C4          | URC_SQ_VCCRX2     | 12   |                 |              | URC_SQ_VCCRX2     | 12   |                       |              |  |
| A8          | URC_SQ_HDOUTP2    | 12   |                 | T            | URC_SQ_HDOUTP2    | 12   |                       | T            |  |
| C8          | URC_SQ_VCCOB2     | 12   |                 |              | URC_SQ_VCCOB2     | 12   |                       |              |  |
| B8          | URC_SQ_HDOUTN2    | 12   |                 | C            | URC_SQ_HDOUTN2    | 12   |                       | C            |  |
| C7          | URC_SQ_VCCTX2     | 12   |                 |              | URC_SQ_VCCTX2     | 12   |                       |              |  |
| B7          | URC_SQ_HDOUTN3    | 12   |                 | C            | URC_SQ_HDOUTN3    | 12   |                       | C            |  |
| A6          | URC_SQ_VCCOB3     | 12   |                 |              | URC_SQ_VCCOB3     | 12   |                       |              |  |

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

| LFE2M50E/SE |                   |      |               |              |
|-------------|-------------------|------|---------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential |
| U12         | PB59B             | 4    | BDQ60         | C            |
| GNDIO       | GNDIO4            | -    |               |              |
| AA12        | PB60A             | 4    | BDQS60        | T            |
| Y12         | PB60B             | 4    | BDQ60         | C            |
| V12         | PB61A             | 4    | BDQ60         | T            |
| W12         | PB61B             | 4    | BDQ60         | C            |
| AB12        | PB62A             | 4    | BDQ60         | T            |
| AA13        | PB62B             | 4    | BDQ60         | C            |
| VCCIO       | VCCIO4            | 4    |               |              |
| T12         | PB63A             | 4    | BDQ60         | T            |
| U13         | PB63B             | 4    | BDQ60         | C            |
| V13         | PB64A             | 4    | BDQ60         | T            |
| T13         | PB64B             | 4    | BDQ60         | C            |
| GNDIO       | GNDIO4            | -    |               |              |
| AB13        | PB65A             | 4    | BDQ69         | T            |
| AB14        | PB65B             | 4    | BDQ69         | C            |
| U14         | PB66A             | 4    | BDQ69         | T            |
| T14         | PB66B             | 4    | BDQ69         | C            |
| AA14        | PB67A             | 4    | BDQ69         | T            |
| VCCIO       | VCCIO4            | 4    |               |              |
| Y14         | PB67B             | 4    | BDQ69         | C            |
| W14         | PB68A             | 4    | BDQ69         | T            |
| V14         | PB68B             | 4    | BDQ69         | C            |
| AB15        | PB69A             | 4    | BDQS69        | T            |
| GNDIO       | GNDIO4            | -    |               |              |
| AA15        | PB69B             | 4    | BDQ69         | C            |
| V15         | PB70A             | 4    | BDQ69         | T            |
| U15         | PB70B             | 4    | BDQ69         | C            |
| AB16        | PB71A             | 4    | BDQ69         | T            |
| VCCIO       | VCCIO4            | 4    |               |              |
| AA16        | PB71B             | 4    | BDQ69         | C            |
| AB17        | PB72A             | 4    | BDQ69         | T            |
| AA17        | PB72B             | 4    | BDQ69         | C            |
| GNDIO       | GNDIO4            | -    |               |              |
| W20         | CFG2              | 8    |               |              |
| V20         | CFG1              | 8    |               |              |
| V19         | CFG0              | 8    |               |              |
| V22         | PROGRAMN          | 8    |               |              |
| W22         | CCLK              | 8    |               |              |
| U18         | INITN             | 8    |               |              |
| U22         | DONE              | 8    |               |              |
| GNDIO       | GNDIO8            | -    |               |              |
| U20         | WRITEN***         | 8    |               |              |

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

| LFE2M50E/SE |                   |      |                       |              |
|-------------|-------------------|------|-----------------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function         | Differential |
| M19         | PR50A             | 3    | RDQ52                 | T (LVDS)*    |
| M18         | PR49B             | 3    | RDQ52                 | C            |
| VCCIO       | VCCIO3            | 3    |                       |              |
| L16         | PR49A             | 3    | RDQ52                 | T            |
| L22         | PR48B             | 3    | RDQ52                 | C (LVDS)*    |
| L21         | PR48A             | 3    | RDQ52                 | T (LVDS)*    |
| GNDIO       | GNDIO3            | -    |                       |              |
| K22         | PR46B             | 3    | RLM3_SPLLC_FB_A       | C            |
| VCCIO       | VCCIO3            | 3    |                       |              |
| K21         | PR46A             | 3    | RLM3_SPLLT_FB_A       | T            |
| L17         | PR45B             | 3    | RLM3_SPLLC_IN_A       | C (LVDS)*    |
| L18         | PR45A             | 3    | RLM3_SPLLT_IN_A       | T (LVDS)*    |
| GNDIO       | GNDIO3            | -    |                       |              |
| L20         | PR44B             | 3    |                       | C            |
| L19         | PR44A             | 3    |                       | T            |
| K16         | PR43B             | 3    |                       | C (LVDS)*    |
| K17         | PR43A             | 3    |                       | T (LVDS)*    |
| VCCIO       | VCCIO3            | 3    |                       |              |
| J16         | PR42B             | 3    | VREF2_3               | C            |
| K18         | PR42A             | 3    | VREF1_3               | T            |
| J22         | PR41B             | 3    | PCLKC3_0              | C (LVDS)*    |
| J21         | PR41A             | 3    | PCLKT3_0              | T (LVDS)*    |
| H22         | PR39B             | 2    | PCLKC2_0/RDQ36        | C            |
| H21         | PR39A             | 2    | PCLKT2_0/RDQ36        | T            |
| GNDIO       | GNDIO2            | -    |                       |              |
| J17         | PR38B             | 2    | RDQ36                 | C (LVDS)*    |
| J18         | PR38A             | 2    | RDQ36                 | T (LVDS)*    |
| J20         | PR37B             | 2    | RDQ36                 | C            |
| J19         | PR37A             | 2    | RDQ36                 | T            |
| VCCIO       | VCCIO2            | 2    |                       |              |
| H16         | PR36B             | 2    | RDQ36                 | C (LVDS)*    |
| H17         | PR36A             | 2    | RDQS36                | T (LVDS)*    |
| G22         | PR35B             | 2    | RDQ36                 | C            |
| GNDIO       | GNDIO2            | -    |                       |              |
| G21         | PR35A             | 2    | RDQ36                 | T            |
| H20         | PR34B             | 2    | RDQ36                 | C (LVDS)*    |
| H19         | PR34A             | 2    | RDQ36                 | T (LVDS)*    |
| G16         | PR33B             | 2    | RUM3_SPLLC_FB_A/RDQ36 | C            |
| VCCIO       | VCCIO2            | 2    |                       |              |
| H18         | PR33A             | 2    | RUM3_SPLLT_FB_A/RDQ36 | T            |
| F22         | PR32B             | 2    | RUM3_SPLLC_IN_A/RDQ36 | C (LVDS)*    |
| F21         | PR32A             | 2    | RUM3_SPLLT_IN_A/RDQ36 | T (LVDS)*    |
| G20         | PR30B             | 2    | RDQ27                 | C            |

## LFE2M50E/SE and LFE2M70E/SE Logic Signal Connections: 900 fpBGA (Cont.)

| LFE2M50E/SE |                   |      |               |              | LFE2M70E/SE       |      |               |              |  |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |  |
| P13         | GND               | -    |               |              | GND               | -    |               |              |  |
| P14         | GND               | -    |               |              | GND               | -    |               |              |  |
| P15         | GND               | -    |               |              | GND               | -    |               |              |  |
| P16         | GND               | -    |               |              | GND               | -    |               |              |  |
| P17         | GND               | -    |               |              | GND               | -    |               |              |  |
| P18         | GND               | -    |               |              | GND               | -    |               |              |  |
| P20         | GND               | -    |               |              | GND               | -    |               |              |  |
| R10         | GND               | -    |               |              | GND               | -    |               |              |  |
| R11         | GND               | -    |               |              | GND               | -    |               |              |  |
| R13         | GND               | -    |               |              | GND               | -    |               |              |  |
| R14         | GND               | -    |               |              | GND               | -    |               |              |  |
| R15         | GND               | -    |               |              | GND               | -    |               |              |  |
| R16         | GND               | -    |               |              | GND               | -    |               |              |  |
| R17         | GND               | -    |               |              | GND               | -    |               |              |  |
| R18         | GND               | -    |               |              | GND               | -    |               |              |  |
| R20         | GND               | -    |               |              | GND               | -    |               |              |  |
| R21         | GND               | -    |               |              | GND               | -    |               |              |  |
| R24         | GND               | -    |               |              | GND               | -    |               |              |  |
| R7          | GND               | -    |               |              | GND               | -    |               |              |  |
| T10         | GND               | -    |               |              | GND               | -    |               |              |  |
| T11         | GND               | -    |               |              | GND               | -    |               |              |  |
| T13         | GND               | -    |               |              | GND               | -    |               |              |  |
| T14         | GND               | -    |               |              | GND               | -    |               |              |  |
| T15         | GND               | -    |               |              | GND               | -    |               |              |  |
| T16         | GND               | -    |               |              | GND               | -    |               |              |  |
| T17         | GND               | -    |               |              | GND               | -    |               |              |  |
| T18         | GND               | -    |               |              | GND               | -    |               |              |  |
| T20         | GND               | -    |               |              | GND               | -    |               |              |  |
| T21         | GND               | -    |               |              | GND               | -    |               |              |  |
| T24         | GND               | -    |               |              | GND               | -    |               |              |  |
| T7          | GND               | -    |               |              | GND               | -    |               |              |  |
| U11         | GND               | -    |               |              | GND               | -    |               |              |  |
| U13         | GND               | -    |               |              | GND               | -    |               |              |  |
| U14         | GND               | -    |               |              | GND               | -    |               |              |  |
| U15         | GND               | -    |               |              | GND               | -    |               |              |  |
| U16         | GND               | -    |               |              | GND               | -    |               |              |  |
| U17         | GND               | -    |               |              | GND               | -    |               |              |  |
| U18         | GND               | -    |               |              | GND               | -    |               |              |  |
| U20         | GND               | -    |               |              | GND               | -    |               |              |  |
| V14         | GND               | -    |               |              | GND               | -    |               |              |  |
| V15         | GND               | -    |               |              | GND               | -    |               |              |  |
| V16         | GND               | -    |               |              | GND               | -    |               |              |  |
| V17         | GND               | -    |               |              | GND               | -    |               |              |  |
| V27         | GND               | -    |               |              | GND               | -    |               |              |  |
| V4          | GND               | -    |               |              | GND               | -    |               |              |  |
| W23         | GND               | -    |               |              | GND               | -    |               |              |  |
| W8          | GND               | -    |               |              | GND               | -    |               |              |  |
| Y14         | GND               | -    |               |              | GND               | -    |               |              |  |

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

| LFE2M100E/SE |                   |      |                          |              |
|--------------|-------------------|------|--------------------------|--------------|
| Ball Number  | Ball/Pad Function | Bank | Dual Function            | Differential |
| AA1          | PL81A             | 6    | LDQS81                   | T (LVDS)*    |
| GNDIO        | GNDIO6            | -    |                          |              |
| AA2          | PL81B             | 6    | LDQ81                    | C (LVDS)*    |
| Y3           | PL82A             | 6    | LDQ81                    | T            |
| AB1          | PL82B             | 6    | LDQ81                    | C            |
| VCCIO        | VCCIO6            | 6    |                          |              |
| Y9           | PL83A             | 6    | LDQ81                    | T (LVDS)*    |
| Y8           | PL83B             | 6    | LDQ81                    | C (LVDS)*    |
| Y7           | PL84A             | 6    | LDQ81                    | T            |
| AA7          | PL84B             | 6    | LDQ81                    | C            |
| GNDIO        | GNDIO6            | -    |                          |              |
| VCCIO        | VCCIO6            | 6    |                          |              |
| AB2          | PL95A             | 6    | LDQ99                    | T (LVDS)*    |
| AB3          | PL95B             | 6    | LDQ99                    | C (LVDS)*    |
| AA5          | PL96A             | 6    | LDQ99                    | T            |
| AA6          | PL96B             | 6    | LDQ99                    | C            |
| AB4          | PL97A             | 6    | LDQ99                    | T (LVDS)*    |
| VCCIO        | VCCIO6            | 6    |                          |              |
| AB5          | PL97B             | 6    | LDQ99                    | C (LVDS)*    |
| AA8          | PL98A             | 6    | LDQ99                    | T            |
| AA9          | PL98B             | 6    | LDQ99                    | C            |
| AC1          | PL99A             | 6    | LLM0_GPLLT_IN_A**/LDQS99 | T (LVDS)*    |
| GNDIO        | GNDIO6            | -    |                          |              |
| AC2          | PL99B             | 6    | LLM0_GPLLC_IN_A**/LDQ99  | C (LVDS)*    |
| AC4          | PL100A            | 6    | LLM0_GPLLT_FB_A/LDQ99    | T            |
| AC3          | PL100B            | 6    | LLM0_GPLLC_FB_A/LDQ99    | C            |
| VCCIO        | VCCIO6            | 6    |                          |              |
| AC7          | PL101A            | 6    | LLM0_GDLLT_IN_A**/LDQ99  | T (LVDS)*    |
| AC6          | PL101B            | 6    | LLM0_GDLLC_IN_A**/LDQ99  | C (LVDS)*    |
| AC5          | PL102A            | 6    | LLM0_GDLLT_FB_A/LDQ99    | T            |
| AD3          | PL102B            | 6    | LLM0_GDLLC_FB_A/LDQ99    | C            |
| GNDIO        | GNDIO6            | -    |                          |              |
| AB8          | LLM0_PLLCAP       | 6    |                          |              |
| AD2          | PL104A            | 6    |                          | T            |
| AD1          | PL104B            | 6    |                          | C            |
| AE2          | TCK               | -    |                          |              |
| AE1          | TDI               | -    |                          |              |
| AF2          | TMS               | -    |                          |              |
| AF1          | TDO               | -    |                          |              |
| AG1          | VCCJ              | -    |                          |              |
| AH1          | LLC_SQ_VCCR3      | 14   |                          |              |
| AK2          | LLC_SQ_HDINP3     | 14   |                          | T            |
| AJ1          | LLC_SQ_VCCIB3     | 14   |                          |              |

## 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 |
| AN29        | LRC_SQ_VCCRX2        | 13   |               |              | LRC_SQ_VCCRX2        | 13   |               |              |
| AM28        | LRC_SQ_HDINN2        | 13   |               | C            | LRC_SQ_HDINN2        | 13   |               | C            |
| AL27        | LRC_SQ_VCCIB2        | 13   |               |              | LRC_SQ_VCCIB2        | 13   |               |              |
| AM29        | LRC_SQ_HDINP2        | 13   |               | T            | LRC_SQ_HDINP2        | 13   |               | T            |
| AL29        | LRC_SQ_VCCP          | 13   |               |              | LRC_SQ_VCCP          | 13   |               |              |
| AL30        | LRC_SQ_REFCLKP       | 13   |               | T            | LRC_SQ_REFCLKP       | 13   |               | T            |
| AK30        | LRC_SQ_REFCLKN       | 13   |               | C            | LRC_SQ_REFCLKN       | 13   |               | C            |
| AK29        | LRC_SQ_VCCAUX33      | 13   |               |              | LRC_SQ_VCCAUX33      | 13   |               |              |
| AM30        | LRC_SQ_HDINP1        | 13   |               | T            | LRC_SQ_HDINP1        | 13   |               | T            |
| AL31        | LRC_SQ_VCCIB1        | 13   |               |              | LRC_SQ_VCCIB1        | 13   |               |              |
| AM31        | LRC_SQ_HDINN1        | 13   |               | C            | LRC_SQ_HDINN1        | 13   |               | C            |
| AN30        | LRC_SQ_VCCRX1        | 13   |               |              | LRC_SQ_VCCRX1        | 13   |               |              |
| AP30        | LRC_SQ_HDOUTP1       | 13   |               | T            | LRC_SQ_HDOUTP1       | 13   |               | T            |
| AL32        | LRC_SQ_VCCOB1        | 13   |               |              | LRC_SQ_VCCOB1        | 13   |               |              |
| AP31        | LRC_SQ_HDOUTN1       | 13   |               | C            | LRC_SQ_HDOUTN1       | 13   |               | C            |
| AN31        | LRC_SQ_VCCTX1        | 13   |               |              | LRC_SQ_VCCTX1        | 13   |               |              |
| AP32        | LRC_SQ_HDOUTN0       | 13   |               | C            | LRC_SQ_HDOUTN0       | 13   |               | C            |
| AM34        | LRC_SQ_VCCOB0        | 13   |               |              | LRC_SQ_VCCOB0        | 13   |               |              |
| AP33        | LRC_SQ_HDOUTP0       | 13   |               | T            | LRC_SQ_HDOUTP0       | 13   |               | T            |
| AN32        | LRC_SQ_VCCTX0        | 13   |               |              | LRC_SQ_VCCTX0        | 13   |               |              |
| AM32        | LRC_SQ_HDINN0        | 13   |               | C            | LRC_SQ_HDINN0        | 13   |               | C            |
| AN34        | LRC_SQ_VCCIB0        | 13   |               |              | LRC_SQ_VCCIB0        | 13   |               |              |
| AM33        | LRC_SQ_HDINP0        | 13   |               | T            | LRC_SQ_HDINP0        | 13   |               | T            |
| AN33        | LRC_SQ_VCCRX0        | 13   |               |              | LRC_SQ_VCCRX0        | 13   |               |              |
| AH28        | CFG2                 | 8    |               |              | CFG2                 | 8    |               |              |
| AD24        | CFG1                 | 8    |               |              | CFG1                 | 8    |               |              |
| AJ29        | CFG0                 | 8    |               |              | CFG0                 | 8    |               |              |
| AF25        | PROGRAMN             | 8    |               |              | PROGRAMN             | 8    |               |              |
| AJ28        | CCLK                 | 8    |               |              | CCLK                 | 8    |               |              |
| AE25        | INITN                | 8    |               |              | INITN                | 8    |               |              |
| AK31        | DONE                 | 8    |               |              | DONE                 | 8    |               |              |
| GNDIO       | GNDIO8               | -    |               |              | GNDIO8               | -    |               |              |
| AE24        | WRITEN***            | 8    |               |              | WRITEN***            | 8    |               |              |
| AJ30        | CS1N***              | 8    |               |              | CS1N***              | 8    |               |              |
| AD25        | CSN***               | 8    |               |              | CSN***               | 8    |               |              |
| AG29        | D0/SPIFASTN***       | 8    |               |              | D0/SPIFASTN***       | 8    |               |              |
| VCCIO       | VCCIO8               | 8    |               |              | VCCIO8               | 8    |               |              |
| AG28        | D1***                | 8    |               |              | D1***                | 8    |               |              |
| AG30        | D2***                | 8    |               |              | D2***                | 8    |               |              |
| AH29        | D3***                | 8    |               |              | D3***                | 8    |               |              |
| GNDIO       | GNDIO8               | -    |               |              | GNDIO8               | -    |               |              |
| AF26        | D4***                | 8    |               |              | D4***                | 8    |               |              |
| AH30        | D5***                | 8    |               |              | D5***                | 8    |               |              |
| AE26        | D6***                | 8    |               |              | D6***                | 8    |               |              |
| AJ31        | D7/SPID0***          | 8    |               |              | D7/SPID0***          | 8    |               |              |
| VCCIO       | VCCIO8               | 8    |               |              | VCCIO8               | 8    |               |              |
| AG27        | DI/CSSPI0N***        | 8    |               |              | DI/CSSPI0N***        | 8    |               |              |
| AK32        | DOUT/CSN/ CSSPI1N*** | 8    |               |              | DOUT/CSN/ CSSPI1N*** | 8    |               |              |
| AK33        | BUSY/SISPI***        | 8    |               |              | BUSY/SISPI***        | 8    |               |              |