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

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

## Applications of Embedded - FPGAs

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

### Details

|                                |                                                                                                                                                                       |
|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Product Status                 | Active                                                                                                                                                                |
| Number of LABs/CLBs            | 750                                                                                                                                                                   |
| Number of Logic Elements/Cells | 6000                                                                                                                                                                  |
| Total RAM Bits                 | 56320                                                                                                                                                                 |
| Number of I/O                  | 90                                                                                                                                                                    |
| Number of Gates                | -                                                                                                                                                                     |
| Voltage - Supply               | 1.14V ~ 1.26V                                                                                                                                                         |
| Mounting Type                  | Surface Mount                                                                                                                                                         |
| Operating Temperature          | -40°C ~ 100°C (TJ)                                                                                                                                                    |
| Package / Case                 | 144-LQFP                                                                                                                                                              |
| Supplier Device Package        | 144-TQFP (20x20)                                                                                                                                                      |
| Purchase URL                   | <a href="https://www.e-xfl.com/product-detail/lattice-semiconductor/lfe2-6se-5tn144i">https://www.e-xfl.com/product-detail/lattice-semiconductor/lfe2-6se-5tn144i</a> |

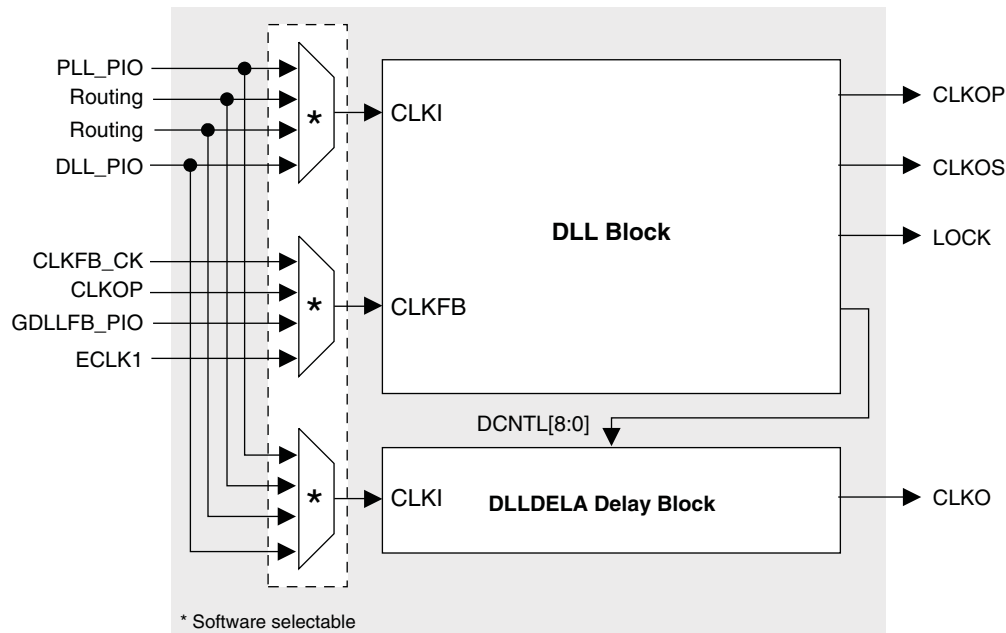
**Table 2-5. DLL Signals**

| Signal     | I/O | Description                                                                   |
|------------|-----|-------------------------------------------------------------------------------|
| CLKI       | I   | Clock input from external pin or routing                                      |
| CLKFB      | I   | DLL feed input from DLL output, clock net, routing or external pin            |
| RSTN       | I   | Active low synchronous reset                                                  |
| ALUHOLD    | I   | Active high freezes the ALU                                                   |
| UDDCNTL    | I   | Synchronous enable signal (hold high for two cycles) from routing             |
| DCNTL[8:0] | O   | Encoded digital control signals for PIC INDEL and slave delay calibration     |
| CLKOP      | O   | The primary clock output                                                      |
| CLKOS      | O   | The secondary clock output with fine phase shift and/or division by 2 or by 4 |
| LOCK       | O   | Active high phase lock indicator                                              |

## DLLDELA Delay Block

Closely associated with each DLL is a DLLDELA block. This is a delay block consisting of a delay line with taps and a selection scheme that selects one of the taps. The DCNTL[8:0] bus controls the delay of the CLKO signal. Typically this is the delay setting that the DLL uses to achieve phase alignment. This results in the delay providing a calibrated 90° phase shift that is useful in centering a clock in the middle of a data cycle for source synchronous data. The CLKO signal feeds the edge clock network. Figure 2-7 shows the connections between the DLL block and the DLLDELA delay block. For more information, please see the list of additional technical documentation at the end of this data sheet.

**Figure 2-7. DLLDELA Delay Block**



## PLL/DLL Cascading

LatticeECP2/M devices have been designed to allow certain combinations of PLL (GPLL and SPLL) and DLL cascading. The allowable combinations are:

- PLL to PLL supported
- PLL to DLL supported

## SERDES Power Supply Requirements (LatticeECP2M Family Only)<sup>1</sup>

Over Recommended Operating Conditions

| Symbol                                    | Description                                        | Typ. <sup>2</sup> | Units |
|-------------------------------------------|----------------------------------------------------|-------------------|-------|
| <b>Standby (Power Down)</b>               |                                                    |                   |       |
| I <sub>CCTX-SB</sub>                      | V <sub>CCTX</sub> current (per channel)            | 10                | μA    |
| I <sub>CCR<sub>X</sub>-SB</sub>           | V <sub>CCR<sub>X</sub></sub> current (per channel) | 75                | μA    |
| I <sub>CCIB-SB</sub>                      | Input buffer current (per channel)                 | 0                 | μA    |
| I <sub>CCOB-SB</sub>                      | Output buffer current (per channel)                | 0                 | μA    |
| I <sub>CCP-SB</sub>                       | SERDES PLL current (per quad)                      | 30                | μA    |
| I <sub>CCAX33-SB</sub>                    | SERDES termination current (per quad)              | 10                | μA    |
| <b>Operating (Data Rate = 3.125 Gbps)</b> |                                                    |                   |       |
| I <sub>CCTX-OP</sub>                      | V <sub>CCTX</sub> current (per channel)            | 19                | mA    |
| I <sub>CCR<sub>X</sub>-OP</sub>           | V <sub>CCR<sub>X</sub></sub> current (per channel) | 34                | mA    |
| I <sub>CCIB-OP</sub>                      | Input buffer current (per channel)                 | 4                 | mA    |
| I <sub>CCOB-OP</sub>                      | Output buffer current (per channel)                | 13                | mA    |
| I <sub>CCP-OP</sub>                       | SERDES PLL current (per quad)                      | 26                | mA    |
| I <sub>CCAX33-OP</sub>                    | SERDES termination current (per quad)              | 0.01              | mA    |

1. Equalization enabled, pre-emphasis disabled.

2. T<sub>J</sub> = 25°C, power supplies at nominal voltage.

## SERDES Power (LatticeECP2M Family Only)

Table 3-1 presents the SERDES power for one channel.

**Table 3-1. SERDES Power<sup>1</sup>**

| Symbol                | Description                             | Typ. <sup>2</sup> | Units |
|-----------------------|-----------------------------------------|-------------------|-------|
| P <sub>S-1CH-31</sub> | SERDES power (one channel @ 3.125 Gbps) | 90                | mW    |
| P <sub>S-1CH-25</sub> | SERDES power (one channel @ 2.5 Gbps)   | 87                | mW    |
| P <sub>S-1CH-12</sub> | SERDES power (one channel @ 1.25 Gbps)  | 86                | mW    |
| P <sub>S-1CH-02</sub> | SERDES power (one channel @ 250 Mbps)   | 76                | mW    |

1. One quarter of the total quad power (includes contribution from common circuits, all channels in the quad operating, pre-emphasis disabled, equalization enabled).

2. Typical values measured at 25°C and 1.2V.

## sys/I/O Recommended Operating Conditions

| Standard                                 | V <sub>CCIO</sub> |      |       | V <sub>REF</sub> (V) |      |       |
|------------------------------------------|-------------------|------|-------|----------------------|------|-------|
|                                          | Min.              | Typ. | Max.  | Min.                 | Typ. | Max.  |
| LVC MOS 3.3 <sup>2</sup>                 | 3.135             | 3.3  | 3.465 | —                    | —    | —     |
| LVC MOS 2.5 <sup>2</sup>                 | 2.375             | 2.5  | 2.625 | —                    | —    | —     |
| LVC MOS 1.8                              | 1.71              | 1.8  | 1.89  | —                    | —    | —     |
| LVC MOS 1.5                              | 1.425             | 1.5  | 1.575 | —                    | —    | —     |
| LVC MOS 1.2 <sup>2</sup>                 | 1.14              | 1.2  | 1.26  | —                    | —    | —     |
| LVTTL <sup>2</sup>                       | 3.135             | 3.3  | 3.465 | —                    | —    | —     |
| PCI                                      | 3.135             | 3.3  | 3.465 | —                    | —    | —     |
| SSTL18 <sup>2</sup> Class I, II          | 1.71              | 1.8  | 1.89  | 0.833                | 0.9  | 0.969 |
| SSTL2 <sup>2</sup> Class I, II           | 2.375             | 2.5  | 2.625 | 1.15                 | 1.25 | 1.35  |
| SSTL3 <sup>2</sup> Class I, II           | 3.135             | 3.3  | 3.465 | 1.3                  | 1.5  | 1.7   |
| HSTL <sup>2</sup> 15 Class I             | 1.425             | 1.5  | 1.575 | 0.68                 | 0.75 | 0.9   |
| HSTL <sup>2</sup> 18 Class I, II         | 1.71              | 1.8  | 1.89  | 0.816                | 0.9  | 1.08  |
| LVDS <sup>2</sup>                        | 2.375             | 2.5  | 2.625 | —                    | —    | —     |
| MLVDS25 <sup>1</sup>                     | 2.375             | 2.5  | 2.625 | —                    | —    | —     |
| LVPECL33 <sup>1,2</sup>                  | 3.135             | 3.3  | 3.465 | —                    | —    | —     |
| BLVDS25 <sup>1,2</sup>                   | 2.375             | 2.5  | 2.625 | —                    | —    | —     |
| RSDS <sup>1,2</sup>                      | 2.375             | 2.5  | 2.625 | —                    | —    | —     |
| SSTL18D_I <sup>2</sup> , II <sup>2</sup> | 1.71              | 1.8  | 1.89  | —                    | —    | —     |
| SSTL25D_I <sup>2</sup> , II <sup>2</sup> | 2.375             | 2.5  | 2.625 | —                    | —    | —     |
| SSTL33D_I <sup>2</sup> , II <sup>2</sup> | 3.135             | 3.3  | 3.465 | —                    | —    | —     |
| HSTL15D_I <sup>2</sup>                   | 1.425             | 1.5  | 1.575 | —                    | —    | —     |
| HSTL18D_I <sup>2</sup> , II <sup>2</sup> | 1.71              | 1.8  | 1.89  | —                    | —    | —     |

1. Inputs on chip. Outputs are implemented with the addition of external resistors.

2. Input on this standard does not depend on the value of V<sub>CCIO</sub>.

### SERDES External Reference Clock (LatticeECP2M Family Only)

The external reference clock selection and its interface are a critical part of system applications for this product. Table 3-14 specifies reference clock requirements, over the full range of operating conditions.

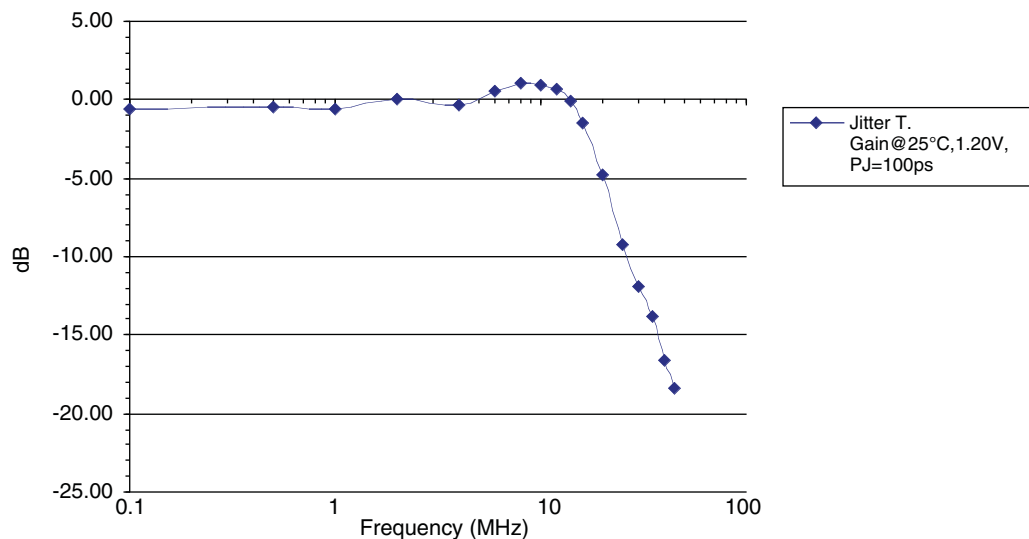
**Table 3-14. External Reference Clock Specification (refclkp/refclkn)**

| Symbol                   | Description                                       | Min. | Typ.  | Max.                   | Units   |
|--------------------------|---------------------------------------------------|------|-------|------------------------|---------|
| F <sub>REF</sub>         | Frequency range                                   | 25   | —     | 320                    | MHz     |
| F <sub>REF-PPM</sub>     | Frequency tolerance                               | -300 | —     | 300                    | ppm     |
| V <sub>REF-IN-SE</sub>   | Input swing, single-ended clock <sup>1</sup>      | 100  | —     | 1200                   | mV, p-p |
| V <sub>REF-IN</sub>      | Input levels                                      | 0    | —     | V <sub>CCP</sub> + 0.8 | V       |
| V <sub>REF-CM-DC</sub>   | Input common mode range (DC coupled)              | 0.5  | —     | 1.2                    | V       |
| V <sub>REF-CM-AC</sub>   | Input common mode range (AC coupled) <sup>2</sup> | 0    | —     | 1.5                    | V       |
| D <sub>REF</sub>         | Duty cycle <sup>3</sup>                           | 40   | —     | 60                     | %       |
| T <sub>REF-R</sub>       | Rise time (20% to 80%)                            |      | 500   | 1000                   | ps      |
| T <sub>REF-F</sub>       | Fall time (80% to 20%)                            |      | 500   | 1000                   | ps      |
| Z <sub>REF-IN-TERM</sub> | Input termination                                 |      | 50/2K |                        | Ohms    |
| C <sub>REF-IN-CAP</sub>  | Input capacitance <sup>4</sup>                    | —    | —     | 1.5                    | pF      |

1. The signal swing for a single-ended input clock must be as large as the p-p differential swing of a differential input clock to get the same gain at the input receiver. Lower swings for the clock may be possible, but will tend to increase jitter.
2. When AC coupled, the input common mode range is determined by:  

$$(\text{Min input level}) + (\text{Peak-to-peak input swing})/2 \leq (\text{Input common mode voltage}) \leq (\text{Max input level}) - (\text{Peak-to-peak input swing})/2$$
3. Measured at 50% amplitude.
4. Input capacitance of 1.5pF is total capacitance, including both device and package.

**Figure 3-13. Jitter Transfer**



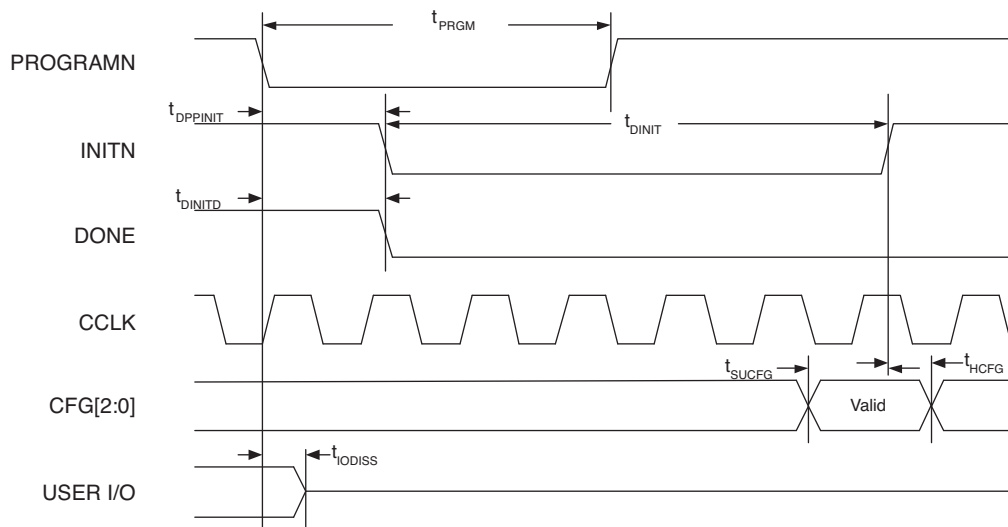
Note: This graph is for a nominal device.

### SERDES Power-Down/Power-Up Specification

**Table 3-15. Power-Down and Power-Up Specification**

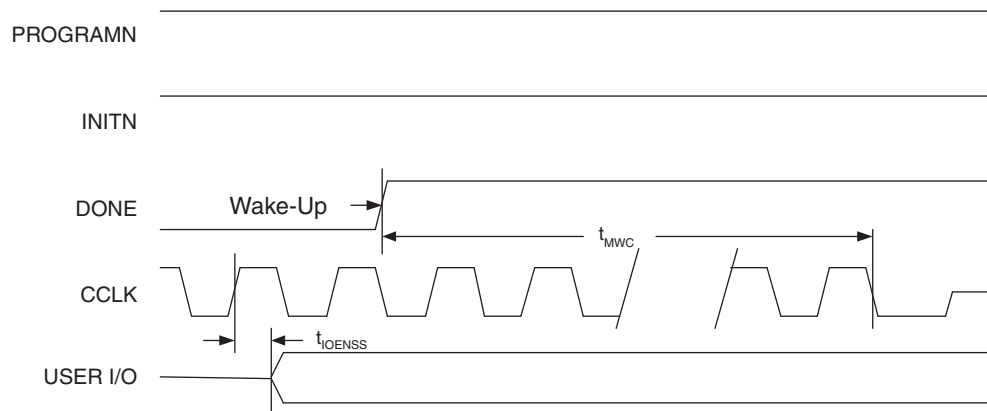
| Symbol             | Description                                                   | Max. | Units |
|--------------------|---------------------------------------------------------------|------|-------|
| t <sub>PWRDN</sub> | Power-down time after all power down register bits set to '0' | 10   | μs    |
| t <sub>PWRUP</sub> | Power-up time after all power down register bits set to '1'   | 100  | μs    |

**Figure 3-18. Configuration from PROGRAMN Timing**

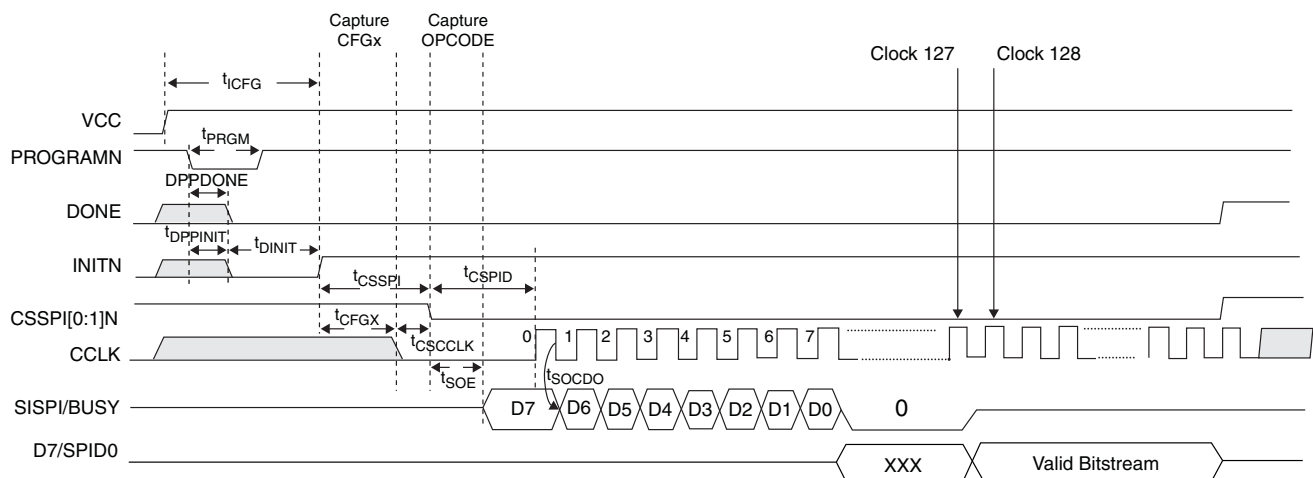


1. The CFG pins are normally static (hard wired)

**Figure 3-19. Wake-Up Timing**



**Figure 3-20. SPI/SPI<sub>m</sub> Configuration Waveforms**



**LatticeECP2 Pin Information Summary, LFE2-50 and LFE2-70 (Cont.)**

| Pin Type                                           |       | LFE2-50   |           | LFE2-70   |           |
|----------------------------------------------------|-------|-----------|-----------|-----------|-----------|
|                                                    |       | 484 fpBGA | 672 fpBGA | 672 fpBGA | 900 fpBGA |
| Available DDR-Interfaces per I/O Bank <sup>1</sup> | Bank0 | 0         | 0         | 0         | 0         |
|                                                    | Bank1 | 0         | 0         | 0         | 0         |
|                                                    | Bank2 | 2         | 3         | 3         | 4         |
|                                                    | Bank3 | 0         | 3         | 3         | 3         |
|                                                    | Bank4 | 3         | 4         | 4         | 4         |
|                                                    | Bank5 | 3         | 4         | 4         | 5         |
|                                                    | Bank6 | 1         | 4         | 4         | 4         |
|                                                    | Bank7 | 2         | 3         | 3         | 4         |
|                                                    | Bank8 | 0         | 0         | 0         | 0         |
| PCI Capable I/Os per Bank                          | Bank0 | 0         | 0         | 0         | 0         |
|                                                    | Bank1 | 0         | 0         | 0         | 0         |
|                                                    | Bank2 | 0         | 0         | 0         | 0         |
|                                                    | Bank3 | 0         | 0         | 0         | 0         |
|                                                    | Bank4 | 46        | 62        | 62        | 72        |
|                                                    | Bank5 | 46        | 68        | 68        | 80        |
|                                                    | Bank6 | 0         | 0         | 0         | 0         |
|                                                    | Bank7 | 0         | 0         | 0         | 0         |
|                                                    | Bank8 | 0         | 0         | 0         | 0         |

1. Minimum requirement to implement a fully functional 8-bit wide DDR bus. Available DDR interface consists of at least 12 I/Os (1 DQS + 1 DQSB + 8 DQs + 1 DM + Bank VREF1).

## LatticeECP2M Power Supply and NC

| Signal                    | 256 fpBGA                                                                                      | 484 fpBGA                                                                                                                                                                                                                                                                                                                       |
|---------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| V <sub>CC</sub>           | G7, G9, H7, J10, K10, K8                                                                       | J10, J11, J12, J13, K14, K9, L14, L9, M14, M9, N14, N9, P10, P11, P12, P13                                                                                                                                                                                                                                                      |
| V <sub>CCIO0</sub>        | E7                                                                                             | B5, B9, E7, H9                                                                                                                                                                                                                                                                                                                  |
| V <sub>CCIO1</sub>        | E10                                                                                            | D13, E16, H14                                                                                                                                                                                                                                                                                                                   |
| V <sub>CCIO2</sub>        | E14, G12                                                                                       | E21, G18, J15, K19                                                                                                                                                                                                                                                                                                              |
| V <sub>CCIO3</sub>        | K12, M14                                                                                       | N19, P15, T18, V21                                                                                                                                                                                                                                                                                                              |
| V <sub>CCIO4</sub>        | M10, P12                                                                                       | AA18, R14, V16, W13                                                                                                                                                                                                                                                                                                             |
| V <sub>CCIO5</sub>        | M7, P5                                                                                         | AA5, R9, V7, W10                                                                                                                                                                                                                                                                                                                |
| V <sub>CCIO6</sub>        | K5, M3                                                                                         | N4, P8, T5, V2                                                                                                                                                                                                                                                                                                                  |
| V <sub>CCIO7</sub>        | E3, G5                                                                                         | E2, G5, J8, K4                                                                                                                                                                                                                                                                                                                  |
| V <sub>CCIO8</sub>        | T15                                                                                            | AA22, U19                                                                                                                                                                                                                                                                                                                       |
| V <sub>CCJ</sub>          | K7                                                                                             | W4                                                                                                                                                                                                                                                                                                                              |
| V <sub>CCAUX</sub>        | G8, H10, J7, K9                                                                                | H11, H12, L15, L8, M15, M8, R11, R12                                                                                                                                                                                                                                                                                            |
| V <sub>CCPLL</sub>        | G10                                                                                            | R8, H15, H8, R15                                                                                                                                                                                                                                                                                                                |
| SERDES Power <sup>3</sup> | C15, B15, C12, A12, C11, C10, C14, C13, B9, C9, C5, C4, C8, C7, A6, C6, B3, C3                 | C22, B22, C19, A19, C18, C17, C21, C20, B16, C16, C12, C11, C15, C14, A13, C13, B10, C10                                                                                                                                                                                                                                        |
| GND <sup>1</sup>          | A1, A15, A16, A3, A9, B12, B6, E15, E2, H14, H8, H9, J3, J8, J9, M15, M2, P9, R12, R5, T1, T16 | A1, A10, A16, A22, AA19, AA4, AB1, AB22, B13, B19, B4, D16, D2, D21, D7, G19, G4, H10, H13, J14, J9, K10, K11, K12, K13, K15, K20, K3, K8, L10, L11, L12, L13, M10, M11, M12, M13, N10, N11, N12, N13, N15, N20, N3, N8, P14, P9, R10, R13, T19, T4, W16, W2, W21, W7, Y10, Y13                                                 |
| NC <sup>2</sup>           | D10, D11, D12, D13, D14, D4, D5, D6, D7, E11, E6, E8, E9, F10, F7, F8, F9                      | <b>LFE2M20:</b> D14, D15, E14, E15, F13, F14, F15, G12, G13, G14, G15<br><b>LFE2M35:</b> D14, D15, E14, E15, F13, F14, F15, G12, G13, G14, G15, U6<br><b>LFE2M50:</b> Y15, W15, AB20, AB21, AA20, AB19, AB18, Y22, Y21, Y17, Y18, Y16, W17, Y19, Y20, W19, W18, V17, V18, D15, G14, G15, D14, E15, E14, F15, F14, F13, G12, G13 |

1. All grounds must be electrically connected at the board level. For fpBGA packages, the total number of GND balls is less than the actual number of GND logic connections from the die to the common package GND plane.
2. NC pins should not be connected to any active signals, VCC or GND.
3. For package migration across device densities, the designer must comprehend the package pin requirements for the SERDES blocks. Specifically, the SERDES power pins of the largest density device must be accounted to accommodate migration to other smaller devices using the same package. Please refer to TN1160, [LatticeECP2/M Density Migration](#) for more details.

**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 |
| -           | -                 | -    |               |              | GNDIO1            | 1    |               |              |
| -           | -                 | -    |               |              | VCCIO             | 1    |               |              |
| D10         | PT19B             | 1    |               | C            | PT37B             | 1    |               | C            |
| C10         | PT19A             | 1    |               | T            | PT37A             | 1    |               | T            |
| GND         | GNDIO1            | -    |               |              | GNDIO1            | -    |               |              |
| B10         | PT18B             | 1    |               | C            | PT36B             | 1    |               | C            |
| A9          | PT17B             | 1    |               | C            | PT35B             | 1    |               | C            |
| A10         | PT18A             | 1    |               | T            | PT36A             | 1    |               | T            |
| B9          | PT17A             | 1    |               | T            | PT35A             | 1    |               | T            |
| VCCIO       | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |
| A8          | PT16B             | 1    |               | C            | PT34B             | 1    |               | C            |
| D9          | PT15B             | 1    |               | C            | PT33B             | 1    |               | C            |
| B8          | PT16A             | 1    |               | T            | PT34A             | 1    |               | T            |
| C9          | PT15A             | 1    |               | T            | PT33A             | 1    |               | T            |
| GND         | GNDIO1            | -    |               |              | GNDIO1            | -    |               |              |
| B7          | PT14B             | 1    |               | C            | PT32B             | 1    |               | C            |
| E9          | PT13B             | 1    |               | C            | PT31B             | 1    |               | C            |
| A7          | PT14A             | 1    |               | T            | PT32A             | 1    |               | T            |
| D8          | PT13A             | 1    |               | T            | PT31A             | 1    |               | T            |
| VCCIO       | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |
| A6          | PT12B             | 1    | PCLKC1_0      | C            | PT30B             | 1    | PCLKC1_0      | C            |
| B6          | PT12A             | 1    | PCLKT1_0      | T            | PT30A             | 1    | PCLKT1_0      | T            |
| E6          | XRES              | -    |               |              | XRES              | 1    |               |              |
| F8          | PT10B             | 0    | PCLKC0_0      | C            | PT28B             | 0    | PCLKC0_0      | C            |
| GND         | GNDIO0            | -    |               |              | GNDIO0            | -    |               |              |
| E8          | PT10A             | 0    | PCLKT0_0      | T            | PT28A             | 0    | PCLKT0_0      | T            |
| A5          | PT9B              | 0    |               | C            | PT27B             | 0    |               | C            |
| A3          | PT8B              | 0    |               | C            | PT26B             | 0    |               | C            |
| A4          | PT9A              | 0    |               | T            | PT27A             | 0    |               | T            |
| VCCIO       | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |
| B3          | PT8A              | 0    |               | T            | PT26A             | 0    |               | T            |
| A2          | PT7B              | 0    |               | C            | PT25B             | 0    |               | C            |
| C7          | PT6B              | 0    |               | C            | PT24B             | 0    |               | C            |
| B2          | PT7A              | 0    |               | T            | PT25A             | 0    |               | T            |
| D7          | PT6A              | 0    |               | T            | PT24A             | 0    |               | T            |
| D6          | PT5B              | 0    |               | C            | PT23B             | 0    |               | C            |
| GND         | GNDIO0            | -    |               |              | GNDIO0            | -    |               |              |
| F7          | PT4B              | 0    |               | C            | PT22B             | 0    |               | C            |
| C6          | PT5A              | 0    |               | T            | PT23A             | 0    |               | T            |
| VCCIO       | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |
| F6          | PT4A              | 0    |               | T            | PT22A             | 0    |               | T            |
| C4          | PT3B              | 0    |               | C            | PT21B             | 0    |               | C            |
| B4          | PT3A              | 0    |               | T            | PT21A             | 0    |               | T            |
| -           | -                 | -    |               |              | GNDIO0            | 0    |               |              |
| -           | -                 | -    |               |              | VCCIO             | 0    |               |              |

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

| LFE2-20E/SE |             |                   |      |               |              |
|-------------|-------------|-------------------|------|---------------|--------------|
| Ball Number | Ball Number | Ball/Pad Function | Bank | Dual Function | Differential |
| VCCIO       | VCCIO       | VCCIO1            | 1    |               |              |
| D12         | D12         | PT62A             | 1    |               | T            |
| B14         | B14         | PT61B             | 1    |               | C            |
| C14         | C14         | PT60B             | 1    |               | C            |
| A14         | A14         | PT61A             | 1    |               | T            |
| D13         | D13         | PT60A             | 1    |               | T            |
| C13         | C13         | PT59B             | 1    |               | C            |
| GND         | GND         | GNDIO1            | -    |               |              |
| A13         | A13         | PT58B             | 1    |               | C            |
| B13         | B13         | PT59A             | 1    |               | T            |
| VCCIO       | VCCIO       | VCCIO1            | 1    |               |              |
| A12         | A12         | PT58A             | 1    |               | T            |
| B11         | B11         | PT57B             | 1    |               | C            |
| D11         | D11         | PT56B             | 1    |               | C            |
| A11         | A11         | PT57A             | 1    |               | T            |
| C11         | C11         | PT56A             | 1    |               | T            |
| -           | GND         | GNDIO1            | 1    |               |              |
| -           | VCC         | VCCIO             | 1    |               |              |
| D10         | D10         | PT46B             | 1    |               | C            |
| C10         | C10         | PT46A             | 1    |               | T            |
| GND         | GND         | GNDIO1            | -    |               |              |
| B10         | B10         | PT45B             | 1    |               | C            |
| A9          | A9          | PT44B             | 1    |               | C            |
| A10         | A10         | PT45A             | 1    |               | T            |
| B9          | B9          | PT44A             | 1    |               | T            |
| VCCIO       | VCCIO       | VCCIO1            | 1    |               |              |
| A8          | A8          | PT43B             | 1    |               | C            |
| D9          | D9          | PT42B             | 1    |               | C            |
| B8          | B8          | PT43A             | 1    |               | T            |
| C9          | C9          | PT42A             | 1    |               | T            |
| GND         | GND         | GNDIO1            | -    |               |              |
| B7          | B7          | PT41B             | 1    |               | C            |
| E9          | E9          | PT40B             | 1    |               | C            |
| A7          | A7          | PT41A             | 1    |               | T            |
| D8          | D8          | PT40A             | 1    |               | T            |
| VCCIO       | VCCIO       | VCCIO1            | 1    |               |              |
| A6          | A6          | PT39B             | 1    | PCLKC1_0      | C            |
| B6          | B6          | PT39A             | 1    | PCLKT1_0      | T            |
| E6          | E6          | XRES              | 1    |               |              |
| F8          | F8          | PT37B             | 0    | PCLKC0_0      | C            |
| GND         | GND         | GNDIO0            | -    |               |              |
| E8          | E8          | PT37A             | 0    | PCLKT0_0      | T            |

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

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

## LFE2-20E/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 |  |
| AA14          | PB29B             | 5    | BDQ33          | C            | PB29B             | 5    | BDQ33          | C            |  |
| AE10          | PB30A             | 5    | BDQ33          | T            | PB30A             | 5    | BDQ33          | T            |  |
| AF10          | PB30B             | 5    | BDQ33          | C            | PB30B             | 5    | BDQ33          | C            |  |
| W14           | PB31A             | 5    | BDQ33          | T            | PB31A             | 5    | BDQ33          | T            |  |
| AB13          | PB31B             | 5    | BDQ33          | C            | PB31B             | 5    | BDQ33          | C            |  |
| VCCIO         | VCCIO5            | 5    |                |              | VCCIO5            | 5    |                |              |  |
| Y14           | PB32A             | 5    | BDQ33          | T            | PB32A             | 5    | BDQ33          | T            |  |
| AB14          | PB32B             | 5    | BDQ33          | C            | PB32B             | 5    | BDQ33          | C            |  |
| GND           | GNDIO5            | -    |                |              | GNDIO5            | -    |                |              |  |
| AE11          | PB33A             | 5    | BDQS33         | T            | PB33A             | 5    | BDQS33         | T            |  |
| AF11          | PB33B             | 5    | BDQ33          | C            | PB33B             | 5    | BDQ33          | C            |  |
| AD14          | PB34A             | 5    | BDQ33          | T            | PB34A             | 5    | BDQ33          | T            |  |
| AA15          | PB34B             | 5    | BDQ33          | C            | PB34B             | 5    | BDQ33          | C            |  |
| AE12          | PB35A             | 5    | PCLKT5_0/BDQ33 | T            | PB35A             | 5    | PCLKT5_0/BDQ33 | T            |  |
| AF12          | PB35B             | 5    | PCLKC5_0/BDQ33 | C            | PB35B             | 5    | PCLKC5_0/BDQ33 | C            |  |
| VCCIO         | VCCIO5            | 5    |                |              | VCCIO5            | 5    |                |              |  |
| GND           | GNDIO5            | -    |                |              | GNDIO5            | -    |                |              |  |
| AD15          | PB40A             | 4    | PCLKT4_0/BDQ42 | T            | PB40A             | 4    | PCLKT4_0/BDQ42 | T            |  |
| VCCIO         | VCCIO4            | 4    |                |              | VCCIO4            | 4    |                |              |  |
| AC15          | PB40B             | 4    | PCLKC4_0/BDQ42 | C            | PB40B             | 4    | PCLKC4_0/BDQ42 | C            |  |
| AE13          | PB41A             | 4    | BDQ42          | T            | PB41A             | 4    | BDQ42          | T            |  |
| AF13          | PB41B             | 4    | BDQ42          | C            | PB41B             | 4    | BDQ42          | C            |  |
| AB17          | PB42A             | 4    | BDQS42         | T            | PB42A             | 4    | BDQS42         | T            |  |
| GND           | GNDIO4            | -    |                |              | GNDIO4            | -    |                |              |  |
| Y15           | PB42B             | 4    | BDQ42          | C            | PB42B             | 4    | BDQ42          | C            |  |
| AE14          | PB43A             | 4    | BDQ42          | T            | PB43A             | 4    | BDQ42          | T            |  |
| AF14          | PB43B             | 4    | BDQ42          | C            | PB43B             | 4    | BDQ42          | C            |  |
| AA16          | PB44A             | 4    | BDQ42          | T            | PB44A             | 4    | BDQ42          | T            |  |
| VCCIO         | VCCIO4            | 4    |                |              | VCCIO4            | 4    |                |              |  |
| W15           | PB44B             | 4    | BDQ42          | C            | PB44B             | 4    | BDQ42          | C            |  |
| AC17          | PB45A             | 4    | BDQ42          | T            | PB45A             | 4    | BDQ42          | T            |  |
| AB16          | PB45B             | 4    | BDQ42          | C            | PB45B             | 4    | BDQ42          | C            |  |
| AE15          | PB46A             | 4    | BDQ42          | T            | PB46A             | 4    | BDQ42          | T            |  |
| GND           | GNDIO4            | -    |                |              | GNDIO4            | -    |                |              |  |
| AF15          | PB46B             | 4    | BDQ42          | C            | PB46B             | 4    | BDQ42          | C            |  |
| AE16          | PB47A             | 4    | BDQ51          | T            | PB47A             | 4    | BDQ51          | T            |  |
| AF16          | PB47B             | 4    | BDQ51          | C            | PB47B             | 4    | BDQ51          | C            |  |
| Y16           | PB48A             | 4    | BDQ51          | T            | PB48A             | 4    | BDQ51          | T            |  |
| AB18          | PB48B             | 4    | BDQ51          | C            | PB48B             | 4    | BDQ51          | C            |  |
| AD17          | PB49A             | 4    | BDQ51          | T            | PB49A             | 4    | BDQ51          | T            |  |
| AD18          | PB49B             | 4    | BDQ51          | C            | PB49B             | 4    | BDQ51          | C            |  |
| VCCIO         | VCCIO4            | 4    |                |              | VCCIO4            | 4    |                |              |  |
| AC18          | PB50A             | 4    | BDQ51          | T            | PB50A             | 4    | BDQ51          | T            |  |
| AD19          | PB50B             | 4    | BDQ51          | C            | PB50B             | 4    | BDQ51          | C            |  |
| GND           | GNDIO4            | -    |                |              | GNDIO4            | -    |                |              |  |
| AC19          | PB51A             | 4    | BDQS51         | T            | PB51A             | 4    | BDQS51         | T            |  |

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

| LFE2-50E/SE |                   |      |                       |              | LFE2-70E/SE       |      |                       |              |  |
|-------------|-------------------|------|-----------------------|--------------|-------------------|------|-----------------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function         | Differential | Ball/Pad Function | Bank | Dual Function         | Differential |  |
| L2          | PL24B             | 7    | LDQ24                 | C (LVDS)*    | PL37B             | 7    | LDQ37                 | C (LVDS)*    |  |
| L1          | PL25A             | 7    | LUM0_SPLLT_IN_A/LDQ24 | T            | PL38A             | 7    | LUM0_SPLLT_IN_A/LDQ37 | T            |  |
| VCCIO       | VCCIO7            | 7    |                       |              | VCCIO7            | 7    |                       |              |  |
| M2          | PL25B             | 7    | LUM0_SPLLC_IN_A/LDQ24 | C            | PL38B             | 7    | LUM0_SPLLC_IN_A/LDQ37 | C            |  |
| M1          | PL26A             | 7    | LUM0_SPLLT_FB_A/LDQ24 | T            | PL39A             | 7    | LUM0_SPLLT_FB_A/LDQ37 | T            |  |
| N2          | PL26B             | 7    | LUM0_SPLLC_FB_A/LDQ24 | C            | PL39B             | 7    | LUM0_SPLLC_FB_A/LDQ37 | C            |  |
| GND         | GNDIO7            | -    |                       |              | GNDIO7            | -    |                       |              |  |
| M8          | VCCPLL            | 7    |                       |              | NC                | -    |                       |              |  |
| VCCIO       | VCCIO7            | 7    |                       |              | VCCIO7            | 7    |                       |              |  |
| GND         | GNDIO7            | -    |                       |              | GNDIO7            | -    |                       |              |  |
| N1          | PL37A             | 7    | LDQ41                 |              | PL50A             | 7    | LDQ54                 |              |  |
| L8          | PL38A             | 7    | LDQ41                 | T            | PL51A             | 7    | LDQ54                 | T            |  |
| K8          | PL38B             | 7    | LDQ41                 | C            | PL51B             | 7    | LDQ54                 | C            |  |
| VCCIO       | VCCIO7            | 7    |                       |              | VCCIO7            | 7    |                       |              |  |
| L6          | PL39A             | 7    | LDQ41                 | T (LVDS)*    | PL52A             | 7    | LDQ54                 | T (LVDS)*    |  |
| K5          | PL39B             | 7    | LDQ41                 | C (LVDS)*    | PL52B             | 7    | LDQ54                 | C (LVDS)*    |  |
| L7          | PL40A             | 7    | LDQ41                 | T            | PL53A             | 7    | LDQ54                 | T            |  |
| L5          | PL40B             | 7    | LDQ41                 | C            | PL53B             | 7    | LDQ54                 | C            |  |
| GND         | GNDIO7            | -    |                       |              | GNDIO7            | -    |                       |              |  |
| P1          | PL41A             | 7    | LDQS41                | T (LVDS)*    | PL54A             | 7    | LDQS54                | T (LVDS)*    |  |
| P2          | PL41B             | 7    | LDQ41                 | C (LVDS)*    | PL54B             | 7    | LDQ54                 | C (LVDS)*    |  |
| M6          | PL42A             | 7    | LDQ41                 | T            | PL55A             | 7    | LDQ54                 | T            |  |
| VCCIO       | VCCIO7            | 7    |                       |              | VCCIO7            | 7    |                       |              |  |
| N8          | PL42B             | 7    | LDQ41                 | C            | PL55B             | 7    | LDQ54                 | C            |  |
| R1          | PL43A             | 7    | LDQ41                 | T (LVDS)*    | PL56A             | 7    | LDQ54                 | T (LVDS)*    |  |
| R2          | PL43B             | 7    | LDQ41                 | C (LVDS)*    | PL56B             | 7    | LDQ54                 | C (LVDS)*    |  |
| M7          | PL44A             | 7    | PCLKT7_0/LDQ41        | T            | PL57A             | 7    | PCLKT7_0/LDQ54        | T            |  |
| GND         | GNDIO7            | -    |                       |              | GNDIO7            | -    |                       |              |  |
| N9          | PL44B             | 7    | PCLKC7_0/LDQ41        | C            | PL57B             | 7    | PCLKC7_0/LDQ54        | C            |  |
| M4          | PL46A             | 6    | PCLKT6_0/LDQ50        | T (LVDS)*    | PL59A             | 6    | PCLKT6_0/LDQ63        | T (LVDS)*    |  |
| M5          | PL46B             | 6    | PCLKC6_0/LDQ50        | C (LVDS)*    | PL59B             | 6    | PCLKC6_0/LDQ63        | C (LVDS)*    |  |
| N7          | PL47A             | 6    | VREF2_6/LDQ50         | T            | PL60A             | 6    | VREF2_6/LDQ63         | T            |  |
| P9          | PL47B             | 6    | VREF1_6/LDQ50         | C            | PL60B             | 6    | VREF1_6/LDQ63         | C            |  |
| N3          | PL48A             | 6    | LDQ50                 | T (LVDS)*    | PL61A             | 6    | LDQ63                 | T (LVDS)*    |  |
| VCCIO       | VCCIO6            | 6    |                       |              | VCCIO6            | 6    |                       |              |  |
| N4          | PL48B             | 6    | LDQ50                 | C (LVDS)*    | PL61B             | 6    | LDQ63                 | C (LVDS)*    |  |
| N5          | PL49A             | 6    | LDQ50                 | T            | PL62A             | 6    | LDQ63                 | T            |  |
| P7          | PL49B             | 6    | LDQ50                 | C            | PL62B             | 6    | LDQ63                 | C            |  |
| T1          | PL50A             | 6    | LDQS50                | T (LVDS)*    | PL63A             | 6    | LDQS63                | T (LVDS)*    |  |
| GND         | GNDIO6            | -    |                       |              | GNDIO6            | -    |                       |              |  |
| T2          | PL50B             | 6    | LDQ50                 | C (LVDS)*    | PL63B             | 6    | LDQ63                 | C (LVDS)*    |  |
| P8          | PL51A             | 6    | LDQ50                 | T            | PL64A             | 6    | LDQ63                 | T            |  |
| P6          | PL51B             | 6    | LDQ50                 | C            | PL64B             | 6    | LDQ63                 | C            |  |
| VCCIO       | VCCIO6            | 6    |                       |              | VCCIO6            | 6    |                       |              |  |
| P5          | PL52A             | 6    | LDQ50                 | T (LVDS)*    | PL65A             | 6    | LDQ63                 | T (LVDS)*    |  |
| P4          | PL52B             | 6    | LDQ50                 | C (LVDS)*    | PL65B             | 6    | LDQ63                 | C (LVDS)*    |  |

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

| LFE2-50E/SE |                   |      |               |              | LFE2-70E/SE       |      |               |              |  |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |  |
| W5          | PL71B             | 6    | LDQ75         | C (LVDS)*    | PL84B             | 6    | LDQ88         | C (LVDS)*    |  |
| AC1         | PL72A             | 6    | LDQ75         | T            | PL85A             | 6    | LDQ88         | T            |  |
| AD1         | PL72B             | 6    | LDQ75         | C            | PL85B             | 6    | LDQ88         | C            |  |
| VCCIO       | VCCIO6            | 6    |               |              | VCCIO6            | 6    |               |              |  |
| Y6          | PL73A             | 6    | LDQ75         | T (LVDS)*    | PL86A             | 6    | LDQ88         | T (LVDS)*    |  |
| Y5          | PL73B             | 6    | LDQ75         | C (LVDS)*    | PL86B             | 6    | LDQ88         | C (LVDS)*    |  |
| AE2         | PL74A             | 6    | LDQ75         | T            | PL87A             | 6    | LDQ88         | T            |  |
| AD2         | PL74B             | 6    | LDQ75         | C            | PL87B             | 6    | LDQ88         | C            |  |
| GND         | GNDIO6            | -    |               |              | GNDIO6            | -    |               |              |  |
| AB3         | PL75A             | 6    | LDQS75        | T (LVDS)*    | PL88A             | 6    | LDQS88        | T (LVDS)*    |  |
| AB2         | PL75B             | 6    | LDQ75         | C (LVDS)*    | PL88B             | 6    | LDQ88         | C (LVDS)*    |  |
| W7          | PL76A             | 6    | LDQ75         | T            | PL89A             | 6    | LDQ88         | T            |  |
| VCCIO       | VCCIO6            | 6    |               |              | VCCIO6            | 6    |               |              |  |
| W8          | PL76B             | 6    | LDQ75         | C            | PL89B             | 6    | LDQ88         | C            |  |
| Y7          | PL77A             | 6    | LDQ75         | T (LVDS)*    | PL90A             | 6    | LDQ88         | T (LVDS)*    |  |
| Y8          | PL77B             | 6    | LDQ75         | C (LVDS)*    | PL90B             | 6    | LDQ88         | C (LVDS)*    |  |
| AC2         | PL78A             | 6    | LDQ75         | T            | PL91A             | 6    | LDQ88         | T            |  |
| GND         | GNDIO6            | -    |               |              | GNDIO6            | -    |               |              |  |
| AD3         | PL78B             | 6    | LDQ75         | C            | PL91B             | 6    | LDQ88         | C            |  |
| AC3         | TCK               | -    |               |              | TCK               | -    |               |              |  |
| AA8         | TDI               | -    |               |              | TDI               | -    |               |              |  |
| AB4         | TMS               | -    |               |              | TMS               | -    |               |              |  |
| AA5         | TDO               | -    |               |              | TDO               | -    |               |              |  |
| AB5         | VCCJ              | -    |               |              | VCCJ              | -    |               |              |  |
| AE3         | PB2A              | 5    | VREF2_5/BDQ6  | T            | PB2A              | 5    | VREF2_5/BDQ6  | T            |  |
| AF3         | PB2B              | 5    | VREF1_5/BDQ6  | C            | PB2B              | 5    | VREF1_5/BDQ6  | C            |  |
| AC4         | PB3A              | 5    | BDQ6          | T            | PB3A              | 5    | BDQ6          | T            |  |
| AD4         | PB3B              | 5    | BDQ6          | C            | PB3B              | 5    | BDQ6          | C            |  |
| AE4         | PB4A              | 5    | BDQ6          | T            | PB4A              | 5    | BDQ6          | T            |  |
| AF4         | PB4B              | 5    | BDQ6          | C            | PB4B              | 5    | BDQ6          | C            |  |
| VCCIO       | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |  |
| V9          | PB5A              | 5    | BDQ6          | T            | PB5A              | 5    | BDQ6          | T            |  |
| W9          | PB5B              | 5    | BDQ6          | C            | PB5B              | 5    | BDQ6          | C            |  |
| GND         | GNDIO5            | -    |               |              | GNDIO5            | -    |               |              |  |
| AA6         | PB6A              | 5    | BDQS6         | T            | PB6A              | 5    | BDQS6         | T            |  |
| AB6         | PB6B              | 5    | BDQ6          | C            | PB6B              | 5    | BDQ6          | C            |  |
| AC5         | PB7A              | 5    | BDQ6          | T            | PB7A              | 5    | BDQ6          | T            |  |
| AD5         | PB7B              | 5    | BDQ6          | C            | PB7B              | 5    | BDQ6          | C            |  |
| AA7         | PB8A              | 5    | BDQ6          | T            | PB8A              | 5    | BDQ6          | T            |  |
| AB7         | PB8B              | 5    | BDQ6          | C            | PB8B              | 5    | BDQ6          | C            |  |
| VCCIO       | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |  |
| AE5         | PB9A              | 5    | BDQ6          | T            | PB9A              | 5    | BDQ6          | T            |  |
| AF5         | PB9B              | 5    | BDQ6          | C            | PB9B              | 5    | BDQ6          | C            |  |
| AC7         | PB10A             | 5    | BDQ6          | T            | PB10A             | 5    | BDQ6          | T            |  |
| AD7         | PB10B             | 5    | BDQ6          | C            | PB10B             | 5    | BDQ6          | C            |  |
| VCCIO       | VCCIO5            | 5    |               |              | VCCIO5            | 5    |               |              |  |

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

| LFE2-50E/SE |                   |      |                       |              | LFE2-70E/SE       |      |                       |              |
|-------------|-------------------|------|-----------------------|--------------|-------------------|------|-----------------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function         | Differential | Ball/Pad Function | Bank | Dual Function         | Differential |
| GND         | GNDIO2            | -    |                       |              | GNDIO2            | -    |                       |              |
| L21         | PR43B             | 2    | RDQ41                 | C (LVDS)*    | PR56B             | 2    | RDQ54                 | C (LVDS)*    |
| K22         | PR43A             | 2    | RDQ41                 | T (LVDS)*    | PR56A             | 2    | RDQ54                 | T (LVDS)*    |
| M24         | PR42B             | 2    | RDQ41                 | C            | PR55B             | 2    | RDQ54                 | C            |
| N23         | PR42A             | 2    | RDQ41                 | T            | PR55A             | 2    | RDQ54                 | T            |
| VCCIO       | VCCIO2            | 2    |                       |              | VCCIO2            | 2    |                       |              |
| K26         | PR41B             | 2    | RDQ41                 | C (LVDS)*    | PR54B             | 2    | RDQ54                 | C (LVDS)*    |
| K25         | PR41A             | 2    | RDQS41                | T (LVDS)*    | PR54A             | 2    | RDQS54                | T (LVDS)*    |
| M20         | PR40B             | 2    | RDQ41                 | C            | PR53B             | 2    | RDQ54                 | C            |
| GND         | GNDIO2            | -    |                       |              | GNDIO2            | -    |                       |              |
| M19         | PR40A             | 2    | RDQ41                 | T            | PR53A             | 2    | RDQ54                 | T            |
| L22         | PR39B             | 2    | RDQ41                 | C (LVDS)*    | PR52B             | 2    | RDQ54                 | C (LVDS)*    |
| M22         | PR39A             | 2    | RDQ41                 | T (LVDS)*    | PR52A             | 2    | RDQ54                 | T (LVDS)*    |
| K21         | PR38B             | 2    | RDQ41                 | C            | PR51B             | 2    | RDQ54                 | C            |
| VCCIO       | VCCIO2            | 2    |                       |              | VCCIO2            | 2    |                       |              |
| M21         | PR38A             | 2    | RDQ41                 | T            | PR51A             | 2    | RDQ54                 | T            |
| K24         | PR37B             | 2    | RDQ41                 | C (LVDS)*    | PR50B             | 2    | RDQ54                 | C (LVDS)*    |
| J24         | PR37A             | 2    | RDQ41                 | T (LVDS)*    | PR50A             | 2    | RDQ54                 | T (LVDS)*    |
| GND         | GNDIO2            | -    |                       |              | GNDIO2            | -    |                       |              |
| VCCIO       | VCCIO2            | 2    |                       |              | VCCIO2            | 2    |                       |              |
| L20         | VCCPLL            | 2    |                       |              | NC                | -    |                       |              |
| GND         | GNDIO2            | -    |                       |              | GNDIO2            | -    |                       |              |
| J26         | PR26B             | 2    | RUM0_SPLLC_FB_A/RDQ24 | C            | PR39B             | 2    | RUM0_SPLLC_FB_A/RDQ37 | C            |
| J25         | PR26A             | 2    | RUM0_SPLLT_FB_A/RDQ24 | T            | PR39A             | 2    | RUM0_SPLLT_FB_A/RDQ37 | T            |
| J23         | PR25B             | 2    | RUM0_SPLLC_IN_A/RDQ24 | C            | PR38B             | 2    | RUM0_SPLLC_IN_A/RDQ37 | C            |
| K23         | PR25A             | 2    | RUM0_SPLLT_IN_A/RDQ24 | T            | PR38A             | 2    | RUM0_SPLLT_IN_A/RDQ37 | T            |
| VCCIO       | VCCIO2            | 2    |                       |              | VCCIO2            | 2    |                       |              |
| H26         | PR24B             | 2    | RDQ24                 | C (LVDS)*    | PR37B             | 2    | RDQ37                 | C (LVDS)*    |
| H25         | PR24A             | 2    | RDQS24***             | T (LVDS)*    | PR37A             | 2    | RDQS37***             | T (LVDS)*    |
| H24         | PR23B             | 2    | RDQ24                 | C            | PR36B             | 2    | RDQ37                 | C            |
| GND         | GNDIO2            | -    |                       |              | GNDIO2            | -    |                       |              |
| H23         | PR23A             | 2    | RDQ24                 | T            | PR36A             | 2    | RDQ37                 | T            |
| VCCIO       | VCCIO2            | 2    |                       |              | VCCIO2            | 2    |                       |              |
| G26         | PR19B             | 2    | RDQ16                 | C            | PR32B             | 2    | RDQ29                 | C            |
| GND         | GNDIO2            | -    |                       |              | GNDIO2            | -    |                       |              |
| G25         | PR19A             | 2    | RDQ16                 | T            | PR32A             | 2    | RDQ29                 | T            |
| F26         | PR18B             | 2    | RDQ16                 | C (LVDS)*    | PR31B             | 2    | RDQ29                 | C (LVDS)*    |
| F25         | PR18A             | 2    | RDQ16                 | T (LVDS)*    | PR31A             | 2    | RDQ29                 | T (LVDS)*    |
| K20         | PR17B             | 2    | RDQ16                 | C            | PR30B             | 2    | RDQ29                 | C            |
| VCCIO       | VCCIO2            | 2    |                       |              | VCCIO2            | 2    |                       |              |
| L19         | PR17A             | 2    | RDQ16                 | T            | PR30A             | 2    | RDQ29                 | T            |
| E26         | PR16B             | 2    | RDQ16                 | C (LVDS)*    | PR29B             | 2    | RDQ29                 | C (LVDS)*    |
| E25         | PR16A             | 2    | RDQS16                | T (LVDS)*    | PR29A             | 2    | RDQS29                | T (LVDS)*    |
| GND         | GNDIO2            | -    |                       |              | GNDIO2            | -    |                       |              |
| J22         | PR15B             | 2    | RDQ16                 | C            | PR28B             | 2    | RDQ29                 | C            |
| H22         | PR15A             | 2    | RDQ16                 | T            | PR28A             | 2    | RDQ29                 | T            |

## 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    |                |              |

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

| LFE2M50E/SE |                   |      |               |              |
|-------------|-------------------|------|---------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential |
| C12         | URC_SQ_VCCIB2     | 12   |               |              |
| B12         | URC_SQ_HDINN2     | 12   |               | C            |
| C11         | URC_SQ_VCCR2      | 12   |               |              |
| A15         | URC_SQ_HDOUTP2    | 12   |               | T            |
| C15         | URC_SQ_VCCOB2     | 12   |               |              |
| B15         | URC_SQ_HDOUTN2    | 12   |               | C            |
| C14         | URC_SQ_VCCTX2     | 12   |               |              |
| B14         | URC_SQ_HDOUTN3    | 12   |               | C            |
| A13         | URC_SQ_VCCOB3     | 12   |               |              |
| A14         | URC_SQ_HDOUTP3    | 12   |               | T            |
| C13         | URC_SQ_VCCTX3     | 12   |               |              |
| B11         | URC_SQ_HDINN3     | 12   |               | C            |
| B10         | URC_SQ_VCCIB3     | 12   |               |              |
| A11         | URC_SQ_HDINP3     | 12   |               | T            |
| C10         | URC_SQ_VCCR3      | 12   |               |              |
| GNDIO       | GNDIO1            | -    |               |              |
| VCCIO       | VCCIO1            | 1    |               |              |
| E13         | PT55B             | 1    |               | C            |
| D12         | PT55A             | 1    |               | T            |
| GNDIO       | GNDIO1            | -    |               |              |
| A9          | PT54B             | 1    |               | C            |
| A8          | PT54A             | 1    |               | T            |
| A7          | PT53B             | 1    |               | C            |
| A6          | PT53A             | 1    |               | T            |
| VCCIO       | VCCIO1            | 1    |               |              |
| E12         | PT52B             | 1    |               | C            |
| F12         | PT52A             | 1    |               | T            |
| A5          | PT51B             | 1    |               | C            |
| A4          | PT51A             | 1    |               | T            |
| GNDIO       | GNDIO1            | -    |               |              |
| B7          | PT50B             | 1    |               | C            |
| B8          | PT50A             | 1    |               | T            |
| G11         | PT49B             | 1    |               | C            |
| E11         | PT49A             | 1    |               | T            |
| VCCIO       | VCCIO1            | 1    |               |              |
| D11         | PT48B             | 1    | VREF2_1       | C            |
| D10         | PT48A             | 1    | VREF1_1       | T            |
| G10         | PT47B             | 1    | PCLKC1_0      | C            |
| F11         | PT47A             | 1    | PCLKT1_0      | T            |
| G9          | PT46B             | 0    | PCLKC0_0      | C            |
| GNDIO       | GNDIO0            | -    |               |              |
| F9          | PT46A             | 0    | PCLKT0_0      | T            |
| C9          | PT45B             | 0    | VREF2_0       | 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 |  |
| AF17        | GND               | -    |               |              | GND               | -    |               |              |  |
| AF25        | GND               | -    |               |              | GND               | -    |               |              |  |
| AF6         | GND               | -    |               |              | GND               | -    |               |              |  |
| AJ10        | GND               | -    |               |              | GND               | -    |               |              |  |
| AJ21        | GND               | -    |               |              | GND               | -    |               |              |  |
| AJ27        | GND               | -    |               |              | GND               | -    |               |              |  |
| AJ4         | GND               | -    |               |              | GND               | -    |               |              |  |
| AK1         | GND               | -    |               |              | GND               | -    |               |              |  |
| AK13        | GND               | -    |               |              | GND               | -    |               |              |  |
| AK18        | GND               | -    |               |              | GND               | -    |               |              |  |
| AK24        | GND               | -    |               |              | GND               | -    |               |              |  |
| AK30        | GND               | -    |               |              | GND               | -    |               |              |  |
| AK7         | GND               | -    |               |              | GND               | -    |               |              |  |
| B10         | GND               | -    |               |              | GND               | -    |               |              |  |
| B21         | GND               | -    |               |              | GND               | -    |               |              |  |
| B27         | GND               | -    |               |              | GND               | -    |               |              |  |
| B4          | GND               | -    |               |              | GND               | -    |               |              |  |
| D25         | GND               | -    |               |              | GND               | -    |               |              |  |
| D6          | GND               | -    |               |              | GND               | -    |               |              |  |
| E14         | GND               | -    |               |              | GND               | -    |               |              |  |
| E17         | GND               | -    |               |              | GND               | -    |               |              |  |
| F22         | GND               | -    |               |              | GND               | -    |               |              |  |
| F27         | GND               | -    |               |              | GND               | -    |               |              |  |
| F4          | GND               | -    |               |              | GND               | -    |               |              |  |
| F9          | GND               | -    |               |              | GND               | -    |               |              |  |
| G12         | GND               | -    |               |              | GND               | -    |               |              |  |
| G19         | GND               | -    |               |              | GND               | -    |               |              |  |
| J24         | GND               | -    |               |              | GND               | -    |               |              |  |
| J7          | GND               | -    |               |              | GND               | -    |               |              |  |
| K14         | GND               | -    |               |              | GND               | -    |               |              |  |
| K15         | GND               | -    |               |              | GND               | -    |               |              |  |
| K16         | GND               | -    |               |              | GND               | -    |               |              |  |
| K17         | GND               | -    |               |              | GND               | -    |               |              |  |
| K27         | GND               | -    |               |              | GND               | -    |               |              |  |
| K4          | GND               | -    |               |              | GND               | -    |               |              |  |
| L14         | GND               | -    |               |              | GND               | -    |               |              |  |
| L15         | GND               | -    |               |              | GND               | -    |               |              |  |
| L16         | GND               | -    |               |              | GND               | -    |               |              |  |
| L17         | GND               | -    |               |              | GND               | -    |               |              |  |
| M23         | GND               | -    |               |              | GND               | -    |               |              |  |
| M8          | GND               | -    |               |              | GND               | -    |               |              |  |
| N14         | GND               | -    |               |              | GND               | -    |               |              |  |
| N15         | GND               | -    |               |              | GND               | -    |               |              |  |
| N16         | GND               | -    |               |              | GND               | -    |               |              |  |
| N17         | GND               | -    |               |              | GND               | -    |               |              |  |
| N27         | GND               | -    |               |              | GND               | -    |               |              |  |
| N4          | GND               | -    |               |              | GND               | -    |               |              |  |
| P11         | GND               | -    |               |              | GND               | -    |               |              |  |

## 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 |  |
| G7          | PL8A              | 7    | LDQ6          | T (LVDS)*    | NC                | -    |               |              |  |
| G8          | PL6A              | 7    | LDQS6****     | T (LVDS)*    | NC                | -    |               |              |  |
| G9          | PL5A              | 7    | LDQ6          | T            | NC                | -    |               |              |  |
| H19         | NC                | -    |               |              | NC                | -    |               |              |  |
| H20         | NC                | -    |               |              | NC                | -    |               |              |  |
| H21         | NC                | -    |               |              | NC                | -    |               |              |  |
| H22         | NC                | -    |               |              | NC                | -    |               |              |  |
| H6          | PL8B              | 7    | LDQ6          | C (LVDS)*    | NC                | -    |               |              |  |
| H8          | PL5B              | 7    | LDQ6          | C            | NC                | -    |               |              |  |
| H9          | PL2A              | 7    | LDQ6          | T (LVDS)*    | NC                | -    |               |              |  |
| J10         | PL2B              | 7    | LDQ6          | C (LVDS)*    | NC                | -    |               |              |  |
| J20         | NC                | -    |               |              | NC                | -    |               |              |  |
| J21         | NC                | -    |               |              | NC                | -    |               |              |  |
| J9          | PL4A              | 7    | LDQ6          | T (LVDS)*    | NC                | -    |               |              |  |
| K9          | PL4B              | 7    | LDQ6          | C (LVDS)*    | NC                | -    |               |              |  |
| R9          | NC                | -    |               |              | NC                | -    |               |              |  |
| U22         | NC                | -    |               |              | NC                | -    |               |              |  |
| W9          | NC                | -    |               |              | NC                | -    |               |              |  |
| N13         | VCCPLL            | -    |               |              | VCCPLL            | -    |               |              |  |
| N18         | VCCPLL            | -    |               |              | VCCPLL            | -    |               |              |  |
| V13         | VCCPLL            | -    |               |              | VCCPLL            | -    |               |              |  |
| V18         | VCCPLL            | -    |               |              | VCCPLL            | -    |               |              |  |

\* 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.

\*\*\* These sysCONFIG pins are dedicated I/O pins for configuration. The outputs are actively driven during normal device operation.

\*\*\*\*Due to packaging bond out option, this DQS does not have all the necessary DQ pins bonded out for a full 8-bit data width.

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.

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

| LFE2M100E/SE |                   |      |                       |              |
|--------------|-------------------|------|-----------------------|--------------|
| Ball Number  | Ball/Pad Function | Bank | Dual Function         | Differential |
| VCCIO        | VCCIO3            | 3    |                       |              |
| T22          | PR69A             | 3    | RDQ72                 | T            |
| T29          | PR68B             | 3    | RDQ72                 | C (LVDS)*    |
| T28          | PR68A             | 3    | RDQ72                 | T (LVDS)*    |
| R23          | PR66B             | 3    | RLM4_SPLLC_FB_A/RDQ63 | C            |
| GNDIO        | GNDIO3            | -    |                       |              |
| -            | -                 | -    |                       |              |
| R22          | PR66A             | 3    | RLM4_SPLLT_FB_A/RDQ63 | T            |
| P30          | PR65B             | 3    | RLM4_SPLLC_IN_A/RDQ63 | C (LVDS)*    |
| R29          | PR65A             | 3    | RLM4_SPLLT_IN_A/RDQ63 | T (LVDS)*    |
| T27          | PR64B             | 3    | RDQ63                 | C            |
| VCCIO        | VCCIO3            | 3    |                       |              |
| T26          | PR64A             | 3    | RDQ63                 | T            |
| GNDIO        | GNDIO3            | -    |                       |              |
| N30          | PR61B             | 3    | RDQ63                 | C (LVDS)*    |
| N29          | PR61A             | 3    | RDQ63                 | T (LVDS)*    |
| VCCIO        | VCCIO3            | 3    |                       |              |
| R27          | PR60B             | 3    | VREF2_3/RDQ63         | C            |
| R28          | PR60A             | 3    | VREF1_3/RDQ63         | T            |
| P29          | PR59B             | 3    | PCLKC3_0/RDQ63        | C (LVDS)*    |
| P28          | PR59A             | 3    | PCLKT3_0/RDQ63        | T (LVDS)*    |
| M30          | PR57B             | 2    | PCLKC2_0/RDQ54        | C            |
| M29          | PR57A             | 2    | PCLKT2_0/RDQ54        | T            |
| GNDIO        | GNDIO2            | -    |                       |              |
| P23          | PR56B             | 2    | RDQ54                 | C (LVDS)*    |
| P24          | PR56A             | 2    | RDQ54                 | T (LVDS)*    |
| R26          | PR55B             | 2    | RDQ54                 | C            |
| P27          | PR55A             | 2    | RDQ54                 | T            |
| VCCIO        | VCCIO2            | 2    |                       |              |
| P25          | PR54B             | 2    | RDQ54                 | C (LVDS)*    |
| P26          | PR54A             | 2    | RDQS54                | T (LVDS)*    |
| K30          | PR53B             | 2    | RDQ54                 | C            |
| GNDIO        | GNDIO2            | -    |                       |              |
| K29          | PR53A             | 2    | RDQ54                 | T            |
| N22          | PR52B             | 2    | RDQ54                 | C (LVDS)*    |
| P22          | PR52A             | 2    | RDQ54                 | T (LVDS)*    |
| J30          | PR51B             | 2    | RUM3_SPLLC_FB_A/RDQ54 | C            |
| VCCIO        | VCCIO2            | 2    |                       |              |
| J29          | PR51A             | 2    | RUM3_SPLLT_FB_A/RDQ54 | T            |
| N24          | PR50B             | 2    | RUM3_SPLLC_IN_A/RDQ54 | C (LVDS)*    |
| N23          | PR50A             | 2    | RUM3_SPLLT_IN_A/RDQ54 | T (LVDS)*    |
| N25          | PR48B             | 2    | RDQ45                 | C            |
| N26          | PR48A             | 2    | RDQ45                 | T            |

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

| LFE2M70E/SE |                   |      |               | LFE2M100E/SE |                   |      |               |              |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |
| AA8         | PL65A             | 6    | LDQ64         | T            | PL73A             | 6    | LDQ72         | T            |
| VCCIO       | VCCIO6            | 6    |               |              | VCCIO6            | 6    |               |              |
| Y9          | PL65B             | 6    | LDQ64         | C            | PL73B             | 6    | LDQ72         | C            |
| AA6         | PL66A             | 6    | LDQ64         | T (LVDS)*    | PL74A             | 6    | LDQ72         | T (LVDS)*    |
| AA7         | PL66B             | 6    | LDQ64         | C (LVDS)*    | PL74B             | 6    | LDQ72         | C (LVDS)*    |
| AA4         | PL67A             | 6    | LDQ64         | T            | PL75A             | 6    | LDQ72         | T            |
| GNDIO       | GNDIO6            | -    |               |              | GNDIO6            | -    |               |              |
| AA3         | PL67B             | 6    | LDQ64         | C            | PL75B             | 6    | LDQ72         | C            |
| AA9         | PL69A             | 6    | LDQ73         | T (LVDS)*    | PL77A             | 6    | LDQ81         | T (LVDS)*    |
| AA10        | PL69B             | 6    | LDQ73         | C (LVDS)*    | PL77B             | 6    | LDQ81         | C (LVDS)*    |
| AA5         | PL70A             | 6    | LDQ73         | T            | PL78A             | 6    | LDQ81         | T            |
| AB6         | PL70B             | 6    | LDQ73         | C            | PL78B             | 6    | LDQ81         | C            |
| AB1         | PL71A             | 6    | LDQ73         | T (LVDS)*    | PL79A             | 6    | LDQ81         | T (LVDS)*    |
| VCCIO       | VCCIO6            | 6    |               |              | VCCIO6            | 6    |               |              |
| AB2         | PL71B             | 6    | LDQ73         | C (LVDS)*    | PL79B             | 6    | LDQ81         | C (LVDS)*    |
| AC8         | PL72A             | 6    | LDQ73         | T            | PL80A             | 6    | LDQ81         | T            |
| AB10        | PL72B             | 6    | LDQ73         | C            | PL80B             | 6    | LDQ81         | C            |
| AC1         | PL73A             | 6    | LDQS73        | T (LVDS)*    | PL81A             | 6    | LDQS81        | T (LVDS)*    |
| GNDIO       | GNDIO6            | -    |               |              | GNDIO6            | -    |               |              |
| AC2         | PL73B             | 6    | LDQ73         | C (LVDS)*    | PL81B             | 6    | LDQ81         | C (LVDS)*    |
| AB7         | PL74A             | 6    | LDQ73         | T            | PL82A             | 6    | LDQ81         | T            |
| AB5         | PL74B             | 6    | LDQ73         | C            | PL82B             | 6    | LDQ81         | C            |
| VCCIO       | VCCIO6            | 6    |               |              | VCCIO6            | 6    |               |              |
| AC3         | PL75A             | 6    | LDQ73         | T (LVDS)*    | PL83A             | 6    | LDQ81         | T (LVDS)*    |
| AC4         | PL75B             | 6    | LDQ73         | C (LVDS)*    | PL83B             | 6    | LDQ81         | C (LVDS)*    |
| AC10        | PL76A             | 6    | LDQ73         | T            | PL84A             | 6    | LDQ81         | T            |
| AC9         | PL76B             | 6    | LDQ73         | C            | PL84B             | 6    | LDQ81         | C            |
| GNDIO       | GNDIO6            | -    |               |              | GNDIO6            | -    |               |              |
| AC7         | NC                | -    |               |              | PL86A             | 6    | LDQ90         | T (LVDS)*    |
| AC5         | NC                | -    |               |              | PL86B             | 6    | LDQ90         | C (LVDS)*    |
| AC6         | NC                | -    |               |              | PL87A             | 6    | LDQ90         | T            |
| AD5         | NC                | -    |               |              | PL87B             | 6    | LDQ90         | C            |
| -           | -                 | -    |               |              | VCCIO6            | 6    |               |              |
| AD4         | NC                | -    |               |              | PL88A             | 6    | LDQ90         | T (LVDS)*    |
| AD3         | NC                | -    |               |              | PL88B             | 6    | LDQ90         | C (LVDS)*    |
| AD10        | NC                | -    |               |              | PL89A             | 6    | LDQ90         | T            |
| AD8         | NC                | -    |               |              | PL89B             | 6    | LDQ90         | C            |
| -           | -                 | -    |               |              | GNDIO6            | -    |               |              |
| AD2         | NC                | -    |               |              | PL90A             | 6    | LDQS90        | T (LVDS)*    |
| AD1         | NC                | -    |               |              | PL90B             | 6    | LDQ90         | C (LVDS)*    |
| AD9         | NC                | -    |               |              | PL91A             | 6    | LDQ90         | T            |
| -           | -                 | -    |               |              | VCCIO6            | 6    |               |              |
| AC11        | NC                | -    |               |              | PL91B             | 6    | LDQ90         | C            |
| AD6         | NC                | -    |               |              | PL92A             | 6    | LDQ90         | T (LVDS)*    |
| AD7         | NC                | -    |               |              | PL92B             | 6    | LDQ90         | C (LVDS)*    |
| AE1         | NC                | -    |               |              | PL93A             | 6    | LDQ90         | T            |
| -           | -                 | -    |               |              | GNDIO6            | -    |               |              |
| AE2         | NC                | -    |               |              | PL93B             | 6    | LDQ90         | C            |
| AF2         | PL78A             | 6    | LDQ82         | T (LVDS)*    | PL95A             | 6    | LDQ99         | T (LVDS)*    |