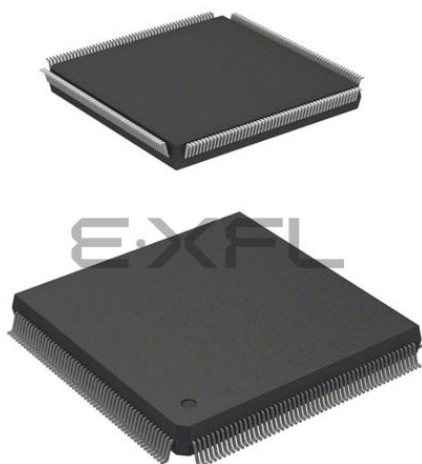




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### Understanding [Embedded - FPGAs \(Field Programmable Gate Array\)](#)

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

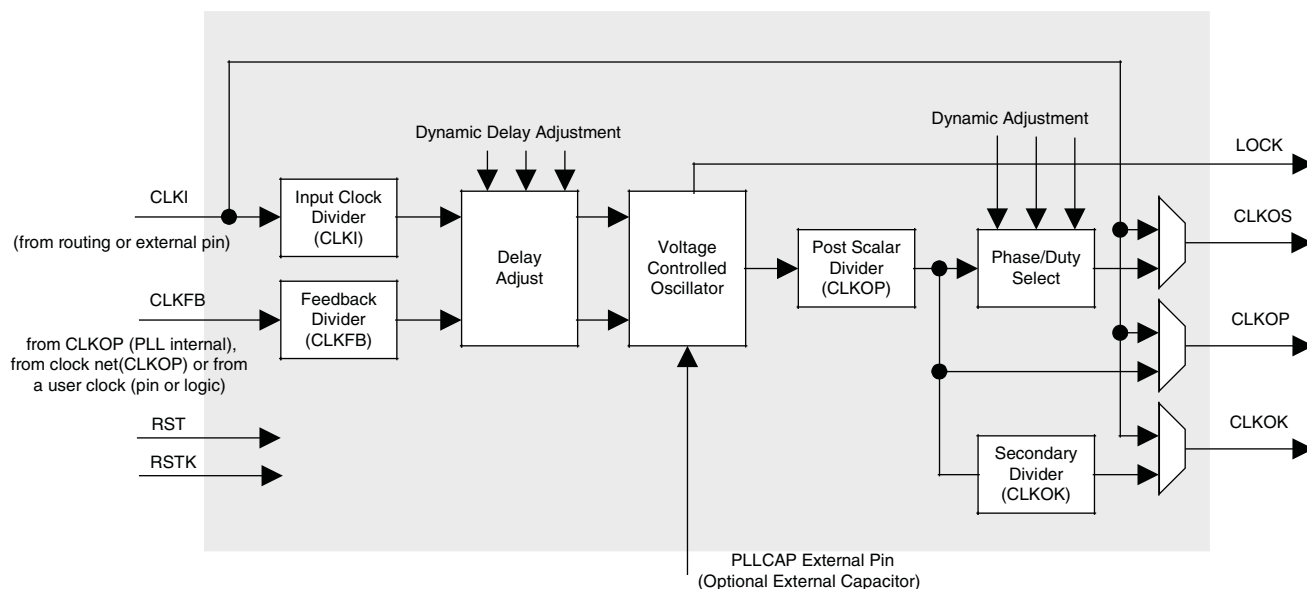
### Applications of Embedded - FPGAs

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

#### Details

|                                |                                                                                                                                                                     |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Product Status                 | Obsolete                                                                                                                                                            |
| Number of LABs/CLBs            | 1500                                                                                                                                                                |
| Number of Logic Elements/Cells | 12000                                                                                                                                                               |
| Total RAM Bits                 | 226304                                                                                                                                                              |
| Number of I/O                  | 131                                                                                                                                                                 |
| Number of Gates                | -                                                                                                                                                                   |
| Voltage - Supply               | 1.14V ~ 1.26V                                                                                                                                                       |
| Mounting Type                  | Surface Mount                                                                                                                                                       |
| Operating Temperature          | 0°C ~ 85°C (TJ)                                                                                                                                                     |
| Package / Case                 | 208-BFQFP                                                                                                                                                           |
| Supplier Device Package        | 208-PQFP (28x28)                                                                                                                                                    |
| Purchase URL                   | <a href="https://www.e-xfl.com/product-detail/lattice-semiconductor/lfe2-12e-5q208c">https://www.e-xfl.com/product-detail/lattice-semiconductor/lfe2-12e-5q208c</a> |

**Figure 2-5. General Purpose PLL (GPLL) Diagram**



## Standard PLL (SPLL)

Some of the larger devices have two to six Standard PLLs (SPLLs). SPLLs have the same features as GPLLs but without delay adjustment capability. SPLLs also provide different parametric specifications. For more information, please see the list of additional technical documentation at the end of this data sheet.

Table 2-4 provides a description of the signals in the GPLL and SPLL blocks.

**Table 2-4. GPLL and SPLL Blocks Signal Descriptions**

| Signal                    | I/O | Description                                                                                              |
|---------------------------|-----|----------------------------------------------------------------------------------------------------------|
| CLKI                      | I   | Clock input from external pin or routing                                                                 |
| CLKFB                     | I   | PLL feedback input from CLKOP (PLL internal), from clock net (CLKOP) or from a user clock (PIN or logic) |
| RST                       | I   | "1" to reset PLL counters, VCO, charge pumps and M-dividers                                              |
| RSTK                      | I   | "1" to reset K-divider                                                                                   |
| CLKOS                     | O   | PLL output clock to clock tree (phase shifted/duty cycle changed)                                        |
| CLKOP                     | O   | PLL output clock to clock tree (no phase shift)                                                          |
| CLKOK                     | O   | PLL output to clock tree through secondary clock divider                                                 |
| LOCK                      | O   | "1" indicates PLL LOCK to CLKI                                                                           |
| DDAMODE <sup>1</sup>      | I   | Dynamic Delay Enable. "1": Pin control (dynamic), "0": Fuse Control (static)                             |
| DDAIZR <sup>1</sup>       | I   | Dynamic Delay Zero. "1": delay = 0, "0": delay = on                                                      |
| DDAILAG <sup>1</sup>      | I   | Dynamic Delay Lag/Lead. "1": Lead, "0": Lag                                                              |
| DDAIDEL[2:0] <sup>1</sup> | I   | Dynamic Delay Input                                                                                      |
| DPA MODES                 | I   | DPA (Dynamic Phase Adjust/Duty Cycle Select) mode                                                        |
| DPHASE [3:0]              | I   | DPA Phase Adjust inputs                                                                                  |
| DDDUTY [3:0]              | —   | DPA Duty Cycle Select inputs                                                                             |

1. These signals are not available in SPLL.

## sysCLOCK SPLL Timing

### Over Recommended Operating Conditions

| Parameter                       | Description                           | Conditions                               | Min.  | Typ. | Max.  | Units |
|---------------------------------|---------------------------------------|------------------------------------------|-------|------|-------|-------|
| f <sub>IN</sub>                 | Input Clock Frequency (CLKI, CLKFB)   | Without external capacitor               | 33    | —    | 420   | MHz   |
|                                 |                                       | With external capacitor <sup>5, 6</sup>  | 2     | —    | 420   | MHz   |
| f <sub>OUT</sub>                | Output Clock Frequency (CLKOP, CLKOS) | Without external capacitor               | 33    | —    | 420   | MHz   |
|                                 |                                       | With external capacitor <sup>5</sup>     | 5     | —    | 50    | MHz   |
| f <sub>OUT2</sub>               | K-Divider Output Frequency (CLKOK)    | Without external capacitor               | 0.258 | —    | 210   | MHz   |
|                                 |                                       | With external capacitor <sup>5</sup>     | 0.039 | —    | 25    | MHz   |
| f <sub>VCO</sub>                | PLL VCO Frequency                     |                                          | 640   | —    | 1280  | MHz   |
| f <sub>PFD</sub>                | Phase Detector Input Frequency        | Without external capacitor               | 33    | —    | 420   | MHz   |
|                                 |                                       | With external capacitor <sup>6</sup>     | 2     | —    | 50    | MHz   |
| AC Characteristics              |                                       |                                          |       |      |       |       |
| t <sub>DT</sub>                 | Output Clock Duty Cycle               | Default Duty Cycle Selected <sup>3</sup> | 45    | 50   | 55    | %     |
| t <sub>PH</sub> <sup>4</sup>    | Output Phase Accuracy                 |                                          | —     | —    | ±0.05 | UI    |
| t <sub>OPJIT</sub> <sup>1</sup> | Output Clock Period Jitter            | f <sub>OUT</sub> ≥ 100 MHz               | —     | —    | ±125  | ps    |
|                                 |                                       | 50 ≤ f <sub>OUT</sub> < 100 MHz          | —     | —    | 0.025 | UIPP  |
|                                 |                                       | f <sub>OUT</sub> < 50 MHz                | —     | —    | 0.04  | UIPP  |
| t <sub>SK</sub>                 | Input Clock to Output Clock Skew      | Divider Ratio = Integer                  | —     | —    | ±250  | ps    |
| t <sub>W</sub>                  | Output Clock Pulse Width              | At 90% or 10%                            | 1     | —    | —     | ns    |
| t <sub>LOCK</sub> <sup>2</sup>  | PLL Lock-in Time                      | Without external capacitor               | —     | —    | 150   | μs    |
|                                 |                                       | With external capacitor <sup>5</sup>     | —     | —    | 500   | μs    |
| t <sub>IPJIT</sub>              | Input Clock Period Jitter             |                                          | —     | —    | ±200  | ps    |
| t <sub>FBKDLY</sub>             | External Feedback Delay               |                                          | —     | —    | 10    | ns    |
| t <sub>HI</sub>                 | Input Clock High Time                 | 90% to 90%                               | 0.5   | —    | —     | ns    |
| t <sub>LO</sub>                 | Input Clock Low Time                  | 10% to 10%                               | 0.5   | —    | —     | ns    |
| t <sub>RST</sub>                | RST Pulse Width (RSTK)                |                                          | 15    | —    | —     | ns    |
|                                 | Reset Signal Pulse Width (RST)        | Without external capacitor               | 500   | —    | —     | ns    |
|                                 |                                       | With external capacitor <sup>5</sup>     | 20    | —    | —     | μs    |

1. Jitter sample is taken over 10,000 samples of the primary PLL output with clean reference clock and no additional I/O pins toggling.

2. Output clock is valid after  $t_{LOCK}$  for PLL reset and dynamic delay adjustment.

3. Using LVDS output buffers.

4. Phase accuracy of CLKOS compared to CLKOP.

5. Value of external capacitor: 5.6 nF ±20%, NPO dielectric, ceramic chip capacitor, 1206 or smaller package, connected to PLLCAP pin.

6.  $f_{OUT}(\max) = f_{IN} * 10$  for  $f_{IN} < 5$  MHz.

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

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

## LFE2-6E/SE and LFE2-12E/SE Logic Signal Connections: 256 fpBGA

| LFE2-6E/SE  |                   |      |                   |              | LFE2-12E/SE       |      |                   |              |  |
|-------------|-------------------|------|-------------------|--------------|-------------------|------|-------------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function     | Differential | Ball/Pad Function | Bank | Dual Function     | Differential |  |
| C3          | PL2A              | 7    | VREF2_7           | T (LVDS)*    | PL2A              | 7    | VREF2_7           | T (LVDS)*    |  |
| C2          | PL2B              | 7    | VREF1_7           | C (LVDS)*    | PL2B              | 7    | VREF1_7           | C (LVDS)*    |  |
| VCCIO       | VCCIO7            | 7    |                   |              | VCCIO7            | 7    |                   |              |  |
| -           | -                 | -    |                   |              | -                 | -    |                   |              |  |
| D3          | PL5A              | 7    |                   | T            | PL5A              | 7    |                   | T            |  |
| D4          | PL4A              | 7    |                   | T (LVDS)*    | PL4A              | 7    |                   | T (LVDS)*    |  |
| D2          | PL5B              | 7    |                   | C            | PL5B              | 7    |                   | C            |  |
| GND         | GNDIO7            | -    |                   |              | GNDIO7            | -    |                   |              |  |
| E4          | PL4B              | 7    |                   | C (LVDS)*    | PL4B              | 7    |                   | C (LVDS)*    |  |
| B1          | PL7A              | 7    | LDQ10             | T            | PL7A              | 7    | LDQ10             | T            |  |
| C1          | PL7B              | 7    | LDQ10             | C            | PL7B              | 7    | LDQ10             | C            |  |
| F5          | PL9A              | 7    | LDQ10             | T            | PL9A              | 7    | LDQ10             | T            |  |
| VCCIO       | VCCIO7            | 7    |                   |              | VCCIO7            | 7    |                   |              |  |
| F4          | PL8A              | 7    | LDQ10             | T (LVDS)*    | PL8A              | 7    | LDQ10             | T (LVDS)*    |  |
| G6          | PL9B              | 7    | LDQ10             | C            | PL9B              | 7    | LDQ10             | C            |  |
| G4          | PL8B              | 7    | LDQ10             | C (LVDS)*    | PL8B              | 7    | LDQ10             | C (LVDS)*    |  |
| D1          | PL10A             | 7    | LDQS10            | T (LVDS)*    | PL10A             | 7    | LDQS10            | T (LVDS)*    |  |
| GND         | GNDIO7            | -    |                   |              | GNDIO7            | -    |                   |              |  |
| E1          | PL10B             | 7    | LDQ10             | C (LVDS)*    | PL10B             | 7    | LDQ10             | C (LVDS)*    |  |
| F3          | PL11A             | 7    | LDQ10             | T            | PL11A             | 7    | LDQ10             | T            |  |
| G3          | PL11B             | 7    | LDQ10             | C            | PL11B             | 7    | LDQ10             | C            |  |
| VCCIO       | VCCIO7            | 7    |                   |              | VCCIO7            | 7    |                   |              |  |
| F2          | PL12A             | 7    | LDQ10             | T (LVDS)*    | PL12A             | 7    | LDQ10             | T (LVDS)*    |  |
| F1          | PL12B             | 7    | LDQ10             | C (LVDS)*    | PL12B             | 7    | LDQ10             | C (LVDS)*    |  |
| GND         | GNDIO7            | -    |                   |              | GNDIO7            | -    |                   |              |  |
| G2          | PL13A             | 7    | PCLKT7_0/LDQ10    | T            | PL13A             | 7    | PCLKT7_0/LDQ10    | T            |  |
| G1          | PL13B             | 7    | PCLKC7_0/LDQ10    | C            | PL13B             | 7    | PCLKC7_0/LDQ10    | C            |  |
| H6          | PL15A             | 6    | PCLKT6_0          | T (LVDS)*    | PL15A             | 6    | PCLKT6_0          | T (LVDS)*    |  |
| VCCIO       | VCCIO6            | 6    |                   |              | VCCIO6            | 6    |                   |              |  |
| H5          | PL15B             | 6    | PCLKC6_0          | C (LVDS)*    | PL15B             | 6    | PCLKC6_0          | C (LVDS)*    |  |
| H4          | PL16A             | 6    | VREF2_6           | T            | PL16A             | 6    | VREF2_6           | T            |  |
| GND         | GNDIO6            | -    |                   |              | GNDIO6            | -    |                   |              |  |
| H3          | PL16B             | 6    | VREF1_6           | C            | PL16B             | 6    | VREF1_6           | C            |  |
| H2          | PL17A             | 6    | LLM0_GDLLT_IN_A** | T (LVDS)*    | PL17A             | 6    | LLM0_GDLLT_IN_A** | T (LVDS)*    |  |
| H1          | PL17B             | 6    | LLM0_GDLLC_IN_A** | C (LVDS)*    | PL17B             | 6    | LLM0_GDLLC_IN_A** | C (LVDS)*    |  |
| G10         | VCC               | -    |                   |              | VCC               | -    |                   |              |  |
| J4          | PL18A             | 6    | LLM0_GDLLT_FB_A   | T            | PL18A             | 6    | LLM0_GDLLT_FB_A   | T            |  |
| J5          | PL18B             | 6    | LLM0_GDLLC_FB_A   | C            | PL18B             | 6    | LLM0_GDLLC_FB_A   | C            |  |
| J6          | LLM0_PLLCAP       | 6    |                   |              | LLM0_PLLCAP       | 6    |                   |              |  |
| K4          | PL20A             | 6    | LLM0_GPLLT_IN_A** | T (LVDS)*    | PL20A             | 6    | LLM0_GPLLT_IN_A** | T (LVDS)*    |  |
| GND         | GNDIO6            | -    |                   |              | GNDIO6            | -    |                   |              |  |
| J1          | PL21A             | 6    | LLM0_GPLLT_FB_A   | T            | PL21A             | 6    | LLM0_GPLLT_FB_A   | T            |  |
| K3          | PL20B             | 6    | LLM0_GPLLC_IN_A** | C (LVDS)*    | PL20B             | 6    | LLM0_GPLLC_IN_A** | C (LVDS)*    |  |
| VCCIO       | VCCIO6            | 6    |                   |              | VCCIO6            | 6    |                   |              |  |
| J2          | PL21B             | 6    | LLM0_GPLLC_FB_A   | C            | PL21B             | 6    | LLM0_GPLLC_FB_A   | C            |  |

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

| LFE2-12E/12SE |                   |      |                   |              | LFE2-20E/20SE     |      |                         |              |
|---------------|-------------------|------|-------------------|--------------|-------------------|------|-------------------------|--------------|
| Ball Number   | Ball/Pad Function | Bank | Dual Function     | Differential | Ball/Pad Function | Bank | Dual Function           | Differential |
| M6            | PL15B             | 6    | PCLKC6_0          | C (LVDS)*    | PL21B             | 6    | PCLKC6_0/LDQ25          | C (LVDS)*    |
| M3            | PL16A             | 6    | VREF2_6           | T            | PL22A             | 6    | VREF2_6/LDQ25           | T            |
| GNDIO         | GNDIO6            | -    |                   |              | -                 | -    |                         |              |
| M4            | PL16B             | 6    | VREF1_6           | C            | PL22B             | 6    | VREF1_6/LDQ25           | C            |
| -             | -                 | -    |                   |              | VCCIO6            | 6    |                         |              |
| N1            | NC                | -    |                   |              | PL24A             | 6    | LDQ25                   | T            |
| M2            | NC                | -    |                   |              | PL23A             | 6    | LDQ25                   | T (LVDS)*    |
| N2            | NC                | -    |                   |              | PL24B             | 6    | LDQ25                   | C            |
| M1            | NC                | -    |                   |              | PL23B             | 6    | LDQ25                   | C (LVDS)*    |
| -             | -                 | -    |                   |              | GNDIO             | -    |                         |              |
| N3            | NC                | -    |                   |              | PL25A             | 6    | LDQS25                  | T (LVDS)*    |
| N5            | NC                | -    |                   |              | PL26A             | 6    | LDQ25                   | T            |
| N4            | NC                | -    |                   |              | PL25B             | 6    | LDQ25                   | C (LVDS)*    |
| -             | -                 | -    |                   |              | VCCIO6            | 6    |                         |              |
| P5            | NC                | -    |                   |              | PL26B             | 6    | LDQ25                   | C            |
| P1            | PL17A             | 6    | LLM0_GDLLT_IN_A** | T (LVDS)*    | PL27A             | 6    | LLM0_GDLLT_IN_A**/LDQ25 | T (LVDS)*    |
| P2            | PL17B             | 6    | LLM0_GDLLC_IN_A** | C (LVDS)*    | PL27B             | 6    | LLM0_GDLLC_IN_A**/LDQ25 | C (LVDS)*    |
| P4            | PL18A             | 6    | LLM0_GDLLT_FB_A   | T            | PL28A             | 6    | LLM0_GDLLT_FB_A/LDQ25   | T            |
| -             | -                 | -    |                   |              | GNDIO             | -    |                         |              |
| R4            | PL18B             | 6    | LLM0_GDLLC_FB_A   | C            | PL28B             | 6    | LLM0_GDLLC_FB_A/LDQ25   | C            |
| P6            | LLM0_PLLCAP       | 6    |                   |              | LLM0_PLLCAP       | 6    |                         |              |
| R1            | PL20A             | 6    | LLM0_GPLLT_IN_A** | T (LVDS)*    | PL30A             | 6    | LLM0_GPLLT_IN_A**/LDQ34 | T (LVDS)*    |
| GNDIO         | GNDIO6            | -    |                   |              | -                 | -    |                         |              |
| R3            | PL21A             | 6    | LLM0_GPLLT_FB_A   | T            | PL31A             | 6    | LLM0_GPLLT_FB_A/LDQ34   | T            |
| R2            | PL20B             | 6    | LLM0_GPLLC_IN_A** | C (LVDS)*    | PL30B             | 6    | LLM0_GPLLC_IN_A/LDQ34   | C (LVDS)*    |
| T4            | PL21B             | 6    | LLM0_GPLLC_FB_A   | C            | PL31B             | 6    | LLM0_GPLLC_FB_A/LDQ34   | C            |
| T5            | PL23A             | 6    |                   | T            | PL33A             | 6    | LDQ34                   | T            |
| VCCIO         | VCCIO6            | 6    |                   |              | VCCIO6            | 6    |                         |              |
| T1            | PL22A             | 6    |                   | T (LVDS)*    | PL32A             | 6    | LDQ34                   | T (LVDS)*    |
| T3            | PL23B             | 6    |                   | C            | PL33B             | 6    | LDQ34                   | C            |
| T2            | PL22B             | 6    |                   | C (LVDS)*    | PL32B             | 6    | LDQ34                   | C (LVDS)*    |
| GNDIO         | GNDIO6            | -    |                   |              | GNDIO6            | -    |                         |              |
| -             | -                 | -    |                   |              | VCCIO6            | 6    |                         |              |
| V1            | PL25A             | 6    | LDQ28             | T            | PL39A             | 6    | LDQ42                   | T            |
| -             | -                 | -    |                   |              | GNDIO             | -    |                         |              |
| V2            | PL25B             | 6    | LDQ28             | C            | PL39B             | 6    | LDQ42                   | C            |
| U1            | PL24A             | 6    | LDQ28             | T (LVDS)*    | PL38A             | 6    | LDQ42                   | T (LVDS)*    |
| U3            | PL27A             | 6    | LDQ28             | T            | PL41A             | 6    | LDQ42                   | T            |
| VCCIO         | VCCIO6            | 6    |                   |              | VCCIO6            | 6    |                         |              |
| U2            | PL24B             | 6    | LDQ28             | C (LVDS)*    | PL38B             | 6    | LDQ42                   | C (LVDS)*    |
| U4            | PL27B             | 6    | LDQ28             | C            | PL41B             | 6    | LDQ42                   | C            |
| R6            | PL26A             | 6    | LDQ28             | T (LVDS)*    | PL40A             | 6    | LDQ42                   | T (LVDS)*    |
| R7            | PL29A             | 6    | LDQ28             | T            | PL43A             | 6    | LDQ42                   | T            |
| GNDIO         | GNDIO6            | -    |                   |              | GNDIO             | -    |                         |              |

## 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 |  |
| U24           | PR30B             | 3    | RLM0_GPLL_C_IN_A**/RDQ34 | C (LVDS)*    | PR44B             | 3    | RLM0_GPLL_C_IN_A**/RDQ48 | C (LVDS)*    |  |
| U25           | PR30A             | 3    | RLM0_GPLL_T_IN_A**/RDQ34 | T (LVDS)*    | PR44A             | 3    | RLM0_GPLL_T_IN_A**/RDQ48 | T (LVDS)*    |  |
| R20           | RLM0_PLLCAP       | 3    |                          |              | RLM0_PLLCAP       | 3    |                          |              |  |
| P18           | VCC               | 3    |                          |              | VCCPLL            | 3    |                          |              |  |
| T19           | PR28B             | 3    | RLM0_GDLLC_FB_A/RDQ25    | C            | PR42B             | 3    | RLM0_GDLLC_FB_A/RDQ39    | C            |  |
| U20           | PR28A             | 3    | RLM0_GDLLT_FB_A/RDQ25    | T            | PR42A             | 3    | RLM0_GDLLT_FB_A/RDQ39    | T            |  |
| GND           | GNDIO3            | -    |                          |              | GNDIO3            | -    |                          |              |  |
| T25           | PR27B             | 3    | RLM0_GDLLC_IN_A**/RDQ25  | C (LVDS)*    | PR41B             | 3    | RLM0_GDLLC_IN_A**/RDQ39  | C (LVDS)*    |  |
| T26           | PR27A             | 3    | RLM0_GDLLT_IN_A**/RDQ25  | T (LVDS)*    | PR41A             | 3    | RLM0_GDLLT_IN_A**/RDQ39  | T (LVDS)*    |  |
| T20           | PR26B             | 3    | RDQ25                    | C            | PR40B             | 3    | RDQ39                    | C            |  |
| T22           | PR26A             | 3    | RDQ25                    | T            | PR40A             | 3    | RDQ39                    | T            |  |
| VCCIO         | VCCIO3            | 3    |                          |              | VCCIO3            | 3    |                          |              |  |
| R26           | PR25B             | 3    | RDQ25                    | C (LVDS)*    | PR39B             | 3    | RDQ39                    | C (LVDS)*    |  |
| R25           | PR25A             | 3    | RDQS25***                | T (LVDS)*    | PR39A             | 3    | RDQS39***                | T (LVDS)*    |  |
| R22           | NC                | -    |                          |              | PR38B             | 3    | RDQ39                    | C            |  |
| GND           | GNDIO3            | -    |                          |              | GNDIO3            | -    |                          |              |  |
| T21           | NC                | -    |                          |              | PR38A             | 3    | RDQ39                    | T            |  |
| P26           | NC                | -    |                          |              | NC                | -    |                          |              |  |
| P25           | NC                | -    |                          |              | NC                | -    |                          |              |  |
| R24           | NC                | -    |                          |              | NC                | -    |                          |              |  |
| VCCIO         | VCCIO3            | 3    |                          |              | VCCIO3            | 3    |                          |              |  |
| R23           | NC                | -    |                          |              | NC                | -    |                          |              |  |
| P20           | NC                | -    |                          |              | NC                | -    |                          |              |  |
| R19           | NC                | -    |                          |              | NC                | -    |                          |              |  |
| P21           | NC                | -    |                          |              | PR34B             | 3    | RDQ31                    | C            |  |
| GND           | GNDIO3            | -    |                          |              | GNDIO3            | -    |                          |              |  |
| P19           | NC                | -    |                          |              | PR34A             | 3    | RDQ31                    | T            |  |
| P23           | NC                | -    |                          |              | PR33B             | 3    | RDQ31                    | C (LVDS)*    |  |
| P22           | NC                | -    |                          |              | PR33A             | 3    | RDQ31                    | T (LVDS)*    |  |
| N22           | NC                | -    |                          |              | PR32B             | 3    | RDQ31                    | C            |  |
| VCCIO         | VCCIO3            | 3    |                          |              | VCCIO3            | 3    |                          |              |  |
| R21           | NC                | -    |                          |              | PR32A             | 3    | RDQ31                    | T            |  |
| N26           | NC                | -    |                          |              | PR31B             | 3    | RDQ31                    | C (LVDS)*    |  |
| N25           | NC                | -    |                          |              | PR31A             | 3    | RDQS31                   | T (LVDS)*    |  |
| GND           | GNDIO3            | -    |                          |              | GNDIO3            | -    |                          |              |  |
| N19           | PR24B             | 3    | RDQ25                    | C            | PR30B             | 3    | RDQ31                    | C            |  |
| N20           | PR24A             | 3    | RDQ25                    | T            | PR30A             | 3    | RDQ31                    | T            |  |
| M26           | PR23B             | 3    | RDQ25                    | C (LVDS)*    | PR29B             | 3    | RDQ31                    | C (LVDS)*    |  |
| M25           | PR23A             | 3    | RDQ25                    | T (LVDS)*    | PR29A             | 3    | RDQ31                    | T (LVDS)*    |  |
| VCCIO         | VCCIO3            | 3    |                          |              | VCCIO3            | 3    |                          |              |  |
| N18           | PR22B             | 3    | VREF2_3/RDQ25            | C            | PR28B             | 3    | VREF2_3/RDQ31            | C            |  |
| N21           | PR22A             | 3    | VREF1_3/RDQ25            | T            | PR28A             | 3    | VREF1_3/RDQ31            | T            |  |
| L26           | PR21B             | 3    | PCLKC3_0/RDQ25           | C (LVDS)*    | PR27B             | 3    | PCLKC3_0/RDQ31           | C (LVDS)*    |  |
| L25           | PR21A             | 3    | PCLKT3_0/RDQ25           | T (LVDS)*    | PR27A             | 3    | PCLKT3_0/RDQ31           | T (LVDS)*    |  |
| N24           | PR19B             | 2    | PCLKC2_0/RDQ16           | C            | PR25B             | 2    | PCLKC2_0/RDQ22           | C            |  |
| M23           | PR19A             | 2    | PCLKT2_0/RDQ16           | T            | PR25A             | 2    | PCLKT2_0/RDQ22           | 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 |  |
| U24         | PR63B             | 3    | RLM0_GPLL_C_IN_A**/RDQ67 | C (LVDS)*    | PR76B             | 3    | RLM0_GPLL_C_IN_A**/RDQ80 | C (LVDS)*    |  |
| U25         | PR63A             | 3    | RLM0_GPLL_T_IN_A**/RDQ67 | T (LVDS)*    | PR76A             | 3    | RLM0_GPLL_T_IN_A**/RDQ80 | T (LVDS)*    |  |
| R20         | RLM0_PLLCAP       | 3    |                          |              | RLM0_PLLCAP       | 3    |                          |              |  |
| P18         | VCCPLL            | 3    |                          |              | VCCPLL            | -    |                          |              |  |
| T19         | PR61B             | 3    | RLM0_GDLLC_FB_A/RDQ58    | C            | PR74B             | 3    | RLM0_GDLLC_FB_A/RDQ71    | C            |  |
| U20         | PR61A             | 3    | RLM0_GDLLT_FB_A/RDQ58    | T            | PR74A             | 3    | RLM0_GDLLT_FB_A/RDQ71    | T            |  |
| GND         | GNDIO3            | -    |                          |              | GNDIO3            | -    |                          |              |  |
| T25         | PR60B             | 3    | RLM0_GDLLC_IN_A**/RDQ58  | C (LVDS)*    | PR73B             | 3    | RLM0_GDLLC_IN_A**/RDQ71  | C (LVDS)*    |  |
| T26         | PR60A             | 3    | RLM0_GDLLT_IN_A**/RDQ58  | T (LVDS)*    | PR73A             | 3    | RLM0_GDLLT_IN_A**/RDQ71  | T (LVDS)*    |  |
| T20         | PR59B             | 3    | RDQ58                    | C            | PR72B             | 3    | RDQ71                    | C            |  |
| T22         | PR59A             | 3    | RDQ58                    | T            | PR72A             | 3    | RDQ71                    | T            |  |
| VCCIO       | VCCIO3            | 3    |                          |              | VCCIO3            | 3    |                          |              |  |
| R26         | PR58B             | 3    | RDQ58                    | C (LVDS)*    | PR71B             | 3    | RDQ71                    | C (LVDS)*    |  |
| R25         | PR58A             | 3    | RDQS58                   | T (LVDS)*    | PR71A             | 3    | RDQS71                   | T (LVDS)*    |  |
| R22         | PR57B             | 3    | RDQ58                    | C            | PR70B             | 3    | RDQ71                    | C            |  |
| GND         | GNDIO3            | -    |                          |              | GNDIO3            | -    |                          |              |  |
| T21         | PR57A             | 3    | RDQ58                    | T            | PR70A             | 3    | RDQ71                    | T            |  |
| P26         | PR56B             | 3    | RDQ58                    | C (LVDS)*    | PR69B             | 3    | RDQ71                    | C (LVDS)*    |  |
| P25         | PR56A             | 3    | RDQ58                    | T (LVDS)*    | PR69A             | 3    | RDQ71                    | T (LVDS)*    |  |
| R24         | PR55B             | 3    | RDQ58                    | C            | PR68B             | 3    | RDQ71                    | C            |  |
| VCCIO       | VCCIO3            | 3    |                          |              | VCCIO3            | 3    |                          |              |  |
| R23         | PR55A             | 3    | RDQ58                    | T            | PR68A             | 3    | RDQ71                    | T            |  |
| P20         | PR54B             | 3    | RDQ58                    | C (LVDS)*    | PR67B             | 3    | RDQ71                    | C (LVDS)*    |  |
| R19         | PR54A             | 3    | RDQ58                    | T (LVDS)*    | PR67A             | 3    | RDQ71                    | T (LVDS)*    |  |
| P21         | PR53B             | 3    | RDQ50                    | C            | PR66B             | 3    | RDQ63                    | C            |  |
| GND         | GNDIO3            | -    |                          |              | GNDIO3            | -    |                          |              |  |
| P19         | PR53A             | 3    | RDQ50                    | T            | PR66A             | 3    | RDQ63                    | T            |  |
| P23         | PR52B             | 3    | RDQ50                    | C (LVDS)*    | PR65B             | 3    | RDQ63                    | C (LVDS)*    |  |
| P22         | PR52A             | 3    | RDQ50                    | T (LVDS)*    | PR65A             | 3    | RDQ63                    | T (LVDS)*    |  |
| N22         | PR51B             | 3    | RDQ50                    | C            | PR64B             | 3    | RDQ63                    | C            |  |
| VCCIO       | VCCIO3            | 3    |                          |              | VCCIO3            | 3    |                          |              |  |
| R21         | PR51A             | 3    | RDQ50                    | T            | PR64A             | 3    | RDQ63                    | T            |  |
| N26         | PR50B             | 3    | RDQ50                    | C (LVDS)*    | PR63B             | 3    | RDQ63                    | C (LVDS)*    |  |
| N25         | PR50A             | 3    | RDQS50                   | T (LVDS)*    | PR63A             | 3    | RDQS63                   | T (LVDS)*    |  |
| GND         | GNDIO3            | -    |                          |              | GNDIO3            | -    |                          |              |  |
| N19         | PR49B             | 3    | RDQ50                    | C            | PR62B             | 3    | RDQ63                    | C            |  |
| N20         | PR49A             | 3    | RDQ50                    | T            | PR62A             | 3    | RDQ63                    | T            |  |
| M26         | PR48B             | 3    | RDQ50                    | C (LVDS)*    | PR61B             | 3    | RDQ63                    | C (LVDS)*    |  |
| M25         | PR48A             | 3    | RDQ50                    | T (LVDS)*    | PR61A             | 3    | RDQ63                    | T (LVDS)*    |  |
| VCCIO       | VCCIO3            | 3    |                          |              | VCCIO3            | 3    |                          |              |  |
| N18         | PR47B             | 3    | VREF2_3/RDQ50            | C            | PR60B             | 3    | VREF2_3/RDQ63            | C            |  |
| N21         | PR47A             | 3    | VREF1_3/RDQ50            | T            | PR60A             | 3    | VREF1_3/RDQ63            | T            |  |
| L26         | PR46B             | 3    | PCLKC3_0/RDQ50           | C (LVDS)*    | PR59B             | 3    | PCLKC3_0/RDQ63           | C (LVDS)*    |  |
| L25         | PR46A             | 3    | PCLKT3_0/RDQ50           | T (LVDS)*    | PR59A             | 3    | PCLKT3_0/RDQ63           | T (LVDS)*    |  |
| N24         | PR44B             | 2    | PCLKC2_0/RDQ41           | C            | PR57B             | 2    | PCLKC2_0/RDQ54           | C            |  |
| M23         | PR44A             | 2    | PCLKT2_0/RDQ41           | T            | PR57A             | 2    | PCLKT2_0/RDQ54           | 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 |
| C20         | PT75B             | 1    |               | C            | PT93B             | 1    |               | C            |
| D20         | PT75A             | 1    |               | T            | PT93A             | 1    |               | T            |
| A22         | PT74B             | 1    |               | C            | PT92B             | 1    |               | C            |
| A21         | PT74A             | 1    |               | T            | PT92A             | 1    |               | T            |
| GND         | GNDIO1            | -    |               |              | GNDIO1            | -    |               |              |
| E19         | PT71B             | 1    |               | C            | PT85B             | 1    |               | C            |
| C19         | PT71A             | 1    |               | T            | PT85A             | 1    |               | T            |
| VCCIO       | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |
| B21         | PT70B             | 1    |               | C            | PT79B             | 1    |               | C            |
| B20         | PT70A             | 1    |               | T            | PT79A             | 1    |               | T            |
| D19         | PT69B             | 1    |               | C            | PT78B             | 1    |               | C            |
| B19         | PT69A             | 1    |               | T            | PT78A             | 1    |               | T            |
| GND         | GNDIO1            | -    |               |              | GNDIO1            | -    |               |              |
| G17         | PT68B             | 1    |               | C            | PT77B             | 1    |               | C            |
| E18         | PT68A             | 1    |               | T            | PT77A             | 1    |               | T            |
| G19         | PT67B             | 1    |               | C            | PT76B             | 1    |               | C            |
| F17         | PT67A             | 1    |               | T            | PT76A             | 1    |               | T            |
| VCCIO       | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |
| A20         | PT66B             | 1    |               | C            | PT75B             | 1    |               | C            |
| A19         | PT66A             | 1    |               | T            | PT75A             | 1    |               | T            |
| E17         | PT65B             | 1    |               | C            | PT74B             | 1    |               | C            |
| D18         | PT65A             | 1    |               | T            | PT74A             | 1    |               | T            |
| B18         | PT64B             | 1    |               | C            | PT73B             | 1    |               | C            |
| GND         | GNDIO1            | -    |               |              | GNDIO1            | -    |               |              |
| A18         | PT64A             | 1    |               | T            | PT73A             | 1    |               | T            |
| E16         | PT63B             | 1    |               | C            | PT72B             | 1    |               | C            |
| G16         | PT63A             | 1    |               | T            | PT72A             | 1    |               | T            |
| F16         | PT62B             | 1    |               | C            | PT71B             | 1    |               | C            |
| VCCIO       | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |
| H18         | PT62A             | 1    |               | T            | PT71A             | 1    |               | T            |
| A17         | PT61B             | 1    |               | C            | PT70B             | 1    |               | C            |
| B17         | PT61A             | 1    |               | T            | PT70A             | 1    |               | T            |
| C18         | PT60B             | 1    |               | C            | PT69B             | 1    |               | C            |
| B16         | PT60A             | 1    |               | T            | PT69A             | 1    |               | T            |
| C17         | PT59B             | 1    |               | C            | PT68B             | 1    |               | C            |
| GND         | GNDIO1            | -    |               |              | GNDIO1            | -    |               |              |
| D17         | PT59A             | 1    |               | T            | PT68A             | 1    |               | T            |
| E15         | PT58B             | 1    |               | C            | PT67B             | 1    |               | C            |
| VCCIO       | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |
| G15         | PT58A             | 1    |               | T            | PT67A             | 1    |               | T            |
| A16         | PT57B             | 1    |               | C            | PT66B             | 1    |               | C            |
| B15         | PT57A             | 1    |               | T            | PT66A             | 1    |               | T            |
| D15         | PT56B             | 1    |               | C            | PT65B             | 1    |               | C            |
| F15         | PT56A             | 1    |               | T            | PT65A             | 1    |               | T            |
| A14         | PT55B             | 1    |               | C            | PT64B             | 1    |               | C            |
| B14         | PT55A             | 1    |               | T            | PT64A             | 1    |               | T            |

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

| LFE2-70E/SE |                   |      |                |              |
|-------------|-------------------|------|----------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function  | Differential |
| P3          | PL54B             | 7    | LDQ54          | C (LVDS)*    |
| R6          | PL55A             | 7    | LDQ54          | T            |
| VCCIO       | VCCIO7            | 7    |                |              |
| R8          | PL55B             | 7    | LDQ54          | C            |
| P2          | PL56A             | 7    | LDQ54          | T (LVDS)*    |
| P1          | PL56B             | 7    | LDQ54          | C (LVDS)*    |
| R5          | PL57A             | 7    | PCLKT7_0/LDQ54 | T            |
| GND         | GNDIO7            | -    |                |              |
| R7          | PL57B             | 7    | PCLKC7_0/LDQ54 | C            |
| R4          | PL59A             | 6    | PCLKT6_0/LDQ63 | T (LVDS)*    |
| R3          | PL59B             | 6    | PCLKC6_0/LDQ63 | C (LVDS)*    |
| T5          | PL60A             | 6    | VREF2_6/LDQ63  | T            |
| T7          | PL60B             | 6    | VREF1_6/LDQ63  | C            |
| T3          | PL61A             | 6    | LDQ63          | T (LVDS)*    |
| VCCIO       | VCCIO6            | 6    |                |              |
| T4          | PL61B             | 6    | LDQ63          | C (LVDS)*    |
| T6          | PL62A             | 6    | LDQ63          | T            |
| T8          | PL62B             | 6    | LDQ63          | C            |
| T2          | PL63A             | 6    | LDQS63         | T (LVDS)*    |
| GND         | GNDIO6            | -    |                |              |
| T1          | PL63B             | 6    | LDQ63          | C (LVDS)*    |
| U7          | PL64A             | 6    | LDQ63          | T            |
| U5          | PL64B             | 6    | LDQ63          | C            |
| VCCIO       | VCCIO6            | 6    |                |              |
| U4          | PL65A             | 6    | LDQ63          | T (LVDS)*    |
| U3          | PL65B             | 6    | LDQ63          | C (LVDS)*    |
| U8          | PL66A             | 6    | LDQ63          | T            |
| U6          | PL66B             | 6    | LDQ63          | C            |
| GND         | GNDIO6            | -    |                |              |
| U2          | PL67A             | 6    | LDQ71          | T (LVDS)*    |
| U1          | PL67B             | 6    | LDQ71          | C (LVDS)*    |
| V7          | PL68A             | 6    | LDQ71          | T            |
| V5          | PL68B             | 6    | LDQ71          | C            |
| VCCIO       | VCCIO6            | 6    |                |              |
| V2          | PL69A             | 6    | LDQ71          | T (LVDS)*    |
| V1          | PL69B             | 6    | LDQ71          | C (LVDS)*    |
| V8          | PL70A             | 6    | LDQ71          | T            |
| V6          | PL70B             | 6    | LDQ71          | C            |
| GND         | GNDIO6            | -    |                |              |
| W1          | PL71A             | 6    | LDQS71         | T (LVDS)*    |
| W2          | PL71B             | 6    | LDQ71          | C (LVDS)*    |
| W5          | PL72A             | 6    | LDQ71          | T            |
| VCCIO       | VCCIO6            | 6    |                |              |

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

| LFE2-70E/SE |                   |      |                       |              |
|-------------|-------------------|------|-----------------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function         | Differential |
| K28         | PR25A             | 2    | RDQ29                 | T (LVDS)*    |
| J24         | PR24B             | 2    | RDQ21                 | C            |
| J26         | PR24A             | 2    | RDQ21                 | T            |
| GND         | GNDIO2            | -    |                       |              |
| K29         | PR23B             | 2    | RDQ21                 | C (LVDS)*    |
| K30         | PR23A             | 2    | RDQ21                 | T (LVDS)*    |
| J23         | PR22B             | 2    | RDQ21                 | C            |
| J25         | PR22A             | 2    | RDQ21                 | T            |
| VCCIO       | VCCIO2            | 99   |                       |              |
| J27         | PR21B             | 2    | RDQ21                 | C (LVDS)*    |
| J28         | PR21A             | 2    | RDQS21                | T (LVDS)*    |
| H26         | PR20B             | 2    | RDQ21                 | C            |
| GND         | GNDIO2            | -    |                       |              |
| H24         | PR20A             | 2    | RDQ21                 | T            |
| J29         | PR19B             | 2    | RDQ21                 | C (LVDS)*    |
| J30         | PR19A             | 2    | RDQ21                 | T (LVDS)*    |
| H25         | PR18B             | 2    | RDQ21                 | C            |
| VCCIO       | VCCIO2            | 2    |                       |              |
| H23         | PR18A             | 2    | RDQ21                 | T            |
| G27         | PR15B             | 2    | RUM1_SPLLC_FB_A/RDQ12 | C            |
| GND         | GNDIO2            | -    |                       |              |
| H27         | PR15A             | 2    | RUM1_SPLLT_FB_A/RDQ12 | T            |
| G29         | PR14B             | 2    | RUM1_SPLLC_IN_A/RDQ12 | C (LVDS)*    |
| G28         | PR14A             | 2    | RUM1_SPLLT_IN_A/RDQ12 | T (LVDS)*    |
| VCCIO       | VCCIO2            | 2    |                       |              |
| GND         | GNDIO2            | -    |                       |              |
| G26         | PR6B              | 2    |                       | C (LVDS)*    |
| G25         | PR6A              | 2    |                       | T (LVDS)*    |
| G30         | PR5B              | 2    |                       | C            |
| F30         | PR5A              | 2    |                       | T            |
| VCCIO       | VCCIO2            | 2    |                       |              |
| F26         | PR4B              | 2    |                       | C (LVDS)*    |
| F27         | PR4A              | 2    |                       | T (LVDS)*    |
| F29         | PR3B              | 2    |                       | C            |
| GND         | GNDIO2            | -    |                       |              |
| F28         | PR3A              | 2    |                       | T            |
| H29         | PR2B              | 2    | VREF2_2               | C (LVDS)*    |
| H30         | PR2A              | 2    | VREF1_2               | T (LVDS)*    |
| VCCIO       | VCCIO2            | 2    |                       |              |
| B26         | PT100B            | 1    | VREF2_1               | C            |
| A26         | PT100A            | 1    | VREF1_1               | T            |
| GND         | GNDIO1            | -    |                       |              |
| C25         | PT99B             | 1    |                       | C            |

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

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

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

| LFE2M50E/SE |                   |      |                |              |
|-------------|-------------------|------|----------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function  | Differential |
| Y6          | PB8A              | 5    | BDQ6           | T            |
| Y5          | PB8B              | 5    | BDQ6           | C            |
| VCCIO       | VCCIO5            | 5    |                |              |
| AB3         | PB9A              | 5    | BDQ6           | T            |
| AB4         | PB9B              | 5    | BDQ6           | C            |
| AB5         | PB10A             | 5    | BDQ6           | T            |
| AA6         | PB10B             | 5    | BDQ6           | C            |
| GNDIO       | GNDIO5            | -    |                |              |
| VCCIO       | VCCIO5            | 5    |                |              |
| V9          | PB40A             | 5    | BDQ42          | T            |
| U9          | PB40B             | 5    | BDQ42          | C            |
| VCCIO       | VCCIO5            | 5    |                |              |
| U10         | PB41A             | 5    | BDQ42          | T            |
| T10         | PB41B             | 5    | BDQ42          | C            |
| GNDIO       | GNDIO5            | -    |                |              |
| W9          | PB42A             | 5    | BDQS42****     | T            |
| Y8          | PB42B             | 5    | BDQ42          | C            |
| AA7         | PB43A             | 5    | VREF2_5/BDQ42  | T            |
| Y7          | PB43B             | 5    | VREF1_5/BDQ42  | C            |
| AB6         | PB44A             | 5    | PCLKT5_0/BDQ42 | T            |
| AB7         | PB44B             | 5    | PCLKC5_0/BDQ42 | C            |
| VCCIO       | VCCIO5            | 5    |                |              |
| GNDIO       | GNDIO5            | -    |                |              |
| AA8         | PB49A             | 4    | PCLKT4_0/BDQ51 | T            |
| VCCIO       | VCCIO4            | 4    |                |              |
| AB8         | PB49B             | 4    | PCLKC4_0/BDQ51 | C            |
| AA9         | PB50A             | 4    | VREF2_4/BDQ51  | T            |
| Y9          | PB50B             | 4    | VREF1_4/BDQ51  | C            |
| AB9         | PB51A             | 4    | BDQS51****     | T            |
| GNDIO       | GNDIO4            | -    |                |              |
| AB10        | PB51B             | 4    | BDQ51          | C            |
| AA10        | PB52A             | 4    | BDQ51          | T            |
| Y11         | PB52B             | 4    | BDQ51          | C            |
| VCCIO       | VCCIO4            | 4    |                |              |
| GNDIO       | GNDIO4            | -    |                |              |
| V10         | PB56A             | 4    | BDQ60          | T            |
| U11         | PB56B             | 4    | BDQ60          | C            |
| V11         | PB57A             | 4    | BDQ60          | T            |
| W11         | PB57B             | 4    | BDQ60          | C            |
| AA11        | PB58A             | 4    | BDQ60          | T            |
| AB11        | PB58B             | 4    | BDQ60          | C            |
| VCCIO       | VCCIO4            | 4    |                |              |
| T11         | PB59A             | 4    | BDQ60          | T            |

**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 Logic Signal Connections: 484 fpBGA (Cont.)**

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

## 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 |  |
| K3          | VCCIO7            | 7    |               |              | VCCIO7            | 7    |               |              |  |
| M10         | VCCIO7            | 7    |               |              | VCCIO7            | 7    |               |              |  |
| M7          | VCCIO7            | 7    |               |              | VCCIO7            | 7    |               |              |  |
| N10         | VCCIO7            | 7    |               |              | VCCIO7            | 7    |               |              |  |
| N3          | VCCIO7            | 7    |               |              | VCCIO7            | 7    |               |              |  |
| P10         | VCCIO7            | 7    |               |              | VCCIO7            | 7    |               |              |  |
| R6          | VCCIO7            | 7    |               |              | VCCIO7            | 7    |               |              |  |
| AA25        | VCCIO8            | 8    |               |              | VCCIO8            | 8    |               |              |  |
| AD28        | VCCIO8            | 8    |               |              | VCCIO8            | 8    |               |              |  |
| AA10        | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| AA11        | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| AA20        | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| AA21        | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| K10         | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| K11         | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| K20         | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| K21         | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| L10         | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| L11         | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| L20         | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| L21         | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| Y10         | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| Y11         | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| Y20         | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| Y21         | VCCAUX            | -    |               |              | VCCAUX            | -    |               |              |  |
| A1          | GND               | -    |               |              | GND               | -    |               |              |  |
| A13         | GND               | -    |               |              | GND               | -    |               |              |  |
| A18         | GND               | -    |               |              | GND               | -    |               |              |  |
| A24         | GND               | -    |               |              | GND               | -    |               |              |  |
| A30         | GND               | -    |               |              | GND               | -    |               |              |  |
| A7          | GND               | -    |               |              | GND               | -    |               |              |  |
| AA14        | GND               | -    |               |              | GND               | -    |               |              |  |
| AA15        | GND               | -    |               |              | GND               | -    |               |              |  |
| AA16        | GND               | -    |               |              | GND               | -    |               |              |  |
| AA17        | GND               | -    |               |              | GND               | -    |               |              |  |
| AA24        | GND               | -    |               |              | GND               | -    |               |              |  |
| AA27        | GND               | -    |               |              | GND               | -    |               |              |  |
| AA4         | GND               | -    |               |              | GND               | -    |               |              |  |
| AB24        | GND               | -    |               |              | GND               | -    |               |              |  |
| AB7         | GND               | -    |               |              | GND               | -    |               |              |  |
| AD12        | GND               | -    |               |              | GND               | -    |               |              |  |
| AD19        | GND               | -    |               |              | GND               | -    |               |              |  |
| AD27        | GND               | -    |               |              | GND               | -    |               |              |  |
| AE22        | GND               | -    |               |              | GND               | -    |               |              |  |
| AE27        | GND               | -    |               |              | GND               | -    |               |              |  |
| AE4         | GND               | -    |               |              | GND               | -    |               |              |  |
| AE9         | GND               | -    |               |              | GND               | -    |               |              |  |
| AF14        | 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 |
| V18          | 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.

## 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 |
| GNDIO       | GNDIO0            | -    |               |              | GNDIO0            | -    |               |              |
| G15         | PT41A             | 0    |               | T            | PT46A             | 0    |               | T            |
| J14         | NC                | -    |               |              | PT45B             | 0    |               | C            |
| L15         | NC                | -    |               |              | PT45A             | 0    |               | T            |
| H14         | NC                | -    |               |              | PT44B             | 0    |               | C            |
| VCCIO       | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |
| K14         | NC                | -    |               |              | PT44A             | 0    |               | T            |
| F15         | PT38B             | 0    |               | C            | PT42B             | 0    |               | C            |
| G14         | PT38A             | 0    |               | T            | PT42A             | 0    |               | T            |
| C15         | PT37B             | 0    |               | C            | PT41B             | 0    |               | C            |
| GNDIO       | GNDIO0            | -    |               |              | GNDIO0            | -    |               |              |
| D14         | PT37A             | 0    |               | T            | PT41A             | 0    |               | T            |
| G13         | PT36B             | 0    |               | C            | PT40B             | 0    |               | C            |
| -           | -                 | -    |               |              | VCCIO0            | 0    |               |              |
| J13         | PT36A             | 0    |               | T            | PT40A             | 0    |               | T            |
| B14         | PT35B             | 0    |               | C            | PT39B             | 0    |               | C            |
| VCCIO       | VCCIO0            | 0    |               |              | -                 | -    |               |              |
| A14         | PT35A             | 0    |               | T            | PT39A             | 0    |               | T            |
| F13         | PT34B             | 0    |               | C            | PT38B             | 0    |               | C            |
| H13         | PT34A             | 0    |               | T            | PT38A             | 0    |               | T            |
| D13         | PT33B             | 0    |               | C            | PT37B             | 0    |               | C            |
| C14         | PT33A             | 0    |               | T            | PT37A             | 0    |               | T            |
| GNDIO       | GNDIO0            | -    |               |              | GNDIO0            | -    |               |              |
| E13         | PT32B             | 0    |               | C            | PT32B             | 0    |               | C            |
| D12         | PT32A             | 0    |               | T            | PT32A             | 0    |               | T            |
| G12         | PT31B             | 0    |               | C            | PT31B             | 0    |               | C            |
| E12         | PT31A             | 0    |               | T            | PT31A             | 0    |               | T            |
| VCCIO       | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |
| F12         | NC                | -    |               |              | PT30B             | 0    |               | C            |
| D11         | NC                | -    |               |              | PT30A             | 0    |               | T            |
| F11         | NC                | -    |               |              | PT29B             | 0    |               | C            |
| E11         | NC                | -    |               |              | PT29A             | 0    |               | T            |
| D7          | ULC_SQ_VCCRX0     | 11   |               |              | ULC_SQ_VCCRX0     | 11   |               |              |
| C9          | ULC_SQ_HDINP0     | 11   |               | T            | ULC_SQ_HDINP0     | 11   |               | T            |
| B9          | ULC_SQ_VCCIB0     | 11   |               |              | ULC_SQ_VCCIB0     | 11   |               |              |
| C8          | ULC_SQ_HDINN0     | 11   |               | C            | ULC_SQ_HDINN0     | 11   |               | C            |
| B8          | ULC_SQ_VCCTX0     | 11   |               |              | ULC_SQ_VCCTX0     | 11   |               |              |
| A9          | ULC_SQ_HDOUTP0    | 11   |               | T            | ULC_SQ_HDOUTP0    | 11   |               | T            |
| D9          | ULC_SQ_VCCOB0     | 11   |               |              | ULC_SQ_VCCOB0     | 11   |               |              |
| A8          | ULC_SQ_HDOUTN0    | 11   |               | C            | ULC_SQ_HDOUTN0    | 11   |               | C            |
| B7          | ULC_SQ_VCCTX1     | 11   |               |              | ULC_SQ_VCCTX1     | 11   |               |              |
| A7          | ULC_SQ_HDOUTN1    | 11   |               | C            | ULC_SQ_HDOUTN1    | 11   |               | C            |
| E7          | ULC_SQ_VCCOB1     | 11   |               |              | ULC_SQ_VCCOB1     | 11   |               |              |
| A6          | ULC_SQ_HDOUTP1    | 11   |               | T            | ULC_SQ_HDOUTP1    | 11   |               | T            |
| B6          | ULC_SQ_VCCRX1     | 11   |               |              | ULC_SQ_VCCRX1     | 11   |               |              |
| C7          | ULC_SQ_HDINN1     | 11   |               | C            | ULC_SQ_HDINN1     | 11   |               | C            |
| D8          | ULC_SQ_VCCIB1     | 11   |               |              | ULC_SQ_VCCIB1     | 11   |               |              |
| C6          | ULC_SQ_HDINP1     | 11   |               | T            | ULC_SQ_HDINP1     | 11   |               | T            |
| E6          | ULC_SQ_VCCAUX33   | 11   |               |              | ULC_SQ_VCCAUX33   | 11   |               |              |

## 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 |
| F21         | GND               | -    |               |              | GND               | -    |               |              |
| G31         | GND               | -    |               |              | GND               | -    |               |              |
| G4          | GND               | -    |               |              | GND               | -    |               |              |
| J12         | GND               | -    |               |              | GND               | -    |               |              |
| J16         | GND               | -    |               |              | GND               | -    |               |              |
| J19         | GND               | -    |               |              | GND               | -    |               |              |
| J23         | GND               | -    |               |              | GND               | -    |               |              |
| K27         | GND               | -    |               |              | GND               | -    |               |              |
| K31         | GND               | -    |               |              | GND               | -    |               |              |
| K4          | GND               | -    |               |              | GND               | -    |               |              |
| K8          | GND               | -    |               |              | GND               | -    |               |              |
| M16         | GND               | -    |               |              | GND               | -    |               |              |
| M17         | GND               | -    |               |              | GND               | -    |               |              |
| M18         | GND               | -    |               |              | GND               | -    |               |              |
| M19         | GND               | -    |               |              | GND               | -    |               |              |
| N16         | GND               | -    |               |              | GND               | -    |               |              |
| N17         | GND               | -    |               |              | GND               | -    |               |              |
| N18         | GND               | -    |               |              | GND               | -    |               |              |
| N19         | GND               | -    |               |              | GND               | -    |               |              |
| N26         | GND               | -    |               |              | GND               | -    |               |              |
| N31         | GND               | -    |               |              | GND               | -    |               |              |
| N4          | GND               | -    |               |              | GND               | -    |               |              |
| N9          | GND               | -    |               |              | GND               | -    |               |              |
| R16         | GND               | -    |               |              | GND               | -    |               |              |
| R17         | GND               | -    |               |              | GND               | -    |               |              |
| R18         | GND               | -    |               |              | GND               | -    |               |              |
| R19         | GND               | -    |               |              | GND               | -    |               |              |
| T12         | GND               | -    |               |              | GND               | -    |               |              |
| T13         | GND               | -    |               |              | GND               | -    |               |              |
| T15         | GND               | -    |               |              | GND               | -    |               |              |
| T16         | GND               | -    |               |              | GND               | -    |               |              |
| T17         | GND               | -    |               |              | GND               | -    |               |              |
| T18         | GND               | -    |               |              | GND               | -    |               |              |
| T19         | GND               | -    |               |              | GND               | -    |               |              |
| T20         | GND               | -    |               |              | GND               | -    |               |              |
| T22         | GND               | -    |               |              | GND               | -    |               |              |
| T23         | GND               | -    |               |              | GND               | -    |               |              |
| T26         | GND               | -    |               |              | GND               | -    |               |              |
| T31         | GND               | -    |               |              | GND               | -    |               |              |
| T4          | GND               | -    |               |              | GND               | -    |               |              |
| T9          | GND               | -    |               |              | GND               | -    |               |              |
| U12         | GND               | -    |               |              | GND               | -    |               |              |
| U13         | GND               | -    |               |              | GND               | -    |               |              |
| U15         | GND               | -    |               |              | GND               | -    |               |              |
| U16         | GND               | -    |               |              | GND               | -    |               |              |
| U17         | GND               | -    |               |              | GND               | -    |               |              |
| U18         | GND               | -    |               |              | GND               | -    |               |              |
| U19         | GND               | -    |               |              | GND               | -    |               |              |
| U20         | GND               | -    |               |              | GND               | -    |               |              |



# LatticeECP2/M Family Data Sheet Supplemental Information

July 2012

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## For Further Information

A variety of technical notes for the LatticeECP2/M family are available on the Lattice web site at [www.latticesemi.com](http://www.latticesemi.com).

- TN1102, [LatticeECP2/M sysIO Usage Guide](#)
- TN1103, [LatticeECP2/M sysCLOCK PLL Design and Usage Guide](#)
- TN1104, [LatticeECP2/M Memory Usage Guide](#)
- TN1105, [LatticeECP2/M High-Speed I/O Interface](#)
- TN1106, [Power Estimation and Management for LatticeECP2/M Devices](#)
- TN1107, [LatticeECP2/M sysDSP Usage Guide](#)
- TN1108, [LatticeECP2/M sysCONFIG Usage Guide](#)
- TN1109, [LatticeECP2/M Configuration Encryption Usage Guide](#)
- TN1113, [LatticeECP2/M Soft Error Detection \(SED\) Usage Guide](#)
- TN1124, [LatticeECP2M SERDES/PCS Usage Guide](#)
- TN1162, [LatticeECP2/M Hardware Checklist](#)

For further information about interface standards refer to the following web sites:

- JEDEC Standards (LVTTTL, LVCMOS, SSTL, HSTL): [www.jedec.org](http://www.jedec.org)
- PCI: [www.pcisig.com](http://www.pcisig.com)