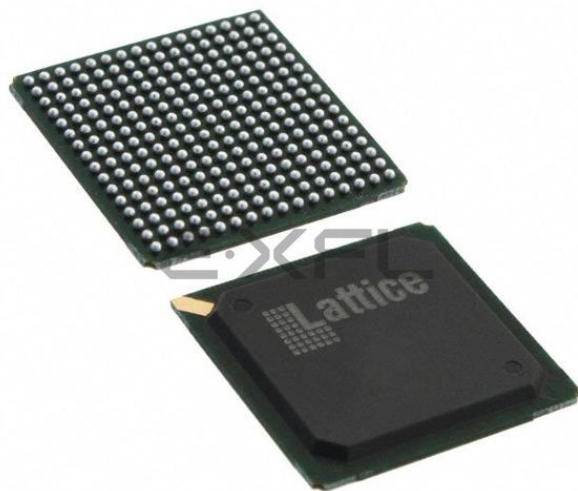




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## Understanding [Embedded - FPGAs \(Field Programmable Gate Array\)](#)

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

## Applications of Embedded - FPGAs

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

### Details

|                                |                                                                                                                                                                         |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Product Status                 | Active                                                                                                                                                                  |
| Number of LABs/CLBs            | 2375                                                                                                                                                                    |
| Number of Logic Elements/Cells | 19000                                                                                                                                                                   |
| Total RAM Bits                 | 1246208                                                                                                                                                                 |
| Number of I/O                  | 140                                                                                                                                                                     |
| Number of Gates                | -                                                                                                                                                                       |
| Voltage - Supply               | 1.14V ~ 1.26V                                                                                                                                                           |
| Mounting Type                  | Surface Mount                                                                                                                                                           |
| Operating Temperature          | -40°C ~ 100°C (TJ)                                                                                                                                                      |
| Package / Case                 | 256-BGA                                                                                                                                                                 |
| Supplier Device Package        | 256-FPBGA (17x17)                                                                                                                                                       |
| Purchase URL                   | <a href="https://www.e-xfl.com/product-detail/lattice-semiconductor/lfe2m20se-6fn256i">https://www.e-xfl.com/product-detail/lattice-semiconductor/lfe2m20se-6fn256i</a> |

## Delay Locked Loops (DLL)

In addition to PLLs, the LatticeECP2/M family of devices has two DLLs per device.

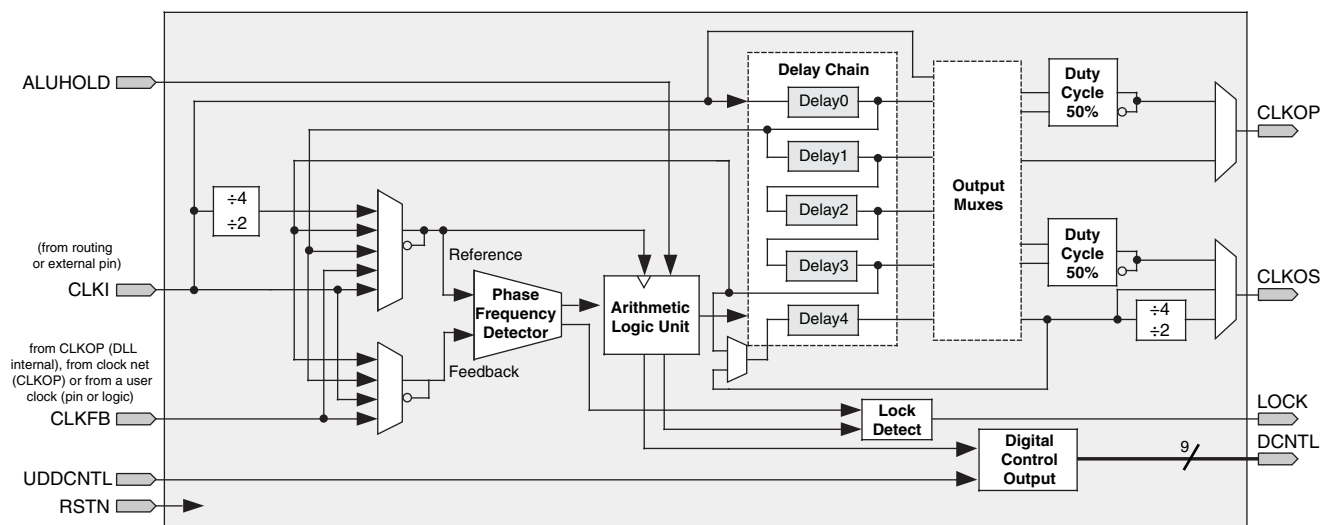
CLKI is the input frequency (generated either from the pin or routing) for the DLL. CLKI feeds into the output muxes block to bypass the DLL, directly to the DELAY CHAIN block and (directly or through divider circuit) to the reference input of the Phase Frequency Detector (PFD) input mux. The reference signal for the PFD can also be generated from the Delay Chain and CLKFB signals. The feedback input to the PFD is generated from the CLKFB pin, CLKI or from tapped signal from the Delay chain.

The PFD produces a binary number proportional to the phase and frequency difference between the reference and feedback signals. This binary output of the PFD is fed into a Arithmetic Logic Unit (ALU). Based on these inputs, the ALU determines the correct digital control codes to send to the delay chain in order to better match the reference and feedback signals. This digital code from the ALU is also transmitted via the Digital Control bus (DCNTL) bus to its associated DLLDELA delay block. The ALUHOLD input allows the user to suspend the ALU output at its current value. The UDDCNTL signal allows the user to latch the current value on the DCNTL bus.

The DLL has two independent clock outputs, CLKOP and CLKOS. These outputs can individually select one of the outputs from the tapped delay line. The CLKOS has optional fine phase shift and divider blocks to allow this output to be further modified, if required. The fine phase shift block allows the CLKOS output to phase shifted a further 45, 22.5 or 11.25 degrees relative to its normal position. Both the CLKOS and CLKOP outputs are available with optional duty cycle correction. Divide by two and divide by four frequencies are available at CLKOS. The LOCK output signal is asserted when the DLL is locked. Figure 2-6 shows the DLL block diagram and Table 2-5 provides a description of the DLL inputs and outputs.

The user can configure the DLL for many common functions such as time reference delay mode and clock injection removal mode. Lattice provides primitives in its design tools for these functions. For more information about the DLL, please see the list of additional technical documentation at the end of this data sheet.

**Figure 2-6. Delay Locked Loop Diagram (DLL)**



for checking soft errors (SED) in SRAM. SED can be run on a programmed device when the user logic is not active. If a soft error occurs, during user mode (normal operation) the device can be programmed to either reload from a known good boot image or generate an error signal.

For further information about Soft Error Detect (SED) support, please see the list of additional technical documentation at the end of this data sheet.

## External Resistor

LatticeECP2/M devices require a single external, 10K ohm  $\pm 1\%$  value between the XRES pin and ground. Device configuration will not be completed if this resistor is missing. There is no boundary scan register on the external resistor pad.

## On-Chip Oscillator

Every LatticeECP2/M device has an internal CMOS oscillator which is used to derive a Master Clock for configuration. The oscillator and the Master Clock run continuously and are available to user logic after configuration is completed. The software default value of the Master Clock is 2.5MHz. Table 2-16 lists all the available Master Configuration Clock frequencies for normal non-encrypted mode and encrypted mode. When a different Master Clock is selected during the design process, the following sequence takes place:

1. Device powers up with a Master Clock frequency of 3.1MHz.
2. During configuration, users select a different master clock frequency.
3. The Master Clock frequency changes to the selected frequency once the clock configuration bits are received.
4. If the user does not select a master clock frequency, then the configuration bitstream defaults to the Master Clock frequency of 2.5MHz.

This internal CMOS oscillator is available to the user by routing it as an input clock to the clock tree. For further information about the use of this oscillator for configuration or user mode, please see the list of additional technical documentation at the end of this data sheet.

**Table 2-16. Selectable Master Clock (CCLK) Frequencies During Configuration**

| Non-Encrypted Mode CCLK (MHz) |      |       | Encrypted Mode CCLK (MHz) |
|-------------------------------|------|-------|---------------------------|
| 2.5 <sup>1</sup>              | 13.0 | 45.0  | 2.5 <sup>1</sup>          |
| 4.3                           | 15.0 | 55.0  | 5.4                       |
| 5.4                           | 20.0 | 60.0  | 10.0                      |
| 6.9                           | 26.0 | —     | —                         |
| 8.1                           | 30.0 | —     | —                         |
| 9.2                           | 34.0 | —     | —                         |
| 10.0                          | 41.0 | 130.0 | —                         |

1. Software default frequency.

## Density Shifting

The LatticeECP2/M family is designed to ensure that different density devices in the same family and in the same package have the same pinout. Furthermore, the architecture ensures a high success rate when performing design migration from lower density devices to higher density devices. In many cases, it is also possible to shift a lower utilization design targeted for a high-density device to a lower density device. However, the exact details of the final resource utilization will impact the likelihood of success in each case. Design migration between LatticeECP2 and LatticeECP2M families is not possible. For specific requirements relating to sysCONFIG pins of the ECP2M50, M70 and M100, see the Logic Signal Connections tables.

## sys/I/O Single-Ended DC Electrical Characteristics

| Input/Output Standard | $V_{IL}$ |                   | $V_{IH}$          |          | $V_{OL}$<br>Max. (V) | $V_{OH}$<br>Min. (V) | $I_{OL}^1$ (mA)  | $I_{OH}^1$ (mA)       |
|-----------------------|----------|-------------------|-------------------|----------|----------------------|----------------------|------------------|-----------------------|
|                       | Min. (V) | Max. (V)          | Min. (V)          | Max. (V) |                      |                      |                  |                       |
| LVCMOS 3.3            | -0.3     | 0.8               | 2.0               | 3.6      | 0.4                  | $V_{CCIO} - 0.4$     | 20, 16, 12, 8, 4 | -20, -16, -12, -8, -4 |
|                       |          |                   |                   |          | 0.2                  | $V_{CCIO} - 0.2$     | 0.1              | -0.1                  |
| LVTTTL                | -0.3     | 0.8               | 2.0               | 3.6      | 0.4                  | $V_{CCIO} - 0.4$     | 20, 16, 12, 8, 4 | -20, -16, -12, -8, -4 |
|                       |          |                   |                   |          | 0.2                  | $V_{CCIO} - 0.2$     | 0.1              | -0.1                  |
| LVCMOS 2.5            | -0.3     | 0.7               | 1.7               | 3.6      | 0.4                  | $V_{CCIO} - 0.4$     | 20, 16, 12, 8, 4 | -20, -16, -12, -8, -4 |
|                       |          |                   |                   |          | 0.2                  | $V_{CCIO} - 0.2$     | 0.1              | -0.1                  |
| LVCMOS 1.8            | -0.3     | $0.35 V_{CCIO}$   | $0.65 V_{CCIO}$   | 3.6      | 0.4                  | $V_{CCIO} - 0.4$     | 16, 12, 8, 4     | -16, -12, -8, -4      |
|                       |          |                   |                   |          | 0.2                  | $V_{CCIO} - 0.2$     | 0.1              | -0.1                  |
| LVCMOS 1.5            | -0.3     | $0.35 V_{CCIO}$   | $0.65 V_{CCIO}$   | 3.6      | 0.4                  | $V_{CCIO} - 0.4$     | 8, 4             | -8, -4                |
|                       |          |                   |                   |          | 0.2                  | $V_{CCIO} - 0.2$     | 0.1              | -0.1                  |
| LVCMOS 1.2            | -0.3     | $0.35 V_{CC}$     | $0.65 V_{CC}$     | 3.6      | 0.4                  | $V_{CCIO} - 0.4$     | 6, 2             | -6, -2                |
|                       |          |                   |                   |          | 0.2                  | $V_{CCIO} - 0.2$     | 0.1              | -0.1                  |
| PCI                   | -0.3     | $0.3 V_{CCIO}$    | $0.5 V_{CCIO}$    | 3.6      | $0.1 V_{CCIO}$       | $0.9 V_{CCIO}$       | 1.5              | -0.5                  |
| SSTL3 Class I         | -0.3     | $V_{REF} - 0.2$   | $V_{REF} + 0.2$   | 3.6      | 0.7                  | $V_{CCIO} - 1.1$     | 8                | -8                    |
| SSTL3 Class II        | -0.3     | $V_{REF} - 0.2$   | $V_{REF} + 0.2$   | 3.6      | 0.5                  | $V_{CCIO} - 0.9$     | 16               | -16                   |
| SSTL2 Class I         | -0.3     | $V_{REF} - 0.18$  | $V_{REF} + 0.18$  | 3.6      | 0.54                 | $V_{CCIO} - 0.62$    | 7.6              | -7.6                  |
|                       |          |                   |                   |          |                      |                      | 12               | -12                   |
| SSTL2 Class II        | -0.3     | $V_{REF} - 0.18$  | $V_{REF} + 0.18$  | 3.6      | 0.35                 | $V_{CCIO} - 0.43$    | 15.2             | -15.2                 |
|                       |          |                   |                   |          |                      |                      | 20               | -20                   |
| SSTL18 Class I        | -0.3     | $V_{REF} - 0.125$ | $V_{REF} + 0.125$ | 3.6      | 0.4                  | $V_{CCIO} - 0.4$     | 6.7              | -6.7                  |
| SSTL18 Class II       | -0.3     | $V_{REF} - 0.125$ | $V_{REF} + 0.125$ | 3.6      | 0.28                 | $V_{CCIO} - 0.28$    | 8                | -8                    |
|                       |          |                   |                   |          |                      |                      | 11               | -11                   |
| HSTL Class I          | -0.3     | $V_{REF} - 0.1$   | $V_{REF} + 0.1$   | 3.6      | 0.4                  | $V_{CCIO} - 0.4$     | 4                | -4                    |
|                       |          |                   |                   |          |                      |                      | 8                | -8                    |
| HSTL18 Class I        | -0.3     | $V_{REF} - 0.1$   | $V_{REF} + 0.1$   | 3.6      | 0.4                  | $V_{CCIO} - 0.4$     | 8                | -8                    |
|                       |          |                   |                   |          |                      |                      | 12               | -12                   |
| HSTL18 Class II       | -0.3     | $V_{REF} - 0.1$   | $V_{REF} + 0.1$   | 3.6      | 0.4                  | $V_{CCIO} - 0.4$     | 16               | -16                   |

1. The average DC current drawn by I/Os between GND connections, or between the last GND in an I/O bank and the end of an I/O bank, as shown in the logic signal connections table shall not exceed  $n * 8\text{mA}$ , where n is the number of I/Os between bank GND connections or between the last GND in a bank and the end of a bank.

## LatticeECP2/M External Switching Characteristics<sup>9</sup>

Over Recommended Operating Conditions

| Parameter                                                                 | Description                              | Device   | -7   |      | -6   |      | -5   |      | Units |
|---------------------------------------------------------------------------|------------------------------------------|----------|------|------|------|------|------|------|-------|
|                                                                           |                                          |          | Min. | Max. | Min. | Max. | Min. | Max. |       |
| General I/O Pin Parameters (using Primary Clock without PLL) <sup>1</sup> |                                          |          |      |      |      |      |      |      |       |
| t <sub>CO</sub>                                                           | Clock to Output - PIO Output Register    | LFE2-6   | —    | 3.50 | —    | 3.90 | —    | 4.20 | ns    |
|                                                                           |                                          | LFE2-12  | —    | 3.50 | —    | 3.90 | —    | 4.20 | ns    |
|                                                                           |                                          | LFE2-20  | —    | 3.50 | —    | 3.90 | —    | 4.20 | ns    |
|                                                                           |                                          | LFE2-35  | —    | 3.50 | —    | 3.90 | —    | 4.20 | ns    |
|                                                                           |                                          | LFE2-50  | —    | 3.50 | —    | 3.90 | —    | 4.20 | ns    |
|                                                                           |                                          | LFE2-70  | —    | 3.70 | —    | 4.10 | —    | 4.40 | ns    |
|                                                                           |                                          | LFE2M20  | —    | 3.90 | —    | 4.30 | —    | 4.70 | ns    |
|                                                                           |                                          | LFE2M35  | —    | 3.90 | —    | 4.30 | —    | 4.70 | ns    |
|                                                                           |                                          | LFE2M50  | —    | 4.50 | —    | 5.00 | —    | 5.40 | ns    |
|                                                                           |                                          | LFE2M70  | —    | 4.50 | —    | 5.00 | —    | 5.40 | ns    |
|                                                                           |                                          | LFE2M100 | —    | 4.50 | —    | 5.00 | —    | 5.40 | ns    |
| t <sub>SU</sub>                                                           | Clock to Data Setup - PIO Input Register | LFE2-6   | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
|                                                                           |                                          | LFE2-12  | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
|                                                                           |                                          | LFE2-20  | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
|                                                                           |                                          | LFE2-35  | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
|                                                                           |                                          | LFE2-50  | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
|                                                                           |                                          | LFE2-70  | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
|                                                                           |                                          | LFE2M20  | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
|                                                                           |                                          | LFE2M35  | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
|                                                                           |                                          | LFE2M50  | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
|                                                                           |                                          | LFE2M70  | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
|                                                                           |                                          | LFE2M100 | 0.00 | —    | 0.00 | —    | 0.00 | —    | ns    |
| t <sub>H</sub>                                                            | Clock to Data Hold - PIO Input Register  | LFE2-6   | 1.40 | —    | 1.70 | —    | 1.90 | —    | ns    |
|                                                                           |                                          | LFE2-12  | 1.40 | —    | 1.70 | —    | 1.90 | —    | ns    |
|                                                                           |                                          | LFE2-20  | 1.40 | —    | 1.70 | —    | 1.90 | —    | ns    |
|                                                                           |                                          | LFE2-35  | 1.40 | —    | 1.70 | —    | 1.90 | —    | ns    |
|                                                                           |                                          | LFE2-50  | 1.40 | —    | 1.70 | —    | 1.90 | —    | ns    |
|                                                                           |                                          | LFE2-70  | 1.40 | —    | 1.70 | —    | 1.90 | —    | ns    |
|                                                                           |                                          | LFE2M20  | 1.40 | —    | 1.70 | —    | 1.90 | —    | ns    |
|                                                                           |                                          | LFE2M35  | 1.40 | —    | 1.70 | —    | 1.90 | —    | ns    |
|                                                                           |                                          | LFE2M50  | 1.80 | —    | 2.10 | —    | 2.30 | —    | ns    |
|                                                                           |                                          | LFE2M70  | 1.80 | —    | 2.10 | —    | 2.30 | —    | ns    |
|                                                                           |                                          | LFE2M100 | 1.80 | —    | 2.10 | —    | 2.30 | —    | ns    |

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

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

## LFE2-20E/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 |  |
| U1            | NC                | -    |                         |              | PL34A             | 6    | LDQ31                   | T            |  |
| V1            | NC                | -    |                         |              | PL34B             | 6    | LDQ31                   | C            |  |
| GND           | GNDIO6            | -    |                         |              | GNDIO6            | -    |                         |              |  |
| P3            | NC                | -    |                         |              | NC                | -    |                         |              |  |
| R3            | NC                | -    |                         |              | NC                | -    |                         |              |  |
| R4            | NC                | -    |                         |              | NC                | -    |                         |              |  |
| U2            | NC                | -    |                         |              | NC                | -    |                         |              |  |
| VCCIO         | VCCIO6            | 6    |                         |              | VCCIO6            | 6    |                         |              |  |
| V2            | NC                | -    |                         |              | NC                | -    |                         |              |  |
| W2            | NC                | -    |                         |              | NC                | -    |                         |              |  |
| T6            | NC                | -    |                         |              | PL38A             | 6    | LDQ39                   | T            |  |
| R5            | NC                | -    |                         |              | PL38B             | 6    | LDQ39                   | C            |  |
| GND           | GNDIO6            | -    |                         |              | GNDIO6            | -    |                         |              |  |
| R6            | PL25A             | 6    | LDQS25***               | T (LVDS)*    | PL39A             | 6    | LDQS39***               | T (LVDS)*    |  |
| R7            | PL25B             | 6    | LDQ25                   | C (LVDS)*    | PL39B             | 6    | LDQ39                   | C (LVDS)*    |  |
| W1            | PL26A             | 6    | LDQ25                   | T            | PL40A             | 6    | LDQ39                   | T            |  |
| VCCIO         | VCCIO6            | 6    |                         |              | VCCIO6            | 6    |                         |              |  |
| Y2            | PL26B             | 6    | LDQ25                   | C            | PL40B             | 6    | LDQ39                   | C            |  |
| Y1            | PL27A             | 6    | LLM0_GDLLT_IN_A**/LDQ25 | T (LVDS)*    | PL41A             | 6    | LLM0_GDLLT_IN_A**/LDQ39 | T (LVDS)*    |  |
| AA2           | PL27B             | 6    | LLM0_GDLLC_IN_A**/LDQ25 | C (LVDS)*    | PL41B             | 6    | LLM0_GDLLC_IN_A**/LDQ39 | C (LVDS)*    |  |
| T5            | PL28A             | 6    | LLM0_GDLLT_FB_A/LDQ25   | T            | PL42A             | 6    | LLM0_GDLLT_FB_A/LDQ39   | T            |  |
| GND           | GNDIO6            | -    |                         |              | GNDIO6            | -    |                         |              |  |
| T7            | PL28B             | 6    | LLM0_GDLLC_FB_A/LDQ25   | C            | PL42B             | 6    | LLM0_GDLLC_FB_A/LDQ39   | C            |  |
| R8            | VCC               | 6    |                         |              | VCCPLL            | 6    |                         |              |  |
| T8            | LLM0_PLLCAP       | 6    |                         |              | LLM0_PLLCAP       | 6    |                         |              |  |
| U3            | PL30A             | 6    | LLM0_GPLLT_IN_A**/LDQ34 | T (LVDS)*    | PL44A             | 6    | LLM0_GPLLT_IN_A**/LDQ48 | T (LVDS)*    |  |
| U4            | PL30B             | 6    | LLM0_GPLLC_IN_A**/LDQ34 | C (LVDS)*    | PL44B             | 6    | LLM0_GPLLC_IN_A**/LDQ48 | C (LVDS)*    |  |
| V3            | PL31A             | 6    | LLM0_GPLLT_FB_A/LDQ34   | T            | PL45A             | 6    | LLM0_GPLLT_FB_A/LDQ48   | T            |  |
| U5            | PL31B             | 6    | LLM0_GPLLC_FB_A/LDQ34   | C            | PL45B             | 6    | LLM0_GPLLC_FB_A/LDQ48   | C            |  |
| V4            | PL32A             | 6    | LDQ34                   | T (LVDS)*    | PL46A             | 6    | LDQ48                   | T (LVDS)*    |  |
| VCCIO         | VCCIO6            | 6    |                         |              | VCCIO6            | 6    |                         |              |  |
| V5            | PL32B             | 6    | LDQ34                   | C (LVDS)*    | PL46B             | 6    | LDQ48                   | C (LVDS)*    |  |
| Y3            | PL33A             | 6    | LDQ34                   | T            | PL47A             | 6    | LDQ48                   | T            |  |
| Y4            | PL33B             | 6    | LDQ34                   | C            | PL47B             | 6    | LDQ48                   | C            |  |
| W3            | PL34A             | 6    | LDQS34                  | T (LVDS)*    | PL48A             | 6    | LDQS48                  | T (LVDS)*    |  |
| GND           | GNDIO6            | -    |                         |              | GNDIO6            | -    |                         |              |  |
| W4            | PL34B             | 6    | LDQ34                   | C (LVDS)*    | PL48B             | 6    | LDQ48                   | C (LVDS)*    |  |
| AA1           | PL35A             | 6    | LDQ34                   | T            | PL49A             | 6    | LDQ48                   | T            |  |
| AB1           | PL35B             | 6    | LDQ34                   | C            | PL49B             | 6    | LDQ48                   | C            |  |
| VCCIO         | VCCIO6            | 6    |                         |              | VCCIO6            | 6    |                         |              |  |
| U8            | PL36A             | 6    | LDQ34                   | T (LVDS)*    | PL50A             | 6    | LDQ48                   | T (LVDS)*    |  |
| U7            | PL36B             | 6    | LDQ34                   | C (LVDS)*    | PL50B             | 6    | LDQ48                   | C (LVDS)*    |  |
| V8            | PL37A             | 6    | LDQ34                   | T            | PL51A             | 6    | LDQ48                   | T            |  |
| U6            | PL37B             | 6    | LDQ34                   | C            | PL51B             | 6    | LDQ48                   | C            |  |
| GND           | GNDIO6            | -    |                         |              | GNDIO6            | -    |                         |              |  |
| W6            | PL38A             | 6    | LDQ42                   | T (LVDS)*    | PL52A             | 6    | LDQ56                   | T (LVDS)*    |  |

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

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

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

| LFE2-50E/SE |                   |      |                          |              | LFE2-70E/SE       |      |                          |              |  |
|-------------|-------------------|------|--------------------------|--------------|-------------------|------|--------------------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function            | Differential | Ball/Pad Function | Bank | Dual Function            | Differential |  |
| 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 |
| A7          | PT35B             | 0    |               | C            | PT44B             | 0    |               | C            |
| B7          | PT35A             | 0    |               | T            | PT44A             | 0    |               | T            |
| VCCIO       | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |
| F12         | PT34B             | 0    |               | C            | PT43B             | 0    |               | C            |
| D10         | PT34A             | 0    |               | T            | PT43A             | 0    |               | T            |
| H11         | PT33B             | 0    |               | C            | PT42B             | 0    |               | C            |
| G11         | PT33A             | 0    |               | T            | PT42A             | 0    |               | T            |
| GND         | GNDIO0            | -    |               |              | GNDIO0            | -    |               |              |
| A6          | PT32B             | 0    |               | C            | PT41B             | 0    |               | C            |
| B6          | PT32A             | 0    |               | T            | PT41A             | 0    |               | T            |
| D8          | PT31B             | 0    |               | C            | PT40B             | 0    |               | C            |
| C8          | PT31A             | 0    |               | T            | PT40A             | 0    |               | T            |
| VCCIO       | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |
| F11         | PT30B             | 0    |               | C            | PT39B             | 0    |               | C            |
| E10         | PT30A             | 0    |               | T            | PT39A             | 0    |               | T            |
| E9          | PT29B             | 0    |               | C            | PT38B             | 0    |               | C            |
| D9          | PT29A             | 0    |               | T            | PT38A             | 0    |               | T            |
| G10         | PT28B             | 0    |               | C            | PT37B             | 0    |               | C            |
| GND         | GNDIO0            | -    |               |              | GNDIO0            | -    |               |              |
| H10         | PT28A             | 0    |               | T            | PT37A             | 0    |               | T            |
| A5          | PT27B             | 0    |               | C            | PT36B             | 0    |               | C            |
| B5          | PT27A             | 0    |               | T            | PT36A             | 0    |               | T            |
| C7          | PT26B             | 0    |               | C            | PT35B             | 0    |               | C            |
| VCCIO       | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |
| D7          | PT26A             | 0    |               | T            | PT35A             | 0    |               | T            |
| E8          | PT25B             | 0    |               | C            | PT34B             | 0    |               | C            |
| F10         | PT25A             | 0    |               | T            | PT34A             | 0    |               | T            |
| F8          | PT24B             | 0    |               | C            | PT33B             | 0    |               | C            |
| H9          | PT24A             | 0    |               | T            | PT33A             | 0    |               | T            |
| C5          | PT23B             | 0    |               | C            | PT32B             | 0    |               | C            |
| GND         | GNDIO0            | -    |               |              | GNDIO0            | -    |               |              |
| D5          | PT23A             | 0    |               | T            | PT32A             | 0    |               | T            |
| B4          | PT22B             | 0    |               |              | PT31B             | 0    |               |              |
| VCCIO       | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |
| GND         | GNDIO0            | -    |               |              | GNDIO0            | -    |               |              |
| VCCIO       | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |
| GND         | GNDIO0            | -    |               |              | GNDIO0            | -    |               |              |
| VCCIO       | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |
| C4          | PT10B             | 0    |               | C            | PT10B             | 0    |               | C            |
| GND         | GNDIO0            | -    |               |              | GNDIO0            | -    |               |              |
| C3          | PT10A             | 0    |               | T            | PT10A             | 0    |               | T            |
| A4          | PT9B              | 0    |               | C            | PT9B              | 0    |               | C            |
| A3          | PT9A              | 0    |               | T            | PT9A              | 0    |               | T            |
| B3          | PT8B              | 0    |               | C            | PT8B              | 0    |               | C            |
| VCCIO       | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |
| B2          | PT8A              | 0    |               | T            | PT8A              | 0    |               | T            |

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

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

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

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

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

| LFE2-70E/SE |                   |      |                       |              |
|-------------|-------------------|------|-----------------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function         | Differential |
| 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 |
| AG4         | NC                | -    |               |              |
| AG8         | NC                | -    |               |              |
| AH1         | NC                | -    |               |              |
| AH16        | NC                | -    |               |              |
| AH2         | NC                | -    |               |              |
| AH26        | NC                | -    |               |              |
| AH27        | NC                | -    |               |              |
| AH29        | NC                | -    |               |              |
| AH30        | NC                | -    |               |              |
| AH4         | NC                | -    |               |              |
| AJ1         | NC                | -    |               |              |
| AJ2         | NC                | -    |               |              |
| AJ27        | NC                | -    |               |              |
| AJ28        | NC                | -    |               |              |
| AJ29        | NC                | -    |               |              |
| AJ3         | NC                | -    |               |              |
| AJ30        | NC                | -    |               |              |
| AK2         | NC                | -    |               |              |
| AK27        | NC                | -    |               |              |
| AK28        | NC                | -    |               |              |
| AK29        | NC                | -    |               |              |
| AK3         | NC                | -    |               |              |
| B1          | NC                | -    |               |              |
| B2          | NC                | -    |               |              |
| B3          | NC                | -    |               |              |
| B30         | NC                | -    |               |              |
| B4          | NC                | -    |               |              |
| B5          | NC                | -    |               |              |
| C1          | NC                | -    |               |              |
| C2          | NC                | -    |               |              |
| C29         | NC                | -    |               |              |
| C30         | NC                | -    |               |              |
| C4          | NC                | -    |               |              |
| D13         | NC                | -    |               |              |
| D18         | NC                | -    |               |              |
| D23         | NC                | -    |               |              |
| D28         | NC                | -    |               |              |
| D29         | NC                | -    |               |              |
| D3          | NC                | -    |               |              |
| D30         | NC                | -    |               |              |
| D4          | NC                | -    |               |              |
| E25         | NC                | -    |               |              |
| E26         | NC                | -    |               |              |

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

| LFE2M20E/SE |                   |      |               |              | LFE2M35E/SE       |      |               |              |  |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |  |
| GNDIO       | GNDIO0            | -    |               |              | GNDIO0            | -    |               |              |  |
| F7          | PT9B              | 0    |               | C            | PT9B              | 0    |               | C            |  |
| G7          | PT9A              | 0    |               | T            | PT9A              | 0    |               | T            |  |
| C3          | PT8B              | 0    |               | C            | PT8B              | 0    |               | C            |  |
| D4          | PT8A              | 0    |               | T            | PT8A              | 0    |               | T            |  |
| VCCIO       | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |  |
| F6          | PT7B              | 0    |               | C            | PT7B              | 0    |               | C            |  |
| E6          | PT7A              | 0    |               | T            | PT7A              | 0    |               | T            |  |
| E5          | PT6B              | 0    |               | C            | PT6B              | 0    |               | C            |  |
| D6          | PT6A              | 0    |               | T            | PT6A              | 0    |               | T            |  |
| GNDIO       | GNDIO0            | -    |               |              | GNDIO0            | -    |               |              |  |
| D3          | PT5B              | 0    |               | C            | PT5B              | 0    |               | C            |  |
| E3          | PT5A              | 0    |               | T            | PT5A              | 0    |               | T            |  |
| D5          | PT4B              | 0    |               | C            | PT4B              | 0    |               | C            |  |
| E4          | PT4A              | 0    |               | T            | PT4A              | 0    |               | T            |  |
| VCCIO       | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |  |
| C2          | PT3B              | 0    |               | C            | PT3B              | 0    |               | C            |  |
| B2          | PT3A              | 0    |               | T            | PT3A              | 0    |               | T            |  |
| B1          | PT2B              | 0    |               | C            | PT2B              | 0    |               | C            |  |
| C1          | PT2A              | 0    |               | T            | PT2A              | 0    |               | T            |  |
| R8          | VCCPLL            | -    |               |              | VCCPLL            | -    |               |              |  |
| H15         | VCCPLL            | -    |               |              | VCCPLL            | -    |               |              |  |
| H8          | VCCPLL            | -    |               |              | VCCPLL            | -    |               |              |  |
| R15         | VCCPLL            | -    |               |              | VCCPLL            | -    |               |              |  |
| J10         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| J11         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| J12         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| J13         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| K14         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| K9          | VCC               | -    |               |              | VCC               | -    |               |              |  |
| L14         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| L9          | VCC               | -    |               |              | VCC               | -    |               |              |  |
| M14         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| M9          | VCC               | -    |               |              | VCC               | -    |               |              |  |
| N14         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| N9          | VCC               | -    |               |              | VCC               | -    |               |              |  |
| P10         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| P11         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| P12         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| P13         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| B5          | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |  |
| B9          | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |  |
| E7          | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |  |
| H9          | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |  |
| D13         | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |  |
| E16         | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |  |
| H14         | VCCIO1            | 1    |               |              | VCCIO1            | 1    |               |              |  |
| E21         | VCCIO2            | 2    |               |              | VCCIO2            | 2    |               |              |  |

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

| LFE2M50E/SE |                   |      |                 |              |
|-------------|-------------------|------|-----------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function   | Differential |
| T1          | PL65A             | 6    | LLM0_GDLLT_FB_A | T            |
| T2          | PL65B             | 6    | LLM0_GDLLC_FB_A | C            |
| GNDIO       | GNDIO6            | -    |                 |              |
| R7          | LLM0_PLLCAP       | 6    |                 |              |
| T6          | PL67A             | 6    | LDQ71           | T (LVDS)*    |
| T7          | PL67B             | 6    | LDQ71           | C (LVDS)*    |
| U1          | PL68A             | 6    | LDQ71           | T            |
| U2          | PL68B             | 6    | LDQ71           | C            |
| VCCIO       | VCCIO6            | 6    |                 |              |
| T3          | PL69A             | 6    | LDQ71           | T (LVDS)*    |
| U3          | PL69B             | 6    | LDQ71           | C (LVDS)*    |
| U6          | PL70A             | 6    | LDQ71           | T            |
| U5          | PL70B             | 6    | LDQ71           | C            |
| GNDIO       | GNDIO6            | -    |                 |              |
| V5          | PL71A             | 6    | LDQS71          | T (LVDS)*    |
| U4          | PL71B             | 6    | LDQ71           | C (LVDS)*    |
| V1          | PL72A             | 6    | LDQ71           | T            |
| VCCIO       | VCCIO6            | 6    |                 |              |
| V3          | PL72B             | 6    | LDQ71           | C            |
| W1          | PL73A             | 6    | LDQ71           | T (LVDS)*    |
| Y1          | PL73B             | 6    | LDQ71           | C (LVDS)*    |
| AA1         | PL74A             | 6    | LDQ71           | T            |
| GNDIO       | GNDIO6            | -    |                 |              |
| AA2         | PL74B             | 6    | LDQ71           | C            |
| V4          | TCK               | -    |                 |              |
| Y2          | TDI               | -    |                 |              |
| Y3          | TMS               | -    |                 |              |
| W3          | TDO               | -    |                 |              |
| W4          | VCCJ              | -    |                 |              |
| W5          | PB2A              | 5    | BDQ6            | T            |
| Y4          | PB2B              | 5    | BDQ6            | C            |
| W6          | PB3A              | 5    | BDQ6            | T            |
| V6          | PB3B              | 5    | BDQ6            | C            |
| AA3         | PB4A              | 5    | BDQ6            | T            |
| AB2         | PB4B              | 5    | BDQ6            | C            |
| VCCIO       | VCCIO5            | 5    |                 |              |
| T8          | PB5A              | 5    | BDQ6            | T            |
| U7          | PB5B              | 5    | BDQ6            | C            |
| GNDIO       | GNDIO5            | -    |                 |              |
| U8          | PB6A              | 5    | BDQS6           | T            |
| T9          | PB6B              | 5    | BDQ6            | C            |
| V8          | PB7A              | 5    | BDQ6            | T            |
| W8          | PB7B              | 5    | BDQ6            | C            |

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

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

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

| LFE2M50E/SE |                   |      |               |              |
|-------------|-------------------|------|---------------|--------------|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential |
| G5          | VCCIO7            | 7    |               |              |
| J8          | VCCIO7            | 7    |               |              |
| K4          | VCCIO7            | 7    |               |              |
| AA22        | VCCIO8            | 8    |               |              |
| U19         | VCCIO8            | 8    |               |              |
| H11         | VCCAUX            | -    |               |              |
| H12         | VCCAUX            | -    |               |              |
| L15         | VCCAUX            | -    |               |              |
| L8          | VCCAUX            | -    |               |              |
| M15         | VCCAUX            | -    |               |              |
| M8          | VCCAUX            | -    |               |              |
| R11         | VCCAUX            | -    |               |              |
| R12         | VCCAUX            | -    |               |              |
| A1          | GND               | -    |               |              |
| A10         | GND               | -    |               |              |
| A16         | GND               | -    |               |              |
| A22         | GND               | -    |               |              |
| AA19        | GND               | -    |               |              |
| AA4         | GND               | -    |               |              |
| AB1         | GND               | -    |               |              |
| AB22        | GND               | -    |               |              |
| B13         | GND               | -    |               |              |
| B19         | GND               | -    |               |              |
| B4          | GND               | -    |               |              |
| D16         | GND               | -    |               |              |
| D2          | GND               | -    |               |              |
| D21         | GND               | -    |               |              |
| D7          | GND               | -    |               |              |
| G19         | GND               | -    |               |              |
| G4          | GND               | -    |               |              |
| H10         | GND               | -    |               |              |
| H13         | GND               | -    |               |              |
| J14         | GND               | -    |               |              |
| J9          | GND               | -    |               |              |
| K10         | GND               | -    |               |              |
| K11         | GND               | -    |               |              |
| K12         | GND               | -    |               |              |
| K13         | GND               | -    |               |              |
| K15         | GND               | -    |               |              |
| K20         | GND               | -    |               |              |
| K3          | GND               | -    |               |              |
| K8          | GND               | -    |               |              |
| L10         | GND               | -    |               |              |

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

| LFE2M35E/SE |                   |      |               |              | LFE2M50E/SE       |      |               |              |  |
|-------------|-------------------|------|---------------|--------------|-------------------|------|---------------|--------------|--|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |  |
| AA14        | PB42B             | 4    | BDQ42         | C            | PB51B             | 4    | BDQ51         | C            |  |
| VCCIO       | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |  |
| GNDIO       | GNDIO4            | -    |               |              | GNDIO4            | -    |               |              |  |
| W17         | PB65A             | 4    | BDQ69         | T            | PB56A             | 4    | BDQ60         | T            |  |
| AA19        | PB65B             | 4    | BDQ69         | C            | PB56B             | 4    | BDQ60         | C            |  |
| AC15        | PB48A             | 4    | BDQ51         | T            | PB57A             | 4    | BDQ60         | T            |  |
| Y18         | PB68B             | 4    | BDQ69         | C            | PB57B             | 4    | BDQ60         | C            |  |
| AB15        | PB49A             | 4    | BDQ51         | T            | PB58A             | 4    | BDQ60         | T            |  |
| AC16        | PB49B             | 4    | BDQ51         | C            | PB58B             | 4    | BDQ60         | C            |  |
| VCCIO       | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |  |
| AA17        | PB60A             | 4    | BDQS60****    | T            | PB59A             | 4    | BDQ60         | T            |  |
| AB16        | PB50B             | 4    | BDQ51         | C            | PB59B             | 4    | BDQ60         | C            |  |
| GNDIO       | GNDIO4            | -    |               |              | GNDIO4            | -    |               |              |  |
| AA15        | PB51A             | 4    | BDQS51****    | T            | PB60A             | 4    | BDQS60        | T            |  |
| W16         | PB59B             | 4    | BDQ60         | C            | PB60B             | 4    | BDQ60         | C            |  |
| Y15         | PB52A             | 4    | BDQ51         | T            | PB61A             | 4    | BDQ60         | T            |  |
| AC17        | PB52B             | 4    | BDQ51         | C            | PB61B             | 4    | BDQ60         | C            |  |
| AA18        | PB61A             | 4    | BDQ60         | T            | PB62A             | 4    | BDQ60         | T            |  |
| Y17         | PB61B             | 4    | BDQ60         | C            | PB62B             | 4    | BDQ60         | C            |  |
| -           | -                 | -    |               |              | VCCIO4            | 4    |               |              |  |
| GNDIO       | GNDIO4            | -    |               |              | -                 | -    |               |              |  |
| W15         | PB54A             | 4    | BDQ51         | T            | PB63A             | 4    | BDQ60         | T            |  |
| AB17        | PB54B             | 4    | BDQ51         | C            | PB63B             | 4    | BDQ60         | C            |  |
| GNDIO       | GNDIO4            | -    |               |              | GNDIO4            | -    |               |              |  |
| VCCIO       | VCCIO4            | 4    |               |              | VCCIO4            | 4    |               |              |  |
| V17         | PB73A             | 4    | BDQ69         | T            | PB72A             | 4    | BDQ69         | T            |  |
| AA20        | PB73B             | 4    | BDQ69         | C            | PB72B             | 4    | BDQ69         | C            |  |
| GNDIO       | GNDIO4            | -    |               |              | GNDIO4            | -    |               |              |  |
| AD13        | VCC               | -    |               |              | LRC_SQ_VCCR3      | 13   |               |              |  |
| AF14        | PB47A             | 4    | BDQ51         | T            | LRC_SQ_HDINP3     | 13   |               | T            |  |
| AE13        | NC                | -    |               |              | LRC_SQ_VCCIB3     | 13   |               |              |  |
| AE14        | PB41A             | 4    | VREF2_4/BDQ42 | T            | LRC_SQ_HDINN3     | 13   |               | C            |  |
| AD16        | VCC               | -    |               |              | LRC_SQ_VCCTX3     | 13   |               |              |  |
| AF17        | PB51B             | 4    | BDQ51         | C            | LRC_SQ_HDOUPT3    | 13   |               | T            |  |
| AF16        | NC                | -    |               |              | LRC_SQ_VCCOB3     | 13   |               |              |  |
| AE17        | PB50A             | 4    | BDQ51         | T            | LRC_SQ_HDOUPTN3   | 13   |               | C            |  |
| AD17        | VCC               | -    |               |              | LRC_SQ_VCCTX2     | 13   |               |              |  |
| AE18        | PB53B             | 4    | BDQ51         | C            | LRC_SQ_HDOUPTN2   | 13   |               | C            |  |
| AD18        | NC                | -    |               |              | LRC_SQ_VCCOB2     | 13   |               |              |  |
| AF18        | PB53A             | 4    | BDQ51         | T            | LRC_SQ_HDOUPT2    | 13   |               | T            |  |
| AD14        | VCC               | -    |               |              | LRC_SQ_VCCR2      | 13   |               |              |  |
| AE15        | PB48B             | 4    | BDQ51         | C            | LRC_SQ_HDINN2     | 13   |               | C            |  |
| AD15        | NC                | -    |               |              | LRC_SQ_VCCIB2     | 13   |               |              |  |
| AF15        | PB47B             | 4    | BDQ51         | C            | LRC_SQ_HDINP2     | 13   |               | T            |  |
| AD19        | VCC               | -    |               |              | LRC_SQ_VCCP       | 13   |               |              |  |
| AC19        | PB57B             | 4    | BDQ60         | C            | LRC_SQ_REFCLKP    | 13   |               | T            |  |
| AB19        | PB59A             | 4    | BDQ60         | T            | LRC_SQ_REFCLKN    | 13   |               | C            |  |
| AE19        | VCCAUX            | -    |               |              | LRC_SQ_VCCAUX33   | 13   |               |              |  |

## 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 |  |
| L13         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| L18         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| L19         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| M11         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| M12         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| M13         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| M14         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| M15         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| M16         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| M17         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| M18         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| M19         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| M20         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| N11         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| N12         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| N19         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| N20         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| P12         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| P19         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| R12         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| R19         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| T12         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| T19         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| U12         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| U19         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| V11         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| V12         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| V19         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| V20         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| W11         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| W12         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| W13         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| W14         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| W15         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| W16         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| W17         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| W18         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| W19         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| W20         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| Y12         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| Y13         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| Y18         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| Y19         | VCC               | -    |               |              | VCC               | -    |               |              |  |
| D14         | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |  |
| E6          | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |  |
| E9          | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |  |
| F12         | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |  |
| K12         | VCCIO0            | 0    |               |              | VCCIO0            | 0    |               |              |  |

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

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