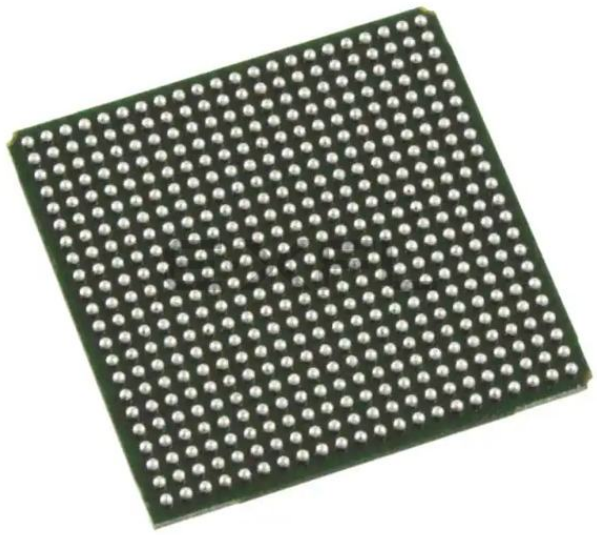
# Lattice Semiconductor Corporation - LFE2-50E-6FN484C Datasheet



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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.

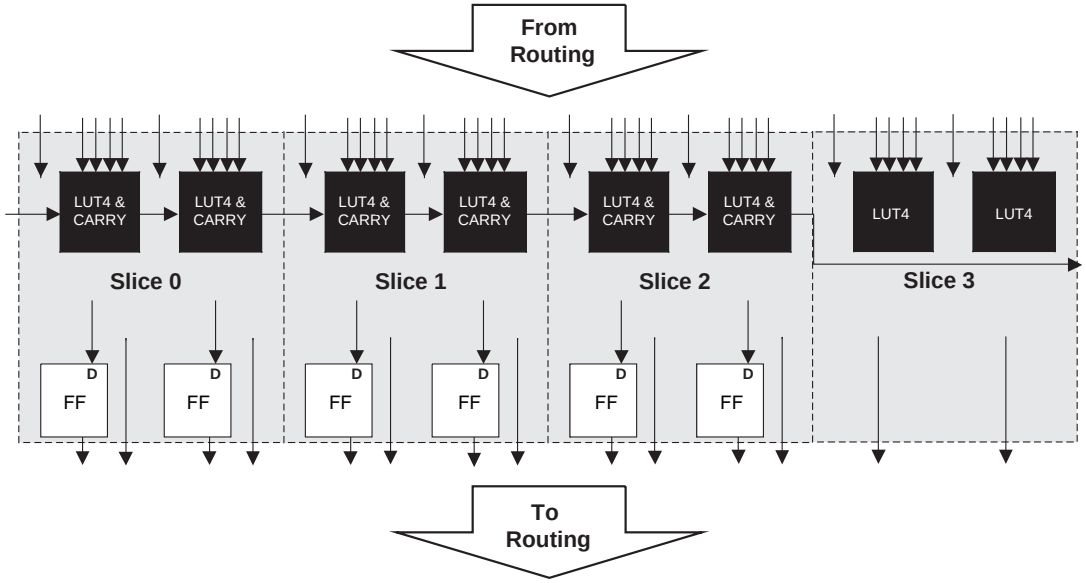
| Details | |
|---|---|
| Product Status | Active |
| Number of LABs/CLBs | 6000 |
| Number of Logic Elements/Cells | 48000 |
| Total RAM Bits | 396288 |
| Number of I/O | 339 |
| Number of Gates | - |
| Voltage - Supply | 1.14V ~ 1.26V |
| Mounting Type | Surface Mount |
| Operating Temperature | 0°C ~ 85°C (TJ) |
| Package / Case | 484-BBGA |
| Supplier Device Package | 484-FPBGA (23x23) |
| Purchase URL | https://www.e-xfl.com/product-detail/lattice-semiconductor/lfe2-50e-6fn484c |

## PFU Blocks

The core of the LatticeECP2/M device consists of PFU blocks, which are provided in two forms, the PFU and PFF. The PFUs can be programmed to perform Logic, Arithmetic, Distributed RAM and Distributed ROM functions. PFF blocks can be programmed to perform Logic, Arithmetic and ROM functions. Except where necessary, the remainder of this data sheet will use the term PFU to refer to both PFU and PFF blocks.

Each PFU block consists of four interconnected slices, numbered 0-3 as shown in Figure 2-3. All the interconnections to and from PFU blocks are from routing. There are 50 inputs and 23 outputs associated with each PFU block.

***Figure 2-3. PFU Diagram***




## Slice

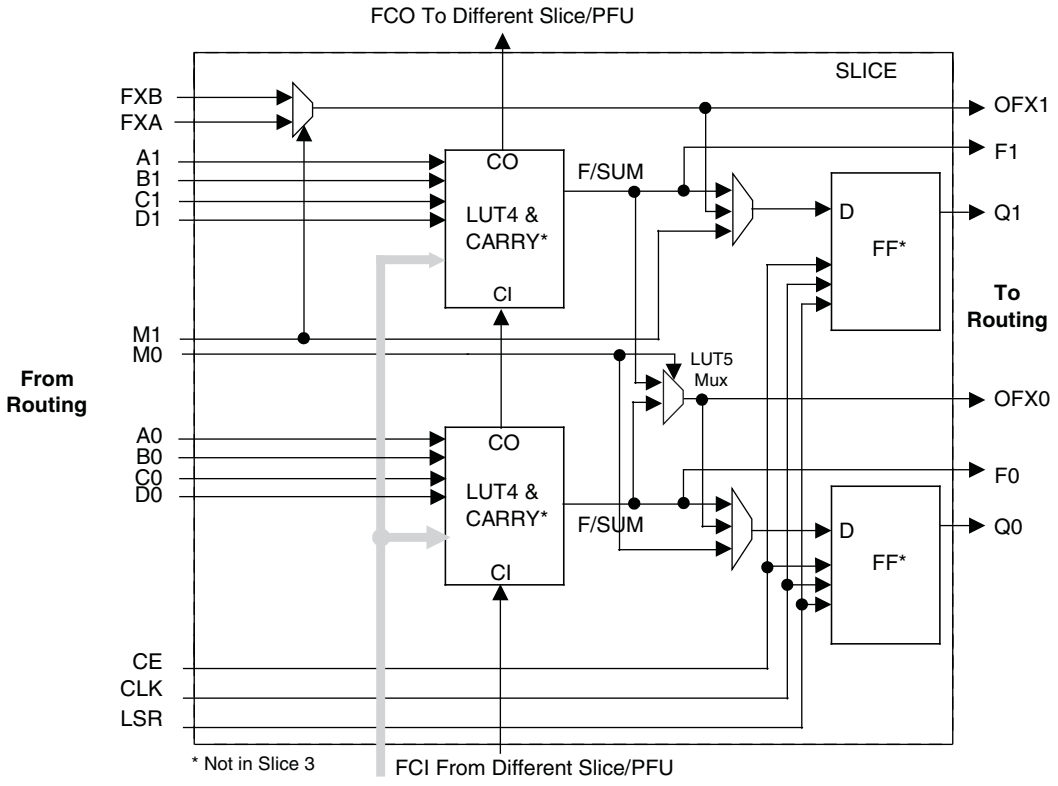
Slice 0 through Slice 2 contain two LUT4s feeding two registers, whereas Slice 3 contains two LUT4s only. For PFUs, Slice 0 and Slice 2 can also be configured as distributed memory, a capability not available in the PFF. Table 2-1 shows the capability of the slices in both PFF and PFU blocks along with the operation modes they enable. In addition, each PFU contains some logic that allows the LUTs to be combined to perform functions such as LUT5, LUT6, LUT7 and LUT8. There is control logic to perform set/reset functions (programmable as synchronous/asynchronous), clock select, chip-select and wider RAM/ROM functions. Figure 2-4 shows an overview of the internal logic of the slice. The registers in the slice can be configured for positive/negative and edge triggered or level sensitive clocks.

***Table 2-1. Resources and Modes Available per Slice***

| Slice | PFU BLock | | PFF Block | |
|---|---|---|---|---|
| | Resources | Modes | Resources | Modes |
| Slice 0 | 2 LUT4s and 2 Registers | Logic, Ripple, RAM, ROM | 2 LUT4s and 2 Registers | Logic, Ripple, ROM |
| Slice 1 | 2 LUT4s and 2 Registers | Logic, Ripple, ROM | 2 LUT4s and 2 Registers | Logic, Ripple, ROM |
| Slice 2 | 2 LUT4s and 2 Registers | Logic, Ripple, RAM, ROM | 2 LUT4s and 2 Registers | Logic, Ripple, ROM |
| Slice 3 | 2 LUT4s | Logic, ROM | 2 LUT4s | Logic, ROM |

Slices 0, 1 and 2 have 14 input signals: 13 signals from routing and one from the carry-chain (from the adjacent slice or PFU). There are seven outputs: six to routing and one to carry-chain (to the adjacent PFU). Slice 3 has 13 input signals from routing and four signals to routing. Table 2-2 lists the signals associated with Slice 0 to Slice 2.

*Figure 2-4. Slice Diagram*




For Slices 0 and 2, memory control signals are generated from Slice 1 as follows:

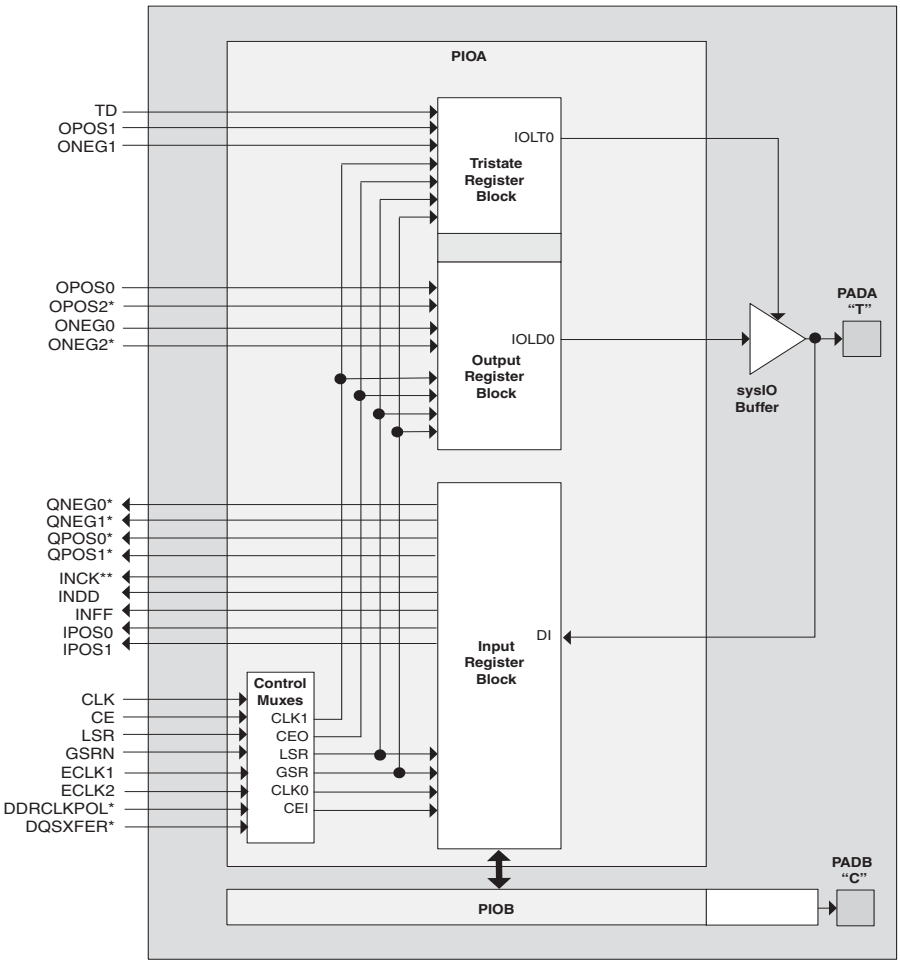
WCK is CLK
WRE is from LSR
DI[3:2] for Slice 2 and DI[1:0] for Slice 0 data
WAD [A:D] is a 4bit address from slice 1 LUT input

*Table 2-2. Slice Signal Descriptions*

| Function | Type | Signal Names | Description |
|---|---|---|---|
| Input | Data signal | A0, B0, C0, D0 | Inputs to LUT4 |
| Input | Data signal | A1, B1, C1, D1 | Inputs to LUT4 |
| Input | Multi-purpose | M0 | Multipurpose Input |
| Input | Multi-purpose | M1 | Multipurpose Input |
| Input | Control signal | CE | Clock Enable |
| Input | Control signal | LSR | Local Set/Reset |
| Input | Control signal | CLK | System Clock |
| Input | Inter-PFU signal | FC | Fast Carry-in[1] |
| Input | Inter-slice signal | FXA | Intermediate signal to generate LUT6 and LUT7 |
| Input | Inter-slice signal | FXB | Intermediate signal to generate LUT6 and LUT7 |
| Output | Data signals | F0, F1 | LUT4 output register bypass signals |
| Output | Data signals | Q0, Q1 | Register outputs |
| Output | Data signals | OFX0 | Output of a LUT5 MUX |
| Output | Data signals | OFX1 | Output of a LUT6, LUT7, LUT8[2] MUX depending on the slice |
| Output | Inter-PFU signal | FCO | Slice 2 of each PFU is the fast carry chain output[1] |

1. See Figure 2-4 for connection details.
2. Requires two PFUs.

*Figure 2-28. PIC Diagram*

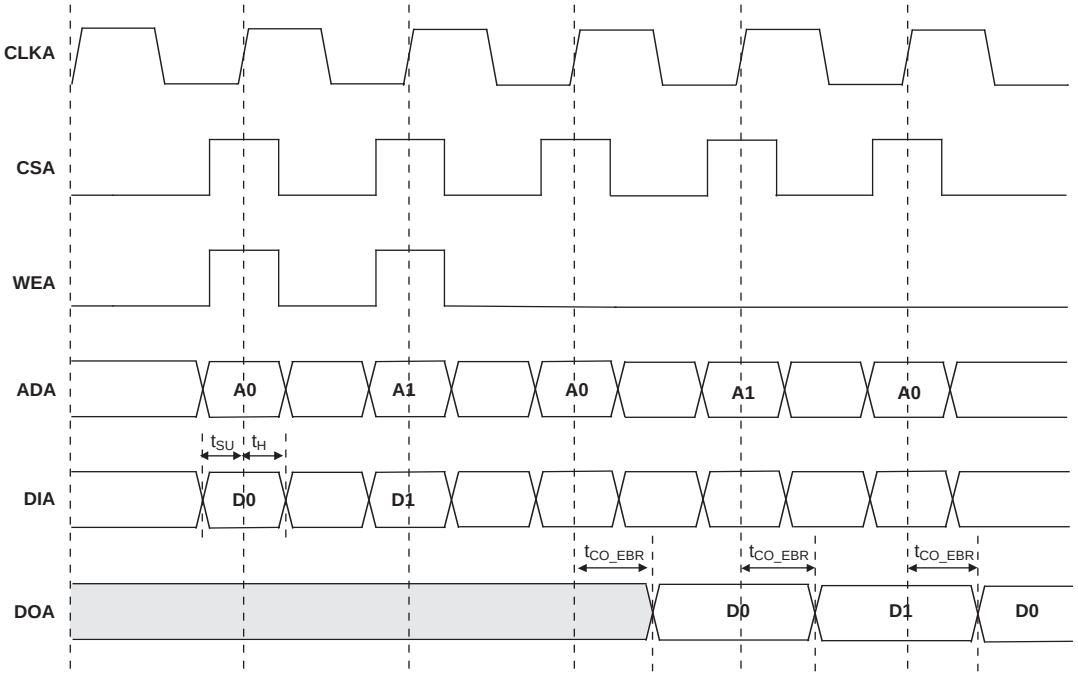



*Signals are available on left/right/bottom edges only.
** Selected blocks.

Two adjacent PIOs can be joined to provide a differential I/O pair (labeled as “T” and “C”) as shown in Figure 2-28. The PAD Labels “T” and “C” distinguish the two PIOs. Approximately 50% of the PIO pairs on the left and right edges of the device can be configured as true LVDS outputs. All I/O pairs can operate as inputs.

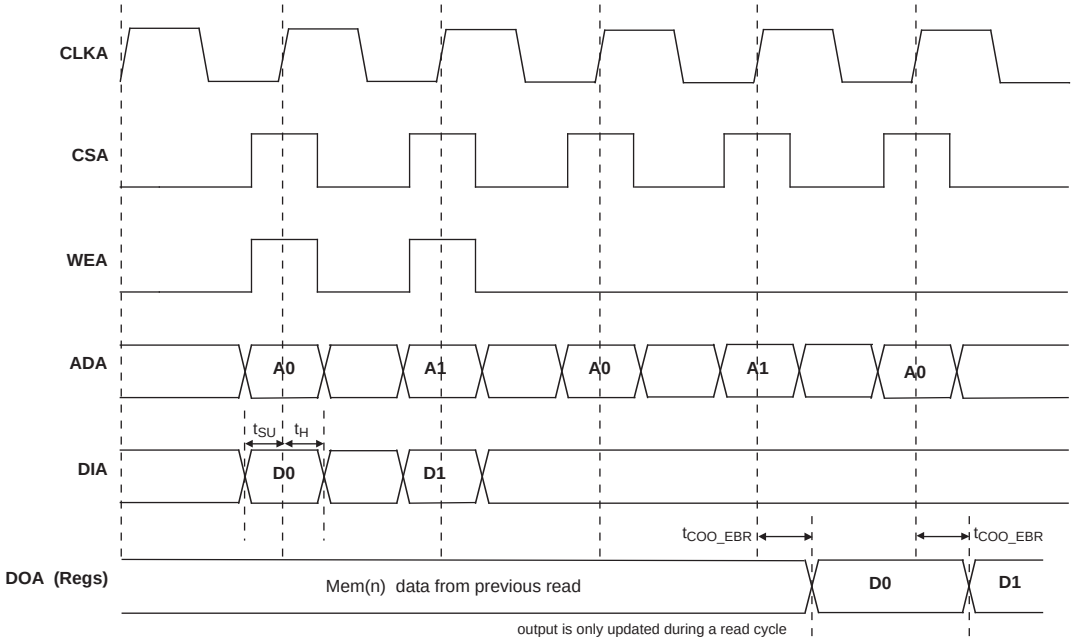
# Timing Diagrams

***Figure 3-9. Read/Write Mode (Normal)***




Note: Input data and address are registered at the positive edge of the clock and output data appears after the positive edge of the clock.

***Figure 3-10. Read/Write Mode with Input and Output Registers***



## LatticeECP2 Power Supply and NC (Cont.)

| Signals | 672 fpBGA[3] | 900 fpBGA[3] |
|---|---|---|
| VCC | **LFE2-20:** R8, P18, M8, L20, L12, L13, L14, L15, M11, M12, M15, M16, N11, N16, P11, P16, R11, R12, R15, R16, T12, T13, T14, T15<br>**LFE2-35/LFE2-50:** L12, L13, L14, L15, M11, M12, M15, M16, N11, N16, P11, P16, R11, R12, R15, R16, T12, T13, T14, T15<br>**LFE2-70:** L12, L13, L14, L15, M11, M12, M15, M16, N11, N16, P11, P16, R11, R12, R15, R16, T12, T13, T14, T15 | AA11, AA20, K11, K21, K22, L11, L12, L13, L18, L19, L20, M11, M20, N11, N20, V11, V20, W11, W20, Y10, Y11, Y12, Y13, Y18, Y19, Y20 |
| VCCIO0 | D11, D6, G9, J12, K12 | J13, J14, K12, K13, K14, K15 |
| VCCIO1 | D16, D21, G18, J15, K15 | J17, J18, J20, K17, K18, K20 |
| VCCIO2 | F23, J20, L23, M17, M18 | L21, M21, M22, N21, N22, R21 |
| VCCIO3 | AA23, R17, R18, T23, V20 | U21, U22, V21, V22, W21, Y22 |
| VCCIO4 | AC16, AC21, U15, V15, Y18 | AA16, AA17, AA18, AA19, AB17, AB18 |
| VCCIO5 | AC11, AC6, U12, V12, Y9 | AA12, AA13, AA14, AB12, AB13, AB14 |
| VCCIO6 | AA4, R10, R9, T4, V7 | U10, U9, V10, W10, W9, Y9 |
| VCCIO7 | F4, J7, L4, M10, M9 | L10, L9, M10, N10, P10, R10 |
| VCCIO8 | AE25, V18 | AA21, Y21 |
| VCCJ | AB5 | AD3 |
| VCCAUX | J10, J11, J16, J17, K18, L18, T18, U18, V16, V17, V10, V11, T9, U9, K9, L9 | AA15, AB11, AB19, AB20, J11, J12, J19, K19, L22, M9, N9, P21, P9, T10, T21, V9, W22 |
| VCCPLL | **LFE2-20:** None<br>**LFE2-35/LFE2-70:** R8, P18<br>**LFE2-50:** R8, P18, M8, L20 | P22, P8, T22, Y7 |
| GND[1] | A2, A25, AA18, AA24, AA3, AA9, AD11, AD16, AD21, AD6, AE1, AE26, AF2, AF25, B1, B26, C11, C16, C21, C6, F18, F24, F3, F9, J13, J14, J21, J6, K10, K11, K13, K14, K16, K17, L10, L11, L16, L17, L24, L3, M13, M14, N10, N12, N13, N14, N15, N17, P10, P12, P13, P14, P15, P17, R13, R14, T10, T11, T16, T17, T24, T3, U10, U11, U13, U14, U16, U17, V13, V14, V21, V6 | A1, A30, AC28, AC3, AH13, AH18, AH23, AH28, AH3, AH8, AK1, AK30, C13, C18, C23, C28, C3, C8, H28, H3, L14, L15, L16, L17, M12, M13, M14, M15, M16, M17, M18, M19, N12, N13, N14, N15, N16, N17, N18, N19, N28, N3, P11, P12, P13, P14, P15, P16, P17, P18, P19, P20, R11, R12, R13, R14, R15, R16, R17, R18, R19, R20, T11, T12, T13, T14, T15, T16, T17, T18, T19, T20, U11, U12, U13, U14, U15, U16, U17, U18, U19, U20, V12, V13, V14, V15, V16, V17, V18, V19, V28, V3, W12, W13, W14, W15, W16, W17, W18, W19, Y14, Y15, Y16, Y17 |
| NC[2] | **LFE2-20:** E4, E3, E2, E1, H6, H5, F2, F1, H8, J9, G4, G3, K3, K2, K1, L2, L1, M2, M1, N2, T1, T2, P8, P6, P5, P4, U1, V1, P3, R3, R4, U2, V2, W2, T6, R5, AA19, W17, Y19, Y17, AF20, AE20, AA20, W18, AD20, AE21, AF21, AF22, R22, T21, P26, P25, R24, R23, P20, R19, P21, P19, P23, P22, N22, R21, N26, N25, J26, J25, J23, K23, H26, H25, H24, H23, F22, E24, D25, C25, D24, B25, H21, G22, B24, C24, D23, C23, E19, C19, B21, B20, D19, B19, G17, E18, G19, F17, A20, A19, E17, D18, M3, N6, P24<br>**LFE2-35:** K3, K2, K1, L2, L1, M2, M1, N2, M8, P3, R3, R4, U2, V2, W2, AF20, AE20, AA20, W18, AD20, AE21, AF21, AF22, P26, P25, R24, R23, P20, R19, L20, J26, J25, J23, K23, H26, H25, H24, H23, E19, C19, B21, B20, D19, B19, G17, E18, G19, F17, A20, A19, E17, D18, M3, N6, P24<br>**LFE2-50:** N6, P24, M3<br>**LFE2-70:** M8, L20, M3, P24, N6 | A2, A3, A4, A5, AB28, AC4, AD23, AE1, AE2, AE29, AE3, AE30, AE4, AE5, AE6, AF1, AF2, AF23, AF26, AF27, AF28, AF29, AF3, AF30, AF4, AF5, AG1, AG13, AG16, AG18, AG2, AG26, AG27, AG28, AG29, AG3, AG30, AG4, AG8, AH1, AH16, AH2, AH26, AH27, AH29, AH30, AH4, AJ1, AJ2, AJ27, AJ28, AJ29, AJ3, AJ30, AK2, AK27, AK28, AK29, AK3, B1, B2, B3, B30, B4, B5, C1, C2, C29, C30, C4, D13, D18, D23, D28, D29, D3, D30, D4, E25, E26, E27, E28, E29, E3, E30, E4, E5, E6, F25, F5, F6, G6, G7, K10, K9, N27, N4, R1, R2, V27, V4 |

1. All grounds must be electrically connected at the board level. For fpBGA packages, the total number of GND balls is less than the actual number of GND logic connections from the die to the common package GND plane.
2. NC pins should not be connected to any active signals, VCC or GND.
3. Pin orientation A1 starts from the upper left corner of the top side view with alphabetical order ascending vertically and numerical order ascending horizontally.

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

| LFE2-20E/SE | | | | | |
|---|---|---|---|---|---|
| Ball Number | Ball Number | Ball/Pad Function | Bank | Dual Function | Differential |
| L11 | L11 | PB61B | 4 | BDQ60 | C |
| T13 | T13 | PB62A | 4 | BDQ60 | T |
| R13 | R13 | PB63A | 4 | BDQ60 | T |
| VCCIO | VCCIO | VCCIO4 | 4 | | |
| T14 | T14 | PB62B | 4 | BDQ60 | C |
| P13 | P13 | PB63B | 4 | BDQ60 | C |
| GND | GND | GNDIO4 | - | | |
| N12 | N12 | PB64A | 4 | VREF2_4/BDQ60 | T |
| M12 | M12 | PB64B | 4 | VREF1_4/BDQ60 | C |
| R15 | R15 | CFG2 | 8 | | |
| N14 | N14 | CFG1 | 8 | | |
| N13 | N13 | PROGRAMN | 8 | | |
| N15 | N15 | CFG0 | 8 | | |
| P15 | P15 | PR44B | 8 | WRITEN | C |
| L12 | L12 | INITN | 8 | | |
| N16 | N16 | PR43B | 8 | CSN | C |
| GND | GND | GNDIO8 | - | | |
| R14 | R14 | CCLK | 8 | | |
| P14 | P14 | PR44A | 8 | CS1N | T |
| M13 | M13 | DONE | 8 | | |
| R16 | R16 | PR42B | 8 | D1 | C |
| VCCIO | VCCIO | VCCIO8 | 8 | | |
| M16 | M16 | PR43A | 8 | D0/SPIFASTN | T |
| P16 | P16 | PR42A | 8 | D2 | T |
| L15 | L15 | PR41B | 8 | D3 | C |
| GND | GND | GNDIO8 | - | | |
| L14 | L14 | PR40A | 8 | D6 | T |
| L16 | L16 | PR41A | 8 | D4 | T |
| L10 | L10 | PR39B | 8 | D7/SPID0 | C |
| L13 | L13 | PR40B | 8 | D5 | C |
| VCCIO | VCCIO | VCCIO8 | 8 | | |
| K11 | K11 | PR39A | 8 | DI/CSSPI0N | T |
| K14 | K14 | PR38B | 8 | DOUT/CSON | C |
| K13 | K13 | PR38A | 8 | BUSY/SISPI | T |
| GND | GND | GNDIO8 | - | | |
| K15 | K15 | PR31B | 3 | RLM0_GPLLC_FB_A/RDQ34 | C |
| VCCIO | VCCIO | VCCIO3 | 3 | | |
| K16 | K16 | PR31A | 3 | RLM0_GPLLT_FB_A/RDQ34 | T |
| GND | GND | GNDIO3 | - | | |
| J16 | J16 | PR30B | 3 | RLM0_GPLLC_IN_A**/RDQ34 | C (LVDS)* |
| J15 | J15 | PR30A | 3 | RLM0_GPLLT_IN_A**/RDQ34 | T (LVDS)* |
| J14 | J14 | RLM0_PLLCAP | 3 | | |

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

| LFE2-12E/12SE | | | | | LFE2-20E/20SE | | | |
|---|---|---|---|---|---|---|---|---|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |
| AB7 | PB13B | 5 | BDQ15 | C | PB22B | 5 | BDQ24 | C |
| Y8 | PB16A | 5 | BDQ15 | T | PB25A | 5 | BDQ24 | T |
| GNDIO | GNDIO5 | - | | | GNDIO | - | | |
| W9 | PB15A | 5 | BDQS15 | T | PB24A | 5 | BDQS24 | T |
| AA8 | PB16B | 5 | BDQ15 | C | PB25B | 5 | BDQ24 | C |
| V9 | PB15B | 5 | BDQ15 | C | PB24B | 5 | BDQ24 | C |
| AB8 | PB18A | 5 | BDQ15 | T | PB27A | 5 | BDQ24 | T |
| VCCIO | VCCIO5 | 5 | | | VCCIO5 | 5 | | |
| W10 | PB17A | 5 | BDQ15 | T | PB26A | 5 | BDQ24 | T |
| AA9 | PB18B | 5 | BDQ15 | C | PB27B | 5 | BDQ24 | C |
| V10 | PB17B | 5 | BDQ15 | C | PB26B | 5 | BDQ24 | C |
| GNDIO | GNDIO5 | - | | | GNDIO | - | | |
| Y10 | PB21A | 5 | BDQ24 | T | PB30A | 5 | BDQ33 | T |
| AB9 | PB20A | 5 | BDQ24 | T | PB29A | 5 | BDQ33 | T |
| AA10 | PB21B | 5 | BDQ24 | C | PB30B | 5 | BDQ33 | C |
| AB10 | PB20B | 5 | BDQ24 | C | PB29B | 5 | BDQ33 | C |
| AB11 | PB23A | 5 | BDQ24 | T | PB32A | 5 | BDQ33 | T |
| U10 | PB22A | 5 | BDQ24 | T | PB31A | 5 | BDQ33 | T |
| VCCIO | VCCIO5 | 5 | | | VCCIO5 | 5 | | |
| AA11 | PB23B | 5 | BDQ24 | C | PB32B | 5 | BDQ33 | C |
| U11 | PB22B | 5 | BDQ24 | C | PB31B | 5 | BDQ33 | C |
| GNDIO | GNDIO5 | - | | | GNDIO5 | - | | |
| AB12 | PB25A | 5 | BDQ24 | T | PB34A | 5 | BDQ33 | T |
| Y11 | PB24A | 5 | BDQS24 | T | PB33A | 5 | BDQS33 | T |
| AA12 | PB25B | 5 | BDQ24 | C | PB34B | 5 | BDQ33 | C |
| W11 | PB24B | 5 | BDQ24 | C | PB33B | 5 | BDQ33 | C |
| AB13 | PB26A | 5 | PCLKT5_0/BDQ24 | T | PB35A | 5 | PCLKT5_0/BDQ33 | T |
| VCCIO | VCCIO5 | 5 | | | VCCIO5 | 5 | | |
| AB14 | PB26B | 5 | PCLKC5_0/BDQ24 | C | PB35B | 5 | PCLKC5_0/BDQ33 | C |
| GNDIO | GNDIO5 | - | | | GNDIO5 | - | | |
| Y12 | PB32A | 4 | BDQ33 | T | PB41A | 4 | BDQ42 | T |
| W12 | PB32B | 4 | BDQ33 | C | PB41B | 4 | BDQ42 | C |
| VCCIO | VCCIO4 | 4 | | | VCCIO4 | 4 | | |
| U12 | PB31A | 4 | PCLKT4_0/BDQ33 | T | PB40A | 4 | PCLKT4_0/BDQ42 | T |
| V12 | PB31B | 4 | PCLKC4_0/BDQ33 | C | PB40B | 4 | PCLKC4_0/BDQ42 | C |
| U13 | PB34A | 4 | BDQ33 | T | PB43A | 4 | BDQ42 | T |
| GNDIO | GNDIO4 | - | | | GNDIO4 | - | | |
| AA13 | PB33A | 4 | BDQS33 | T | PB42A | 4 | BDQS42 | T |
| U14 | PB34B | 4 | BDQ33 | C | PB43B | 4 | BDQ42 | C |
| Y13 | PB33B | 4 | BDQ33 | C | PB42B | 4 | BDQ42 | C |
| AB16 | PB36A | 4 | BDQ33 | T | PB45A | 4 | BDQ42 | T |
| VCCIO | VCCIO4 | 4 | | | VCCIO4 | 4 | | |
| AB15 | PB35A | 4 | BDQ33 | T | PB44A | 4 | BDQ42 | T |
| AB17 | PB36B | 4 | BDQ33 | C | PB45B | 4 | BDQ42 | C |

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

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

# LFE2-50E/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_GPLLC_IN_A**/RDQ67 | C (LVDS)* | PR76B | 3 | RLM0_GPLLC_IN_A**/RDQ80 | C (LVDS)* |
| U25 | PR63A | 3 | RLM0_GPLLT_IN_A**/RDQ67 | T (LVDS)* | PR76A | 3 | RLM0_GPLLT_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 |

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

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

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

| LFE2-70E/SE | | | | |
|---|---|---|---|---|
| **Ball Number** | **Ball/Pad Function** | **Bank** | **Dual Function** | **Differential** |
| W7 | PL72B | 6 | LDQ71 | C |
| W4 | PL73A | 6 | LLM0_GDLLT_IN_A**/LDQ71 | T (LVDS)* |
| W3 | PL73B | 6 | LLM0_GDLLC_IN_A**/LDQ71 | C (LVDS)* |
| W6 | PL74A | 6 | LLM0_GDLLT_FB_A/LDQ71 | T |
| GND | GNDIO6 | - | | |
| W8 | PL74B | 6 | LLM0_GDLLC_FB_D/LDQ71 | C |
| Y8 | LLM0_PLLCAP | 6 | | |
| Y1 | PL76A | 6 | LLM0_GPLLT_IN_A**/LDQ80 | T (LVDS)* |
| Y2 | PL76B | 6 | LLM0_GPLLC_IN_A**/LDQ80 | C (LVDS)* |
| Y5 | PL77A | 6 | LLM0_GPLLT_FB_A/LDQ80 | T |
| Y6 | PL77B | 6 | LLM0_GPLLC_FB_A/LDQ80 | C |
| Y4 | PL78A | 6 | LDQ80 | T (LVDS)* |
| VCCIO | VCCIO6 | 6 | | |
| Y3 | PL78B | 6 | LDQ80 | C (LVDS)* |
| AA6 | PL79A | 6 | LDQ80 | T |
| AA8 | PL79B | 6 | LDQ80 | C |
| AA2 | PL80A | 6 | LDQS80 | T (LVDS)* |
| GND | GNDIO6 | - | | |
| AA1 | PL80B | 6 | LDQ80 | C (LVDS)* |
| AA7 | PL81A | 6 | LDQ80 | T |
| AA5 | PL81B | 6 | LDQ80 | C |
| VCCIO | VCCIO6 | 6 | | |
| AA4 | PL82A | 6 | LDQ80 | T (LVDS)* |
| AA3 | PL82B | 6 | LDQ80 | C (LVDS)* |
| AB7 | PL83A | 6 | LDQ80 | T |
| AB5 | PL83B | 6 | LDQ80 | C |
| GND | GNDIO6 | - | | |
| AB2 | PL84A | 6 | LDQ88 | T (LVDS)* |
| AB1 | PL84B | 6 | LDQ88 | C (LVDS)* |
| AB8 | PL85A | 6 | LDQ88 | T |
| AB6 | PL85B | 6 | LDQ88 | C |
| VCCIO | VCCIO6 | 6 | | |
| AB4 | PL86A | 6 | LDQ88 | T (LVDS)* |
| AB3 | PL86B | 6 | LDQ88 | C (LVDS)* |
| AC7 | PL87A | 6 | LDQ88 | T |
| AC5 | PL87B | 6 | LDQ88 | C |
| GND | GNDIO6 | - | | |
| AC2 | PL88A | 6 | LDQS88 | T (LVDS)* |
| AC1 | PL88B | 6 | LDQ88 | C (LVDS)* |
| AC6 | PL89A | 6 | LDQ88 | T |
| VCCIO | VCCIO6 | 6 | | |
| AD6 | PL89B | 6 | LDQ88 | C |
| AD1 | PL90A | 6 | LDQ88 | T (LVDS)* |

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

| LFE2-70E/SE | | | | |
|---|---|---|---|---|
| **Ball Number** | **Ball/Pad Function** | **Bank** | **Dual Function** | **Differential** |
| U10 | VCCIO6 | 6 | | |
| U9 | VCCIO6 | 6 | | |
| V10 | VCCIO6 | 6 | | |
| W10 | VCCIO6 | 6 | | |
| W9 | VCCIO6 | 6 | | |
| Y9 | VCCIO6 | 6 | | |
| L10 | VCCIO7 | 7 | | |
| L9 | VCCIO7 | 7 | | |
| M10 | VCCIO7 | 7 | | |
| N10 | VCCIO7 | 7 | | |
| P10 | VCCIO7 | 7 | | |
| R10 | VCCIO7 | 7 | | |
| AA21 | VCCIO8 | 8 | | |
| Y21 | VCCIO8 | 8 | | |
| AA15 | VCCAUX | - | | |
| AB11 | VCCAUX | - | | |
| AB19 | VCCAUX | - | | |
| AB20 | VCCAUX | - | | |
| J11 | VCCAUX | - | | |
| J12 | VCCAUX | - | | |
| J19 | VCCAUX | - | | |
| K19 | VCCAUX | - | | |
| L22 | VCCAUX | - | | |
| M9 | VCCAUX | - | | |
| N9 | VCCAUX | - | | |
| P21 | VCCAUX | - | | |
| P9 | VCCAUX | - | | |
| T10 | VCCAUX | - | | |
| T21 | VCCAUX | - | | |
| V9 | VCCAUX | - | | |
| W22 | VCCAUX | - | | |
| A1 | GND | - | | |
| A30 | GND | - | | |
| AC28 | GND | - | | |
| AC3 | GND | - | | |
| AH13 | GND | - | | |
| AH18 | GND | - | | |
| AH23 | GND | - | | |
| AH28 | GND | - | | |
| AH3 | GND | - | | |
| AH8 | GND | - | | |
| AK1 | GND | - | | |
| AK30 | GND | - | | |

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

| LFE2M50E/SE | | | | |
|---|---|---|---|---|
| **Ball Number** | **Ball/Pad Function** | **Bank** | **Dual Function** | **Differential** |
| GNDIO | GNDIO7 | - | | |
| L1 | PL36A | 7 | LDQS36 | T (LVDS)* |
| L2 | PL36B | 7 | LDQ36 | C (LVDS)* |
| M7 | PL37A | 7 | LDQ36 | T |
| VCCIO | VCCIO7 | 7 | | |
| L5 | PL37B | 7 | LDQ36 | C |
| L3 | PL38A | 7 | LDQ36 | T (LVDS)* |
| L4 | PL38B | 7 | LDQ36 | C (LVDS)* |
| M1 | PL39A | 7 | PCLKT7_0/LDQ36 | T |
| GNDIO | GNDIO7 | - | | |
| M2 | PL39B | 7 | PCLKC7_0/LDQ36 | C |
| M6 | PL41A | 6 | PCLKT6_0 | T (LVDS)* |
| M5 | PL41B | 6 | PCLKC6_0 | C (LVDS)* |
| M3 | PL42A | 6 | VREF2_6 | T |
| M4 | PL42B | 6 | VREF1_6 | C |
| VCCIO | VCCIO6 | 6 | | |
| N7 | PL45A | 6 | LLM3_SPLLT_IN_A | T (LVDS)* |
| GNDIO | GNDIO6 | - | | |
| N6 | PL45B | 6 | LLM3_SPLLC_IN_A | C (LVDS)* |
| N1 | PL46A | 6 | LLM3_SPLLT_FB_A | T |
| N2 | PL46B | 6 | LLM3_SPLLC_FB_A | C |
| VCCIO | VCCIO6 | 6 | | |
| GNDIO | GNDIO6 | - | | |
| P6 | PL52A | 6 | LDQS52**** | T (LVDS)* |
| N5 | PL52B | 6 | LDQ52 | C (LVDS)* |
| P1 | PL53A | 6 | LDQ52 | T |
| VCCIO | VCCIO6 | 6 | | |
| P2 | PL53B | 6 | LDQ52 | C |
| P3 | PL54A | 6 | LDQ52 | T (LVDS)* |
| P4 | PL54B | 6 | LDQ52 | C (LVDS)* |
| P5 | PL55A | 6 | LDQ52 | T |
| GNDIO | GNDIO6 | - | | |
| P7 | PL55B | 6 | LDQ52 | C |
| VCCIO | VCCIO6 | 6 | | |
| GNDIO | GNDIO6 | - | | |
| R1 | PL62A | 6 | LLM0_GPLLT_IN_A** | T (LVDS)* |
| GNDIO | GNDIO6 | - | | |
| R2 | PL62B | 6 | LLM0_GPLLC_IN_A** | C (LVDS)* |
| R3 | PL63A | 6 | LLM0_GPLLT_FB_A | T |
| R4 | PL63B | 6 | LLM0_GPLLC_FB_A | C |
| VCCIO | VCCIO6 | 6 | | |
| R6 | PL64A | 6 | LLM0_GDLLT_IN_A** | T (LVDS)* |
| R5 | PL64B | 6 | LLM0_GDLLC_IN_A** | C (LVDS)* |

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

| LFE2M50E/SE | | | | |
|---|---|---|---|---|
| **Ball Number** | **Ball/Pad Function** | **Bank** | **Dual Function** | **Differential** |
| C12 | URC_SQ_VCCIB2 | 12 | | |
| B12 | URC_SQ_HDINN2 | 12 | | C |
| C11 | URC_SQ_VCCRX2 | 12 | | |
| A15 | URC_SQ_HDOUTP2 | 12 | | T |
| C15 | URC_SQ_VCCOB2 | 12 | | |
| B15 | URC_SQ_HDOUTN2 | 12 | | C |
| C14 | URC_SQ_VCCTX2 | 12 | | |
| B14 | URC_SQ_HDOUTN3 | 12 | | C |
| A13 | URC_SQ_VCCOB3 | 12 | | |
| A14 | URC_SQ_HDOUTP3 | 12 | | T |
| C13 | URC_SQ_VCCTX3 | 12 | | |
| B11 | URC_SQ_HDINN3 | 12 | | C |
| B10 | URC_SQ_VCCIB3 | 12 | | |
| A11 | URC_SQ_HDINP3 | 12 | | T |
| C10 | URC_SQ_VCCRX3 | 12 | | |
| GNDIO | GNDIO1 | - | | |
| VCCIO | VCCIO1 | 1 | | |
| E13 | PT55B | 1 | | C |
| D12 | PT55A | 1 | | T |
| GNDIO | GNDIO1 | - | | |
| A9 | PT54B | 1 | | C |
| A8 | PT54A | 1 | | T |
| A7 | PT53B | 1 | | C |
| A6 | PT53A | 1 | | T |
| VCCIO | VCCIO1 | 1 | | |
| E12 | PT52B | 1 | | C |
| F12 | PT52A | 1 | | T |
| A5 | PT51B | 1 | | C |
| A4 | PT51A | 1 | | T |
| GNDIO | GNDIO1 | - | | |
| B7 | PT50B | 1 | | C |
| B8 | PT50A | 1 | | T |
| G11 | PT49B | 1 | | C |
| E11 | PT49A | 1 | | T |
| VCCIO | VCCIO1 | 1 | | |
| D11 | PT48B | 1 | VREF2_1 | C |
| D10 | PT48A | 1 | VREF1_1 | T |
| G10 | PT47B | 1 | PCLKC1_0 | C |
| F11 | PT47A | 1 | PCLKT1_0 | T |
| G9 | PT46B | 0 | PCLKC0_0 | C |
| GNDIO | GNDIO0 | - | | |
| F9 | PT46A | 0 | PCLKT0_0 | T |
| C9 | PT45B | 0 | VREF2_0 | C |

# 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 |
| F11 | VCCIO0 | 0 | | | VCCIO0 | 0 | | |
| J13 | VCCIO0 | 0 | | | VCCIO0 | 0 | | |
| K12 | VCCIO0 | 0 | | | VCCIO0 | 1 | | |
| D18 | VCCIO1 | 1 | | | VCCIO1 | 1 | | |
| F16 | VCCIO1 | 1 | | | VCCIO1 | 1 | | |
| J14 | VCCIO1 | 1 | | | VCCIO1 | 1 | | |
| K15 | VCCIO1 | 1 | | | VCCIO1 | 1 | | |
| G25 | VCCIO2 | 2 | | | VCCIO2 | 2 | | |
| L21 | VCCIO2 | 2 | | | VCCIO2 | 2 | | |
| M17 | VCCIO2 | 2 | | | VCCIO2 | 2 | | |
| M25 | VCCIO2 | 2 | | | VCCIO2 | 2 | | |
| N18 | VCCIO2 | 2 | | | VCCIO2 | 2 | | |
| P18 | VCCIO3 | 3 | | | VCCIO3 | 3 | | |
| R17 | VCCIO3 | 3 | | | VCCIO3 | 3 | | |
| R25 | VCCIO3 | 3 | | | VCCIO3 | 3 | | |
| T21 | VCCIO3 | 3 | | | VCCIO3 | 3 | | |
| Y25 | VCCIO3 | 3 | | | VCCIO3 | 3 | | |
| AA16 | VCCIO4 | 4 | | | VCCIO4 | 4 | | |
| AC18 | VCCIO4 | 4 | | | VCCIO4 | 4 | | |
| U15 | VCCIO4 | 4 | | | VCCIO4 | 4 | | |
| V14 | VCCIO4 | 4 | | | VCCIO4 | 4 | | |
| AA11 | VCCIO5 | 5 | | | VCCIO5 | 5 | | |
| V13 | VCCIO5 | 5 | | | VCCIO5 | 5 | | |
| AE12 | VCCIO5 | 5 | | | VCCIO5 | 5 | | |
| AE7 | VCCIO5 | 5 | | | VCCIO5 | 5 | | |
| U12 | VCCIO5 | 5 | | | VCCIO5 | 5 | | |
| P9 | VCCIO6 | 6 | | | VCCIO6 | 6 | | |
| R10 | VCCIO6 | 6 | | | VCCIO6 | 6 | | |
| R2 | VCCIO6 | 6 | | | VCCIO6 | 6 | | |
| T6 | VCCIO6 | 6 | | | VCCIO6 | 6 | | |
| Y2 | VCCIO6 | 6 | | | VCCIO6 | 6 | | |
| G2 | VCCIO7 | 7 | | | VCCIO7 | 7 | | |
| L6 | VCCIO7 | 7 | | | VCCIO7 | 7 | | |
| M10 | VCCIO7 | 7 | | | VCCIO7 | 7 | | |
| M2 | VCCIO7 | 7 | | | VCCIO7 | 7 | | |
| N9 | VCCIO7 | 7 | | | VCCIO7 | 7 | | |
| AC24 | VCCIO8 | 8 | | | VCCIO8 | 8 | | |
| U17 | VCCIO8 | 8 | | | VCCIO8 | 8 | | |
| J11 | VCCAUX | - | | | VCCAUX | - | | |
| J12 | VCCAUX | - | | | VCCAUX | - | | |
| J15 | VCCAUX | - | | | VCCAUX | - | | |
| J16 | VCCAUX | - | | | VCCAUX | - | | |
| L18 | VCCAUX | - | | | VCCAUX | - | | |
| L9 | VCCAUX | - | | | VCCAUX | - | | |
| M18 | VCCAUX | - | | | VCCAUX | - | | |
| M9 | VCCAUX | - | | | VCCAUX | - | | |
| R18 | VCCAUX | - | | | VCCAUX | - | | |
| R9 | VCCAUX | - | | | VCCAUX | - | | |

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

| LFE2M100E/SE | | | | |
|---|---|---|---|---|
| **Ball Number** | **Ball/Pad Function** | **Bank** | **Dual Function** | **Differential** |
| K26 | PR26A | 2 | RDQ23 | T |
| K23 | PR25B | 2 | RDQ23 | C (LVDS)* |
| K22 | PR25A | 2 | RDQ23 | T (LVDS)* |
| J22 | PR24B | 2 | RDQ23 | C |
| VCCIO | VCCIO2 | 2 | | |
| J23 | PR24A | 2 | RDQ23 | T |
| GNDIO | GNDIO2 | - | | |
| VCCIO | VCCIO2 | 2 | | |
| J26 | PR17B | 2 | RDQ15 | C (LVDS)* |
| H26 | PR17A | 2 | RDQ15 | T (LVDS)* |
| H27 | PR16B | 2 | RDQ15 | C |
| G26 | PR16A | 2 | RDQ15 | T |
| VCCIO | VCCIO2 | 2 | | |
| H23 | PR15B | 2 | RDQ15 | C (LVDS)* |
| H24 | PR15A | 2 | RDQS15 | T (LVDS)* |
| D28 | PR14B | 2 | RDQ15 | C |
| GNDIO | GNDIO2 | - | | |
| E28 | PR14A | 2 | RDQ15 | T |
| G24 | PR13B | 2 | RDQ15 | C (LVDS)* |
| H25 | PR13A | 2 | RDQ15 | T (LVDS)* |
| D27 | PR12B | 2 | RUM0_SPLLC_FB_A/RDQ15 | C |
| VCCIO | VCCIO2 | 2 | | |
| E27 | PR12A | 2 | RUM0_SPLLT_FB_A/RDQ15 | T |
| F26 | PR11B | 2 | RUM0_SPLLC_IN_A/RDQ15 | C (LVDS)* |
| G25 | PR11A | 2 | RUM0_SPLLT_IN_A/RDQ15 | T (LVDS)* |
| F24 | PR9B | 2 | VREF2_2 | C |
| - | - | - | | |
| GNDIO | GNDIO2 | - | | |
| F25 | PR9A | 2 | VREF1_2 | T |
| VCCIO | VCCIO2 | 2 | | |
| G23 | XRES | 1 | | |
| C30 | URC_SQ_VCCRX0 | 12 | | |
| A29 | URC_SQ_HDINP0 | 12 | | T |
| B30 | URC_SQ_VCCIB0 | 12 | | |
| B29 | URC_SQ_HDINN0 | 12 | | C |
| C27 | URC_SQ_VCCTX0 | 12 | | |
| A26 | URC_SQ_HDOUTP0 | 12 | | T |
| A27 | URC_SQ_VCCOB0 | 12 | | |
| B26 | URC_SQ_HDOUTN0 | 12 | | C |
| C26 | URC_SQ_VCCTX1 | 12 | | |
| B25 | URC_SQ_HDOUTN1 | 12 | | C |
| C25 | URC_SQ_VCCOB1 | 12 | | |
| A25 | URC_SQ_HDOUTP1 | 12 | | T |

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

| LFE2M70E/SE | | | | LFE2M100E/SE | | | | |
|---|---|---|---|---|---|---|---|---|
| Ball Number | Ball/Pad Function | Bank | Dual Function | Differential | Ball/Pad Function | Bank | Dual Function | Differential |
| AA25 | PR74B | 3 | RDQ73 | C | PR82B | 3 | RDQ81 | C |
| VCCIO | VCCIO3 | 3 | | | VCCIO3 | 3 | | |
| AC24 | PR74A | 3 | RDQ73 | T | PR82A | 3 | RDQ81 | T |
| AC33 | PR73B | 3 | RDQ73 | C (LVDS)* | PR81B | 3 | RDQ81 | C (LVDS)* |
| AC34 | PR73A | 3 | RDQS73 | T (LVDS)* | PR81A | 3 | RDQS81 | T (LVDS)* |
| GNDIO | GNDIO3 | - | | | GNDIO3 | - | | |
| AB24 | PR72B | 3 | RDQ73 | C | PR80B | 3 | RDQ81 | C |
| Y26 | PR72A | 3 | RDQ73 | T | PR80A | 3 | RDQ81 | T |
| AB33 | PR71B | 3 | RDQ73 | C (LVDS)* | PR79B | 3 | RDQ81 | C (LVDS)* |
| AB34 | PR71A | 3 | RDQ73 | T (LVDS)* | PR79A | 3 | RDQ81 | T (LVDS)* |
| VCCIO | VCCIO3 | 3 | | | VCCIO3 | 3 | | |
| Y27 | PR70B | 3 | RDQ73 | C | PR78B | 3 | RDQ81 | C |
| AB29 | PR70A | 3 | RDQ73 | T | PR78A | 3 | RDQ81 | T |
| AA34 | PR69B | 3 | RDQ73 | C (LVDS)* | PR77B | 3 | RDQ81 | C (LVDS)* |
| AA33 | PR69A | 3 | RDQ73 | T (LVDS)* | PR77A | 3 | RDQ81 | T (LVDS)* |
| AA31 | PR67B | 3 | RDQ64 | C | PR75B | 3 | RDQ72 | C |
| AA32 | PR67A | 3 | RDQ64 | T | PR75A | 3 | RDQ72 | T |
| GNDIO | GNDIO3 | - | | | GNDIO3 | - | | |
| AA28 | PR66B | 3 | RDQ64 | C (LVDS)* | PR74B | 3 | RDQ72 | C (LVDS)* |
| AA29 | PR66A | 3 | RDQ64 | T (LVDS)* | PR74A | 3 | RDQ72 | T (LVDS)* |
| AA30 | PR65B | 3 | RDQ64 | C | PR73B | 3 | RDQ72 | C |
| AB30 | PR65A | 3 | RDQ64 | T | PR73A | 3 | RDQ72 | T |
| VCCIO | VCCIO3 | 3 | | | VCCIO3 | 3 | | |
| Y28 | PR64B | 3 | RDQ64 | C (LVDS)* | PR72B | 3 | RDQ72 | C (LVDS)* |
| Y29 | PR64A | 3 | RDQS64 | T (LVDS)* | PR72A | 3 | RDQS72 | T (LVDS)* |
| AA24 | PR63B | 3 | RDQ64 | C | PR71B | 3 | RDQ72 | C |
| GNDIO | GNDIO3 | - | | | GNDIO3 | - | | |
| Y25 | PR63A | 3 | RDQ64 | T | PR71A | 3 | RDQ72 | T |
| Y31 | PR62B | 3 | RDQ64 | C (LVDS)* | PR70B | 3 | RDQ72 | C (LVDS)* |
| Y30 | PR62A | 3 | RDQ64 | T (LVDS)* | PR70A | 3 | RDQ72 | T (LVDS)* |
| Y24 | PR61B | 3 | RDQ64 | C | PR69B | 3 | RDQ72 | C |
| VCCIO | VCCIO3 | 3 | | | VCCIO3 | 3 | | |
| W25 | PR61A | 3 | RDQ64 | T | PR69A | 3 | RDQ72 | T |
| Y33 | PR60B | 3 | RDQ64 | C (LVDS)* | PR68B | 3 | RDQ72 | C (LVDS)* |
| Y34 | PR60A | 3 | RDQ64 | T (LVDS)* | PR68A | 3 | RDQ72 | T (LVDS)* |
| W28 | PR58B | 3 | RLM3_SPLLC_FB_A/RDQ55 | C | PR66B | 3 | RLM4_SPLLC_FB_A/RDQ63 | C |
| GNDIO | GNDIO3 | - | | | GNDIO3 | - | | |
| V26 | PR58A | 3 | RLM3_SPLLT_FB_A/RDQ55 | T | PR66A | 3 | RLM4_SPLLT_FB_A/RDQ63 | T |
| V28 | PR57B | 3 | RLM3_SPLLC_IN_A/RDQ55 | C (LVDS)* | PR65B | 3 | RLM4_SPLLC_IN_A/RDQ63 | C (LVDS)* |
| V27 | PR57A | 3 | RLM3_SPLLT_IN_A/RDQ55 | T (LVDS)* | PR65A | 3 | RLM4_SPLLT_IN_A/RDQ63 | T (LVDS)* |
| V25 | PR56B | 3 | RDQ55 | C | PR64B | 3 | RDQ63 | C |
| VCCIO | VCCIO3 | 3 | | | VCCIO3 | 3 | | |
| W24 | PR56A | 3 | RDQ55 | T | PR64A | 3 | RDQ63 | T |
| W33 | PR55B | 3 | RDQ55 | C (LVDS)* | PR63B | 3 | RDQ63 | C (LVDS)* |
| W34 | PR55A | 3 | RDQS55 | T (LVDS)* | PR63A | 3 | RDQS63 | T (LVDS)* |
| GNDIO | GNDIO3 | - | | | GNDIO3 | - | | |
| V24 | PR54B | 3 | RDQ55 | C | PR62B | 3 | RDQ63 | C |
| U26 | PR54A | 3 | RDQ55 | T | PR62A | 3 | RDQ63 | T |
| W29 | PR53B | 3 | RDQ55 | C (LVDS)* | PR61B | 3 | RDQ63 | C (LVDS)* |

| Part Number | I/Os | Voltage | Grade | Package | Pins | Temp. | LUTs (K) |
|---|---|---|---|---|---|---|---|
| LFE2-20E-5Q208I | 131 | 1.2V | -5 | PQFP | 208 | IND | 20 |
| LFE2-20E-6Q208I | 131 | 1.2V | -6 | PQFP | 208 | IND | 20 |
| LFE2-20E-5F256I | 193 | 1.2V | -5 | fpBGA | 256 | IND | 20 |
| LFE2-20E-6F256I | 193 | 1.2V | -6 | fpBGA | 256 | IND | 20 |
| LFE2-20E-5F484I | 331 | 1.2V | -5 | fpBGA | 484 | IND | 20 |
| LFE2-20E-6F484I | 331 | 1.2V | -6 | fpBGA | 484 | IND | 20 |
| LFE2-20E-5F672I | 402 | 1.2V | -5 | fpBGA | 672 | IND | 20 |
| LFE2-20E-6F672I | 402 | 1.2V | -6 | fpBGA | 672 | IND | 20 |

| Part Number | I/Os | Voltage | Grade | Package | Pins | Temp. | LUTs (K) |
|---|---|---|---|---|---|---|---|
| LFE2-35E-5F484I | 331 | 1.2V | -5 | fpBGA | 484 | IND | 35 |
| LFE2-35E-6F484I | 331 | 1.2V | -6 | fpBGA | 484 | IND | 35 |
| LFE2-35E-5F672I | 450 | 1.2V | -5 | fpBGA | 672 | IND | 35 |
| LFE2-35E-6F672I | 450 | 1.2V | -6 | fpBGA | 672 | IND | 35 |

| Part Number | I/Os | Voltage | Grade | Package | Pins | Temp. | LUTs (K) |
|---|---|---|---|---|---|---|---|
| LFE2-50E-5F484I | 339 | 1.2V | -5 | fpBGA | 484 | IND | 50 |
| LFE2-50E-6F484I | 339 | 1.2V | -6 | fpBGA | 484 | IND | 50 |
| LFE2-50E-5F672I | 500 | 1.2V | -5 | fpBGA | 672 | IND | 50 |
| LFE2-50E-6F672I | 500 | 1.2V | -6 | fpBGA | 672 | IND | 50 |

| Part Number | I/Os | Voltage | Grade | Package | Pins | Temp. | LUTs (K) |
|---|---|---|---|---|---|---|---|
| LFE2-70E-5F672I | 500 | 1.2V | -5 | fpBGA | 672 | IND | 70 |
| LFE2-70E-6F672I | 500 | 1.2V | -6 | fpBGA | 672 | IND | 70 |
| LFE2-70E-5F900I | 583 | 1.2V | -5 | fpBGA | 900 | IND | 70 |
| LFE2-70E-6F900I | 583 | 1.2V | -6 | fpBGA | 900 | IND | 70 |

**Industrial**

| Part Number | I/Os | Voltage | Grade | Package | Pins | Temp. | LUTs (K) |
|---|---|---|---|---|---|---|---|
| LFE2M20SE-5F484I | 304 | 1.2V | -5 | fpBGA | 484 | Ind | 20 |
| LFE2M20SE-6F484I | 304 | 1.2V | -6 | fpBGA | 484 | Ind | 20 |
| LFE2M20SE-5F256I | 140 | 1.2V | -5 | fpBGA | 256 | Ind | 20 |
| LFE2M20SE-6F256I | 140 | 1.2V | -6 | fpBGA | 256 | Ind | 20 |

| Part Number | I/Os | Voltage | Grade | Package | Pins | Temp. | LUTs (K) |
|---|---|---|---|---|---|---|---|
| LFE2M35SE-5F672I | 410 | 1.2V | -5 | fpBGA | 672 | Ind | 35 |
| LFE2M35SE-6F672I | 410 | 1.2V | -6 | fpBGA | 672 | Ind | 35 |
| LFE2M35SE-5F484I | 303 | 1.2V | -5 | fpBGA | 484 | Ind | 35 |
| LFE2M35SE-6F484I | 303 | 1.2V | -6 | fpBGA | 484 | Ind | 35 |
| LFE2M35SE-5F256I | 140 | 1.2V | -5 | fpBGA | 256 | Ind | 35 |
| LFE2M35SE-6F256I | 140 | 1.2V | -6 | fpBGA | 256 | Ind | 35 |

| Part Number | I/Os | Voltage | Grade | Package | Pins | Temp. | LUTs (K) |
|---|---|---|---|---|---|---|---|
| LFE2M50SE-5F900I | 410 | 1.2V | -5 | fpBGA | 900 | Ind | 50 |
| LFE2M50SE-6F900I | 410 | 1.2V | -6 | fpBGA | 900 | Ind | 50 |
| LFE2M50SE-5F672I | 372 | 1.2V | -5 | fpBGA | 672 | Ind | 50 |
| LFE2M50SE-6F672I | 372 | 1.2V | -6 | fpBGA | 672 | Ind | 50 |
| LFE2M50SE-5F484I | 270 | 1.2V | -5 | fpBGA | 484 | Ind | 50 |
| LFE2M50SE-6F484I | 270 | 1.2V | -6 | fpBGA | 484 | Ind | 50 |

| Part Number | I/Os | Voltage | Grade | Package | Pins | Temp. | LUTs (K) |
|---|---|---|---|---|---|---|---|
| LFE2M70SE-5F1152I | 436 | 1.2V | -5 | fpBGA | 1152 | Ind | 70 |
| LFE2M70SE-6F1152I | 436 | 1.2V | -6 | fpBGA | 1152 | Ind | 70 |
| LFE2M70SE-5F900I | 416 | 1.2V | -5 | fpBGA | 900 | Ind | 70 |
| LFE2M70SE-6F900I | 416 | 1.2V | -6 | fpBGA | 900 | Ind | 70 |

| Part Number | I/Os | Voltage | Grade | Package | Pins | Temp. | LUTs (K) |
|---|---|---|---|---|---|---|---|
| LFE2M100SE-5F1152I | 520 | 1.2V | -5 | fpBGA | 1152 | Ind | 100 |
| LFE2M100SE-6F1152I | 520 | 1.2V | -6 | fpBGA | 1152 | Ind | 100 |
| LFE2M100SE-5F900I | 416 | 1.2V | -5 | fpBGA | 900 | Ind | 100 |
| LFE2M100SE-6F900I | 416 | 1.2V | -6 | fpBGA | 900 | Ind | 100 |

## LatticeECP2M S-Series Devices, Lead-Free Packaging

**Commercial**

| Part Number | I/Os | Voltage | Grade | Package | Pins | Temp. | LUTs (K) |
|---|---|---|---|---|---|---|---|
| LFE2M20SE-5FN484C | 304 | 1.2V | -5 | Lead-Free fpBGA | 484 | Com | 20 |
| LFE2M20SE-6FN484C | 304 | 1.2V | -6 | Lead-Free fpBGA | 484 | Com | 20 |
| LFE2M20SE-7FN484C | 304 | 1.2V | -7 | Lead-Free fpBGA | 484 | Com | 20 |
| LFE2M20SE-5FN256C | 140 | 1.2V | -5 | Lead-Free fpBGA | 256 | Com | 20 |
| LFE2M20SE-6FN256C | 140 | 1.2V | -6 | Lead-Free fpBGA | 256 | Com | 20 |
| LFE2M20SE-7FN256C | 140 | 1.2V | -7 | Lead-Free fpBGA | 256 | Com | 20 |

| Part Number | I/Os | Voltage | Grade | Package | Pins | Temp. | LUTs (K) |
|---|---|---|---|---|---|---|---|
| LFE2M35SE-5FN672C | 410 | 1.2V | -5 | Lead-Free fpBGA | 672 | Com | 35 |
| LFE2M35SE-6FN672C | 410 | 1.2V | -6 | Lead-Free fpBGA | 672 | Com | 35 |
| LFE2M35SE-7FN672C | 410 | 1.2V | -7 | Lead-Free fpBGA | 672 | Com | 35 |
| LFE2M35SE-5FN484C | 303 | 1.2V | -5 | Lead-Free fpBGA | 484 | Com | 35 |
| LFE2M35SE-6FN484C | 303 | 1.2V | -6 | Lead-Free fpBGA | 484 | Com | 35 |
| LFE2M35SE-7FN484C | 303 | 1.2V | -7 | Lead-Free fpBGA | 484 | Com | 35 |
| LFE2M35SE-5FN256C | 140 | 1.2V | -5 | Lead-Free fpBGA | 256 | Com | 35 |
| LFE2M35SE-6FN256C | 140 | 1.2V | -6 | Lead-Free fpBGA | 256 | Com | 35 |
| LFE2M35SE-7FN256C | 140 | 1.2V | -7 | Lead-Free fpBGA | 256 | Com | 35 |

| Part Number | I/Os | Voltage | Grade | Package | Pins | Temp. | LUTs (K) |
|---|---|---|---|---|---|---|---|
| LFE2M50SE-5FN900C | 410 | 1.2V | -5 | Lead-Free fpBGA | 900 | Com | 50 |
| LFE2M50SE-6FN900C | 410 | 1.2V | -6 | Lead-Free fpBGA | 900 | Com | 50 |
| LFE2M50SE-7FN900C | 410 | 1.2V | -7 | Lead-Free fpBGA | 900 | Com | 50 |
| LFE2M50SE-5FN672C | 372 | 1.2V | -5 | Lead-Free fpBGA | 672 | Com | 50 |
| LFE2M50SE-6FN672C | 372 | 1.2V | -6 | Lead-Free fpBGA | 672 | Com | 50 |
| LFE2M50SE-7FN672C | 372 | 1.2V | -7 | Lead-Free fpBGA | 672 | Com | 50 |
| LFE2M50SE-5FN484C | 270 | 1.2V | -5 | Lead-Free fpBGA | 484 | Com | 50 |
| LFE2M50SE-6FN484C | 270 | 1.2V | -6 | Lead-Free fpBGA | 484 | Com | 50 |
| LFE2M50SE-7FN484C | 270 | 1.2V | -7 | Lead-Free fpBGA | 484 | Com | 50 |

| Part Number | I/Os | Voltage | Grade | Package | Pins | Temp. | LUTs (K) |
|---|---|---|---|---|---|---|---|
| LFE2M70SE-5FN1152C | 436 | 1.2V | -5 | Lead-Free fpBGA | 1152 | Com | 70 |
| LFE2M70SE-6FN1152C | 436 | 1.2V | -6 | Lead-Free fpBGA | 1152 | Com | 70 |
| LFE2M70SE-7FN1152C | 436 | 1.2V | -7 | Lead-Free fpBGA | 1152 | Com | 70 |
| LFE2M70SE-5FN900C | 416 | 1.2V | -5 | Lead-Free fpBGA | 900 | Com | 70 |
| LFE2M70SE-6FN900C | 416 | 416 | -6 | Lead-Free fpBGA | 900 | Com | 70 |
| LFE2M70SE-7FN900C | 416 | 416 | -7 | Lead-Free fpBGA | 900 | Com | 70 |