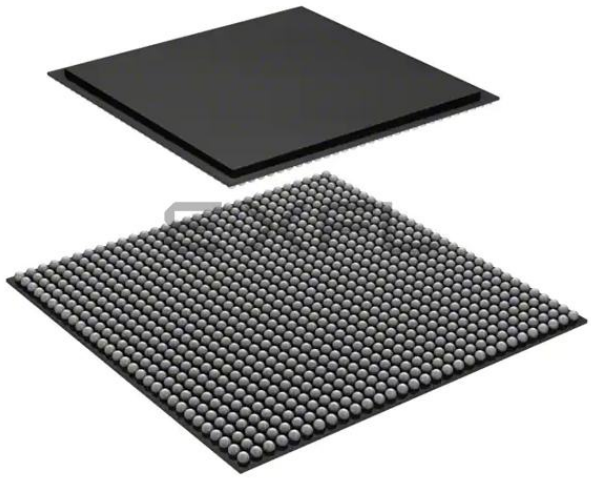
Lattice Semiconductor Corporation - LFE2-70E-7FN900C Datasheet



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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	8500
Number of Logic Elements/Cells	68000
Total RAM Bits	1056768
Number of I/O	583
Number of Gates	-
Voltage - Supply	1.14V ~ 1.26V
Mounting Type	Surface Mount
Operating Temperature	0°C ~ 85°C (TJ)
Package / Case	900-BBGA
Supplier Device Package	900-FPBGA (31x31)
Purchase URL	https://www.e-xfl.com/product-detail/lattice-semiconductor/lfe2-70e-7fn900c

Table 1-2. LatticeECP2M (Including "S-Series") Family Selection

Device	ECP2M20	ECP2M35	ECP2M50	ECP2M70	ECP2M100
LUTs (K)	19	34	48	67	95
sysMEM Blocks (18kb)	66	114	225	246	288
Embedded Memory (Kbits)	1217	2101	4147	4534	5308
Distributed Memory (Kbits)	41	71	101	145	202
sysDSP Blocks	6	8	22	24	42
18x18 Multipliers	24	32	88	96	168
GPLL+SPLL+DLL	2+6+2	2+6+2	2+6+2	2+6+2	2+6+2
Maximum Available I/O	304	410	410	436	520
Packages and SERDES / I/O Combinations					
256-ball fpBGA (17 x 17 mm)	4 / 140	4 / 140			
484-ball fpBGA (23 x 23 mm)	4 / 304	4 / 303	4 / 270		
672-ball fpBGA (27 x 27 mm)		4 / 410	8 / 372		
900-ball fpBGA (31 x 31 mm)			8 / 410	16 / 416	16 / 416
1152-ball fpBGA (35 x 35 mm)				16 / 436	16 / 520

Introduction

The LatticeECP2/M family of FPGA devices is optimized to deliver high performance features such as advanced DSP blocks, high speed SERDES (LatticeECP2M family only) and high speed source synchronous interfaces in an economical FPGA fabric. This combination was achieved through advances in device architecture and the use of 90nm technology.

The LatticeECP2/M FPGA fabric is optimized with high performance and low cost in mind. The LatticeECP2/M devices include LUT-based logic, distributed and embedded memory, Phase Locked Loops (PLLs), Delay Locked Loops (DLLs), pre-engineered source synchronous I/O support, enhanced sysDSP blocks and advanced configuration support, including encryption ("S" versions only) and dual boot capabilities.

The LatticeECP2M device family features high speed SERDES with PCS. These high jitter tolerance and low transmission jitter SERDES with PCS blocks can be configured to support an array of popular data protocols including PCI Express, Ethernet (1GbE and SGMII), OBSAI and CPRI. Transmit Pre-emphasis and Receive Equalization settings make SERDES suitable for chip to chip and small form factor backplane applications.

Lattice Diamond® design software allows large complex designs to be efficiently implemented using the LatticeECP2/M FPGA family. Synthesis library support for LatticeECP2/M is available for popular logic synthesis tools. The Diamond software uses the synthesis tool output along with the constraints from its floor planning tools to place and route the design in the LatticeECP2/M device. The Diamond design tool extracts the timing from the routing and back-annotates it into the design for timing verification.

Lattice provides many pre-engineered IP (Intellectual Property) modules for the LatticeECP2/M family. By using these IP cores as standardized blocks, designers are free to concentrate on the unique aspects of their design, increasing their productivity.

Figure 2-1. Simplified Block Diagram, ECP2-6 Device (Top Level)

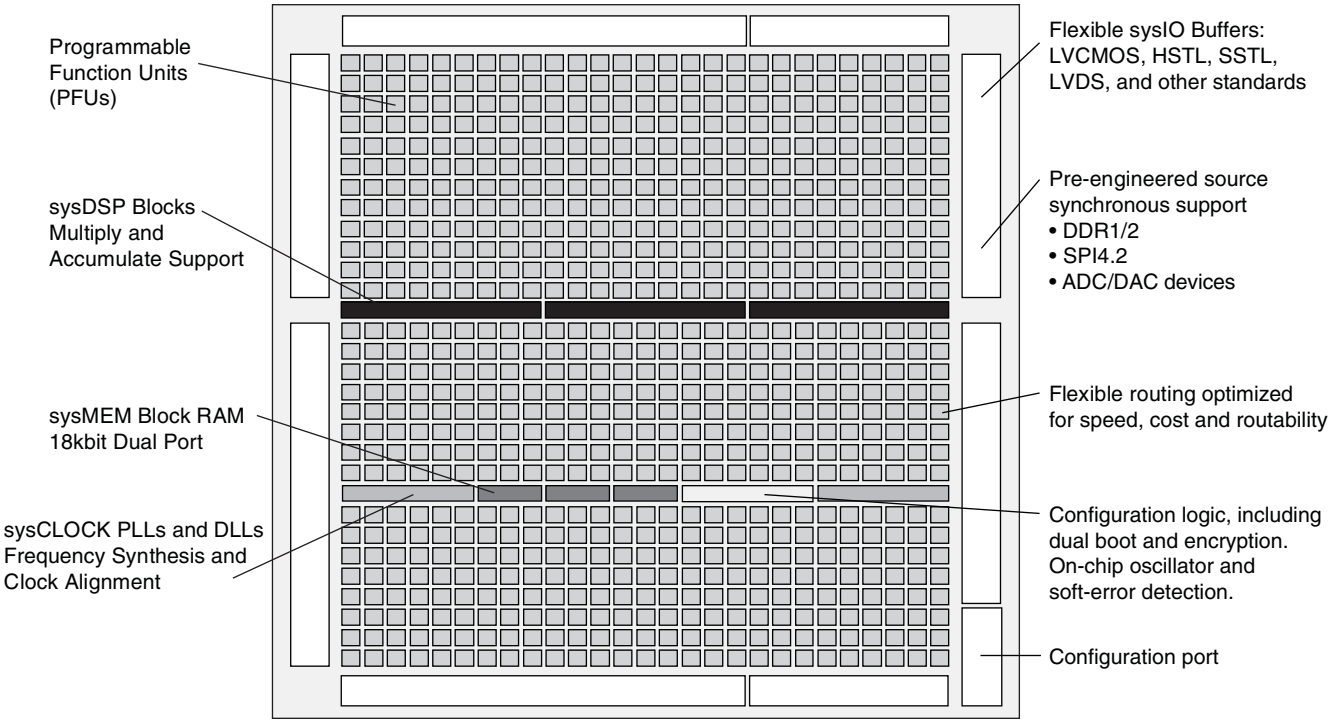
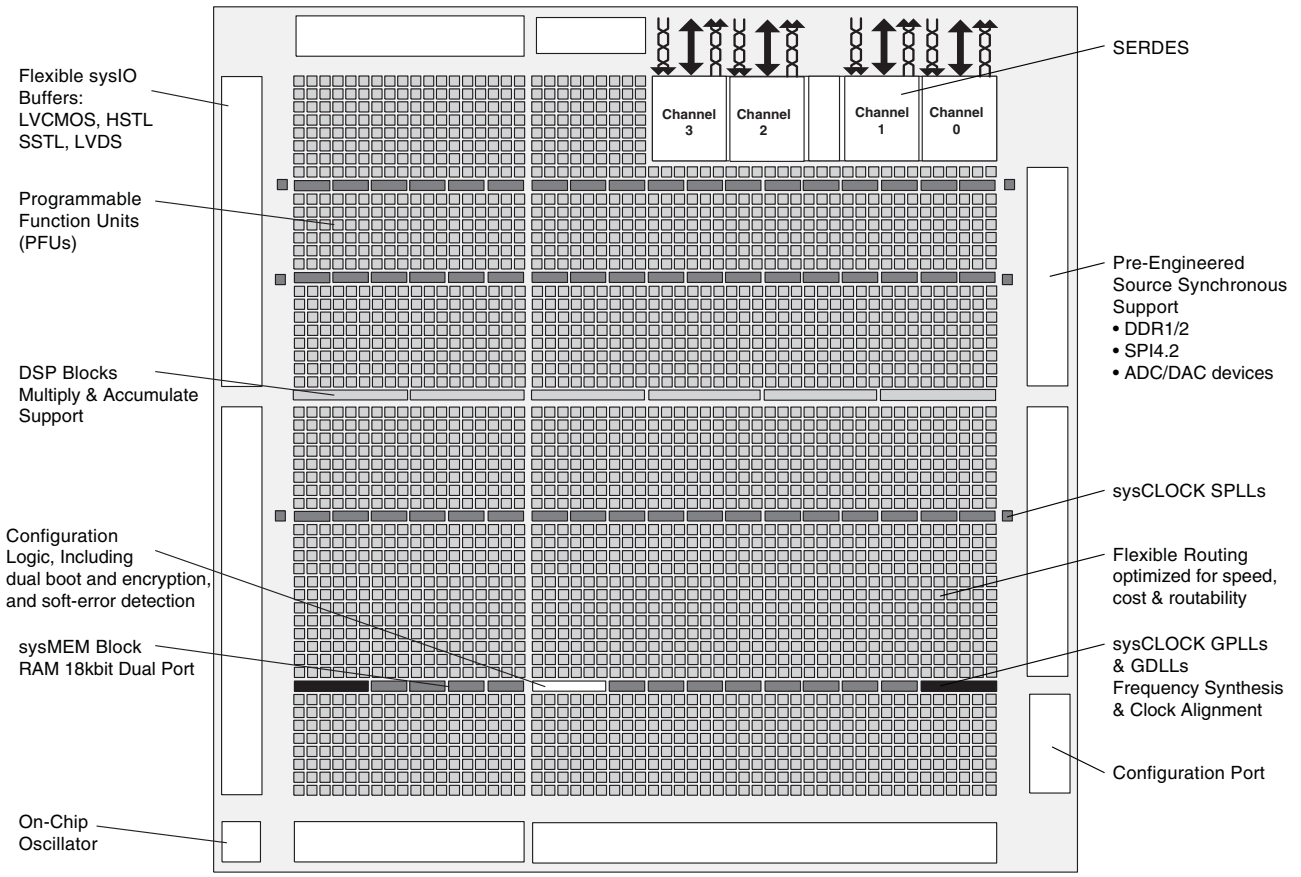


Figure 2-2. Simplified Block Diagram, ECP2M20 Device (Top Level)



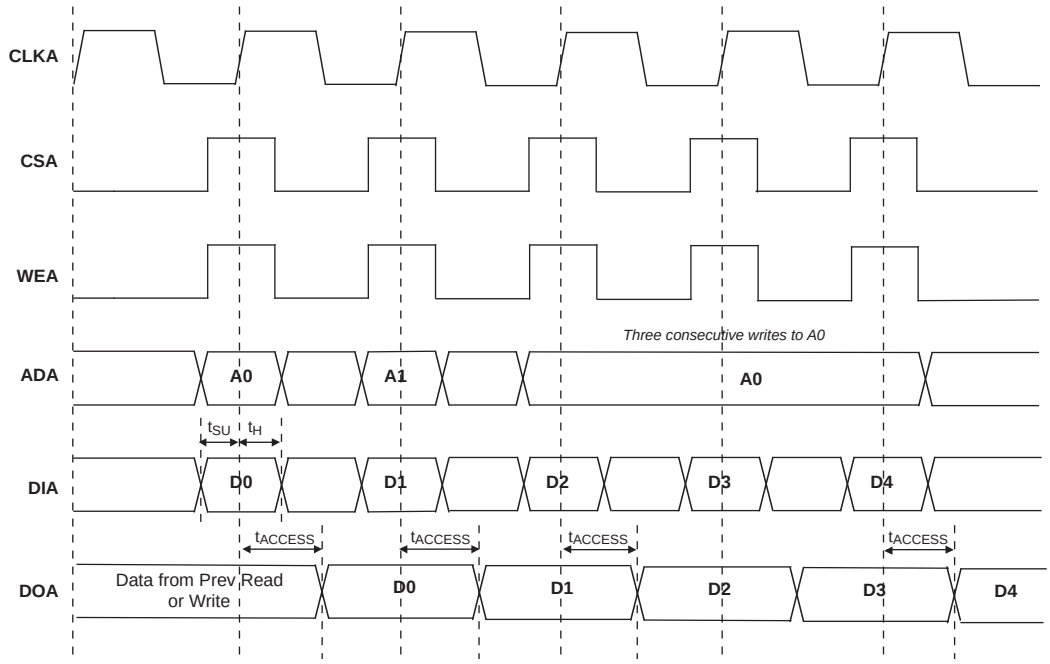
LatticeECP2M Initialization Supply Current[1, 2, 3, 4]

Over Recommended Operating Conditions

Symbol	Parameter	Device	Typ.[5, 6, 7]	Units
I_{CC}	Core Power Supply Current	ECP2M20	41	mA
		ECP2M35	107	mA
		ECP2M50	169	mA
		ECP2M70	254	mA
		ECP2M100	378	mA
I_{CCAUX}	Auxiliary Power Supply Current	ECP2M20	30	mA
		ECP2M35	30	mA
		ECP2M50	30	mA
		ECP2M70	30	mA
		ECP2M100	30	mA
I_{CCGPLL}	GPLL Power Supply Current (per GPLL)	All Devices	0.5	mA
I_{CCSPLL}	SPLL Power Supply Current (per SPLL)	All Devices	0.5	mA
I_{CCIO}	Bank Power Supply Current (per Bank)	All Devices	3	mA
I_{CCJ}	VCCJ Power Supply Current	All Devices	4	mA

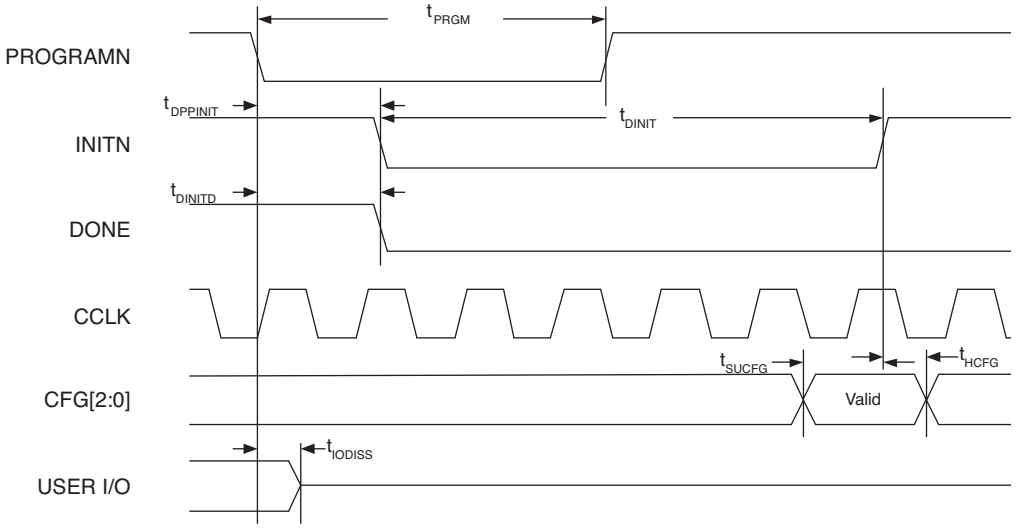
1. Until DONE signal is active.
2. For further information about supply current, please see the list of additional technical documentation at the end of this data sheet.
3. Assumes all outputs are tristated, all inputs are configured as LVCMOS and held at the V_{CCIO} or GND.
4. Frequency 0MHz.
5. T_J = 25ºC, power supplies at nominal voltage.
6. A specific configuration pattern is used that scales with the size of the device; consists of 75% PFU utilization, 50% EBR, and 25% I/O configuration.
7. Values shown in this column are the typical average DC current during configuration. Use the Power Calculator tool to find the peak startup current.

Figure 3-11. Write Through (SP Read/Write on Port A, Input Registers Only)



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 3-18. Configuration from PROGRAMN Timing



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

Figure 3-19. Wake-Up Timing

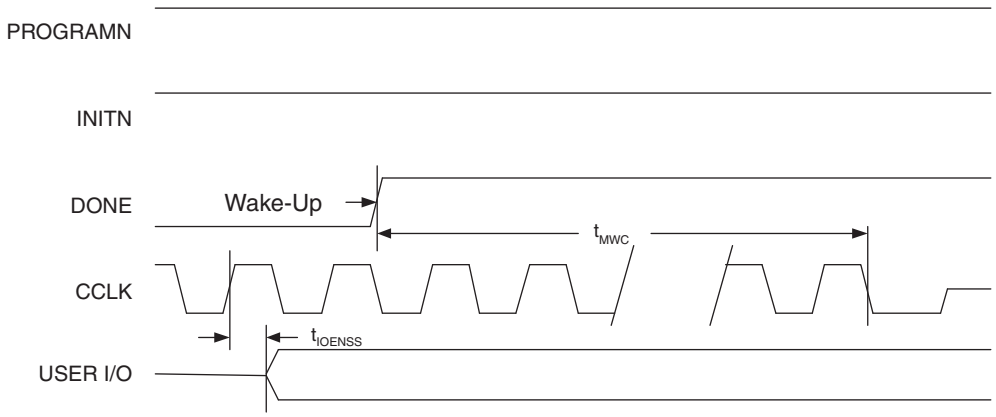
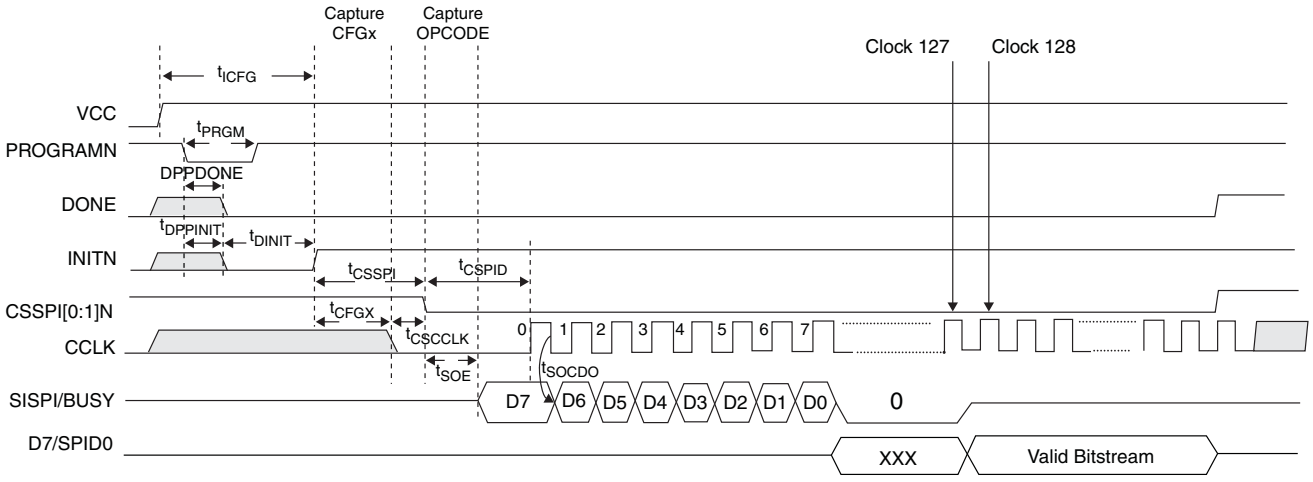


Figure 3-20. SPI/SPIm Configuration Waveforms



LatticeECP2M Power Supply and NC (Cont.)

Signal	672 fpBGA	900 fpBGA
V_{CC}	**LFE2M35:** AD13, AD14, AD16, AD17, AD19, AD21, AD22, AD24, AD25, L12, L13, L14, L15, M11, M12, M15, M16, N11, N16, P11, P16, R11, R12, R15, R16, T12, T13, T14, T15 **LFE2M50:** L12, L13, L14, L15, M11, M12, M15, M16, N11, N16, P11, P16, R11, R12, R15, R16, T12, T13, T14, T15	**LFE2M50:** AH1, AH4, AH5, AH2, AH7, AH12, AH9, AH10, AH13, C13, C10, C9, C12, C7, C2, C5, C4, C1, L12, L13, L18, L19, M11, M12, M13, M14, M15, M16, M17, M18, M19, M20, N11, N12, N19, N20, P12, P19, R12, R19, T12, T19, U12, U19, V11, V12, V19, V20, W11, W12, W13, W14, W15, W16, W17, W18, W19, W20, Y12, Y13, Y18, Y19 **LFE2M70/LFE2M100:** L12, L13, L18, L19, M11, M12, M13, M14, M15, M16, M17, M18, M19, M20, N11, N12, N19, N20, P12, P19, R12, R19, T12, T19, U12, U19, V11, V12, V19, V20, W11, W12, W13, W14, W15, W16, W17, W18, W19, W20, Y12, Y13, Y18, Y19
V_{CCIO0}	B12, B7, F11, J13, K12	D14, E6, E9, F12, K12, K13
V_{CCIO1}	D18, F16, J14, K15	D17, E22, E25, F19, K18, K19
V_{CCIO2}	G25, L21, M17, M25, N18	F28, J25, K28, M21, M24, N21, N28, P21, R25
V_{CCIO3}	P18, R17, R25, T21, Y25	AA28, AB25, AE28, T25, U21, V21, V28, W21, W24
V_{CCIO4}	AA16, AC18, U15, V14	AA18, AA19, AE19, AF22, AG17, AG25
V_{CCIO5}	AA11, AE12, AE7, U12, V13	AA12, AA13, AE12, AF9, AG14, AG6
V_{CCIO6}	P9, R10, R2, T6, Y2	AA3, AB6, AE3, T6, U10, V10, V3, W10, W7
V_{CCIO7}	G2, L6, M10, M2, N9	F3, J6, K3, M10, M7, N10, N3, P10, R6
V_{CCIO8}	AC24, U17	AA25, AD28
V_{CCJ}	AA7	AG1
V_{CCAUX}	**LFE2M35:** AE19, J11, J12, J15, J16, L18, L9, M18, M9, R18, R9, T18, T9, V11, V12, V15, V16 **LFE2M50:** J11, J12, J15, J16, L18, L9, M18, M9, R18, R9, T18, T9, V11, V12, V15, V16	**LFE2M50:** AJ7, B7, AA10, AA11, AA20, AA21, K10, K11, K20, K21, L10, L11, L20, L21, Y10, Y11, Y20, Y21 **LFE2M70/LFE2M100:** AA10, AA11, AA20, AA21, K10, K11, K20, K21, L10, L11, L20, L21, Y10, Y11, Y20, Y21
V_{CCPLL}	H7, K6, P7, R8, V18, P20, J17, G19	N13, N18, V13, V18
SERDES Power[3]	**LFE2M35:** C25, B25, C22, A22, C21, C20, C24, C23, B19, C19, C15, C14, C18, C17, A16, C16, B13, C13 **LFE2M50:** AD13, AE13, AD16, AF16, AD17, AD18, AD14, AD15, AD19, AE19, AD23, AD24, AD20, AD21, AF22, AD22, AE25, AD25, C25, B25, C22, A22, C21, C20, C24, C23, B19, C19, C15, C14, C18, C17, A16, C16, B13, C13	**LFE2M50:** AH18, AJ18, AH21, AK21, AH22, AH23, AH19, AH20, AH24, AJ24, AH28, AH29, AH25, AH26, AK27, AH27, AJ30, AH30, C30, B30, C27, A27, C26, C25, C29, C28, B24, C24, C20, C19, C23, C22, A21, C21, B18, C18 **LFE2M70/LFE2M100:** C13, B13, C10, A10, C9, C8, C12, C11, B7, C7, C3, C2, C6, C5, A4, C4, B1, C1, C30, B30, C27, A27, C26, C25, C29, C28, B24, C24, C20, C19, C23, C22, A21, C21, B18, C18, AH18, AJ18, AH21, AK21, AH22, AH23, AH19, AH20, AH24, AJ24, AH28, AH29, AH25, AH26, AK27, AH27, AJ30, AH30, AH1, AJ1, AH4, AK4, AH5, AH6, AH2, AH3, AH7, AJ7, AH11, AH12, AH8, AH9, AK10, AH10, AJ13, AH13

LatticeECP2M Power Supply and NC (Cont.)

Signal	672 fpBGA	900 fpBGA
GND[1]	A13, A19, A2, A25, AA2, AA25, AB18, AB22, AB5, AB9, AE1, AE11, AE16, AE22, AE26, AE6, AF13, AF19, AF2, AF25, B1, B11, B16, B22, B26, B6, E18, E22, E5, E9, F2, F25, G11, G16, J22, J5, K11, K13, K14, K16, L10, L11, L16, L17, L2, L20, L25, L7, M13, M14, N10, N12, N13, N14, N15, N17, P10, P12, P13, P14, P15, P17, R13, R14, T10, T11, T16, T17, T2, T20, T25, T7, U11, U13, U14, U16, V22, V5, Y11, Y16	**LFE2M50:** A1, A13, A18, A24, A30, A7, AA14, AA15, AA16, AA17, AA24, AA27, AA4, AB24, AB7, AD12, AD19, AD27, AE22, AE27, AE4, AE9, AF14, AF17, AF25, AF6, AJ10, AJ21, AJ27, AJ4, AK1, AK13, AK18, AK24, AK30, AK7, B10, B21, B27, B4, D25, D6, E14, E17, F22, F27, F4, F9, G12, G19, J24, J7, K14, K15, K16, K17, K27, K4, L14, L15, L16, L17, M23, M8, N14, N15, N16, N17, N27, N4, P11, P13, P14, P15, P16, P17, P18, P20, R10, R11, R13, R14, R15, R16, R17, R18, R20, R21, R24, R7, T10, T11, T13, T14, T15, T16, T17, T18, T20, T21, T24, T7, U11, U13, U14, U15, U16, U17, U18, U20, V14, V15, V16, V17, V27, V4, W23, W8, Y14, Y15, Y16, Y17 **LFE2M70/LFE2M100:** A1, A13, A18, A24, A30, A7, AA14, AA15, AA16, AA17, AA24, AA27, AA4, AB24, AB7, AD12, AD19, AD27, AE22, AE27, AE4, AE9, AF14, AF17, AF25, AF6, AJ10, AJ21, AJ27, AJ4, AK1, AK13, AK18, AK24, AK30, AK7, B10, B21, B27, B4, D25, D6, E14, E17, F22, F27, F4, F9, G12, G19, J24, J7, K14, K15, K16, K17, K27, K4, L14, L15, L16, L17, M23, M8, N14, N15, N16, N17, N27, N4, P11, P13, P14, P15, P16, P17, P18, P20, R10, R11, R13, R14, R15, R16, R17, R18, R20, R21, R24, R7, T10, T11, T13, T14, T15, T16, T17, T18, T20, T21, T24, T7, U11, U13, U14, U15, U16, U17, U18, U20, V14, V15, V16, V17, V27, V4, W23, W8, Y14, Y15, Y16, Y17
NC[2]	**LFE2M35:** AB3, AB4, AC1, AC2, AD15, AD18, AD20, AD23, AE13, AE25, AF16, AF22, B4, B5, C26, D20, D21, D22, D23, D24, D25, D26, E20, E21, E25, E26, F20, G20, K10, K17, R4, U10, U23, V10, W7, N7, V7 **LFE2M50:** AB3, AB4, AC1, AC2, B4, B5, C26, D20, D21, D22, D23, D24, D25, D26, E20, E21, E25, E26, F20, G20, K10, K17, R4, U10, U23, V10, W7, AB21, AC20, AC21, AC22, AC23, AC25, AD26, W20	**LFE2M50:** G5, G4, K7, K8, E1, F2, F1, G3, G2, G1, L9, L7, K6, K5, L8, L6, AA1, AA2, Y3, AB1, Y9, Y8, Y7, AA7, AB2, AB3, AA5, AA6, AB4, AB5, AA8, AA9, AJ1, AK4, AH6, AH3, AH11, AH8, AK10, AJ13, AB26, AB27, Y24, Y25, AA29, Y28, Y30, Y29, W22, V22, Y27, Y26, W30, W29, W25, W26, L24, L23, D30, D29, K24, K25, J27, K26, J26, H26, H27, G26, H23, H24, D28, E28, J18, J19, H17, J17, F18, F17, B13, A10, C8, C11, C3, C6, A4, B1, AA26, AB11, AB12, AB13, AB14, AB15, AB16, AB17, AB19, AB20, AB21, AC11, AC21, AC22, AD21, AD22, AE23, AF20, AF23, AG23, AG26, F20, F23, G10, G20, G21, H19, H20, H21, H22, J20, J21, R9, U22, W9 **LFE2M70/LFE2M100:** AA26, AB10, AB11, AB12, AB13, AB14, AB15, AB16, AB17, AB19, AB20, AB21, AB9, AC10, AC11, AC21, AC22, AC8, AC9, AD21, AD22, AD4, AD5, AD6, AD7, AD8, AE23, AE5, AE6, AE7, AF20, AF23, AF5, AG23, AG26, D10, E10, E11, F10, F20, F23, F8, G10, G20, G21, G7, G8, G9, H19, H20, H21, H22, H6, H8, H9, J10, J20, J21, J9, K9, R9, U22, W9

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

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

LFE2-6E/SE					LFE2-12E/SE			
Ball Number	Ball/Pad Function	Bank	Dual Function	Differential	Ball/Pad Function	Bank	Dual Function	Differential
D5	PT2B	0	VREF2_0	C	PT2B	0	VREF2_0	C
E5	PT2A	0	VREF1_0	T	PT2A	0	VREF1_0	T
G7	VCC	-			VCC	-		
G9	VCC	-			VCC	-		
H7	VCC	-			VCC	-		
J10	VCC	-			VCC	-		
K10	VCC	-			VCC	-		
K8	VCC	-			VCC	-		
G8	VCCAUX	-			VCCAUX	-		
H10	VCCAUX	-			VCCAUX	-		
J7	VCCAUX	-			VCCAUX	-		
K9	VCCAUX	-			VCCAUX	-		
C5	VCCIO0	0			VCCIO0	0		
E7	VCCIO0	0			VCCIO0	0		
C12	VCCIO1	1			VCCIO1	1		
E10	VCCIO1	1			VCCIO1	1		
E14	VCCIO2	2			VCCIO2	2		
G12	VCCIO2	2			VCCIO2	2		
K12	VCCIO3	3			VCCIO3	3		
M14	VCCIO3	3			VCCIO3	3		
M10	VCCIO4	4			VCCIO4	4		
P12	VCCIO4	4			VCCIO4	4		
M7	VCCIO5	5			VCCIO5	5		
P5	VCCIO5	5			VCCIO5	5		
K5	VCCIO6	6			VCCIO6	6		
M3	VCCIO6	6			VCCIO6	6		
E3	VCCIO7	7			VCCIO7	7		
G5	VCCIO7	7			VCCIO7	7		
T15	VCCIO8	8			VCCIO8	8		
A1	GND	-			GND	-		
A16	GND	-			GND	-		
B12	GND	-			GND	-		
B5	GND	-			GND	-		
C8	GND	-			GND	-		
E15	GND	-			GND	-		
E2	GND	-			GND	-		
H14	GND	-			GND	-		
H8	GND	-			GND	-		
H9	GND	-			GND	-		
J3	GND	-			GND	-		
J8	GND	-			GND	-		
J9	GND	-			GND	-		
M15	GND	-			GND	-		
M2	GND	-			GND	-		
P9	GND	-			GND	-		

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
A6	PT21A	0		T	PT30A	0		T
GNDIO	GNDIO0	-			GNDIO0	-		
C7	PT17B	0		C	PT26B	0		C
D10	PT18B	0		C	PT27B	0		C
C6	PT17A	0		T	PT26A	0		T
E10	PT18A	0		T	PT27A	0		T
VCCIO	VCCIO0	0			VCCIO0	0		
F10	PT15B	0		C	PT24B	0		C
B6	PT16B	0		C	PT25B	0		C
D9	PT15A	0		T	PT24A	0		T
B5	PT16A	0		T	PT25A	0		T
GNDIO	GNDIO0	-			GNDIO0	-		
A5	PT13B	0		C	PT22B	0		C
F9	PT14B	0		C	PT23B	0		C
A4	PT13A	0		T	PT22A	0		T
E9	PT14A	0		T	PT23A	0		T
VCCIO	VCCIO0	0			VCCIO0	0		
G8	PT11B	0		C	PT20B	0		C
A3	PT12B	0		C	PT21B	0		C
E8	PT11A	0		T	PT20A	0		T
A2	PT12A	0		T	PT21A	0		T
GNDIO	GNDIO0	-			GNDIO0	-		
-	-	-			VCCIO0	0		
C3	PT10B	0		C	PT10B	0		C
B3	PT10A	0		T	PT10A	0		T
-	-	-			GNDIO0	-		
E7	PT8B	0		C	PT8B	0		C
F8	PT9B	0		C	PT9B	0		C
F7	PT8A	0		T	PT8A	0		T
D7	PT9A	0		T	PT9A	0		T
VCCIO	VCCIO0	0			VCCIO0	0		
D4	PT6B	0		C	PT6B	0		C
D5	PT7B	0		C	PT7B	0		C
C4	PT6A	0		T	PT6A	0		T
D6	PT7A	0		T	PT7A	0		T
GNDIO	GNDIO0	-			GNDIO	-		
J7	PT4B	0		C	PT4B	0		C
B2	PT5B	0		C	PT5B	0		C
H7	PT4A	0		T	PT4A	0		T
B1	PT5A	0		T	PT5A	0		T
VCCIO	VCCIO0	0			VCCIO0	0		
D1	PT2B	0	VREF2_0	C	PT2B	0	VREF2_0	C
D3	PT3B	0		C	PT3B	0		C
C1	PT2A	0	VREF1_0	T	PT2A	0	VREF1_0	T

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
W20	CFG0	8			CFG0	8		
V20	PROGRAMN	8			PROGRAMN	8		
W22	CCLK	8			CCLK	8		
V22	INITN	8			INITN	8		
V21	DONE	8			DONE	8		
GNDIO	GNDIO8	-			GNDIO8	-		
R16	PR58B	8	WRITEN	C	PR77B	8	WRITEN	C
R17	PR58A	8	CS1N	T	PR77A	8	CS1N	T
U19	PR57B	8	CSN	C	PR76B	8	CSN	C
U20	PR57A	8	D0/SPIFASTN	T	PR76A	8	D0/SPIFASTN	T
VCCIO	VCCIO8	8			VCCIO	8		
U22	PR56B	8	D1	C	PR75B	8	D1	C
U21	PR56A	8	D2	T	PR75A	8	D2	T
T20	PR55B	8	D3	C	PR74B	8	D3	C
GNDIO	GNDIO8	-			GNDIO8	-		
T19	PR55A	8	D4	T	PR74A	8	D4	T
T17	PR54B	8	D5	C	PR73B	8	D5	C
T18	PR54A	8	D6	T	PR73A	8	D6	T
T21	PR53B	8	D7/SPID0	C	PR72B	8	D7/SPID0	C
VCCIO	VCCIO8	8			VCCIO	8		
T22	PR53A	8	DI/CSSPI0N	T	PR72A	8	DI/CSSPI0N	T
R18	PR52B	8	DOUT/CSON	C	PR71B	8	DOUT/CSON	C
R19	PR52A	8	BUSY/SISPI	T	PR71A	8	BUSY/SISPI	T
GNDIO	GNDIO3	-			GNDIO3	-		
VCCIO	VCCIO3	3			VCCIO	3		
R22	PR47B	3	RDQ48	C	PR66B	3	RDQ67	C
R21	PR47A	3	RDQ48	T	PR66A	3	RDQ67	T
P18	PR46B	3	RDQ48	C (LVDS)*	PR65B	3	RDQ67	C (LVDS)*
P19	PR46A	3	RDQ48	T (LVDS)*	PR65A	3	RDQ67	T (LVDS)*
VCCIO	VCCIO3	3			VCCIO	3		
R20	PR45B	3	RLM0_GPLLC_FB_A/RDQ48	C	PR64B	3	RLM0_GPLLC_FB_A/RDQ67	C
P22	PR45A	3	RLM0_GPLLT_FB_A/RDQ48	T	PR64A	3	RLM0_GPLLT_FB_A/RDQ67	T
P21	PR44B	3	RLM0_GPLLC_IN_A**/RDQ48	C (LVDS)*	PR63B	3	RLM0_GPLLC_IN_A**/RDQ67	C (LVDS)*
N21	PR44A	3	RLM0_GPLLT_IN_A**/RDQ48	T (LVDS)*	PR63A	3	RLM0_GPLLT_IN_A**/RDQ67	T (LVDS)*
N17	RLM0_PLLCAP	3			RLM0_PLLCAP	3		
N22	PR42B	3	RLM0_GDLLC_FB_A/RDQ39	C	PR61B	3	RLM0_GDLLC_FB_A/RDQ58	C
N20	PR42A	3	RLM0_GDLLT_FB_A/RDQ39	T	PR61A	3	RLM0_GDLLT_FB_A/RDQ58	T
GNDIO	GNDIO3	-			GNDIO3	-		
M22	PR41B	3	RLM0_GDLLC_IN_A**/RDQ39	C (LVDS)*	PR60B	3	RLM0_GDLLC_IN_A**/RDQ58	C (LVDS)*
M21	PR41A	3	RLM0_GDLLT_IN_A**/RDQ39	T (LVDS)*	PR60A	3	RLM0_GDLLT_IN_A**/RDQ58	T (LVDS)*
N19	PR40B	3	RDQ39	C	PR59B	3	RDQ58	C
M19	PR40A	3	RDQ39	T	PR59A	3	RDQ58	T
VCCIO	VCCIO3	3			VCCIO	3		
GNDIO	GNDIO3	-			GNDIO3	-		
L22	PR30B	3	RDQ31	C	PR49B	3	RDQ50	C
K22	PR30A	3	RDQ31	T	PR49A	3	RDQ50	T

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

LFE2-70E/SE				
Ball Number	**Ball/Pad Function**	**Bank**	**Dual Function**	**Differential**
AD2	PL90B	6	LDQ88	C (LVDS)*
AD7	PL91A	6	LDQ88	T
GND	GNDIO6	-		
AB9	PL91B	6	LDQ88	C
AD5	TCK	-		
AE7	TDI	-		
AD4	TMS	-		
AA9	TDO	-		
AD3	VCCJ	-		
AC8	PB2A	5	VREF2_5/BDQ6	T
AE8	PB2B	5	VREF1_5/BDQ6	C
AD8	PB3A	5	BDQ6	T
AF8	PB3B	5	BDQ6	C
AG7	PB4A	5	BDQ6	T
VCCIO	VCCIO5	5		
AH7	PB4B	5	BDQ6	C
AC9	PB5A	5	BDQ6	T
AE9	PB5B	5	BDQ6	C
AD9	PB6A	5	BDQS6	T
GND	GNDIO5	-		
AF9	PB6B	5	BDQ6	C
AB10	PB7A	5	BDQ6	T
AA10	PB7B	5	BDQ6	C
AJ7	PB8A	5	BDQ6	T
VCCIO	VCCIO5	5		
AK7	PB8B	5	BDQ6	C
AC10	PB9A	5	BDQ6	T
AE10	PB9B	5	BDQ6	C
AJ8	PB10A	5	BDQ6	T
GND	GNDIO5	-		
AK8	PB10B	5	BDQ6	C
AF6	PB11A	5	BDQ15	T
AF7	PB11B	5	BDQ15	C
AG5	PB12A	5	BDQ15	T
AH5	PB12B	5	BDQ15	C
AG6	PB13A	5	BDQ15	T
AH6	PB13B	5	BDQ15	C
VCCIO	VCCIO5	5		
AJ4	PB14A	5	BDQ15	T
AK4	PB14B	5	BDQ15	C
GND	GNDIO5	-		
AJ5	PB15A	5	BDQS15	T
AK5	PB15B	5	BDQ15	C

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

LFE2M20E/SE					LFE2M35E/SE			
Ball Number	Ball/Pad Function	Bank	Dual Function	Differential	Ball/Pad Function	Bank	Dual Function	Differential
GNDIO	GNDIO6	-			GNDIO6	-		
L1	PL42A	6	LLM0_GPLLT_IN_A	T (LVDS)*	PL57A	6	LLM0_GPLLT_IN_A**/LDQS57***	T (LVDS)*
GNDIO	GNDIO6	-			GNDIO6	-		
L2	PL42B	6	LLM0_GPLLC_IN_A	C (LVDS)*	PL57B	6	LLM0_GPLLC_IN_A**/LDQ57	C(LVDS)*
L3	PL43A	6	LLM0_GPLLT_FB_A	T	PL58A	6	LLM0_GPLLT_FB_A/LDQ57	T
L4	PL43B	6	LLM0_GPLLC_FB_A	C	PL58B	6	LLM0_GPLLC_FB_A/LDQ57	C
VCCIO	VCCIO6	6			VCCIO6	6		
M1	PL44A	6	LLM0_GDLLT_IN_A	T (LVDS)*	PL59A	6	LLM0_GDLLT_IN_A**/LDQ57	T (LVDS)*
N1	PL44B	6	LLM0_GDLLC_IN_A	C (LVDS)*	PL59B	6	LLM0_GDLLC_IN_A**/LDQ57	C(LVDS)*
N2	PL45A	6	LLM0_GDLLT_FB_A	T	PL60A	6	LLM0_GDLLT_FB_A/LDQ57	T
N3	PL45B	6	LLM0_GDLLC_FB_A	C	PL60B	6	LLM0_GDLLC_FB_A/LDQ57	C
GNDIO	GNDIO6	-			GNDIO6	-		
M4	LLM0_PLLCAP	6			LLM0_PLLCAP	6		
VCCIO	VCCIO6	6			VCCIO6	6		
GNDIO	GNDIO6	-			GNDIO6	-		
K6	TCK	-			TCK	-		
L5	TDI	-			TDI	-		
N4	TMS	-			TMS	-		
N6	TDO	-			TDO	-		
K7	VCCJ	-			VCCJ	-		
M5	PB2A	5	BDQ6	T	PB2A	5	BDQ6	T
N5	PB2B	5	BDQ6	C	PB2B	5	BDQ6	C
L6	PB3A	5	BDQ6	T	PB3A	5	BDQ6	T
M6	PB3B	5	BDQ6	C	PB3B	5	BDQ6	C
P3	PB4A	5	BDQ6	T	PB4A	5	BDQ6	T
VCCIO	VCCIO5	5			VCCIO5	5		
P4	PB4B	5	BDQ6	C	PB4B	5	BDQ6	C
P2	PB5A	5	BDQ6	T	PB5A	5	BDQ6	T
P1	PB5B	5	BDQ6	C	PB5B	5	BDQ6	C
R1	PB6A	5	BDQS6	T	PB6A	5	BDQS6	T
GNDIO	GNDIO5	-			GNDIO5	-		
R2	PB6B	5	BDQ6	C	PB6B	5	BDQ6	C
R3	PB7A	5	BDQ6	T	PB7A	5	BDQ6	T
T2	PB7B	5	BDQ6	C	PB7B	5	BDQ6	C
R4	PB8A	5	BDQ6	T	PB8A	5	BDQ6	T
VCCIO	VCCIO5	5			VCCIO5	5		
T3	PB8B	5	BDQ6	C	PB8B	5	BDQ6	C
T4	PB10A	5	BDQ6	T	PB10A	5	BDQ6	T
GNDIO	GNDIO5	-			GNDIO5	-		
T5	PB10B	5	BDQ6	C	PB10B	5	BDQ6	C
VCCIO	VCCIO5	5			VCCIO5	5		
GNDIO	GNDIO5	-			GNDIO5	-		
T6	PB16A	5	VREF2_5/BDQ15	T	PB34A	5	VREF2_5/BDQ33	T
R6	PB16B	5	VREF1_5/BDQ15	C	PB34B	5	VREF1_5/BDQ33	C
P6	PB17A	5	PCLKT5_0/BDQ15	T	PB35A	5	PCLKT5_0/BDQ33	T
P7	PB17B	5	PCLKC5_0/BDQ15	C	PB35B	5	PCLKC5_0/BDQ33	C
VCCIO	VCCIO5	5			VCCIO5	5		
GNDIO	GNDIO5	-			GNDIO5	-		

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
AB6	PB17A	5	PCLKT5_0/BDQ15	T	PB35A	5	PCLKT5_0/BDQ33	T
AB7	PB17B	5	PCLKC5_0/BDQ15	C	PB35B	5	PCLKC5_0/BDQ33	C
VCCIO	VCCIO5	5			VCCIO5	5		
GNDIO	GNDIO5	-			GNDIO5	-		
AA8	PB22A	4	PCLKT4_0/BDQ24	T	PB40A	4	PCLKT4_0/BDQ42	T
VCCIO	VCCIO4	4			VCCIO4	4		
AB8	PB22B	4	PCLKC4_0/BDQ24	C	PB40B	4	PCLKC4_0/BDQ42	C
AA9	PB23A	4	VREF2_4/BDQ24	T	PB41A	4	VREF2_4/BDQ42	T
Y9	PB23B	4	VREF1_4/BDQ24	C	PB41B	4	VREF1_4/BDQ42	C
AB9	PB24A	4	BDQS24****	T	PB42A	4	BDQS42****	T
GNDIO	GNDIO4	-			GNDIO4	-		
AB10	PB24B	4	BDQ24	C	PB42B	4	BDQ42	C
AA10	PB25A	4	BDQ24	T	PB43A	4	BDQ42	T
Y11	PB25B	4	BDQ24	C	PB43B	4	BDQ42	C
VCCIO	VCCIO4	4			VCCIO4	4		
GNDIO	GNDIO4	-			GNDIO4	-		
V10	PB29A	4	BDQ33	T	PB47A	4	BDQ51	T
U11	PB29B	4	BDQ33	C	PB47B	4	BDQ51	C
V11	PB30A	4	BDQ33	T	PB48A	4	BDQ51	T
W11	PB30B	4	BDQ33	C	PB48B	4	BDQ51	C
AA11	PB31A	4	BDQ33	T	PB49A	4	BDQ51	T
AB11	PB31B	4	BDQ33	C	PB49B	4	BDQ51	C
VCCIO	VCCIO4	4			VCCIO4	4		
T11	PB32A	4	BDQ33	T	PB50A	4	BDQ51	T
U12	PB32B	4	BDQ33	C	PB50B	4	BDQ51	C
GNDIO	GNDIO4	-			GNDIO4	-		
AA12	PB33A	4	BDQS33	T	PB51A	4	BDQS51	T
Y12	PB33B	4	BDQ33	C	PB51B	4	BDQ51	C
V12	PB34A	4	BDQ33	T	PB52A	4	BDQ51	T
W12	PB34B	4	BDQ33	C	PB52B	4	BDQ51	C
AB12	PB35A	4	BDQ33	T	PB53A	4	BDQ51	T
AA13	PB35B	4	BDQ33	C	PB53B	4	BDQ51	C
VCCIO	VCCIO4	4			VCCIO4	4		
T12	PB36A	4	BDQ33	T	PB54A	4	BDQ51	T
U13	PB36B	4	BDQ33	C	PB54B	4	BDQ51	C
V13	PB37A	4	BDQ33	T	PB55A	4	BDQ51	T
T13	PB37B	4	BDQ33	C	PB55B	4	BDQ51	C
GNDIO	GNDIO4	-			GNDIO4	-		
AB13	PB38A	4	BDQ42	T	PB56A	4	BDQ60	T
AB14	PB38B	4	BDQ42	C	PB56B	4	BDQ60	C
U14	PB39A	4	BDQ42	T	PB57A	4	BDQ60	T
T14	PB39B	4	BDQ42	C	PB57B	4	BDQ60	C
AA14	PB40A	4	BDQ42	T	PB58A	4	BDQ60	T
VCCIO	VCCIO4	4			VCCIO4	4		
Y14	PB40B	4	BDQ42	C	PB58B	4	BDQ60	C
W14	PB41A	4	BDQ42	T	PB59A	4	BDQ60	T
V14	PB41B	4	BDQ42	C	PB59B	4	BDQ60	C
AB15	PB42A	4	BDQS42	T	PB60A	4	BDQS60	T

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
T17	PR51A	8	D2***	T	PR66A	8	D2***	T
T22	PR50B	8	D3***	C	PR65B	8	D3***	C
GNDIO	GNDIO8	-			GNDIO8	-		
R22	PR50A	8	D4***	T	PR65A	8	D4***	T
T15	PR49B	8	D5***	C	PR64B	8	D5***	C
R17	PR49A	8	D6***	T	PR64A	8	D6***	T
T20	PR48B	8	D7/SPID0***	C	PR63B	8	D7/SPID0***	C
VCCIO	VCCIO8	8			VCCIO8	8		
T21	PR48A	8	DI/CSSPI0N***	T	PR63A	8	DI/CSSPI0N***	T
R21	PR47B	8	DOUT/CSON/CSSPI1N***	C	PR62B	8	DOUT/CSON/CSSPI1N***	C
R20	PR47A	8	BUSY/SISPI***	T	PR62A	8	BUSY/SISPI***	T
R16	RLM0_PLLCAP	3			RLM0_PLLCAP	3		
R18	PR45B	3	RLM0_GDLLC_FB_A	C	PR60B	3	RLM0_GDLLC_FB_A/RDQ57	C
GNDIO	GNDIO3	-			GNDIO3	-		
R19	PR45A	3	RLM0_GDLLT_FB_A	T	PR60A	3	RLM0_GDLLT_FB_A/RDQ57	T
P22	PR44B	3	RLM0_GDLLC_IN_A**	C (LVDS)*	PR59B	3	RLM0_GDLLC_IN_A**/RDQ57	C (LVDS)*
P21	PR44A	3	RLM0_GDLLT_IN_A**	T (LVDS)*	PR59A	3	RLM0_GDLLT_IN_A**/RDQ57	T (LVDS)*
P16	PR43B	3	RLM0_GPLLC_IN_A**	C	PR58B	3	RLM0_GPLLC_IN_A**/RDQ57	C
VCCIO	VCCIO3	3			VCCIO3	3		
P17	PR43A	3	RLM0_GPLLT_IN_A**	T	PR58A	3	RLM0_GPLLT_IN_A**/RDQ57	T
P20	PR42B	3	RLM0_GPLLC_FB_A	C (LVDS)*	PR57B	3	RLM0_GPLLC_FB_A/RDQ57	C (LVDS)*
P19	PR42A	3	RLM0_GPLLT_FB_A	T (LVDS)*	PR57A	3	RLM0_GPLLT_FB_A/RDQS57****	T (LVDS)*
GNDIO	GNDIO3	-			GNDIO3	-		
-	-	-			VCCIO3	3		
P18	PR41B	3	RDQ38	C	PR51B	3	RDQ48	C
N16	PR41A	3	RDQ38	T	PR51A	3	RDQ48	T
GNDIO	GNDIO3	-			GNDIO3	-		
N22	PR40B	3	RDQ38	C (LVDS)*	PR50B	3	RDQ48	C (LVDS)*
N21	PR40A	3	RDQ38	T (LVDS)*	PR50A	3	RDQ48	T (LVDS)*
N17	PR39B	3	RDQ38	C	PR49B	3	RDQ48	C
N18	PR39A	3	RDQ38	T	PR49A	3	RDQ48	T
VCCIO	VCCIO3	3			VCCIO3	3		
M22	PR38B	3	RDQ38	C (LVDS)*	PR48B	3	RDQ48	C (LVDS)*
M21	PR38A	3	RDQS38	T (LVDS)*	PR48A	3	RDQS48	T (LVDS)*
M16	PR37B	3	RDQ38	C	PR47B	3	RDQ48	C
GNDIO	GNDIO3	-			GNDIO3	-		
M17	PR37A	3	RDQ38	T	PR47A	3	RDQ48	T
M20	PR36B	3	RDQ38	C (LVDS)*	PR46B	3	RDQ48	C (LVDS)*
M19	PR36A	3	RDQ38	T (LVDS)*	PR46A	3	RDQ48	T (LVDS)*
M18	PR35B	3	RDQ38	C	PR45B	3	RDQ48	C
VCCIO	VCCIO3	3			VCCIO3	3		
L16	PR35A	3	RDQ38	T	PR45A	3	RDQ48	T
L22	PR34B	3	RDQ38	C (LVDS)*	PR44B	3	RDQ48	C (LVDS)*
L21	PR34A	3	RDQ38	T (LVDS)*	PR44A	3	RDQ48	T (LVDS)*
K22	PR32B	3	RLM1_SPLLC_FB_A	C	PR42B	3	RLM2_SPLLC_FB_A	C
VCCIO	VCCIO3	3			VCCIO3	3		
K21	PR32A	3	RLM1_SPLLT_FB_A	T	PR42A	3	RLM2_SPLLT_FB_A	T
L17	PR31B	3	RLM1_SPLLC_IN_A	C (LVDS)*	PR41B	3	RLM2_SPLLC_IN_A	C (LVDS)*

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
F19	PR11A	2	RUM0_SPLLT_IN_A	T (LVDS)*	PR11A	2	RUM0_SPLLT_IN_A/RDQ15	T (LVDS)*
E18	PR9B	2	VREF2_2	C	PR9B	2	VREF2_2	C
GNDIO	GNDIO2	-			GNDIO2	-		
D18	PR9A	2	VREF1_2	T	PR9A	2	VREF1_2	T
VCCIO	VCCIO2	2			-	-		
F16	XRES	-			XRES	-		
C22	URC_SQ_VCCRX0	12			URC_SQ_VCCRX0	12		
A21	URC_SQ_HDINP0	12		T	URC_SQ_HDINP0	12		T
B22	URC_SQ_VCCIB0	12			URC_SQ_VCCIB0	12		
B21	URC_SQ_HDINN0	12		C	URC_SQ_HDINN0	12		C
C19	URC_SQ_VCCTX0	12			URC_SQ_VCCTX0	12		
A18	URC_SQ_HDOUTP0	12		T	URC_SQ_HDOUTP0	12		T
A19	URC_SQ_VCCOB0	12			URC_SQ_VCCOB0	12		
B18	URC_SQ_HDOUTN0	12		C	URC_SQ_HDOUTN0	12		C
C18	URC_SQ_VCCTX1	12			URC_SQ_VCCTX1	12		
B17	URC_SQ_HDOUTN1	12		C	URC_SQ_HDOUTN1	12		C
C17	URC_SQ_VCCOB1	12			URC_SQ_VCCOB1	12		
A17	URC_SQ_HDOUTP1	12		T	URC_SQ_HDOUTP1	12		T
C21	URC_SQ_VCCRX1	12			URC_SQ_VCCRX1	12		
B20	URC_SQ_HDINN1	12		C	URC_SQ_HDINN1	12		C
C20	URC_SQ_VCCIB1	12			URC_SQ_VCCIB1	12		
A20	URC_SQ_HDINP1	12		T	URC_SQ_HDINP1	12		T
B16	URC_SQ_VCCAUX33	12			URC_SQ_VCCAUX33	12		
E17	URC_SQ_REFCLKN	12		C	URC_SQ_REFCLKN	12		C
D17	URC_SQ_REFCLKP	12		T	URC_SQ_REFCLKP	12		T
C16	URC_SQ_VCCP	12			URC_SQ_VCCP	12		
A12	URC_SQ_HDINP2	12		T	URC_SQ_HDINP2	12		T
C12	URC_SQ_VCCIB2	12			URC_SQ_VCCIB2	12		
B12	URC_SQ_HDINN2	12		C	URC_SQ_HDINN2	12		C
C11	URC_SQ_VCCRX2	12			URC_SQ_VCCRX2	12		
A15	URC_SQ_HDOUTP2	12		T	URC_SQ_HDOUTP2	12		T
C15	URC_SQ_VCCOB2	12			URC_SQ_VCCOB2	12		
B15	URC_SQ_HDOUTN2	12		C	URC_SQ_HDOUTN2	12		C
C14	URC_SQ_VCCTX2	12			URC_SQ_VCCTX2	12		
B14	URC_SQ_HDOUTN3	12		C	URC_SQ_HDOUTN3	12		C
A13	URC_SQ_VCCOB3	12			URC_SQ_VCCOB3	12		
A14	URC_SQ_HDOUTP3	12		T	URC_SQ_HDOUTP3	12		T
C13	URC_SQ_VCCTX3	12			URC_SQ_VCCTX3	12		
B11	URC_SQ_HDINN3	12		C	URC_SQ_HDINN3	12		C
B10	URC_SQ_VCCIB3	12			URC_SQ_VCCIB3	12		
A11	URC_SQ_HDINP3	12		T	URC_SQ_HDINP3	12		T
C10	URC_SQ_VCCRX3	12			URC_SQ_VCCRX3	12		

LFE2M35E/SE and LFE2M50E/SE Logic Signal Connections: 672 fpBGA

LFE2M35E/SE					LFE2M50E/SE			
Ball Number	Ball/Pad Function	Bank	Dual Function	Differential	Ball/Pad Function	Bank	Dual Function	Differential
C2	PL2A	7	LDQ6	T (LVDS)*	PL2A	7	LDQ6	T*
C1	PL2B	7	LDQ6	C (LVDS)*	PL2B	7	LDQ6	C*
F6	PL3A	7	LDQ6	T	PL3A	7	LDQ6	T
H9	PL3B	7	LDQ6	C	PL3B	7	LDQ6	C
D3	PL4A	7	LDQ6	T (LVDS)*	PL4A	7	LDQ6	T*
VCCIO	VCCIO7	7			VCCIO7	7		
D2	PL4B	7	LDQ6	C (LVDS)*	PL4B	7	LDQ6	C*
F5	PL5A	7	LDQ6	T	PL5A	7	LDQ6	T
H8	PL5B	7	LDQ6	C	PL5B	7	LDQ6	C
E3	PL6A	7	LDQS6	T (LVDS)*	PL6A	7	LDQS6	T*
GNDIO	GNDIO7	-			GNDIO7	-		
E2	PL6B	7	LDQ6	C (LVDS)*	PL6B	7	LDQ6	C*
J9	PL7A	7	LDQ6	T	PL7A	7	LDQ6	T
E4	PL7B	7	LDQ6	C	PL7B	7	LDQ6	C
VCCIO	VCCIO7	7			VCCIO7	7		
E1	PL8A	7	LDQ6	T (LVDS)*	PL8A	7	LDQ6	T*
D1	PL8B	7	LDQ6	C (LVDS)*	PL8B	7	LDQ6	C*
J8	PL9A	7	VREF2_7/LDQ6	T	PL9A	7	VREF2_7/LDQ6	T
F4	PL9B	7	VREF1_7/LDQ6	C	PL9B	7	VREF1_7/LDQ6	C
GNDIO	GNDIO7	-			GNDIO7	-		
-	-	-			VCCIO7	7		
F3	PL11A	7	LUM0_SPLLT_IN_A/LDQ15	T (LVDS)*	PL11A	7	LUM0_SPLLT_IN_A	T*
F1	PL11B	7	LUM0_SPLLC_IN_A/LDQ15	C (LVDS)*	PL11B	7	LUM0_SPLLC_IN_A	C*
G6	PL12A	7	LUM0_SPLLT_FB_A/LDQ15	T	PL12A	7	LUM0_SPLLT_FB_A	T
K9	PL12B	7	LUM0_SPLLC_FB_A/LDQ15	C	PL12B	7	LUM0_SPLLC_FB_A	C
-	-	-			GNDIO7	-		
G5	PL13A	7	LDQ15	T (LVDS)*	PL13A	7		T*
VCCIO	VCCIO7	7			-	-		
G4	PL13B	7	LDQ15	C (LVDS)*	PL13B	7		C*
H5	PL14A	7	LDQ15	T	PL14A	7		T
-	-	-			VCCIO7	7		
H6	PL14B	7	LDQ15	C	PL14B	7		C
GNDIO	GNDIO7	-			GNDIO7	-		
J7	PL16A	7	LDQ15	T	PL19A	7		T
H4	PL16B	7	LDQ15	C	PL19B	7		C
H3	PL17A	7	LDQ15	T (LVDS)*	PL20A	7		T*
VCCIO	VCCIO7	7			VCCIO7	7		
G3	PL17B	7	LDQ15	C (LVDS)*	PL20B	7		C*
GNDIO	GNDIO7	-			GNDIO7	-		
G1	PL19A	7	LDQ23	T (LVDS)*	PL23A	7	LDQ27	T*
H1	PL19B	7	LDQ23	C (LVDS)*	PL23B	7	LDQ27	C*
J3	PL20A	7	LDQ23	T	PL24A	7	LDQ27	T
J4	PL20B	7	LDQ23	C	PL24B	7	LDQ27	C
VCCIO	VCCIO7	7			VCCIO7	7		
H2	PL21A	7	LDQ23	T (LVDS)*	PL25A	7	LDQ27	T*
J2	PL21B	7	LDQ23	C (LVDS)*	PL25B	7	LDQ27	C*
K7	PL22A	7	LDQ23	T	PL26A	7	LDQ27	T
J6	PL22B	7	LDQ23	C	PL26B	7	LDQ27	C

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

LFE2M50E/SE					LFE2M70E/SE			
Ball Number	Ball/Pad Function	Bank	Dual Function	Differential	Ball/Pad Function	Bank	Dual Function	Differential
Y22	PR60B	3		C	PR81B	3	RDQ82	C
Y23	PR60A	3		T	PR81A	3	RDQ82	T
AB26	NC	-			PR80B	3	RDQ82	C (LVDS)*
AB27	NC	-			PR80A	3	RDQ82	T (LVDS)*
-	-	-			VCCIO3	3		
Y24	NC	-			PR79B	3	RDQ82	C
Y25	NC	-			PR79A	3	RDQ82	T
AA29	NC	-			PR78B	3	RDQ82	C (LVDS)*
Y28	NC	-			PR78A	3	RDQ82	T (LVDS)*
Y30	NC	-			PR76B	3	RDQ73	C
Y29	NC	-			PR76A	3	RDQ73	T
-	-	-			GNDIO3	-		
-	-	-			-	-		
W22	NC	-			PR75B	3	RDQ73	C (LVDS)*
V22	NC	-			PR75A	3	RDQ73	T (LVDS)*
Y27	NC	-			PR74B	3	RDQ73	C
-	-	-			VCCIO3	3		
Y26	NC	-			PR74A	3	RDQ73	T
W30	NC	-			PR73B	3	RDQ73	C (LVDS)*
W29	NC	-			PR73A	3	RDQS73	T (LVDS)*
-	-	-			GNDIO3	-		
W25	NC	-			PR72B	3	RDQ73	C
W26	NC	-			PR72A	3	RDQ73	T
U29	PR59B	3		C (LVDS)*	PR71B	3	RDQ73	C (LVDS)*
V29	PR59A	3		T (LVDS)*	PR71A	3	RDQ73	T (LVDS)*
VCCIO	VCCIO3	3			VCCIO3	3		
V30	PR58B	3		C	PR70B	3	RDQ73	C
U30	PR58A	3		T	PR70A	3	RDQ73	T
W27	PR57B	3		C (LVDS)*	PR69B	3	RDQ73	C (LVDS)*
W28	PR57A	3		T (LVDS)*	PR69A	3	RDQ73	T (LVDS)*
V24	PR55B	3	RDQ52	C	PR67B	3	RDQ64	C
V25	PR55A	3	RDQ52	T	PR67A	3	RDQ64	T
GNDIO	GNDIO3	-			GNDIO3	-		
U28	PR54B	3	RDQ52	C (LVDS)*	PR66B	3	RDQ64	C (LVDS)*
U27	PR54A	3	RDQ52	T (LVDS)*	PR66A	3	RDQ64	T (LVDS)*
U23	PR53B	3	RDQ52	C	PR65B	3	RDQ64	C
V23	PR53A	3	RDQ52	T	PR65A	3	RDQ64	T
VCCIO	VCCIO3	3			VCCIO3	3		
V26	PR52B	3	RDQ52	C (LVDS)*	PR64B	3	RDQ64	C (LVDS)*
U26	PR52A	3	RDQS52	T (LVDS)*	PR64A	3	RDQS64	T (LVDS)*
U25	PR51B	3	RDQ52	C	PR63B	3	RDQ64	C
GNDIO	GNDIO3	-			GNDIO3	-		
U24	PR51A	3	RDQ52	T	PR63A	3	RDQ64	T
T30	PR50B	3	RDQ52	C (LVDS)*	PR62B	3	RDQ64	C (LVDS)*
R30	PR50A	3	RDQ52	T (LVDS)*	PR62A	3	RDQ64	T (LVDS)*
T23	PR49B	3	RDQ52	C	PR61B	3	RDQ64	C
VCCIO	VCCIO3	3			VCCIO3	3		
T22	PR49A	3	RDQ52	T	PR61A	3	RDQ64	T

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
E13	PT28A	0		T	PT37A	0		T
VCCIO	VCCIO0	0			VCCIO0	0		
GNDIO	GNDIO0	-			GNDIO0	-		
J12	PT5B	0		C	PT31B	0		C
GNDIO	GNDIO0	-			-	-		
VCCIO	VCCIO0	0			VCCIO0	0		
H10	PT5A	0		T	PT31A	0		T
E12	PT4B	0		C	PT30B	0		C
D11	PT4A	0		T	PT30A	0		T
H11	PT3B	0		C	PT29B	0		C
F11	PT3A	0		T	PT29A	0		T
C13	VCC	-			ULC_SQ_VCCRX0	11		
A12	PT19A	0		T	ULC_SQ_HDINP0	11		T
B13	NC	-			ULC_SQ_VCCIB0	11		
B12	PT19B	0		C	ULC_SQ_HDINN0	11		C
C10	VCC	-			ULC_SQ_VCCTX0	11		
A9	PT17A	0		T	ULC_SQ_HDOUTP0	11		T
A10	NC	-			ULC_SQ_VCCOB0	11		
B9	PT17B	0		C	ULC_SQ_HDOUTN0	11		C
C9	VCC	-			ULC_SQ_VCCTX1	11		
B8	PT18B	0		C	ULC_SQ_HDOUTN1	11		C
C8	NC	-			ULC_SQ_VCCOB1	11		
A8	PT18A	0		T	ULC_SQ_HDOUTP1	11		T
C12	VCC	-			ULC_SQ_VCCRX1	11		
B11	PT16B	0		C	ULC_SQ_HDINN1	11		C
C11	NC	-			ULC_SQ_VCCIB1	11		
A11	PT16A	0		T	ULC_SQ_HDINP1	11		T
B7	VCCAUX	-			ULC_SQ_VCCAUX33	11		
E7	PT15B	0		C	ULC_SQ_REFCLKN	11		C
D7	PT15A	0		T	ULC_SQ_REFCLKP	11		T
C7	VCC	-			ULC_SQ_VCCP	11		
A3	PT12A	0		T	ULC_SQ_HDINP2	11		T
C3	NC	-			ULC_SQ_VCCIB2	11		
B3	PT12B	0		C	ULC_SQ_HDINN2	11		C
C2	VCC	-			ULC_SQ_VCCRX2	11		
A6	PT14A	0		T	ULC_SQ_HDOUTP2	11		T
C6	NC	-			ULC_SQ_VCCOB2	11		
B6	PT14B	0		C	ULC_SQ_HDOUTN2	11		C
C5	VCC	-			ULC_SQ_VCCTX2	11		
B5	PT13B	0		C	ULC_SQ_HDOUTN3	11		C
A4	NC	-			ULC_SQ_VCCOB3	11		
A5	PT13A	0		T	ULC_SQ_HDOUTP3	11		T
C4	VCC	-			ULC_SQ_VCCTX3	11		
B2	PT11B	0		C	ULC_SQ_HDINN3	11		C
B1	NC	-			ULC_SQ_VCCIB3	11		
A2	PT11A	0		T	ULC_SQ_HDINP3	11		T
C1	VCC	-			ULC_SQ_VCCRX3	11		
L12	VCC	-			VCC	-		

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

LFE2M100E/SE				
Ball Number	**Ball/Pad Function**	**Bank**	**Dual Function**	**Differential**
C29	URC_SQ_VCCRX1	12		
B28	URC_SQ_HDINN1	12		C
C28	URC_SQ_VCCIB1	12		
A28	URC_SQ_HDINP1	12		T
B24	URC_SQ_VCCAUX33	12		
E24	URC_SQ_REFCLKN	12		C
D24	URC_SQ_REFCLKP	12		T
C24	URC_SQ_VCCP	12		
A20	URC_SQ_HDINP2	12		T
C20	URC_SQ_VCCIB2	12		
B20	URC_SQ_HDINN2	12		C
C19	URC_SQ_VCCRX2	12		
A23	URC_SQ_HDOUTP2	12		T
C23	URC_SQ_VCCOB2	12		
B23	URC_SQ_HDOUTN2	12		C
C22	URC_SQ_VCCTX2	12		
B22	URC_SQ_HDOUTN3	12		C
A21	URC_SQ_VCCOB3	12		
A22	URC_SQ_HDOUTP3	12		T
C21	URC_SQ_VCCTX3	12		
B19	URC_SQ_HDINN3	12		C
B18	URC_SQ_VCCIB3	12		
A19	URC_SQ_HDINP3	12		T
C18	URC_SQ_VCCRX3	12		
D23	PT100B	1		C
GNDIO	GNDIO1	-		
E21	PT100A	1		T
D26	PT99B	1		C
E26	PT99A	1		T
E23	PT98B	1		C
VCCIO	VCCIO1	1		
G22	PT98A	1		T
-	-	-		
D22	PT97B	1		C
F21	PT97A	1		T
G18	PT96B	1		C
H18	PT96A	1		T
D20	PT95B	1		C
GNDIO	GNDIO1	-		
D21	PT95A	1		T
E20	PT94B	1		C
VCCIO	VCCIO1	1		
E19	PT94A	1		T

LatticeECP2M Standard Series Devices, Lead-Free Packaging

Commercial

Part Number	I/Os	Voltage	Grade	Package	Pins	Temp.	LUTs (K)
LFE2M20E-5FN484C	304	1.2V	-5	Lead-Free fpBGA	484	COM	20
LFE2M20E-6FN484C	304	1.2V	-6	Lead-Free fpBGA	484	COM	20
LFE2M20E-7FN484C	304	1.2V	-7	Lead-Free fpBGA	484	COM	20
LFE2M20E-5FN256C	140	1.2V	-5	Lead-Free fpBGA	256	COM	20
LFE2M20E-6FN256C	140	1.2V	-6	Lead-Free fpBGA	256	COM	20
LFE2M20E-7FN256C	140	1.2V	-7	Lead-Free fpBGA	256	COM	20

Part Number	I/Os	Voltage	Grade	Package	Pins	Temp.	LUTs (K)
LFE2M35E-5FN672C	410	1.2V	-5	Lead-Free fpBGA	672	COM	35
LFE2M35E-6FN672C	410	1.2V	-6	Lead-Free fpBGA	672	COM	35
LFE2M35E-7FN672C	410	1.2V	-7	Lead-Free fpBGA	672	COM	35
LFE2M35E-5FN484C	303	1.2V	-5	Lead-Free fpBGA	484	COM	35
LFE2M35E-6FN484C	303	1.2V	-6	Lead-Free fpBGA	484	COM	35
LFE2M35E-7FN484C	303	1.2V	-7	Lead-Free fpBGA	484	COM	35
LFE2M35E-5FN256C	140	1.2V	-5	Lead-Free fpBGA	256	COM	35
LFE2M35E-6FN256C	140	1.2V	-6	Lead-Free fpBGA	256	COM	35
LFE2M35E-7FN256C	140	1.2V	-7	Lead-Free fpBGA	256	COM	35

Part Number	I/Os	Voltage	Grade	Package	Pins	Temp.	LUTs (K)
LFE2M50E-5FN900C	410	1.2V	-5	Lead-Free fpBGA	900	COM	50
LFE2M50E-6FN900C	410	1.2V	-6	Lead-Free fpBGA	900	COM	50
LFE2M50E-7FN900C	410	1.2V	-7	Lead-Free fpBGA	900	COM	50
LFE2M50E-5FN672C	372	1.2V	-5	Lead-Free fpBGA	672	COM	50
LFE2M50E-6FN672C	372	1.2V	-6	Lead-Free fpBGA	672	COM	50
LFE2M50E-7FN672C	372	1.2V	-7	Lead-Free fpBGA	672	COM	50
LFE2M50E-5FN484C	270	1.2V	-5	Lead-Free fpBGA	484	COM	50
LFE2M50E-6FN484C	270	1.2V	-6	Lead-Free fpBGA	484	COM	50
LFE2M50E-7FN484C	270	1.2V	-7	Lead-Free fpBGA	484	COM	50

Part Number	I/Os	Voltage	Grade	Package	Pins	Temp.	LUTs (K)
LFE2M70E-5FN1152C	436	1.2V	-5	Lead-Free fpBGA	1152	COM	70
LFE2M70E-6FN1152C	436	1.2V	-6	Lead-Free fpBGA	1152	COM	70
LFE2M70E-7FN1152C	436	1.2V	-7	Lead-Free fpBGA	1152	COM	70
LFE2M70E-5FN900C	416	1.2V	-5	Lead-Free fpBGA	900	COM	70
LFE2M70E-6FN900C	416	1.2V	-6	Lead-Free fpBGA	900	COM	70
LFE2M70E-7FN900C	416	1.2V	-7	Lead-Free fpBGA	900	COM	70