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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	4246528
Number of I/O	372
Number of Gates	-
Voltage - Supply	1.14V ~ 1.26V
Mounting Type	Surface Mount
Operating Temperature	0°C ~ 85°C (TJ)
Package / Case	672-BBGA
Supplier Device Package	672-FPBGA (27x27)
Purchase URL	https://www.e-xfl.com/product-detail/lattice-semiconductor/lfe2m50se-6fn672c

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

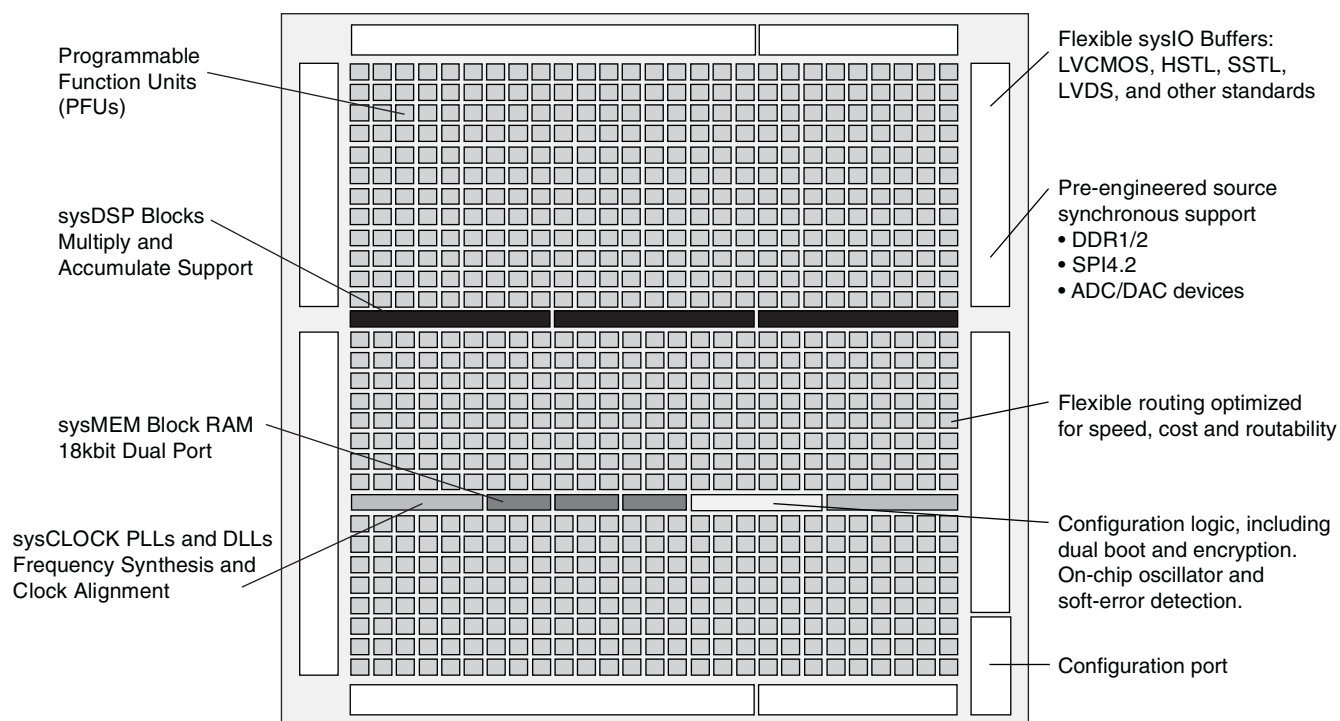
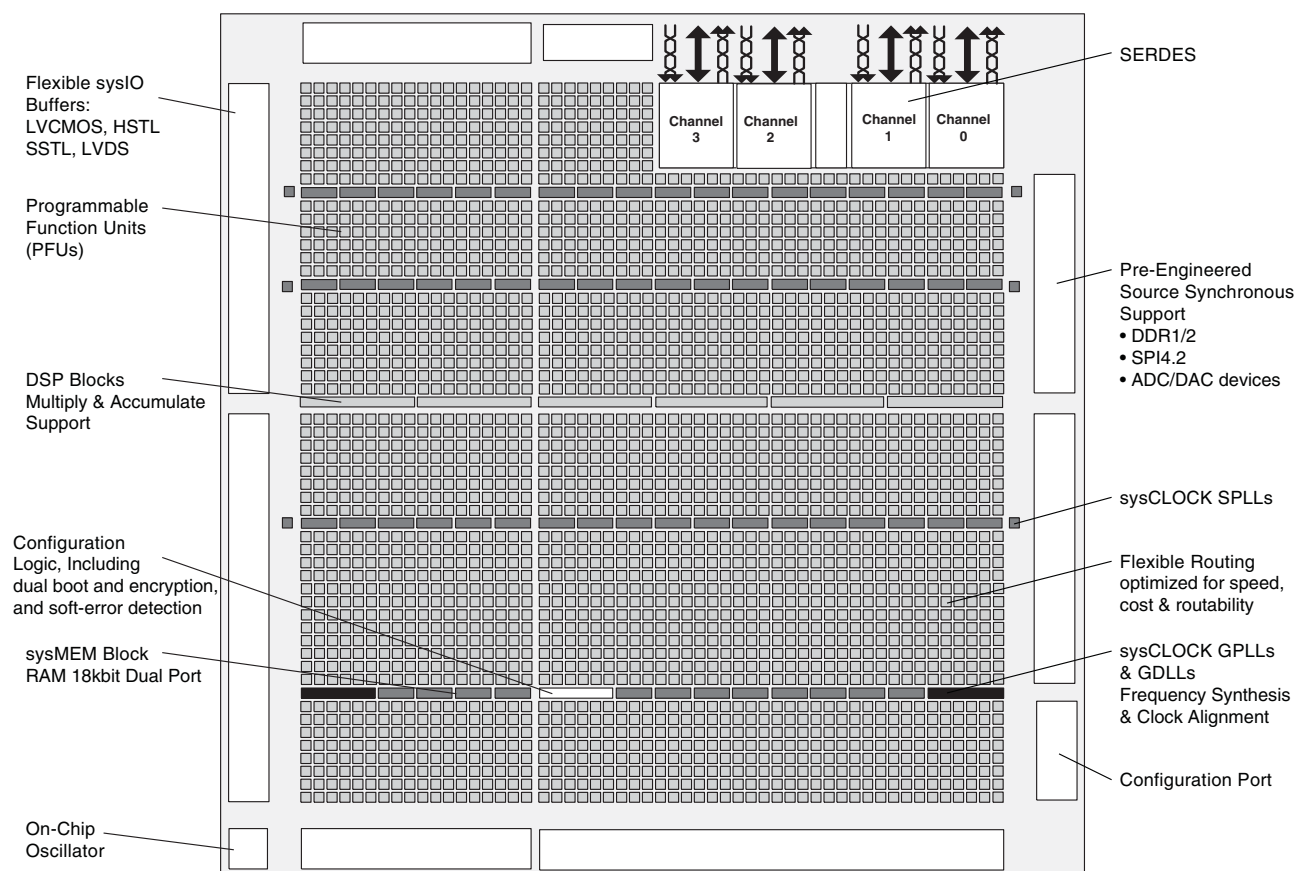


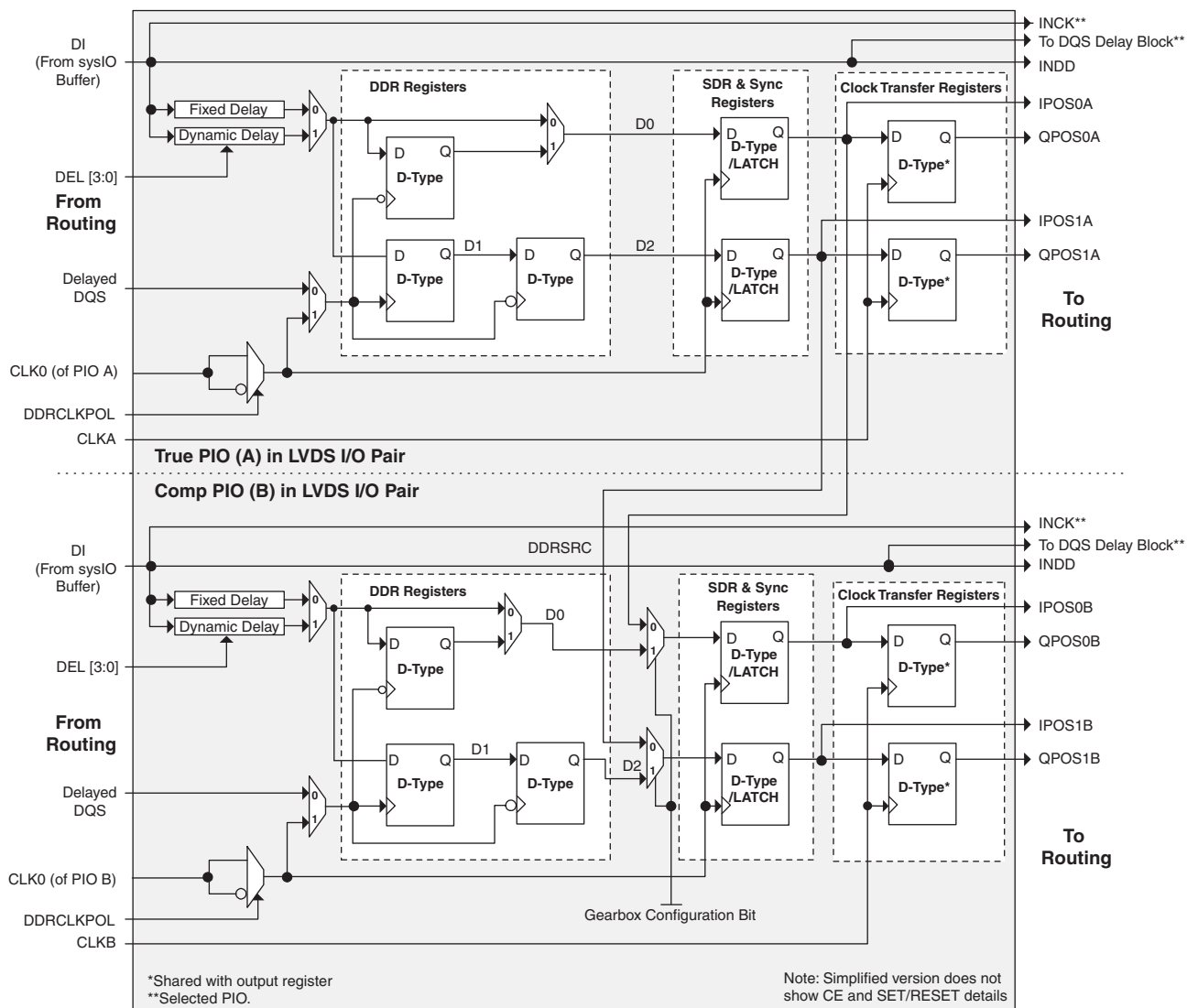
Figure 2-2. Simplified Block Diagram, ECP2M20 Device (Top Level)



By combining input blocks of the complementary PIOs and sharing some registers from output blocks, a gearbox function can be implemented, which takes a double data rate signal applied to PIOA and converts it as four data streams, IPOS0A, IPOS1A, IPOS0B and IPOS1B. Figure 2-29 shows the diagram using this gearbox function. For more information about this topic, please see information regarding additional documentation at the end of this data sheet.

The signal DDRCLKPOL controls the polarity of the clock used in the synchronization registers. It ensures adequate timing when data is transferred from the DQS to the system clock domain. For further information about this topic, see the DDR Memory section of this data sheet.

Figure 2-29. Input Register Block for Left, Right and Bottom Edges



LatticeECP2/M Family Timing Adders^{1, 2, 3} (Continued)
Over Recommended Operating Conditions

Buffer Type	Description	-7	-6	-5	Units
LVC MOS25_4mA	LVC MOS 2.5 4mA drive, slow slew rate	2.18	2.26	2.33	ns
LVC MOS25_8mA	LVC MOS 2.5 8mA drive, slow slew rate	2.19	2.35	2.51	ns
LVC MOS25_12mA	LVC MOS 2.5 12mA drive, slow slew rate	1.50	1.66	1.82	ns
LVC MOS25_16mA	LVC MOS 2.5 16mA drive, slow slew rate	1.60	1.59	1.58	ns
LVC MOS25_20mA	LVC MOS 2.5 20mA drive, slow slew rate	1.43	1.39	1.34	ns
LVC MOS18_4mA	LVC MOS 1.8 4mA drive, slow slew rate	2.22	2.27	2.32	ns
LVC MOS18_8mA	LVC MOS 1.8 8mA drive, slow slew rate	1.93	2.08	2.23	ns
LVC MOS18_12mA	LVC MOS 1.8 12mA drive, slow slew rate	1.43	1.51	1.58	ns
LVC MOS18_16mA	LVC MOS 1.8 16mA drive, slow slew rate	1.47	1.46	1.45	ns
LVC MOS15_4mA	LVC MOS 1.5 4mA drive, slow slew rate	2.32	2.38	2.43	ns
LVC MOS15_8mA	LVC MOS 1.5 8mA drive, slow slew rate	1.84	1.98	2.12	ns
LVC MOS12_2mA	LVC MOS 1.2 2mA drive, slow slew rate	2.52	2.63	2.74	ns
LVC MOS12_6mA	LVC MOS 1.2 6mA drive, slow slew rate	1.69	1.83	1.96	ns
PCI33	PCI33	0.04	0.04	0.04	ns

1. Timing Adders are characterized but not tested on every device.
 2. LVC MOS timing measured with the load specified in Switching Test Condition table.
 3. All other standards tested according to the appropriate specifications.
 4. These timing adders are measured with the recommended resistor values.
- Timing v.A 0.11

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

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

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

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
F15	PR11B	2	RDQ10	C	PR11B	2	RDQ10	C
G11	PR12B	2	RDQ10	C (LVDS)*	PR12B	2	RDQ10	C (LVDS)*
F14	PR11A	2	RDQ10	T	PR11A	2	RDQ10	T
VCCIO	VCCIO2	2			VCCIO2	2		
F12	PR12A	2	RDQ10	T (LVDS)*	PR12A	2	RDQ10	T (LVDS)*
G14	PR10B	2	RDQ10	C (LVDS)*	PR10B	2	RDQ10	C (LVDS)*
G13	PR10A	2	RDQS10	T (LVDS)*	PR10A	2	RDQS10	T (LVDS)*
GND	GNDIO2	-			GNDIO2	-		
F16	PR8B	2	RDQ10	C (LVDS)*	PR8B	2	RDQ10	C (LVDS)*
F9	PR9B	2	RDQ10	C	PR9B	2	RDQ10	C
E16	PR8A	2	RDQ10	T (LVDS)*	PR8A	2	RDQ10	T (LVDS)*
F10	PR9A	2	RDQ10	T	PR9A	2	RDQ10	T
VCCIO	VCCIO2	2			VCCIO2	2		
D16	PR7B	2	RDQ10	C	PR7B	2	RDQ10	C
D15	PR7A	2	RDQ10	T	PR7A	2	RDQ10	T
C15	PR4B	2		C (LVDS)*	PR4B	2		C (LVDS)*
C16	PR5B	2		C	PR5B	2		C
GND	GNDIO2	-			GNDIO2	-		
D14	PR4A	2		T (LVDS)*	PR4A	2		T (LVDS)*
B16	PR5A	2		T	PR5A	2		T
F13	PR2B	2	VREF2_2	C (LVDS)*	PR2B	2	VREF2_2	C (LVDS)*
VCCIO	VCCIO2	2			VCCIO2	2		
E13	PR2A	2	VREF1_2	T (LVDS)*	PR2A	2	VREF1_2	T (LVDS)*
F11	PT28B	1	VREF2_1	C	PT55B	1	VREF2_1	C
E11	PT28A	1	VREF1_1	T	PT55A	1	VREF1_1	T
GND	GNDIO1	-			GNDIO1	-		
A15	PT27B	1		C	PT54B	1		C
E12	PT26B	1		C	PT53B	1		C
B15	PT27A	1		T	PT54A	1		T
VCCIO	VCCIO1	1			VCCIO1	1		
D12	PT26A	1		T	PT53A	1		T
B14	PT25B	1		C	PT52B	1		C
C14	PT24B	1		C	PT51B	1		C
A14	PT25A	1		T	PT52A	1		T
D13	PT24A	1		T	PT51A	1		T
C13	PT23B	1		C	PT50B	1		C
GND	GNDIO1	-			GNDIO1	-		
A13	PT22B	1		C	PT49B	1		C
B13	PT23A	1		T	PT50A	1		T
VCCIO	VCCIO1	1			VCCIO1	1		
A12	PT22A	1		T	PT49A	1		T
B11	PT21B	1		C	PT48B	1		C
D11	PT20B	1		C	PT47B	1		C
A11	PT21A	1		T	PT48A	1		T
C11	PT20A	1		T	PT47A	1		T

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

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

LFE2-35E/SE and LFE2-50E/SE Logic Signal Connections: 484 fpBGA

LFE2-35E/SE					LFE2-50E/SE			
Ball Number	Ball/Pad Function	Bank	Dual Function	Differential	Ball/Pad Function	Bank	Dual Function	Differential
E4	PL2A	7	VREF2_7/LDQ6	T (LVDS)*	PL2A	7	VREF2_7	T (LVDS)*
E5	PL2B	7	VREF1_7/LDQ6	C (LVDS)*	PL2B	7	VREF1_7	C (LVDS)*
VCCIO	VCCIO7	-			GNDIO7	-		
GNDIO	GNDIO7	-			VCCIO	7		
E3	PL10A	7	LDQ14	T (LVDS)*	PL12A	7	LDQ16	T (LVDS)*
F3	PL10B	7	LDQ14	C (LVDS)*	PL12B	7	LDQ16	C (LVDS)*
F4	PL11A	7	LDQ14	T	PL13A	7	LDQ16	T
F5	PL11B	7	LDQ14	C	PL13B	7	LDQ16	C
E2	PL12A	7	LDQ14	T (LVDS)*	PL14A	7	LDQ16	T (LVDS)*
VCCIO	VCCIO7	7			VCCIO	7		
E1	PL12B	7	LDQ14	C (LVDS)*	PL14B	7	LDQ16	C (LVDS)*
G6	PL13A	7	LDQ14	T	PL15A	7	LDQ16	T
G7	PL13B	7	LDQ14	C	PL15B	7	LDQ16	C
H4	PL14A	7	LDQS14	T (LVDS)*	PL16A	7	LDQS16	T (LVDS)*
GNDIO	GNDIO7	-			GNDIO7	-		
H5	PL14B	7	LDQ14	C (LVDS)*	PL16B	7	LDQ16	C (LVDS)*
F1	PL15A	7	LDQ14	T	PL17A	7	LDQ16	T
F2	PL15B	7	LDQ14	C	PL17B	7	LDQ16	C
VCCIO	VCCIO7	7			VCCIO	7		
G3	PL16A	7	LDQ14	T (LVDS)*	PL18A	7	LDQ16	T (LVDS)*
G4	PL16B	7	LDQ14	C (LVDS)*	PL18B	7	LDQ16	C (LVDS)*
G1	PL17A	7	LDQ14	T	PL19A	7	LDQ16	T
G2	PL17B	7	LDQ14	C	PL19B	7	LDQ16	C
GNDIO	GNDIO7	-			GNDIO7	-		
-	-	-			VCCIO	7		
H6	NC	-			PL25A	7	LUM0_SPLLT_IN_A/LDQ24	T
-	-	-			VCCIO	7		
J6	NC	-			PL25B	7	LUM0_SPLLC_IN_A/LDQ24	C
H3	NC	-			PL26A	7	LUM0_SPLLT_FB_A/LDQ24	T
H2	NC	-			PL26B	7	LUM0_SPLLC_FB_A/LDQ24	C
-	-	-			GNDIO7	-		
-	-	-			VCCIO	7		
H1	PL18A	7	LDQ22		PL37A	7	LDQ41	
J4	PL19A	7	LDQ22	T	PL38A	7	LDQ41	T
J5	PL19B	7	LDQ22	C	PL38B	7	LDQ41	C
VCCIO	VCCIO7	7			VCCIO	7		
J2	PL20A	7	LDQ22	T (LVDS)*	PL39A	7	LDQ41	T (LVDS)*
J1	PL20B	7	LDQ22	C (LVDS)*	PL39B	7	LDQ41	C (LVDS)*
L6	PL21A	7	LDQ22	T	PL40A	7	LDQ41	T
L5	PL21B	7	LDQ22	C	PL40B	7	LDQ41	C
GNDIO	GNDIO7	-			GNDIO7	-		
K3	PL22A	7	LDQS22	T (LVDS)*	PL41A	7	LDQS41	T (LVDS)*
K4	PL22B	7	LDQ22	C (LVDS)*	PL41B	7	LDQ41	C (LVDS)*
K2	PL23A	7	LDQ22	T	PL42A	7	LDQ41	T
VCCIO	VCCIO7	7			VCCIO	7		

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		

LFE2-50E/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	
G24	PR14B	2	RDQ16	C (LVDS)*	PR27B	2	RDQ29	C (LVDS)*	
G23	PR14A	2	RDQ16	T (LVDS)*	PR27A	2	RDQ29	T (LVDS)*	
VCCIO	VCCIO2	2			VCCIO2	2			
K19	PR13B	2	RDQ16	C	PR26B	2	RDQ29	C	
J19	PR13A	2	RDQ16	T	PR26A	2	RDQ29	T	
D26	PR12B	2	RDQ16	C (LVDS)*	PR25B	2	RDQ29	C (LVDS)*	
C26	PR12A	2	RDQ16	T (LVDS)*	PR25A	2	RDQ29	T (LVDS)*	
F22	PR11B	2	RDQ8	C	PR24B	2	RDQ21	C	
E24	PR11A	2	RDQ8	T	PR24A	2	RDQ21	T	
GND	GNDIO2	-			GNDIO2	-			
D25	PR10B	2	RDQ8	C (LVDS)*	PR23B	2	RDQ21	C (LVDS)*	
C25	PR10A	2	RDQ8	T (LVDS)*	PR23A	2	RDQ21	T (LVDS)*	
D24	PR9B	2	RDQ8	C	PR22B	2	RDQ21	C	
B25	PR9A	2	RDQ8	T	PR22A	2	RDQ21	T	
VCCIO	VCCIO2	2			VCCIO2	2			
H21	PR8B	2	RDQ8	C (LVDS)*	PR21B	2	RDQ21	C (LVDS)*	
G22	PR8A	2	RDQS8	T (LVDS)*	PR21A	2	RDQS21	T (LVDS)*	
B24	PR7B	2	RDQ8	C	PR20B	2	RDQ21	C	
GND	GNDIO2	-			GNDIO2	-			
C24	PR7A	2	RDQ8	T	PR20A	2	RDQ21	T	
D23	PR6B	2	RDQ8	C (LVDS)*	PR19B	2	RDQ21	C (LVDS)*	
C23	PR6A	2	RDQ8	T (LVDS)*	PR19A	2	RDQ21	T (LVDS)*	
G21	PR5B	2	RDQ8	C	PR18B	2	RDQ21	C	
VCCIO	VCCIO2	2			VCCIO2	2			
H20	PR5A	2	RDQ8	T	PR18A	2	RDQ21	T	
GND	GNDIO2	-			GNDIO2	-			
E22	PR2B	2	VREF2_2	C (LVDS)*	PR2B	2	VREF2_2	C (LVDS)*	
F21	PR2A	2	VREF1_2	T (LVDS)*	PR2A	2	VREF1_2	T (LVDS)*	
E23	PT82B	1	VREF2_1	C	PT100B	1	VREF2_1	C	
GND	GNDIO1	-			GNDIO1	-			
D22	PT82A	1	VREF1_1	T	PT100A	1	VREF1_1	T	
G20	PT81B	1		C	PT99B	1		C	
J18	PT81A	1		T	PT99A	1		T	
F20	PT80B	1		C	PT98B	1		C	
VCCIO	VCCIO1	1			VCCIO1	1			
H19	PT80A	1		T	PT98A	1		T	
A24	PT79B	1		C	PT97B	1		C	
A23	PT79A	1		T	PT97A	1		T	
E21	PT78B	1		C	PT96B	1		C	
F19	PT78A	1		T	PT96A	1		T	
C22	PT77B	1		C	PT95B	1		C	
GND	GNDIO1	-			GNDIO1	-			
E20	PT77A	1		T	PT95A	1		T	
B22	PT76B	1		C	PT94B	1		C	
VCCIO	VCCIO1	1			VCCIO1	1			
B23	PT76A	1		T	PT94A	1		T	

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

LFE2-70E/SE				
Ball Number	Ball/Pad Function	Bank	Dual Function	Differential
E27	NC	-		
E28	NC	-		
E29	NC	-		
E3	NC	-		
E30	NC	-		
E4	NC	-		
E5	NC	-		
E6	NC	-		
F25	NC	-		
F5	NC	-		
F6	NC	-		
G6	NC	-		
G7	NC	-		
K10	NC	-		
K9	NC	-		
N27	NC	-		
N4	NC	-		
R1	NC	-		
R2	NC	-		
V27	NC	-		
V4	NC	-		
P22	VCCPLL	-		
P8	VCCPLL	-		
T22	VCCPLL	-		
Y7	VCCPLL	-		

* Supports true LVDS. Other differential signals must be emulated with external resistors.

** These dedicated input pins can be used for GPLLs or GDLLs within the respective quadrant.

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

Note: VCCIO and GND pads are used to determine the average DC current drawn by I/Os between GND/VCCIO connections, or between the last GND/VCCIO in an I/O bank and the end of an I/O bank. The substrate pads listed in the Pin Table do not necessarily have a one to one connection with a package ball or pin.

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	

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

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

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

LFE2M50E/SE				
Ball Number	Ball/Pad Function	Bank	Dual Function	Differential
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
U21	CS1N***	8		
U17	CSN***	8		
U16	D0/SPIFASTN***	8		
VCCIO	VCCIO8	8		
T16	D1***	8		
T17	D2***	8		
T22	D3***	8		
GNDIO	GNDIO8	-		
R22	D4***	8		
T15	D5***	8		
R17	D6***	8		
T20	D7/SPID0***	8		
VCCIO	VCCIO8	8		
T21	DI/CSSPI0N***	8		
R21	DOUT/CSON/CSSPI1N***	8		
R20	BUSY/SISPI***	8		
R16	RLM0_PLLCAP	3		
R18	PR65B	3	RLM0_GDLLC_FB_A	C
GNDIO	GNDIO3	-		
R19	PR65A	3	RLM0_GDLLT_FB_A	T
P22	PR64B	3	RLM0_GDLLC_IN_A**	C (LVDS)*
P21	PR64A	3	RLM0_GDLLT_IN_A**	T (LVDS)*
P16	PR63B	3	RLM0_GPLL_C_IN_A**	C
VCCIO	VCCIO3	3		
P17	PR63A	3	RLM0_GPLLT_IN_A**	T
P20	PR62B	3	RLM0_GPLL_C_FB_A	C (LVDS)*
P19	PR62A	3	RLM0_GPLLT_FB_A	T (LVDS)*
GNDIO	GNDIO3	-		
VCCIO	VCCIO3	3		
P18	PR55B	3	RDQ52	C
N16	PR55A	3	RDQ52	T
GNDIO	GNDIO3	-		
N22	PR54B	3	RDQ52	C (LVDS)*
N21	PR54A	3	RDQ52	T (LVDS)*
N17	PR53B	3	RDQ52	C
N18	PR53A	3	RDQ52	T
VCCIO	VCCIO3	3		
M22	PR52B	3	RDQ52	C (LVDS)*
M21	PR52A	3	RDQS52	T (LVDS)*
M16	PR51B	3	RDQ52	C
GNDIO	GNDIO3	-		
M17	PR51A	3	RDQ52	T
M20	PR50B	3	RDQ52	C (LVDS)*

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

LFE2M50E/SE				
Ball Number	Ball/Pad Function	Bank	Dual Function	Differential
L11	GND	-		
L12	GND	-		
L13	GND	-		
M10	GND	-		
M11	GND	-		
M12	GND	-		
M13	GND	-		
N10	GND	-		
N11	GND	-		
N12	GND	-		
N13	GND	-		
N15	GND	-		
N20	GND	-		
N3	GND	-		
N8	GND	-		
P14	GND	-		
P9	GND	-		
R10	GND	-		
R13	GND	-		
T19	GND	-		
T4	GND	-		
W16	GND	-		
W2	GND	-		
W21	GND	-		
W7	GND	-		
Y10	GND	-		
Y13	GND	-		
Y15	NC	-		
W15	NC	-		
AB20	NC	-		
AB21	NC	-		
AA21	NC	-		
AA20	NC	-		
AB19	NC	-		
AB18	NC	-		
Y22	NC	-		
Y21	NC	-		
Y17	NC	-		
Y18	NC	-		
Y16	NC	-		
W17	NC	-		
Y19	NC	-		
Y20	NC	-		

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

LFE2M50E/SE					LFE2M70E/SE				
Ball Number	Ball/Pad Function	Bank	Dual Function	Differential	Ball/Pad Function	Bank	Dual Function	Differential	
K3	VCCIO7	7			VCCIO7	7			
M10	VCCIO7	7			VCCIO7	7			
M7	VCCIO7	7			VCCIO7	7			
N10	VCCIO7	7			VCCIO7	7			
N3	VCCIO7	7			VCCIO7	7			
P10	VCCIO7	7			VCCIO7	7			
R6	VCCIO7	7			VCCIO7	7			
AA25	VCCIO8	8			VCCIO8	8			
AD28	VCCIO8	8			VCCIO8	8			
AA10	VCCAUX	-			VCCAUX	-			
AA11	VCCAUX	-			VCCAUX	-			
AA20	VCCAUX	-			VCCAUX	-			
AA21	VCCAUX	-			VCCAUX	-			
K10	VCCAUX	-			VCCAUX	-			
K11	VCCAUX	-			VCCAUX	-			
K20	VCCAUX	-			VCCAUX	-			
K21	VCCAUX	-			VCCAUX	-			
L10	VCCAUX	-			VCCAUX	-			
L11	VCCAUX	-			VCCAUX	-			
L20	VCCAUX	-			VCCAUX	-			
L21	VCCAUX	-			VCCAUX	-			
Y10	VCCAUX	-			VCCAUX	-			
Y11	VCCAUX	-			VCCAUX	-			
Y20	VCCAUX	-			VCCAUX	-			
Y21	VCCAUX	-			VCCAUX	-			
A1	GND	-			GND	-			
A13	GND	-			GND	-			
A18	GND	-			GND	-			
A24	GND	-			GND	-			
A30	GND	-			GND	-			
A7	GND	-			GND	-			
AA14	GND	-			GND	-			
AA15	GND	-			GND	-			
AA16	GND	-			GND	-			
AA17	GND	-			GND	-			
AA24	GND	-			GND	-			
AA27	GND	-			GND	-			
AA4	GND	-			GND	-			
AB24	GND	-			GND	-			
AB7	GND	-			GND	-			
AD12	GND	-			GND	-			
AD19	GND	-			GND	-			
AD27	GND	-			GND	-			
AE22	GND	-			GND	-			
AE27	GND	-			GND	-			
AE4	GND	-			GND	-			
AE9	GND	-			GND	-			
AF14	GND	-			GND	-			

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

LFE2M100E/SE				
Ball Number	Ball/Pad Function	Bank	Dual Function	Differential
H14	PT61A	0		T
A14	PT60B	0		C
B14	PT60A	0		T
D13	PT59B	0		C
GNDIO	GNDIO0	-		
F13	PT59A	0		T
G13	PT58B	0		C
VCCIO	VCCIO0	0		
J11	PT58A	0		T
D4	PT57B	0		
D5	PT56A	0		
E5	PT55B	0		C
F6	PT55A	0		T
GNDIO	GNDIO0	-		
VCCIO	VCCIO0	0		
F7	PT52B	0		C
D8	PT52A	0		T
GNDIO	GNDIO0	-		
J13	PT50B	0		C
G11	PT50A	0		T
H13	PT49B	0		C
H12	PT49A	0		T
VCCIO	VCCIO0	0		
E8	PT48B	0		C
D9	PT48A	0		T
D12	PT46B	0		C
GNDIO	GNDIO0	-		
E13	PT46A	0		T
VCCIO	VCCIO0	0		
GNDIO	GNDIO0	-		
J12	PT31B	0		C
-	-	-		
VCCIO	VCCIO0	0		
H10	PT31A	0		T
E12	PT30B	0		C
D11	PT30A	0		T
H11	PT29B	0		C
F11	PT29A	0		T
C13	ULC_SQ_VCCR0	11		
A12	ULC_SQ_HDINP0	11		T
B13	ULC_SQ_VCCIB0	11		
B12	ULC_SQ_HDINN0	11		C
C10	ULC_SQ_VCCTX0	11		

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

LFE2M70E/SE				LFE2M100E/SE				
Ball Number	Ball/Pad Function	Bank	Dual Function	Differential	Ball/Pad Function	Bank	Dual Function	Differential
AE12	NC	-			NC	-		
AE13	NC	-			NC	-		
AE19	NC	-			NC	-		
AE21	NC	-			NC	-		
AE22	NC	-			NC	-		
AE23	NC	-			NC	-		
AF11	NC	-			NC	-		
AF21	NC	-			NC	-		
AF22	NC	-			NC	-		
AF24	NC	-			NC	-		
AF8	NC	-			NC	-		
AF9	NC	-			NC	-		
AG10	NC	-			NC	-		
AG11	NC	-			NC	-		
AG24	NC	-			NC	-		
AG25	NC	-			NC	-		
AG26	NC	-			NC	-		
AG3	NC	-			NC	-		
AG7	NC	-			NC	-		
AG8	NC	-			NC	-		
AG9	NC	-			NC	-		
AH10	NC	-			NC	-		
AH11	NC	-			NC	-		
AH13	NC	-			NC	-		
AH24	NC	-			NC	-		
AH25	NC	-			NC	-		
AH26	NC	-			NC	-		
AH27	NC	-			NC	-		
AH5	NC	-			NC	-		
AH6	NC	-			NC	-		
AH7	NC	-			NC	-		
AH8	NC	-			NC	-		
AH9	NC	-			NC	-		
AJ10	NC	-			NC	-		
AJ11	NC	-			NC	-		
AJ13	NC	-			NC	-		
AJ24	NC	-			NC	-		
AJ25	NC	-			NC	-		
AJ26	NC	-			NC	-		
AJ27	NC	-			NC	-		
AJ3	NC	-			NC	-		
AJ4	NC	-			NC	-		
AJ5	NC	-			NC	-		
AJ6	NC	-			NC	-		
AJ7	NC	-			NC	-		
AJ8	NC	-			NC	-		
AJ9	NC	-			NC	-		
AK10	NC	-			NC	-		
AK11	NC	-			NC	-		

Part Number	I/Os	Voltage	Grade	Package	Pins	Temp.	LUTs (K)
LFE2-35E-5F484C	331	1.2V	-5	fpBGA	484	COM	35
LFE2-35E-6F484C	331	1.2V	-6	fpBGA	484	COM	35
LFE2-35E-7F484C	331	1.2V	-7	fpBGA	484	COM	35
LFE2-35E-5F672C	450	1.2V	-5	fpBGA	672	COM	35
LFE2-35E-6F672C	450	1.2V	-6	fpBGA	672	COM	35
LFE2-35E-7F672C	450	1.2V	-7	fpBGA	672	COM	35

Part Number	I/Os	Voltage	Grade	Package	Pins	Temp.	LUTs (K)
LFE2-50E-5F484C	339	1.2V	-5	fpBGA	484	COM	50
LFE2-50E-6F484C	339	1.2V	-6	fpBGA	484	COM	50
LFE2-50E-7F484C	339	1.2V	-7	fpBGA	484	COM	50
LFE2-50E-5F672C	500	1.2V	-5	fpBGA	672	COM	50
LFE2-50E-6F672C	500	1.2V	-6	fpBGA	672	COM	50
LFE2-50E-7F672C	500	1.2V	-7	fpBGA	672	COM	50

Part Number	I/Os	Voltage	Grade	Package	Pins	Temp.	LUTs (K)
LFE2-70E-5F672C	500	1.2V	-5	fpBGA	672	COM	70
LFE2-70E-6F672C	500	1.2V	-6	fpBGA	672	COM	70
LFE2-70E-7F672C	500	1.2V	-7	fpBGA	672	COM	70
LFE2-70E-5F900C	583	1.2V	-5	fpBGA	900	COM	70
LFE2-70E-6F900C	583	1.2V	-6	fpBGA	900	COM	70
LFE2-70E-7F900C	583	1.2V	-7	fpBGA	900	COM	70

Industrial

Part Number	I/Os	Voltage	Grade	Package	Pins	Temp.	LUTs (K)
LFE2-6E-5T144I	90	1.2V	-5	TQFP	144	IND	6
LFE2-6E-6T144I	90	1.2V	-6	TQFP	144	IND	6
LFE2-6E-5F256I	190	1.2V	-5	fpBGA	256	IND	6
LFE2-6E-6F256I	190	1.2V	-6	fpBGA	256	IND	6

Part Number	I/Os	Voltage	Grade	Package	Pins	Temp.	LUTs (K)
LFE2-12E-5T144I	93	1.2V	-5	TQFP	144	IND	12
LFE2-12E-6T144I	93	1.2V	-6	TQFP	144	IND	12
LFE2-12E-5Q208I	131	1.2V	-5	PQFP	208	IND	12
LFE2-12E-6Q208I	131	1.2V	-6	PQFP	208	IND	12
LFE2-12E-5F256I	193	1.2V	-5	fpBGA	256	IND	12
LFE2-12E-6F256I	193	1.2V	-6	fpBGA	256	IND	12
LFE2-12E-5F484I	297	1.2V	-5	fpBGA	484	IND	12
LFE2-12E-6F484I	297	1.2V	-6	fpBGA	484	IND	12

Industrial

Part Number	I/Os	Voltage	Grade	Package	Pins	Temp.	LUTs (K)
LFE2M20SE-5FN484I	304	1.2V	-5	Lead-Free fpBGA	484	Ind	20
LFE2M20SE-6FN484I	304	1.2V	-6	Lead-Free fpBGA	484	Ind	20
LFE2M20SE-5FN256I	140	1.2V	-5	Lead-Free fpBGA	256	Ind	20
LFE2M20SE-6FN256I	140	1.2V	-6	Lead-Free fpBGA	256	Ind	20

Part Number	I/Os	Voltage	Grade	Package	Pins	Temp.	LUTs (K)
LFE2M35SE-5FN672I	410	1.2V	-5	Lead-Free fpBGA	672	Ind	35
LFE2M35SE-6FN672I	410	1.2V	-6	Lead-Free fpBGA	672	Ind	35
LFE2M35SE-5FN484I	303	1.2V	-5	Lead-Free fpBGA	484	Ind	35
LFE2M35SE-6FN484I	303	1.2V	-6	Lead-Free fpBGA	484	Ind	35
LFE2M35SE-5FN256I	140	1.2V	-5	Lead-Free fpBGA	256	Ind	35
LFE2M35SE-6FN256I	140	1.2V	-6	Lead-Free fpBGA	256	Ind	35

Part Number	I/Os	Voltage	Grade	Package	Pins	Temp.	LUTs (K)
LFE2M50SE-5FN900I	410	1.2V	-5	Lead-Free fpBGA	900	Ind	50
LFE2M50SE-6FN900I	410	1.2V	-6	Lead-Free fpBGA	900	Ind	50
LFE2M50SE-5FN672I	372	1.2V	-5	Lead-Free fpBGA	672	Ind	50
LFE2M50SE-6FN672I	372	1.2V	-6	Lead-Free fpBGA	672	Ind	50
LFE2M50SE-5FN484I	270	1.2V	-5	Lead-Free fpBGA	484	Ind	50
LFE2M50SE-6FN484I	270	1.2V	-6	Lead-Free fpBGA	484	Ind	50

Part Number	I/Os	Voltage	Grade	Package	Pins	Temp.	LUTs (K)
LFE2M70SE-5FN1152I	436	1.2V	-5	Lead-Free fpBGA	1152	Ind	70
LFE2M70SE-6FN1152I	436	1.2V	-6	Lead-Free fpBGA	1152	Ind	70
LFE2M70SE-5FN900I	416	1.2V	-5	Lead-Free fpBGA	900	Ind	70
LFE2M70SE-6FN900I	416	1.2V	-6	Lead-Free fpBGA	900	Ind	70

Part Number	I/Os	Voltage	Grade	Package	Pins	Temp.	LUTs (K)
LFE2M100SE-5FN1152I	520	1.2V	-5	Lead-Free fpBGA	1152	Ind	100
LFE2M100SE-6FN1152I	520	1.2V	-6	Lead-Free fpBGA	1152	Ind	100
LFE2M100SE-5FN900I	416	1.2V	-5	Lead-Free fpBGA	900	Ind	100
LFE2M100SE-6FN900I	416	1.2V	-6	Lead-Free fpBGA	900	Ind	100