



Welcome to [E·XFL.COM](https://www.e-xfl.com)

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	1500
Number of Logic Elements/Cells	12000
Total RAM Bits	226304
Number of I/O	131
Number of Gates	-
Voltage - Supply	1.14V ~ 1.26V
Mounting Type	Surface Mount
Operating Temperature	0°C ~ 85°C (TJ)
Package / Case	208-BFQFP
Supplier Device Package	208-PQFP (28x28)
Purchase URL	https://www.e-xfl.com/product-detail/lattice-semiconductor/lfe2-12e-6qn208c

Figure 3-6. SPI4.2 Parameters

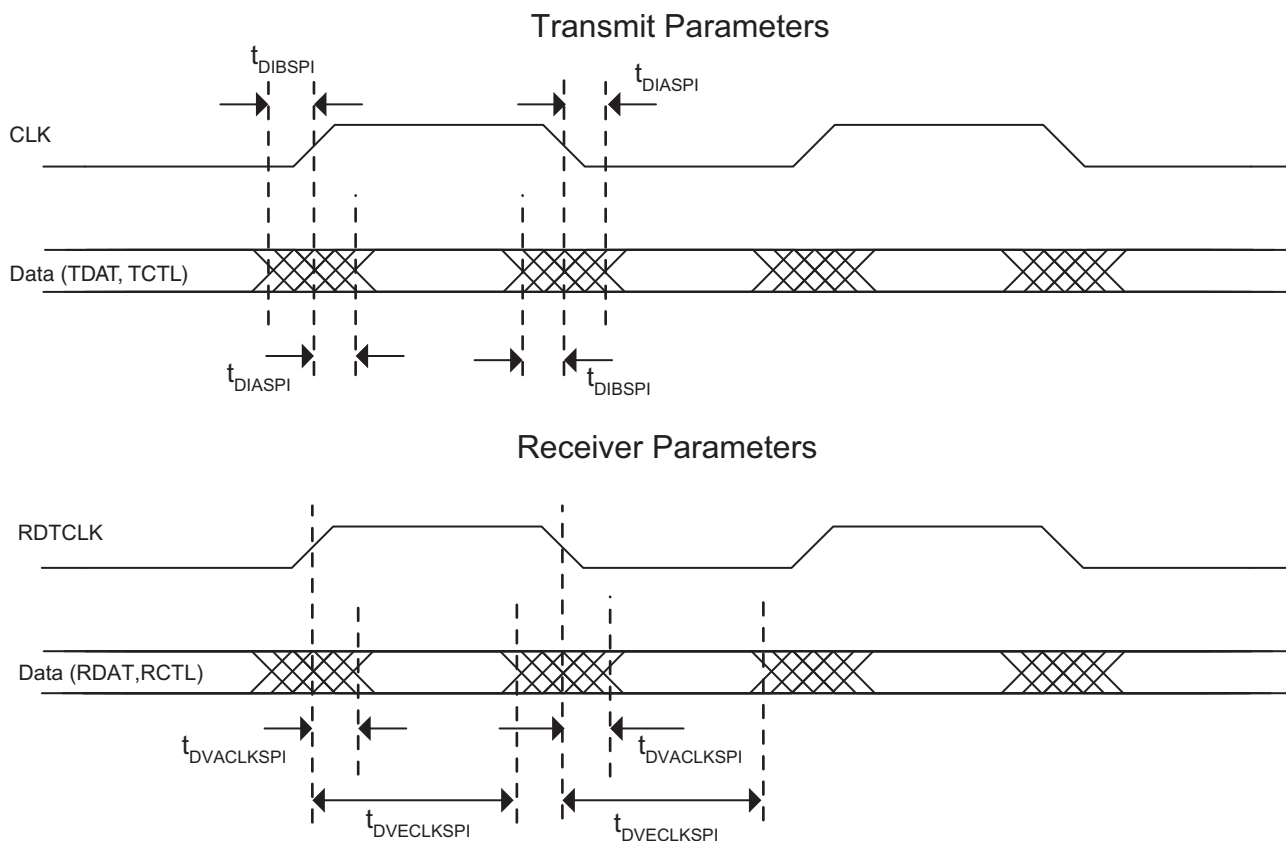
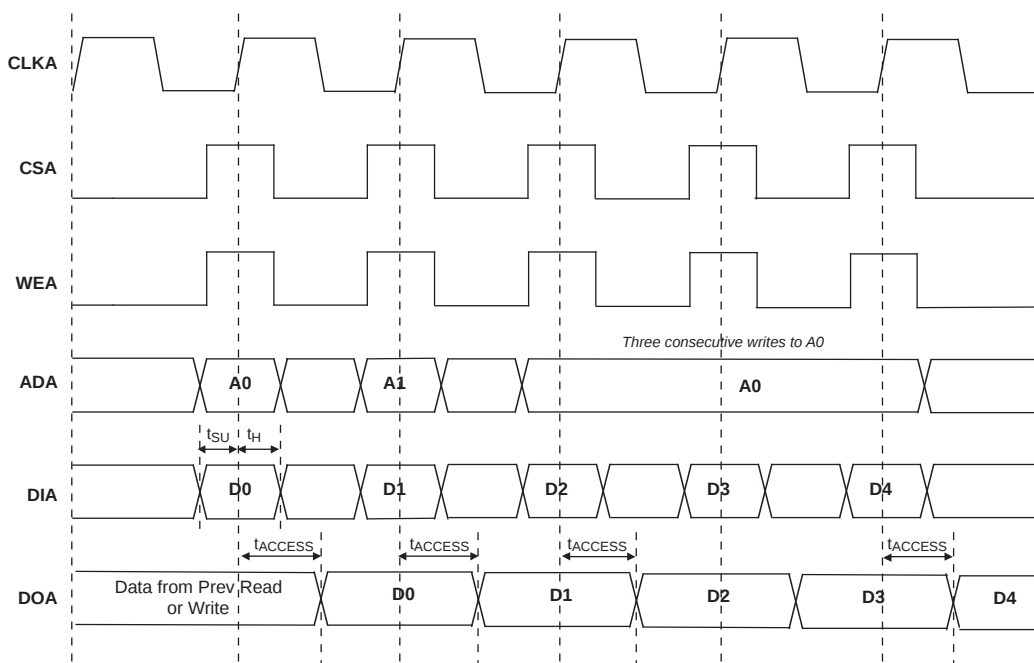


Figure 3-11. Write Through (SP Read/Write on Port A, Input Registers Only)



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.

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

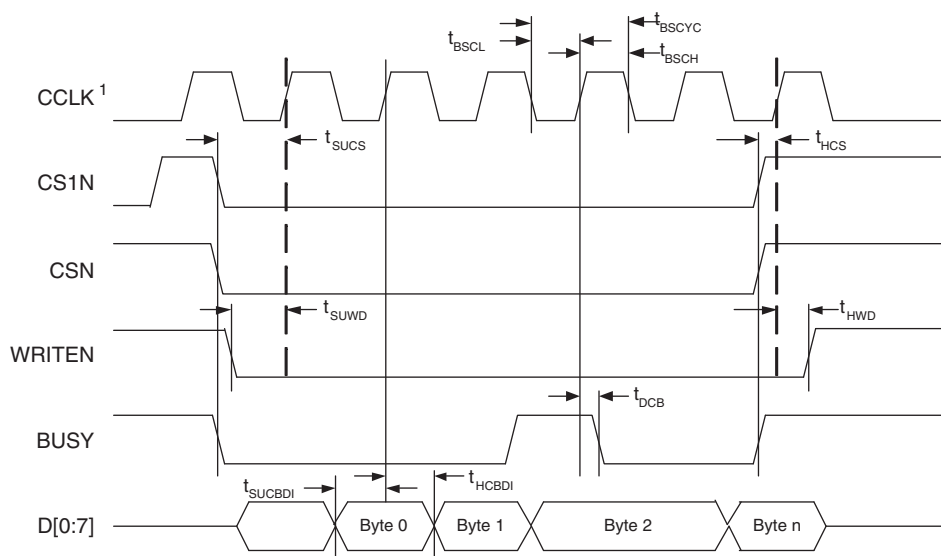
Buffer Type	Description	-7	-6	-5	Units
LVC MOS25_4mA	LVC MOS 2.5 4mA drive, slow slew rate	2.18	2.26	2.33	ns
LVC MOS25_8mA	LVC MOS 2.5 8mA drive, slow slew rate	2.19	2.35	2.51	ns
LVC MOS25_12mA	LVC MOS 2.5 12mA drive, slow slew rate	1.50	1.66	1.82	ns
LVC MOS25_16mA	LVC MOS 2.5 16mA drive, slow slew rate	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

Table 3-18. Reference Clock

Symbol	Description	Test Conditions	Min.	Typ.	Max.	Units
F_{REFCLK}	Reference clock frequency		—	100	—	MHz
V_{CM}	Input common mode voltage		—	0.65	—	V
T_R/T_F	Clock input rise/fall time		—	—	1.0	ns
V_{SW}	Differential input voltage swing		0.6	—	1.6	V
DC_{REFCLK}	Input clock duty cycle		40	50	60	%
PPM	Reference clock tolerance		-300	—	+300	ppm

Figure 3-15. sysCONFIG Parallel Port Write Cycle



1. In Master Parallel Mode the FPGA provides CCLK. In Slave Parallel Mode the external device provides CCLK.

Figure 3-16. sysCONFIG Slave Serial Port Timing

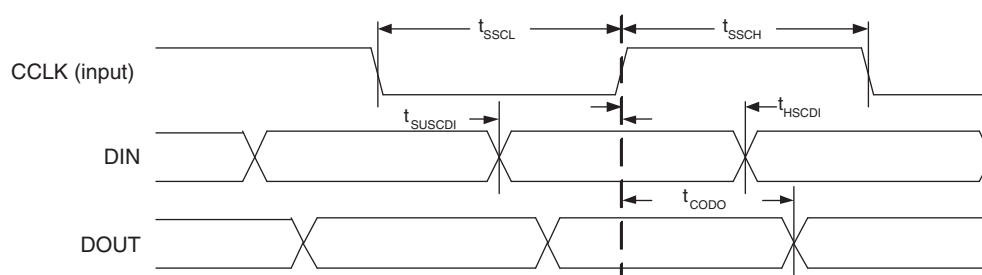
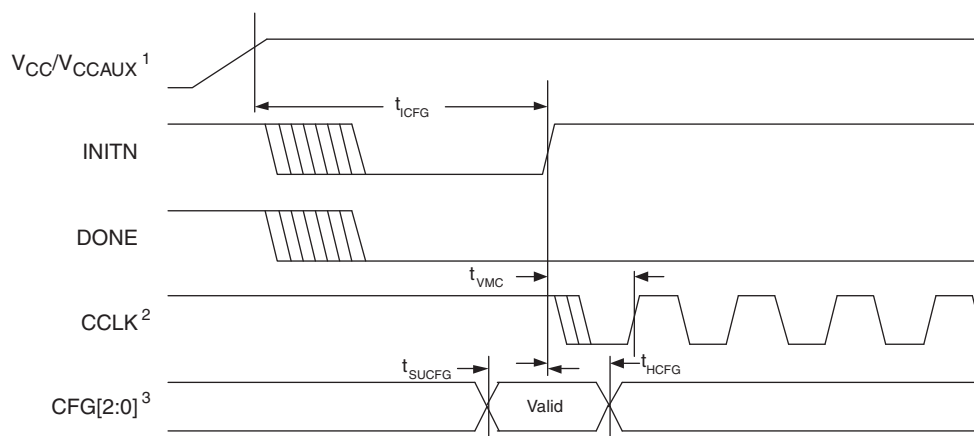


Figure 3-17. Power-On-Reset (POR) Timing



1. Time taken from V_{CC} or V_{CCAUX} , whichever is the last to reach its V_{MIN} .
2. Device is in a Master Mode.
3. The CFG pins are normally static (hard wired).

LFE2-6E/SE and LFE2-12E/SE Logic Signal Connections: 144 TQFP

LFE2-6E/SE					LFE2-12E/12SE				
Pin Number	Pin/Pad Function	Bank	Dual Function	Differential	Pin/Pad Function	Bank	Dual Function	Differential	
1	PL2A	7	VREF2_7	T (LVDS)*	PL2A	7	VREF2_7	T (LVDS)*	
2	PL2B	7	VREF1_7	C (LVDS)*	PL2B	7	VREF1_7	C (LVDS)*	
3	PL4A	7		T (LVDS)*	PL4A	7		T (LVDS)*	
4	PL4B	7		C (LVDS)*	PL4B	7		C (LVDS)*	
5	PL6A	7	LDQ10	T (LVDS)*	PL6A	7	LDQ10	T (LVDS)*	
6	VCCAUX	-			VCCAUX	-			
7	PL6B	7	LDQ10	C (LVDS)*	PL6B	7	LDQ10	C (LVDS)*	
8	PL8A	7	LDQ10	T (LVDS)*	PL8A	7	LDQ10	T (LVDS)*	
9	VCCIO7	7			VCCIO7	7			
10	PL8B	7	LDQ10	C (LVDS)*	PL8B	7	LDQ10	C (LVDS)*	
11	GND	-			GND	-			
12	PL12A	7	LDQ10	T (LVDS)*	PL12A	7	LDQ10	T (LVDS)*	
13	PL12B	7	LDQ10	C (LVDS)*	PL12B	7	LDQ10	C (LVDS)*	
14	PL13A	7	PCLKT7_0/LDQ10	T	PL13A	7	PCLKT7_0/LDQ10	T	
15	PL13B	7	PCLKC7_0/LDQ10	C	PL13B	7	PCLKC7_0/LDQ10	C	
16	VCC	-			VCC	-			
17	PL15A	6	PCLKT6_0	T (LVDS)*	PL15A	6	PCLKT6_0	T (LVDS)*	
18	PL15B	6	PCLKC6_0	C (LVDS)*	PL15B	6	PCLKC6_0	C (LVDS)*	
19	PL16A	6	VREF2_6	T	PL16A	6	VREF2_6	T	
20	PL16B	6	VREF1_6	C	PL16B	6	VREF1_6	C	
21	GND	-			GND	-			
22	VCC	-			VCC	-			
23	PL18A	6	LLM0_GDLLT_FB_A	T	PL18A	6	LLM0_GDLLT_FB_A	T	
24	PL18B	6	LLM0_GDLLC_FB_A	C	PL18B	6	LLM0_GDLLC_FB_A	C	
25	LLM0_PLLCAP	6			LLM0_PLLCAP	6			
26	PL20A	6	LLM0_GPLLT_IN_A**	T (LVDS)*	PL20A	6	LLM0_GPLLT_IN_A**	T (LVDS)*	
27	PL20B	6	LLM0_GPLLC_IN_A**	C (LVDS)*	PL20B	6	LLM0_GPLLC_IN_A**	C (LVDS)*	
28	PL22A	6			PL22A	6			
29	VCC	-			VCC	-			
30	GND	-			GND	-			
31	VCCIO6	6			VCCIO6	6			
32	TCK	-			TCK	-			
33	TDI	-			TDI	-			
34	TDO	-			TDO	-			
35	VCCJ	-			VCCJ	-			
36	TMS	-			TMS	-			
37	PB2A	5	VREF2_5/BDQ6	T	PB2A	5	VREF2_5/BDQ6	T	
38	PB2B	5	VREF1_5/BDQ6	C	PB2B	5	VREF1_5/BDQ6	C	
39	VCCAUX	-			VCCAUX	-			
40	PB4A	5	BDQ6	T	PB6A	5	BDQS6	T	
41	PB4B	5	BDQ6	C	PB6B	5	BDQ6	C	
42	VCCIO5	5			VCCIO5	5			
43	PB6A	5	BDQS6	T	PB12A	5	BDQ15	T	
44	PB6B	5	BDQ6	C	PB12B	5	BDQ15	C	
45	NC	5			PB16A	5	BDQ15	T	

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
N14	CFG1	8			CFG1	8		
N13	PROGRAMN	8			PROGRAMN	8		
N15	CFG0	8			CFG0	8		
P15	PR30B	8	WRITEN	C	PR30B	8	WRITEN	C
L12	INITN	8			INITN	8		
N16	PR29B	8	CSN	C	PR29B	8	CSN	C
GND	GNDIO8	-			GNDIO8	-		
R14	CCLK	8			CCLK	8		
P14	PR30A	8	CS1N	T	PR30A	8	CS1N	T
M13	DONE	8			DONE	8		
R16	PR28B	8	D1	C	PR28B	8	D1	C
VCCIO	VCCIO8	8			VCCIO8	8		
M16	PR29A	8	D0/SPIFASTN	T	PR29A	8	D0/SPIFASTN	T
P16	PR28A	8	D2	T	PR28A	8	D2	T
L15	PR27B	8	D3	C	PR27B	8	D3	C
GND	GNDIO8	-			GNDIO8	-		
L14	PR26A	8	D6	T	PR26A	8	D6	T
L16	PR27A	8	D4	T	PR27A	8	D4	T
L10	PR25B	8	D7/SPID0	C	PR25B	8	D7/SPID0	C
L13	PR26B	8	D5	C	PR26B	8	D5	C
VCCIO	VCCIO8	8			VCCIO8	8		
K11	PR25A	8	DI/CSSPI0N	T	PR25A	8	DI/CSSPI0N	T
K14	PR24B	8	DOU/CSON	C	PR24B	8	DOU/CSON	C
K13	PR24A	8	BUSY/SISPI	T	PR24A	8	BUSY/SISPI	T
GND	GNDIO8	-			GNDIO8	-		
K15	PR21B	3	RLM0_GPLL_C_FB_A	C	PR21B	3	RLM0_GPLL_C_FB_A	C
VCCIO	VCCIO3	3			VCCIO3	3		
K16	PR21A	3	RLM0_GPLL_T_FB_A	T	PR21A	3	RLM0_GPLL_T_FB_A	T
GND	GNDIO3	-			GNDIO3	-		
J16	PR20B	3	RLM0_GPLL_C_IN_A**	C (LVDS)*	PR20B	3	RLM0_GPLL_C_IN_A**	C (LVDS)*
J15	PR20A	3	RLM0_GPLL_T_IN_A**	T (LVDS)*	PR20A	3	RLM0_GPLL_T_IN_A**	T (LVDS)*
J14	RLM0_PLLCAP	3			RLM0_PLLCAP	3		
J13	PR18B	3	RLM0_GDLL_C_FB_A	C	PR18B	3	RLM0_GDLL_C_FB_A	C
J12	PR18A	3	RLM0_GDLL_T_FB_A	T	PR18A	3	RLM0_GDLL_T_FB_A	T
H12	PR17B	3	RLM0_GDLL_C_IN_A**	C (LVDS)*	PR17B	3	RLM0_GDLL_C_IN_A**	C (LVDS)*
GND	GNDIO3	-			GNDIO3	-		
H13	PR17A	3	RLM0_GDLL_T_IN_A**	T (LVDS)*	PR17A	3	RLM0_GDLL_T_IN_A**	T (LVDS)*
H15	PR16B	3	VREF2_3	C	PR16B	3	VREF2_3	C
VCCIO	VCCIO3	3			VCCIO3	3		
H16	PR16A	3	VREF1_3	T	PR16A	3	VREF1_3	T
H11	PR15B	3	PCLKC3_0	C (LVDS)*	PR15B	3	PCLKC3_0	C (LVDS)*
J11	PR15A	3	PCLKT3_0	T (LVDS)*	PR15A	3	PCLKT3_0	T (LVDS)*
G16	PR13B	2	PCLKC2_0/RDQ10	C	PR13B	2	PCLKC2_0/RDQ10	C
GND	GNDIO2	-			GNDIO2	-		
G15	PR13A	2	PCLKT2_0/RDQ10	T	PR13A	2	PCLKT2_0/RDQ10	T

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
M19	NC	-			PR26A	3	RDQ25	T
J22	NC	-			PR23B	3	RDQ25	C (LVDS)*
-	-	-			GNDIO	-		
L22	NC	-			PR24B	3	RDQ25	C
H22	NC	-			PR23A	3	RDQ25	T (LVDS)*
K22	NC	-			PR24A	3	RDQ25	T
M20	PR16B	3	VREF2_3	C	PR22B	3	VREF2_3/RDQ25	C
VCCIO	VCCIO3	3			VCCIO3	3		
L21	PR16A	3	VREF1_3	T	PR22A	3	VREF1_3/RDQ25	T
K21	PR15B	3	PCLKC3_0	C (LVDS)*	PR21B	3	PCLKC3_0/RDQ25	C (LVDS)*
J21	PR15A	3	PCLKT3_0	T (LVDS)*	PR21A	3	PCLKT3_0/RDQ25	T (LVDS)*
M18	PR13B	2	PCLKC2_0/RDQ10	C	PR19B	2	PCLKC2_0/RDQ16	C
GNDIO	GNDIO2	-			GNDIO2	-		
L17	PR13A	2	PCLKT2_0/RDQ10	T	PR19A	2	PCLKT2_0/RDQ16	T
L19	PR12B	2	RDQ10	C (LVDS)*	PR18B	2	RDQ16	C (LVDS)*
K18	PR10B	2	RDQ10	C (LVDS)*	PR16B	2	RDQ16	C (LVDS)*
L20	PR12A	2	RDQ10	T (LVDS)*	PR18A	2	RDQ16	T (LVDS)*
VCCIO	VCCIO2	2			VCCIO2	2		
K19	PR10A	2	RDQS10	T (LVDS)*	PR16A	2	RDQS16	T (LVDS)*
L18	PR11B	2	RDQ10	C	PR17B	2	RDQ16	C
K17	PR11A	2	RDQ10	T	PR17A	2	RDQ16	T
GNDIO	GNDIO2	-			GNDIO2	-		
J17	PR8B	2	RDQ10	C (LVDS)*	PR14B	2	RDQ16	C (LVDS)*
G22	PR9B	2	RDQ10	C	PR15B	2	RDQ16	C
J18	PR8A	2	RDQ10	T (LVDS)*	PR14A	2	RDQ16	T (LVDS)*
F22	PR9A	2	RDQ10	T	PR15A	2	RDQ16	T
VCCIO	VCCIO2	2			VCCIO2	2		
H21	PR6B	2	RDQ10	C (LVDS)*	PR12B	2	RDQ16	C (LVDS)*
K20	PR7B	2	RDQ10	C	PR13B	2	RDQ16	C
G21	PR6A	2	RDQ10	T (LVDS)*	PR12A	2	RDQ16	T (LVDS)*
J19	PR7A	2	RDQ10	T	PR13A	2	RDQ16	T
D22	NC	-			PR10B	2	RDQ8	C (LVDS)*
F21	NC	-			PR11B	2	RDQ8	C
-	-	-			GNDIO	-		
E21	NC	-			PR10A	2	RDQ8	T (LVDS)*
E22	NC	-			PR11A	2	RDQ8	T
H19	NC	-			PR8B	2	RDQ8	C (LVDS)*
G20	NC	-			PR9B	2	RDQ8	C
-	-	-			VCCIO2	2		
G19	NC	-			PR8A	2	RDQS8	T (LVDS)*
F20	NC	-			PR9A	2	RDQ8	T
G17	PR5B	2		C	PR7B	2	RDQ8	C
GNDIO	GNDIO2	-			GNDIO2	-		
E20	PR4B	2		C (LVDS)*	PR6B	2	RDQ8	C (LVDS)*

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/CSSPION	T	PR72A	8	DI/CSSPION	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_GPLL_C_FB_A/RDQ48	C	PR64B	3	RLM0_GPLL_C_FB_A/RDQ67	C
P22	PR45A	3	RLM0_GPLL_T_FB_A/RDQ48	T	PR64A	3	RLM0_GPLL_T_FB_A/RDQ67	T
P21	PR44B	3	RLM0_GPLL_C_IN_A**/RDQ48	C (LVDS)*	PR63B	3	RLM0_GPLL_C_IN_A**/RDQ67	C (LVDS)*
N21	PR44A	3	RLM0_GPLL_T_IN_A**/RDQ48	T (LVDS)*	PR63A	3	RLM0_GPLL_T_IN_A**/RDQ67	T (LVDS)*
N17	RLM0_PLLCAP	3			RLM0_PLLCAP	3		
N22	PR42B	3	RLM0_GDLL_C_FB_A/RDQ39	C	PR61B	3	RLM0_GDLL_C_FB_A/RDQ58	C
N20	PR42A	3	RLM0_GDLL_T_FB_A/RDQ39	T	PR61A	3	RLM0_GDLL_T_FB_A/RDQ58	T
GNDIO	GNDIO3	-			GNDIO3	-		
M22	PR41B	3	RLM0_GDLL_C_IN_A**/RDQ39	C (LVDS)*	PR60B	3	RLM0_GDLL_C_IN_A**/RDQ58	C (LVDS)*
M21	PR41A	3	RLM0_GDLL_T_IN_A**/RDQ39	T (LVDS)*	PR60A	3	RLM0_GDLL_T_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

LFE2-20E/SE and LFE2-35E/SE Logic Signal Connections: 672 fpBGA (Cont.)

LFE2-20E/20SE					LFE2-35E/35SE			
Ball Number	Ball/Pad Function	Bank	Dual Function	Differential	Ball/Pad Function	Bank	Dual Function	Differential
A7	PT26B	0		C	PT26B	0		C
B7	PT26A	0		T	PT26A	0		T
VCCIO	VCCIO0	0			VCCIO0	0		
F12	PT25B	0		C	PT25B	0		C
D10	PT25A	0		T	PT25A	0		T
H11	PT24B	0		C	PT24B	0		C
G11	PT24A	0		T	PT24A	0		T
GND	GNDIO0	-			GNDIO0	-		
A6	PT23B	0		C	PT23B	0		C
B6	PT23A	0		T	PT23A	0		T
D8	PT22B	0		C	PT22B	0		C
C8	PT22A	0		T	PT22A	0		T
VCCIO	VCCIO0	0			VCCIO0	0		
F11	PT21B	0		C	PT21B	0		C
E10	PT21A	0		T	PT21A	0		T
E9	PT20B	0		C	PT20B	0		C
D9	PT20A	0		T	PT20A	0		T
G10	PT19B	0		C	PT19B	0		C
GND	GNDIO0	-			GNDIO0	-		
H10	PT19A	0		T	PT19A	0		T
A5	PT18B	0		C	PT18B	0		C
B5	PT18A	0		T	PT18A	0		T
C7	PT17B	0		C	PT17B	0		C
VCCIO	VCCIO0	0			VCCIO0	0		
D7	PT17A	0		T	PT17A	0		T
E8	PT16B	0		C	PT16B	0		C
F10	PT16A	0		T	PT16A	0		T
F8	PT15B	0		C	PT15B	0		C
H9	PT15A	0		T	PT15A	0		T
C5	PT14B	0		C	PT14B	0		C
GND	GNDIO0	-			GNDIO0	-		
D5	PT14A	0		T	PT14A	0		T
B4	PT13B	0			PT13B	0		
VCCIO	VCCIO0	0			VCCIO0	0		
GND	GNDIO0	-			GNDIO0	-		
VCCIO	VCCIO0	0			VCCIO0	0		
GND	GNDIO0	-			GNDIO0	-		
VCCIO	VCCIO0	0			VCCIO0	0		
C4	PT10B	0		C	PT10B	0		C
GND	GNDIO0	-			GNDIO0	-		
C3	PT10A	0		T	PT10A	0		T
A4	PT9B	0		C	PT9B	0		C
A3	PT9A	0		T	PT9A	0		T
B3	PT8B	0		C	PT8B	0		C
VCCIO	VCCIO0	0			VCCIO0	0		
B2	PT8A	0		T	PT8A	0		T

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

LFE2-50E/SE					LFE2-70E/SE			
Ball Number	Ball/Pad Function	Bank	Dual Function	Differential	Ball/Pad Function	Bank	Dual Function	Differential
C20	PT75B	1		C	PT93B	1		C
D20	PT75A	1		T	PT93A	1		T
A22	PT74B	1		C	PT92B	1		C
A21	PT74A	1		T	PT92A	1		T
GND	GNDIO1	-			GNDIO1	-		
E19	PT71B	1		C	PT85B	1		C
C19	PT71A	1		T	PT85A	1		T
VCCIO	VCCIO1	1			VCCIO1	1		
B21	PT70B	1		C	PT79B	1		C
B20	PT70A	1		T	PT79A	1		T
D19	PT69B	1		C	PT78B	1		C
B19	PT69A	1		T	PT78A	1		T
GND	GNDIO1	-			GNDIO1	-		
G17	PT68B	1		C	PT77B	1		C
E18	PT68A	1		T	PT77A	1		T
G19	PT67B	1		C	PT76B	1		C
F17	PT67A	1		T	PT76A	1		T
VCCIO	VCCIO1	1			VCCIO1	1		
A20	PT66B	1		C	PT75B	1		C
A19	PT66A	1		T	PT75A	1		T
E17	PT65B	1		C	PT74B	1		C
D18	PT65A	1		T	PT74A	1		T
B18	PT64B	1		C	PT73B	1		C
GND	GNDIO1	-			GNDIO1	-		
A18	PT64A	1		T	PT73A	1		T
E16	PT63B	1		C	PT72B	1		C
G16	PT63A	1		T	PT72A	1		T
F16	PT62B	1		C	PT71B	1		C
VCCIO	VCCIO1	1			VCCIO1	1		
H18	PT62A	1		T	PT71A	1		T
A17	PT61B	1		C	PT70B	1		C
B17	PT61A	1		T	PT70A	1		T
C18	PT60B	1		C	PT69B	1		C
B16	PT60A	1		T	PT69A	1		T
C17	PT59B	1		C	PT68B	1		C
GND	GNDIO1	-			GNDIO1	-		
D17	PT59A	1		T	PT68A	1		T
E15	PT58B	1		C	PT67B	1		C
VCCIO	VCCIO1	1			VCCIO1	1		
G15	PT58A	1		T	PT67A	1		T
A16	PT57B	1		C	PT66B	1		C
B15	PT57A	1		T	PT66A	1		T
D15	PT56B	1		C	PT65B	1		C
F15	PT56A	1		T	PT65A	1		T
A14	PT55B	1		C	PT64B	1		C
B14	PT55A	1		T	PT64A	1		T

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

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

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

LFE2M50E/SE				
Ball Number	Ball/Pad Function	Bank	Dual Function	Differential
J11	VCC	-		
J12	VCC	-		
J13	VCC	-		
K14	VCC	-		
K9	VCC	-		
L14	VCC	-		
L9	VCC	-		
M14	VCC	-		
M9	VCC	-		
N14	VCC	-		
N9	VCC	-		
P10	VCC	-		
P11	VCC	-		
P12	VCC	-		
P13	VCC	-		
B5	VCCIO0	0		
B9	VCCIO0	0		
E7	VCCIO0	0		
H9	VCCIO0	0		
D13	VCCIO1	1		
E16	VCCIO1	1		
H14	VCCIO1	1		
E21	VCCIO2	2		
G18	VCCIO2	2		
J15	VCCIO2	2		
K19	VCCIO2	2		
N19	VCCIO3	3		
P15	VCCIO3	3		
T18	VCCIO3	3		
V21	VCCIO3	3		
AA18	VCCIO4	4		
R14	VCCIO4	4		
V16	VCCIO4	4		
W13	VCCIO4	4		
AA5	VCCIO5	5		
R9	VCCIO5	5		
V7	VCCIO5	5		
W10	VCCIO5	5		
N4	VCCIO6	6		
P8	VCCIO6	6		
T5	VCCIO6	6		
V2	VCCIO6	6		
E2	VCCIO7	7		

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	
K19	PR16A	2	RDQ15	T	PR19A	2		T	
G24	PR15B	2	RDQ15	C (LVDS)*	PR18B	2		C*	
G23	PR15A	2	RDQS15	T (LVDS)*	PR18A	2		T*	
GNDIO	GNDIO2	-			GNDIO2	-			
J18	PR14B	2	RDQ15	C	PR14B	2		C	
F22	PR14A	2	RDQ15	T	PR14A	2		T	
-	-	-			VCCIO2	2			
F23	PR13B	2	RDQ15	C (LVDS)*	PR13B	2		C*	
F24	PR13A	2	RDQ15	T (LVDS)*	PR13A	2		T*	
VCCIO	VCCIO2	2			-	-			
H20	PR12B	2	RUM0_SPLLC_FB_A/RDQ15	C	PR12B	2	RUM0_SPLLC_FB_A	C	
-	-	-			GNDIO2	-			
F21	PR12A	2	RUM0_SPLLT_FB_A/RDQ15	T	PR12A	2	RUM0_SPLLT_FB_A	T	
G26	PR11B	2	RUM0_SPLLC_IN_A/RDQ15	C (LVDS)*	PR11B	2	RUM0_SPLLC_IN_A	C*	
F26	PR11A	2	RUM0_SPLLT_IN_A/RDQ15	T (LVDS)*	PR11A	2	RUM0_SPLLT_IN_A	T*	
-	-	-			VCCIO2	2			
E24	PR9B	2	VREF2_2	C	PR9B	2	VREF2_2	C	
GNDIO	GNDIO2	-			GNDIO2	-			
E23	PR9A	2	VREF1_2	T	PR9A	2	VREF1_2	T	
VCCIO	VCCIO4	4			VCCIO2	2			
H19	XRES	-			XRES	-			
C25	URC_SQ_VCCR_X0	12			URC_SQ_VCCR_X0	12			
A24	URC_SQ_HDIN_P0	12		T	URC_SQ_HDIN_P0	12		T	
B25	URC_SQ_VCCIB0	12			URC_SQ_VCCIB0	12			
B24	URC_SQ_HDIN_N0	12		C	URC_SQ_HDIN_N0	12		C	
C22	URC_SQ_VCCTX0	12			URC_SQ_VCCTX0	12			
A21	URC_SQ_HDOUT_P0	12		T	URC_SQ_HDOUT_P0	12		T	
A22	URC_SQ_VCCOB0	12			URC_SQ_VCCOB0	12			
B21	URC_SQ_HDOUT_N0	12		C	URC_SQ_HDOUT_N0	12		C	
C21	URC_SQ_VCCTX1	12			URC_SQ_VCCTX1	12			
B20	URC_SQ_HDOUT_N1	12		C	URC_SQ_HDOUT_N1	12		C	
C20	URC_SQ_VCCOB1	12			URC_SQ_VCCOB1	12			
A20	URC_SQ_HDOUT_P1	12		T	URC_SQ_HDOUT_P1	12		T	
C24	URC_SQ_VCCR_X1	12			URC_SQ_VCCR_X1	12			
B23	URC_SQ_HDIN_N1	12		C	URC_SQ_HDIN_N1	12		C	
C23	URC_SQ_VCCIB1	12			URC_SQ_VCCIB1	12			
A23	URC_SQ_HDIN_P1	12		T	URC_SQ_HDIN_P1	12		T	
B19	URC_SQ_VCCAUX33	12			URC_SQ_VCCAUX33	12			
E19	URC_SQ_REFCLK_N	12		C	URC_SQ_REFCLK_N	12		C	
D19	URC_SQ_REFCLK_P	12		T	URC_SQ_REFCLK_P	12		T	
C19	URC_SQ_VCCP	12			URC_SQ_VCCP	12			
A15	URC_SQ_HDIN_P2	12		T	URC_SQ_HDIN_P2	12		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	
M26	PR27A	2	RDQS27	T (LVDS)*	PR37A	2	RDQS37	T (LVDS)*	
L30	PR26B	2	RDQ27	C	PR36B	2	RDQ37	C	
GNDIO	GNDIO2	-			GNDIO2	-			
L29	PR26A	2	RDQ27	T	PR36A	2	RDQ37	T	
L28	PR25B	2	RDQ27	C (LVDS)*	PR35B	2	RDQ37	C (LVDS)*	
L27	PR25A	2	RDQ27	T (LVDS)*	PR35A	2	RDQ37	T (LVDS)*	
H29	PR24B	2	RDQ27	C	PR34B	2	RDQ37	C	
VCCIO	VCCIO2	2			VCCIO2	2			
G29	PR24A	2	RDQ27	T	PR34A	2	RDQ37	T	
L22	PR23B	2	RDQ27	C (LVDS)*	PR33B	2	RDQ37	C (LVDS)*	
M22	PR23A	2	RDQ27	T (LVDS)*	PR33A	2	RDQ37	T (LVDS)*	
F30	PR21B	2		C	PR31B	2	RDQ28	C	
GNDIO	GNDIO2	-			GNDIO2	-			
F29	PR21A	2		T	PR31A	2	RDQ28	T	
-	-	-			-	-			
-	-	-			-	-			
E30	PR20B	2		C (LVDS)*	PR30B	2	RDQ28	C (LVDS)*	
E29	PR20A	2		T (LVDS)*	PR30A	2	RDQ28	T (LVDS)*	
VCCIO	VCCIO2	2			-	-			
L25	PR19B	2		C	PR29B	2	RDQ28	C	
L26	PR19A	2		T	PR29A	2	RDQ28	T	
-	-	-			VCCIO2	2			
H28	PR18B	2		C (LVDS)*	PR28B	2	RDQ28	C (LVDS)*	
J28	PR18A	2		T (LVDS)*	PR28A	2	RDQS28	T (LVDS)*	
G28	PR16B	2		C	PR27B	2	RDQ28	C	
GNDIO	GNDIO2	-			GNDIO2	-			
G27	PR16A	2		T	PR27A	2	RDQ28	T	
L24	NC	-			PR26B	2	RDQ28	C (LVDS)*	
L23	NC	-			PR26A	2	RDQ28	T (LVDS)*	
D30	NC	-			PR25B	2	RDQ28	C	
-	-	-			VCCIO2	2			
D29	NC	-			PR25A	2	RDQ28	T	
K24	NC	-			PR24B	2	RDQ28	C (LVDS)*	
K25	NC	-			PR24A	2	RDQ28	T (LVDS)*	
J27	NC	-			PR22B	2		C	
-	-	-			GNDIO2	-			
K26	NC	-			PR22A	2		T	
K23	PR15B	2		C (LVDS)*	PR21B	2		C (LVDS)*	
K22	PR15A	2		T (LVDS)*	PR21A	2		T (LVDS)*	
J22	PR14B	2		C	PR20B	2		C	
VCCIO	VCCIO2	-			VCCIO2	2			
J23	PR14A	2		T	PR20A	2		T	
-	-	-			GNDIO2	-			
-	-	-			-	-			
J26	NC	-			PR17B	2	RDQ15	C (LVDS)*	
H26	NC	-			PR17A	2	RDQ15	T (LVDS)*	
H27	NC	-			PR16B	2	RDQ15	C	
G26	NC	-			PR16A	2	RDQ15	T	

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

LFE2M100E/SE				
Ball Number	Ball/Pad Function	Bank	Dual Function	Differential
AF11	PB62B	5	PCLKC5_0/BDQ60	C
VCCIO	VCCIO5	5		
GNDIO	GNDIO5	-		
AJ14	PB67A	4	PCLKT4_0/BDQ69	T
VCCIO	VCCIO4	4		
AK14	PB67B	4	PCLKC4_0/BDQ69	C
AK15	PB68A	4	VREF2_4/BDQ69	T
AK16	PB68B	4	VREF1_4/BDQ69	C
AF18	PB69A	4	BDQS69	T
GNDIO	GNDIO4	-		
AD16	PB69B	4	BDQ69	C
AJ15	PB70A	4	BDQ69	T
AG16	PB70B	4	BDQ69	C
AE17	PB71A	4	BDQ69	T
VCCIO	VCCIO4	4		
AC17	PB71B	4	BDQ69	C
AH16	PB72A	4	BDQ69	T
AK17	PB72B	4	BDQ69	C
AG20	PB73A	4	BDQ69	T
GNDIO	GNDIO4	-		
AG21	PB73B	4	BDQ69	C
AG18	PB74A	4	BDQ78	T
AJ16	PB74B	4	BDQ78	C
AF21	PB75A	4	BDQ78	T
AG22	PB75B	4	BDQ78	C
AD17	PB76A	4	BDQ78	T
AF19	PB76B	4	BDQ78	C
VCCIO	VCCIO4	4		
GNDIO	GNDIO4	-		
AH17	PB80A	4	BDQ78	T
AJ17	PB80B	4	BDQ78	C
VCCIO	VCCIO4	4		
AF26	PB82A	4	BDQ78	T
AE25	PB82B	4	BDQ78	C
GNDIO	GNDIO4	-		
AD24	PB92A	4	BDQ96	T
AE24	PB92B	4	BDQ96	C
AD18	PB93A	4	BDQ96	T
AC18	PB93B	4	BDQ96	C
AE18	PB94A	4	BDQ96	T
AG19	PB94B	4	BDQ96	C
VCCIO	VCCIO4	4		
GNDIO	GNDIO4	-		

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

LFE2M100E/SE				
Ball Number	Ball/Pad Function	Bank	Dual Function	Differential
C29	URC_SQ_VCCR1	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_VCCR2	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_VCCR3	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

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

LFE2M100E/SE				
Ball Number	Ball/Pad Function	Bank	Dual Function	Differential
M10	VCCIO7	7		
M7	VCCIO7	7		
N10	VCCIO7	7		
N3	VCCIO7	7		
P10	VCCIO7	7		
R6	VCCIO7	7		
AA25	VCCIO8	8		
AD28	VCCIO8	8		
AA10	VCCAUX	-		
AA11	VCCAUX	-		
AA20	VCCAUX	-		
AA21	VCCAUX	-		
K10	VCCAUX	-		
K11	VCCAUX	-		
K20	VCCAUX	-		
K21	VCCAUX	-		
L10	VCCAUX	-		
L11	VCCAUX	-		
L20	VCCAUX	-		
L21	VCCAUX	-		
Y10	VCCAUX	-		
Y11	VCCAUX	-		
Y20	VCCAUX	-		
Y21	VCCAUX	-		
A1	GND	-		
A13	GND	-		
A18	GND	-		
A24	GND	-		
A30	GND	-		
A7	GND	-		
AA14	GND	-		
AA15	GND	-		
AA16	GND	-		
AA17	GND	-		
AA24	GND	-		
AA27	GND	-		
AA4	GND	-		
AB24	GND	-		
AB7	GND	-		
AD12	GND	-		
AD19	GND	-		
AD27	GND	-		
AE22	GND	-		

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
AB16	GND	-			GND	-		
AB17	GND	-			GND	-		
AB18	GND	-			GND	-		
AB19	GND	-			GND	-		
AB26	GND	-			GND	-		
AB31	GND	-			GND	-		
AB4	GND	-			GND	-		
AB9	GND	-			GND	-		
AC16	GND	-			GND	-		
AC17	GND	-			GND	-		
AC18	GND	-			GND	-		
AC19	GND	-			GND	-		
AD27	GND	-			GND	-		
AE27	GND	-			GND	-		
AE31	GND	-			GND	-		
AE4	GND	-			GND	-		
AE8	GND	-			GND	-		
AF12	GND	-			GND	-		
AF16	GND	-			GND	-		
AF19	GND	-			GND	-		
AF23	GND	-			GND	-		
AG31	GND	-			GND	-		
AH31	GND	-			GND	-		
AH4	GND	-			GND	-		
AJ14	GND	-			GND	-		
AJ21	GND	-			GND	-		
AK27	GND	-			GND	-		
AK8	GND	-			GND	-		
AL10	GND	-			GND	-		
AL16	GND	-			GND	-		
AL19	GND	-			GND	-		
AL2	GND	-			GND	-		
AL25	GND	-			GND	-		
AL33	GND	-			GND	-		
AP1	GND	-			GND	-		
AP10	GND	-			GND	-		
AP13	GND	-			GND	-		
AP22	GND	-			GND	-		
AP25	GND	-			GND	-		
AP34	GND	-			GND	-		
D10	GND	-			GND	-		
D16	GND	-			GND	-		
D19	GND	-			GND	-		
D2	GND	-			GND	-		
D25	GND	-			GND	-		
D33	GND	-			GND	-		
E27	GND	-			GND	-		
E8	GND	-			GND	-		
F14	GND	-			GND	-		