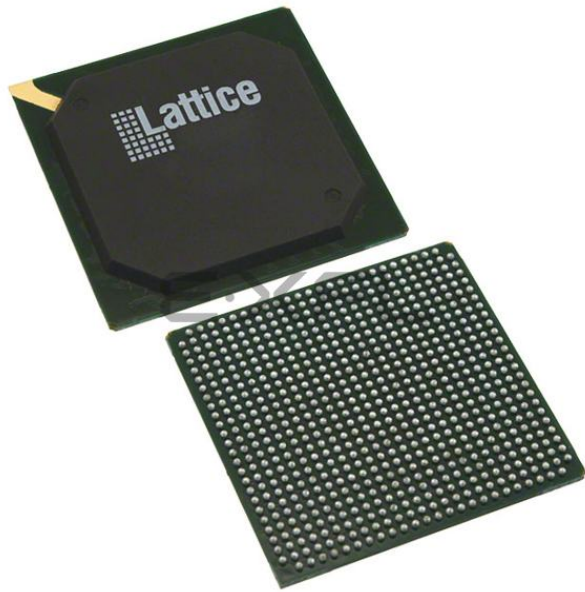




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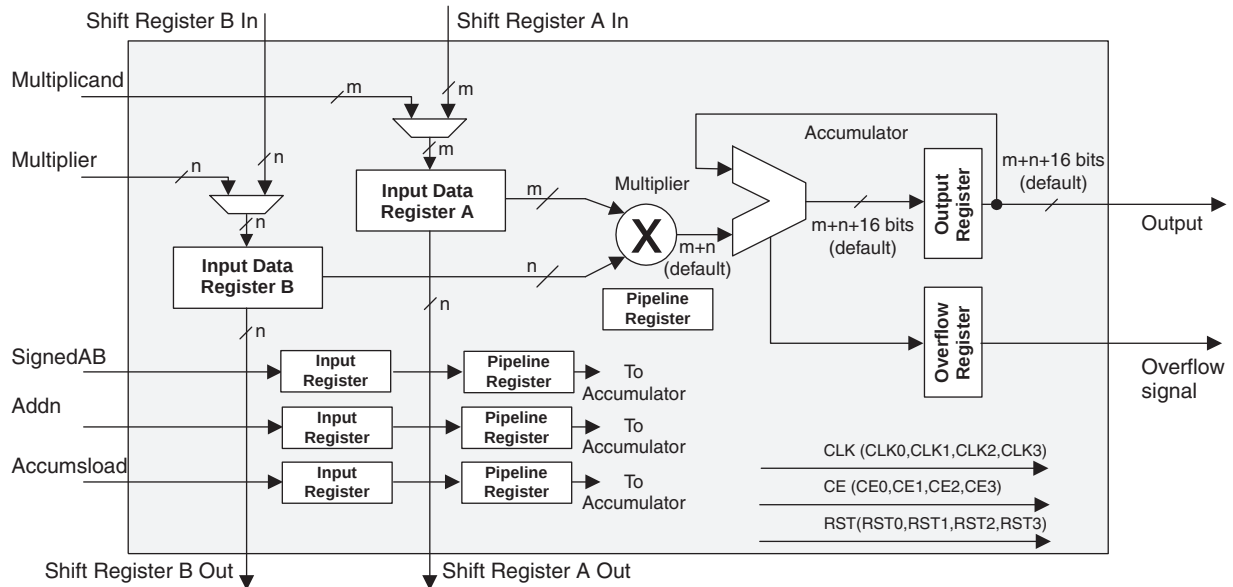
Applications of Embedded - FPGAs

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

Details

Product Status	Obsolete
Number of LABs/CLBs	-
Number of Logic Elements/Cells	19700
Total RAM Bits	434176
Number of I/O	400
Number of Gates	-
Voltage - Supply	1.14V ~ 1.26V
Mounting Type	Surface Mount
Operating Temperature	-40°C ~ 100°C (TJ)
Package / Case	672-BBGA
Supplier Device Package	672-FPBGA (27x27)
Purchase URL	https://www.e-xfl.com/product-detail/lattice-semiconductor/lfecp20e-4fn672i

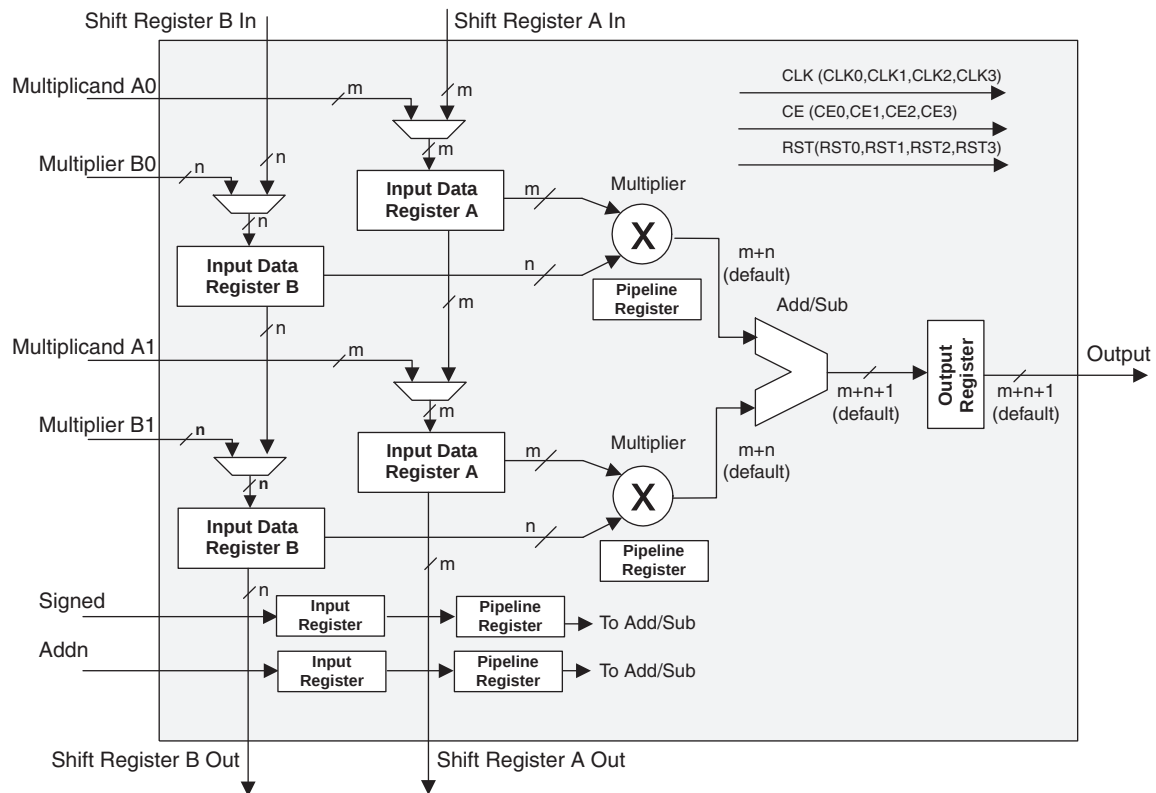
Figure 2-20. MAC sysDSP Element



MULTADD sysDSP Element

In this case, the operands A0 and B0 are multiplied and the result is added/subtracted with the result of the multiplier operation of operands A1 and A2. The user can enable the input, output and pipeline registers. Figure 2-21 shows the MULTADD sysDSP element.

Figure 2-21. MULTADD



LatticeECP/EC sysCONFIG Port Timing Specifications (Continued)

Over Recommended Operating Conditions

Parameter	Description	Min.	Typ.	Max.	Units
t_{SOE}	CSSPIN Active Setup Time	300		—	ns
t_{CSPID}	CSSPIN Low to First Clock Edge Setup Time	300+3cyc		600+6cyc	ns
f_{MAXSPI}	Max Frequency for SPI	—		25	MHz
t_{SUSPI}	SOSPI Data Setup Time Before CCLK	7		—	ns
t_{HSPI}	SOSPI Data Hold Time After CCLK	1		—	ns

Timing v.G 0.30

Master Clock

Clock Mode	Min.	Typ.	Max.	Units
2.5MHz	1.75	2.5	3.25	MHz
5 MHz	3.78	5.4	7.02	MHz
10 MHz	7	10	13	MHz
15 MHz	10.5	15	19.5	MHz
20 MHz	14	20	26	MHz
25 MHz	18.2	26	33.8	MHz
30 MHz	21	30	39	MHz
35 MHz	23.8	34	44.2	MHz
40 MHz	28.7	41	53.3	MHz
45 MHz	31.5	45	58.5	MHz
50 MHz	35.7	51	66.3	MHz
55 MHz	38.5	55	71.5	MHz
60 MHz	42	60	78	MHz
Duty Cycle	40	—	60	%

Timing v.G 0.30

Figure 3-14. sysCONFIG Master Serial Port Timing

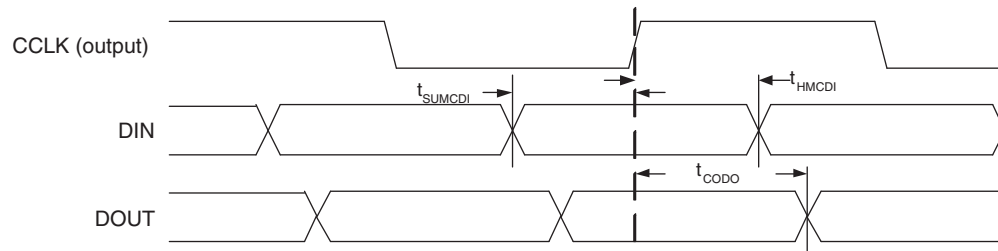


Figure 3-15. sysCONFIG Slave Serial Port Timing

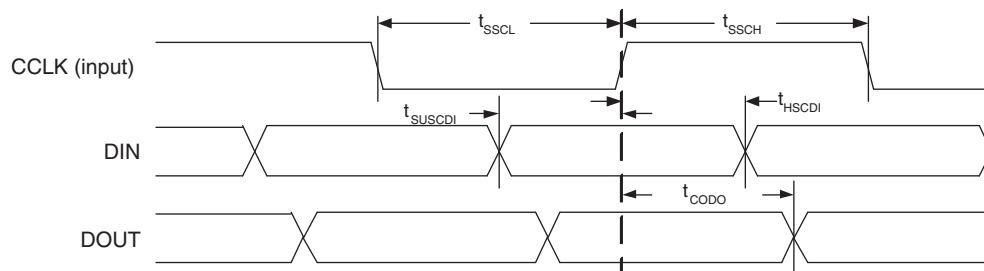
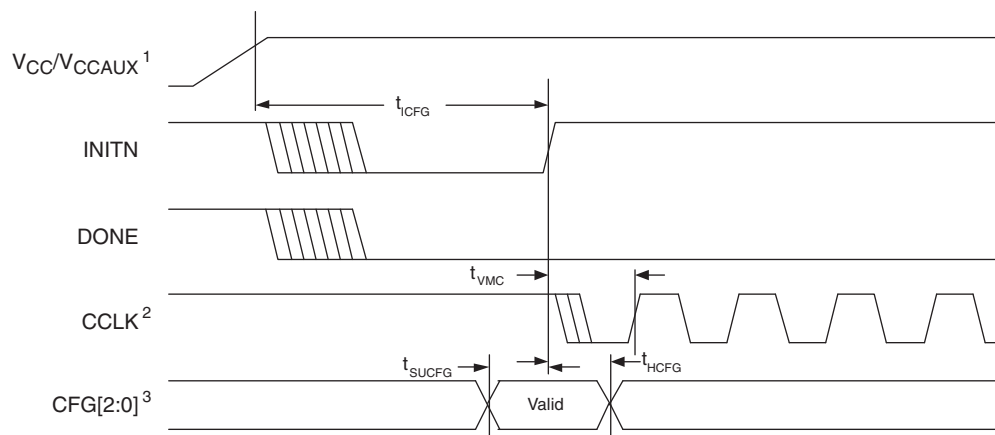


Figure 3-16. Power-On-Reset (POR) Timing



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).

Power Supply and NC Connections

Signals	100 TQFP	144 TQFP	208 PQFP	256 fpBGA
VCC	12, 64	EC1, EC3: 13, 92, 99 ECP/EC6: 11, 13, 92, 99	EC1, EC3: 26, 128, 135 ECP/EC6: 24, 26, 128, 135 ECP/EC10: 5, 24, 26, 128, 135, 152	E12, E5, E8, M12, M5, M9, F6, F11, L11, L6
VCCIO0	100	136, 143	EC1: 187, 208 EC3, ECP/EC6, ECP/EC10: 187, 197, 208	F7, F8
VCCIO1	86	110, 125	157, 176	F9, F10
VCCIO2	73	108	EC1: 155 EC3, ECP/EC6, ECP/EC10: 145, 155	G11, H11
VCCIO3	56	73, 84	106, 120	J11, K11
VCCIO4	38	55, 71	85, 104	L9, L10
VCCIO5	26	38, 44	EC1: 53, 74 EC2, ECP/EC6, ECP/EC10: 53, 64, 74	L7, L8
VCCIO6	24	24, 36	37, 51	J6, K6
VCCIO7	2	1	EC1: 2 EC3, ECP/EC6, ECP/EC10: 2, 13	G6, H6
VCCJ	18	19	32	L4
VCCAUX	37, 87	54, 126	EC1: 84, 177 EC3, ECP/EC6, ECP/EC10: 22, 84, 136, 177	B15, R2
VCCPLL	—	—	—	—
GND, GND0-GND7	1, 14, 25, 35, 51, 68, 74, 89	EC1, EC3: 15, 28, 37, 52, 63, 72, 80, 96, 98, 109, 117, 128, 144 ECP/EC6: 12, 15, 28, 37, 52, 63, 72, 80, 96, 98, 109, 117, 128, 144	EC1: 1, 28, 41, 52, 82, 93, 105, 116, 132, 134, 156, 168, 179 EC3: 1, 28, 41, 52, 72, 82, 93, 105, 116, 132, 134, 138, 156, 168, 179, 189 ECP/EC6: 1, 18, 25, 28, 41, 52, 72, 82, 93, 105, 116, 132, 134, 138, 156, 168, 179, 189 ECP/EC10: 1, 6, 18, 25, 28, 41, 52, 72, 82, 93, 105, 116, 132, 134, 138, 151, 156, 168, 179, 189	A1, A16, G10, G7, G8, G9, H10, H7, H8, H9, J10, J7, J8, J9, K10, K7, K8, K9, T1, T16
NC	—	EC1, EC3: 11, 12 ECP6/EC6: None	EC1: 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 18, 22, 24, 25, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 72, 103, 136, 138, 144, 145, 146, 147, 148, 149, 150, 151, 152, 158, 189, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207 EC3: 5, 6, 18, 24, 25, 103, 151, 152, 158 ECP/EC6: 5, 6, 151, 152 ECP/EC10: None	EC3: G5, H5, F2, F1, H4, H3, G2, G1, J4, J3, J5, K5, H2, H1, J2, J1, R12, H16, H15, G16, G15, K12, J12, J14, J15, F16, F15, J13, H13, H14, G14, E16, E15, B13, C13 ECP/EC10: None ECP/EC15: None

LFEC1, LFEC3 Logic Signal Connections: 208 PQFP (Cont.)

Pin Number	LFEC1				LFEC3			
	Pin Function	Bank	LVDS	Dual Function	Pin Function	Bank	LVDS	Dual Function
85	VCCIO4	4			VCCIO4	4		
86	PB10A	4	T	WRITEN	PB18A	4	T	WRITEN
87	PB10B	4	C	CS1N	PB18B	4	C	CS1N
88	PB11A	4	T	VREF1_4	PB19A	4	T	VREF1_4
89	PB11B	4	C	CSN	PB19B	4	C	CSN
90	PB12A	4	T	VREF2_4	PB20A	4	T	VREF2_4
91	PB12B	4	C	D0/SPID7	PB20B	4	C	D0/SPID7
92	PB13A	4	T	D2/SPID5	PB21A	4	T	D2/SPID5
93	GND4	4			GND4	4		
94	PB13B	4	C	D1/SPID6	PB21B	4	C	D1/SPID6
95	PB14A	4	T	BDQS14	PB22A	4	T	BDQS22
96	PB14B	4	C	D3/SPID4	PB22B	4	C	D3/SPID4
97	PB15A	4	T		PB23A	4	T	
98	PB15B	4	C	D4/SPID3	PB23B	4	C	D4/SPID3
99	PB16A	4	T		PB24A	4	T	
100	PB16B	4	C	D5/SPID2	PB24B	4	C	D5/SPID2
101	PB17A	4	T		PB25A	4	T	
102	PB17B	4	C	D6/SPID1	PB25B	4	C	D6/SPID1
103	NC	-			NC	-		
104	VCCIO4	4			VCCIO4	4		
105*	GND3 GND4	-			GND3 GND4	-		
106	VCCIO3	3			VCCIO3	3		
107	PR14B	3	C	VREF2_3	PR18B	3	C	VREF2_3
108	PR14A	3	T	VREF1_3	PR18A	3	T	VREF1_3
109	PR13B	3	C		PR17B	3	C	
110	PR13A	3	T		PR17A	3	T	
111	PR12B	3	C		PR16B	3	C	
112	PR12A	3	T		PR16A	3	T	
113	PR11B	3	C		PR15B	3	C	
114	PR11A	3	T	RDQS11	PR15A	3	T	RDQS15
115	PR10B	3	C	RLM0_PLLC_FB_A	PR14B	3	C	RLM0_PLLC_FB_A
116	GND3	3			GND3	3		
117	PR10A	3	T	RLM0_PLLT_FB_A	PR14A	3	T	RLM0_PLLT_FB_A
118	PR9B	3	C	RLM0_PLLC_IN_A	PR13B	3	C	RLM0_PLLC_IN_A
119	PR9A	3	T	RLM0_PLLT_IN_A	PR13A	3	T	RLM0_PLLT_IN_A
120	VCCIO3	3			VCCIO3	3		
121	PR8B	3	C	DI/CSSPIN	PR12B	3	C	DI/CSSPIN
122	PR8A	3	T	DOUT/CSON	PR12A	3	T	DOUT/CSON
123	PR7B	3	C	BUSY/SISPI	PR11B	3	C	BUSY/SISPI
124	PR7A	3	T	D7/SPID0	PR11A	3	T	D7/SPID0
125	CFG2	3			CFG2	3		
126	CFG1	3			CFG1	3		

LFEC1, LFEC3 Logic Signal Connections: 208 PQFP (Cont.)

Pin Number	LFEC1				LFEC3			
	Pin Function	Bank	LVDS	Dual Function	Pin Function	Bank	LVDS	Dual Function
169	PT13A	1	T		PT21A	1	T	
170	PT12B	1	C		PT20B	1	C	
171	PT12A	1	T		PT20A	1	T	
172	PT11B	1	C	VREF2_1	PT19B	1	C	VREF2_1
173	PT11A	1	T	VREF1_1	PT19A	1	T	VREF1_1
174	PT10B	1	C		PT18B	1	C	
175	PT10A	1	T		PT18A	1	T	
176	VCCIO1	1			VCCIO1	1		
177	VCCAUX	-			VCCAUX	-		
178	PT9B	0	C	PCLKC0_0	PT17B	0	C	PCLKC0_0
179	GND0	0			GND0	0		
180	PT9A	0	T	PCLKT0_0	PT17A	0	T	PCLKT0_0
181	PT8B	0	C	VREF1_0	PT16B	0	C	VREF1_0
182	PT8A	0	T	VREF2_0	PT16A	0	T	VREF2_0
183	PT7B	0	C		PT15B	0	C	
184	PT7A	0	T		PT15A	0	T	
185	PT6B	0	C		PT14B	0	C	
186	PT6A	0	T	TDQS6	PT14A	0	T	TDQS14
187	VCCIO0	0			VCCIO0	0		
188	PT5B	0	C		PT13B	0	C	
189	NC	-			GND0	0		
190	PT5A	0	T		PT13A	0	T	
191	PT4B	0	C		PT12B	0	C	
192	PT4A	0	T		PT12A	0	T	
193	PT3B	0	C		PT11B	0	C	
194	PT3A	0	T		PT11A	0	T	
195	PT2B	0	C		PT10B	0	C	
196	PT2A	0	T		PT10A	0	T	
197	NC	-			VCCIO0	0		
198	NC	-			PT6B	0	C	
199	NC	-			PT6A	0	T	TDQS6
200	NC	-			PT5B	0	C	
201	NC	-			PT5A	0	T	
202	NC	-			PT4B	0	C	
203	NC	-			PT4A	0	T	
204	NC	-			PT3B	0	C	
205	NC	-			PT3A	0	T	
206	NC	-			PT2B	0	C	
207	NC	-			PT2A	0	T	
208	VCCIO0	0			VCCIO0	0		

* Double bonded to the pin.

LFEC6P/EC6, LFEC6P/EC10 Logic Signal Connections: 208 PQFP (Cont.)

Pin Number	LFEC6P/EC6				LFEC6P/EC10			
	Pin Function	Bank	LVDS	Dual Function	Pin Function	Bank	LVDS	Dual Function
43	PL24A	6	T	LDQS24	PL33A	6	T	LDQS33
44	PL24B	6	C		PL33B	6	C	
45	PL25A	6	T		PL34A	6	T	
46	PL25B	6	C		PL34B	6	C	
47	PL26A	6	T		PL35A	6	T	
48	PL26B	6	C		PL35B	6	C	
49	PL27A	6	T	VREF1_6	PL36A	6	T	VREF1_6
50	PL27B	6	C	VREF2_6	PL36B	6	C	VREF2_6
51	VCCIO6	6			VCCIO6	6		
52*	GND5 GND6	-			GND5 GND6	-		
53	VCCIO5	5			VCCIO5	5		
54	PB2A	5	T		PB2A	5	T	
55	PB2B	5	C		PB2B	5	C	
56	PB3A	5	T		PB3A	5	T	
57	PB3B	5	C		PB3B	5	C	
58	PB4A	5	T		PB4A	5	T	
59	PB4B	5	C		PB4B	5	C	
60	PB5A	5	T		PB5A	5	T	
61	PB5B	5	C		PB5B	5	C	
62	PB6A	5	T	BDQS6	PB6A	5	T	BDQS6
63	PB6B	5	C		PB6B	5	C	
64	VCCIO5	5			VCCIO5	5		
65	PB10A	5	T		PB18A	5	T	
66	PB10B	5	C		PB18B	5	C	
67	PB11A	5	T		PB19A	5	T	
68	PB11B	5	C		PB19B	5	C	
69	PB12A	5	T		PB20A	5	T	
70	PB12B	5	C		PB20B	5	C	
71	PB13A	5	T		PB21A	5	T	
72	GND5	5			GND5	5		
73	PB13B	5	C		PB21B	5	C	
74	VCCIO5	5			VCCIO5	5		
75	PB14A	5	T	BDQS14	PB22A	5	T	BDQS22
76	PB14B	5	C		PB22B	5	C	
77	PB15A	5	T		PB23A	5	T	
78	PB15B	5	C		PB23B	5	C	
79	PB16A	5	T	VREF2_5	PB24A	5	T	VREF2_5
80	PB16B	5	C	VREF1_5	PB24B	5	C	VREF1_5
81	PB17A	5	T	PCLKT5_0	PB25A	5	T	PCLKT5_0
82	GND5	5			GND5	5		
83	PB17B	5	C	PCLKC5_0	PB25B	5	C	PCLKC5_0
84	VCCAUX	-			VCCAUX	-		

LFEC6/EC6, LFEC6/EC10 Logic Signal Connections: 208 PQFP (Cont.)

Pin Number	LFEC6/LFEC6				LFEC10/LFEC10			
	Pin Function	Bank	LVDS	Dual Function	Pin Function	Bank	LVDS	Dual Function
169	PT21A	1	T		PT29A	1	T	
170	PT20B	1	C		PT28B	1	C	
171	PT20A	1	T		PT28A	1	T	
172	PT19B	1	C	VREF2_1	PT27B	1	C	VREF2_1
173	PT19A	1	T	VREF1_1	PT27A	1	T	VREF1_1
174	PT18B	1	C		PT26B	1	C	
175	PT18A	1	T		PT26A	1	T	
176	VCCIO1	1			VCCIO1	1		
177	VCCAUX	-			VCCAUX	-		
178	PT17B	0	C	PCLKC0_0	PT25B	0	C	PCLKC0_0
179	GND0	0			GND0	0		
180	PT17A	0	T	PCLKT0_0	PT25A	0	T	PCLKT0_0
181	PT16B	0	C	VREF1_0	PT24B	0	C	VREF1_0
182	PT16A	0	T	VREF2_0	PT24A	0	T	VREF2_0
183	PT15B	0	C		PT23B	0	C	
184	PT15A	0	T		PT23A	0	T	
185	PT14B	0	C		PT22B	0	C	
186	PT14A	0	T	TDQS14	PT22A	0	T	TDQS22
187	VCCIO0	0			VCCIO0	0		
188	PT13B	0	C		PT21B	0	C	
189	GND0	0			GND0	0		
190	PT13A	0	T		PT21A	0	T	
191	PT12B	0	C		PT20B	0	C	
192	PT12A	0	T		PT20A	0	T	
193	PT11B	0	C		PT19B	0	C	
194	PT11A	0	T		PT19A	0	T	
195	PT10B	0	C		PT18B	0	C	
196	PT10A	0	T		PT18A	0	T	
197	VCCIO0	0			VCCIO0	0		
198	PT6B	0	C		PT6B	0	C	
199	PT6A	0	T	TDQS6	PT6A	0	T	TDQS6
200	PT5B	0	C		PT5B	0	C	
201	PT5A	0	T		PT5A	0	T	
202	PT4B	0	C		PT4B	0	C	
203	PT4A	0	T		PT4A	0	T	
204	PT3B	0	C		PT3B	0	C	
205	PT3A	0	T		PT3A	0	T	
206	PT2B	0	C		PT2B	0	C	
207	PT2A	0	T		PT2A	0	T	
208	VCCIO0	0			VCCIO0	0		

*Double bonded to the pin.

LFEC3 and LFECP/EC6 Logic Signal Connections: 256 fpBGA (Cont.)

Ball Number	LFEC3				LFECP6/LFEC6			
	Ball Function	Bank	LVDS	Dual Function	Ball Function	Bank	LVDS	Dual Function
E5	VCC	-			VCC	-		
E8	VCC	-			VCC	-		
M12	VCC	-			VCC	-		
M5	VCC	-			VCC	-		
M9	VCC	-			VCC	-		
B15	VCCAUX	-			VCCAUX	-		
R2	VCCAUX	-			VCCAUX	-		
F7	VCCIO0	0			VCCIO0	0		
F8	VCCIO0	0			VCCIO0	0		
F10	VCCIO1	1			VCCIO1	1		
F9	VCCIO1	1			VCCIO1	1		
G11	VCCIO2	2			VCCIO2	2		
H11	VCCIO2	2			VCCIO2	2		
J11	VCCIO3	3			VCCIO3	3		
K11	VCCIO3	3			VCCIO3	3		
L10	VCCIO4	4			VCCIO4	4		
L9	VCCIO4	4			VCCIO4	4		
L7	VCCIO5	5			VCCIO5	5		
L8	VCCIO5	5			VCCIO5	5		
J6	VCCIO6	6			VCCIO6	6		
K6	VCCIO6	6			VCCIO6	6		
G6	VCCIO7	7			VCCIO7	7		
H6	VCCIO7	7			VCCIO7	7		
F6	VCC	-			VCC	-		
F11	VCC	-			VCC	-		
L11	VCC	-			VCC	-		
L6	VCC	-			VCC	-		

LFECF/EC6, LFECF/EC10, LFECF/EC15 Logic Signal Connections: 484 fpBGA (Cont.)

LFECF6/LFEC6					LFECF10/LFEC10					LFECF15/LFEC15				
Ball Number	Ball Function	Bank	LVDS	Dual Function	Ball Number	Ball Function	Bank	LVDS	Dual Function	Ball Number	Ball Function	Bank	LVDS	Dual Function
GND	GND5	5			GND	GND5	5			GND	GND5	5		
V7	NC	-			V7	PB2A	5	T		V7	PB2A	5	T	
T6	NC	-			T6	PB2B	5	C		T6	PB2B	5	C	
V8	NC	-			V8	PB3A	5	T		V8	PB3A	5	T	
U7	NC	-			U7	PB3B	5	C		U7	PB3B	5	C	
W5	NC	-			W5	PB4A	5	T		W5	PB4A	5	T	
U6	NC	-			U6	PB4B	5	C		U6	PB4B	5	C	
AA3	NC	-			AA3	PB5A	5	T		AA3	PB5A	5	T	
AB3	NC	-			AB3	PB5B	5	C		AB3	PB5B	5	C	
Y6	NC	-			Y6	PB6A	5	T	BDQS6	Y6	PB6A	5	T	BDQS6
V6	NC	-			V6	PB6B	5	C		V6	PB6B	5	C	
AA5	NC	-			AA5	PB7A	5	T		AA5	PB7A	5	T	
W6	NC	-			W6	PB7B	5	C		W6	PB7B	5	C	
Y5	NC	-			Y5	PB8A	5	T		Y5	PB8A	5	T	
Y4	NC	-			Y4	PB8B	5	C		Y4	PB8B	5	C	
AA4	NC	-			AA4	PB9A	5	T		AA4	PB9A	5	T	
GND	-	-			GND	GND5	5			GND	GND5	5		
AB4	NC	-			AB4	PB9B	5	C		AB4	PB9B	5	C	
Y7	PB2A	5	T		Y7	PB10A	5	T		Y7	PB10A	5	T	
W8	PB2B	5	C		W8	PB10B	5	C		W8	PB10B	5	C	
W7	PB3A	5	T		W7	PB11A	5	T		W7	PB11A	5	T	
U8	PB3B	5	C		U8	PB11B	5	C		U8	PB11B	5	C	
W9	PB4A	5	T		W9	PB12A	5	T		W9	PB12A	5	T	
U9	PB4B	5	C		U9	PB12B	5	C		U9	PB12B	5	C	
Y8	PB5A	5	T		Y8	PB13A	5	T		Y8	PB13A	5	T	
GND	-	-			GND	GND5	5			GND	GND5	5		
Y9	PB5B	5	C		Y9	PB13B	5	C		Y9	PB13B	5	C	
V9	PB6A	5	T	BDQS6	V9	PB14A	5	T	BDQS14	V9	PB14A	5	T	BDQS14
T9	PB6B	5	C		T9	PB14B	5	C		T9	PB14B	5	C	
W10	PB7A	5	T		W10	PB15A	5	T		W10	PB15A	5	T	
U10	PB7B	5	C		U10	PB15B	5	C		U10	PB15B	5	C	
V10	PB8A	5	T		V10	PB16A	5	T		V10	PB16A	5	T	
T10	PB8B	5	C		T10	PB16B	5	C		T10	PB16B	5	C	
AA6	PB9A	5	T		AA6	PB17A	5	T		AA6	PB17A	5	T	
GND	GND5	5			GND	GND5	5			GND	GND5	5		
AB5	PB9B	5	C		AB5	PB17B	5	C		AB5	PB17B	5	C	
AA8	PB10A	5	T		AA8	PB18A	5	T		AA8	PB18A	5	T	
AA7	PB10B	5	C		AA7	PB18B	5	C		AA7	PB18B	5	C	
AB6	PB11A	5	T		AB6	PB19A	5	T		AB6	PB19A	5	T	
AB7	PB11B	5	C		AB7	PB19B	5	C		AB7	PB19B	5	C	
Y10	PB12A	5	T		Y10	PB20A	5	T		Y10	PB20A	5	T	
W11	PB12B	5	C		W11	PB20B	5	C		W11	PB20B	5	C	
AB8	PB13A	5	T		AB8	PB21A	5	T		AB8	PB21A	5	T	
GND	GND5	5			GND	GND5	5			GND	GND5	5		
AB9	PB13B	5	C		AB9	PB21B	5	C		AB9	PB21B	5	C	
AA10	PB14A	5	T	BDQS14	AA10	PB22A	5	T	BDQS22	AA10	PB22A	5	T	BDQS22
AA9	PB14B	5	C		AA9	PB22B	5	C		AA9	PB22B	5	C	
Y11	PB15A	5	T		Y11	PB23A	5	T		Y11	PB23A	5	T	
AA11	PB15B	5	C		AA11	PB23B	5	C		AA11	PB23B	5	C	
V11	PB16A	5	T	VREF2_5	V11	PB24A	5	T	VREF2_5	V11	PB24A	5	T	VREF2_5

LFEC6P/EC6, LFEC6P/EC10, LFEC6P/EC15 Logic Signal Connections: 484 fpBGA (Cont.)

LFEC6P/EC6					LFEC6P/EC10					LFEC6P/EC15				
Ball Number	Ball Function	Bank	LVDS	Dual Function	Ball Number	Ball Function	Bank	LVDS	Dual Function	Ball Number	Ball Function	Bank	LVDS	Dual Function
F14	PT23B	1	C		F14	PT31B	1	C		F14	PT31B	1	C	
D14	PT23A	1	T		D14	PT31A	1	T		D14	PT31A	1	T	
E13	PT22B	1	C		E13	PT30B	1	C		E13	PT30B	1	C	
G13	PT22A	1	T	TDQS22	G13	PT30A	1	T	TDQS30	G13	PT30A	1	T	TDQS30
A12	PT21B	1	C		A12	PT29B	1	C		A12	PT29B	1	C	
GND	GND1	1			GND	GND1	1			GND	GND1	1		
B12	PT21A	1	T		B12	PT29A	1	T		B12	PT29A	1	T	
F13	PT20B	1	C		F13	PT28B	1	C		F13	PT28B	1	C	
D13	PT20A	1	T		D13	PT28A	1	T		D13	PT28A	1	T	
F12	PT19B	1	C	VREF2_1	F12	PT27B	1	C	VREF2_1	F12	PT27B	1	C	VREF2_1
D12	PT19A	1	T	VREF1_1	D12	PT27A	1	T	VREF1_1	D12	PT27A	1	T	VREF1_1
F11	PT18B	1	C		F11	PT26B	1	C		F11	PT26B	1	C	
C12	PT18A	1	T		C12	PT26A	1	T		C12	PT26A	1	T	
A11	PT17B	0	C	PCLKC0_0	A11	PT25B	0	C	PCLKC0_0	A11	PT25B	0	C	PCLKC0_0
GND	GND0	0			GND	GND0	0			GND	GND0	0		
A10	PT17A	0	T	PCLKT0_0	A10	PT25A	0	T	PCLKT0_0	A10	PT25A	0	T	PCLKT0_0
E12	PT16B	0	C	VREF1_0	E12	PT24B	0	C	VREF1_0	E12	PT24B	0	C	VREF1_0
E11	PT16A	0	T	VREF2_0	E11	PT24A	0	T	VREF2_0	E11	PT24A	0	T	VREF2_0
B11	PT15B	0	C		B11	PT23B	0	C		B11	PT23B	0	C	
C11	PT15A	0	T		C11	PT23A	0	T		C11	PT23A	0	T	
B9	PT14B	0	C		B9	PT22B	0	C		B9	PT22B	0	C	
B10	PT14A	0	T	TDQS14	B10	PT22A	0	T	TDQS22	B10	PT22A	0	T	TDQS22
A9	PT13B	0	C		A9	PT21B	0	C		A9	PT21B	0	C	
GND	GND0	0			GND	GND0	0			GND	GND0	0		
A8	PT13A	0	T		A8	PT21A	0	T		A8	PT21A	0	T	
D11	PT12B	0	C		D11	PT20B	0	C		D11	PT20B	0	C	
C10	PT12A	0	T		C10	PT20A	0	T		C10	PT20A	0	T	
A7	PT11B	0	C		A7	PT19B	0	C		A7	PT19B	0	C	
A6	PT11A	0	T		A6	PT19A	0	T		A6	PT19A	0	T	
B7	PT10B	0	C		B7	PT18B	0	C		B7	PT18B	0	C	
B8	PT10A	0	T		B8	PT18A	0	T		B8	PT18A	0	T	
A5	PT9B	0	C		A5	PT17B	0	C		A5	PT17B	0	C	
GND	GND0	0			GND	GND0	0			GND	GND0	0		
B6	PT9A	0	T		B6	PT17A	0	T		B6	PT17A	0	T	
G10	PT8B	0	C		G10	PT16B	0	C		G10	PT16B	0	C	
E10	PT8A	0	T		E10	PT16A	0	T		E10	PT16A	0	T	
F10	PT7B	0	C		F10	PT15B	0	C		F10	PT15B	0	C	
D10	PT7A	0	T		D10	PT15A	0	T		D10	PT15A	0	T	
G9	PT6B	0	C		G9	PT14B	0	C		G9	PT14B	0	C	
E9	PT6A	0	T	TDQS6	E9	PT14A	0	T	TDQS14	E9	PT14A	0	T	TDQS14
C9	PT5B	0	C		C9	PT13B	0	C		C9	PT13B	0	C	
GND	-	-			GND	GND0	0			GND	GND0	0		
C8	PT5A	0	T		C8	PT13A	0	T		C8	PT13A	0	T	
F9	PT4B	0	C		F9	PT12B	0	C		F9	PT12B	0	C	
D9	PT4A	0	T		D9	PT12A	0	T		D9	PT12A	0	T	
F8	PT3B	0	C		F8	PT11B	0	C		F8	PT11B	0	C	
D7	PT3A	0	T		D7	PT11A	0	T		D7	PT11A	0	T	
D8	PT2B	0	C		D8	PT10B	0	C		D8	PT10B	0	C	
C7	PT2A	0	T		C7	PT10A	0	T		C7	PT10A	0	T	
GND	GND0	0			GND	GND0	0			GND	GND0	0		

LFEC20/EC20 and LFEC20/EC33 Logic Signal Connections: 484 fpBGA (Cont.)

LFEC20/LFEC20					LFEC20/LFEC33				
Ball Number	Ball Function	Bank	LVD S	Dual Function	Ball Number	Ball Function	Bank	LVD S	Dual Function
K3	PL21A	7	T		K3	PL33A	7	T	
K2	PL21B	7	C		K2	PL33B	7	C	
J1	PL22A	7	T	PCLKT7_0	J1	PL34A	7	T	PCLKT7_0
GND	GND7	7			GND	GND7	7		
K1	PL22B	7	C	PCLKC7_0	K1	PL34B	7	C	PCLKC7_0
L3	XRES	6			L3	XRES	6		
L4	PL24A	6	T		L4	PL36A	6	T	
L5	PL24B	6	C		L5	PL36B	6	C	
L2	PL25A	6	T		L2	PL37A	6	T	
L1	PL25B	6	C		L1	PL37B	6	C	
M4	PL26A	6	T		M4	PL38A	6	T	
M5	PL26B	6	C		M5	PL38B	6	C	
M1	PL27A	6	T		M1	PL39A	6	T	
GND	GND6	6			GND	GND6	6		
M2	PL27B	6	C		M2	PL39B	6	C	
N3	PL28A	6	T	LDQS28	N3	PL40A	6	T	LDQS40
M3	PL28B	6	C		M3	PL40B	6	C	
N5	PL29A	6	T		N5	PL41A	6	T	
N4	PL29B	6	C		N4	PL41B	6	C	
N1	PL30A	6	T		N1	PL42A	6	T	
N2	PL30B	6	C		N2	PL42B	6	C	
P1	PL31A	6	T		P1	PL43A	6	T	
GND	GND6	6			GND	GND6	6		
P2	PL31B	6	C		P2	PL43B	6	C	
R6	PL32A	6	T		R6	PL44A	6	T	
P5	PL32B	6	C		P5	PL44B	6	C	
P3	PL33A	6	T		P3	PL45A	6	T	
P4	PL33B	6	C		P4	PL45B	6	C	
R1	PL34A	6	T		R1	PL46A	6	T	
R2	PL34B	6	C		R2	PL46B	6	C	
R5	PL35A	6	T		R5	PL47A	6	T	
GND	GND6	6			GND	GND6	6		
R4	PL35B	6	C		R4	PL47B	6	C	
T1	PL36A	6	T	LDQS36	T1	PL48A	6	T	LDQS48
T2	PL36B	6	C		T2	PL48B	6	C	
R3	PL37A	6	T		R3	PL49A	6	T	
T3	PL37B	6	C		T3	PL49B	6	C	
GND	GND6	6			GND	GND6	6		
T5	TCK	6			T5	TCK	6		
U5	TDI	6			U5	TDI	6		
T4	TMS	6			T4	TMS	6		
U1	TDO	6			U1	TDO	6		
U2	VCCJ	6			U2	VCCJ	6		
V1	PL41A	6	T	LLM0_PLLT_IN_A	V1	PL53A	6	T	LLM0_PLLT_IN_A

LFEC20/EC20 and LFEC20/EC33 Logic Signal Connections: 484 fpBGA (Cont.)

LFEC20/LFEC20					LFEC20/LFEC33				
Ball Number	Ball Function	Bank	LVD S	Dual Function	Ball Number	Ball Function	Bank	LVD S	Dual Function
N22	PR30A	3	T		N22	PR42A	3	T	
N19	PR29B	3	C		N19	PR41B	3	C	
N18	PR29A	3	T		N18	PR41A	3	T	
M21	PR28B	3	C		M21	PR40B	3	C	
L20	PR28A	3	T	RDQS28	L20	PR40A	3	T	RDQS40
L21	PR27B	3	C		L21	PR39B	3	C	
GND	GND3	3			GND	GND3	3		
M20	PR27A	3	T		M20	PR39A	3	T	
M18	PR26B	3	C		M18	PR38B	3	C	
M19	PR26A	3	T		M19	PR38A	3	T	
M22	PR25B	3	C		M22	PR37B	3	C	
L22	PR25A	3	T		L22	PR37A	3	T	
K22	PR24B	3	C		K22	PR36B	3	C	
K21	PR24A	3	T		K21	PR36A	3	T	
J22	PR22B	2	C	PCLKC2_0	J22	PR34B	2	C	PCLKC2_0
GND	GND2	2			GND	GND2	2		
J21	PR22A	2	T	PCLKT2_0	J21	PR34A	2	T	PCLKT2_0
H22	PR21B	2	C		H22	PR33B	2	C	
H21	PR21A	2	T		H21	PR33A	2	T	
L19	PR20B	2	C		L19	PR32B	2	C	
L18	PR20A	2	T		L18	PR32A	2	T	
K20	PR19B	2	C		K20	PR31B	2	C	
J20	PR19A	2	T	RDQS19	J20	PR31A	2	T	RDQS31
K19	PR18B	2	C		K19	PR30B	2	C	
GND	GND2	2			GND	GND2	2		
K18	PR18A	2	T		K18	PR30A	2	T	
G22	PR17B	2	C		G22	PR29B	2	C	
F22	PR17A	2	T		F22	PR29A	2	T	
F21	PR16B	2	C		F21	PR28B	2	C	
E22	PR16A	2	T		E22	PR28A	2	T	
E21	PR15B	2	C		E21	PR27B	2	C	
D22	PR15A	2	T		D22	PR27A	2	T	
G21	PR14B	2	C		G21	PR26B	2	C	
G20	PR14A	2	T		G20	PR26A	2	T	
GND	GND2	2			GND	GND2	2		
J18	PR13B	2	C		J18	PR25B	2	C	
H19	PR13A	2	T		H19	PR25A	2	T	
J19	PR12B	2	C		J19	PR24B	2	C	
H20	PR12A	2	T		H20	PR24A	2	T	
H17	PR11B	2	C		H17	PR23B	2	C	
H18	PR11A	2	T		H18	PR23A	2	T	RDQS23
D21	PR9B	2	C	RUM0_PLLC_FB_A	D21	PR17B	2	C	RUM0_PLLC_FB_A
GND	GND2	2			GND	GND2	2		
GND	-	-			GND	GND2	2		

LFEC20/EC20 and LFEC20/EC33 Logic Signal Connections: 484 fpBGA (Cont.)

LFEC20/LFEC20					LFEC20/LFEC33				
Ball Number	Ball Function	Bank	LVD S	Dual Function	Ball Number	Ball Function	Bank	LVD S	Dual Function
K16	VCC	-			K16	VCC	-		
K17	VCC	-			K17	VCC	-		
K6	VCC	-			K6	VCC	-		
K7	VCC	-			K7	VCC	-		
L17	VCC	-			L17	VCC	-		
L6	VCC	-			L6	VCC	-		
M17	VCC	-			M17	VCC	-		
M6	VCC	-			M6	VCC	-		
N16	VCC	-			N16	VCC	-		
N17	VCC	-			N17	VCC	-		
N6	VCC	-			N6	VCC	-		
N7	VCC	-			N7	VCC	-		
P16	VCC	-			P16	VCC	-		
P7	VCC	-			P7	VCC	-		
G11	VCCIO0	0			G11	VCCIO0	0		
H10	VCCIO0	0			H10	VCCIO0	0		
H11	VCCIO0	0			H11	VCCIO0	0		
H9	VCCIO0	0			H9	VCCIO0	0		
G12	VCCIO1	1			G12	VCCIO1	1		
H12	VCCIO1	1			H12	VCCIO1	1		
H13	VCCIO1	1			H13	VCCIO1	1		
H14	VCCIO1	1			H14	VCCIO1	1		
J15	VCCIO2	2			J15	VCCIO2	2		
K15	VCCIO2	2			K15	VCCIO2	2		
L15	VCCIO2	2			L15	VCCIO2	2		
L16	VCCIO2	2			L16	VCCIO2	2		
M15	VCCIO3	3			M15	VCCIO3	3		
M16	VCCIO3	3			M16	VCCIO3	3		
N15	VCCIO3	3			N15	VCCIO3	3		
P15	VCCIO3	3			P15	VCCIO3	3		
R12	VCCIO4	4			R12	VCCIO4	4		
R13	VCCIO4	4			R13	VCCIO4	4		
R14	VCCIO4	4			R14	VCCIO4	4		
T12	VCCIO4	4			T12	VCCIO4	4		
R10	VCCIO5	5			R10	VCCIO5	5		
R11	VCCIO5	5			R11	VCCIO5	5		
R9	VCCIO5	5			R9	VCCIO5	5		
T11	VCCIO5	5			T11	VCCIO5	5		
M7	VCCIO6	6			M7	VCCIO6	6		
M8	VCCIO6	6			M8	VCCIO6	6		
N8	VCCIO6	6			N8	VCCIO6	6		
P8	VCCIO6	6			P8	VCCIO6	6		
J8	VCCIO7	7			J8	VCCIO7	7		
K8	VCCIO7	7			K8	VCCIO7	7		

LFECP/EC20, LFECP/EC33 Logic Signal Connections: 672 fpBGA

LFEC20/LFECP20					LFECP/EC33				
Ball Number	Ball Function	Bank	LVDS	Dual Function	Ball Number	Ball Function	Bank	LVDS	Dual Function
GND	GND7	7			GND	GND7	7		
E3	PL2A	7	T	VREF2_7	E3	PL2A	7	T	VREF2_7
E4	PL2B	7	C	VREF1_7	E4	PL2B	7	C	VREF1_7
E5	NC	-			E5	PL6A	7	T	LDQS6
D5	NC	-			D5	PL6B	7	C	
F4	NC	-			F4	PL7A	7	T	
F5	NC	-			F5	PL7B	7	C	
C3	NC	-			C3	PL8A	7	T	
D3	NC	-			D3	PL8B	7	C	
C2	NC	-			C2	PL9A	7	T	
-	-	-			GND	GND7	7		
B2	NC	-			B2	PL9B	7	C	
B1	PL3A	7	T		B1	PL10A	7	T	
C1	PL3B	7	C		C1	PL10B	7	C	
F3	PL4A	7	T		F3	PL11A	7	T	
G3	PL4B	7	C		G3	PL11B	7	C	
D2	PL5A	7	T		D2	PL12A	7	T	
E2	PL5B	7	C		E2	PL12B	7	C	
-	-	-			GND	GND7	7		
D1	PL6A	7	T	LDQS6	D1	PL14A	7	T	LDQS14
E1	PL6B	7	C		E1	PL14B	7	C	
F2	PL7A	7	T		F2	PL15A	7	T	
G2	PL7B	7	C		G2	PL15B	7	C	
F6	PL8A	7	T	LUM0_PLLT_IN_A	F6	PL16A	7	T	LUM0_PLLT_IN_A
G6	PL8B	7	C	LUM0_PLLC_IN_A	G6	PL16B	7	C	LUM0_PLLC_IN_A
H4	PL9A	7	T	LUM0_PLLT_FB_A	H4	PL17A	7	T	LUM0_PLLT_FB_A
GND	GND7	7			GND	GND7	7		
G4	PL9B	7	C	LUM0_PLLC_FB_A	G4	PL17B	7	C	LUM0_PLLC_FB_A
H6	NC	-			H6	PL19A	7	T	
J7	NC	-			J7	PL19B	7	C	
G5	NC	-			G5	PL20A	7	T	
H5	NC	-			H5	PL20B	7	C	
H3	NC	-			H3	PL21A	7	T	
J3	NC	-			J3	PL21B	7	C	
H2	NC	-			H2	PL22A	7	T	
-	-	-			GND	GND7	7		
J2	NC	-			J2	PL22B	7	C	
J4	PL11A	7	T		J4	PL23A	7	T	LDQS23
J5	PL11B	7	C		J5	PL23B	7	C	
K4	PL12A	7	T		K4	PL24A	7	T	
K5	PL12B	7	C		K5	PL24B	7	C	
J6	PL13A	7	T		J6	PL25A	7	T	

LFECP/EC20, LFECP/EC33 Logic Signal Connections: 672 fpBGA (Cont.)

LFEC20/LFECP20					LFECP/EC33				
Ball Number	Ball Function	Bank	LVDS	Dual Function	Ball Number	Ball Function	Bank	LVDS	Dual Function
E24	NC	-			E24	PR8B	2	C	
D24	NC	-			D24	PR8A	2	T	
E22	NC	-			E22	PR7B	2	C	
F22	NC	-			F22	PR7A	2	T	
E21	NC	-			E21	PR6B	2	C	
D22	NC	-			D22	PR6A	2	T	RDQS6
E23	PR2B	2	C	VREF1_2	E23	PR2B	2	C	VREF1_2
D23	PR2A	2	T	VREF2_2	D23	PR2A	2	T	VREF2_2
GND	GND2	2			GND	GND2	2		
GND	GND1	1			GND	GND1	1		
G20	NC	-			G20	PT65B	1	C	
F20	NC	-			F20	PT65A	1	T	
D21	NC	-			D21	PT64B	1	C	
C21	NC	-			C21	PT64A	1	T	
C23	NC	-			C23	PT63B	1	C	
C22	NC	-			C22	PT63A	1	T	
B23	NC	-			B23	PT62B	1	C	
C24	NC	-			C24	PT62A	1	T	TDQS62
D20	NC	-			D20	PT61B	1	C	
-	-	-			GND	GND1	1		
E19	NC	-			E19	PT61A	1	T	
B25	NC	-			B25	PT60B	1	C	
B24	NC	-			B24	PT60A	1	T	
B26	NC	-			B26	PT59B	1	C	
A25	NC	-			A25	PT59A	1	T	
C20	NC	-			C20	PT58B	1	C	
C19	NC	-			C19	PT58A	1	T	
A24	PT57B	1	C		A24	PT57B	1	C	
-	-	-			GND	GND1	1		
A23	PT57A	1	T		A23	PT57A	1	T	
E18	PT56B	1	C		E18	PT56B	1	C	
D19	PT56A	1	T		D19	PT56A	1	T	
F19	PT55B	1	C		F19	PT55B	1	C	
B22	PT55A	1	T		B22	PT55A	1	T	
G19	PT54B	1	C		G19	PT54B	1	C	
B21	PT54A	1	T	TDQS54	B21	PT54A	1	T	TDQS54
D18	PT53B	1	C		D18	PT53B	1	C	
GND	GND1	1			GND	GND1	1		
C18	PT53A	1	T		C18	PT53A	1	T	
F18	PT52B	1	C		F18	PT52B	1	C	
A22	PT52A	1	T		A22	PT52A	1	T	
G18	PT51B	1	C		G18	PT51B	1	C	

LatticeEC Commercial (Continued)

Part Number	I/Os	Grade	Package	Pins	Temp.	LUTs
LFEC10E-4F256C	195	-4	fpBGA	256	COM	10.2K
LFEC10E-5F256C	195	-5	fpBGA	256	COM	10.2K
LFEC10E-3Q208C	147	-3	PQFP	208	COM	10.2K
LFEC10E-4Q208C	147	-4	PQFP	208	COM	10.2K
LFEC10E-5Q208C	147	-5	PQFP	208	COM	10.2K

Part Number	I/Os	Grade	Package	Pins	Temp.	LUTs
LFEC15E-3F484C	352	-3	fpBGA	484	COM	15.3K
LFEC15E-4F484C	352	-4	fpBGA	484	COM	15.3K
LFEC15E-5F484C	352	-5	fpBGA	484	COM	15.3K
LFEC15E-3F256C	195	-3	fpBGA	256	COM	15.3K
LFEC15E-4F256C	195	-4	fpBGA	256	COM	15.3K
LFEC15E-5F256C	195	-5	fpBGA	256	COM	15.3K

Part Number	I/Os	Grade	Package	Pins	Temp.	LUTs
LFEC20E-3F672C	400	-3	fpBGA	672	COM	19.7K
LFEC20E-4F672C	400	-4	fpBGA	672	COM	19.7K
LFEC20E-5F672C	400	-5	fpBGA	672	COM	19.7K
LFEC20E-3F484C	360	-3	fpBGA	484	COM	19.7K
LFEC20E-4F484C	360	-4	fpBGA	484	COM	19.7K
LFEC20E-5F484C	360	-5	fpBGA	484	COM	19.7K

Part Number	I/Os	Grade	Package	Pins	Temp.	LUTs
LFEC33E-3F672C	496	-3	fpBGA	672	COM	32.8K
LFEC33E-4F672C	496	-4	fpBGA	672	COM	32.8K
LFEC33E-5F672C	496	-5	fpBGA	672	COM	32.8K
LFEC33E-3F484C	360	-3	fpBGA	484	COM	32.8K
LFEC33E-4F484C	360	-4	fpBGA	484	COM	32.8K
LFEC33E-5F484C	360	-5	fpBGA	484	COM	32.8K

LatticeECP Commercial

Part Number	I/Os	Grade	Package	Pins	Temp.	LUTs
LFEC6E-3F484C	224	-3	fpBGA	484	COM	6.1K
LFEC6E-4F484C	224	-4	fpBGA	484	COM	6.1K
LFEC6E-5F484C	224	-5	fpBGA	484	COM	6.1K
LFEC6E-3F256C	195	-3	fpBGA	256	COM	6.1K
LFEC6E-4F256C	195	-4	fpBGA	256	COM	6.1K
LFEC6E-5F256C	195	-5	fpBGA	256	COM	6.1K
LFEC6E-3Q208C	147	-3	PQFP	208	COM	6.1K
LFEC6E-4Q208C	147	-4	PQFP	208	COM	6.1K
LFEC6E-5Q208C	147	-5	PQFP	208	COM	6.1K
LFEC6E-3T144C	97	-3	TQFP	144	COM	6.1K
LFEC6E-4T144C	97	-4	TQFP	144	COM	6.1K
LFEC6E-5T144C	97	-5	TQFP	144	COM	6.1K

Part Number	I/Os	Grade	Package	Pins	Temp.	LUTs
LFEC10E-3F484C	288	-3	fpBGA	484	COM	10.2K
LFEC10E-4F484C	288	-4	fpBGA	484	COM	10.2K
LFEC10E-5F484C	288	-5	fpBGA	484	COM	10.2K
LFEC10E-3F256C	195	-3	fpBGA	256	COM	10.2K
LFEC10E-4F256C	195	-4	fpBGA	256	COM	10.2K
LFEC10E-5F256C	195	-5	fpBGA	256	COM	10.2K
LFEC10E-3Q208C	147	-3	PQFP	208	COM	10.2K
LFEC10E-4Q208C	147	-4	PQFP	208	COM	10.2K
LFEC10E-5Q208C	147	-5	PQFP	208	COM	10.2K

Part Number	I/Os	Grade	Package	Pins	Temp.	LUTs
LFEC15E-3F484C	352	-3	fpBGA	484	COM	15.3K
LFEC15E-4F484C	352	-4	fpBGA	484	COM	15.3K
LFEC15E-5F484C	352	-5	fpBGA	484	COM	15.3K
LFEC15E-3F256C	195	-3	fpBGA	256	COM	15.3K
LFEC15E-4F256C	195	-4	fpBGA	256	COM	15.3K
LFEC15E-5F256C	195	-5	fpBGA	256	COM	15.3K

Part Number	I/Os	Grade	Package	Pins	Temp.	LUTs
LFEC20E-3F672C	400	-3	fpBGA	672	COM	19.7K
LFEC20E-4F672C	400	-4	fpBGA	672	COM	19.7K
LFEC20E-5F672C	400	-5	fpBGA	672	COM	19.7K
LFEC20E-3F484C	360	-3	fpBGA	484	COM	19.7K
LFEC20E-4F484C	360	-4	fpBGA	484	COM	19.7K
LFEC20E-5F484C	360	-5	fpBGA	484	COM	19.7K

Part Number	I/Os	Grade	Package	Pins	Temp.	LUTs
LFEC33E-3F672C	496	-3	fpBGA	672	COM	32.8K
LFEC33E-4F672C	496	-4	fpBGA	672	COM	32.8K
LFEC33E-5F672C	496	-5	fpBGA	672	COM	32.8K

LatticeEC Industrial (Continued)

Part Number	I/Os	Grade	Package	Pins/Balls	Temp.	LUTs
LFEC15E-3FN484I	352	-3	Lead-Free fpBGA	484	IND	15.3K
LFEC15E-4FN484I	352	-4	Lead-Free fpBGA	484	IND	15.3K
LFEC15E-3FN256I	195	-3	Lead-Free fpBGA	256	IND	15.3K
LFEC15E-4FN256I	195	-4	Lead-Free fpBGA	256	IND	15.3K

Part Number	I/Os	Grade	Package	Pins/Balls	Temp.	LUTs
LFEC20E-3FN672I	400	-3	Lead-Free fpBGA	672	IND	19.7K
LFEC20E-4FN672I	400	-4	Lead-Free fpBGA	672	IND	19.7K
LFEC20E-3FN484I	400	-3	Lead-Free fpBGA	484	IND	19.7K
LFEC20E-4FN484I	400	-4	Lead-Free fpBGA	484	IND	19.7K

Part Number	I/Os	Grade	Package	Pins/Balls	Temp.	LUTs
LFEC33E-3FN672I	496	-3	Lead-Free fpBGA	672	IND	32.8K
LFEC33E-4FN672I	496	-4	Lead-Free fpBGA	672	IND	32.8K
LFEC33E-3FN484I	360	-3	Lead-Free fpBGA	484	IND	32.8K
LFEC33E-4FN484I	360	-4	Lead-Free fpBGA	484	IND	32.8K

LatticeECP Industrial

Part Number	I/Os	Grade	Package	Pins/Balls	Temp.	LUTs
LFEC6E-3FN484I	224	-3	Lead-Free fpBGA	484	IND	6.1K
LFEC6E-4FN484I	224	-4	Lead-Free fpBGA	484	IND	6.1K
LFEC6E-3FN256I	195	-3	Lead-Free fpBGA	256	IND	6.1K
LFEC6E-4FN256I	195	-4	Lead-Free fpBGA	256	IND	6.1K
LFEC6E-3QN208I	147	-3	Lead-Free PQFP	208	IND	6.1K
LFEC6E-4QN208I	147	-4	Lead-Free PQFP	208	IND	6.1K
LFEC6E-3TN144I	97	-3	Lead-Free TQFP	144	IND	6.1K
LFEC6E-4TN144I	97	-4	Lead-Free TQFP	144	IND	6.1K

Part Number	I/Os	Grade	Package	Pins/Balls	Temp.	LUTs
LFEC10E-3FN484I	288	-3	Lead-Free fpBGA	484	IND	10.2K
LFEC10E-4FN484I	288	-4	Lead-Free fpBGA	484	IND	10.2K
LFEC10E-3FN256I	195	-3	Lead-Free fpBGA	256	IND	10.2K
LFEC10E-4FN256I	195	-4	Lead-Free fpBGA	256	IND	10.2K
LFEC10E-3QN208I	147	-3	Lead-Free PQFP	208	IND	10.2K
LFEC10E-4QN208I	147	-4	Lead-Free PQFP	208	IND	10.2K

Part Number	I/Os	Grade	Package	Pins/Balls	Temp.	LUTs
LFEC15E-3FN484I	352	-3	Lead-Free fpBGA	484	IND	15.3K
LFEC15E-4FN484I	352	-4	Lead-Free fpBGA	484	IND	15.3K
LFEC15E-3FN256I	195	-3	Lead-Free fpBGA	256	IND	15.3K
LFEC15E-4FN256I	195	-4	Lead-Free fpBGA	256	IND	15.3K

Date	Version	Section	Change Summary
December 2004	01.4	Architecture	Updated Hot Socketing Recommended Power Up Sequence section.
		Pinout Information	Added LFEC1, LFEC3, LFECP/EC10, LFECP/EC15 to Pin Information
			Added LFEC1, LFEC3, LFECP/EC10, LFECP/EC15 to Power Supply and NC Connections
			Added LFEC1 and LFEC3 100 TQFP Pinout
			Added LFEC1 and LFEC3 144 TQFP Pinout
			Added LFEC1, LFEC3 and LFECP/EC10 208 PQFP Pinout
			Added LFEC3, LFECP/EC10 and LFECP/EC15 256 fpBGA Pinout
			Added LFECP/EC10 and LFECP/EC15 484 fpBGA Pinout
		Ordering Information	Added Lead-Free Package Designators
			Added Lead-Free Ordering Part Numbers
		Supplemental Information	Updated list of technical notes.
April 2005	01.5	Architecture	EBR memory support section has been updated with clarification.
			Updated sysIO buffer pair section.
		DC & Switching Characteristics	Hot Socketing Specification has been updated.
			DC Electrical Characteristics table (I_{IL} , I_{IH}) has been updated.
			Supply Current (Standby) table has been updated.
			Initialization Supply Current table has been updated.
			External Switching Characteristics section has been updated.
			Removed t_{RSTW} spec. from PLL Parameter table.
			t_{RST} specifications have been updated.
			sysCONFIG Port Timing Specifications (t_{BSCL} , t_{ODISS} , t_{PRGMRJ}) have been updated.
		Pinout Information	Added LFECP/EC33 Pinout Information
			Pin Information Summary table has been updated.
			Power Supply and NC Connection table has been updated.
			484-fpBGA logic connection has been updated (Ball # J6, J17, P6 and P17 for ECP/EC33 are now called VCCPLL).
			672-fpBGA logic connection has been updated (Ball # K19, L8, U19, U8 for ECP/EC33 are now called VCCPLL).
May 2005	01.6	Introduction	ECP/EC33 EBR SRAM Bits and Blocks have been updated to 498K and 54 respectively.
		Architecture	Table 2-10 has been updated (ECP/EC33 EBR SRAM Bits and Blocks have been updated to 498K and 54 respectively.)
			Recommended Power Up Sequence section has been removed.
		DC & Switching Characteristics	Supply Current (Standby) table has been updated.
			Initialization Supply Current table has been updated.
			Vos test condition has been updated to $(VOP+VOM)/2$.
			Register-to-Register performance table has been updated (rev. G 0.27).
			External switching characteristics have been updated (rev. G 0.27).
			Internal timing parameters have been updated (rev. G 0.27).
			Timing adders have been updated (rev. G 0.27).
			sysCONFIG port timing specifications have been updated.
		Pinout Information	Pin Information Summary table has been updated.
			Power Supply and NC Connection table has been updated.
		Ordering Information	OPN list has been updated.