Lattice Semiconductor Corporation - LFSCM3GA40EP1-5FFA1020I 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	Obsolete
Number of LABs/CLBs	10000
Number of Logic Elements/Cells	40000
Total RAM Bits	4075520
Number of I/O	562
Number of Gates	-
Voltage - Supply	0.95V ~ 1.26V
Mounting Type	Surface Mount
Operating Temperature	-40°C ~ 105°C (TJ)
Package / Case	1020-BBGA, FCBGA
Supplier Device Package	1020-OFcBGA Rev 2 (33x33)
Purchase URL	https://www.e-xfl.com/product-detail/lattice-semiconductor/lfscm3ga40ep1-5ffa1020i

Modes of Operation

Each Slice is capable of four modes of operation: Logic, Ripple, RAM and ROM. Table 2-2 lists the modes and the capability of the Slice blocks.

Table 2-2. Slice Modes

	Logic	Ripple	RAM	ROM
PFU Slice	LUT 4x2 or LUT 5x1	2-bit Arithmetic Unit	SPR 16x2 DPR 16x2	ROM 16x2

Logic Mode

In this mode, the LUTs in each Slice are configured as combinatorial lookup tables. A LUT4 can have 16 possible input combinations. Any logic function with four inputs can be generated by programming this lookup table. Since there are two LUT4s per Slice, a LUT5 can be constructed within one Slice. Larger lookup tables such as LUT6, LUT7 and LUT8 can be constructed by concatenating other Slices in the PFU.

Ripple Mode

Ripple mode allows the efficient implementation of small arithmetic functions. In ripple mode, the following functions can be implemented by each Slice:

- Addition 2-bit
- Subtraction 2-bit
- Up counter 2-bit
- Down counter 2-bit
- Comparator functions of A and B inputs
  - A greater-than-or-equal-to B
  - A not-equal-to B
  - A less-than-or-equal-to B

Ripple Mode includes an optional configuration that performs arithmetic using fast carry chain methods. In this configuration (also referred to as CCU2 mode) two additional signals, Carry Generate and Carry Propagate, are generated on a per slice basis to allow fast arithmetic functions to be constructed by concatenating Slices.

RAM Mode

In this mode, distributed RAM can be constructed using each LUT block as a 16x1-bit memory. Through the combination of LUTs and Slices, a variety of different memories can be constructed.

The Lattice design tools support the creation of a variety of different size memories. Where appropriate, the software will construct these using distributed memory primitives that represent the capabilities of the Slice. Table 2-3 shows the number of Slices required to implement different distributed RAM primitives. Dual port memories involve the pairing of two Slices, one Slice functions as the read-write port. The other companion Slice supports the read-only port. For more information on RAM mode, please see details of additional technical documentation at the end of this data sheet.

Table 2-3. Number of Slices Required For Implementing Distributed RAM

	SPR16x2	DPR16x2
Number of Slices	1	2

Note: SPR = Single Port RAM, DPR = Dual Port RAM

ROM Mode

The ROM mode uses the same principal as the RAM modes, but without the Write port. Pre-loading is accomplished through the programming interface during configuration.

Differential HSTL and SSTL

Differential HSTL and SSTL outputs are implemented as a pair of complementary single-ended outputs. All allowable single-ended output classes (class I and class II) are supported in this mode.

MLVDS

The LatticeSC devices support the MLVDS standard. This industry standard is emulated using controlled impedance complementary LVCMOS outputs in conjunction with a parallel external resistor across the driver outputs. MLVDS is intended for use when multi-drop and bi-directional multi-point differential signaling is required. The scheme shown in Figure 3-1 is one possible solution for bi-directional multi-point differential signals.

Figure 3-1. MLVDS Multi-Point Output Example

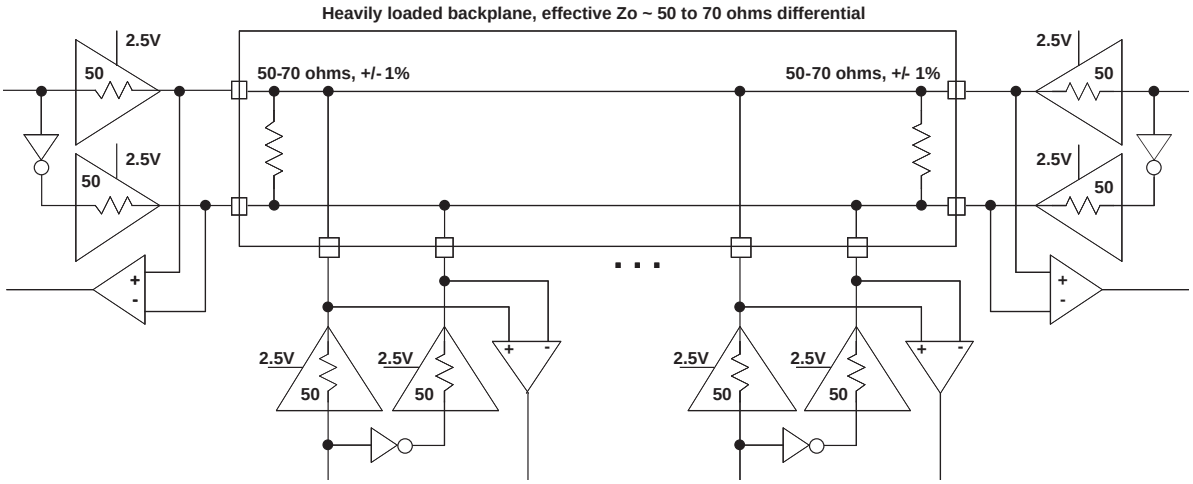

Table 3-1. MLVDS DC Conditions[1]

Over Recommended Operating Conditions

Symbol	Description	Nominal		Units
		Zo = 50	Zo = 70	
Z_{OUT}	Output impedance	50	50	ohm
R_{TLEFT}	Left end termination	50	70	ohm
R_{TRIGHT}	Right end termination	50	70	ohm
V_{OH}	Output high voltage	1.50	1.575	V
V_{OL}	Output low voltage	1.00	0.925	V
V_{OD}	Output differential voltage	0.50	0.65	V
V_{CM}	Output common mode voltage	1.25	1.25	V
I_{DC}	DC output current	20.0	18.5	mA

1. For input buffer, see LVDS table.

sysCLOCK DLL Timing

Over Recommended Operating Conditions

Parameter	Description	Conditions	Min.	Typ.	Max.	Units
f_{IN}	Input Clock Frequency (CLKI, CLKFB)		100	—	700	MHz
f_{OUTOP}	Output Clock Frequency (CLKOP)		100	—	700	MHz
f_{OUTOS}	Output Clock Frequency (CLKOS)		25	—	700	MHz
AC Characteristics						
t_{DUTY}	Output Clock Duty Cycle	Output Clock Duty Cycle (at 50% levels, 50% duty cycle input clock, duty cycle correction turned off, time reference delay mode)	38	—	62	%
t_{DUTYRD}	Output Clock Duty Cycle	Output Clock Duty Cycle (at 50% levels, arbitrary duty cycle input clock, duty cycle correction turned on, time reference delay mode)	45	—	55	%
$t_{DUTYCIR}$	Output Clock Duty Cycle	Output Clock Duty Cycle (at 50% levels, arbitrary duty cycle input clock, duty cycle correction turned on, clock injection removal mode)	40	—	60	%
t_{OPJIT}[1]	Output Clock Period Jitter		—	—	200	ps
t_{CPJIT}[1]	Output Clock Cycle-to-Cycle Jitter		—	—	200	ps
t_{SKEW}	Output Clock to Clock Skew (Between Two Outputs with the Same Phase Setting)		—	—	100	ps
t_{LOCK}	DLL Lock-in Time		8	—	18500	cycles
t_{IDUTY}	Input Clock Duty Cycle	Applies to all operating conditions	35	—	65	%
t_{IPJIT}	Input Clock Period Jitter		—	—	+/- 250	ps
t_{HI}	Input Clock High Time	At 80% level	500	—	—	ps
t_{LO}	Input Clock Low Time	At 20% level	500	—	—	ps
t_{RSWD}	Reset Signal Pulse Width		3	—	—	ns
t_{FDEL}	Timeshift Delay Step Size		35	45	80	ps
t_{DLL}	Delay Through the DLL when No Delay Taps are Chosen but Not in Bypass Mode.		—	760	—	ps

1. Values are measured with FPGA logic active, no additional I/Os toggling and REFCLK total jitter = 30 ps.

Pin Information Summary (Cont.)

Pin Type		1152 fcBGA			1704 fcBGA	
		LFSC/M40	LFSC/M80	LFSC/M115	LFSC/M80	LFSC/M115
Single Ended User I/O		604	660	660	904	942
Differential Pair User I/O		302	330	330	452	470
LVDS Output Pairs		78	102	102	114	132
Configuration	Dedicated	11	11	11	11	11
	Muxes/MPI sysBus	72	72	72	72	72
JTAG (excluding VCCJ)		4	4	4	4	4
Dedicated Pins		4	4	4	4	4
VCC		44	44	44	76	76
VCC12		52	52	52	88	88
VCCAUX		38	38	38	52	52
VCCIO	Bank 1	10	10	10	10	10
	Bank 2	9	9	9	12	12
	Bank 3	12	12	12	14	14
	Bank 4	12	12	12	14	14
	Bank 5	12	12	12	14	14
	Bank 6	12	12	12	14	14
	Bank 7	9	9	9	12	12
VTT	Bank 2	3	3	3	4	4
	Bank 3	3	3	3	4	4
	Bank 4	3	3	3	5	5
	Bank 5	3	3	3	5	5
	Bank 6	3	3	3	4	4
	Bank 7	3	3	3	4	4
GND		130	130	130	184	184
NC		62	6	6	52	14
Single Ended User / Differential I/O per Bank	Bank 1	80/40	80/40	80/40	80/40	80/40
	Bank 2	60/30	76/38	76/38	96/48	103/51
	Bank 3	96/48	108/54	108/54	132/66	144/72
	Bank 4	106/53	106/53	106/53	184/92	184/92
	Bank 5	106/53	106/53	106/53	184/92	184/92
	Bank 6	96/48	108/54	108/54	132/66	144/72
	Bank 7	60/30	76/38	76/38	96/48	103/51
LVDS Output Pairs Per Bank	Bank 2	15	21	21	24	27
	Bank 3	24	30	30	33	39
	Bank 6	24	30	30	33	39
	Bank 7	15	21	21	24	27
VCCJ		1	1	1	1	1
SERDES (signal + power supply)		108	108	108	212	212
Total		1152	1152	1152	1704	1704

LFSC/M15, LFSC/M25 Logic Signal Connections: 900 fpBGA[1, 2] (Cont.)

Ball Number	LFSC/M15			LFSC/M25		
	Ball Function	VCCIO Bank	Dual Function	Ball Function	VCCIO Bank	Dual Function
AH29	PB48B	4	LRC_DLLC_IN_C/LRC_DLLC_FB_D	PB68B	4	LRC_DLLC_IN_C/LRC_DLLC_FB_D
AE26	PB48C	4		PB68C	4	
AD25	PB48D	4		PB68D	4	
AJ30	PB49A	4	LRC_PLLT_IN_A/LRC_PLLT_FB_B	PB69A	4	LRC_PLLT_IN_A/LRC_PLLT_FB_B
AH30	PB49B	4	LRC_PLLC_IN_A/LRC_PLLC_FB_B	PB69B	4	LRC_PLLC_IN_A/LRC_PLLC_FB_B
AG28	PB49C	4	LRC_DLLT_IN_D/LRC_DLLT_FB_C	PB69C	4	LRC_DLLT_IN_D/LRC_DLLT_FB_C
AG29	PB49D	4	LRC_DLLC_IN_D/LRC_DLLC_FB_C	PB69D	4	LRC_DLLC_IN_D/LRC_DLLC_FB_C
AF26	VCC12	-		VCC12	-	
AD27	PROBE_VCC	-		PROBE_VCC	-	
AG27	VCC12	-		VCC12	-	
AE28	PROBE_GND	-		PROBE_GND	-	
AC25	PR45D	3	LRC_PLLC_IN_B/LRC_PLLC_FB_A	PR57D	3	LRC_PLLC_IN_B/LRC_PLLC_FB_A
AD26	PR45C	3	LRC_PLLT_IN_B/LRC_PLLT_FB_A	PR57C	3	LRC_PLLT_IN_B/LRC_PLLT_FB_A
AF28	PR45B	3	LRC_DLLC_IN_F/LRC_DLLC_FB_E	PR57B	3	LRC_DLLC_IN_F/LRC_DLLC_FB_E
AF29	PR45A	3	LRC_DLLT_IN_F/LRC_DLLT_FB_E	PR57A	3	LRC_DLLT_IN_F/LRC_DLLT_FB_E
AC26	PR44D	3	LRC_DLLC_IN_E/LRC_DLLC_FB_F	PR55D	3	LRC_DLLC_IN_E/LRC_DLLC_FB_F
AB26	PR44C	3	LRC_DLLT_IN_E/LRC_DLLT_FB_F	PR55C	3	LRC_DLLT_IN_E/LRC_DLLT_FB_F
AG30	PR44B	3		PR55B	3	
AF30	PR44A	3		PR55A	3	
AC28	PR43B	3		PR52B	3	
AB28	PR43A	3		PR52A	3	
AB27	PR41D	3	VREF2_3	PR51D	3	VREF2_3
AE30	PR41B	3		PR51B	3	
AD30	PR41A	3		PR51A	3	
AB25	PR40B	3		PR49B	3	
AA25	PR40A	3		PR49A	3	
AA30	PR39B	3		PR48B	3	
Y30	PR39A	3		PR48A	3	
W29	PR37B	3		PR44B	3	
V29	PR37A	3		PR44A	3	
U30	PR36B	3		PR43B	3	
T30	PR36A	3		PR43A	3	
V25	PR35D	3	DIFFR_3	PR42D	3	DIFFR_3
W28	PR35B	3		PR42B	3	
V28	PR35A	3		PR42A	3	
R30	PR33B	3		PR38B	3	
P30	PR33A	3		PR38A	3	
N30	PR32B	3		PR35B	3	
M29	PR32A	3		PR35A	3	
U26	PR31D	3		PR34D	3	
T26	PR31C	3	VREF1_3	PR34C	3	VREF1_3
U28	PR31B	3		PR34B	3	
T28	PR31A	3		PR34A	3	
M30	PR28D	3	PCLKC3_2	PR31D	3	PCLKC3_2
L29	PR28C	3	PCLKT3_2	PR31C	3	PCLKT3_2

LFSC/M15, LFSC/M25 Logic Signal Connections: 900 fpBGA[1, 2] (Cont.)

Ball Number	LFSC/M15			LFSC/M25		
	Ball Function	VCCIO Bank	Dual Function	Ball Function	VCCIO Bank	Dual Function
G1	NC	-		PL20B	7	
M4	NC	-		NC	-	
J3	NC	-		NC	-	
P5	NC	-		NC	-	
W5	NC	-		PL48C	6	
T6	NC	-		PL35C	6	
U3	NC	-		PL36A	6	
V3	NC	-		PL36B	6	
T5	NC	-		PL39A	6	
T4	NC	-		PL39B	6	
V5	NC	-		PL43C	6	
U6	NC	-		PL42C	6	
U4	NC	-		PL40A	6	
U5	NC	-		PL40B	6	
V4	NC	-		PL43D	6	
Y2	NC	-		PL47A	6	
AA2	NC	-		PL47B	6	
W3	NC	-		PL47D	6	
Y3	NC	-		PL47C	6	
AB3	NC	-		NC	-	
AC4	NC	-		PL53A	6	
AD4	NC	-		PL53B	6	
AE3	NC	-		PL56A	6	
AF3	NC	-		PL56B	6	
AF7	NC	-		PB7A	5	
AF6	NC	-		PB7B	5	
AH4	NC	-		PB8A	5	
AG5	NC	-		PB8B	5	
AF8	NC	-		PB9A	5	
AG8	NC	-		PB9B	5	
AG7	NC	-		NC	-	
AG10	NC	-		NC	-	
AF12	NC	-		NC	-	
AH7	NC	-		PB15A	5	
AE13	NC	-		PB15D	5	
AG13	NC	-		PB23C	5	
AH8	NC	-		PB15B	5	
AJ5	NC	-		PB17A	5	
AJ6	NC	-		PB17B	5	
AF15	NC	-		PB21D	5	
AJ7	NC	-		PB19A	5	
AJ8	NC	-		PB19B	5	
AE12	NC	-		PB15C	5	
AF16	NC	-		PB38D	4	
AF19	NC	-		PB49D	4	

LFSC/M15, LFSC/M25 Logic Signal Connections: 900 fpBGA[1, 2] (Cont.)

Ball Number	LFSC/M15			LFSC/M25		
	Ball Function	VCCIO Bank	Dual Function	Ball Function	VCCIO Bank	Dual Function
P22	VCCIO2	-		VCCIO2	-	
R22	VCCIO2	-		VCCIO2	-	
AA23	VCCIO3	-		VCCIO3	-	
AA24	VCCIO3	-		VCCIO3	-	
AB23	VCCIO3	-		VCCIO3	-	
AB24	VCCIO3	-		VCCIO3	-	
T22	VCCIO3	-		VCCIO3	-	
U22	VCCIO3	-		VCCIO3	-	
V22	VCCIO3	-		VCCIO3	-	
W22	VCCIO3	-		VCCIO3	-	
Y22	VCCIO3	-		VCCIO3	-	
Y23	VCCIO3	-		VCCIO3	-	
Y24	VCCIO3	-		VCCIO3	-	
AB16	VCCIO4	-		VCCIO4	-	
AB17	VCCIO4	-		VCCIO4	-	
AB18	VCCIO4	-		VCCIO4	-	
AB19	VCCIO4	-		VCCIO4	-	
AB20	VCCIO4	-		VCCIO4	-	
AC20	VCCIO4	-		VCCIO4	-	
AC21	VCCIO4	-		VCCIO4	-	
AC22	VCCIO4	-		VCCIO4	-	
AD20	VCCIO4	-		VCCIO4	-	
AD21	VCCIO4	-		VCCIO4	-	
AD22	VCCIO4	-		VCCIO4	-	
AB11	VCCIO5	-		VCCIO5	-	
AB12	VCCIO5	-		VCCIO5	-	
AB13	VCCIO5	-		VCCIO5	-	
AB14	VCCIO5	-		VCCIO5	-	
AB15	VCCIO5	-		VCCIO5	-	
AC10	VCCIO5	-		VCCIO5	-	
AC11	VCCIO5	-		VCCIO5	-	
AC9	VCCIO5	-		VCCIO5	-	
AD10	VCCIO5	-		VCCIO5	-	
AD11	VCCIO5	-		VCCIO5	-	
AD9	VCCIO5	-		VCCIO5	-	
AA7	VCCIO6	-		VCCIO6	-	
AA8	VCCIO6	-		VCCIO6	-	
AB7	VCCIO6	-		VCCIO6	-	
AB8	VCCIO6	-		VCCIO6	-	
T9	VCCIO6	-		VCCIO6	-	
U9	VCCIO6	-		VCCIO6	-	
V9	VCCIO6	-		VCCIO6	-	
W9	VCCIO6	-		VCCIO6	-	
Y7	VCCIO6	-		VCCIO6	-	
Y8	VCCIO6	-		VCCIO6	-	

LFSC/M25, LFSC/M40 Logic Signal Connections: 1020 fcBGA[1, 2] (Cont.)

Ball Number	LFSC/M25			LFSC/M40		
	Ball Function	VCCIO Bank	Dual Function	Ball Function	VCCIO Bank	Dual Function
AH11	PB47C	4	PCLKT4_6	PB54C	4	PCLKT4_6
AH10	PB47D	4	PCLKC4_6	PB54D	4	PCLKC4_6
AK12	PB49A	4	PCLKT4_0	PB55A	4	PCLKT4_0
AJ12	PB49B	4	PCLKC4_0	PB55B	4	PCLKC4_0
AF14	PB49C	4	VREF2_4	PB55C	4	VREF2_4
AE14	PB49D	4		PB55D	4	
AL11	PB51A	4	PCLKT4_5	PB57A	4	PCLKT4_5
AL10	PB51B	4	PCLKC4_5	PB57B	4	PCLKC4_5
AH9	PB51C	4		PB57C	4	
AH8	PB51D	4		PB57D	4	
AK11	PB52A	4	PCLKT4_3	PB58A	4	PCLKT4_3
AJ11	PB52B	4	PCLKC4_3	PB58B	4	PCLKC4_3
AH7	PB52C	4	PCLKT4_4	PB58C	4	PCLKT4_4
AH6	PB52D	4	PCLKC4_4	PB58D	4	PCLKC4_4
AK8	PB53A	4		PB67A	4	
AJ8	PB53B	4		PB67B	4	
AF11	PB53C	4		PB67C	4	
AD12	PB55A	4		PB69A	4	
AE12	PB55B	4		PB69B	4	
AM6	PB56A	4		PB70A	4	
AM5	PB56B	4		PB70B	4	
AC12	PB56C	4		PB70C	4	
AL6	PB57A	4		PB73A	4	
AL5	PB57B	4		PB73B	4	
AG7	PB59A	4		PB74A	4	
AG8	PB59B	4		PB74B	4	
AK6	PB60A	4		PB75A	4	
AJ6	PB60B	4		PB75B	4	
AF10	PB60C	4		PB75C	4	
AE11	PB60D	4		PB75D	4	
AM4	PB61A	4		PB77A	4	
AM3	PB61B	4		PB77B	4	
AH5	PB63A	4		PB78A	4	
AH4	PB63B	4		PB78B	4	
AK5	PB64A	4		PB79A	4	
AJ5	PB64B	4		PB79B	4	
AF8	PB64C	4		PB79C	4	
AF7	PB64D	4		PB79D	4	
AL4	PB65A	4		PB81A	4	
AL3	PB65B	4		PB81B	4	
AG5	PB65C	4		PB81C	4	
AF6	PB65D	4		PB81D	4	
AK3	PB67A	4		PB82A	4	
AJ3	PB67B	4		PB82B	4	
AE10	PB67C	4	VREF1_4	PB82C	4	VREF1_4
AD10	PB67D	4		PB82D	4	
AL2	PB68A	4	LRC_DLLT_IN_C/LRC_DLLT_FB_D	PB83A	4	LRC_DLLT_IN_C/LRC_DLLT_FB_D
AK2	PB68B	4	LRC_DLLC_IN_C/LRC_DLLC_FB_D	PB83B	4	LRC_DLLC_IN_C/LRC_DLLC_FB_D
AE9	PB68C	4		PB83C	4	
AE8	PB68D	4		PB83D	4	

LFSC/M40, LFSC/M80 Logic Signal Connections: 1152 fcBGA[1, 2] (Cont.)

Ball Number	LFSC/M40			LFSC/M80		
	Ball Function	VCCIO Bank	Dual Function	Ball Function	VCCIO Bank	Dual Function
L33	PL27B	7		PL35B	7	
M30	PL27C	7		PL35C	7	
N30	PL27D	7		PL35D	7	
M31	PL29A	7		PL37A	7	
N31	PL29B	7		PL37B	7	
P24	PL29C	7		PL37C	7	
R24	PL29D	7		PL37D	7	
M33	PL30A	7		PL42A	7	
N33	PL30B	7		PL42B	7	
U25	PL30C	7		PL42C	7	
T25	PL30D	7		PL42D	7	
L34	PL31A	7		PL43A	7	
M34	PL31B	7		PL43B	7	
P29	PL31C	7		PL43C	7	
R29	PL31D	7		PL43D	7	
N34	PL34A	7		PL46A	7	
P34	PL34B	7		PL46B	7	
R27	PL34C	7		PL46C	7	
T27	PL34D	7		PL46D	7	
R32	PL35A	7	PCLKT7_1	PL47A	7	PCLKT7_1
R31	PL35B	7	PCLKC7_1	PL47B	7	PCLKC7_1
U24	PL35C	7	PCLKT7_3	PL47C	7	PCLKT7_3
T24	PL35D	7	PCLKC7_3	PL47D	7	PCLKC7_3
P33	PL36A	7	PCLKT7_0	PL48A	7	PCLKT7_0
R33	PL36B	7	PCLKC7_0	PL48B	7	PCLKC7_0
T26	PL36C	7	PCLKT7_2	PL48C	7	PCLKT7_2
U26	PL36D	7	PCLKC7_2	PL48D	7	PCLKC7_2
T32	PL38A	6	PCLKT6_0	PL50A	6	PCLKT6_0
T31	PL38B	6	PCLKC6_0	PL50B	6	PCLKC6_0
U29	PL38C	6	PCLKT6_1	PL50C	6	PCLKT6_1
V29	PL38D	6	PCLKC6_1	PL50D	6	PCLKC6_1
T30	PL39A	6		PL51A	6	
U30	PL39B	6		PL51B	6	
U27	PL39C	6	PCLKT6_3	PL51C	6	PCLKT6_3
V27	PL39D	6	PCLKC6_3	PL51D	6	PCLKC6_3
R34	PL40A	6		PL52A	6	
T34	PL40B	6		PL52B	6	
U28	PL40C	6	PCLKT6_2	PL52C	6	PCLKT6_2
V28	PL40D	6	PCLKC6_2	PL52D	6	PCLKC6_2
V30	PL43A	6		PL55A	6	
W30	PL43B	6		PL55B	6	
W27	PL43C	6	VREF1_6	PL55C	6	VREF1_6
Y27	PL43D	6		PL55D	6	
T33	PL44A	6		PL56A	6	
U33	PL44B	6		PL56B	6	

LFSC/M40, LFSC/M80 Logic Signal Connections: 1152 fcBGA[1, 2] (Cont.)

Ball Number	LFSC/M40			LFSC/M80		
	Ball Function	VCCIO Bank	Dual Function	Ball Function	VCCIO Bank	Dual Function
C2	VCCJ	-		VCCJ	-	
M9	TDO	-	TDO	TDO	-	TDO
L9	TMS	-		TMS	-	
D1	TCK	-		TCK	-	
C1	TDI	-		TDI	-	
J8	PROGRAMN	1		PROGRAMN	1	
K8	MPIIRQN	1	CFGIRQN/MPI_IRQ_N	MPIIRQN	1	CFGIRQN/MPI_IRQ_N
B2	CCLK	1		CCLK	1	
H9	RESP_URC	-		RESP_URC	-	
H10	VCC12	-		VCC12	-	
H8	A_REFCLKN_R	-		A_REFCLKN_R	-	
G8	A_REFCLKP_R	-		A_REFCLKP_R	-	
C3	VCC12	-		VCC12	-	
D3	A_VDDIB0_R	-		A_VDDIB0_R	-	
A3	A_HDINP0_R	-	PCS 3E0 CH 0 IN P	A_HDINP0_R	-	PCS 3E0 CH 0 IN P
B3	A_HDINN0_R	-	PCS 3E0 CH 0 IN N	A_HDINN0_R	-	PCS 3E0 CH 0 IN N
E5	VCC12	-		VCC12	-	
A4	A_HDOUTP0_R	-	PCS 3E0 CH 0 OUT P	A_HDOUTP0_R	-	PCS 3E0 CH 0 OUT P
F6	A_VDDOB0_R	-		A_VDDOB0_R	-	
B4	A_HDOUTN0_R	-	PCS 3E0 CH 0 OUT N	A_HDOUTN0_R	-	PCS 3E0 CH 0 OUT N
F7	A_VDDOB1_R	-		A_VDDOB1_R	-	
B5	A_HDOUTN1_R	-	PCS 3E0 CH 1 OUT N	A_HDOUTN1_R	-	PCS 3E0 CH 1 OUT N
E6	VCC12	-		VCC12	-	
A5	A_HDOUTP1_R	-	PCS 3E0 CH 1 OUT P	A_HDOUTP1_R	-	PCS 3E0 CH 1 OUT P
B6	A_HDINN1_R	-	PCS 3E0 CH 1 IN N	A_HDINN1_R	-	PCS 3E0 CH 1 IN N
A6	A_HDINP1_R	-	PCS 3E0 CH 1 IN P	A_HDINP1_R	-	PCS 3E0 CH 1 IN P
C6	VCC12	-		VCC12	-	
D4	A_VDDIB1_R	-		A_VDDIB1_R	-	
C7	VCC12	-		VCC12	-	
D5	A_VDDIB2_R	-		A_VDDIB2_R	-	
A7	A_HDINP2_R	-	PCS 3E0 CH 2 IN P	A_HDINP2_R	-	PCS 3E0 CH 2 IN P
B7	A_HDINN2_R	-	PCS 3E0 CH 2 IN N	A_HDINN2_R	-	PCS 3E0 CH 2 IN N
E7	VCC12	-		VCC12	-	
A8	A_HDOUTP2_R	-	PCS 3E0 CH 2 OUT P	A_HDOUTP2_R	-	PCS 3E0 CH 2 OUT P
F8	A_VDDOB2_R	-		A_VDDOB2_R	-	
B8	A_HDOUTN2_R	-	PCS 3E0 CH 2 OUT N	A_HDOUTN2_R	-	PCS 3E0 CH 2 OUT N
F9	A_VDDOB3_R	-		A_VDDOB3_R	-	
B9	A_HDOUTN3_R	-	PCS 3E0 CH 3 OUT N	A_HDOUTN3_R	-	PCS 3E0 CH 3 OUT N
E8	VCC12	-		VCC12	-	
A9	A_HDOUTP3_R	-	PCS 3E0 CH 3 OUT P	A_HDOUTP3_R	-	PCS 3E0 CH 3 OUT P
B10	A_HDINN3_R	-	PCS 3E0 CH 3 IN N	A_HDINN3_R	-	PCS 3E0 CH 3 IN N
A10	A_HDINP3_R	-	PCS 3E0 CH 3 IN P	A_HDINP3_R	-	PCS 3E0 CH 3 IN P
C10	VCC12	-		VCC12	-	
D6	A_VDDIB3_R	-		A_VDDIB3_R	-	
G10	VCC12	-		VCC12	-	

LFSC/M40, LFSC/M80 Logic Signal Connections: 1152 fcBGA[1, 2] (Cont.)

Ball Number	LFSC/M40			LFSC/M80		
	Ball Function	VCCIO Bank	Dual Function	Ball Function	VCCIO Bank	Dual Function
K20	GND	-		GND	-	
K23	GND	-		GND	-	
K26	GND	-		GND	-	
K28	GND	-		GND	-	
K6	GND	-		GND	-	
K9	GND	-		GND	-	
L12	GND	-		GND	-	
L32	GND	-		GND	-	
L4	GND	-		GND	-	
M10	GND	-		GND	-	
M17	GND	-		GND	-	
M24	GND	-		GND	-	
N29	GND	-		GND	-	
N7	GND	-		GND	-	
P15	GND	-		GND	-	
P20	GND	-		GND	-	
P3	GND	-		GND	-	
P31	GND	-		GND	-	
R10	GND	-		GND	-	
R14	GND	-		GND	-	
R16	GND	-		GND	-	
R19	GND	-		GND	-	
R21	GND	-		GND	-	
R26	GND	-		GND	-	
T15	GND	-		GND	-	
T17	GND	-		GND	-	
T18	GND	-		GND	-	
T20	GND	-		GND	-	
T28	GND	-		GND	-	
T6	GND	-		GND	-	
U16	GND	-		GND	-	
U19	GND	-		GND	-	
U23	GND	-		GND	-	
U32	GND	-		GND	-	
U4	GND	-		GND	-	
V12	GND	-		GND	-	
V16	GND	-		GND	-	
V19	GND	-		GND	-	
V3	GND	-		GND	-	
V31	GND	-		GND	-	
W15	GND	-		GND	-	
W17	GND	-		GND	-	
W18	GND	-		GND	-	
W20	GND	-		GND	-	
W29	GND	-		GND	-	

LFSC/M40, LFSC/M80 Logic Signal Connections: 1152 fcBGA[1, 2] (Cont.)

Ball Number	LFSC/M40			LFSC/M80		
	Ball Function	VCCIO Bank	Dual Function	Ball Function	VCCIO Bank	Dual Function
AM17	VCCIO4	-		VCCIO4	-	
AM5	VCCIO4	-		VCCIO4	-	
AE20	VCCIO5	-		VCCIO5	-	
AE23	VCCIO5	-		VCCIO5	-	
AE26	VCCIO5	-		VCCIO5	-	
AH22	VCCIO5	-		VCCIO5	-	
AH28	VCCIO5	-		VCCIO5	-	
AJ19	VCCIO5	-		VCCIO5	-	
AJ25	VCCIO5	-		VCCIO5	-	
AL18	VCCIO5	-		VCCIO5	-	
AL24	VCCIO5	-		VCCIO5	-	
AL30	VCCIO5	-		VCCIO5	-	
AM21	VCCIO5	-		VCCIO5	-	
AM27	VCCIO5	-		VCCIO5	-	
AA31	VCCIO6	-		VCCIO6	-	
AB29	VCCIO6	-		VCCIO6	-	
AC24	VCCIO6	-		VCCIO6	-	
AD32	VCCIO6	-		VCCIO6	-	
AE28	VCCIO6	-		VCCIO6	-	
AG31	VCCIO6	-		VCCIO6	-	
AK32	VCCIO6	-		VCCIO6	-	
T29	VCCIO6	-		VCCIO6	-	
U31	VCCIO6	-		VCCIO6	-	
V32	VCCIO6	-		VCCIO6	-	
W28	VCCIO6	-		VCCIO6	-	
Y26	VCCIO6	-		VCCIO6	-	
E31	VCCIO7	-		VCCIO7	-	
G28	VCCIO7	-		VCCIO7	-	
H32	VCCIO7	-		VCCIO7	-	
K29	VCCIO7	-		VCCIO7	-	
L31	VCCIO7	-		VCCIO7	-	
M25	VCCIO7	-		VCCIO7	-	
N28	VCCIO7	-		VCCIO7	-	
P32	VCCIO7	-		VCCIO7	-	
R25	VCCIO7	-		VCCIO7	-	
J25	VCCIO1	-		VCCIO1	-	
N11	VTT_2	2		VTT_2	2	
R12	VTT_2	2		VTT_2	2	
T12	VTT_2	2		VTT_2	2	
AB11	VTT_3	3		VTT_3	3	
W12	VTT_3	3		VTT_3	3	
Y12	VTT_3	3		VTT_3	3	
AC15	VTT_4	4		VTT_4	4	
AC16	VTT_4	4		VTT_4	4	
AD13	VTT_4	4		VTT_4	4	

LFSC/M115 Logic Signal Connections: 1152 fcBGA[1, 2]

Ball Number	LFSC/M115		
	Ball Function	VCCIO Bank	Dual Function
AJ34	PL98A	6	
AK34	PL98B	6	
AB27	PL98C	6	
AC27	PL98D	6	
AF33	PL99A	6	
AG33	PL99B	6	
AC29	PL99C	6	
AD29	PL99D	6	
AE31	PL103A	6	
AF31	PL103B	6	
AF30	PL103C	6	
AF29	PL103D	6	
AH33	PL104A	6	
AJ33	PL104B	6	
AC28	PL104C	6	
AD28	PL104D	6	
AH32	PL107A	6	
AJ32	PL107B	6	
AD27	PL107C	6	
AE27	PL107D	6	VREF2_6
AG34	PL109A	6	
AH34	PL109B	6	
AC26	PL109C	6	
AB26	PL109D	6	
AK33	PL112A	6	
AL33	PL112B	6	
AG30	PL112C	6	
AH30	PL112D	6	
AL34	PL115A	6	
AM34	PL115B	6	
AJ30	PL115C	6	LLC_DLLT_IN_E/LLC_DLLT_FB_F
AK30	PL115D	6	LLC_DLLC_IN_E/LLC_DLLC_FB_F
AJ31	PL116A	6	
AH31	PL116B	6	
AD26	PL116C	6	
AD25	PL116D	6	
AL32	PL117A	6	LLC_DLLT_IN_F/LLC_DLLT_FB_E
AL31	PL117B	6	LLC_DLLC_IN_F/LLC_DLLC_FB_E
AG29	PL117C	6	LLC_PLLT_IN_B/LLC_PLLT_FB_A
AG28	PL117D	6	LLC_PLLC_IN_B/LLC_PLLC_FB_A
AF28	XRES	-	
AF27	TEMP	6	
AM33	PB3A	5	LLC_PLLT_IN_A/LLC_PLLT_FB_B

LFSC/M115 Logic Signal Connections: 1152 fcBGA[1, 2]

Ball Number	LFSC/M115		
	Ball Function	VCCIO Bank	Dual Function
F6	A_VDDOB0_R	-	
B4	A_HDOUTN0_R	-	PCS 3E0 CH 0 OUT N
F7	A_VDDOB1_R	-	
B5	A_HDOUTN1_R	-	PCS 3E0 CH 1 OUT N
E6	VCC12	-	
A5	A_HDOUTP1_R	-	PCS 3E0 CH 1 OUT P
B6	A_HDINN1_R	-	PCS 3E0 CH 1 IN N
A6	A_HDINP1_R	-	PCS 3E0 CH 1 IN P
C6	VCC12	-	
D4	A_VDDIB1_R	-	
C7	VCC12	-	
D5	A_VDDIB2_R	-	
A7	A_HDINP2_R	-	PCS 3E0 CH 2 IN P
B7	A_HDINN2_R	-	PCS 3E0 CH 2 IN N
E7	VCC12	-	
A8	A_HDOUTP2_R	-	PCS 3E0 CH 2 OUT P
F8	A_VDDOB2_R	-	
B8	A_HDOUTN2_R	-	PCS 3E0 CH 2 OUT N
F9	A_VDDOB3_R	-	
B9	A_HDOUTN3_R	-	PCS 3E0 CH 3 OUT N
E8	VCC12	-	
A9	A_HDOUTP3_R	-	PCS 3E0 CH 3 OUT P
B10	A_HDINN3_R	-	PCS 3E0 CH 3 IN N
A10	A_HDINP3_R	-	PCS 3E0 CH 3 IN P
C10	VCC12	-	
D6	A_VDDIB3_R	-	
G10	VCC12	-	
D7	B_VDDIB0_R	-	
E10	B_HDINP0_R	-	PCS 3E1 CH 0 IN P
F10	B_HDINN0_R	-	PCS 3E1 CH 0 IN N
K10	VCC12	-	
A11	B_HDOUTP0_R	-	PCS 3E1 CH 0 OUT P
D10	B_VDDOB0_R	-	
B11	B_HDOUTN0_R	-	PCS 3E1 CH 0 OUT N
D11	B_VDDOB1_R	-	
B12	B_HDOUTN1_R	-	PCS 3E1 CH 1 OUT N
L10	VCC12	-	
A12	B_HDOUTP1_R	-	PCS 3E1 CH 1 OUT P
F11	B_HDINN1_R	-	PCS 3E1 CH 1 IN N
E11	B_HDINP1_R	-	PCS 3E1 CH 1 IN P
G11	VCC12	-	
D8	B_VDDIB1_R	-	
G12	VCC12	-	

LFSC/M115 Logic Signal Connections: 1152 fcBGA[1, 2]

Ball Number	LFSC/M115		
	Ball Function	VCCIO Bank	Dual Function
L21	PT55D	1	A16/MPI_ADDR30
L20	PT55C	1	D13/MPI_DATA13
D20	PT55B	1	A15/MPI_ADDR29
E20	PT55A	1	A17/MPI_ADDR31
L19	PT54D	1	A19/MPI_TSIZ1
K19	PT54C	1	A20/MPI_BDIP
D21	PT54B	1	A18/MPI_TSIZ0
E21	PT54A	1	MPI_TEA
M20	PT51D	1	D14/MPI_DATA14
M19	PT51C	1	DP1/MPI_PAR1
F21	PT51B	1	A21/MPI_BURST
G21	PT51A	1	D15/MPI_DATA15
H24	B_REFCLKP_L	-	
J24	B_REFCLKN_L	-	
L22	VCC12	-	
E26	B_VDDIB3_L	-	
G22	VCC12	-	
E22	B_HDINP3_L	-	PCS 361 CH 3 IN P
F22	B_HDINN3_L	-	PCS 361 CH 3 IN N
A21	B_HDOUTP3_L	-	PCS 361 CH 3 OUT P
L24	VCC12	-	
B21	B_HDOUTN3_L	-	PCS 361 CH 3 OUT N
D22	B_VDDOB3_L	-	
B22	B_HDOUTN2_L	-	PCS 361 CH 2 OUT N
D23	B_VDDOB2_L	-	
A22	B_HDOUTP2_L	-	PCS 361 CH 2 OUT P
K24	VCC12	-	
F23	B_HDINN2_L	-	PCS 361 CH 2 IN N
E23	B_HDINP2_L	-	PCS 361 CH 2 IN P
D26	B_VDDIB2_L	-	
G23	VCC12	-	
D27	B_VDDIB1_L	-	
G24	VCC12	-	
E24	B_HDINP1_L	-	PCS 361 CH 1 IN P
F24	B_HDINN1_L	-	PCS 361 CH 1 IN N
A23	B_HDOUTP1_L	-	PCS 361 CH 1 OUT P
L25	VCC12	-	
B23	B_HDOUTN1_L	-	PCS 361 CH 1 OUT N
D24	B_VDDOB1_L	-	
B24	B_HDOUTN0_L	-	PCS 361 CH 0 OUT N
D25	B_VDDOB0_L	-	
A24	B_HDOUTP0_L	-	PCS 361 CH 0 OUT P
K25	VCC12	-	

LFSC/M80, LFSC/M115 Logic Signal Connections: 1704 fcBGA[1, 2] (Cont.)

Ball Number	LFSC/M80			LFSC/M115		
	Ball Function	VCCIO Bank	Dual Function	Ball Function	VCCIO Bank	Dual Function
AL23	PB56D	5		PB58D	5	
AW24	PB57A	5		PB61A	5	
AW23	PB57B	5		PB61B	5	
AN23	PB57C	5		PB61C	5	
AP23	PB57D	5		PB61D	5	
AY23	PB59A	5		PB63A	5	
AY24	PB59B	5		PB63B	5	
AU23	PB59C	5		PB63C	5	
AU22	PB59D	5		PB63D	5	
AV23	PB60A	5		PB66A	5	
AV22	PB60B	5		PB66B	5	
AM22	PB60C	5		PB66C	5	
AL22	PB60D	5		PB66D	5	
BA23	PB61A	5		PB69A	5	
BA22	PB61B	5		PB69B	5	
AN22	PB61C	5		PB69C	5	
AP22	PB61D	5		PB69D	5	
BB23	PB63A	5		PB71A	5	
BB22	PB63B	5		PB71B	5	
AT22	PB63C	5		PB71C	5	
AR22	PB63D	5		PB71D	5	
BB21	PB65A	4		PB73A	4	
BB20	PB65B	4		PB73B	4	
AR21	PB65C	4		PB73C	4	
AT21	PB65D	4		PB73D	4	
BA21	PB66A	4		PB75A	4	
BA20	PB66B	4		PB75B	4	
AP21	PB66C	4		PB75C	4	
AN21	PB66D	4		PB75D	4	
AV21	PB67A	4		PB78A	4	
AV20	PB67B	4		PB78B	4	
AM21	PB67C	4		PB78C	4	
AL21	PB67D	4		PB78D	4	
AY20	PB69A	4		PB81A	4	
AY19	PB69B	4		PB81B	4	
AU21	PB69C	4		PB81C	4	
AU20	PB69D	4		PB81D	4	
AW20	PB70A	4		PB83A	4	
AW19	PB70B	4		PB83B	4	
AP20	PB70C	4		PB83C	4	
AN20	PB70D	4		PB83D	4	
BB19	PB71A	4		PB86A	4	
BB18	PB71B	4		PB86B	4	
AM20	PB71C	4		PB86C	4	
AL20	PB71D	4		PB86D	4	

LFSC/M80, LFSC/M115 Logic Signal Connections: 1704 fcBGA[1, 2] (Cont.)

Ball Number	LFSC/M80			LFSC/M115		
	Ball Function	VCCIO Bank	Dual Function	Ball Function	VCCIO Bank	Dual Function
V8	PR41C	2		PR55C	2	
T4	PR41B	2		PR55B	2	
U4	PR41A	2		PR55A	2	
V9	PR39D	2		PR53D	2	
U9	PR39C	2		PR53C	2	
V6	PR39B	2		PR53B	2	
U6	PR39A	2		PR53A	2	
AA12	PR38D	2		PR52D	2	
Y12	PR38C	2		PR52C	2	
P1	PR38B	2		PR52B	2	
N1	PR38A	2		PR52A	2	
T7	PR37D	2		PR51D	2	
R7	PR37C	2		PR51C	2	
T5	PR37B	2		PR51B	2	
R5	PR37A	2		PR51A	2	
U10	PR35D	2		PR49D	2	
V10	PR35C	2		PR49C	2	
P2	PR35B	2		PR49B	2	
N2	PR35A	2		PR49A	2	
T8	PR34D	2		PR48D	2	
R8	PR34C	2		PR48C	2	
N3	PR34B	2		PR48B	2	
P3	PR34A	2		PR48A	2	
M6	PR33D	2		PR47D	2	
M7	PR33C	2		PR47C	2	
T6	PR33B	2		PR47B	2	
R6	PR33A	2		PR47A	2	
V11	PR31D	2		PR45D	2	
U11	PR31C	2		PR45C	2	
M1	PR31B	2		PR45B	2	
L1	PR31A	2		PR45A	2	
Y14	PR30D	2		PR44D	2	
W14	PR30C	2		PR44C	2	
M2	PR30B	2		PR44B	2	
L2	PR30A	2		PR44A	2	
T9	PR29D	2	DIFFR_2	PR43D	2	DIFFR_2
R9	PR29C	2	VREF1_2	PR43C	2	VREF1_2
P4	PR29B	2		PR43B	2	
N4	PR29A	2		PR43A	2	
N7	PR26D	2		PR40D	2	
N8	PR26C	2		PR40C	2	
P5	PR26B	2		PR40B	2	
N5	PR26A	2		PR40A	2	
K7	PR25D	2		PR38D	2	
J7	PR25C	2		PR38C	2	

LFSC/M80, LFSC/M115 Logic Signal Connections: 1704 fcBGA[1, 2] (Cont.)

Ball Number	LFSC/M80			LFSC/M115		
	Ball Function	VCCIO Bank	Dual Function	Ball Function	VCCIO Bank	Dual Function
D32	C_HDINP1_L	-	PCS 362 CH 1 IN P	C_HDINP1_L	-	PCS 362 CH 1 IN P
E32	C_HDINN1_L	-	PCS 362 CH 1 IN N	C_HDINN1_L	-	PCS 362 CH 1 IN N
B31	C_HDOUTP1_L	-	PCS 362 CH 1 OUT P	C_HDOUTP1_L	-	PCS 362 CH 1 OUT P
K32	VCC12	-		VCC12	-	
A31	C_HDOUTN1_L	-	PCS 362 CH 1 OUT N	C_HDOUTN1_L	-	PCS 362 CH 1 OUT N
L32	C_VDDOB1_L	-		C_VDDOB1_L	-	
A32	C_HDOUTN0_L	-	PCS 362 CH 0 OUT N	C_HDOUTN0_L	-	PCS 362 CH 0 OUT N
M31	C_VDDOB0_L	-		C_VDDOB0_L	-	
B32	C_HDOUTP0_L	-	PCS 362 CH 0 OUT P	C_HDOUTP0_L	-	PCS 362 CH 0 OUT P
H37	VCC12	-		VCC12	-	
E33	C_HDINN0_L	-	PCS 362 CH 0 IN N	C_HDINN0_L	-	PCS 362 CH 0 IN N
D33	C_HDINP0_L	-	PCS 362 CH 0 IN P	C_HDINP0_L	-	PCS 362 CH 0 IN P
G31	C_VDDIB0_L	-		C_VDDIB0_L	-	
J29	VCC12	-		VCC12	-	
L29	B_REFCLKP_L	-		B_REFCLKP_L	-	
M29	B_REFCLKN_L	-		B_REFCLKN_L	-	
J31	VCC12	-		VCC12	-	
H31	B_VDDIB3_L	-		B_VDDIB3_L	-	
J30	VCC12	-		VCC12	-	
D34	B_HDINP3_L	-	PCS 361 CH 3 IN P	B_HDINP3_L	-	PCS 361 CH 3 IN P
E34	B_HDINN3_L	-	PCS 361 CH 3 IN N	B_HDINN3_L	-	PCS 361 CH 3 IN N
B33	B_HDOUTP3_L	-	PCS 361 CH 3 OUT P	B_HDOUTP3_L	-	PCS 361 CH 3 OUT P
H38	VCC12	-		VCC12	-	
A33	B_HDOUTN3_L	-	PCS 361 CH 3 OUT N	B_HDOUTN3_L	-	PCS 361 CH 3 OUT N
C38	B_VDDOB3_L	-		B_VDDOB3_L	-	
A34	B_HDOUTN2_L	-	PCS 361 CH 2 OUT N	B_HDOUTN2_L	-	PCS 361 CH 2 OUT N
L31	B_VDDOB2_L	-		B_VDDOB2_L	-	
B34	B_HDOUTP2_L	-	PCS 361 CH 2 OUT P	B_HDOUTP2_L	-	PCS 361 CH 2 OUT P
G38	VCC12	-		VCC12	-	
E35	B_HDINN2_L	-	PCS 361 CH 2 IN N	B_HDINN2_L	-	PCS 361 CH 2 IN N
D35	B_HDINP2_L	-	PCS 361 CH 2 IN P	B_HDINP2_L	-	PCS 361 CH 2 IN P
H32	B_VDDIB2_L	-		B_VDDIB2_L	-	
K29	VCC12	-		VCC12	-	
K30	B_VDDIB1_L	-		B_VDDIB1_L	-	
F33	VCC12	-		VCC12	-	
D36	B_HDINP1_L	-	PCS 361 CH 1 IN P	B_HDINP1_L	-	PCS 361 CH 1 IN P
E36	B_HDINN1_L	-	PCS 361 CH 1 IN N	B_HDINN1_L	-	PCS 361 CH 1 IN N
B35	B_HDOUTP1_L	-	PCS 361 CH 1 OUT P	B_HDOUTP1_L	-	PCS 361 CH 1 OUT P
L34	VCC12	-		VCC12	-	
A35	B_HDOUTN1_L	-	PCS 361 CH 1 OUT N	B_HDOUTN1_L	-	PCS 361 CH 1 OUT N
K35	B_VDDOB1_L	-		B_VDDOB1_L	-	
A36	B_HDOUTN0_L	-	PCS 361 CH 0 OUT N	B_HDOUTN0_L	-	PCS 361 CH 0 OUT N
G39	B_VDDOB0_L	-		B_VDDOB0_L	-	
B36	B_HDOUTP0_L	-	PCS 361 CH 0 OUT P	B_HDOUTP0_L	-	PCS 361 CH 0 OUT P
J35	VCC12	-		VCC12	-	

Industrial, Cont.

Part Number	Grade	Package	Balls	Temp.	LUTs (K)
LFSCM3GA40EP1-6FF1020I[1]	-6	Organic fcBGA	1020	IND	40.4
LFSCM3GA40EP1-5FF1020I[1]	-5	Organic fcBGA	1020	IND	40.4
LFSCM3GA40EP1-6FFA1020I	-6	Organic fcBGA Revision 2	1020	IND	40.4
LFSCM3GA40EP1-5FFA1020I	-5	Organic fcBGA Revision 2	1020	IND	40.4
LFSCM3GA40EP1-6FC1152I[2]	-6	Ceramic fcBGA	1152	IND	40.4
LFSCM3GA40EP1-5FC1152I[2]	-5	Ceramic fcBGA	1152	IND	40.4
LFSCM3GA40EP1-6FF1152I	-6	Organic fcBGA	1152	IND	40.4
LFSCM3GA40EP1-5FF1152I	-5	Organic fcBGA	1152	IND	40.4

1. Converted to organic flip-chip BGA package revision 2 per PCN #02A-10.
2. Converted to organic flip-chip BGA package per PCN #01A-10.

Part Number	Grade	Package	Balls	Temp.	LUTs (K)
LFSC3GA80E-6FC1152I[1]	-6	Ceramic fcBGA	1152	IND	80.1
LFSC3GA80E-5FC1152I[1]	-5	Ceramic fcBGA	1152	IND	80.1
LFSC3GA80E-6FF1152I	-6	Organic fcBGA	1152	IND	80.1
LFSC3GA80E-5FF1152I	-5	Organic fcBGA	1152	IND	80.1
LFSC3GA80E-6FC1704I[1]	-6	Ceramic fcBGA	1704	IND	80.1
LFSC3GA80E-5FC1704I[1]	-5	Ceramic fcBGA	1704	IND	80.1
LFSC3GA80E-6FF1704I	-6	Organic fcBGA	1704	IND	80.1
LFSC3GA80E-5FF1704I	-5	Organic fcBGA	1704	IND	80.1

1. Converted to organic flip-chip BGA package per PCN #01A-10.

Part Number	Grade	Package	Balls	Temp.	LUTs (K)
LFSCM3GA80EP1-6FC1152I[1]	-6	Ceramic fcBGA	1152	IND	80.1
LFSCM3GA80EP1-5FC1152I[1]	-5	Ceramic fcBGA	1152	IND	80.1
LFSCM3GA80EP1-6FF1152I	-6	Organic fcBGA	1152	IND	80.1
LFSCM3GA80EP1-5FF1152I	-5	Organic fcBGA	1152	IND	80.1
LFSCM3GA80EP1-6FC1704I[1]	-6	Ceramic fcBGA	1704	IND	80.1
LFSCM3GA80EP1-5FC1704I[1]	-5	Ceramic fcBGA	1704	IND	80.1
LFSCM3GA80EP1-6FF1704I	-6	Organic fcBGA	1704	IND	80.1
LFSCM3GA80EP1-5FF1704I	-5	Organic fcBGA	1704	IND	80.1

1. Converted to organic flip-chip BGA package per PCN #01A-10.

Date	Version	Section	Change Summary
September 2007	01.7	Pinout Information	Added Thermal Management text section.
		Supplemental Information	Updated title list.
November 2007	01.8	Ordering Information	Removed -7 speed grade information for 115K LUT devices in the Ordering Information tables.
January 2008	01.9	Introduction	Corrections/Additions to memory controller list (Tables 1-2).
		Architecture	AIL Overview – Modified power used by AIL block.
			PURESPEED I/O Buffer Banks – Modified VTT termination info. Added info about complimentary drivers for all banks.
			Supported Source Synchronous Interfaces – Modified data for DDRII in Table 2-11.
		DC and Switching Characteristics	Recommended Operating Conditions – Changed footnote 3.
			Initialization and Standby Supply Current – Inserted a paragraph with info regarding the table. Also updated the table.
			Typical Building Block Function Performance – Added VCC=1.2V=1.2V+/-5% above Pin to Pin Performance table.
			LatticeSC External Switching Characteristics – Added VCC=1.2V=1.2V+/-5% above table. Reworded footnote 3.
			LatticeSC Family Timing Adders – Added VCC=1.2V=1.2V+/-5% above table.
			LatticeSC Internal Timing Parameters – Added VCC=1.2V=1.2V+/-5% above table. Reworded footnote 1.
			GSR Timing – Added a new table for Internal System Bus Timing after GSR Timing.
			LatticeSC sysCONFIG Port Timing – Corrected sysCONFIG SPI Port information.
		Pinout Information	Signal Descriptions – Modified info for VTT_x, PROBE_VCC, and PROBE_GND. Modified info for [LOC]_DLL[T,C]_IN[C,D,E,F].
		Supplemental Information	Updated list of technical notes, added reference to LatticeSC/M flexiPCS Data Sheet.
March 2008	02.0	DC and Switching Characteristics	Updated Internal Timing Parameters table.
			Updated Read Mode timing diagram.
			Updated Read Mode with Input Registers Only timing diagram.
June 2008	02.1	—	Data sheet status changed from preliminary to final.
		Architecture	Removed Read-Before-Write sysMEM EBR mode.
		DC and Switching Characteristics	Updated LatticeSC/M External Switching Characteristics table.
			Updated LatticeSC/M Internal Timing Parameters table.
			Removed Read-Before-Write sysMEM EBR mode.
December 2008	02.2	Architecture	Output/Tristate DDR/Shift Register Block Diagram - corrected connection to POS.
		DC and Switching Characteristics	DC and Switching Characteristics table - updated data for $t_{SUI\_PIO.}$
			Added $T_{R,}$ T_F parameter to PURESPEED I/O Differential Electrical Characteristics (LVDS) table.
		Multiple	Removed references to HyperTransport throughout the data sheet.
January 2010	02.3	Introduction	Updated per PCN #01A-10 (ceramic fcBGA conversion to organic fcBGA for the 1152-ball and 1704-ball fcBGA packages) and PCN #02A-10 (1020-ball organic fcBGA conversion to 1020-ball organic fcBGA revision 2 package).
		Ordering Information	