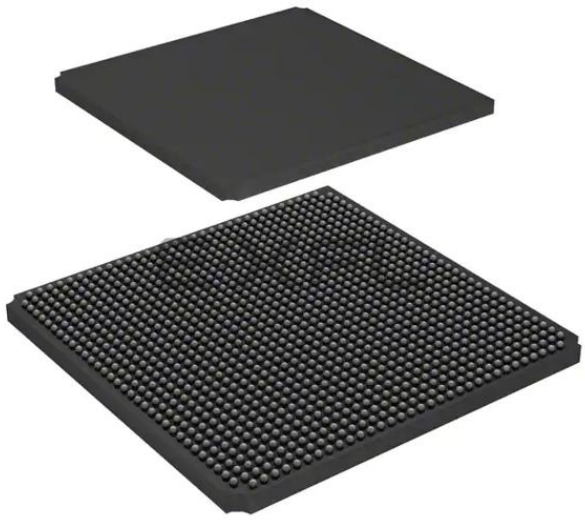
Lattice Semiconductor Corporation - LFSCM3GA80EP1-7FF1152C Datasheet



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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	20000
Number of Logic Elements/Cells	80000
Total RAM Bits	5816320
Number of I/O	660
Number of Gates	-
Voltage - Supply	0.95V ~ 1.26V
Mounting Type	Surface Mount
Operating Temperature	0°C ~ 85°C (TJ)
Package / Case	1152-BBGA, FCBGA
Supplier Device Package	1152-FCBGA (35x35)
Purchase URL	https://www.e-xfl.com/product-detail/lattice-semiconductor/lfscm3ga80ep1-7ff1152c

PCI Specification, Revision 2.2 requires the use of clamping diodes for 3.3V operation. For more information on the PCI interface, please refer to the PCI Specification, Revision 2.2.

Programmable Slew Rate Control

All output and bidirectional buffers have an optional programmable output slew rate control that can be configured for either low noise or high-speed performance. Each I/O pin has an individual slew rate control. This allows designers to specify slew rate control on a pin-by-pin basis. This slew rate control affects both the rising and falling edges.

Programmable Termination

Many of the I/O standards supported by the LatticeSC devices require termination at the transmitter, receiver or both. The SC devices provide the capability to implement many kinds of termination on-chip, minimizing stub lengths and hence improving performance. Utilizing this feature also has the benefit of reducing the number of discrete components required on the circuit board. The termination schemes can be split into two categories single-ended and differential.

Single Ended Termination

Single Ended Outputs: The SC devices support a number of different terminations for single ended outputs:

- Series
- Parallel to V_{CCIO} or GND
- Parallel to $V_{CCIO}/2$
- Parallel to $V_{CCIO}/2$ combined with series

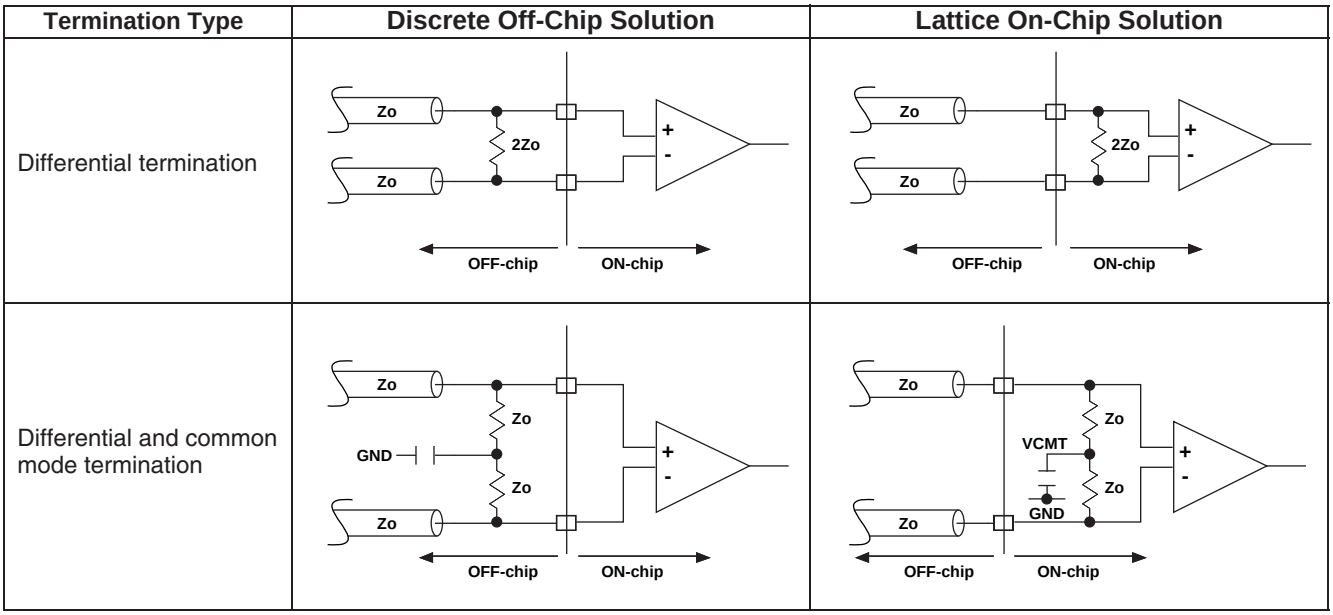
Figure 2-27 shows the single ended output schemes that are supported. The nominal values of the termination resistors are shown in Table 2-10.

Differential Input Termination

The LatticeSC device allows two types of differential termination. The first is a single resistor across the differential inputs. The second is a center-tapped system where each input is terminated to the on-chip termination bus V_{CMT}. The V_{CMT} bus is DC-coupled through an internal capacitor to ground.

Figure 2-29 shows the differential termination schemes and Table 2-9 shows the nominal values of the termination resistors.

Figure 2-29. Differential Termination Scheme



Calibration

There are two calibration sources that are associated with the termination scheme used in the LatticeSC devices:

- DIFFR – This pin occurs in each bank that supports differential drivers and must be connected through a 1K+/-1% resistor to ground if differential outputs are used. Note that differential drivers are not supported in banks 1, 4 and 5.
- XRES – There is one of these pins per device. It is used for several functions including calibrating on-chip termination. This pin should always be connected through a 1K+/-1% resistor to ground.

The LatticeSC devices support two modes of calibration:

- Continuous – In this mode the SC devices continually calibrate the termination resistances. Calibration happens several times a second. Using this mode ensures that termination resistances remain calibrated as the silicon junction temperature changes.
- User Request – In this mode the calibration circuit operates continuously. However, the termination resistor values are only updated on the assertion of the calibration_update signal available to the core logic.

For more information on calibration, refer to the details of additional technical documentation at the end of this data sheet.

Hot Socketing

The LatticeSC devices have been carefully designed to ensure predictable behavior during power-up and power-down. To ensure proper power sequencing, care must be taken during power-up and power-down as described below. During power-up and power-down sequences, the I/Os remain in tristate until the power supply voltage is high enough to ensure reliable operation. In addition, leakage into I/O pins is controlled to within specified limits,

Internal Logic Analyzer Capability (ispTRACY)

All LatticeSC devices support an internal logic analyzer diagnostic feature. The diagnostic features provide capabilities similar to an external logic analyzer, such as programmable event and trigger condition and deep trace memory. This feature is enabled by Lattice's ispTRACY. The ispTRACY utility is added into the user design at compile time. For additional detail refer to technical information at the end of the data sheet.

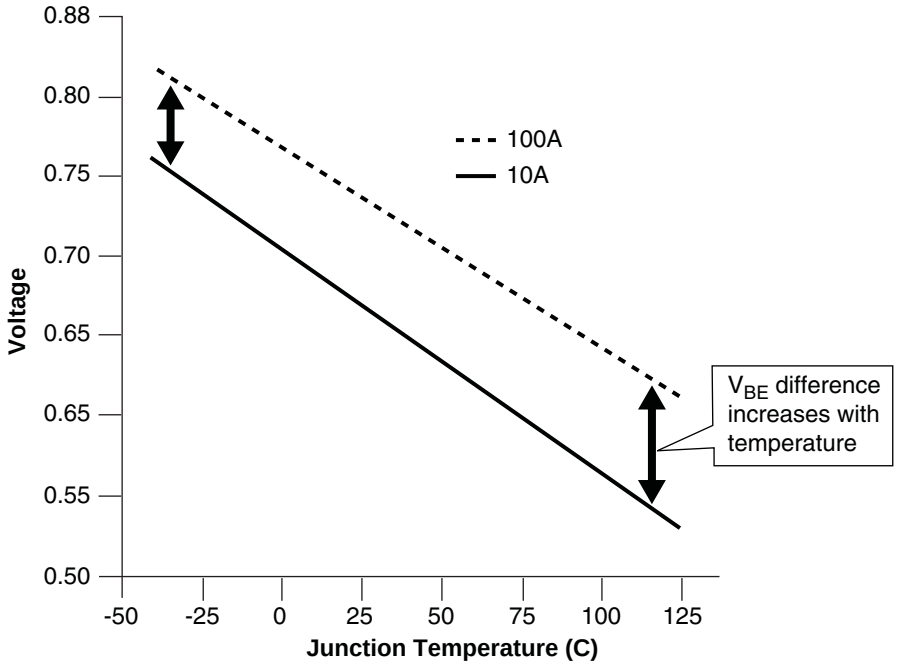
Temperature Sensing

Lattice provides a way to monitor the die temperature by using a temperature-sensing diode that is designed into every LatticeSC device. The difference in V_{BE} of the diode at two different forward currents varies with temperature. This relationship is shown in Figure 2-33. The accuracy of the temperature-sensing diode is typically +/- 10°C.

On packages that include PROBE_GND, the most accurate measurements will occur between the TEMP pin and the PROBE_GND pin. On packages that do not include PROBE_GND, measurements should be made between the TEMP pin and board ground.

This temperature-sensing diode is designed to work with an external temperature sensor such as the Maxim 1617A. The Maxim 1617A is configured to measure difference in V_{BE} (of the temperature-sensing diode) at 10µA and at 100µA. This difference in V_{BE} voltage varies with temperature at approximately 1.64 mV/°C. A typical device with a 85°C junction temperature will measure approximately 593mV. For additional detail refer to TN1115, Temperature Sensing Diode in LatticeSC Devices.

Figure 2-33. Sensing Diode Typical Characteristics



Oscillator

Every LatticeSC device has an internal CMOS oscillator, which is used as a master serial clock for configuration and is also available as a potential general purpose clock (MCK) for the FPGA core. There is a K divider (divide by 2/4/8/16/32/64/128) available with this oscillator to get lower MCK frequencies. This clock is available as a general purpose clock signal to the software routing tool. For additional detail refer to technical information at the end of the data sheet.

LatticeSC/M Family Data Sheet DC and Switching Characteristics

December 2011 **Data Sheet DS1004**

Absolute Maximum Ratings

Supply Voltage V_{CC}, V_{CC12}, V_{DDIB}, V_{DDOB} . . . . . -0.5 to 1.6V

Supply Voltage V_{CCAUX}, V_{DDAX25}, V_{TT} . . . . . -0.5 to 2.75V

Supply Voltage V_{CCJ} . . . . . -0.5 to 3.6V

Supply Voltage V_{CCIO} (Banks 1, 4, 5) . . . . . -0.5 to 3.6V

Supply Voltage V_{CCIO} (Banks 2, 3, 6, 7) . . . . . -0.5 to 2.75V

Input or I/O Tristate Voltage Applied (Banks 1, 4, 5) . . . . . -0.5 to 3.6V

Input or I/O Tristate Voltage Applied (Banks 2, 3, 6, 7) . . . . . -0.5 to 2.75V

Storage Temperature (Ambient) . . . . . -65 to 150°C

Junction Temperature Under Bias (Tj) . . . . . +125°C

Notes:

1. Stress above those listed under the “Absolute Maximum Ratings” may cause permanent damage to the device. Functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied.
2. Compliance with the Lattice Thermal Management document is required.
3. All voltages referenced to GND.
4. Undershoot and overshoot of -2V to (VIHMAX +2) volts is permitted for a duration of <20ns.

Recommended Operating Conditions

Symbol	Parameter	Min.	Max.	Units
V_{CC}[5]	Core Supply Voltage (Nominal 1.2V Operation)	0.95	1.26	V
V_{CCAUX}[6]	Programmable I/O Auxiliary Supply Voltage	2.375	2.625	V
V_{CCIO}[1, 2, 5, 6]	Programmable I/O Driver Supply Voltage (Banks 1, 4, 5)	1.14	3.45	V
V_{CCIO}[1, 2, 5, 6]	Programmable I/O Driver Supply Voltage (Banks 2, 3, 6, 7)	1.14	2.625	V
V_{CC12}[4, 5]	Internal 1.2V Power Supply Voltage for Configuration Logic and FPGA PLL, SERDES PLL Power Supply Voltage and SERDES Analog Supply Voltage	1.14	1.26	V
V_{DDIB}	SERDES Input Buffer Supply Voltage	1.14	1.575	V
V_{DDOB}	SERDES Output Buffer Supply Voltage	1.14	1.575	V
V_{DDAX25}	SERDES Termination Auxiliary Supply Voltage	2.375	2.625	V
V_{CCJ}[1, 5]	Supply Voltage for IEEE 1149.1 Test Access Port	1.71	3.45	V
V_{TT}[2, 3]	Programmable I/O Termination Power Supply	0.5	V_{CCAUX} - 0.5	V
t_{JCOM}	Junction Temperature, Commercial Operation	0	+85	C
t_{JIND}	Junction Temperature, Industrial Operation	-40	105	C

1. If V_{CCIO} or V_{CCJ} is set to 2.5V, they must be connected to the same power supply as V_{CCAUX}.
2. See recommended voltages by I/O standard in subsequent table.
3. When V_{TT} termination is not required, or used to provide the common mode termination voltage (V_{CMT}), these pins can be left unconnected on the device.
4. V_{CC12} cannot be lower than V_{CC} at any time. For 1.2V operation, it is recommended that the V_{CC} and V_{CC12} supplies be tied together with proper noise decoupling between the digital VCC and analog VCC12 supplies.
5. V_{CC}, V_{CCIO} (all banks), V_{CC12} and V_{CCJ} must reach their minimum values before configuration will proceed.
6. If V_{CCIO} for a bank is nominally 1.2V/1.5V/1.8V, then V_{CCAUX} must always be higher than V_{CCIO} during power up.

Switching Test Conditions

Figure 3-15 shows the output test load that is used for AC testing. The specific values for resistance, capacitance, voltage, and other test conditions are shown in Table 3-4.

Figure 3-15. Output Test Load, LVTTL and LVCMOS Standards

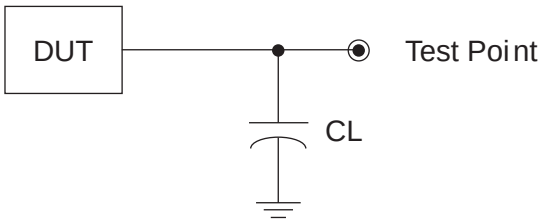


Table 3-4. Test Fixture Required Components, Non-Terminated Interfaces

Test Condition	C_L	Timing Ref.	V_T
LVTTL and other LVCMOS settings (L -> H, H -> L)	30pF	LVCMOS 3.3 = 1.5V	—
		LVCMOS 2.5 = $V_{CCIO}/2$	—
		LVCMOS 1.8 = $V_{CCIO}/2$	—
		LVCMOS 1.5 = $V_{CCIO}/2$	—
		LVCMOS 1.2 = $V_{CCIO}/2$	—
LVCMOS 2.5 I/O (Z -> H)	30pF	$V_{CCIO}/2$	V_{OL}
LVCMOS 2.5 I/O (Z -> L)		$V_{CCIO}/2$	V_{OH}
LVCMOS 2.5 I/O (H -> Z)		V_{OH} - 0.15	V_{OL}
LVCMOS 2.5 I/O (L -> Z)		V_{OL} + 0.15	V_{OH}

Note: Output test conditions for all other interfaces are determined by the respective standards.

Signal Descriptions

Signal Name	I/O	Description
General Purpose		
P[Edge] [Row/Column Number*]_[A/B/C/D]	I/O	[Edge] indicates the edge of the device on which the pad is located. Valid edge designations are L (Left), B (Bottom), R (Right), T (Top). [Row/Column Number] indicates the PIC row or the column of the device on which the PIC exists. When Edge is T (Top) or (Bottom), only need to specify Row Number. When Edge is L (Left) or R (Right), only need to specify Column Number. [A/B/C/D] indicates the PIO within the PIC to which the pad is connected. Some of these user programmable pins are shared with special function pins. These pin when not used as special purpose pins can be programmed as I/Os for user logic. During configuration the user-programmable I/Os are tri-stated with an internal pull-up resistor enabled. If any pin is not used (or not bonded to a package pin), it is also tri-stated with an internal pull-up resistor enabled after configuration.
VREF1_x, VREF2_x	—	The reference supply pins for I/O bank x. Any I/O pin in a bank can be assigned as a reference supply pin, but software defaults use designated pin.
NC	—	No connect. NC pins should not be connected to any active signals, VCC or GND.
Non-SERDES Power Supplies		
VCCIOx	—	VCCIO - The power supply pins for I/O bank x. Dedicated pins.
VCC12[1]	—	1.2V supply for configuration logic, PLLs and SERDES Rx, Tx and PLL. All VCC12 pins must be connected. As VCC12 supplies power for analog circuitry, VCC12 should be quiet and isolated from noisy digital board supplies.
VTT_x	—	Termination voltage for bank x. When VTT termination is not required, or used to provide the common mode termination voltage (VCMT), these pins can be left unconnected on the device. VCMT function is not used in the bank. If the internal or external VCMT function for differential input termination is used, the VTT pins should be unconnected and allowed to float.
GND	—	GND - Ground. Dedicated pins. All grounds must be electrically connected at the board level.
VCC	—	VCC - The power supply pins for core logic. Dedicated pins (1.2V/ 1.0V).
VCCAUX	—	VCCAUX - Auxiliary power supply pin - powers all differential and referenced input buffers. Dedicated pins (2.5V).
VCCJ	—	VCCJ - The power supply pin for JTAG Test Access Port.
PROBE_VCC	—	VCC signal - Connected to internal VCC node. Can be used for feedback to control an external board power converter. Can be unconnected if not used.

Signal Descriptions (Cont.)

Signal Name	I/O	Description
PROBE_GND	—	GND signal - Connected to internal VSS node. Can be used for feedback to control an external board power converter. Can be unconnected if not used.
PLL and Clock Functions (Used as user-programmable I/O pins when not in use for PLL, DLL or clock pins.)		
[LOC]_PLL[T, C]_FB_[A/B]	I	PLL feedback input. Pull-ups are enabled on input pins during configuration. [LOC] indicates the corner the PLL is located in: ULC (upper left), URC (upper right), LLC (lower left) and LRC (lower right). [T, C] indicates whether input is true or complement. [A, B] indicates PLL reference within the corner.
[LOC]_DLL[T, C]_FB_[C, D, E, F]	I	DLL feedback input. Pull-ups are enabled on input pins during configuration. [LOC] indicates the corner the DLL is located in: ULC (upper left), URC (upper right), LLC (lower left) and LRC (lower right). [T/C] indicates whether input is true or complement. [C, D, E, F] indicates DLL reference within a corner. Note: E and F are only available on the lower corners.
[LOC]_PLL[T, C]_IN[A/B]	I	PLL reference clock input. Pull-ups are enabled on input pins during configuration. [LOC] indicates the corner the PLL is located in: ULC (upper left corner), URC (upper right corner), LLC (lower left corner) and LRC (lower right corner). [T, C] indicates whether input is true or complement.[A, B] indicates PLL reference within the corner.
[LOC]_DLL[T, C]_IN[C, D, E, F]		DLL reference clock inputs. Pull-ups are enabled on input pins during configuration. [LOC] indicates the corner the DLL is located in: ULC (upper left corner), URC (upper right corner), LLC (lower left corner) and LRC (lower right corner). [T/C] indicates whether input is true or complement. [C, D, E, F] indicates DLL reference within a corner. Note: E and F are only available on the lower corners. PCKLxy_[0:3] can drive primary clocks, edge clocks, and CLKDIVs. PCLKxy_[4:7] can only drive edge clocks.
PCLKxy_z		General clock inputs. x indicates whether T (true) or C (complement). y indicates the I/O bank the clock is associated with. z indicates the clock number within a bank.
Test and Programming (Dedicated pins. Pull-up is enabled on input pins during configuration.)		
TMS	I	Test Mode Select input, used to control the 1149.1 state machine.
TCK	I	Test Clock input pin, used to clock the 1149.1 state machine.
TDI	I	Test Data in pin, used to load data into device using 1149.1 state machine. After power-up, this TAP port can be activated for configuration by sending appropriate command. (Note: once a configuration port is selected it is locked. Another configuration port cannot be selected until the power-up sequence).
TDO	O	Output pin -Test Data out pin used to shift data out of device using 1149.1.
Configuration Pads (Dedicated pins. Used during sysCONFIG.)		
M[3:0]	I	Mode pins used to specify configuration modes values latched on rising edge of INITN.
INITN	I/O	Open Drain pin - Indicates the FPGA is ready to be configured. During configuration, a pull-up is enabled that will pull the I/O above 1.5V.
PROGRAMN	I	Initiates configuration sequence when asserted low. This pin always has an active pull-up.
DONE	I/O	Open Drain pin - Indicates that the configuration sequence is complete, and the startup sequence is in progress.
CCLK	I/O	Configuration Clock for configuring an FPGA in sysCONFIG mode.

LFSC/M15, LFSC/M25 Logic Signal Connections: 900 fpBGA[1, 2]

Ball Number	LFSC/M15			LFSC/M25		
	Ball Function	VCCIO Bank	Dual Function	Ball Function	VCCIO Bank	Dual Function
F7	A_VDDAX25_L	-		A_VDDAX25_L	-	
B1	A_REFCLKP_L	-		A_REFCLKP_L	-	
C1	A_REFCLKN_L	-		A_REFCLKN_L	-	
D5	VCC12	-		VCC12	-	
A2	RESP_ULC	-		RESP_ULC	-	
E5	VCC12	-		VCC12	-	
D4	VCC12	-		VCC12	-	
H5	RESETN	1		RESETN	1	
H6	TSALLN	1		TSALLN	1	
G6	DONE	1		DONE	1	
G5	INITN	1		INITN	1	
F5	M0	1		M0	1	
F6	M1	1		M1	1	
F4	M2	1		M2	1	
E4	M3	1		M3	1	
D3	PL15A	7	ULC_PLLT_IN_A/ULC_PLLT_FB_B	PL16A	7	ULC_PLLT_IN_A/ULC_PLLT_FB_B
D2	PL15B	7	ULC_PLLC_IN_A/ULC_PLLC_FB_B	PL16B	7	ULC_PLLC_IN_A/ULC_PLLC_FB_B
J6	PL15C	7		PL16C	7	
J5	PL15D	7		PL16D	7	
E3	PL17A	7	ULC_DLLT_IN_C/ULC_DLLT_FB_D	PL17A	7	ULC_DLLT_IN_C/ULC_DLLT_FB_D
E2	PL17B	7	ULC_DLLC_IN_C/ULC_DLLC_FB_D	PL17B	7	ULC_DLLC_IN_C/ULC_DLLC_FB_D
K4	PL17C	7	ULC_PLLT_IN_B/ULC_PLLT_FB_A	PL17C	7	ULC_PLLT_IN_B/ULC_PLLT_FB_A
J4	PL17D	7	ULC_PLLC_IN_B/ULC_PLLC_FB_A	PL17D	7	ULC_PLLC_IN_B/ULC_PLLC_FB_A
F3	PL18A	7	ULC_DLLT_IN_D/ULC_DLLT_FB_C	PL18A	7	ULC_DLLT_IN_D/ULC_DLLT_FB_C
G3	PL18B	7	ULC_DLLC_IN_D/ULC_DLLC_FB_C	PL18B	7	ULC_DLLC_IN_D/ULC_DLLC_FB_C
K5	PL18C	7		PL18C	7	
K6	PL18D	7	VREF2_7	PL18D	7	VREF2_7
F2	PL19A	7		PL22A	7	
F1	PL19B	7		PL22B	7	
E1	PL19C	7		PL22C	7	
D1	PL19D	7		PL22D	7	
K3	PL22A	7		PL25A	7	
L3	PL22B	7		PL25B	7	
L6	PL22C	7	VREF1_7	PL25C	7	VREF1_7
M6	PL22D	7	DIFFR_7	PL25D	7	DIFFR_7
J1	PL23A	7	PCLKT7_1	PL26A	7	PCLKT7_1
K1	PL23B	7	PCLKC7_1	PL26B	7	PCLKC7_1
L1	PL24A	7	PCLKT7_0	PL27A	7	PCLKT7_0
M1	PL24B	7	PCLKC7_0	PL27B	7	PCLKC7_0
P8	PL24C	7	PCLKT7_2	PL27C	7	PCLKT7_2
R8	PL24D	7	PCLKC7_2	PL27D	7	PCLKC7_2
N2	PL26A	6	PCLKT6_0	PL29A	6	PCLKT6_0
N1	PL26B	6	PCLKC6_0	PL29B	6	PCLKC6_0
R7	PL26C	6	PCLKT6_1	PL29C	6	PCLKT6_1
R6	PL26D	6	PCLKC6_1	PL29D	6	PCLKC6_1

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
H1	PR25B	2		PR23B	2	
H2	PR25A	2		PR23A	2	
N8	PR22D	2		PR25D	2	
M8	PR22C	2		PR25C	2	
H4	PR22B	2		PR25B	2	
J4	PR22A	2		PR25A	2	
G1	PR21B	2		PR22B	2	
G2	PR21A	2		PR22A	2	
L7	PR20D	2		PR21D	2	
L8	PR20C	2		PR21C	2	
F2	PR20B	2		PR21B	2	
F1	PR20A	2		PR21A	2	
K5	PR18D	2	VREF2_2	PR18D	2	VREF2_2
J5	PR18C	2		PR18C	2	
E2	PR18B	2	URC_DLLC_IN_D/URC_DLLC_FB_C	PR18B	2	URC_DLLC_IN_D/URC_DLLC_FB_C
E1	PR18A	2	URC_DLLT_IN_D/URC_DLLT_FB_C	PR18A	2	URC_DLLT_IN_D/URC_DLLT_FB_C
N10	PR17D	2	URC_PLLC_IN_B/URC_PLLC_FB_A	PR17D	2	URC_PLLC_IN_B/URC_PLLC_FB_A
M10	PR17C	2	URC_PLLT_IN_B/URC_PLLT_FB_A	PR17C	2	URC_PLLT_IN_B/URC_PLLT_FB_A
D2	PR17B	2	URC_DLLC_IN_C/URC_DLLC_FB_D	PR17B	2	URC_DLLC_IN_C/URC_DLLC_FB_D
D1	PR17A	2	URC_DLLT_IN_C/URC_DLLT_FB_D	PR17A	2	URC_DLLT_IN_C/URC_DLLT_FB_D
K6	PR16D	2		PR16D	2	
K7	PR16C	2		PR16C	2	
J8	PR16B	2	URC_PLLC_IN_A/URC_PLLC_FB_B	PR16B	2	URC_PLLC_IN_A/URC_PLLC_FB_B
K8	PR16A	2	URC_PLLT_IN_A/URC_PLLT_FB_B	PR16A	2	URC_PLLT_IN_A/URC_PLLT_FB_B
J10	VCCJ	-		VCCJ	-	
J9	TDO	-	TDO	TDO	-	TDO
K9	TMS	-		TMS	-	
J12	TCK	-		TCK	-	
J13	TDI	-		TDI	-	
K12	PROGRAMN	1		PROGRAMN	1	
K13	MPIIRQN	1	CFGIRQN/MPI_IRQ_N	MPIIRQN	1	CFGIRQN/MPI_IRQ_N
K10	CCLK	1		CCLK	1	
F5	RESP_URC	-		RESP_URC	-	
B5	VCC12	-		VCC12	-	
D5	A_REFCLKN_R	-		A_REFCLKN_R	-	
C5	A_REFCLKP_R	-		A_REFCLKP_R	-	
B2	A_VDDIB0_R	-		A_VDDIB0_R	-	
C1	A_HDINP0_R	-	PCS 3E0 CH 0 IN P	A_HDINP0_R	-	PCS 3E0 CH 0 IN P
C2	A_HDINN0_R	-	PCS 3E0 CH 0 IN N	A_HDINN0_R	-	PCS 3E0 CH 0 IN N
A3	A_HDOUTP0_R	-	PCS 3E0 CH 0 OUT P	A_HDOUTP0_R	-	PCS 3E0 CH 0 OUT P
D3	A_VDDOB0_R	-		A_VDDOB0_R	-	
B3	A_HDOUTN0_R	-	PCS 3E0 CH 0 OUT N	A_HDOUTN0_R	-	PCS 3E0 CH 0 OUT N
D4	A_VDDOB1_R	-		A_VDDOB1_R	-	
B4	A_HDOUTN1_R	-	PCS 3E0 CH 1 OUT N	A_HDOUTN1_R	-	PCS 3E0 CH 1 OUT N
A4	A_HDOUTP1_R	-	PCS 3E0 CH 1 OUT P	A_HDOUTP1_R	-	PCS 3E0 CH 1 OUT P
H5	A_HDINN1_R	-	PCS 3E0 CH 1 IN N	A_HDINN1_R	-	PCS 3E0 CH 1 IN N
G5	A_HDINP1_R	-	PCS 3E0 CH 1 IN P	A_HDINP1_R	-	PCS 3E0 CH 1 IN P
F4	A_VDDIB1_R	-		A_VDDIB1_R	-	
H6	A_VDDIB2_R	-		A_VDDIB2_R	-	
F6	A_HDINP2_R	-	PCS 3E0 CH 2 IN P	A_HDINP2_R	-	PCS 3E0 CH 2 IN P

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
P10	GND	-		GND	-	
P13	GND	-		GND	-	
P15	GND	-		GND	-	
P18	GND	-		GND	-	
P20	GND	-		GND	-	
P24	GND	-		GND	-	
R12	GND	-		GND	-	
R14	GND	-		GND	-	
R16	GND	-		GND	-	
R17	GND	-		GND	-	
R19	GND	-		GND	-	
R21	GND	-		GND	-	
R26	GND	-		GND	-	
R6	GND	-		GND	-	
T15	GND	-		GND	-	
T18	GND	-		GND	-	
T30	GND	-		GND	-	
T4	GND	-		GND	-	
U15	GND	-		GND	-	
U18	GND	-		GND	-	
U29	GND	-		GND	-	
U3	GND	-		GND	-	
V12	GND	-		GND	-	
V14	GND	-		GND	-	
V16	GND	-		GND	-	
V17	GND	-		GND	-	
V19	GND	-		GND	-	
V21	GND	-		GND	-	
V27	GND	-		GND	-	
V7	GND	-		GND	-	
W13	GND	-		GND	-	
W15	GND	-		GND	-	
W18	GND	-		GND	-	
W20	GND	-		GND	-	
W23	GND	-		GND	-	
W9	GND	-		GND	-	
Y12	GND	-		GND	-	
Y14	GND	-		GND	-	
Y19	GND	-		GND	-	
Y21	GND	-		GND	-	
Y30	GND	-		GND	-	
Y4	GND	-		GND	-	
N13	VCC	-		VCC	-	
N15	VCC	-		VCC	-	
N16	VCC	-		VCC	-	
N17	VCC	-		VCC	-	
N18	VCC	-		VCC	-	
N20	VCC	-		VCC	-	
P14	VCC	-		VCC	-	
P16	VCC	-		VCC	-	

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
U12	VCC12	-		VCC12	-	
U21	VCC12	-		VCC12	-	
AA16	VCC12	-		VCC12	-	
AA17	VCC12	-		VCC12	-	
M14	VCC12	-		VCC12	-	
P12	VCC12	-		VCC12	-	
W12	VCC12	-		VCC12	-	
AA14	VCC12	-		VCC12	-	
AA19	VCC12	-		VCC12	-	
W21	VCC12	-		VCC12	-	
P21	VCC12	-		VCC12	-	
M19	VCC12	-		VCC12	-	
A2	GND	-		GND	-	
A10	GND	-		GND	-	
E28	NC	-		NC	-	
E5	NC	-		NC	-	
F10	NC	-		NC	-	
E10	NC	-		NC	-	
E23	NC	-		NC	-	
F23	NC	-		NC	-	

1. Differential pair grouping within a PIC is A (True) and B (Complement) and C (True) and D (Complement).
2. The LatticeSC/M25 and LatticeSC/M40 in a 1020-pin package support a 16-bit MPI interface.

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
AF21	PB26D	5		PB29D	5	
AN23	PB27A	5		PB45A	5	
AN22	PB27B	5		PB45B	5	
AP23	PB29A	5		PB55A	5	
AP22	PB29B	5		PB55B	5	
AG21	PB29C	5		PB55C	5	
AG20	PB29D	5		PB55D	5	
AP25	PB30A	5	PCLKT5_3	PB48A	5	PCLKT5_3
AP24	PB30B	5	PCLKC5_3	PB48B	5	PCLKC5_3
AD21	PB30C	5	PCLKT5_4	PB48C	5	PCLKT5_4
AD20	PB30D	5	PCLKC5_4	PB48D	5	PCLKC5_4
AL23	PB31A	5	PCLKT5_5	PB49A	5	PCLKT5_5
AL22	PB31B	5	PCLKC5_5	PB49B	5	PCLKC5_5
AH24	PB31C	5		PB49C	5	
AH23	PB31D	5		PB49D	5	
AM23	PB33A	5	PCLKT5_0	PB51A	5	PCLKT5_0
AM22	PB33B	5	PCLKC5_0	PB51B	5	PCLKC5_0
AJ24	PB33C	5		PB51C	5	
AJ23	PB33D	5	VREF2_5	PB51D	5	VREF2_5
AN21	PB34A	5	PCLKT5_1	PB52A	5	PCLKT5_1
AN20	PB34B	5	PCLKC5_1	PB52B	5	PCLKC5_1
AE19	PB34C	5	PCLKT5_6	PB52C	5	PCLKT5_6
AD19	PB34D	5	PCLKC5_6	PB52D	5	PCLKC5_6
AK21	PB35A	5	PCLKT5_2	PB53A	5	PCLKT5_2
AK20	PB35B	5	PCLKC5_2	PB53B	5	PCLKC5_2
AK23	PB35C	5	PCLKT5_7	PB53C	5	PCLKT5_7
AK22	PB35D	5	PCLKC5_7	PB53D	5	PCLKC5_7
AL20	PB37A	5		PB56A	5	
AL19	PB37B	5		PB56B	5	
AG19	PB37C	5		PB56C	5	
AF19	PB37D	5		PB56D	5	
AP21	PB38A	5		PB57A	5	
AP20	PB38B	5		PB57B	5	
AH21	PB38C	5		PB57C	5	
AH20	PB38D	5		PB57D	5	
AM20	PB39A	5		PB59A	5	
AM19	PB39B	5		PB59B	5	
AJ21	PB39C	5		PB59C	5	
AJ20	PB39D	5		PB59D	5	
AK19	PB41A	5		PB60A	5	
AK18	PB41B	5		PB60B	5	
AE18	PB41C	5		PB60C	5	
AD18	PB41D	5		PB60D	5	
AN19	PB42A	5		PB61A	5	
AN18	PB42B	5		PB61B	5	

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

Ball Number	LFSC/M115		
	Ball Function	VCCIO Bank	Dual Function
AP27	PB26A	5	
AP26	PB26B	5	
AK25	PB26C	5	
AK24	PB26D	5	
AN25	PB29A	5	
AN24	PB29B	5	
AE22	PB29C	5	
AE21	PB29D	5	
AM26	PB31A	5	
AM25	PB31B	5	
AF22	PB31C	5	
AF21	PB31D	5	
AN23	PB47A	5	
AN22	PB47B	5	
AP23	PB57A	5	
AP22	PB57B	5	
AG21	PB57C	5	
AG20	PB57D	5	
AP25	PB50A	5	PCLKT5_3
AP24	PB50B	5	PCLKC5_3
AD21	PB50C	5	PCLKT5_4
AD20	PB50D	5	PCLKC5_4
AL23	PB51A	5	PCLKT5_5
AL22	PB51B	5	PCLKC5_5
AH24	PB51C	5	
AH23	PB51D	5	
AM23	PB53A	5	PCLKT5_0
AM22	PB53B	5	PCLKC5_0
AJ24	PB53C	5	
AJ23	PB53D	5	VREF2_5
AN21	PB54A	5	PCLKT5_1
AN20	PB54B	5	PCLKC5_1
AE19	PB54C	5	PCLKT5_6
AD19	PB54D	5	PCLKC5_6
AK21	PB55A	5	PCLKT5_2
AK20	PB55B	5	PCLKC5_2
AK23	PB55C	5	PCLKT5_7
AK22	PB55D	5	PCLKC5_7
AL20	PB58A	5	
AL19	PB58B	5	
AG19	PB58C	5	
AF19	PB58D	5	
AP21	PB61A	5	

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
W7	GND	-	
AA14	VCC	-	
AA16	VCC	-	
AA17	VCC	-	
AA18	VCC	-	
AA19	VCC	-	
AA21	VCC	-	
AB13	VCC	-	
AB22	VCC	-	
N13	VCC	-	
N22	VCC	-	
P14	VCC	-	
P16	VCC	-	
P17	VCC	-	
P18	VCC	-	
P19	VCC	-	
P21	VCC	-	
R15	VCC	-	
R17	VCC	-	
R18	VCC	-	
R20	VCC	-	
T14	VCC	-	
T16	VCC	-	
T19	VCC	-	
T21	VCC	-	
U14	VCC	-	
U15	VCC	-	
U17	VCC	-	
U18	VCC	-	
U20	VCC	-	
U21	VCC	-	
V14	VCC	-	
V15	VCC	-	
V17	VCC	-	
V18	VCC	-	
V20	VCC	-	
V21	VCC	-	
W14	VCC	-	
W16	VCC	-	
W19	VCC	-	
W21	VCC	-	
Y15	VCC	-	
Y17	VCC	-	

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
T16	GND	-		GND	-	
T19	GND	-		GND	-	
T24	GND	-		GND	-	
T27	GND	-		GND	-	
T32	GND	-		GND	-	
U18	GND	-		GND	-	
U20	GND	-		GND	-	
U23	GND	-		GND	-	
U25	GND	-		GND	-	
U36	GND	-		GND	-	
U7	GND	-		GND	-	
G36	GND	-		GND	-	
G7	GND	-		GND	-	
V17	GND	-		GND	-	
V19	GND	-		GND	-	
V24	GND	-		GND	-	
V26	GND	-		GND	-	
V4	GND	-		GND	-	
V40	GND	-		GND	-	
W12	GND	-		GND	-	
W16	GND	-		GND	-	
W18	GND	-		GND	-	
W20	GND	-		GND	-	
W23	GND	-		GND	-	
W25	GND	-		GND	-	
W27	GND	-		GND	-	
W31	GND	-		GND	-	
Y17	GND	-		GND	-	
Y19	GND	-		GND	-	
Y21	GND	-		GND	-	
Y22	GND	-		GND	-	
AA17	VCC	-		VCC	-	
AA18	VCC	-		VCC	-	
AA19	VCC	-		VCC	-	
AA21	VCC	-		VCC	-	
AA22	VCC	-		VCC	-	
AA24	VCC	-		VCC	-	
AA25	VCC	-		VCC	-	
AA26	VCC	-		VCC	-	
AB17	VCC	-		VCC	-	
AB18	VCC	-		VCC	-	
AB19	VCC	-		VCC	-	
AB21	VCC	-		VCC	-	
AB22	VCC	-		VCC	-	
AB24	VCC	-		VCC	-	

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
AH22	VTT_5	5		VTT_5	5	
AJ22	VTT_5	5		VTT_5	5	
AJ23	VTT_5	5		VTT_5	5	
AJ24	VTT_5	5		VTT_5	5	
AJ25	VTT_5	5		VTT_5	5	
AB28	VTT_6	6		VTT_6	6	
AB29	VTT_6	6		VTT_6	6	
AE29	VTT_6	6		VTT_6	6	
AJ30	VTT_6	6		VTT_6	6	
AA28	VTT_7	7		VTT_7	7	
AA29	VTT_7	7		VTT_7	7	
R31	VTT_7	7		VTT_7	7	
V29	VTT_7	7		VTT_7	7	
Y24	GND	-		GND	-	
Y26	GND	-		GND	-	
Y8	GND	-		GND	-	
Y35	GND	-		GND	-	
AA16	VCC12	-		VCC12	-	
AA27	VCC12	-		VCC12	-	
AB16	VCC12	-		VCC12	-	
AB27	VCC12	-		VCC12	-	
AF16	VCC12	-		VCC12	-	
AF27	VCC12	-		VCC12	-	
AG17	VCC12	-		VCC12	-	
AG21	VCC12	-		VCC12	-	
G33	NC	-		NC	-	
G10	NC	-		NC	-	
M15	NC	-		NC	-	
L15	NC	-		NC	-	
K16	NC	-		NC	-	
J16	NC	-		NC	-	
M18	NC	-		NC	-	
L18	NC	-		NC	-	
M25	NC	-		NC	-	
L25	NC	-		NC	-	
J27	NC	-		NC	-	
K27	NC	-		NC	-	
L28	NC	-		NC	-	
M28	NC	-		NC	-	

1. Differential pair grouping within a PIC is A (True) and B (Complement) and C (True) and D (Complement).
2. The LatticeSC/M80 and LatticeSC/M115 in a 1704-pin package supports a 32-bit MPI interface.

Commercial, Cont.

Part Number	Grade	Package	Balls	Temp.	LUTs (K)
LFSC3GA80E-7FC1152C[1]	-7	Ceramic fcBGA	1152	COM	80.1
LFSC3GA80E-6FC1152C[1]	-6	Ceramic fcBGA	1152	COM	80.1
LFSC3GA80E-5FC1152C[1]	-5	Ceramic fcBGA	1152	COM	80.1
LFSC3GA80E-7FF1152C	-7	Organic fcBGA	1152	COM	80.1
LFSC3GA80E-6FF1152C	-6	Organic fcBGA	1152	COM	80.1
LFSC3GA80E-5FF1152C	-5	Organic fcBGA	1152	COM	80.1
LFSC3GA80E-7FC1704C[1]	-7	Ceramic fcBGA	1704	COM	80.1
LFSC3GA80E-6FC1704C[1]	-6	Ceramic fcBGA	1704	COM	80.1
LFSC3GA80E-5FC1704C[1]	-5	Ceramic fcBGA	1704	COM	80.1
LFSC3GA80E-7FF1704C	-7	Organic fcBGA	1704	COM	80.1
LFSC3GA80E-6FF1704C	-6	Organic fcBGA	1704	COM	80.1
LFSC3GA80E-5FF1704C	-5	Organic fcBGA	1704	COM	80.1

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

Part Number	Grade	Package	Balls	Temp.	LUTs (K)
LFSCM3GA80EP1-7FC1152C[1]	-7	Ceramic fcBGA	1152	COM	80.1
LFSCM3GA80EP1-6FC1152C[1]	-6	Ceramic fcBGA	1152	COM	80.1
LFSCM3GA80EP1-5FC1152C[1]	-5	Ceramic fcBGA	1152	COM	80.1
LFSCM3GA80EP1-7FF1152C	-7	Organic fcBGA	1152	COM	80.1
LFSCM3GA80EP1-6FF1152C	-6	Organic fcBGA	1152	COM	80.1
LFSCM3GA80EP1-5FF1152C	-5	Organic fcBGA	1152	COM	80.1
LFSCM3GA80EP1-7FC1704C[1]	-7	Ceramic fcBGA	1704	COM	80.1
LFSCM3GA80EP1-6FC1704C[1]	-6	Ceramic fcBGA	1704	COM	80.1
LFSCM3GA80EP1-5FC1704C[1]	-5	Ceramic fcBGA	1704	COM	80.1
LFSCM3GA80EP1-7FF1704C	-7	Organic fcBGA	1704	COM	80.1
LFSCM3GA80EP1-6FF1704C	-6	Organic fcBGA	1704	COM	80.1
LFSCM3GA80EP1-5FF1704C	-5	Organic fcBGA	1704	COM	80.1

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

Part Number	Grade	Package	Balls	Temp.	LUTs (K)
LFSC3GA115E-6FC1152C[1]	-6	Ceramic fcBGA	1152	COM	115.2
LFSC3GA115E-5FC1152C[1]	-5	Ceramic fcBGA	1152	COM	115.2
LFSC3GA115E-6FF1152C	-6	Organic fcBGA	1152	COM	115.2
LFSC3GA115E-5FF1152C	-5	Organic fcBGA	1152	COM	115.2
LFSC3GA115E-6FC1704C[1]	-6	Ceramic fcBGA	1704	COM	115.2
LFSC3GA115E-5FC1704C[1]	-5	Ceramic fcBGA	1704	COM	115.2
LFSC3GA115E-6FF1704C	-6	Organic fcBGA	1704	COM	115.2
LFSC3GA115E-5FF1704C	-5	Organic fcBGA	1704	COM	115.2

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

Lead-Free Packaging

Commercial

Part Number	Grade	Package	Balls	Temp.	LUTs (K)
LFSC3GA15E-7FN256C	-7	Lead-Free fpBGA	256	COM	15.2
LFSC3GA15E-6FN256C	-6	Lead-Free fpBGA	256	COM	15.2
LFSC3GA15E-5FN256C	-5	Lead-Free fpBGA	256	COM	15.2
LFSC3GA15E-7FN900C	-7	Lead-Free fpBGA	900	COM	15.2
LFSC3GA15E-6FN900C	-6	Lead-Free fpBGA	900	COM	15.2
LFSC3GA15E-5FN900C	-5	Lead-Free fpBGA	900	COM	15.2

Part Number	Grade	Package	Balls	Temp.	LUTs (K)
LFSCM3GA15EP1-7FN256C	-7	Lead-Free fpBGA	256	COM	15.2
LFSCM3GA15EP1-6FN256C	-6	Lead-Free fpBGA	256	COM	15.2
LFSCM3GA15EP1-5FN256C	-5	Lead-Free fpBGA	256	COM	15.2
LFSCM3GA15EP1-7FN900C	-7	Lead-Free fpBGA	900	COM	15.2
LFSCM3GA15EP1-6FN900C	-6	Lead-Free fpBGA	900	COM	15.2
LFSCM3GA15EP1-5FN900C	-5	Lead-Free fpBGA	900	COM	15.2

Part Number	Grade	Package	Balls	Temp.	LUTs (K)
LFSC3GA25E-7FN900C	-7	Lead-Free fpBGA	900	COM	25.4
LFSC3GA25E-6FN900C	-6	Lead-Free fpBGA	900	COM	25.4
LFSC3GA25E-5FN900C	-5	Lead-Free fpBGA	900	COM	25.4
LFSC3GA25E-7FFN1020C[1]	-7	Lead-Free Organic fcBGA	1020	COM	25.4
LFSC3GA25E-6FFN1020C[1]	-6	Lead-Free Organic fcBGA	1020	COM	25.4
LFSC3GA25E-5FFN1020C[1]	-5	Lead-Free Organic fcBGA	1020	COM	25.4
LFSC3GA25E-7FFAN1020C	-7	Lead-Free Organic fcBGA Revision 2	1020	COM	25.4
LFSC3GA25E-6FFAN1020C	-6	Lead-Free Organic fcBGA Revision 2	1020	COM	25.4
LFSC3GA25E-5FFAN1020C	-5	Lead-Free Organic fcBGA Revision 2	1020	COM	25.4

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

Part Number	Grade	Package	Balls	Temp.	LUTs (K)
LFSCM3GA25EP1-7FN900C	-7	Lead-Free fpBGA	900	COM	25.4
LFSCM3GA25EP1-6FN900C	-6	Lead-Free fpBGA	900	COM	25.4
LFSCM3GA25EP1-5FN900C	-5	Lead-Free fpBGA	900	COM	25.4
LFSCM3GA25EP1-7FFN1020C[1]	-7	Lead-Free Organic fcBGA	1020	COM	25.4
LFSCM3GA25EP1-6FFN1020C[1]	-6	Lead-Free Organic fcBGA	1020	COM	25.4
LFSCM3GA25EP1-5FFN1020C[1]	-5	Lead-Free Organic fcBGA	1020	COM	25.4
LFSCM3GA25EP1-7FFAN1020C	-7	Lead-Free Organic fcBGA Revision 2	1020	COM	25.4
LFSCM3GA25EP1-6FFAN1020C	-6	Lead-Free Organic fcBGA Revision 2	1020	COM	25.4
LFSCM3GA25EP1-5FFAN1020C	-5	Lead-Free Organic fcBGA Revision 2	1020	COM	25.4

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

Date	Version	Section	Change Summary
March 2007 (cont.)	01.5 (cont.)	DC and Switching Characteristics (cont.)	Updated LatticeSC Internal Timing Parameters with ispLEVER 6.1 SP1 results.
			Updated t_{FDEL} and t_{CDEL} specifications.
			Updated LatticeSC Family Timing Adders with ispLEVER 6.1 SP1 results.
			Updated PLL specifications to expand frequency range down to 2 MHz and break out jitter for the different ranges.
			Added footnote to sysCLOCK PLL Timing table specifying the conditions for the jitter measurements.
			Added t_{DLL} specification to sysCLOCK DLL Timing table.
			Added footnote to sysCLOCK DLL Timing table specifying the conditions for the jitter measurements.
			Added sysCONFIG Master Parallel Configuration Mode and sysCONFIG SPI Port to LatticeSC sysCONFIG Port Timing table.
		Pin Information	Updated Pin Information Summary with SC40 information.
			Updated LFSC25 Logic Signal Connections: FF1020 with SC40 information.
			Updated LFSC80 Logic Signal Connections: FC1152 with SC40 information.
August 2007	01.6	General	Changed references of "HDC" to "HDC/SI".
			Changed references of "LDCN" to "LDCN/SCS".
			Changed references of "BUSYN/RCLK" to "BUSYN/RCLK/SCK".
			Changed references of "RDCFGN" to "TSALLN".
			Changed references of "TDO/RDDATA" to "TDO".
		Architecture	Updated text in Ripple Mode section.
			Added information to Global Set/Reset.
			Added information for Spread Spectrum Clocking
			Modified information for PLL/DLL Cascading. DLL to PLL is now supported.
			Modified AIL Block text and figure.
			Modified Figure 2-20 DDR/Shift Register Block.
			Added Information to Hot Socketing.
			Added new information for I/O Architecture Rules.
			Added information to SERDES Power Supply Sequencing Requirements.
		DC and Switching Characteristics	Added footnote to Hot Socketing Specifications table.
			Modified Initialization and Standby Supply Current table.
			Modified GSR Timing table.
			Modified sysCLOCK DLL Timing table to include $I_{DUTY.}$
			Deleted Readback Timing information from sysCONFIG Port Timing table.
			Modified data in External Switching Characteristics table.
		Pin Information	Added information to the Signal Descriptions table for HDC/SI, LDCN/SCS.
			Added footnote to Signal Descriptions table.
			Modified Description for signal BUSYN/RCLK/SCK.
			Modified data in Pin Information Summary and device-specific Pinout Information tables.