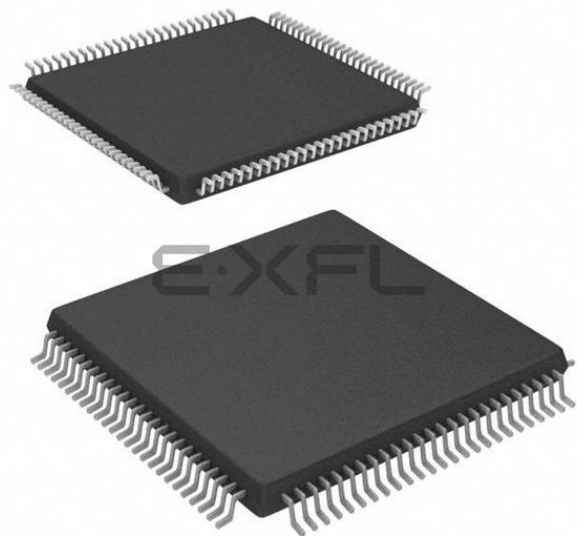




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Understanding Embedded - FPGAs (Field Programmable Gate Array)

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	Active
Number of LABs/CLBs	176
Number of Logic Elements/Cells	1584
Total RAM Bits	55296
Number of I/O	68
Number of Gates	50000
Voltage - Supply	1.14V ~ 1.26V
Mounting Type	Surface Mount
Operating Temperature	0°C ~ 85°C (TJ)
Package / Case	100-TQFP
Supplier Device Package	100-VQFP (14x14)
Purchase URL	https://www.e-xfl.com/product-detail/xilinx/xc3s50a-4vq100c

Production Status

Table 3 indicates the production status of each Spartan-3A FPGA by temperature range and speed grade. The table also lists the earliest speed file version required for creating

a production configuration bitstream. Later versions are also supported.

Table 3: Spartan-3A FPGA Production Status (Production Speed File)

Temperature Range		Commercial (C)		Industrial
Speed Grade		Standard (–4)	High-Performance (–5)	Standard (–4)
Part Number	XC3S50A	Production (v1.35)	Production (v1.35)	Production (v1.35)
	XC3S200A	Production (v1.35)	Production (v1.35)	Production (v1.35)
	XC3S400A	Production (v1.36)	Production (v1.36)	Production (v1.36)
	XC3S700A	Production (v1.34)	Production (v1.35)	Production (v1.34)
	XC3S1400A	Production (v1.34)	Production (v1.35)	Production (v1.34)

Package Marking

Figure 2 provides a top marking example for Spartan-3A FPGAs in the quad-flat packages. Figure 3 shows the top marking for Spartan-3A FPGAs in BGA packages. The markings for the BGA packages are nearly identical to those for the quad-flat packages, except that the marking is rotated with respect to the ball A1 indicator.

The “5C” and “4I” Speed Grade/Temperature Range part combinations may be dual marked as “5C/4I”. Devices with a single mark are only guaranteed for the marked speed grade and temperature range.

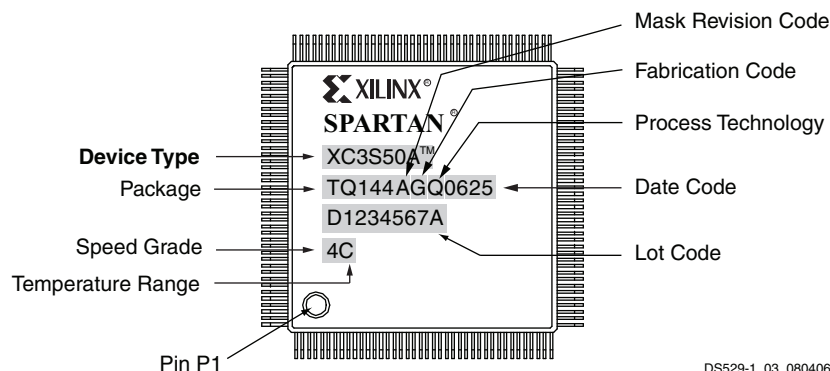


Figure 2: Spartan-3A QFP Package Marking Example

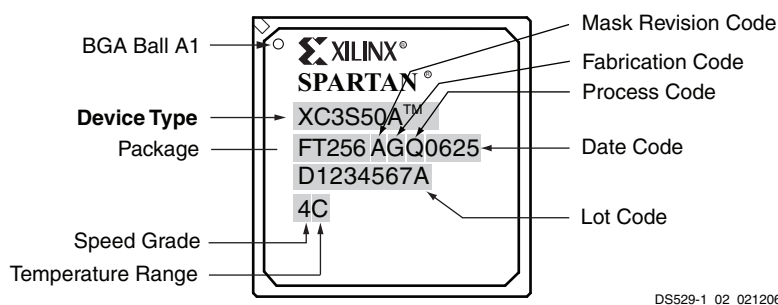


Figure 3: Spartan-3A BGA Package Marking Example

Spartan-3A FPGA Design Documentation

The functionality of the Spartan®-3A FPGA Family is described in the following documents. The topics covered in each guide is listed below.

- **DS706: Extended Spartan-3A Family Overview**
www.xilinx.com/support/documentation/data_sheets/ds706.pdf
- **UG331: Spartan-3 Generation FPGA User Guide**
www.xilinx.com/support/documentation/user_guides/ug331.pdf
 - Clocking Resources
 - Digital Clock Managers (DCMs)
 - Block RAM
 - Configurable Logic Blocks (CLBs)
 - Distributed RAM
 - SRL16 Shift Registers
 - Carry and Arithmetic Logic
 - I/O Resources
 - Embedded Multiplier Blocks
 - Programmable Interconnect
 - ISE® Software Design Tools
 - IP Cores
 - Embedded Processing and Control Solutions
 - Pin Types and Package Overview
 - Package Drawings
 - Powering FPGAs
 - Power Management
- **UG332: Spartan-3 Generation Configuration User Guide**
www.xilinx.com/support/documentation/user_guides/ug332.pdf
 - Configuration Overview
 - Configuration Pins and Behavior
 - Bitstream Sizes

- Detailed Descriptions by Mode
 - Master Serial Mode using Xilinx® Platform Flash PROM
 - Master SPI Mode using Commodity SPI Serial Flash PROM
 - Master BPI Mode using Commodity Parallel NOR Flash PROM
 - Slave Parallel (SelectMAP) using a Processor
 - Slave Serial using a Processor
 - JTAG Mode
- ISE iMPACT Programming Examples
- MultiBoot Reconfiguration
- Design Authentication using Device DNA

For application examples, see the Spartan-3A FPGA application notes.

- **Spartan-3A FPGA Application Notes**
www.xilinx.com/support/documentation/spartan-3a_application_notes.htm

For specific hardware examples, please see the Spartan-3A FPGA Starter Kit board web page, which has links to various design examples and the user guide.

- **Spartan-3A/3AN FPGA Starter Kit Board Page**
www.xilinx.com/s3astarter
- **UG334: Spartan-3A/3AN FPGA Starter Kit User Guide**
www.xilinx.com/support/documentation/boards_and_kits/ug334.pdf

For information on the XA Automotive version of the Spartan-3A family, see the following data sheet.

- XA Spartan-3A Automotive FPGA Family Data Sheet
www.xilinx.com/support/documentation/data_sheets/ds681.pdf

Create a Xilinx user account and sign up to receive automatic e-mail notification whenever this data sheet or the associated user guides are updated.

- Sign Up for Alerts
www.xilinx.com/support/answers/18683.htm

External Termination Requirements for Differential I/O

LVDS, RSDS, MINI LVDS, and PPDS I/O Standards

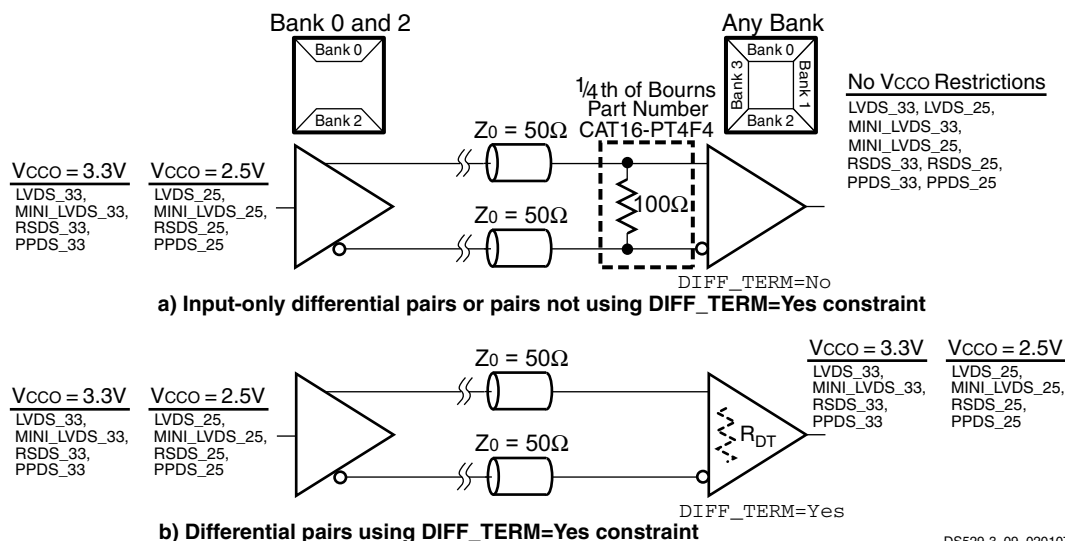


Figure 6: External Input Termination for LVDS, RSDS, MINI LVDS, and PPDS I/O Standards

BLVDS 25 I/O Standard

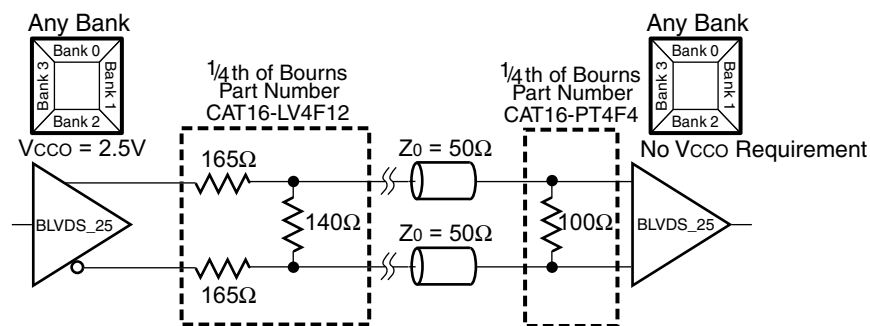


Figure 7: External Output and Input Termination Resistors for BLVDS 25 I/O Standard

TMDS 33 I/O Standard

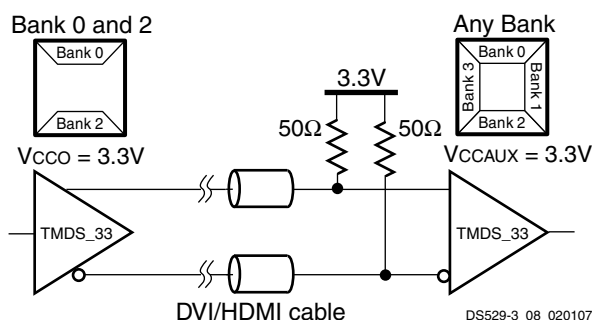


Figure 8: External Input Resistors Required for TMDS 33 I/O Standard

Device DNA Read Endurance

Table 15: Device DNA Identifier Memory Characteristics

Symbol	Description	Minimum	Units
DNA_CYCLES	Number of READ operations or JTAG ISC_DNA read operations. Unaffected by HOLD or SHIFT operations.	30,000,000	Read cycles

Pin-to-Pin Setup and Hold Times

Table 19: Pin-to-Pin Setup and Hold Times for the IOB Input Path (System Synchronous)

Symbol	Description	Conditions	Device	Speed Grade		Units
				-5	-4	
				Min	Min	
Setup Times						
T _{PSDCM}	When writing to the Input Flip-Flop (IFF), the time from the setup of data at the Input pin to the active transition at a Global Clock pin. The DCM is in use. No Input Delay is programmed.	LVCMOS25 ⁽²⁾ , IFD_DELAY_VALUE = 0, with DCM ⁽⁴⁾	XC3S50A	2.45	2.68	ns
			XC3S200A	2.59	2.84	ns
			XC3S400A	2.38	2.68	ns
			XC3S700A	2.38	2.57	ns
			XC3S1400A	1.91	2.17	ns
T _{PSFD}	When writing to IFF, the time from the setup of data at the Input pin to an active transition at the Global Clock pin. The DCM is not in use. The Input Delay is programmed.	LVCMOS25 ⁽²⁾ , IFD_DELAY_VALUE = 5, without DCM	XC3S50A	2.55	2.76	ns
			XC3S200A	2.32	2.76	ns
			XC3S400A	2.21	2.60	ns
			XC3S700A	2.28	2.63	ns
			XC3S1400A	2.33	2.41	ns
Hold Times						
T _{PHDCM}	When writing to IFF, the time from the active transition at the Global Clock pin to the point when data must be held at the Input pin. The DCM is in use. No Input Delay is programmed.	LVCMOS25 ⁽³⁾ , IFD_DELAY_VALUE = 0, with DCM ⁽⁴⁾	XC3S50A	-0.36	-0.36	ns
			XC3S200A	-0.52	-0.52	ns
			XC3S400A	-0.33	-0.29	ns
			XC3S700A	-0.17	-0.12	ns
			XC3S1400A	-0.07	0.00	ns
T _{PHFD}	When writing to IFF, the time from the active transition at the Global Clock pin to the point when data must be held at the Input pin. The DCM is not in use. The Input Delay is programmed.	LVCMOS25 ⁽³⁾ , IFD_DELAY_VALUE = 5, without DCM	XC3S50A	-0.63	-0.58	ns
			XC3S200A	-0.56	-0.56	ns
			XC3S400A	-0.42	-0.42	ns
			XC3S700A	-0.80	-0.75	ns
			XC3S1400A	-0.69	-0.69	ns

Notes:

1. The numbers in this table are tested using the methodology presented in [Table 27](#) and are based on the operating conditions set forth in [Table 8](#) and [Table 11](#).
2. This setup time requires adjustment whenever a signal standard other than LVCMOS25 is assigned to the Global Clock Input or the data Input. If this is true of the Global Clock Input, subtract the appropriate adjustment from [Table 23](#). If this is true of the data Input, add the appropriate Input adjustment from the same table.
3. This hold time requires adjustment whenever a signal standard other than LVCMOS25 is assigned to the Global Clock Input or the data Input. If this is true of the Global Clock Input, add the appropriate Input adjustment from [Table 23](#). If this is true of the data Input, subtract the appropriate Input adjustment from the same table. When the hold time is negative, it is possible to change the data before the clock's active edge.
4. DCM output jitter is included in all measurements.

Input Setup and Hold Times

Table 20: Setup and Hold Times for the IOB Input Path

Symbol	Description	Conditions	IFD_ DELAY_ VALUE	Device	Speed Grade		Units
					-5	-4	
					Min	Min	
Setup Times							
T _{IO PICK}	Time from the setup of data at the Input pin to the active transition at the ICLK input of the Input Flip-Flop (IFF). No Input Delay is programmed.	LVCMOS25 ⁽²⁾	0	XC3S50A	1.56	1.58	ns
				XC3S200A	1.71	1.81	ns
				XC3S400A	1.30	1.51	ns
				XC3S700A	1.34	1.51	ns
				XC3S1400A	1.36	1.74	ns
T _{IO PICKD}	Time from the setup of data at the Input pin to the active transition at the ICLK input of the Input Flip-Flop (IFF). The Input Delay is programmed.	LVCMOS25 ⁽²⁾	1	XC3S50A	2.16	2.18	ns
			2		3.10	3.12	ns
			3		3.51	3.76	ns
			4		4.04	4.32	ns
			5		3.88	4.24	ns
			6		4.72	5.09	ns
			7		5.47	5.94	ns
			8		5.97	6.52	ns
			1	XC3S200A	2.05	2.20	ns
			2		2.72	2.93	ns
			3		3.38	3.78	ns
			4		3.88	4.37	ns
			5		3.69	4.20	ns
			6		4.56	5.23	ns
			7		5.34	6.11	ns
			8		5.85	6.71	ns
			1	XC3S400A	1.79	2.02	ns
			2		2.43	2.67	ns
			3		3.02	3.43	ns
			4		3.49	3.96	ns
			5		3.41	3.95	ns
			6		4.20	4.81	ns
			7		4.96	5.66	ns
			8		5.44	6.19	ns

Table 22: Propagation Times for the IOB Input Path(Continued)

Symbol	Description	Conditions	DELAY_VALUE	Device	Speed Grade		Units
					-5	-4	
					Max	Max	
T _{IOPID}	The time it takes for data to travel from the Input pin to the I output with the input delay programmed	LVCMOS25 ⁽²⁾	5	XC3S1400A	3.17	3.52	ns
			6		3.52	3.92	ns
			7		3.82	4.18	ns
			8		4.10	4.57	ns
			9		3.84	4.31	ns
			10		4.20	4.79	ns
			11		4.46	5.06	ns
			12		4.87	5.51	ns
			13		5.07	5.73	ns
			14		5.43	6.08	ns
			15		5.73	6.33	ns
			16		6.01	6.77	ns
T _{IOPLI}	The time it takes for data to travel from the Input pin through the IFF latch to the I output with no input delay programmed	LVCMOS25 ⁽²⁾	IFD_DELAY_VALUE=0	XC3S50A	1.70	1.81	ns
				XC3S200A	1.85	2.04	ns
				XC3S400A	1.44	1.74	ns
				XC3S700A	1.48	1.74	ns
				XC3S1400A	1.50	1.97	ns
T _{IOPLID}	The time it takes for data to travel from the Input pin through the IFF latch to the I output with the input delay programmed	LVCMOS25 ⁽²⁾	1	XC3S50A	2.30	2.41	ns
			2		3.24	3.35	ns
			3		3.65	3.98	ns
			4		4.18	4.55	ns
			5		4.02	4.47	ns
			6		4.86	5.32	ns
			7		5.61	6.17	ns
			8		6.11	6.75	ns
			1	XC3S200A	2.19	2.43	ns
			2		2.86	3.16	ns
			3		3.52	4.01	ns
			4		4.02	4.60	ns
			5		3.83	4.43	ns
			6		4.70	5.46	ns
			7		5.48	6.33	ns
			8		5.99	6.94	ns
			1	XC3S400A	1.93	2.25	ns
			2		2.57	2.90	ns
			3		3.16	3.66	ns
			4		3.63	4.19	ns

Output Timing Adjustments

Table 26: Output Timing Adjustments for IOB

Convert Output Time from LVCMOS25 with 12mA Drive and Fast Slew Rate to the Following Signal Standard (IOSTANDARD)			Add the Adjustment Below		Units
			Speed Grade		
			-5	-4	
Single-Ended Standards					
LVTTL	Slow	2 mA	5.58	5.58	ns
		4 mA	3.16	3.16	ns
		6 mA	3.17	3.17	ns
		8 mA	2.09	2.09	ns
		12 mA	1.62	1.62	ns
		16 mA	1.24	1.24	ns
		24 mA	2.74 ⁽³⁾	2.74 ⁽³⁾	ns
	Fast	2 mA	3.03	3.03	ns
		4 mA	1.71	1.71	ns
		6 mA	1.71	1.71	ns
		8 mA	0.53	0.53	ns
		12 mA	0.53	0.53	ns
		16 mA	0.59	0.59	ns
		24 mA	0.60	0.60	ns
	QuietIO	2 mA	27.67	27.67	ns
		4 mA	27.67	27.67	ns
		6 mA	27.67	27.67	ns
		8 mA	16.71	16.71	ns
		12 mA	16.67	16.67	ns
		16 mA	16.22	16.22	ns
		24 mA	12.11	12.11	ns

Table 26: Output Timing Adjustments for IOB(Continued)

Convert Output Time from LVC MOS25 with 12mA Drive and Fast Slew Rate to the Following Signal Standard (IOSTANDARD)			Add the Adjustment Below		Units
			Speed Grade		
			-5	-4	
LVC MOS33	Slow	2 mA	5.58	5.58	ns
		4 mA	3.17	3.17	ns
		6 mA	3.17	3.17	ns
		8 mA	2.09	2.09	ns
		12 mA	1.24	1.24	ns
		16 mA	1.15	1.15	ns
		24 mA	2.55 ⁽³⁾	2.55 ⁽³⁾	ns
	Fast	2 mA	3.02	3.02	ns
		4 mA	1.71	1.71	ns
		6 mA	1.72	1.72	ns
		8 mA	0.53	0.53	ns
		12 mA	0.59	0.59	ns
		16 mA	0.59	0.59	ns
		24 mA	0.51	0.51	ns
	QuietIO	2 mA	27.67	27.67	ns
		4 mA	27.67	27.67	ns
		6 mA	27.67	27.67	ns
		8 mA	16.71	16.71	ns
		12 mA	16.29	16.29	ns
		16 mA	16.18	16.18	ns
		24 mA	12.11	12.11	ns

Table 26: Output Timing Adjustments for IOB(Continued)

Convert Output Time from LVCMOS25 with 12mA Drive and Fast Slew Rate to the Following Signal Standard (IOSTANDARD)			Add the Adjustment Below		Units
			Speed Grade		
			-5	-4	
LVCMOS25	Slow	2 mA	5.33	5.33	ns
		4 mA	2.81	2.81	ns
		6 mA	2.82	2.82	ns
		8 mA	1.14	1.14	ns
		12 mA	1.10	1.10	ns
		16 mA	0.83	0.83	ns
		24 mA	2.26 ⁽³⁾	2.26 ⁽³⁾	ns
	Fast	2 mA	4.36	4.36	ns
		4 mA	1.76	1.76	ns
		6 mA	1.25	1.25	ns
		8 mA	0.38	0.38	ns
		12 mA	0	0	ns
		16 mA	0.01	0.01	ns
		24 mA	0.01	0.01	ns
	QuietIO	2 mA	25.92	25.92	ns
		4 mA	25.92	25.92	ns
		6 mA	25.92	25.92	ns
		8 mA	15.57	15.57	ns
		12 mA	15.59	15.59	ns
		16 mA	14.27	14.27	ns
		24 mA	11.37	11.37	ns
LVCMOS18	Slow	2 mA	4.48	4.48	ns
		4 mA	3.69	3.69	ns
		6 mA	2.91	2.91	ns
		8 mA	1.99	1.99	ns
		12 mA	1.57	1.57	ns
		16 mA	1.19	1.19	ns
	Fast	2 mA	3.96	3.96	ns
		4 mA	2.57	2.57	ns
		6 mA	1.90	1.90	ns
		8 mA	1.06	1.06	ns
		12 mA	0.83	0.83	ns
		16 mA	0.63	0.63	ns
	QuietIO	2 mA	24.97	24.97	ns
		4 mA	24.97	24.97	ns
		6 mA	24.08	24.08	ns
		8 mA	16.43	16.43	ns
12 mA		14.52	14.52	ns	
		16 mA	13.41	13.41	ns

Table 26: Output Timing Adjustments for IOB(Continued)

Convert Output Time from LVCMOS25 with 12mA Drive and Fast Slew Rate to the Following Signal Standard (IOSTANDARD)			Add the Adjustment Below		Units
			Speed Grade		
			-5	-4	
LVCMOS15	Slow	2 mA	5.82	5.82	ns
		4 mA	3.97	3.97	ns
		6 mA	3.21	3.21	ns
		8 mA	2.53	2.53	ns
		12 mA	2.06	2.06	ns
	Fast	2 mA	5.23	5.23	ns
		4 mA	3.05	3.05	ns
		6 mA	1.95	1.95	ns
		8 mA	1.60	1.60	ns
		12 mA	1.30	1.30	ns
	QuietIO	2 mA	34.11	34.11	ns
		4 mA	25.66	25.66	ns
		6 mA	24.64	24.64	ns
		8 mA	22.06	22.06	ns
		12 mA	20.64	20.64	ns
LVCMOS12	Slow	2 mA	7.14	7.14	ns
		4 mA	4.87	4.87	ns
		6 mA	5.67	5.67	ns
	Fast	2 mA	6.77	6.77	ns
		4 mA	5.02	5.02	ns
		6 mA	4.09	4.09	ns
	QuietIO	2 mA	50.76	50.76	ns
		4 mA	43.17	43.17	ns
		6 mA	37.31	37.31	ns
PCI33_3			0.34	0.34	ns
PCI66_3			0.34	0.34	ns
HSTL_I			0.78	0.78	ns
HSTL_III			1.16	1.16	ns
HSTL_I_18			0.35	0.35	ns
HSTL_II_18			0.30	0.30	ns
HSTL_III_18			0.47	0.47	ns
SSTL18_I			0.40	0.40	ns
SSTL18_II			0.30	0.30	ns
SSTL2_I			0	0	ns
SSTL2_II			−0.05	−0.05	ns
SSTL3_I			0	0	ns
SSTL3_II			0.17	0.17	ns

Table 27: Test Methods for Timing Measurement at I/Os(Continued)

Signal Standard (IOSTANDARD)	Inputs			Outputs		Inputs and Outputs
	V _{REF} (V)	V _L (V)	V _H (V)	R _T (Ω)	V _T (V)	V _M (V)
Differential						
LVDS_25	-	V _{ICM} - 0.125	V _{ICM} + 0.125	50	1.2	V _{ICM}
LVDS_33	-	V _{ICM} - 0.125	V _{ICM} + 0.125	50	1.2	V _{ICM}
BLVDS_25	-	V _{ICM} - 0.125	V _{ICM} + 0.125	1M	0	V _{ICM}
MINI_LVDS_25	-	V _{ICM} - 0.125	V _{ICM} + 0.125	50	1.2	V _{ICM}
MINI_LVDS_33	-	V _{ICM} - 0.125	V _{ICM} + 0.125	50	1.2	V _{ICM}
LVPECL_25	-	V _{ICM} - 0.3	V _{ICM} + 0.3	N/A	N/A	V _{ICM}
LVPECL_33	-	V _{ICM} - 0.3	V _{ICM} + 0.3	N/A	N/A	V _{ICM}
RSDS_25	-	V _{ICM} - 0.1	V _{ICM} + 0.1	50	1.2	V _{ICM}
RSDS_33	-	V _{ICM} - 0.1	V _{ICM} + 0.1	50	1.2	V _{ICM}
TMDS_33	-	V _{ICM} - 0.1	V _{ICM} + 0.1	50	3.3	V _{ICM}
PPDS_25	-	V _{ICM} - 0.1	V _{ICM} + 0.1	50	0.8	V _{ICM}
PPDS_33	-	V _{ICM} - 0.1	V _{ICM} + 0.1	50	0.8	V _{ICM}
DIFF_HSTL_I	-	V _{ICM} - 0.5	V _{ICM} + 0.5	50	0.75	V _{ICM}
DIFF_HSTL_III	-	V _{ICM} - 0.5	V _{ICM} + 0.5	50	1.5	V _{ICM}
DIFF_HSTL_I_18	-	V _{ICM} - 0.5	V _{ICM} + 0.5	50	0.9	V _{ICM}
DIFF_HSTL_II_18	-	V _{ICM} - 0.5	V _{ICM} + 0.5	50	0.9	V _{ICM}
DIFF_HSTL_III_18	-	V _{ICM} - 0.5	V _{ICM} + 0.5	50	1.8	V _{ICM}
DIFF_SSTL18_I	-	V _{ICM} - 0.5	V _{ICM} + 0.5	50	0.9	V _{ICM}
DIFF_SSTL18_II	-	V _{ICM} - 0.5	V _{ICM} + 0.5	50	0.9	V _{ICM}
DIFF_SSTL2_I	-	V _{ICM} - 0.5	V _{ICM} + 0.5	50	1.25	V _{ICM}
DIFF_SSTL2_II	-	V _{ICM} - 0.5	V _{ICM} + 0.5	50	1.25	V _{ICM}
DIFF_SSTL3_I	-	V _{ICM} - 0.5	V _{ICM} + 0.5	50	1.5	V _{ICM}
DIFF_SSTL3_II	-	V _{ICM} - 0.5	V _{ICM} + 0.5	50	1.5	V _{ICM}

Notes:

- Descriptions of the relevant symbols are as follows:
V_{REF} – The reference voltage for setting the input switching threshold
V_{ICM} – The common mode input voltage
V_M – Voltage of measurement point on signal transition
V_L – Low-level test voltage at Input pin
V_H – High-level test voltage at Input pin
R_T – Effective termination resistance, which takes on a value of 1 MΩ when no parallel termination is required
V_T – Termination voltage
- The load capacitance (C_L) at the Output pin is 0 pF for all signal standards.
- According to the PCI specification.

The capacitive load (C_L) is connected between the output and GND. *The Output timing for all standards, as published in the speed files and the data sheet, is always based on a C_L value of zero.* High-impedance probes (less than 1 pF) are used for all measurements. Any delay that the test fixture might contribute to test measurements is subtracted from those measurements to produce the final timing numbers as published in the speed files and data sheet.

Configuration Clock (CCLK) Characteristics

Table 46: Master Mode CCLK Output Period by *ConfigRate* Option Setting

Symbol	Description	ConfigRate Setting	Temperature Range	Minimum	Maximum	Units
T_{CCLK1}	CCLK clock period by <i>ConfigRate</i> setting	1 (power-on value)	Commercial	1,254	2,500	ns
			Industrial	1,180		ns
T_{CCLK3}		3	Commercial	413	833	ns
			Industrial	390		ns
T_{CCLK6}		6 (default)	Commercial	207	417	ns
			Industrial	195		ns
T_{CCLK7}		7	Commercial	178	357	ns
			Industrial	168		ns
T_{CCLK8}		8	Commercial	156	313	ns
			Industrial	147		ns
T_{CCLK10}		10	Commercial	123	250	ns
			Industrial	116		ns
T_{CCLK12}		12	Commercial	103	208	ns
			Industrial	97		ns
T_{CCLK13}		13	Commercial	93	192	ns
			Industrial	88		ns
T_{CCLK17}		17	Commercial	72	147	ns
			Industrial	68		ns
T_{CCLK22}		22	Commercial	54	114	ns
			Industrial	51		ns
T_{CCLK25}		25	Commercial	47	100	ns
			Industrial	45		ns
T_{CCLK27}		27	Commercial	44	93	ns
			Industrial	42		ns
T_{CCLK33}		33	Commercial	36	76	ns
			Industrial	34		ns
T_{CCLK44}		44	Commercial	26	57	ns
			Industrial	25		ns
T_{CCLK50}		50	Commercial	22	50	ns
			Industrial	21		ns
T_{CCLK100}		100	Commercial	11.2	25	ns
			Industrial	10.6		ns

Notes:

1. Set the *ConfigRate* option value when generating a configuration bitstream.

FT256: 256-ball Fine-pitch, Thin Ball Grid Array

The 256-ball fine-pitch, thin ball grid array package, FT256, supports all five Spartan-3A FPGAs. The XC3S200A and XC3S400A have identical footprints, and the XC3S700A and XC3S1400A have identical footprints. The XC3S50A is compatible with the XC3S200A/XC3S400A but has 51 unconnected balls. The XC3S200A/XC3S400A is similar to the XC3S700A/XC3S1400A, but the XC3S700A/XC3S1400A adds more power and ground pins and therefore is not compatible.

Table 68 lists all the package pins for the XC3S50A, XC3S200A, and XC3S400A. They are sorted by bank number and then by pin name of the largest device. Pins that form a differential I/O pair appear together in the table. The table also shows the pin number for each pin and the pin type, as defined earlier.

The highlighted rows indicate pinout differences between the XC3S50A, the XC3S200A, and the XC3S400A FPGAs. The XC3S50A has 51 unconnected balls, indicated as N.C. (No Connection) in **Table 68** and **Figure 20** and with the black diamond character (◆) in **Table 68**. **Figure 21** provides the common footprint for the XC3S200A and XC3S400A.

Table 68 also indicates that some differential I/O pairs have different assignments between the XC3S50A and the XC3S200A/XC3S400A, highlighted in light blue. See **"Footprint Migration Differences," page 99** for additional information.

All other balls have nearly identical functionality on all three devices. **Table 73** summarizes the XC3S50A FPGA footprint migration differences for the FT256 package.

The XC3S50A does not support the address output pins for the Byte-wide Peripheral Interface (BPI) configuration mode.

Table 69 lists all the package pins for the XC3S700A and XC3S1400A. They are sorted by bank number and then by pin name. Pins that form a differential I/O pair appear together in the table. The table also shows the pin number for each pin and the pin type, as defined earlier. **Figure 22** provides the common footprint for the XC3S200A and XC3S400A.

An electronic version of this package pinout table and footprint diagram is available for download from the Xilinx website at

www.xilinx.com/support/documentation/data_sheets/s3a_pin.zip.

Pinout Table

Table 68: Spartan-3A FT256 Pinout (XC3S50A, XC3S200A, XC3S400)

Bank	XC3S50A	XC3S200A XC3S400A	FT256 Ball	Type
0	IO_L01N_0	IO_L01N_0	C13	I/O
0	IO_L01P_0	IO_L01P_0	D13	I/O
0	IO_L02N_0	IO_L02N_0	B14	I/O
0	IO_L02P_0/ VREF_0	IO_L02P_0/ VREF_0	B15	VREF
0	IO_L03N_0	IO_L03N_0	D11	I/O
0	IO_L03P_0	IO_L03P_0	C12	I/O
0	IO_L04N_0	IO_L04N_0	A13	I/O
0	IO_L04P_0	IO_L04P_0	A14	I/O
0	N.C. (◆)	IO_L05N_0	A12	I/O
0	IP_0	IO_L05P_0	B12	I/O
0	N.C. (◆)	IO_L06N_0/ VREF_0	E10	VREF
0	N.C. (◆)	IO_L06P_0	D10	I/O
0	IO_L07N_0	IO_L07N_0	A11	I/O
0	IO_L07P_0	IO_L07P_0	C11	I/O
0	IO_L08N_0	IO_L08N_0	A10	I/O
0	IO_L08P_0	IO_L08P_0	B10	I/O
0	IO_L09N_0/ GCLK5	IO_L09N_0/ GCLK5	D9	GCLK
0	IO_L09P_0/ GCLK4	IO_L09P_0/ GCLK4	C10	GCLK
0	IO_L10N_0/ GCLK7	IO_L10N_0/ GCLK7	A9	GCLK
0	IO_L10P_0/ GCLK6	IO_L10P_0/ GCLK6	C9	GCLK
0	IO_L11N_0/ GCLK9	IO_L11N_0/ GCLK9	D8	GCLK
0	IO_L11P_0/ GCLK8	IO_L11P_0/ GCLK8	C8	GCLK
0	IO_L12N_0/ GCLK11	IO_L12N_0/ GCLK11	B8	GCLK
0	IO_L12P_0/ GCLK10	IO_L12P_0/ GCLK10	A8	GCLK
0	N.C. (◆)	IO_L13N_0	C7	I/O
0	N.C. (◆)	IO_L13P_0	A7	I/O
0	N.C. (◆)	IO_L14N_0/ VREF_0	E7	VREF
0	N.C. (◆)	IO_L14P_0	F8	I/O
0	IO_L15N_0	IO_L15N_0	B6	I/O
0	IO_L15P_0	IO_L15P_0	A6	I/O
0	IO_L16N_0	IO_L16N_0	C6	I/O
0	IO_L16P_0	IO_L16P_0	D7	I/O
0	IO_L17N_0	IO_L17N_0	C5	I/O

Table 68: Spartan-3A FT256 Pinout (XC3S50A, XC3S200A, XC3S400) (Continued)

Bank	XC3S50A	XC3S200A XC3S400A	FT256 Ball	Type
2	IO_L01N_2/M0	IO_L01N_2/M0	P4	DUAL
2	IO_L01P_2/M1	IO_L01P_2/M1	N4	DUAL
2	IO_L02N_2/ CSO_B	IO_L02N_2/ CSO_B	T2	DUAL
2	IO_L02P_2/M2	IO_L02P_2/M2	R2	DUAL
2	IO_L04P_2/VS2	IO_L03N_2/VS2	T3	DUAL
2	IO_L03P_2/ RDWR_B	IO_L03P_2/ RDWR_B	R3	DUAL
2	IO_L04N_2/VS0	IO_L04N_2/VS0	P5	DUAL
2	IO_L03N_2/VS1	IO_L04P_2/VS1	N6	DUAL
2	IO_L06P_2	IO_L05N_2	R5	I/O
2	IO_L05P_2	IO_L05P_2	T4	I/O
2	IO_L06N_2/D6	IO_L06N_2/D6	T6	DUAL
2	IO_L05N_2/D7	IO_L06P_2/D7	T5	DUAL
2	N.C. (◆)	IO_L07N_2	P6	I/O
2	N.C. (◆)	IO_L07P_2	N7	I/O
2	IO_L08N_2/D4	IO_L08N_2/D4	N8	DUAL
2	IO_L08P_2/D5	IO_L08P_2/D5	P7	DUAL
2	N.C. (◆)	IO_L09N_2/ GCLK13	T7	GCLK
2	N.C. (◆)	IO_L09P_2/ GCLK12	R7	GCLK
2	IO_L10N_2/ GCLK15	IO_L10N_2/ GCLK15	T8	GCLK
2	IO_L10P_2/ GCLK14	IO_L10P_2/ GCLK14	P8	GCLK
2	IO_L11N_2/ GCLK1	IO_L11N_2/ GCLK1	P9	GCLK
2	IO_L11P_2/ GCLK0	IO_L11P_2/ GCLK0	N9	GCLK
2	IO_L12N_2/ GCLK3	IO_L12N_2/ GCLK3	T9	GCLK
2	IO_L12P_2/ GCLK2	IO_L12P_2/ GCLK2	R9	GCLK
2	N.C. (◆)	IO_L13N_2	M10	I/O
2	N.C. (◆)	IO_L13P_2	N10	I/O
2	IO_L14P_2/ MOSI/CSI_B	IO_L14N_2/ MOSI/CSI_B	P10	DUAL
2	IO_L14N_2	IO_L14P_2	T10	I/O
2	IO_L15N_2/ DOUT	IO_L15N_2/ DOUT	R11	DUAL
2	IO_L15P_2/ AWAKE	IO_L15P_2/ AWAKE	T11	PWR MGMT
2	IO_L16N_2	IO_L16N_2	N11	I/O
2	IO_L16P_2	IO_L16P_2	P11	I/O
2	IO_L17N_2/D3	IO_L17N_2/D3	P12	DUAL
2	IO_L17P_2/ INIT_B	IO_L17P_2/ INIT_B	T12	DUAL

Table 68: Spartan-3A FT256 Pinout (XC3S50A, XC3S200A, XC3S400) (Continued)

Bank	XC3S50A	XC3S200A XC3S400A	FT256 Ball	Type
2	IO_L20P_2/D1	IO_L18N_2/D1	R13	DUAL
2	IO_L18P_2/D2	IO_L18P_2/D2	T13	DUAL
2	N.C. (◆)	IO_L19N_2	P13	I/O
2	N.C. (◆)	IO_L19P_2	N12	I/O
2	IO_L20N_2/ CCLK	IO_L20N_2/ CCLK	R14	DUAL
2	IO_L18N_2/D0/ DIN/MISO	IO_L20P_2/D0/ DIN/MISO	T14	DUAL
2	IP_2	IP_2	L7	INPUT
2	IP_2	IP_2	L8	INPUT
2	IP_2/VREF_2	IP_2/VREF_2	L9	VREF
2	IP_2/VREF_2	IP_2/VREF_2	L10	VREF
2	IP_2/VREF_2	IP_2/VREF_2	M7	VREF
2	IP_2/VREF_2	IP_2/VREF_2	M8	VREF
2	IP_2/VREF_2	IP_2/VREF_2	M11	VREF
2	IP_2/VREF_2	IP_2/VREF_2	N5	VREF
2	VCCO_2	VCCO_2	M9	VCCO
2	VCCO_2	VCCO_2	R4	VCCO
2	VCCO_2	VCCO_2	R8	VCCO
2	VCCO_2	VCCO_2	R12	VCCO
3	IO_L01N_3	IO_L01N_3	C1	I/O
3	IO_L01P_3	IO_L01P_3	C2	I/O
3	IO_L02N_3	IO_L02N_3	D3	I/O
3	IO_L02P_3	IO_L02P_3	D4	I/O
3	IO_L03N_3	IO_L03N_3	E1	I/O
3	IO_L03P_3	IO_L03P_3	D1	I/O
3	N.C. (◆)	IO_L05N_3	E2	I/O
3	N.C. (◆)	IO_L05P_3	E3	I/O
3	N.C. (◆)	IO_L07N_3	G4	I/O
3	N.C. (◆)	IO_L07P_3	F3	I/O
3	IO_L08N_3/ VREF_3	IO_L08N_3/ VREF_3	G1	VREF
3	IO_L08P_3	IO_L08P_3	F1	I/O
3	N.C. (◆)	IO_L09N_3	H4	I/O
3	N.C. (◆)	IO_L09P_3	G3	I/O
3	N.C. (◆)	IO_L10N_3	H5	I/O
3	N.C. (◆)	IO_L10P_3	H6	I/O
3	IO_L11N_3/ LHCLK1	IO_L11N_3/ LHCLK1	H1	LHCLK
3	IO_L11P_3/ LHCLK0	IO_L11P_3/ LHCLK0	G2	LHCLK
3	IO_L12N_3/ IRDY2/LHCLK3	IO_L12N_3/ IRDY2/LHCLK3	J3	LHCLK
3	IO_L12P_3/ LHCLK2	IO_L12P_3/ LHCLK2	H3	LHCLK

Table 69: Spartan-3A FT256 Pinout (XC3S700A,

Bank	XC3S700A XC3S1400A	FT256 Ball	Type
VCCAUX	VCCAUX	F5	VCCAUX
VCCAUX	VCCAUX	H14	VCCAUX
VCCAUX	VCCAUX	H4	VCCAUX
VCCAUX	VCCAUX	L12	VCCAUX
VCCAUX	VCCAUX	L5	VCCAUX
VCCAUX	VCCAUX	M10	VCCAUX
VCCAUX	VCCAUX	M6	VCCAUX
VCCINT	VCCINT	F10	VCCINT
VCCINT	VCCINT	G11	VCCINT
VCCINT	VCCINT	G7	VCCINT
VCCINT	VCCINT	G9	VCCINT
VCCINT	VCCINT	H10	VCCINT
VCCINT	VCCINT	H6	VCCINT
VCCINT	VCCINT	H8	VCCINT
VCCINT	VCCINT	J11	VCCINT
VCCINT	VCCINT	J7	VCCINT
VCCINT	VCCINT	J9	VCCINT
VCCINT	VCCINT	K10	VCCINT
VCCINT	VCCINT	K6	VCCINT
VCCINT	VCCINT	K8	VCCINT
VCCINT	VCCINT	L7	VCCINT
VCCINT	VCCINT	L9	VCCINT

User I/Os by Bank

Table 70, Table 71, and Table 72 indicate how the available user-I/O pins are distributed between the four I/O banks on the FT256 package. The AWAKE pin is counted as a dual-purpose I/O.

The XC3S50A FPGA in the FT256 package has 51 unconnected balls, labeled with an “N.C.” type. These pins are also indicated in Figure 20.

Table 70: User I/Os Per Bank on XC3S50A in the FT256 Package

Package Edge	I/O Bank	Maximum I/O	All Possible I/O Pins by Type				
			I/O	INPUT	DUAL	VREF	CLK
Top	0	40	21	7	1	3	8
Right	1	32	12	5	4	3	8
Bottom	2	40	5	2	21	6	6
Left	3	32	15	6	0	3	8
TOTAL		144	53	20	26	15	30

Table 71: User I/Os Per Bank on XC3S200A and XC3S400A in the FT256 Package

Package Edge	I/O Bank	Maximum I/O	All Possible I/O Pins by Type				
			I/O	INPUT	DUAL	VREF	CLK
Top	0	47	27	6	1	5	8
Right	1	50	1	6	30	5	8
Bottom	2	48	11	2	21	6	8
Left	3	50	30	7	0	5	8
TOTAL		195	69	21	52	21	32

Table 72: User I/Os Per Bank on XC3S700A and XC3S1400A in the FT256 Package

Package Edge	I/O Bank	Maximum I/O	All Possible I/O Pins by Type				
			I/O	INPUT	DUAL	VREF	CLK
Top	0	41	27	1	1	4	8
Right	1	40	0	0	30	4	6
Bottom	2	41	7	0	21	5	8
Left	3	39	25	1	0	5	8
TOTAL		161	59	2	52	18	30

FT256 Footprint (XC3S700A, XC3S1400A)

Bank 0																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
A	GND	PROG_B	I/O L19P_0	I/O L18P_0	I/O L17P_0	I/O L15P_0	I/O L13P_0	I/O L12P_0 GCLK10	I/O L10N_0 GCLK7	I/O L08N_0	I/O L07N_0	I/O L05N_0	I/O L04N_0	I/O L04P_0	TCK	GND
B	TDI	TMS	I/O L19N_0	I/O L18N_0	VCCO_0	I/O L15N_0	GND	I/O L12N_0 GCLK11	VCCO_0	I/O L08P_0	GND	I/O L05P_0	VCCO_0	I/O L02N_0	I/O L02P_0 VREF_0	TDO
C	I/O L01N_3	I/O L01P_3	GND	I/O L20P_0 VREF_0	I/O L17N_0	I/O L16N_0	I/O L13N_0	I/O L11P_0 GCLK8	I/O L10P_0 GCLK6	I/O L09P_0 GCLK4	I/O L07P_0	I/O L03P_0	I/O L01N_0	GND	I/O L24N_1 A25	I/O L24P_1 A24
D	I/O L03P_3	VCCO_3	I/O L02N_3	I/O L02P_3	I/O L20N_0 PUDC_B	VCCAUX	I/O L16P_0	I/O L11N_0 GCLK9	I/O L09N_0 GCLK5	I/O L06N_0 VREF_0	I/O L06P_0	I/O L03N_0	I/O L01P_0	I/O L23N_1 A23	I/O L22N_1 A21	I/O L22P_1 A20
E	I/O L03N_3	I/O L05N_3	I/O L05P_3	I/O L04P_3	GND	INPUT	I/O L14N_0 VREF_0	VCCO_0	I/O L14P_0	GND	VCCAUX	GND	I/O L23P_1 A22	I/O L20P_1 A18	VCCO_1	I/O L18P_1 A14
F	I/O L08P_3	GND	I/O L07P_3	I/O L04N_3	VCCAUX	GND	GND	GND	GND	VCCINT	GND	VCCAUX	I/O L20N_1 A19	I/O L19N_1 A17	I/O L18N_1 A15	I/O L16N_1 A11
G	I/O L08N_3 VREF_3	I/O L11P_3 LHCLK0	I/O L07N_3	INPUT VREF_3	GND	GND	VCCINT	GND	VCCINT	GND	VCCINT	GND	I/O L19P_1 A16	I/O L17N_1 A13	GND	I/O L16P_1 A10
H	I/O L11N_3 LHCLK1	VCCO_3	I/O L12P_3 LHCLK2	VCCAUX	GND	VCCINT	GND	VCCINT	GND	VCCINT	GND	INPUT VREF_1	I/O L17P_1 A12	VCCAUX	I/O L15P_1 IRDY1 RHCLK6	I/O L15N_1 RHCLK7
J	I/O L14N_3 LHCLK5	I/O L14P_3 LHCLK4	I/O L12N_3 IRDY2 LHCLK3	INPUT	INPUT VREF_3	GND	VCCINT	GND	VCCINT	GND	VCCINT	I/O L10P_1 A8	I/O L10N_1 A9	INPUT VREF_1	VCCO_1	I/O L12N_1 TRDY1 RHCLK3
K	I/O L15N_3 LHCLK7	GND	I/O L15P_3 TRDY2 LHCLK6	I/O L18P_3	GND	VCCINT	GND	VCCINT	GND	VCCINT	GND	GND	I/O L06N_1 A3	I/O L11N_1 RHCLK1	I/O L11P_1 RHCLK0	I/O L12P_1 RHCLK2
L	I/O L16P_3 VREF_3	I/O L16N_3	I/O L18N_3	I/O L19N_3	VCCAUX	GND	VCCINT	GND	VCCINT	GND	GND	VCCAUX	I/O L06P_1 A2	I/O L08P_1 A6	GND	I/O L08N_1 A7
M	I/O L20P_3	VCCO_3	I/O L19P_3	I/O L24N_3	GND	VCCAUX	INPUT VREF_2	GND	INPUT VREF_2	VCCAUX	INPUT VREF_2	GND	INPUT VREF_1	INPUT VREF_1	I/O L07P_1 A4	I/O L07N_1 A5
N	I/O L20N_3	I/O L22P_3 VREF_3	I/O L24P_3	I/O L01P_2 M1	INPUT VREF_2	I/O L04P_2 VS1	GND	I/O L08N_2 D4	I/O L11P_2 GCLK0	GND	I/O L16N_2	I/O L19P_2	I/O L01P_1 HDC	I/O L01N_1 LDC2	VCCO_1	I/O L03N_1 A1
P	I/O L22N_3	I/O L23N_3	GND	I/O L01N_2 M0	I/O L04N_2 VS0	INPUT VREF_2	I/O L08P_2 D5	I/O L10P_2 GCLK14	I/O L11N_2 GCLK1	I/O L14N_2 MOSI CSI_B	I/O L16P_2	I/O L17N_2 D3	I/O L19N_2	GND	I/O L02N_1 LDC0	I/O L03P_1 A0
R	I/O L23P_3	I/O L02P_2 M2	I/O L03P_2 RDWR_B	VCCO_2	I/O L05N_2	GND	I/O L09P_2 GCLK12	VCCO_2	I/O L12P_2 GCLK2	GND	I/O L15N_2 DOUT	VCCO_2	I/O L18N_2 D1	I/O L20N_2 CCLK	I/O L02P_1 LDC1	SUSPEND
T	GND	I/O L02N_2 CSO_B	I/O L03N_2 VS2	I/O L05P_2	I/O L06P_2 D7	I/O L06N_2 D6	I/O L09N_2 GCLK13	I/O L10N_2 GCLK15	I/O L12N_2 GCLK3	I/O L14P_2	I/O L15P_2 AWAKE	I/O L17P_2 INIT_B	I/O L18P_2 D2	I/O L20P_2 DO/DIN MISO	DONE	GND
Bank 2																

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Figure 22: XC3S700A and XC3S1400A FT256 Package Footprint (Top View)

59	I/O: Unrestricted, general-purpose user I/O	51	DUAL: Configuration, then possible user I/O	18	VREF: User I/O or input voltage reference for bank	2	SUSPEND: Dedicated SUSPEND and dual-purpose AWAKE Power Management pins
2	INPUT: Unrestricted, general-purpose input pin	30	CLK: User I/O, input, or global buffer input	13	VCCO: Output voltage supply for bank		
2	CONFIG: Dedicated configuration pins	4	JTAG: Dedicated JTAG port pins	15	VCCINT: Internal core supply voltage (+1.2V)		
0	N.C.: Not connected	50	GND: Ground	10	VCCAUX: Auxiliary supply voltage		

FG400 Footprint

Left Half of FG400 Package (Top View)

- 155 **I/O:** Unrestricted, general-purpose user I/O
- 46 **INPUT:** Unrestricted, general-purpose input pin
- 51 **DUAL:** Configuration pins, then possible user I/O
- 26 **VREF:** User I/O or input voltage reference for bank
- 32 **CLK:** User I/O, input, or clock buffer input
- 2 **CONFIG:** Dedicated configuration pins
- 4 **JTAG:** Dedicated JTAG port pins
- 2 **SUSPEND:** Dedicated SUSPEND and dual-purpose AWAKE Power Management pins
- 43 **GND:** Ground
- 22 **VCCO:** Output voltage supply for bank
- 9 **VCCINT:** Internal core supply voltage (+1.2V)
- 8 **VCCAUX:** Auxiliary supply voltage

		Bank 0									
		1	2	3	4	5	6	7	8	9	10
Bank 3	A	GND	I/O L32P_0 VREF_0	I/O L30P_0	I/O L29P_0	I/O L26P_0	I/O L25P_0	I/O L24N_0	I/O L18N_0 GCLK11	I/O L18P_0 GCLK10	I/O L16P_0 GCLK6
	B	I/O L02P_3	I/O L32N_0 PUDC_B	I/O L30N_0	VCCO_0	I/O L26N_0	GND	I/O L24P_0	I/O L20P_0	I/O L19P_0	VCCO_0
	C	I/O L03P_3	I/O L02N_3	GND	I/O L29N_0	I/O L28P_0	I/O L25N_0	I/O L21P_0	I/O L20N_0	I/O L19N_0	I/O L16N_0 GCLK7
	D	I/O L05P_3	I/O L03N_3	I/O L01N_3	I/O L01P_3	PROG_B	I/O L28N_0	VCCO_0	I/O L21N_0	GND	I/O L17P_0 GCLK8
	E	I/O L05N_3	VCCO_3	I/O L10P_3	TMS	GND	I/O L31P_0	I/O L27P_0	I/O L23P_0	I/O L22P_0	I/O L17N_0 GCLK9
	F	I/O L13P_3	I/O L10N_3	I/O L09P_3	I/O L06P_3	TDI	I/O L31N_0	I/O L27N_0	I/O L23N_0	I/O L22N_0 VREF_0	VCCO_0
	G	I/O L13N_3 VREF_3	GND	I/O L12P_3	I/O L09N_3	I/O L06N_3	INPUT L04N_3 VREF_3	INPUT L04P_3	INPUT	INPUT	INPUT
	H	VCCAUX	I/O L12N_3	I/O L14N_3	I/O L08N_3	VCCO_3	I/O L08P_3	INPUT	GND	INPUT	INPUT
	J	I/O L17P_3 LHCLK0	I/O L16N_3	I/O L16P_3	I/O L14P_3	I/O L07N_3	I/O L07P_3	INPUT L11N_3 VREF_3	INPUT L11P_3	GND	VCCINT
	K	GND	I/O L17N_3 LHCLK1	I/O L18P_3 LHCLK2	I/O L20P_3 LHCLK4	INPUT L19N_3	INPUT L19P_3	INPUT L15N_3	INPUT L15P_3	VCCINT	GND
	L	I/O L21P_3 TRDY2 LHCLK6	VCCO_3	I/O L18N_3 IRDY2 LHCLK3	GND	I/O L20N_3 LHCLK5	INPUT L23N_3	INPUT L23P_3	VCCAUX	GND	VCCINT
	M	I/O L21N_3 LHCLK7	I/O L22P_3 VREF_3	I/O L22N_3	I/O L24P_3	I/O L24N_3	INPUT L31P_3	INPUT L27N_3	INPUT L27P_3	VCCINT	GND
	N	I/O L25P_3	I/O L25N_3	I/O L26P_3	I/O L26N_3	VCCO_3	INPUT L35N_3	INPUT L31N_3	GND	INPUT VREF_2	VCCINT
	P	I/O L28P_3	GND	I/O L29P_3	I/O L29N_3	INPUT L35P_3	INPUT L39P_3	INPUT L39N_3 VREF_3	INPUT VREF_2	INPUT	INPUT VREF_2
	R	I/O L28N_3	I/O L30P_3	I/O L30N_3	I/O L33N_3	I/O L36P_3	GND	I/O L04N_2	INPUT	GND	INPUT
	T	I/O L32P_3 VREF_3	I/O L32N_3	I/O L33P_3	I/O L36N_3	VCCAUX	I/O L04P_2	I/O L06P_2	I/O L07P_2 RDWR_B	I/O L11P_2	I/O L14N_2 D4
	U	I/O L34P_3	VCCO_3	I/O L34N_3	I/O L01P_2 M1	I/O L05N_2	I/O L06N_2	I/O L07N_2 VS2	VCCO_2	I/O L11N_2	I/O L14P_2 D5
	V	I/O L37P_3	I/O L37N_3	GND	I/O L01N_2 M0	I/O L05P_2	I/O L09P_2 VS1	I/O L12P_2 D7	I/O L13P_2	I/O L13N_2	I/O L16P_2 GCLK14
	W	I/O L38P_3	I/O L38N_3	I/O L02P_2 M2	I/O L03N_2	VCCO_2	I/O L09N_2 VS0	GND	I/O L12N_2 D6	I/O L15P_2 GCLK12	I/O L16N_2 GCLK15
	Y	GND	I/O L02N_2 CSO_B	I/O L03P_2	I/O L08P_2	I/O L08N_2	I/O L10P_2	I/O L10N_2	VCCAUX	I/O L15N_2 GCLK13	GND
		Bank 2									

Figure 24: FG400 Package Footprint (Top View)

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Table 83: Spartan-3A FG484 Pinout(Continued)

Bank	Pin Name	FG484 Ball	Type
1	IO_L26P_1/A10	K22	DUAL
1	IO_L28N_1	L19	I/O
1	IO_L28P_1	L18	I/O
1	IO_L29N_1/A13	J20	DUAL
1	IO_L29P_1/A12	J21	DUAL
1	IO_L30N_1/A15	G22	DUAL
1	IO_L30P_1/A14	H22	DUAL
1	IO_L32N_1	K18	I/O
1	IO_L32P_1	K17	I/O
1	IO_L33N_1/A17	H20	DUAL
1	IO_L33P_1/A16	H21	DUAL
1	IO_L34N_1/A19	F21	DUAL
1	IO_L34P_1/A18	F22	DUAL
1	IO_L36N_1	G20	I/O
1	IO_L36P_1	G19	I/O
1	IO_L37N_1	H19	I/O
1	IO_L37P_1	J18	I/O
1	IO_L38N_1	F20	I/O
1	IO_L38P_1	E20	I/O
1	IO_L40N_1	F18	I/O
1	IO_L40P_1	F19	I/O
1	IO_L41N_1	D22	I/O
1	IO_L41P_1	E22	I/O
1	IO_L42N_1	D20	I/O
1	IO_L42P_1	D21	I/O
1	IO_L44N_1/A21	C21	DUAL
1	IO_L44P_1/A20	C22	DUAL
1	IO_L45N_1/A23	B21	DUAL
1	IO_L45P_1/A22	B22	DUAL
1	IO_L46N_1/A25	G17	DUAL
1	IO_L46P_1/A24	G18	DUAL
1	IP_L04N_1/VREF_1	R16	VREF
1	IP_L04P_1	R15	INPUT
1	IP_L08N_1	P16	INPUT
1	IP_L08P_1	P15	INPUT
1	IP_L12N_1/VREF_1	R18	VREF
1	IP_L12P_1	R17	INPUT
1	IP_L16N_1/VREF_1	N16	VREF
1	IP_L16P_1	N15	INPUT
1	IP_L23N_1	M16	INPUT

Table 83: Spartan-3A FG484 Pinout(Continued)

Bank	Pin Name	FG484 Ball	Type
1	IP_L23P_1	M17	INPUT
1	IP_L27N_1	L16	INPUT
1	IP_L27P_1/VREF_1	M15	VREF
1	IP_L31N_1	K16	INPUT
1	IP_L31P_1	L15	INPUT
1	IP_L35N_1	K15	INPUT
1	IP_L35P_1/VREF_1	K14	VREF
1	IP_L39N_1	H18	INPUT
1	IP_L39P_1	H17	INPUT
1	IP_L43N_1/VREF_1	J15	VREF
1	IP_L43P_1	J16	INPUT
1	IP_L47N_1	H15	INPUT
1	IP_L47P_1/VREF_1	H16	VREF
VCCAUX	SUSPEND	U18	PWR MGMT
1	VCCO_1	E21	VCCO
1	VCCO_1	J17	VCCO
1	VCCO_1	K21	VCCO
1	VCCO_1	P17	VCCO
1	VCCO_1	P21	VCCO
1	VCCO_1	V21	VCCO
2	IO_L01N_2/M0	W5	DUAL
2	IO_L01P_2/M1	V6	DUAL
2	IO_L02N_2/CSO_B	Y4	DUAL
2	IO_L02P_2/M2	W4	DUAL
2	IO_L03N_2	AA3	I/O
2	IO_L03P_2	AB2	I/O
2	IO_L04N_2	AA4	I/O
2	IO_L04P_2	AB3	I/O
2	IO_L05N_2	Y5	I/O
2	IO_L05P_2	W6	I/O
2	IO_L06N_2	AB5	I/O
2	IO_L06P_2	AB4	I/O
2	IO_L07N_2	Y6	I/O
2	IO_L07P_2	W7	I/O
2	IO_L08N_2	AB6	I/O
2	IO_L08P_2	AA6	I/O
2	IO_L09N_2/VS2	W9	DUAL
2	IO_L09P_2/RDWR_B	V9	DUAL
2	IO_L10N_2	AB7	I/O

Table 83: Spartan-3A FG484 Pinout(Continued)

Bank	Pin Name	FG484 Ball	Type
3	IP_L04P_3	H8	INPUT
3	IP_L11N_3	K8	INPUT
3	IP_L11P_3	J7	INPUT
3	IP_L15N_3/VREF_3	L8	VREF
3	IP_L15P_3	K7	INPUT
3	IP_L19N_3	M8	INPUT
3	IP_L19P_3	L7	INPUT
3	IP_L23N_3	M6	INPUT
3	IP_L23P_3	M7	INPUT
3	IP_L27N_3	N9	INPUT
3	IP_L27P_3	N8	INPUT
3	IP_L31N_3	N5	INPUT
3	IP_L31P_3	N6	INPUT
3	IP_L35N_3	P8	INPUT
3	IP_L35P_3	N7	INPUT
3	IP_L39N_3	R8	INPUT
3	IP_L39P_3	P7	INPUT
3	IP_L46N_3/VREF_3	T6	VREF
3	IP_L46P_3	R7	INPUT
3	VCCO_3	E2	VCCO
3	VCCO_3	J2	VCCO
3	VCCO_3	J6	VCCO
3	VCCO_3	N2	VCCO
3	VCCO_3	P6	VCCO
3	VCCO_3	V2	VCCO
GND	GND	A1	GND
GND	GND	A22	GND
GND	GND	AA11	GND
GND	GND	AA16	GND
GND	GND	AA7	GND
GND	GND	AB1	GND
GND	GND	AB22	GND
GND	GND	B12	GND
GND	GND	B16	GND
GND	GND	B7	GND
GND	GND	C20	GND
GND	GND	C3	GND
GND	GND	D14	GND
GND	GND	D9	GND
GND	GND	F11	GND

Table 83: Spartan-3A FG484 Pinout(Continued)

Bank	Pin Name	FG484 Ball	Type
GND	GND	F17	GND
GND	GND	F6	GND
GND	GND	G2	GND
GND	GND	G21	GND
GND	GND	J11	GND
GND	GND	J13	GND
GND	GND	J14	GND
GND	GND	J19	GND
GND	GND	J4	GND
GND	GND	J9	GND
GND	GND	K10	GND
GND	GND	K12	GND
GND	GND	L11	GND
GND	GND	L13	GND
GND	GND	L17	GND
GND	GND	L2	GND
GND	GND	L6	GND
GND	GND	L9	GND
GND	GND	M10	GND
GND	GND	M12	GND
GND	GND	M14	GND
GND	GND	M21	GND
GND	GND	N11	GND
GND	GND	N13	GND
GND	GND	P10	GND
GND	GND	P14	GND
GND	GND	P19	GND
GND	GND	P4	GND
GND	GND	P9	GND
GND	GND	T12	GND
GND	GND	T2	GND
GND	GND	T21	GND
GND	GND	U17	GND
GND	GND	U6	GND
GND	GND	W10	GND
GND	GND	W14	GND
GND	GND	Y20	GND
GND	GND	Y3	GND
VCCAUX	SUSPEND	U18	PWR MGMT

Bank 0											
12	13	14	15	16	17	18	19	20	21	22	
I/O L18P_0 GCLK6	I/O L16N_0	I/O L13N_0	I/O L12N_0 VREF_0	I/O L12P_0	I/O L10N_0	I/O L05N_0	I/O L06N_0	I/O L03N_0	TCK	GND	A
GND	I/O L16P_0	VCCO_0	I/O L13P_0	GND	I/O L10P_0	VCCO_0	I/O L06P_0 VREF_0	I/O L03P_0	I/O L45N_1 A23	I/O L45P_1 A22	B
I/O L17P_0 GCLK4	I/O L15N_0	I/O L09P_0	I/O L11N_0	I/O L08N_0	I/O L07N_0	I/O L05P_0	I/O L02N_0	GND	I/O L44N_1 A21	I/O L44P_1 A20	C
VCCAUX	I/O L15P_0	GND	I/O L11P_0	I/O L08P_0	I/O L07P_0	I/O L01N_0	I/O L02P_0 VREF_0	I/O L42N_1	I/O L42P_1	I/O L41N_1	D
I/O L17N_0 GCLK5	I/O L14N_0	I/O L09N_0	I/O L04P_0	INPUT	I/O L01P_0	VCCAUX	TDO	I/O L38P_1	VCCO_1	I/O L41P_1	E
INPUT	I/O L14P_0	VCCO_0	I/O L04N_0	INPUT	GND	I/O L40N_1	I/O L40P_1	I/O L38N_1	I/O L34N_1 A19	I/O L34P_1 A18	F
INPUT	INPUT	INPUT	INPUT	INPUT	I/O L46N_1 A25	I/O L46P_1 A24	I/O L36P_1	I/O L36N_1	GND	I/O L30N_1 A15	G
INPUT VREF_0	INPUT	INPUT	INPUT L47N_1	INPUT L47P_1 VREF_1	INPUT L39P_1	INPUT L39N_1	I/O L37N_1	I/O L33N_1 A17	I/O L33P_1 A16	I/O L30P_1 A14	H
VCCINT	GND	GND	INPUT L43N_1 VREF_1	INPUT L43P_1	VCCO_1	I/O L37P_1	GND	I/O L29N_1 A13	I/O L29P_1 A12	I/O L26N_1 A11	J
GND	VCCINT	INPUT L35P_1 VREF_1	INPUT L35N_1	INPUT L31N_1	I/O L32P_1	I/O L32N_1	I/O L25N_1 RHCLK7	I/O L25P_1 IRDY1 RHCLK6	VCCO_1	I/O L26P_1 A10	K
VCCINT	GND	VCCINT	INPUT L31P_1	INPUT L27N_1	GND	I/O L28P_1	I/O L28N_1	I/O L22N_1 TRDY1 RHCLK3	I/O L22P_1 RHCLK2	I/O L21N_1 RHCLK1	L
GND	VCCINT	GND	INPUT L27P_1 VREF_1	INPUT L23N_1	INPUT L23P_1	I/O L24P_1 RHCLK4	VCCAUX	I/O L24N_1 RHCLK5	GND	I/O L21P_1 RHCLK0	M
VCCINT	GND	VCCINT	INPUT L16P_1	INPUT L16N_1 VREF_1	I/O L20N_1 A9	I/O L20P_1 A8	I/O L19N_1 A7	I/O L19P_1 A6	I/O L18N_1 A5	I/O L18P_1 A4	N
INPUT	VCCINT	GND	INPUT L08P_1	INPUT L08N_1	VCCO_1	I/O L17N_1 A3	GND	I/O L15P_1	VCCO_1	I/O L15N_1 VREF_1	P
INPUT VREF_2	INPUT VREF_2	INPUT VREF_2	INPUT L04P_1	INPUT L04N_1 VREF_1	INPUT L12P_1	INPUT L12N_1 VREF_1	I/O L17P_1 A2	I/O L13P_1	I/O L14P_1	I/O L14N_1	R
GND	INPUT	INPUT	INPUT VREF_2	INPUT VREF_2	I/O L03P_1 A0	I/O L03N_1 A1	I/O L13N_1	I/O L11P_1	GND	I/O L11N_1	T
I/O L20N_2 GCLK3	I/O L26N_2 D3	VCCO_2	INPUT	INPUT	GND	SUSPEND	I/O L10N_1	I/O L10P_1	I/O L09N_1	I/O L09P_1	U
I/O L20P_2 GCLK2	I/O L26P_2 INIT_B	I/O L30P_2	I/O L30N_2	I/O L31N_2	I/O L33N_2	VCCAUX	I/O L06P_1	I/O L06N_1	VCCO_1	I/O L07N_1	V
I/O L18P_2 GCLK14	I/O L23P_2	GND	I/O L25P_2	I/O L31P_2	I/O L34N_2	I/O L33P_2	I/O L02P_1 LDC1	I/O L02N_1 LDC0	I/O L05N_1	I/O L07P_1	W
I/O L18N_2 GCLK15	I/O L21N_2	I/O L23N_2	I/O L25N_2	I/O L27N_2	I/O L28N_2 D1	I/O L34P_2	DONE	GND	I/O L01N_1 LDC2	I/O L05P_1	Y
I/O L19P_2 GCLK0	VCCO_2	I/O L22P_2	I/O L24N_2 DOUT	GND	I/O L28P_2 D2	VCCO_2	I/O L32N_2	I/O L36N_2 CLK	I/O L35N_2	I/O L01P_1 HDC	A A
I/O L19N_2 GCLK1	I/O L21P_2	I/O L22N_2 MOSI CSI_B	I/O L24P_2 AWAKE	I/O L27P_2	I/O L29P_2	I/O L29N_2	I/O L32P_2	I/O L36P_2 D0 DIN/MISO	I/O L35P_2	GND	A B

Right Half of FG484
Package (Top View)

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Figure 26:

Bank 0																									
14	15	16	17	18	19	20	21	22	23	24	25	26													
I/O L26N_0 GCLK7	I/O L23N_0	GND	INPUT	I/O L18N_0	I/O L15N_0	I/O L14N_0	GND	I/O L07N_0	INPUT	N.C. ◆	TCK	GND	A												
I/O L26P_0 GCLK6	I/O L23P_0	VCCO_0	I/O L19N_0	I/O L18P_0	I/O L15P_0	I/O L14P_0 VREF_0	I/O L09N_0	VCCO_0	I/O L07P_0	N.C. ◆	INPUT L65N_1	INPUT L65P_1 VREF_1	B												
GND	I/O L22N_0	I/O L21N_0	I/O L19P_0	I/O L17N_0	GND	I/O L11N_0	I/O L09P_0	I/O L05N_0	I/O L06N_0	GND	I/O L63N_1 A23	I/O L63P_1 A22	C												
INPUT VREF_0	INPUT	I/O L22P_0	I/O L21P_0	I/O L17P_0	INPUT	I/O L11P_0	I/O L10N_0	I/O L05P_0	I/O L06P_0	I/O L61N_1	I/O L61P_1	I/O L60N_1	D												
I/O L24P_0	I/O L20N_0 VREF_0	VCCAUX	I/O L13N_0	INPUT	VCCO_0	INPUT	I/O L10P_0	VCCAUX	TDO	I/O L56P_1	VCCO_1	I/O L60P_1	E												
I/O L24N_0	I/O L20P_0	GND	I/O L13P_0	N.C. ◆	I/O L02N_0	I/O L01N_0	GND	I/O L58P_1 VREF_1	I/O L56N_1	I/O L54N_1	I/O L54P_1	GND	F												
INPUT	I/O L16P_0	INPUT	I/O L08N_0	N.C. ◆	I/O L02P_0 VREF_0	I/O L01P_0	I/O L64N_1 A25	I/O L58N_1	I/O L51P_1	I/O L51N_1	INPUT L52N_1 VREF_1	INPUT L52P_1	G												
GND	I/O L16N_0	VCCO_0	I/O L08P_0	INPUT	GND	I/O L64P_1 A24	I/O L62N_1 A21	VCCO_1	INPUT L48P_1	INPUT L48N_1	INPUT L44N_1	INPUT L44P_1 VREF_1	H												
I/O L25N_0 GCLK5	INPUT	I/O L12P_0	INPUT VREF_0	VCCAUX	I/O L59P_1	I/O L59N_1	I/O L62P_1 A20	I/O L49N_1	I/O L49P_1	GND	I/O L43N_1 A19	I/O L43P_1 A18	J												
I/O L25P_0 GCLK4	VCCINT	I/O L12N_0	GND	I/O L57N_1	I/O L57P_1	I/O L53N_1	I/O L50N_1	I/O L46N_1	I/O L46P_1	INPUT L40P_1	I/O L41P_1	I/O L41N_1	K												
VCCINT	GND	VCCINT	I/O L55N_1	I/O L55P_1	VCCO_1	I/O L53P_1	GND	I/O L50P_1	INPUT L40N_1	I/O L38P_1 A12	VCCO_1	GND	L												
GND	VCCINT	GND	VCCINT	I/O L47N_1	I/O L47P_1	I/O L42N_1 A17	I/O L45P_1	I/O L45N_1	I/O L38N_1 A13	INPUT L36P_1 VREF_1	I/O L35N_1 A11	I/O L35P_1 A10	M												
VCCINT	GND	VCCINT	I/O L39N_1 A15	I/O L39P_1 A14	I/O L34N_1 RHCLK7	I/O L42P_1 A16	I/O L37N_1	VCCO_1	INPUT L36N_1	I/O L33N_1 RHCLK5	INPUT L32N_1	INPUT L32P_1	N												
VCCINT	VCCINT	GND	VCCAUX	I/O L34P_1 TRDY1 RHCLK6	GND	I/O L30N_1 RHCLK1	I/O L30P_1 RHCLK0	I/O L37P_1	I/O L33P_1 RHCLK4	GND	I/O L31N_1 TRDY1 RHCLK3	I/O L31P_1 RHCLK2	P											Bank 1	
VCCINT	GND	VCCINT	I/O L27N_1 A7	I/O L27P_1 A6	I/O L22P_1	I/O L22N_1	I/O L25P_1 A2	I/O L25N_1 A3	INPUT L28P_1 VREF_1	INPUT L28N_1	I/O L29P_1 A8	I/O L29N_1 A9	R												
GND	VCCINT	GND	I/O L17N_1	I/O L17P_1	VCCO_1	I/O L14N_1	GND	VCCAUX	I/O L26P_1 A4	I/O L26N_1 A5	VCCO_1	GND	T												
VCCAUX	I/O L35N_2	I/O L42N_2	GND	I/O L12N_1	I/O L12P_1	I/O L10N_1	I/O L14P_1	I/O L21N_1	I/O L23P_1	I/O L23N_1 VREF_1	INPUT L24P_1	INPUT L24N_1 VREF_1	U												
I/O L31P_2	I/O L35P_2	I/O L42P_2	I/O L46N_2	I/O L08P_1	I/O L08N_1	SUSPEND	I/O L10P_1	I/O L18N_1	I/O L21P_1	I/O L19P_1	I/O L19N_1	INPUT L20N_1 VREF_1	V												
GND	I/O L31N_2	VCCO_2	I/O L46P_2	N.C. ◆	GND	I/O L04P_1	I/O L04N_1	VCCO_1	I/O L18P_1	GND	INPUT L16P_1	INPUT L20P_1	W												
I/O L27P_2 GCLK0	I/O L34N_2 D3	INPUT 2 VREF_2	I/O L43N_2	N.C. ◆	N.C. ◆	I/O L01P_1 HDC	I/O L01N_1 LDC2	I/O L13P_1	I/O L13N_1	I/O L15P_1	I/O L15N_1	INPUT L16N_1	Y												
I/O L27N_2 GCLK1	I/O L34P_2 INIT_B	GND	I/O L43P_2	I/O L47N_2	INPUT	INPUT VREF_2	GND	I/O L09P_1	I/O L09N_1	I/O L11P_1	I/O L11N_1	GND	A											A A	
VCCO_2	I/O L30N_2 MOSI CSI_B	I/O L38N_2	INPUT	I/O L47P_2	VCCO_2	INPUT	DONE	VCCAUX	I/O L07P_1	I/O L07N_1 VREF_1	VCCO_1	I/O L06N_1	A											A B	
I/O L29N_2	I/O L30P_2	I/O L38P_2	INPUT	INPUT	I/O L40N_2	I/O L41N_2	I/O L45N_2	N.C. ◆	I/O L03P_1 A0	I/O L03N_1 A1	I/O L05N_1	I/O L06P_1	A											A C	
I/O L29P_2	I/O L32P_2 AWAKE	INPUT	I/O L33N_2	GND	I/O L40P_2	I/O L41P_2	I/O L44N_2	I/O L45P_2	N.C. ◆	GND	I/O L02N_1 LDC0	I/O L05P_1	A											A D	
I/O L28N_2 GCLK3	I/O L32N_2 DOUT	VCCO_2	I/O L33P_2	I/O L36N_2 D1	I/O L37N_2	I/O L39N_2	I/O L44P_2	VCCO_2	I/O L48N_2	I/O L52N_2 CCLK	I/O L51N_2	I/O L02P_1 LDC1	A											A E	
I/O L28P_2 GCLK2	INPUT VREF_2	GND	INPUT VREF_2	I/O L36P_2 D2	I/O L37P_2	I/O L39P_2	GND	INPUT VREF_2	I/O L48P_2	I/O L52P_2 D0 DIN/MISO	I/O L51P_2	GND	A											A F	
Bank 2																									

Right Half of FG676
Package (Top View)

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