

Spartan™-3 Generation

The World's Lowest-Cost FPGAs.



➔ MAKE IT YOUR ASIC

Eight Years of Low-Cost

1998



1999



2000



2001



Designed for the Low-Cost Market

Since 1998, low-cost Xilinx Spartan™ FPGAs have been helping designers get to market sooner with lower total costs. Best of all, their low price points are supported even in small volumes, so you don't need a high-volume application to realize the cost and feature benefits of Spartan FPGAs.

- First to offer a dedicated low-cost FPGA family (Spartan Series)
- First low-cost FPGA family with \$1 Billion in revenue (Spartan Series)
- First to offer a 90nm low-cost FPGA family (Spartan-3)
- First 90nm FPGA family to ship 1 Million devices (Spartan-3)
- First to offer a US\$9, 1.2 million-gate FPGA (Spartan-3E XC3S1200E)
- First to offer a US\$2, 100K-gate FPGA (Spartan-3E XC3S100E)

Designed for the High-Volume Market

Xilinx is the ideal partner for your supply-chain management challenges. We offer the entire range of custom logic options—from prototype to production—from a single vendor. And we respond quickly to changes in your supply requirements, providing a host of unique advantages:

- Only FPGA vendor to develop a multi-fab supply base for high-volume production
- Only vendor to extend the benefits of FPGAs to ASIC volumes
 - Spartan-3E FPGAs push out the ASIC crossover point beyond 250,000 units per year for many applications
 - Spartan-3 EasyPath™ FPGAs offer a conversion-free, lower-priced alternative to structured ASICs

FPGA Leadership.

2002

2003

2004

2005 



SPARTAN-3L
LOW POWER FPGA



Widest Range of Applications

Domain	Examples
• Digital Consumer Electronics	Flat-Panel Displays, Set-Top Boxes, DVRs
• Storage and Computing	Blade Servers, RAID Controllers
• Telecommunications	SoHo Routers, Line Cards
• Medical	System Monitoring, Medical Imaging
• Low-Cost DSP	Security Cameras, Voice Processing
• In-Cabin Automotive	Telematics, Driver Information Systems



Cost-Optimized Custom Logic

Spartan-3E — Optimized for Gate-Centric Designs



Spartan-3E is the seventh family in the low-cost Spartan series, reducing the price points for FPGAs to unprecedented levels. Through the use of 90nm process technology, 300mm wafers, and application-driven architecture choices, Xilinx has extended the use of FPGAs into volumes and applications previously reserved for mask-programmed ASICs. In fact, Spartan-3E devices offer the lowest cost-per-logic (CPL) of any FPGA.

The Spartan-3E family was developed to deliver superior performance in digital consumer electronics applications. The resulting advanced features and capabilities benefit all high-volume/low-cost applications.

Spartan-3E FPGA Unique Features

- Low-cost serial (SPI) and parallel flash memory configuration options
- PCI 64/66 compliance and PCI-X 100 MHz compatibility
- Support for mini-LVDS I/O standard
- Up to eight enhanced Digital Clock Managers with support for low-cost oscillators
- Independent global and regional clock capability
- Enhanced performance multipliers—aligned with block RAM for low-cost DSP
- DDR333 memory interface

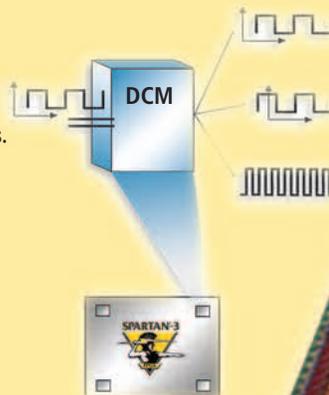
Get complete Spartan-3E family details at www.xilinx.com/spartan3e

Spartan-3 Generation Platform Features

System Clock Management

Sophisticated clock management offers increased flexibility and control for high-performance circuits.

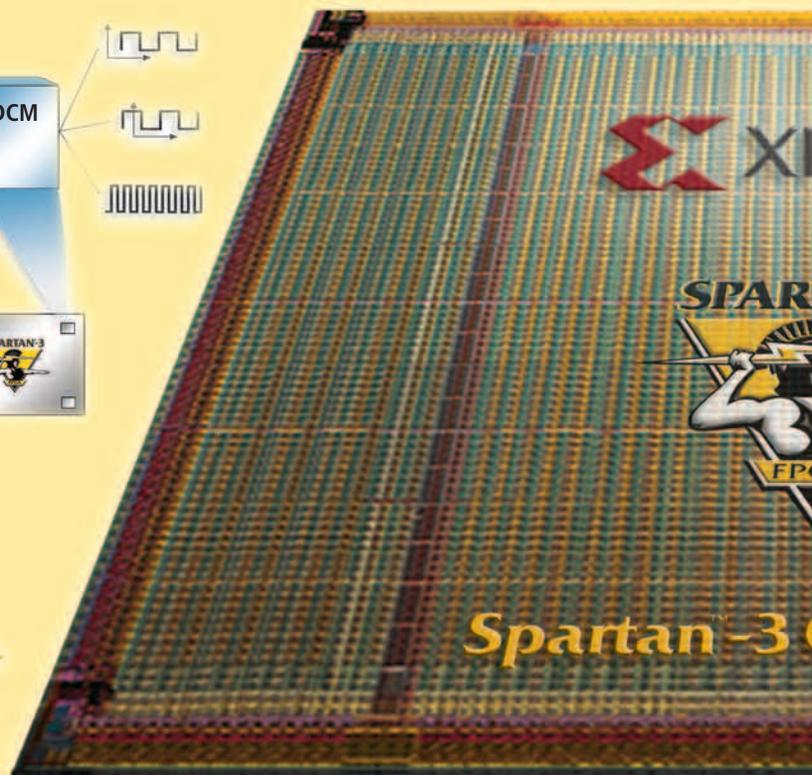
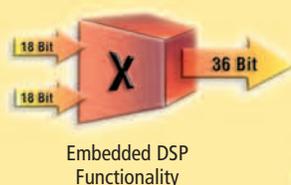
- Nine external outputs
- Up to eight global clock networks
- Elimination of external clock management devices (reduced part count)
- Ability to use the Spartan device as the master clock control (lower costs)



Embedded Multipliers

Dedicated multipliers allow you to implement high-performance DSP and optimize arithmetic functions.

- Dedicated Carry Logic
- Ideal co-processor performance for standard product DSPs



for All Applications.

Spartan-3 — Optimized for I/O-Centric Designs



The Spartan-3 FPGA family is the world's first 90nm FPGA family—and the low-cost FPGA of choice for a variety of high-volume applications. These FPGAs are optimized for I/O-centric designs and offer the lowest cost-per-I/O (CPI) of any FPGA, making them ideal for many networking, storage, connectivity, and interfacing applications.

The Spartan-3 family opens new applications and domains to the benefits of programmability with a range of unique features and capabilities.

Spartan-3 FPGA Unique Features

- High-current I/O options (up to 36 mA)
- XCITE Digitally-Controlled Impedance (DCI)
- Low-power Spartan-3L FPGA option for heat or power-constrained designs
- I/O support for GTL/GTLP/HSTL_I/HSTL_III/HSTL_II_18/SSTL18_II/SSTL2_II/LDT_25/BLVDS_25/LVDSEXT_25
- Staggered pads for very-high I/O:gate ratio
- Up to 5 million system gates; up to 784 I/O pins

Get complete Spartan-3 family details at www.xilinx.com/spartan3

Multiple Embedded Memory Types

Data can be stored in block RAM or distributed RAM, depending on your design requirements.



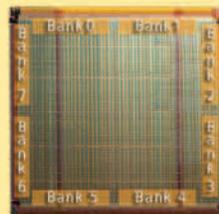
High-Performance
Synchronous Dual-Port RAM

- 18 Kbit dual-port RAM blocks
 - Code and data storage
 - DSP results and intermediate value storage
- Distributed RAM
 - Natively organized as 16x1-bit words
 - Ideal for Shift Registers and FIFOs

SelectIO™ Connectivity

Versatile I/O blocks interface to all popular interface standards.

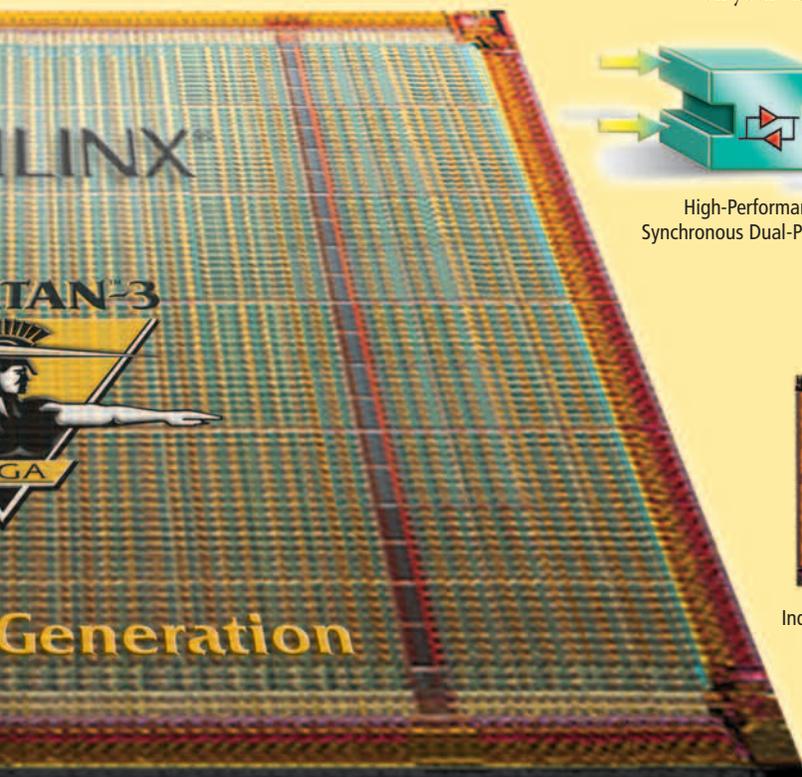
- Native transfer rates up to 622 Mb/s
- Multiple standards including PCI, HSTL, SSTL, LVDS, RSDS, LVPECL, LVTTTL, and LVCMOS
- Multiple I/O banks for bridging and interfacing applications



Independent I/O Banks Enable
Multiple Simultaneous
I/O Standards

Extensive Package Options

- Exceptional migration options between device densities for a given package
- Pb-free availability for all packages—ideal for worldwide consumer markets



Optimize Your Performance

Spartan-3 EasyPath — Ideal for High-Volume Cost Reduction

Spartan-3 EasyPath FPGAs deliver a conversion-free, flexible alternative to ASICs at prices below structured ASICs. This eliminates the risks of design conversion and the hidden costs associated with ASIC and structured ASIC conversions.



- Conversion-free methodology
- Tested for single or dual applications
- Support for in-system ECO changes
- High-volume cost-reduction option
- Identical in functionality and timing to the Xilinx FPGAs used for prototyping
- One-stop prototyping-to-production solution from a single vendor

Selection Criteria	Structured ASICs*	EasyPath FPGAs
Time to Prototype Samples	4 – 8 weeks	0 weeks
Total Time to Volume Production	12 – 15 weeks	8 weeks
Vendor NRE/Mask Costs	\$100K – \$200K	\$75K
Design Costs for Conversion	\$250K – \$300K	\$0
Additional Cost of Tools for Conversion	\$100K – \$200K	\$0
Unit Costs	Low	Low
Risk	High	Low
Flexibility to Make Changes In-System	Inflexible	Flexible
Design Conversion from Prototype to Production	Additional Engineering	Conversion Free

* Xilinx market analysis

Spartan-3L FPGAs — Ideal for Power Reduction

Reducing power consumption is a key challenge for many electronic systems and a necessity for enabling lower-cost cooling systems, smaller, less-expensive enclosures, and higher system reliability. With up to 98% power reduction in an exclusive hibernate mode, Spartan-3L FPGAs are ideal for systems with constraints on heat and power consumption.

Many applications have limited heat and power budgets, but require the flexibility offered by programmable logic. Spartan-3L devices are well suited for these applications, providing the low cost and platform features of Spartan-3 FPGAs with a reduced power option. Typical applications include rack-mounted equipment, fully sealed enclosures, and systems with reduced airflow for cooling.

- Easy-to-use power management with built-in hibernate mode
- I/Os stable during hibernate mode; no glitching or false switching
- Low dynamic power consumption, significantly reduced from previous process-technology generations
- Reduced total system cost through minimized cooling requirements

Get complete details at www.xilinx.com/easypath and www.xilinx.com/spartan3L

and Productivity.



Leading Design Resources

Complete Design Tool Suite

Speed design creation with twice the productivity of ASIC design flows. Slash debug cycle time with the advanced verification and real-time debug capabilities of ChipScope Pro™ tools. Xilinx design tools make it easy.

Hundreds of Pre-Verified IP Cores

Design faster and reduce risk with the latest pre-verified, pre-optimized intellectual property cores.

Education and Customized Support

The Xilinx Productivity Advantage (XPA) offers bundled packages of software, education, support services, and IP cores. This enables you to accelerate product development with online resources, training courses, and premium support services.

Expert Design Services

Augment your development team with our worldwide network of Xilinx Design Service (XDS) and third-party independent system design experts.

Lowest-Cost Embedded Processing

Xilinx offers a complete spectrum of programmable processing solutions and a unified development tool suite to create high-performance, lower-cost embedded systems for a wide range of applications. Control and processing applications benefit from the 32-bit MicroBlaze™ and 8-bit PicoBlaze™ soft processors from Xilinx. When implemented on Spartan-3 series FPGAs, MicroBlaze and PicoBlaze processors deliver the industry's best performance and lowest cost for FPGA-based embedded processing.

- No risk of processor or code obsolescence and the ability to perform rapid design updates and changes
- Embedded Development Kit—The FPGA industry's most advanced embedded design tools suite
- A variety of MicroBlaze RTOS options: ATI Nucleus, Express Logic ThreadX, and Micrium uC/OS-II
- 68 DMIPS for MicroBlaze processor in Spartan-3 FPGAs; 44 MIPS for PicoBlaze processor in Spartan-3 FPGAs
- Reduced total cost by consolidating entire embedded systems onto a single device

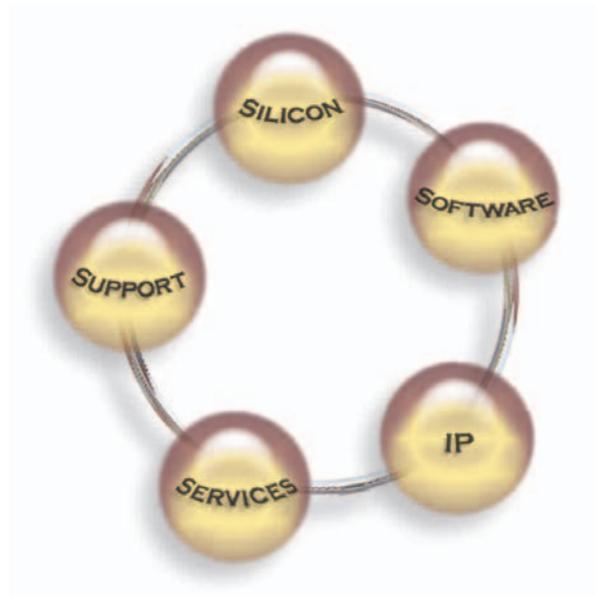
MicroBlaze™

Lowest-Cost Embedded DSP

Spartan-series FPGAs offer the optimal blend of low-cost, high-efficiency signal processing in a programmable logic device. This makes them ideal for applications such as set-top boxes, consumer digital, and video. Typical DSP functions well suited for Spartan-series FPGAs include:

- Video: convolution, color space conversion, rotation, scaling, and edge-detection
- Audio: noise reduction, modulation and demodulation, encoding and decoding
- Data: encryption, compression, signal conditioning (filtering and stabilization), and decimation
- Communications: down- and up-conversion, modulation and demodulation, and filtering

XtremeDSP



Take the Next Step.

Xilinx and our partners offer a range of evaluation hardware, including starter kits and prototyping systems. This hardware accelerates your development and debug cycle, and comes complete with design tools, documentation, reference designs and getting-started guides.



Order your Starter Kit online today at
www.xilinx.com/products/spartan3/s3boards.htm

Spartan-3 and Spartan-3E Family Device Selection Guide

Spartan-3 FPGA Family									Spartan-3E FPGA Family				
Spartan-3	XC3S50	XC3S200	XC3S400	XC3S1000	XC3S1500	XC3S2000	XC3S4000	XC3S5000					
Spartan-3L	—	—	—	XC3S1000L	XC3S1500L	—	XC3S4000L	—					
Spartan-3 EasyPath	—	—	—	—	XCE3S1500	XCE3S2000	XCE3S4000	XCE3S5000					
Xilinx Automotive (XA)	XA3S50	XA3S200	XA3S400	XA3S1000	—	—	—	—	XC3S100E	XC3S250E	XC3S500E	XC3S1200E	XC3S1600E
System Gates	50K	200K	400K	1000K	1500K	2000K	4000K	5000K	100K	250K	500K	1,200K	1,600K
Logic Cells	1,728	4,320	8,064	17,280	29,952	46,080	62,208	74,880	2,160	5,508	10,476	19,512	33,192
Block RAM Bits	72K	216K	288K	432K	576K	720K	1,728K	1,872K	72K	216K	360K	504K	648K
Distributed RAM Bits	12K	30K	56K	120K	208K	320K	432K	520K	15K	38K	73K	136K	231K
DCMs	2	4	4	4	4	4	4	4	2	4	4	8	8
Multipliers	4	12	16	24	32	40	96	104	4	12	20	28	36
I/O Standards	24	24	24	24	24	24	24	24	18	18	18	18	18
Max Single Ended I/O ¹	124	173	264	391	487	565	712	784	108	172	232	304	376
Max Differential I/O Pairs	56	76	116	175	221	270	312	344	40	68	92	124	156
Package and I/O Offerings													
	XC3S50	XC3S200	XC3S400	XC3S1000	XC3S1500	XC3S2000	XC3S4000	XC3S5000	XC3S100E	XC3S250E	XC3S500E	XC3S1200E	XC3S1600E
VQ100 14 x 14 mm	63 ³	63 ³							66	66			
CP132 8 x 8 mm	89									92	92		
TQ144 20 x 20 mm	97	97	97						108	108			
PQ208 28 x 28 mm	124 ³	141 ³	141 ³							158	158		
FT256 17 x 17 mm		173 ³	173 ³	173 ²						172	190	190	
FG320 19 x 19 mm			221	221 ²	221 ²						232	250	250
FG400 21 x 21 mm												304	304
FG456 23 x 23 mm			264	333 ^{2,3}	333 ²	333							
FG484 23 x 23 mm													376
FG676 27 x 27 mm				391	487 ²	489	489						
FG900 31 x 31 mm						565	633 ²	633					
FG1156 35 x 35 mm							712	784					

¹ See Package and I/O Offerings for Spartan-3L maximum values

² Also available in Spartan-3L

³ Also available in Spartan-3 Xilinx Automotive



Pb-free devices available now

Corporate Headquarters

Xilinx, Inc.
 2100 Logic Drive
 San Jose, CA 95124
 Tel: (408) 559-7778
 Fax: (408) 559-7114
 Web: www.xilinx.com

European Headquarters

Xilinx
 Citywest Business Campus
 Saggart,
 Co. Dublin
 Ireland
 Tel: +353-1-464-0311
 Fax: +353-1-464-0324
 Web: www.xilinx.com

Japan

Xilinx, K.K.
 Shinjuku Square Tower 18F
 6-22-1 Nishi-Shinjuku
 Shinjuku-ku, Tokyo
 163-1118, Japan
 Tel: 81-3-5321-7711
 Fax: 81-3-5321-7765
 Web: www.xilinx.co.jp

Asia Pacific

Xilinx Asia Pacific Pte. Ltd.
 No. 3 Changi Business Park Vista, #04-01
 Singapore 486051
 Tel: (65) 6544-8999
 Fax: (65) 6789-8886
 RCB no: 20-0312557-M
 Web: www.xilinx.com

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