



Virtex-5 Platform FPGA Family The Ultimate System Integration Platform Feature Fact Sheet

Overview

The Virtex™-5 FPGA family is the fifth generation of the market-leading Xilinx® Virtex Series product line. It offers a choice of four new domain-optimized platforms that deliver the next level of performance, density, power optimization, and cost savings in programmable logic. Virtex-5 platforms are built on the proven ASMBL™ architecture and power-optimized 65-nanometer (nm) triple-oxide manufacturing process technology. Combined, they provide the ultimate system integration platform with an optimal mix of high-performance logic, serial connectivity, DSP and embedded processing functionality, plus a range of hard intellectual property (IP) cores:

- Virtex-5 LX Platform for high performance logic
- Virtex-5 LXT Platform for high performance logic with serial connectivity
- Virtex-5 SXT Platform for high performance DSP with serial connectivity
- Virtex-5 FXT Platform for embedded processing with serial connectivity

The Virtex-5 LX Platform is shipping now with each of the remaining platforms slated for the second half of 2006 through the first half of 2007.

FPGA Leadership

- **Breakthrough Performance:** Virtex-5 FPGAs deliver higher system performance than any FPGA shipping today. The new ultra-fast 65-nm ExpressFabric™ technology with an all-new look-up table (LUT) with six independent inputs (6LUT) and a new diagonal routing structure helps Virtex-5 FPGAs deliver 30 percent faster performance than previous generations and 40 percent faster performance than competing FPGAs. The Virtex-5 family includes hardened IP blocks such as embedded memory (Block RAM), clocking management blocks, and DSP functions, all tuned to 550 MHz.
- **Highest Integration:** Virtex-5 FPGAs deliver up to 330,000 logic cells (65 percent more than previous generation), plus embedded functionality. This enables the highest integration of system features in the industry today and reduced device cost.
- **Optimized Power:** Virtex-5 FPGAs have the lowest static power consumption with its second generation triple-oxide technology, and also deliver on average 35 percent lower dynamic power and the same low static power compared to previous generations.
- **Superior Signal Integrity:** Second-generation Sparse Chevron packaging technology ensures lowest SSO noise and cross talk.

- **Lowest System Cost:** Virtex-5 FPGAs reduce the area by 45 percent for a given function compared to previous generations. The Virtex-5 EasyPath™ program delivers a further 30 to 75 percent risk-free cost reduction over standard FPGAs.
- **Maximum Design Productivity:** Xilinx delivers a complete design solution with its industry-leading Integrated Software Environment (ISE™) design suite, and optional tightly-integrated EDA tools from Xilinx and its ecosystem partners. Support for Virtex-5 FPGAs includes reference designs, development boards, design kits, IP cores as well as Xilinx premium support and design services to help achieve design closure in the fastest possible time.

Innovative Features and Technologies

The Virtex-5 LX Platform, the first in the series of Virtex-5 product introductions, features a range of key technical innovations, including:

- **New ExpressFabric technology:** The Virtex-5 FPGA family is based on the new ExpressFabric technology that includes a real 6-input LUT and new diagonal interconnect structure. The all-new 6LUT reduces logic levels and the new diagonal interconnect structure minimizes delays to deliver the highest speeds ever in an FPGA: on average 30 percent faster, which equals up to two speed-grades faster than Virtex-4 FPGAs. The Virtex-5 LX family has up to 330,000 logic cells that can be configured as logic, RAM, or shift registers.
- **550 MHz clocking technology:** The Virtex-5 550 MHz clocking structure delivers the highest performance and best quality system clocks. A new clock management tile combines one phase-locked loop (PLL) with two digital clock managers (DCMs). The DCM provides precise phase control for better design margin, while the PLL reduces reference clock jitter by more than two times. Virtex-5 LX has up to 18 clock elements for flexibility and differential global clocking for low skew and jitter.
- **550 MHz BlockRAM:** The Virtex-5 BlockRAM helps designers build the right memory for any application with compact utilization and highest performance. It delivers a wider interface for increased bandwidth and built-in 64-bit error checking and correction (ECC) for high-reliability systems. Designers can implement large memory arrays efficiently with 36-Kbit blocks, minimize power consumption by turning off unused 16-Kbit sub-blocks, and configure multi-rate FIFOs from block RAM without consuming logic resources.
- **1.25 Gbps SelectIO technology:** Virtex-5 SelectIO™ technology enables designers to implement industry-standard and custom protocols. Virtex-5 LX provides a 1.25 Gbps differential I/O and 800 Mbps single-ended I/O, while the ChipSync source-synchronous technology simplifies board design supporting up to 1,200 user I/Os.

- **Second-generation Sparse Chevron packaging technology:** Designers can keep system noise under control while simplifying PCB layout with the low-noise Virtex-5 FPGA packaging. Its unique power and ground pin pattern minimizes crosstalk while minimizing the risk of costly board redesigns.
- **550 MHz DSP48E slice:** The Virtex-5 architecture enables designers to create an ultra-high performance DSP system. Virtex-5 LX contains up to 192 slices for 105 GMACs and 25 x 18-bit multipliers to enable increased precision. The highly flexible block is configurable for DSP, arithmetic and logic functions, and can be cascaded for adder chain architectures. The DSP Slice has 40 percent lower power consumption: 1.38mW/100 MHz at a 38 percent toggle rate compared to previous generations.
- **Enhanced device configuration and bitstream protection:** Virtex-5 LX contains more configuration options with new Serial Peripheral Interface (SPI) and Byte-Wide Peripheral Interface (BPI) support of commodity flash memories to reduce system cost and increase reliability. It also features multi-bitstream management for greater reliability with in-system reconfiguration and enhanced security with 256-bit advanced encryption.