EXTENDING PROGRAMMABLE LOGIC TO MORE APPLICATIONS—FROM HIGH-VOLUME TO ULTRA HIGH-END

XILINX 7 SERIES FPGAS: BREAKTHROUGH POWER AND PERFORMANCE, DRAMATICALLY REDUCED DEVELOPMENT TIME

Today's Market Challenges

- Industry dynamics are driving the need for systems that consume much less power
- Insatiable bandwidth requirements call for higher system-level performance
- Competitive pressure is forcing customers to explore new options for performance/cost tradeoffs
- Companies are struggling to increase productivity without sacrificing innovation and differentiation
- Companies are struggling to break through multi-chip partitioning barriers to prototype complex ASICs

Xilinx 7 Series FPGAs: Addressing the Programmable Imperative

- Cutting power consumption in half, allowing FPGAs to be used in new applications and providing more "useable performance"
- Setting new benchmarks for system-level performance in terms of logic density, I/O bandwidth, and signal processing
- Replacing ASICs and ASSPs in high capacity, high-bandwidth systems
- Providing unmatched performance per dollar
- Offering a scalable optimized architecture that reduces development time and fosters innovation and differentiation

Lowest Power Consumption

Power is becoming the primary concern for most designs. Beyond meeting supply and thermal constraints, lowering power improves cost and reliability, and supports increased performance. With breakthrough reductions in power consumption, the Xilinx® 7 Series FPGAs meet the design goals for an increasingly diverse range of applications. For the first time—and as ASIC and ASSP designs are becoming more challenging—systems with the most demanding power requirements can take advantage of FPGAs for flexibility and shortened time to market. By lowering both static and dynamic power consumption, Xilinx makes it possible for designers to take advantage of the increased logic density, signal processing performance, and higher I/O bandwidth of the 7 series FPGAs to achieve dramatically higher system performance.

Shattering System Limits

Building on the logic architecture and technology from earlier Virtex® FPGAs, the optimized 28nm families double density and drive up performance. Up to 2M logic cells are complemented with 67Mbits of Block RAM, up to 96 transceivers operating at 13.1Gbps, and 16 transceivers operating at 28.05Gbps raise I/O bandwidth to 2.8Tbps. Up to 3,600 DSP48E1 slices raise DSP performance to 5.3TMACS, and all 7 series FPGAs offer Agile Mixed Signal (AMS) capability and integrated block for PCI Express. By surpassing previous limits, the 7 series FPGAs deliver a 2X price-performance improvement.

Today a single Xilinx 7 series device based on stacked silicon interconnect technology delivers 2X the capacity and a 100X improvement in inter-die bandwidth per watt compared to a monolithic device. The ultra high-end of the Virtex-7 family has logic, processing, memory, and transceiver capacity that accelerates the replacement of high-capacity ASICs and ASSPs, enables increased system integration to increase performance and lower power, and enables ASIC prototyping and emulation.

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Multiple Families—Scalable Optimized Architecture

In the past, repurposing a high-performance design for a low-cost, low-power application—or vice versa—meant practically starting over. The Xilinx 7 series FPGA families protect IP investments and enable portable FPGA-based designs that can span high-volume to ultra high-end applications. Unified with a single architecture, the Xilinx Artix™-7, Kintex™-7, and Virtex®-7 FPGA families shorten time to market for derivative applications and allow more time for solution differentiation.

With 7 series FPGAs, Xilinx introduces a new high-κ metal gate (HKMG), high-performance, low-power (HPL) variant of 28nm process technology. The resulting Artix-7, Kintex-7, and Virtex-7 FPGAs allow designers to achieve low power consumption, get the most usable performance out of the process technology, and maximize productivity. The 7 series also brings to market the world's first stacked silicon Interconnect FPGA, the Virtex-7 2000T, made possible by Xilinx patented FPGA architectural innovations and advanced foundry processes.

Breakthrough 50% Power Reduction

The 7 series FPGAs combine power reducing process, design techniques, and architectural enhancements to deliver the lowest-in-class power consumption, compared to previous generation FPGAs:

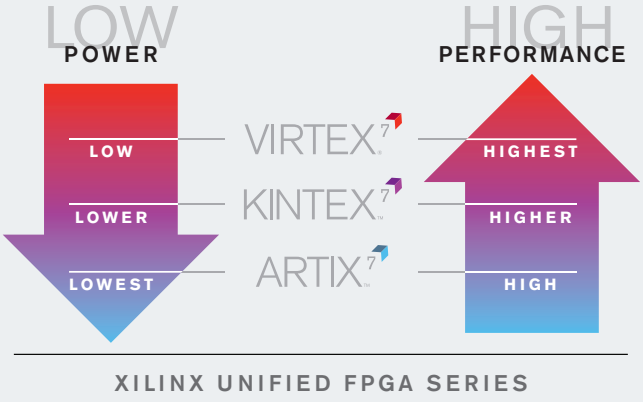
- 65% lower static power consumption
- 25% to 30% lower dynamic power consumption
- 30% I/O dynamic power consumption

2X Price-Performance Improvement

The 7 series FPGAs simultaneously push price and bandwidth to offer the industry's highest-performance programmable devices at unprecedented price points.

Greater than 2X System Performance

Designers can break through system performance bottlenecks with the 7 series' high-speed serial transceivers, capable of up to 28.05Gbps and high-bandwidth DDR3-1866 memory interfaces. With up to 2M logic cells and 3,600 DSP48E1 slices, designers can exploit the parallelism inherent in the FPGA architecture for even greater performance gains.



100X Die-to-Die Connectivity

Instead of using standard I/O connections to integrate multiple FPGAs on a circuit board, stacked silicon interconnect technology eliminates interchip bandwidth bottlenecks by two orders of magnitude, at one-fifth the latency, and without consuming any high-speed serial or parallel I/O resources. The stacked silicon interconnect-based devices in the 7 series:

- Deliver breakthrough capacity and power savings: more than 6.8 billion transistors enabling 2 million logic cells
- Achieve tremendous levels of computational and bandwidth performance with data flows that leverage over 10,000 routing connections
- Take FPGA applications and system-on-a-chip (SoC) designs to the next level with support for the latest cores and platform solutions within a single chip

Dramatically Reduced Development Time

The scalable, optimized architecture simplifies the process of migrating designs and IP from Virtex-6 and Spartan-6 FPGA families. New designs can efficiently span the entire 7 series. This design and IP portability is enabled by the common FPGA elements of fabric, Block RAM, DSP, clocking, Agile Mixed Signal (AMS), and more. The result is dramatically reduced overall development time necessary for engineers to quickly differentiate their systems over competition.

The choice of three 7 series families gives designers the ability to match I/O, performance, feature quantities, packaging, and power consumption to the target application—at the right cost points for each market.

- Artix-7 FPGAs: Lowest power and cost
- Kintex-7 FPGAs: Industry's best price-performance with lower power
- Virtex-7 FPGAs: Industry's highest system performance and capacity with low power
- EasyPath™-7 FPGAs: Fast, simple and risk-free solution for cost-reducing Kintex-7 and Virtex-7 FPGA designs

7 SERIES FPGA FAMILY COMPARISON

MAXIMUM CAPABILITY	ARTIX-7 FPGAS	KINTEX-7 FPGAS	VIRTEX-7 FPGAS
Logic Cells	360K	478K	1,955K
Block RAM	19Mb	34Mb	68Mb
DSP Slices	1,040	1,920	3,600
Peak DSP Performance (symmetric FIR)	1,248 GMACS	2,845 GMACS	5,335 GMACS
Transceiver Count	16	32	96
Peak Transceiver Speed	6.6 Gbps	12.5 Gbps	13.1 / 28.05 Gbps
Peak Serial Bandwidth (full duplex)	211Gbps	800Gbps	2,784 Gbps
PCI Express® Interface	x4 Gen2	x8 Gen2	x8 Gen2 / x8 Gen3*
Memory Interface	1,066 Mbps	1,866 Mbps	1,866 Mbps
I/O Pins	600	500	1,200
I/O Voltage	1.2V, 1.35V, 1.5V, 1.8V, 2.5V, 3.3V	1.2V, 1.35V, 1.5V, 1.8V, 2.5V, 3.3V	1.2V, 1.35V, 1.5V, 1.8V, 2.5V, 3.3V*
Packaging Options	Low-cost wire bond	Low-cost lidless flip-chip and high-performance flip-chip	Highest performance flip-chip; stacked silicon interconnect technology based
Target Application Examples	▪ Portable/handheld ultrasound ▪ 3D cameras and camcorders ▪ D-SLR still cameras ▪ Software defined radio ▪ 3D TV ▪ Portable eReaders ▪ Automotive Infotainment ▪ Multifunction printers ▪ Video surveillance	▪ Wireless LTE infrastructure ▪ 10G PON OLT line card ▪ LED backlit and 3D video displays ▪ Video-over-IP bridge ▪ Cellular radio ▪ Medical Imaging ▪ Avionics imaging ▪ Set top boxes ▪ Motor control	▪ 400G and 100G line cards ▪ 300G Interlaken bridge ▪ Terabit switch fabric ▪ 100G OTN ▪ MUXPONDER ▪ RADAR ▪ ASIC emulation ▪ High-performance computing ▪ Test and measurement

*Refer to the 7 Series Product Overview for device details such as soft vs. hard Gen3 interface, and> 2.5V/3.3V support.

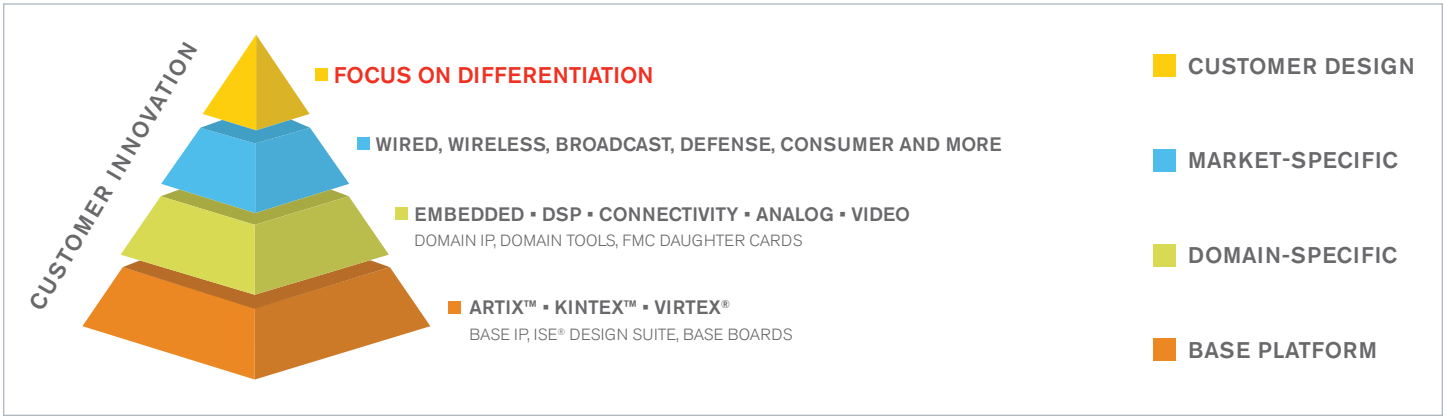
Integrated Software Design Environment

The proven development and verification tools in the Xilinx ISE and Vivado™ Design Suites help designers get 7 series FPGA solutions to market faster and with high quality. The award-winning software includes domain-specific DSP, embedded-processing, and system-level design capabilities. ISE and Vivado Design Suites include full support for all 7 series devices as well as advancements that increase team efficiencies for collaborative projects.

Foundation for Next-Generation Targeted Design Platforms

Xilinx Targeted Design Platforms speed time to market and free designers to focus on innovation and differentiation. The integration of FPGA devices, design tools, and IP into targeted reference designs that run on development or evaluation boards creates a robust development and run-time environment. The platforms help designers more quickly learn about FPGAs and leverage standard or modified tools and IP to accelerate development. Xilinx teams up with industry leaders to build customized Base, Domain-Specific, and Market-Specific variations of the Targeted Design Platform, each introducing common methodologies to benefit both hardware designers and software application developers.

FOCUS ON DIFFERENTIATION



Take the NEXT STEP

Download the latest version of ISE Design Suite 13.3 get started designing with Xilinx 7 series FPGAs today: **www.xilinx.com/ise**

For more information on Xilinx 7 Series FPGAs visit: **www.xilinx.com/7**

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