

Artix UltraScale+ FPGA

OVERVIEW

Artix® UltraScale+™ devices are the industry's only cost-optimized FPGAs based on a production-proven 16nm architecture for best-in-class performance/watt, along with packaging innovation for ultra-compact form factor and compute density.

With up to 16Gb/s transceivers for advanced protocols, and the highest DSP performance in their class, Artix UltraScale+ FPGAs match I/O bandwidth to compute to maximize system performance for cost-sensitive and low power applications in machine vision, secure networking, 4K broadcast, and a range of industrial IoT and edge markets.

HIGHLIGHTS

Highest I/O Bandwidth and Compute in a Cost-Optimized FPGA

- > 2.4X fabric performance/watt vs. Artix-7 FPGAs
- > Up to 16Gb/s transceivers for emerging protocols in networking, video, and vision
- > Exceptional fixed- and floating-point DSP compute in its class
- > 2500Mb/s MIPI performance for the latest sensor technologies

Packaging Innovation for Industry's Highest Compute Density

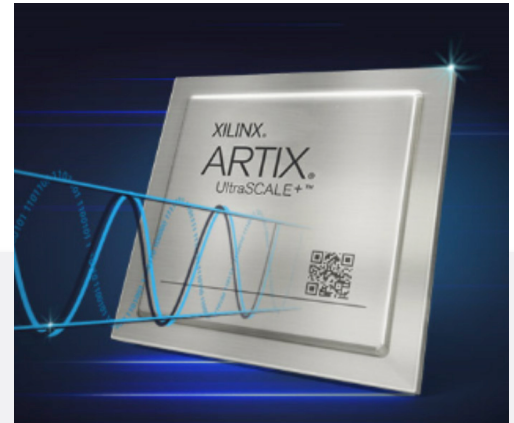
- > Integrated Fan-Out (InFO) packaging for ultra compact form factor (10.2x8.5mm)
- > "Near die-size" ball pitch (0.5mm) for no loss of pins
- > 75% less area (than flip-chip packaging) for better thermal & power distribution
- > Exceptional I/O bandwidth and compute / mm² in its class

Multi-Level Safeguards for Cybersecurity and IP Protection

- > RSA-4096 authentication to verify design source
- > AES-CGM decryption (NIST-approved) with faster configuration
- > Security monitor IP to adapt to security threats across the product life cycle
- > Range of safeguards - including anti-tamper and SEU performance

Scalable to Mid-Range and High-End UltraScale+ FPGA Families

- > Scale to higher logic density, compute, and transceiver performance as needed
- > Common silicon architecture, tool flows, and ecosystem for a common platform
- > Preserve investments in SW, IP, tools, and PCB design across the portfolio
- > Leverage a platform strategy for developing a multi-product portfolio



TARGET APPLICATIONS

Industrial

- > Machine Vision
- > Industrial Networking (Time-Sensitive Networking)
- > Industrial Controllers

Medical

- > Portable and Desktop Ultrasound
- > Surgical Vision
- > Endoscopy

Networking

- > Cost-sensitive Nx10G and 25G Networking
- > Network Bridging for Nx100G Systems

AV Broadcasting

- > LED Video Walls
- > Digital Signage
- > KVM Switch
- > Video Mini-Converters

Aerospace & Defense

- > MILCOM Radio
- > Missiles & Munitions

FEATURES

Artix UltraScale+ FPGAs leverage production-proven architectural blocks of the UltraScale™ architecture.

FEATURES OVERVIEW	
Enhanced Programmable Logic Architecture	<ul style="list-style-type: none"> > Based on TSMC's 16nm FinFET+ process > 2.4X performance/watt vs. Artix-7 FPGAs > Voltage scaling to tune power and performance on the same device > Enhanced CLB/LUTs, routing, and ASIC-class clocking for high utilization
High-Performance Transceivers	<ul style="list-style-type: none"> > Up to 16Gb/s transceiver line rates (minimum of 12Gb/s across the family) > Power-optimized architecture vs. Artix-7 FPGAs > Single oscillator for fabric and SerDes eliminates extra clocking components
PCI Express® Gen3, Gen4 Support	<ul style="list-style-type: none"> > PCI Express Gen3 x8, Gen4 x8 compatible > DMA IP for complete end-to-end solution
Exceptional DSP Compute in its Class	<ul style="list-style-type: none"> > Highest bandwidth in a cost-optimized FPGA > 1,860 GOP/s, 620 GFLOPs (FP32) in the largest device > Up to 50% fewer resources for equivalent computation vs. Artix-7 FPGAs
Safety and Multi-Level Security Features	<ul style="list-style-type: none"> > RSA-4096 authentication to verify design source > NIST AES-CGM decryption approved, for faster configuration > Permanent tamper penalty to prevent adversaries from accessing security features > Security monitoring IP to adapt to security threats across the product life cycle
DDR4-2400 Performance	<ul style="list-style-type: none"> > DDR4-2400 for highest memory interface performance in a cost-optimized FPGA > Memory bandwidth to match on-chip compute > Reduced memory controller fabric utilization and power vs. Artix-7 FPGAs
Outstanding MIPI and LVDS Performance	<ul style="list-style-type: none"> > Up to 2500Mb/s MIPI and LVDS performance > Support for advanced vision sensors (MIPI, SLVS-EC)
Analog Mixed-Signal Monitoring Block	<ul style="list-style-type: none"> > Voltage, current, and temperature tracking for safe, secure, and reliable operation > Helps meet requirements for key standards: FIPS 140-2, IEC 61508, ISO26262 > Allows for integration of low-amplitude sensors

Scalable to mid- and high-end FPGA families to increase feature-set while preserving design investment

ARTIX [®] UltraSCALE ⁺	KINTEX [®] UltraSCALE ⁺	VIRTEX [®] UltraSCALE ⁺
<ul style="list-style-type: none"> > Up to 308K System Logic Cells > Up to 1,200 DSP Slices > Up to 16Gb/s Transceivers 	<ul style="list-style-type: none"> > Up to 1,843K System Logic Cells > Up to 3,528 DSP Slices > Up to 32.75Gb/s Transceivers 	<ul style="list-style-type: none"> > Up to 8,938K System Logic Cells > Up to 12,288 DSP Slices > Up to 58Gb/s Transceivers

TAKE THE NEXT STEP

Artix UltraScale+ FPGAs are supported by comprehensive development tools, reference designs, an IP catalog, and [evaluation platforms](#).

For more information, visit www.xilinx.com/artix-ultrascale-plus.

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