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
> Highest 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 (11.5x9.5mm)
> “Near die-size” ball pitch (0.5mm) for no loss of pins
> 70% less area (than flip-chip packaging) for better thermal & power distribution
> Highest 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
> Secure 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

<table>
<thead>
<tr>
<th>Feature</th>
<th>Details</th>
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<tbody>
<tr>
<td><strong>Enhanced Programmable Logic Architecture</strong></td>
<td>Based on TSMC’s 16nm FinFET+ process, world’s #1 foundry</td>
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<td>2.4X performance-per-watt vs. Artix-7 FPGAs</td>
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<td>Voltage scaling to tune power and performance on the same device</td>
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<td>Enhanced CLB/LUTs, routing, and ASIC-class clocking for high utilization</td>
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<td><strong>High-Performance Transceivers</strong></td>
<td>Up to 16Gb/s transceiver line rates (minimum of 12Gb/s across the family)</td>
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<td>Power-optimized architecture vs. Artix-7 FPGAs</td>
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<td>Single oscillator for fabric and SerDes eliminates extra clocking components</td>
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<td><strong>PCI Express® Gen3, Gen4 Support</strong></td>
<td>PCI Express Gen3 x8, Gen4 x2 compatible</td>
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<td>DMA IP for complete end-to-end solution</td>
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<td><strong>Highest DSP Compute in Its Class</strong></td>
<td>Highest bandwidth in a cost-optimized FPGA</td>
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<td>1,860 GMAC/s, 620 GFLOPs (FP32) in the largest device</td>
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<td>Up to 50% fewer resources for equivalent computation vs. Artix-7 FPGAs</td>
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<td><strong>Safety and Multi-Level Security</strong></td>
<td>RSA-4096 authentication to verify design source</td>
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<td>NIST AES-CGM decryption approved, for faster configuration</td>
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<td>Permanent tamper penalty to prevent adversaries from accessing security features</td>
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<td>Security monitoring IP to adapt to security threats across the product life cycle</td>
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<td><strong>DDR4-2400 Performance</strong></td>
<td>DDR4-2400 for highest memory interface performance in a cost-optimized FPGA</td>
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<td>Memory bandwidth to match on-chip compute</td>
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<td>Reduced memory controller fabric utilization and power vs. Artix-7 FPGAs</td>
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<td><strong>MIPI and LVDS Best-in-Class Performance</strong></td>
<td>Up to 2500Mb/s MIPI and LVDS performance</td>
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<td>Support for the most advanced vision sensors (MIPI, SLVS-EC)</td>
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<td><strong>Analog Mixed-Signal Monitoring Block</strong></td>
<td>Voltage, current, and temperature tracking for safe, secure, and reliable operation</td>
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<td>Helps meet requirements for key standards: FIPS 140-2, IEC 61508, ISO26262</td>
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<td>Allows for integration of low-amplitude sensors</td>
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Scalable to mid- and high-end FPGA families to increase feature-set while preserving design investment

### ARTIX UltraScale+

- Up to 308K System Logic Cells
- Up to 1,200 DSP Slices
- 16Gb/s Transceivers

### KINTEX UltraScale+

- Up to 1,843K System Logic Cells
- Up to 3,528 DSP Slices
- 32.75Gb/s Transceivers

### VIRTEX UltraScale+

- Up to 8,938K System Logic Cells
- Up to 12,288 DSP Slices
- Up to 58Gb/s Transceivers

**TAKE THE NEXT STEP**