altera™
An Intel Company

Agilex™ 7 FPGAs and SoCs
Ideal for the Most Bandwidth- and Compute-Intensive Applications

The Intel Agilex 7 devices include the industry's highest performance FPGAs providing a range of premium features for the most demanding applications, including the F-Series, I-Series, and M-Series FPGAs. This tier offers the industry's highest data rate transceivers—up to 116 Gbps—the first PCIe 5.0 and Compute Express Link (CXL) support, and options to integrate in-package HBM2e memory delivering the industry's highest memory bandwidth (over 1 TBps). These capabilities enable customized connectivity and acceleration for the most compute, bandwidth, and memory-intensive use cases in communications, data center, defense, high-performance computing, video, high-end test/measurement/medical, and more.
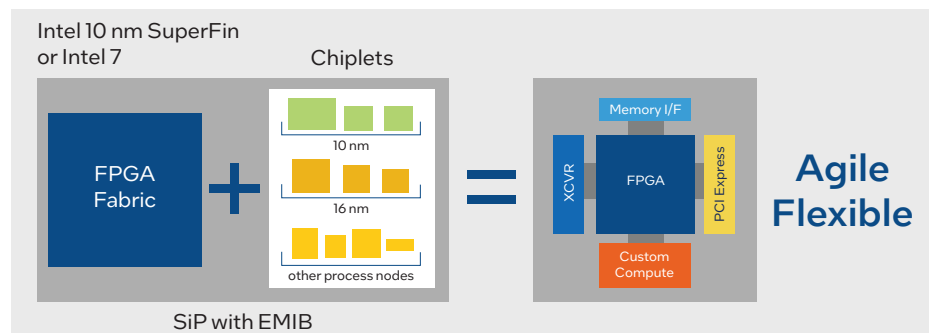
Up to

2X
better fabric performance/watt

vs competing 7 nm FPGAs

50%
Higher Performance [1,3†]

40%
Lower Power [1,3†]

38
TFLOPS [2,3†]

The Intel Agilex 7 FPGA F-Series, I-Series, and M-Series brings together the power of Intel's 10 nm SuperFin and Intel 7 technology, heterogeneous system-in-package (SiP) integration with Intel's proprietary Embedded Multi-Die Interconnect Bridge (EMIB), and an innovative chiplet-based architecture to deliver customized connectivity and acceleration for a variety of applications.

Intel 10 nm SuperFin or Intel 7 · Chiplets · FPGA Fabric · 10 nm · 16 nm · other process nodes · SiP with EMIB · Memory I/F · XCVR · FPGA · PCI Express · Custom Compute · Agile Flexible

The new architecture allows you to combine the FPGA fabric with purpose-built chiplets, such as transceivers, processor interfaces, optimized I/O, custom computing, Intel® eASIC™ devices, and many other functions to create solutions that are uniquely optimized for each application.

From the edge through the network to the cloud, an explosion of data is driving the need for flexibility and agility in the products that process, move, and store data. Advances in analytics are compelling hardware systems to cope with evolving standards, support varying workloads, and integrate multiple functions.

Process Data
Move Data
Store Data

Markets Demanding Customization

Edge
Real-Time Actionable Intelligence

Network
High-Bandwidth Aggregation and Processing

Data Center
Managing, Organizing, and Processing the Explosion of Data

Intel Agilex® 7 FPGA Series

F-Series
For wide range of applications that require optimal balance of power and performance

573k – 2.7M LEs
Up to 58 G transceivers
PCIe 4.0 x16
DDR4 interface
Quad-core Arm Cortex-A53 SoC option

I-Series
For high-performance processor interface and bandwidth-intensive applications

1.9M – 4M LEs
Up to 116 G transceivers
PCIe 5.0 x16
DDR4 interface
Quad-core Arm Cortex-A53 SoC option
Compute Express Link (CXL) to Intel® Xeon® Scalable processor

M-Series
For compute-intensive and high-memory-bandwidth applications

3.2M – 3.8M LEs
Up to 116 G transceivers
PCIe 5.0 x16
DDR4, DDR5 and LPDDR5 interfaces
Quad-core Arm Cortex-A53 SoC option
Compute Express Link (CXL) to Intel® Xeon® Scalable processor
HBM2e (up to 32 GB)

Intel Agilex FPGAs – Key Innovations

Key Innovations[4]	
Manufactured using advanced Intel technologies and processes	Utilizes advanced Intel process technologies (Intel 10 nm SuperFin and Intel 7), contributing to ~2X fabric performance per watt compared to competing 7 nm FPGAs and supply chain resiliency.
Compute Express Link (CXL)	First FPGA with a cache- and memory-coherent interconnect to Intel® Xeon® Scalable processors for high-speed, low-latency, and efficient performance between CPU and FPGA.
Highest transceiver data rates	Support up to 116 Gbps data rates for data intensive applications and hardened media access control, physical coding sublayer (PCS), and forward error correction (FEC) up to 400 Gbps Ethernet (GbE) for networking applications.
Hardened PCI Express (PCIe) 5.0 support	First FPGA providing PCIe 5.0 x16 support. Enables 2X higher bandwidth compared with PCIe 4.0 interface allows for higher data throughput.[†]
2nd Generation Intel Hyperflex™ FPGA Architecture	Enables significant design optimization to deliver up to 50% higher performance, or up to 40% lower total power compared to Intel® Stratix® 10 FPGAs.[†]
DSP enhanced for floating point and AI functions	First FPGA to support hardened half-precision floating point (FP16) and BFLOAT16, providing up to 38 tera floating point operations per second (TFLOPS)[2] of digital signal processing (DSP) performance (FP16) for higher performance/watt for artificial intelligence (AI) and other compute-intensive functions.
Industry-leading memory interface support	Industry's only FPGA to support industry-standard DDR5, high-bandwidth memory (HBM).
Advanced processor options	Integrated hard Arm processor options quad-core A53.
Intel® eASIC™ devices migration option	Structured ASIC solutions with reusable intellectual property (IP) cores provide a custom logic continuum to enable lower cost and power.

For More Information

- Intel Agilex FPGAs and SoC FPGAs portfolio page: intel.com/agilex

- Intel Agilex 7 FPGAs and SoC FPGAs product page: intel.com/agilex7

- Intel Agilex FPGA Architecture White Paper: intel.com/agilex-wp

- Compute Express Link: www.computeexpresslink.org

- Intel® Quartus® Prime Software page: intel.com/quartus

- Contact an Intel sales representative for inquiries

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1 Compared to Intel Stratix® 10 FPGAs

2 With FP16 configuration

3 Based on current estimates

4 The key innovations are different for each Intel Agilex 7 FPGA series

† Tests measure performance of components on a particular test, in specific systems. Differences in hardware, software, or configuration will affect actual performance.

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