Product Brief

FPGA and SoC

Intel® Agilex™ FPGA

Agility and Flexibility for the Data-Centric World

The Intel® Agilex™ FPGA family leverages the full breadth of Intel innovation and manufacturing capability. Built with advanced 10 nm SuperFin technology (F-Series and I-Series), Intel 7 technology (M-Series and D-Series), and a second-generation Intel® Hyperflex™ FPGA Architecture, Intel Agilex devices deliver ~2X better fabric performance per watt compared to competing 7 nm FPGAs. Intel Agilex devices also offer integrated Arm-based processors, transceivers up to 116G, PCI Express (PCIe) 5.0, and Compute Express Link (CXL). These features make them ideal for a wide range of applications in many markets including data center, networking, broadcast, defense, and industrial.

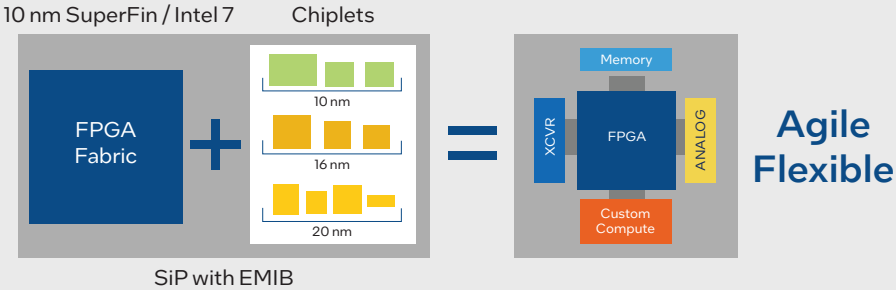
Up to

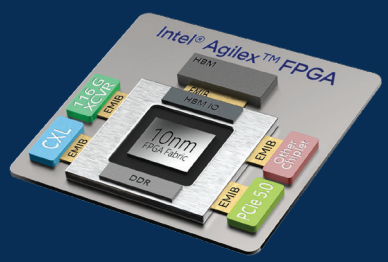
50%
Higher Performance [1,3†]

40%
Lower Power [1,3†]

38
TFLOPS [2,3†]

The Intel® Agilex™ FPGA F-Series, I-Series, and M-Series family 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.





Process Data

Move Data

Store Data

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.

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™ FPGA Series

D-Series	F-Series	I-Series	M-Series
For Midrange FPGA applications requiring lower power and smaller form factors	For wide range of applications	For high-performance processor interface and bandwidth-intensive applications	For compute intensive and high memory bandwidth applications
103k – 644k Logic Elements (LEs)	573k – 2.7M LEs	1.9M – 4M LEs	3.2M – 3.8M LEs
Up to 28G transceivers	Up to 58 G transceivers	Up to 116 G transceivers	Up to 116 G transceivers
PCIe 4.0	PCIe 4.0	PCIe 5.0	PCIe 5.0
DDR4, DDR5, LPDDR4, LPDDR5	DDR4	DDR4	DDR4, DDR5 and LPDDR5
Multi-core Arm with Dual-core Cortex-A55 and Dual-core Cortex-A76 SoC option	Quad-core Arm Cortex-A53 SoC option	Quad-core Arm Cortex-A53 SoC option	Quad-core Arm Cortex-A53 SoC option
		Compute Express Link (CXL) to Intel® Xeon® Scalable processor	Compute Express Link (CXL) to Intel® Xeon® Scalable processor
			HBM2e 16/32B

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 PCIe PCI Express (PCIe) 5.0 support	First FPGAs 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 FPGAs 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 FPGAs to support industry-standard DDR5, high-bandwidth memory (HBM).
Advanced processor options	Integrated hard Arm processor options including multi-core arm processors (dual-core A76 and dual-core A55), or 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 FPGA home page: www.intel.com/agilex
- Intel Agilex FPGA Architecture White Paper: www.intel.com/agilex-wp
- Intel FPGA Product Leadership: www.intel.com/fpgaleadership
- Compute Express Link: www.computeexpresslink.org
- Contact an Intel sales representative for inquiries

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 FPGA series

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

All information provided here is subject to change without notice. Contact your Intel representative to obtain the latest Intel product specifications and roadmaps. Features and benefits of Intel's technologies depend on system configuration, hardware, software and services. No computer system can be absolutely secure.

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For more complete information about performance and benchmark results, visit www.intel.com/benchmarks.

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