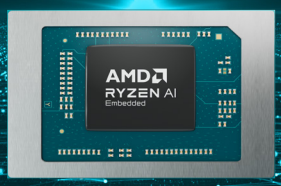
PRODUCT BRIEF

AMD RYZEN™ AI EMBEDDED P100 SERIES PROCESSOR

AMD RYZEN AI Embedded



PRODUCT OVERVIEW

The AMD Ryzen™ AI Embedded P100 Series processors represent the next evolution in AMD automotive grade (AECQ-100 qualified) and industrial (temperature) embedded processors. The products are designed to deliver exceptional compute, graphics, and AI acceleration for applications requiring high performance, deterministic behavior, and long operational life.

Built on the 4nm "Zen 5/5c" architecture with "RDNA 3.5" graphics and XDNA™ 2 AI engines, the P100 Series brings cutting-edge performance, energy efficiency, and robust reliability to embedded computing.

The platform supports up to 6 cores and 12 threads, 50 TOPS of dedicated AI inference capability, and up to two Work Group Processors (WGPs) for graphics acceleration. With scalable TDPs from 15W to 54W, and industrial-grade thermal tolerance, the P100 Series is engineered for reliable 24/7 operation over many years.

Built for Automotive and Industrial

The Ryzen AI Embedded P100 Series processor is built to advance in-vehicle experiences. It delivers the proven compute performance of AMD Ryzen processors along the AMD Radeon™ graphics capabilities that can power up to four 4K (or two 8K) displays simultaneously at up to 120 frames per second. With the ability to run small-language models locally and in real-time on the NPU, the AEC-Q100 qualified device can enable a variety of transformative in-car experiences, from immersive displays to natural-language voice-powered features.

Ryzen AI Embedded P100 Series processors are also built for efficient AI compute in rugged, always-on environments offering up to 59 total system TOPS of AI inference acceleration today, and additional parts coming later that will offer higher TOPS performance. The P100 processor series offers up to 3 times the TOPS performance of Ryzen™ Embedded 8000 processor series. It thrives in harsh environments, operating from –40°C to +105°C with BIOS-selectable reliability modes that extend operational life up to 10 years.

The new P100 Series also simplifies the design experience, helping to accelerate time to market and enable cost savings. The product's open ecosystem, featuring Yocto Linux, Xen virtualization, Android Automotive, and FreeRTOS, enables customers to partition workloads securely while ensuring deterministic real-time response. It is ideal for automotive in-vehicle systems, industrial controllers, and medical devices that require predictable performance and long-term reliability.

TARGET MARKETS AND APPLICATIONS

INDUSTRIAL

- Industrial PCs
- Smart cameras
- HMI applications

AEROSPACE & DEFENSE

- Electronic and signal intelligence
- Communications systems
- UAV
- Autonomous systems

HEALTHCARE & LIFE SCIENCES

- Portable ultrasound
- Patient monitoring

CONSUMER & BROADCAST

- Sports analytics
- Video walls, and more

AUTOMOTIVE

- Next-gen immersive and advanced digital cockpit

PRODUCT HIGHLIGHTS

- **Advanced Architecture:**
  - Built on 4nm "Zen 5/5c" CPU cores, offering exceptional performance-per-watt
  - Integrated "RDNA 3.5" GPU with support of up to 2 WGP
  - Support for up to 4× 4K120 displays
  - XDNA™ 2 NPU delivering up to 50 TOPS of AI inference acceleration
- **High-Speed Connectivity & I/O:**
  - Up to 14 PCIe® Gen 4 lanes, USB 4.0, and 10 Gb Ethernet
  - DDR5 (5600 MT/s) with ECC and LPDDR5x (8000 MT/s) memory with Link-ECC support
  - Optional expansion via AMD B650/X670 chipsets for up to 44 PCIe lanes
- **Hardened Reliability**
  - Industrial-grade reliability, 10-year supply, and extended temperature operation
  - Automotive-grade reliability with AEC-Q100 support
  - Enhanced testing and validation for mission-critical and automotive environments
- **AI and Virtualization Enablement**
  - AMD Ryzen™ AI for optimized AI workloads, and advanced HMI applications
  - Real-time OS support within a virtualized stack (Xen Hypervisor)
  - Deterministic real-time performance and time-sensitive networking (TSN) supported

VALUE PROPOSITION

The P100 Series delivers a compelling combination of performance, scalability, and endurance, enabling OEMs and system integrators to bring next-generation AI-powered embedded systems to market efficiently.

- **High-Performance SoC:** Integrated CPU, GPU, and NPU resources delivering balanced compute and AI acceleration .
- **Hardened Operation:** Designed for industrial and automotive use with extended thermal and reliability specifications
- **Extended Lifecycle:** Long-term availability (up to 10 years) and support for LTS software maintenance
- **Advanced Enablement:** Reference designs, virtualized software stacks, and support for multiple operating systems reduce time-to-market
- **AI-Ready Platform:** Integrated NPU acceleration with Ryzen AI software ecosystem for modern AI/ML workloads

AMD RYZEN™ AI EMBEDDED P100 SERIES PROCESSOR PRODUCT TABLE

				INDUSTRIAL TEMP		AUTOMOTIVE GRADE	
	Model #	**P121**	**P132**	**P121i**	**P132i**	**P122a**	**P132a**
CPU	"Zen 5" CPU Cores	4	6	4	6	4	6
	Max Frequency	4.4 GHz	4.5 GHz	4.4 GHz	4.5 GHz	3.65 GHz	3.65 GHz
	L3 Shared Cache	8 MB	8 MB	8 MB	8 MB	8 MB	8 MB
GPU	Work Group Processors	1	2	1	2	2	2
	4K120 / 8Kp120 Displays	4 / 2	4 / 2	4 / 2	4 / 2	4 / 2	4 / 2
	GPU Max Frequency	2.7 GHz	2.8 GHz	2.7 GHz	2.8 GHz	2.0 GHz	2.4 GHz
NPU	TOPS	30	50	30	50	30	50
I/O	10Gb/E Ethernet Cores w/TSN	2	2	2	2	2	2
	DDR5 (ECC)	5600 MT/s				N/A	
	LPDDR5X (Link ECC)	7500 MT/s	8000 MT/s	7500 MT/s	8000 MT/s	7500 MT/s w/RAS	7500 MT/s w/RAS
	USB 4.0	2x USB4				N/A	
	Other USB	1x USB 3.2 | 1x USB3.1 | 3x USB2 | 1x USB2 (Secure BIOS)					
Power & Thermal	Nominal TDP	28 W	28 W	28 W	28 W	28 W	45 W
	Nominal TDP	15-54 W	15-54 W	15-54 W	15-54 W	15-30 W	25-45 W
	Junction Temperature	0 to 105°C	0 to 105°C	-40 to 105°C	-40 to 105°C	-40 to 105°C	-40 to 105°C
Package & Reliability	Package	25 mm x 40 mm					
	Reliability (Standard | Extended)[1]	2.5 Years (Standard) | Up to 10 Years (Extended)				AEC-Q100	

SUMMARY

The AMD Ryzen™ AI Embedded P100 Series establishes a new benchmark in embedded computing, combining AI inference, graphics rendering, and deterministic control in a compact, efficient SoC. The series empowers developers to build smart, fast, and highly reliable embedded systems with long-term stability and scalability. Whether deployed in industrial automation, automotive systems, or other applications, the P100 Series delivers the computing foundation needed for the next generation of intelligent, connected devices.