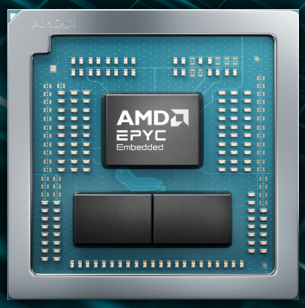
PRODUCT BRIEF

AMD EPYC™ EMBEDDED 2005 SERIES PROCESSOR

AMD EPYC Embedded



The rapid rise of AI is placing unprecedented demand on networking, storage, and industrial edge infrastructure. Organizations are struggling to keep pace with workloads that require more compute power, faster memory, and higher I/O performance, while also balancing limited space, strict power budgets, and long lifecycle requirements. At the same time, the industry shift from DDR4 to DDR5 is accelerating change, creating new opportunities for system redesign. The AMD EPYC™ Embedded 2005 processor is built to address these challenges.

PRODUCT OVERVIEW

The EPYC Embedded 2005 Series is a next-generation mid-tier x86 embedded BGA processor from AMD designed for high-performance networking, storage, and industrial applications that demand enterprise-class reliability within tight thermal and mechanical envelopes.

Built on advanced 4nm (CCD) + 6nm (IOD) process technology, it integrates up to 16 "Zen 5" CPU cores, dual-channel DDR5-5600 memory, and 28 lanes of PCIe® Gen5 in a compact 40mm×40mm BGA package, delivering exceptional performance-per-watt across embedded deployments.

It also features 64 MB of shared L3 cache for high compute density and energy efficiency and is up to 2.4x smaller[1] than comparable, competing Enterprise BGA solutions. The device achieves up to 35% higher Base CPU frequencies at half the power of the competition[2], enabling designers to reduce system costs while maximizing performance and efficiency.

Engineered for power-, thermal-, and space-constrained deployments, the EPYC™ Embedded 2005 processor delivers reliable, low-latency performance for networking, storage, and industrial edge systems that must operate continuously for up to 10 years. With dozens of advanced RAS features and robust hardware-based security, it ensures maximum up-time and data protection in demanding, always-on environments.

AMD EPYC™ Embedded 2005 processors deliver leading I/O throughput for flexible, high-bandwidth expansion and scalable system design. Paired with DDR5 memory support, it provides a future-ready platform offering faster data transfer, broader connectivity options, and extended product longevity.

PRODUCT HIGHLIGHTS

- Superior performance-per-watt to optimize system BOM cost
- Enables system cost efficiency through adjustable 45–75W TDP and compact BGA packaging
- Offers up to 10 years of field operation with enterprise-grade reliability (RAS) for 24/7 'always on' systems

TARGET MARKETS AND APPLICATIONS

NETWORKING

- Control planes
- Routers
- Switches
- Security appliances

STORAGE

- Cold cloud storage
- EBOD (Extended Bunch of Disks)

INDUSTRIAL

- Robotics
- Machine control
- Real-time industrial operations

AEROSPACE & DEFENSE

- Ruggedized embedded systems

AMD EPYC Embedded

KEY FEATURES

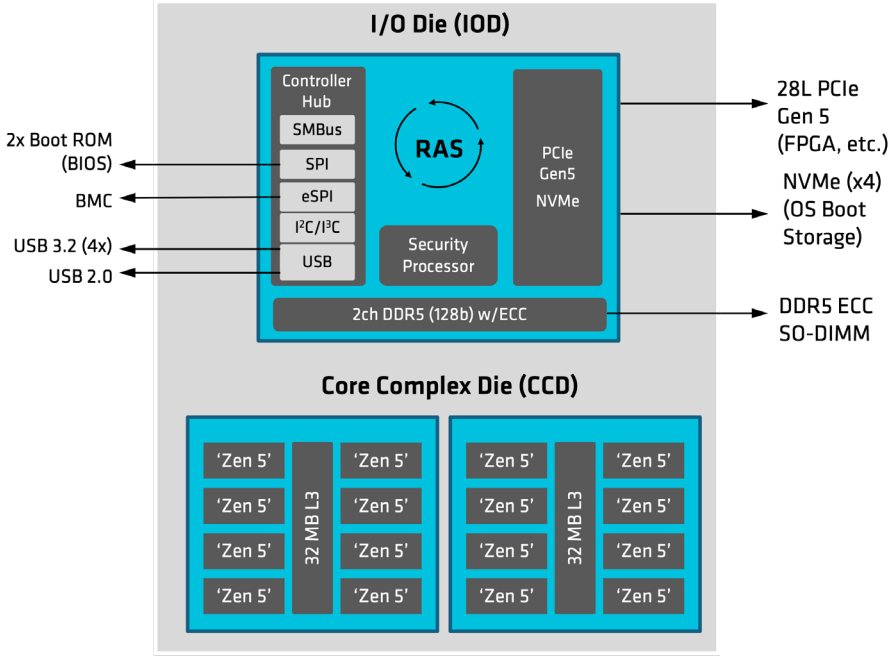
CATEGORY	HIGHLIGHTS
CPU	• Up to 16x Zen 5 cores / 32 threads, 1MB L2 per core, up to 64MB L3 cache shared
MEMORY	• 128b DDR5-5600 with sideband ECC
I/O	• 28 PCIe Gen5 lanes, 11 root ports, NVMe, enhanced hot-plug
CONNECTIVITY	• 4× USB 3.2 Gen2 + 1× USB 2.0, 1x SPI/eSPI, 1x SPI, 4× I2C/I3C
POWER ENVELOPE	• Configurable 45–75W cTDP
PACKAGE	• Lidless 40×40mm BGA, 0.81mm pitch, 1,763 balls
RELIABILITY	• Enterprise-class RAS features and up to 10-year field operation
SOFTWARE	• EDKII, Yocto, Upstreamed Linux® Kernel drivers

AMD EPYC™ EMBEDDED 2005 SERIES PROCESSOR PRODUCT TABLE

	Model #	2435	2655	2875
	OPN	100-000001912	100-000001911	100-000001910
	Die Configuration	1 CCD + 1 IOD	1 CCD + 1 IOD	2 CCD + 1 IOD
Compute	"Zen 5" Cores	8	12	16
Compute	# of Threads	16 Threads	24 Threads	32 Threads
Compute	L3 Shared Cache	32 MB	64 MB	64 MB
Compute	Base[1] / Boost Frequency	2.8 / 4.5 GHz	2.7 / 4.5 GHz	3.0 / 4.5 GHz
I/O	PCIe® Gen5	28 Lanes | 11 Root Ports | SR-IOV | Enhanced Hot Plug		
I/O	Storage Interface	4x NVMe		
I/O	DDR Interface	2-Channel DDR5-5600 (1 DIMM/Channel) or DDR5-3600 (2 DIMMs/ch) w/sideband ECC		
I/O	USB	4x USB 3.2 Gen 2 (10 Gb/s) + 1x USB 2.0 (480 Mb/s)		
I/O	SPI	1x eSPI/SPI Controller + 1x SPI Controller		
I/O	I2C / I3C	4x ports (SMBus: 2x Ports Shared with I2C)		
Power & Thermal	cTDP	45-55W	45-75W	45-75W
Power & Thermal	Nominal TDP	45W	55W	75W
Power & Thermal	Junction Temperature	0 to 105°C	0 to 105°C	0 to 105°C
Package & Longevity	Package	FL1 Lidless BGA: 40 x 40 x 2.133 mm; 0.81 mm pitch, 1,763 ball count		
Package & Longevity	Planned Availability	Up to 10 Years		

1. CPU base frequency attainment at nominal TDP is characterized within a 0 to 95°C Tj range

4nm Chiplet Architecture



VALUE PROPOSITION

- **Superior perf/W and balanced I/O density** to optimize system BOM cost
- **Enterprise reliability** for mission-critical embedded deployments.
- **Cost-optimized design** with flexible thermal options
- **Future-ready platform** with 10-year manufacturing longevity and DDR5 support – an ideal upgrade from DDR4
- **Diversified supply chain** opportunity for OEMs seeking alternatives from competitors

SUMMARY

AMD EPYC Embedded 2005 Series processor redefines performance, power efficiency, and reliability for embedded x86 systems. With its small footprint, enterprise-class RAS, and scalable architecture, it empowers OEMs to deliver next-gen networking, storage and industrial solutions that are powerful, efficient, and future-ready – all while reducing cost.

FOOTNOTES

1. EE2-003: AMD EPYC™ Embedded 2005 Series processor is 2.4x smaller than Intel Xeon™ 6500P-B Series.

   Based on AMD internal analysis as of November 2025. AMD EPYC™ Embedded 2005 Series has a 40mm x 40mm (1,600mm2) BGA package size. Intel Xeon™ 6500P-B Series has a 77.5mm x 50mm (3,875mm2) BGA package size. (3,875mm2 – 1,600mm2) / 1,600 mm2 =142% smaller package area or 2.42x smaller Intel Xeon 6500P-B Processor specifications: https://www.intel.com/content/www/us/en/products/details/processors/xeon/edge.html

2. EE2-004: AMD EPYC™ Embedded 2655 model processor delivers up to 35% higher Base CPU frequency at half of the TDP (Thermal Dissipation Power) of Intel Intel Xeon™ 6503P-B.

   Based on AMD internal analysis as of November 2025. AMD EPYC™ Embedded 2655 is a 12-core "Zen 5" processor model with a 2.7 GHz Base CPU frequency and 55W nominal TDP. Intel Xeon™ 6503P-B is a 12-core processor model with a 2.0 GHz Base CPU frequency and 110W nominal TDP. (2.7 GHz – 2.0 GHz) / 2.0 GHz = 35% higher Base CPU frequency or 1.35x better. (110W – 55W) / 100W = 0.5x or half the TDP. Intel Xeon™ 6503P-B specifications: https://www.intel.com/content/www/us/en/products/sku/242897/intel-xeon-6503pb-processor-48m-cache-2-00-ghz/specifications.html

DISCLAIMERS

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