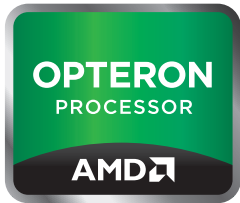


AMD Opteron™ 6000 Series Platform Quick Reference Guide

The world's first 16-core x86 processor, delivering a rich mix of performance, scalability and efficiency for today's highly threaded computing environments.

AMD Opteron™ 6200 Series Processor



KEY FEATURES

- **New Core Architecture** — drives more core density and greater throughput
- **AMD Turbo CORE Technology** — allows processors to independently boost their clock speeds, scaling frequency up 500MHz-1GHz automatically to respond to the need for more application performance¹
- **Flex FP** — delivers 256-bit floating point processing with more throughput² for both 128-bit and 256-bit technical applications
- **AMD Virtualization™ (AMD-V™) Technology 2.0** — heightens virtualization efficiency with new enhancements to the AMD-V™ suite of virtualization to optimize data center rack space and help minimize management tasks

END USER BENEFITS

Unleash unprecedented performance of highly threaded applications through massive, industry-leading core density

- A new 16-core architecture for the next generation of scalable business critical applications, featuring an innovative design that drives more core density and greater throughput with up to 160% more cores than the competition³
- The modular design features up to 33% more cores⁴ and 35% greater performance⁵ in a smaller silicon footprint⁶ than AMD's current products, bringing high performance throughput for scalable computing environments like virtualization, HPC, web/cloud clusters and database applications
- Performance features designed for leadership across threaded workloads and price/performance leadership across even more workloads
- Straight-through computing helps ensure that there are no bottlenecks or compromises — when the workload grows up to 16 tasks each has their own dedicated core, with maximum memory and I/O speed available on every processor SKU regardless of the price

Today's highly threaded applications demand more scalability and the AMD Opteron™ 6000 Series platform delivers the most cores in the industry⁷

- As user loads increase for web/cloud, database applications or virtualized environments, AMD Opteron™ 6200 Series processors can continue to seamlessly handle growing workloads and allow balanced scaling up to 16 cores per processor.

- Straight-through computing ensures the memory and I/O architecture supports the power of more cores.
- Break HPC barriers with the ability to scale to higher core counts with fewer nodes⁸ boosting overall performance while decreasing physical system count and decreasing system-to-system latency⁹.

Bring unparalleled efficiency to your processing, power and financial budgets

- Optimize data center floor space and power requirements with up to 16 cores, dramatically boosting processing efficiency⁹ allowing enterprises to do more work with fewer systems.¹⁰
- Straight-through computing capability gives compute-intensive applications like database, HPC and Java dedicated processing resources.
- New instructions help streamline software development by minimizing code differences between platforms and help more efficiently process applications, especially media encoding and streaming, that utilizes complex SSE codes.

1 Based on internal AMD engineering projections of AMD Opteron™ 6200 Series processors with up to 500MHz in P1 boost state and up to 1.4GHz in P0 boost state over base P2 clock frequency when thermal headroom is available

2 Compared to 128-bit floating point unit in AMD Opteron™ 6100 Series processors

3 Comparison of 16-core AMD Opteron™ 6200 Series processor with 6-core Intel Xeon 5600 Series and 10-core Intel Xeon E7 Series processor. SVR30

4 Based on 16-core AMD Opteron™ 6200 Series processor compared to 12-core AMD Opteron™ 6100 Series processors

5 Based on AMD internal engineering performance for top bin 16-core AMD Opteron™ 6200 Series standard power processor compared to top bin 12-core AMD Opteron™ 6100 Series standard power processor

6 Based on 2x 316mm² silicon die area of AMD Opteron™ 6200 Series processor versus 2x 346mm² die size for AMD Opteron™ 6100 Series processor

7 Based on 16-core AMD Opteron™ 6200 Series processor compared to 6-core Intel Xeon 5600 Series and 10-core Intel Xeon E7 processors

8 Intel Xeon 5600 Series = 504 cores per rack ((2x6-core) * 42U), AMD Opteron™ 6200 Series = 1344 cores per rack ((2x16-core) * 42U). AMD could achieve 504 cores in only 16 nodes, taking up 61% less rack space. In a 2P Intel-based server, each core has 11 other cores to poll for low-latency data before having to reach out to the cluster fabric; AMD has 31 other cores to poll for 180% greater likelihood of finding low latency data at the node level

9 AMD estimates that 16-core AMD Opteron™ 6200 Series processors will deliver up to 30% greater throughput in the same power/thermal envelopes as AMD Opteron™ 6100 Series processors

10 Twelve 2P servers with AMD Opteron™ 6176 SE @ 2.3GHz = 2880 GFLOPs total performance. Nine 2P AMD Opteron™ 6200 Series processor-based servers @ 2.5GHz = 2880 GFLOPs; same amount of total processing power in 33% fewer servers



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AMD Opteron™ 6200 Series Processor Product Specifications

Model Number	Core Count	Core Frequency	All Core Boost Frequency	AMD Turbo CORE Max Frequency	Max Memory Bandwidth	CMOS Tech	L2 Cache	L3 Cache	TDP
6282 SE	16	2.6 GHz	3.0 GHz	3.3 GHz	102.4 GB/s	32 nm SOI	8 x 2 MB	16 MB	140W
6276	16	2.3 GHz	2.6 GHz	3.2 GHz	102.4 GB/s	32 nm SOI	8 x 2 MB	16 MB	115W
6274	16	2.2 GHz	2.5 GHz	3.1 GHz	102.4 GB/s	32 nm SOI	8 x 2 MB	16 MB	115W
6272	16	2.1 GHz	2.4 GHz	3.0 GHz	102.4 GB/s	32 nm SOI	8 x 2 MB	16 MB	115W
6262 HE	16	1.6 GHz	2.1 GHz	2.9 GHz	102.4 GB/s	32 nm SOI	8 x 2 MB	16 MB	85W
6238	12	2.6 GHz	2.9 GHz	3.2 GHz	102.4 GB/s	32 nm SOI	6 x 2 MB	16 MB	115W
6234	12	2.4 GHz	2.7 GHz	3.0 GHz	102.4 GB/s	32 nm SOI	6 x 2 MB	16 MB	115W
6220	8	3.0 GHz	3.3 GHz	3.6 GHz	102.4 GB/s	32 nm SOI	4 x 2 MB	16MB	115W
6212	8	2.6 GHz	2.9 GHz	3.2 GHz	102.4 GB/s	32 nm SOI	4 x 2 MB	16 MB	115W
6204	4	3.3 GHz	N/A	N/A	102.4 GB/s	32 nm SOI	2 x 2 MB	16 MB	115W

AMD Opteron™ 6200 Series Processor Product Specifications

Cache Sizes	Total Cache: 32MB (16 core), 28MB (12 core), 24MB (8 core), 20 MB (4 core) L1 Cache: 16KB/core + 64KB instruction/module L2 Cache: 1MB (per core) L3 Cache: 16MB (per socket)
Process Technology	32-nanometer SOI (silicon-on-insulator) technology
HyperTransport™ Technology Links	Four x16 links at up to 6.4GT/s per link
Memory	Integrated DDR3 memory controller — Up to 102.4 GB/s memory bandwidth per CPU for Socket G34
Number of Channels/Types of Memory	Quad Channel support for U/RDDR3 up to DDR3-1600 and ULV (1.25V) RDDR3 up to DDR3-1333 and LRDIMM up to DDR3-1333
Die Size	316mm ²
Packaging	Socket G34 — 1944-pin organic Land Grid Array (LGA)

AMD SR5650, SR5670, SR5690 I/O Hub Product Specifications

Model Number	Processor Interface	PCI Express®	Number of PCIe® Ports/Engines	Virtualization	Error Detection/Isolation	Max TDP/ Idle (w/cle)	Process Technology	Package
SR5650	HyperTransport™ 3.0 technology (5.2GT/s)	v2.0	22 lanes/ 8 engines	AMD-Vi (IOMMU 1.26)	HyperTransport error handling, PCIe® Advanced Error Reporting, PCIe® end-to-end Cycle Redundancy Check	12.6W/ 5.4W	TSMC 65nm	29 x 29mm FCBGA
SR5670	HyperTransport™ 3.0 technology (5.2GT/s)	v2.0	30 lanes/ 9 engines	AMD-Vi (IOMMU 1.26)	HyperTransport error handling, PCIe® Advanced Error Reporting, PCIe® end-to-end Cycle Redundancy Check	15.4W/ 5.75W	TSMC 65nm	29 x 29mm FCBGA
SR5690	HyperTransport™ 3.0 technology (5.2GT/s)	v2.0	42 lanes/ 11 engines	AMD-Vi (IOMMU 1.26)	HyperTransport error handling, PCIe® Advanced Error Reporting, PCIe® end-to-end Cycle Redundancy Check	18W/6.15W	TSMC 65nm	29 x 29mm FCBGA

AMD SP5100 Southbridge Product Specifications

USB Ports	12 USB 2.0 + 2 USB 1.1
PCI Bus Support	PCI rev 2.3
Serial ATA	AHCI 1.1 SATA 3.0Gb/s with SW RAID Support
SATA Ports	6 (can be independently disabled)
Max TDP/Idle	4W/1W
Process Technology	TSMC .13um
Package	528 ball FCBGA, 21x21mm, 0.8mm pitch

* Using HyperTransport™ technology

** ACP stands for Average CPU power. See www.amd.com/ACP

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