



# Quad-Core AMD Opteron™ Processors

## Fast Facts

### NAME

Third-Generation AMD Opteron™ processor or Quad-Core AMD Opteron™ processor

### SOUNDBITE

Simplifies your business, giving you flexibility for today and scalability for the future.

### QUICK FEATURES

- Native Quad-Core
- AMD64 technology
- Direct Connect Architecture
  - Integrated memory controller
  - HyperTransport™ technology
- AMD Virtualization™ (AMD-V™) with Rapid Virtualization Indexing
- Enhanced AMD PowerNow!™ technology
  - Independent Dynamic Core Technology
  - Dual Dynamic Power Management™
- AMD CoolCore™ Technology
- AMD Memory Optimizer Technology
- AMD Balanced Smart Cache
- AMD Wide Floating-Point Accelerator
- Low power HE models
- DDR2 memory
- Optimized Platform Management Architecture (OPMA)
- Enhanced Virus Protection

### EXAMPLE MODEL NUMBER

8350<sup>1</sup>

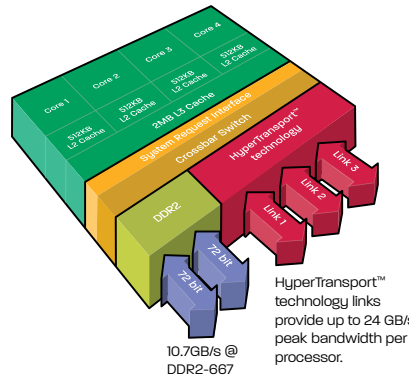
<sup>1</sup>This model number indicates relative performance among Third-Generation AMD Opteron™ processors. Model number 8350 is used in this document for illustration purposes only. Other model numbers can be used interchangeably. For a list of current AMD model numbers log on to [www.amd.com/opteronmodels](http://www.amd.com/opteronmodels) or contact your AMD sales representative.

## Minimizing Integration Complexity in an Ever-Changing IT Environment

**OPTIMAL VIRTUALIZATION** AMD Virtualization™ (AMD-V™) technology with Rapid Virtualization Indexing provides a balanced approach to improve virtualization efficiency, enabling more virtual machines to run per server for greater server consolidation and improved manageability.

**INDUSTRY LEADING POWER EFFICIENCY** Enhanced AMD PowerNow!™ technology in AMD Opteron™ processors provides you with performance-on-demand capabilities for optimum performance-per-watt and power savings.

**SUPERIOR INVESTMENT PROTECTION** Stable roadmap and product transitions provide a long product lifecycle to match true enterprise environments.



### BALANCED PERFORMANCE WITH DIRECT CONNECT ARCHITECTURE

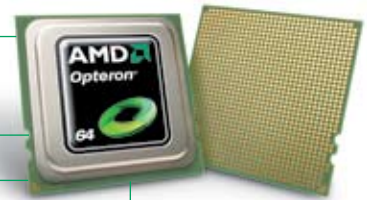
Direct Connect Architecture eliminates the bottlenecks inherent in traditional front-side bus architectures providing increased throughput for the best system scaling. It's designed for multi-threaded and multitasking environments and can be deployed on a single platform for simplified manageability and lower TCO with industry-leading processor performance.

## Product Features and Benefits

- **RAPID VIRTUALIZATION INDEXING** helps improve virtualization performance, enabling more virtual machines to run per server.
- **ENHANCED AMD POWERNOW!™ TECHNOLOGY** works with the operating system to provide performance-on-demand capabilities for precise power management, power savings and lower TCO.
- **INDEPENDENT DYNAMIC CORE TECHNOLOGY** can vary clock frequency per core based on workload for reduced power consumption and thermal output.
- **AMD COOLCORE™ TECHNOLOGY** automatically turns off blocks of logic when they are not in use for reduced power consumption.
- **DUAL DYNAMIC POWER MANAGEMENT™** allows for greater application performance while providing more opportunities to save system power with AMD PowerNow!™ technology.
- **AMD WIDE FLOATING POINT ACCELERATOR** for significantly improved performance on HPC, scientific and workstation applications.
- **AMD MEMORY OPTIMIZER TECHNOLOGY** to increase memory throughput and support quad-core technology.
- **AMD BALANCED SMART CACHE** offers better support for multi-threaded environments with a highly efficient cache structure that helps reduce latency to main memory.

## Quad-Core AMD Opteron™ Processor Specifications

|                                  |   |
|----------------------------------|---|
| Cache Size                       | L1 Cache: 64KB (Data) + 64KB (Instruction) per core<br>L2 Cache: 512KB per core<br>L3 Cache: 2MB  |
| Process Technology               | 65-nanometer SOI (silicon-on-insulator) technology  |
| HyperTransport™ Technology Links | Three 16-bit/16-bit links @ up to 1000MHz full duplex for Socket F (1207)<br>One 16-bit/16-bit links @ up to 2000MHz full duplex for Socket AM2                                   |
| Memory                           | Integrated DDR2 memory controller—up to 10.7GB/s memory bandwidth per CPU for Socket F (1207)<br>Integrated DDR2 memory controller—up to 12.8GB/s memory bandwidth for Socket AM2 |
| Types of Memory                  | Registered ECC DDR2-400, DDR2-533, DDR2-667 for Socket F (1207)<br>Unbuffered ECC DDR2-400, DDR2-533, DDR2-667, DDR2-800 for Socket AM2   |
| Chipsets                         | Solutions are available from Broadcom, NVIDIA and AMD   |
| Packaging                        | Socket F (1207)—1207-pin organic Land Grid Array (LGA)<br>Socket AM2—940-pin organic micro Pin Grid Array (PGA)   |



## Understanding AMD Opteron™ Processor Model Numbers

Third-Generation AMD Opteron™ processors are offered in three series: the 1000 Series (up to 1P/4 cores), the 2000 Series (up to 2P/8 cores), and the 8000 Series (up to 8P/32 cores). The 1000 Series is built on AMD's Socket AM2. The 2000 Series and 8000 Series are built on AMD's Socket F (1207).

## Quad-Core AMD Opteron™ Processor Model Comparison

| MODEL NUMBER | CORE FREQUENCY | I/O BUS FREQUENCY* | MAX I/O BANDWIDTH | SOCKET   | CMOS TECH | L2 CACHE    | L3 CACHE | ACP*** |
|--------------|----------------|--------------------|-------------------|----------|-----------|-------------|----------|--------|
| 8360 SE**    | 2.5 GHz        | 1000 MHz           | 24 GB/s           | F (1207) | 65 nm SOI | 512 KB/core | 2MB      | 105W   |
| 2360 SE**    | 2.5 GHz        | 1000 MHz           | 24 GB/s           | F (1207) | 65 nm SOI | 512 KB/core | 2MB      | 105W   |
| 8358 SE**    | 2.4 GHz        | 1000 MHz           | 24 GB/s           | F (1207) | 65 nm SOI | 512 KB/core | 2 MB     | 105W   |
| 2358 SE**    | 2.4 GHz        | 1000 MHz           | 24 GB/s           | F (1207) | 65 nm SOI | 512 KB/core | 2 MB     | 105W   |
| 8356         | 2.3 GHz        | 1000 MHz           | 24 GB/s           | F (1207) | 65 nm SOI | 512 KB/core | 2 MB     | 75W    |
| 2356         | 2.3 GHz        | 1000 MHz           | 24 GB/s           | F (1207) | 65 nm SOI | 512 KB/core | 2 MB     | 75W    |
| 1356**       | 2.3 GHz        | 2000 MHz           | 16 GB/s           | AM2      | 65 nm SOI | 512 KB/core | 2 MB     | 75W    |
| 8354         | 2.2 GHz        | 1000 MHz           | 24 GB/s           | F (1207) | 65 nm SOI | 512 KB/core | 2 MB     | 75W    |
| 2354         | 2.2 GHz        | 1000 MHz           | 24 GB/s           | F (1207) | 65 nm SOI | 512 KB/core | 2 MB     | 75W    |
| 1354**       | 2.2 GHz        | 1800 MHz           | 14.4 GB/s         | AM2      | 65 nm SOI | 512 KB/core | 2 MB     | 75W    |
| 2352         | 2.1 GHz        | 1000 MHz           | 24 GB/s           | F (1207) | 65 nm SOI | 512 KB/core | 2 MB     | 75W    |
| 1352**       | 2.1 GHz        | 1800 MHz           | 14.4 GB/s         | AM2      | 65 nm SOI | 512 KB/core | 2 MB     | 75W    |
| 8350         | 2.0 GHz        | 1000 MHz           | 24 GB/s           | F (1207) | 65 nm SOI | 512 KB/core | 2 MB     | 75W    |
| 2350         | 2.0 GHz        | 1000 MHz           | 24 GB/s           | F (1207) | 65 nm SOI | 512 KB/core | 2 MB     | 75W    |
| 8347 HE**    | 1.9 GHz        | 1000 MHz           | 24 GB/s           | F (1207) | 65 nm SOI | 512 KB/core | 2 MB     | 55W    |
| 2347 HE**    | 1.9 GHz        | 1000 MHz           | 24 GB/s           | F (1207) | 65 nm SOI | 512 KB/core | 2 MB     | 55W    |
| 8346 HE**    | 1.8 GHz        | 1000 MHz           | 24 GB/s           | F (1207) | 65 nm SOI | 512 KB/core | 2 MB     | 55W    |
| 2346 HE**    | 1.8 GHz        | 1000 MHz           | 24 GB/s           | F (1207) | 65 nm SOI | 512 KB/core | 2 MB     | 55W    |

\* Using HyperTransport™ Technology

\*\* Availability planned for later Q2 '08

\*\*\* ACP stands for Average CPU power. See [www.amd.com/ACP](http://www.amd.com/ACP)