

AMD Ryzen 5 3600X Review: Great multi-threaded support, overclockable

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AMD's third generation Ryzen CPUs bring the major improvements in clock speed you expect from the new processor architecture. It also brings significant additional benefits, like much larger cache and PCI Express 4.0 support.

One of the outstanding options of the new product line is the Ryzen 5 3600X (priced at \$ 250 / nearly VND 5.7 million). Like most AMD chips, the Ryzen 5 3600X lacks integrated graphics, but in return it is multithreaded and easily overclocked, two features that some Intel competitors lack. This is a great option for a gaming PC.

Technical data

There are currently two Ryzen 5 third-generation chips based on AMD's latest Zen 2 microarchitecture, Ryzen 5 3600X and Ryzen 5 3600. Both have 6 cores with multithreading support, which means each core The processor can process two command lines at a time, for a total of 12 threads. The Ryzen 5 3600X tested here is a 95-watt chip with a 3.8GHz base clock and a 4.4GHz boost clock. The Ryzen 5 3600, on the other hand, costs \$ 199 (VND 4.6 million), is a 65-watt chip with a base clock of 3.6GHz and boost clock of 4.2GHz.



AMD Ryzen 5 3600X

Compared to the specifications of the previous version, these improvements are not too large. The second generation Ryzen 5 2600X is also a 6-core, 12-thread, 95-watt chip. The main differences are in base clock and boost clock, respectively 3.6GHz and 4.2GHz. However, in addition to a small increase in clock speed, this

third-generation version also has a big improvement in cache: Ryzen 5 3600X has a Level 3 cache of 35MB, which is equal to Ryzen 5 3600. That's twice as Ryzen 5 2600X and Ryzen 5 2600 (16MB).

Both third-generation Ryzen 5 chips have 24 CPU Express 4.0 lanes based on CPU and 16 lanes of chipset. Currently, Ryzen 3rd Generation are the only CPUs that feature PCIe Gen 4, allowing for much faster data transfer for SSDs and also improving the performance of future graphics cards.

If you're planning to install PCIe Gen 4 SSD in your new Ryzen 5 3600X build, you'll also need a motherboard that supports PCIe Gen 4. Otherwise, you can choose from nearly any AM4 motherboard. , because Ryzen 5 3600X is backward compatible (although some boards may need a BIOS update before installing the chip).

Compare with Intel

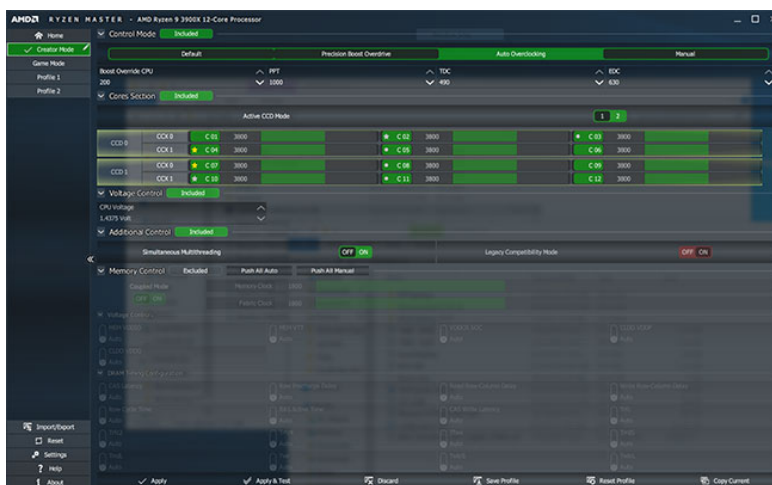
Intel's latest 10th-generation chips aren't yet available for the main desktop, so the main competitor to the Ryzen 5 3600X is the 9th Gen Core i5 CPUs. They include the Core i5-9600K, a 6-core chip for \$ 263 (6 million VND), close to Ryzen 5 3600X. The clock speed is the same, at base clock of 3.7GHz and boost clock of 4.6GHz, have the same power consumption rating of 95 watts and can also be overclocked.

However, the Core i5-9600K lacks support for both PCIe Gen 4 and Hyper-Threading. This can significantly affect performance when running applications such as modern multimedia content creation programs, designed to take advantage of many cores and threads, as what a processor has to offer. Core i5-9600K also has a much smaller 9MB L3 cache. Cache size is important for applications that need quick access to system memory.

If you're building a PC from scratch, then the Core i5-9600K lacks an integrated CPU cooling solution. AMD provides good quality Wraith Spire cooling fans with Ryzen 5 3600X. The fact that the Core i5-9600K doesn't include coolers or radiators, means you'll have to budget extra to buy third-party products.

Other additional features

To help you fine-tune the performance of the Ryzen 5 3600X, AMD provides the Ryzen Master software utility, compatible with all Ryzen CPUs. It accomplishes many tasks, including adjusting the clock speed and memory configuration without having to boot into the BIOS.



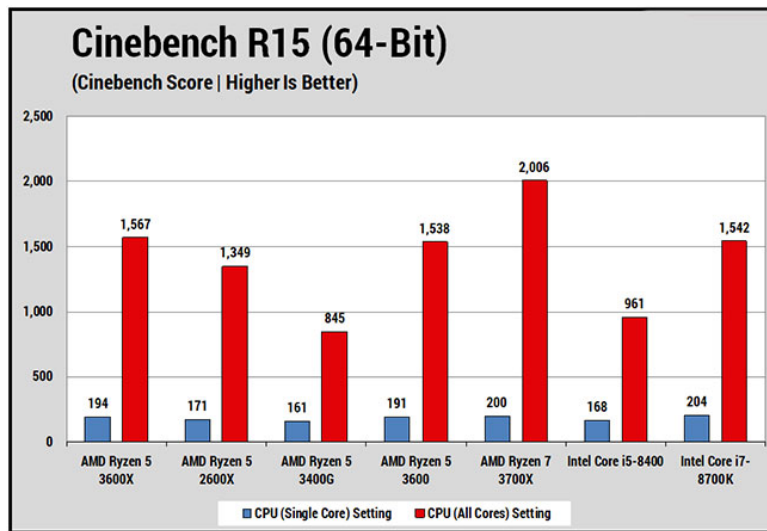
AMD provides the Ryzen Master software utility

AMD also now includes a free 3-month Xbox Game Pass for PC with Ryzen 5 3600X. Both Ryzen 5 3600X and Core i5-9600K are backed by a 3-year warranty.

Excellent performance

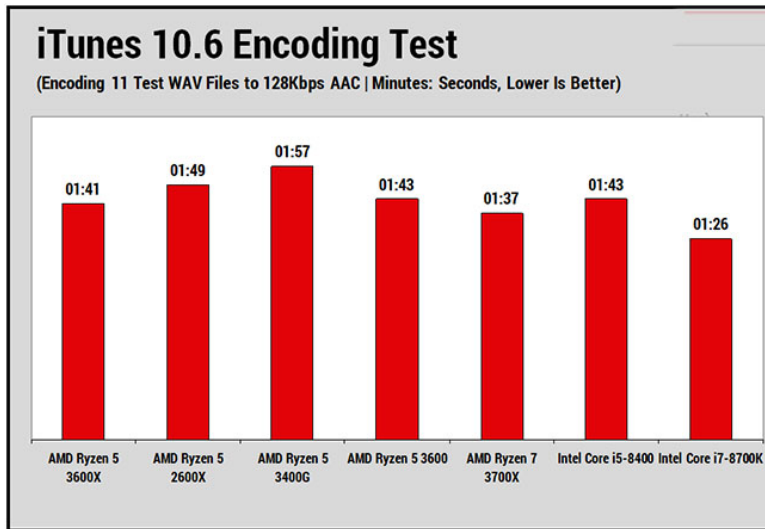
To evaluate the performance of the Ryzen 5 3600X, the article compared its results in benchmark tests with a few competitors.

Cinebench testing is one of the best performance prediction tools for resource-intensive tasks, like rendering 3D images. The Ryzen 5 3600X did a very admirable thing here, surpassing all competitors, except for the Ryzen 7 3700X on the Cinebench test using the entire core. When running on a single core, the Ryzen 5 3600X is slower than both the Ryzen 7 3700X and Core i7-8700K.



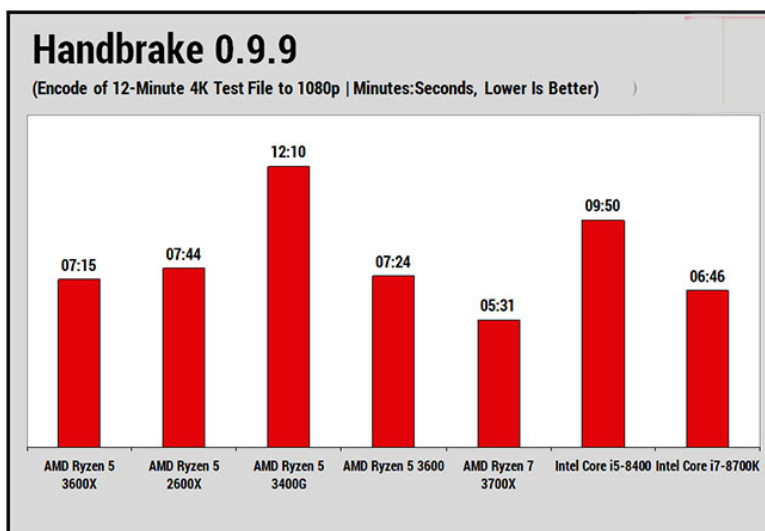
Cinebench testing

Single-core performance is important, if you rely on old software that isn't optimized for today's multi-core CPUs. Testing audio coding, using Apple iTunes software, provides a more thorough test of performance for single-core tasks. In this test, the Core i7-8700K shows a clear advantage.



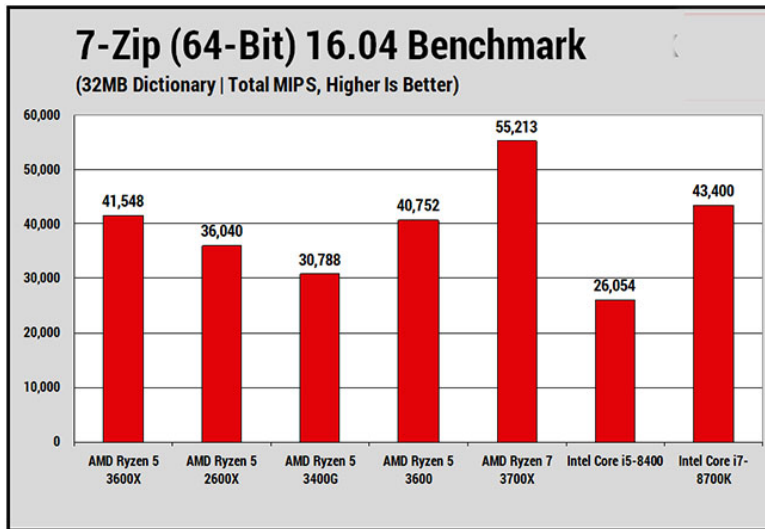
Test audio coding

In contrast, video coding testing provides a rough view of the expected performance while using Handbrake, a modern open source application designed to scale with more cores and CPU threads. The results are predictable but the difference is even more pronounced, with the Ryzen 5 3600X far surpassing the rival Ryzen 5 3400G.



Testing video coding with Handbrake

Almost every PC user will need to compress or decompress files at some point, a CPU-intensive task emulated with the 7-Zip benchmark test. Here, the results are similar to the Cinebench test that uses the entire core (Ryzen 5 3600X is faster than all except Ryzen 7 3700X and Core i7-8700K).

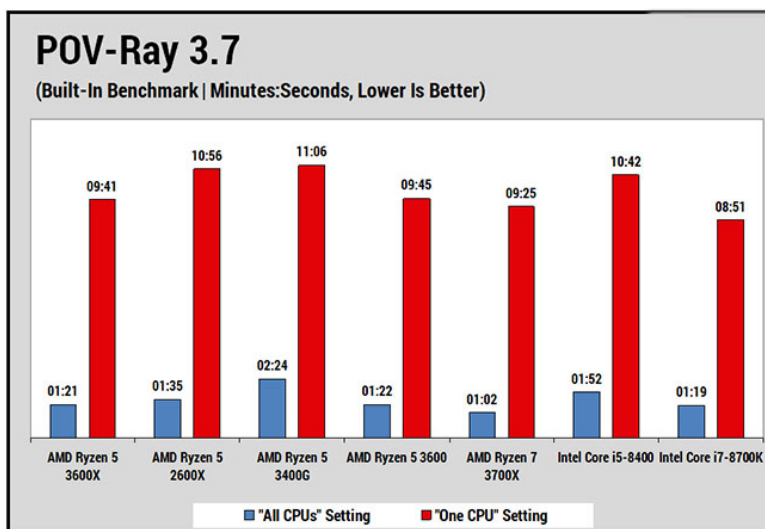


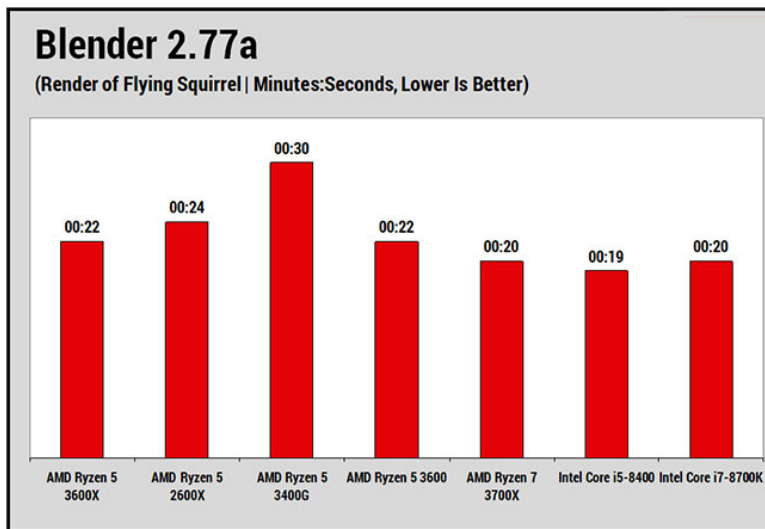
Benchmark 7-Zip

Gaming performance

Although the PC's GPU is the most important factor in determining its performance for AAA games, the CPU can also play an important role. In benchmark tests with popular titles like Far Cry 5 and Hitman: Absolution, Ryzen 5 3600X performed significantly worse when compared to more expensive CPUs, like Intel Core i9-9900K and Ryzen 9. 3900X.

On the other hand, some games are not limited by CPU performance, such as Counter Strike: Global Offensive. On this game, nearly all tested and mainstream high-end CPUs achieve frame rates around the 400fps mark at 1080p. And if you plan to play at 4K resolution, then the graphics card is a much more restrictive factor. On Far Cry 5, all processors can only be at around 70 frames per second, with 4K resolution.





Finally, Ryzen 5 3600X is no substitute for the high-end CPU you want to install in a gaming console or multimedia editing workstation. This is evident from the results of the POV-Ray and Blender tests.

The Ryzen 5 3600X and other chips function almost equally, especially in the Blender test. If you're building a powerful PC to perform these tasks, you'll want to invest in a much more powerful processor, such as Ryzen Threadripper or Intel Core i9.

Great specifications bring the superior capabilities

Multi-threaded support of Ryzen 5 3600X and an increase in the new cache size help it achieve great main performance. In most cases, the Ryzen 7 3700X is slightly superior. However, if you don't want to pay an extra \$ 80 for the Ryzen 7 3700X, then the Ryzen 5 3600X is a great option.

Gamers or content creators with resource-intensive workflows should probably stay away from Ryzen 5 3600X. If you really want to get the fastest frame rates, it's worth investing in the more powerful Ryzen 9 or Core i9. On the other hand, if you're a casual gamer who doesn't care about discrete GPUs, you'll want a CPU with a powerful integrated graphics processor like the Ryzen 5 3400G.

Conclude

Finally, no matter what reason you buy the new CPU, it's hard to deny backward compatibility with Ryzen 5 3600X motherboards and support for the advanced PCIe 4.0 standard. The rival Intel currently lacks support for PCIe 4.0 and combined with multithreading support, confirming the advantages of Ryzen 5 3600X.

Advantages

1. Support multithreading
2. Can overclock
3. Powerful management software

4. Backward compatible with older AM4 motherboards
5. Includes cooling fan

Defect

1. There is no integrated graphics
2. Not very good performance on some games

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