Samsung SSD 850 EVO M.2

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Summary

- SATA 6Gb/s SSD for Client PCs

- M.2 (2280)

- Samsung V-NAND

- Samsung Magician Software for SSD
  management

- Samsung Data Migration Software

V-NAND Technology and THE SAMSUNG SSD 850 EVO Series

Samsung's unique and innovative V-NAND flash memory architecture is a breakthrough in overcoming the density limitations, performance and endurance of today's conventional planar NAND architecture. V-NAND is fabricated by stacking cell layers vertically over one another rather than decreasing the cells dimensions and trying to fit itself onto a fixed horizontal space resulting in higher density and better performance utilizing a smaller footprint.

The 850 EVO Series is the advanced consumer SSD powered by V-NAND technology that maximizes everyday computing experiences with optimized performance and enhanced reliability.

Optimized performance for everyday computing experiences

Powered by Samsung's cutting-edge V-NAND technology, the 850 EVO M.2 delivers top-class sequential and random read and write performance to optimize everyday computing experiences.

The 850 EVO M.2 is seamlessly integrated with V-NAND, MGX controller, DRAM and software for high optimization. Like the 2.5" form factor model, the 850 EVO M.2 maximizes user experience with trace-based benchmark, which means that the 850 EVO M.2 gives form factor flexibility for SATA 6Gb/s interface by providing various yet standardized option. Therefore, you can enjoy Samsung's latest

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technology no matter which form factor your device supports.

Reinforcement of TurboWrite Technology

Samsung was the first one to introduce TurboWrite technology to sequential write performance in the early stages of the 840 EVO Series. With TurboWrite Technology, write speeds have been significantly accelerated during data transfer by creating a high-performance write buffer in an SSD. If a consecutive write operation (i.e. no idle time) exceeds the size of a buffer, the transfer will exit TurboWrite and be processed at "After TurboWrite" speeds. Once the buffer is cleared, the TurboWrite performance will resume. However, since the buffer size for TurboWrite is more than sufficient for everyday computer use, users can experience accelerated speeds for most workloads.

Guaranteed endurance and reliability for maximum use

Guaranteed endurance

The 850 EVO Series delivers guaranteed endurance and reliability by doubling the TeraBytes Written(TBW) compared to the previous generation 840 EVO Series backed by an industry leading 5 year warranty.

With twice the endurance of a typical NAND flash SSD, the 850 EVO Series will keep working as long as you do. All form factors of the 850 EVO Series are guaranteed with a 5 year limited warranty or 75TBW for 120GB and 250GB, 150TBW for 500GB and 1TB.

Enhanced reliability with improved sustained performance

Through enhanced reliability with improved sustained performance, the 850 EVO Series boasts long-term dependable performance of up to 40% longer than the 840 EVO Series with minimized performance degradation. You can use it every day when doing work or entertaining yourself knowing that it will keep performing even with heavy daily workloads over the years.

Advanced data encryption

Regardless of which form factor it is, the 850 EVO Series provides the same data encryption feature as the 840 EVO Series does. The Self-Encrypting Drive (SED) security technology will help keep your data safe at all times. The device is equipped with an AES 256-bit hardware-based encryption engine to ensure that your personal files remain secure. A hardware-based encryption engine secures your data without performance degradation that you may experience with a software-based encryption. Furthermore, the 850 EVO M.2 is compliant with advanced security management solutions (TCG Opal and IEEE 1667). Magician will guide you on "How to use security features". Moreover, you can erase or initialize the data with the crypto erase service with PSID.

Efficient power management for all PC applications

Power consumption affects everyone. With 850 EVO Series, you actually save of up to 50% more on power than with the 840 EVO Series during write operations thanks to V-NAND consuming half the power of 2D planar NAND.

Plus, whether you would like to preserve battery life for longer cordless use or just save costs, power management is important. Device sleep signals the SSD to enter a low power state which is vital for ultra-books and other battery powered devices. With 850 EVO M.2's Device Sleep feature at a highly efficient 2mW, you get longer battery life on your notebook thanks to a controller optimized for V-NAND. With the 850 EVO M.2, you can work and play longer without having to plug in.

Technical Specifications

Samsung SSD 850 EVO M.2	
Usage Application	Client PCs
Capacity	120GB, 250GB, 500GB, 1TB(1,000GB)
Dimensions (LxWxH)	Max 80.15 x Max 22.15 x Max.2.38 (mm)
Interface	SATA 6Gb/s (compatible with SATA 3Gb/s and SATA 1.5Gb/s)
Form Factor	M.2(2280)[†]
Controller	Samsung MGX controller
NAND Flash Memory	Samsung V-NAND
DRAM Cache Memory	512MB LPDDR3(120/250/500GB), 1GB LPDDR3(1TB)
Performance*	Sequential Read: Max. 540 MB/s
	Sequential Write**: Max. 520 MB/s
	4KB Random Read (QD1): Max. 10,000 IOPS
	4KB Random Write(QD1): Max. 40,000 IOPS
	4KB Random Read(QD32): Max. 97,000 IOPS
	4KB Random Write(QD32): Max. 89,000 IOPS
Data Security	AES 256-bit Full Disk Encryption (FDE)
	TCG/Opal V2.0, Encrypted Drive(IEEE1667)
Weight	Max. 8g(1TB)
Reliability	MTBF: 1.5 million hours
TBW	120GB/250GB: 75TBW
	500GB/1TB : 150 TBW
Power Consumption***	Active Read/Write (Average): Max. 2.2W(1TB) / Max.2.7W(1TB) Idle: Max. 50mW Device Sleep(Typ.): 2mW(120GB/250GB/500GB) and 3mW(1TB)
Supporting features	TRIM(Required OS support), Garbage Collection, S.M.A.R.T
Temperature	Operating: 0°C to 70°C Non-Operating: -40°C to 85°C
Humidity	5% to 95%, non-condensing
Vibration	Non-Operating: 20~2000Hz, 20G
Shock	Non-Operating: 1500G , duration 0.5m sec, 3 axis
Warranty	5 years limited

† **M.2 is a form factor specification for ultra-thin PCs. Commercially, M.2 is 22mm in width with lengths of 30, 42, 60 , 80 or 110mm. Samsung provides the most popular form factor with 22mm X 80mm model (i.e., 2280).**

※ Since M.2 is a form factor specification, SSD manufacturers can produce various types of M.2 SSD with different interface (SATA-based M.2, PCIe-based M.2 and NVMe-based M.2, for example). The Samsung SSD 850 EVO M.2 is SATA-based.

* Sequential performance measurements based on CrystalDiskMark v.3.0.1. Random performance measurements based on Iometer1.1.0 Performance may vary based on SSD's firmware version, system hardware & configuration.
 Test system configuration : Intel Core i7-4790K @ 4.0GHz, DDR3 1600MHz 8GB, OS – Windows7 Ultimate x64 SP1, IRST 13.0.3.1001, Chipset : Intel® Z97PRO
** Sequential Write performance measurements based on TurboWrite technology. , The sequential write performances after TurboWrite region are 150MB/s(120GB), 300MB/s(250GB) and 500MB/s(500GB/1TB).
*** Power consumption measured with IOmeter 1.1.0 with Intel i7-4770K, DDR3 8GB, Intel®DH87RL OS- Windows7 Ultimate x64 SP1

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Product Lineup

Density	Model Name	Box Contents	Model Code
120 GB*	MZ-N5E120	Samsung SSD 850 EVO M.2 120GB Warranty statement	MZ-N5E120BW
250 GB*	MZ-N5E250	Samsung SSD 850 EVO M.2 250GB Warranty statement	MZ-N5E250BW
500 GB*	MZ-N5E500	Samsung SSD 850 EVO M.2 500GB Warranty statement	MZ-N5E500BW
1TB (1,000 GB*)	MZ-N5E1T0	Samsung SSD 850 EVO M.2 1TB Warranty statement	MZ-N5E1T0BW

* GB: 1GB = 1,000,000,000 bytes. A certain portion of capacity may be used for system file and maintenance use, thus the actual capacity may differ that indicated on the product label.

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