Samsung SSD 850 EVO

Data Sheet, Rev.1.0 (December, 2014)

Summary

- SATA 6Gb/s SSD for Client PCs
- 2.5 inch form factor
- Samsung 32 layer 3D V-NAND
- Samsung Magician Software for SSD management
- Samsung Data Migration Software

3D V-NAND Technology and THE SAMSUNG SSD 850 EVO

Samsung's unique and innovative 3D V-NAND flash memory architecture is a breakthrough in overcoming the density limitations, performance and endurance of today's conventional planar NAND architecture. 3D V-NAND is fabricated by stacking 32 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 is the advanced consumer SSD powered by 3D 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 3D V-NAND technology, 850 EVO delivers top-class sequential and random read and write performance to optimize everyday computing. With improved performance thanks to TurboWrite technology the 850 EVO provides not only more than a 10% better user experience than 840 EVO but up to 1.9x faster random write speeds for the 120/250 GB models as well. In fact, the 850 EVO delivers top class sequential read (540 MB/s) and write (520 MB/s) performance in all capacities. This comes with optimized random read and write performance on all QD and improved QD1 and QD2 random performance for Client PC usage.

Reinforcement of TurboWrite

Technology

In the early stages of the 840 EVO, Samsung adopted sequential write performance first. With TurboWrite, write speeds are significantly accelerated during data transfers by creating a high-performance write buffer in the SSD. If a consecutive write operation (i.e. no idle time) exceeds the size of the buffer, the transfer will exit TurboWrite and be processed at "After TurboWrite" speeds. Once the buffer is cleared, TurboWrite performance will resume. However, the buffer size for TurboWrite is more than sufficient for everyday PC use, and you should experience accelerated speeds for most workloads.

For the 850 EVO, enhanced TurboWrite technology applied to random write speeds up to 1.9x faster for the 120 GB model and 1.25x faster for the 250GB model over the 840 EVO.

Guaranteed endurance and reliability for maximum use

Guaranteed endurance

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

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

Enhanced reliability with improved sustained performance

With enhanced reliability through improved sustained performance, the 850 EVO assures long-term dependable performance up to 30% longer than the 840 EVO with minimized performance degradation. This means you can use it every day when taking care of work or entertaining yourself knowing it will keep performing even with heavy daily workloads over the years.

Advanced data encryption

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

Efficient power management for all PC applications

Power consumption affects everyone. You actually save of up to 50% more on power than with the 840 EVO during write operations thanks to 3D V-NAND consuming half the power of 2D planar NAND.

Plus, whether it's preserving battery life for longer cordless use or just saving on 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's Device Sleep at a highly efficient 2mW you get longer battery life on your notebook thanks to a controller optimized for 3D V-NAND. With the 850 EVO you can work and play longer without having to plug in.

Specification	850 EVO	
	120/250/500GB	1TB
DEVSLP power	2mW	4mW

Technical Specifications

Samsung SSD 850 EVO		
Usage Application	Client PCs	
Capacity	120GB, 250GB, 500GB, 1TB(1,000GB)	
Dimensions (LxWxH)	100 x 69.85 x 6.8 (mm)	
Interface	SATA 6Gb/s (compatible with SATA 3Gb/s and SATA 1.5Gb/s)	
Form Factor	2.5 inch	
Controller	120/250/500GB : Samsung MGX controller 1TB: Samsung MEX controller	
NAND Flash Memory	Samsung 32 layer 3D V-NAND	
DRAM Cache Memory	256MB (120GB) or 512MB(250GB&500GB) or 1GB (1TB) LPDDR2	
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. 98,000 IOPS(500GB/1TB) Max. 97,000 IOPS(250GB) Max. 94,000 IOPS(120GB)
	4KB Random Write(QD32):	Max. 90,000 IOPS(500GB/1TB) Max. 88,000 IOPS(120GB/250GB)
Data Security	AES 256-bit Full Disk Encryption (FDE) TCG/Opal V2.0, Encrypted Drive(IEEE1667)	
Weight	Max. 66g (1TB)	
Reliability	MTBF: 1.5 million hours	
TBW	120/250GB: 75TBW 500GB/1TB: 150 TBW	
Power Consumption* **	Active Read/Write (Average): Max. 3.7W(1TB) / Max. 4.4W(1TB) Idle: Max. 50mW Device Sleep: 2mW(120/250/500GB), 4mW(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	

* Sequential performance measurements based on CrystalDiskMark v.3.0.1. Random performance measurements based on Iometer 2010. 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® Z97

** Sequential Write performance measurements based on TurboWrite technology, The sequential write performances after TurboWrite region are 150MB/s(120GB), 300MB/s(250GB), 500MB/s(500GB) and 520MB/s(1TB).

*** Power consumption measured with IOmeter 1.1.0 with Intel i7-4770K, DDR3 8GB, Intel®DH87RL OS- Windows7 Ultimate x64 SP1

Product Lineup

Density	Model Name	Box Contents	Model Code
120 GB	MZ-75E120	Samsung SSD 850 EVO 120GB Warranty statement Installation guide Software CD	MZ-75E120BW MZ-75E120B/AM MZ-75E120B/EU MZ-75E120B/KR MZ-75E120B/CN
250 GB	MZ-75E250	Samsung SSD 850 EVO 250GB Warranty statement Installation guide Software CD	MZ-75E250BW MZ-75E250B/AM MZ-75E250B/EU MZ-75E250B/KR MZ-75E250B/CN
500 GB	MZ-75E500	Samsung SSD 850 EVO 500GB Warranty statement Installation guide Software CD	MZ-75E500BW MZ-75E500B/AM MZ-75E500B/EU MZ-75E500B/KR MZ-75E500B/CN
1TB(1,000GB)	MZ-75E1T0	Samsung SSD 850 EVO 1TB Warranty statement Installation guide Software CD	MZ-75E1T0BW MZ-75E1T0B/AM MZ-75E1T0B/EU MZ-75E1T0B/KR MZ-75E1T0B/CN

For more information, please visit
www.samsung.com/ssd and
www.samsungssd.com.
To download the latest software & manuals,
please visit www.samsung.com/samsungssd

DISCLAIMER

SAMSUNG ELECTRONICS RESERVES THE RIGHT TO CHANGE PRODUCTS, INFORMATION AND SPECIFICATIONS WITHOUT NOTICE.
Products and specifications discussed herein are for reference purposes only. All information discussed herein may change without notice and is provided on an "AS IS" basis, without warranties of any kind. This document and all information discussed herein remain the sole and exclusive property of Samsung Electronics. No license of any patent, copyright, mask work, trademark or any other intellectual property right is granted by one party to the other party under this document, by implication, estoppels or otherwise. Samsung products are not intended for use in life support, critical care, medical, safety equipment, or similar applications where product failure could result in loss of life or personal or physical harm, or any military or defense application, or any governmental procurement to which special terms or provisions may apply. For updates or additional information about Samsung products, contact your nearest Samsung office.

COPYRIGHT © 2014

This material is copyrighted by Samsung Electronics. Any unauthorized reproductions, use or disclosure of this material, or any part thereof, is strictly prohibited and is a violation under copyright law.

TRADEMARKS & SERVICE MARKS

The Samsung Logo is the trademark of Samsung Electronics. Adobe is a trademark and Adobe Acrobat is a registered trademark of Adobe Systems Incorporated. All other company and product names may be trademarks of the respective companies with which they are associated.