

Samsung SSD 850 PRO

Data Sheet, Rev.1.0 (July, 2014)



Summary

- SATA 6Gb/s SSD for Client PCs
- 2.5 inch form factor
- Samsung 3-core MEX controller
- Samsung 32 layer 3D V-NAND
- Up to 1GB Samsung Low Power DDR2 SDRAM cache memory
- Samsung Magician Software for SSD management
- Samsung Data Migration Software

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

Samsung's 3D V-NAND flash memory is fabricated using an innovative vertical design. Its vertical architecture stacks 32 cell layers on top of one another rather than trying to decrease the cells' length and width to fit today's ever-

shrinking form factors. This architecture results in higher density and higher performance using a smaller footprint. Samsung's 3D V-NAND technology is a breakthrough in overcoming the density limits currently faced with conventional planar NAND architecture.

The Samsung SSD 850 PRO is a brand new successor of Samsung's premium SSD product 840 PRO. The 850 PRO is powered by Samsung's 3D V-NAND. In 2013, Samsung mass-produced 24 layer 3D V-NAND products for datacenters which have already been proven in the market. Samsung is now releasing the world's 1st 3D V-NAND SSD for client PCs.

Ultimate Read/Write Performance

Powered by Samsung's own cutting-edge 3D V-NAND technology, the 850 PRO delivers up to two times write speed when compared with traditional 2D planar NAND flash for the ultimate in read and write performance. By changing to a

32-layer cylindrical cell structure, more cells can be stacked vertically, resulting in a smaller footprint and higher density. As a result, you gain superior maximum read and write performance in both sequential and random aspects, especially with the 128GB model that outperforms other similar models in the market by more than 100MB/s in write speed.

Plus, with RAPID mode, you can kick up to optional higher speeds-up to almost two times better write performance speeds than the previous model. Magician software allows you to enhance performance by processing data on a system level using free PC memory (DRAM) as a cache.

Enhanced Endurance and Reliability

Enhanced endurance

With twice the endurance of a typical NAND flash SSD, the 850 PRO will keep working as long as you do. Samsung's 3D V-NAND technology is built to handle a 40 GB daily workload, which equates to 150 Tera Bytes Written (TBW) over ten years. Plus, it comes with an industry leading ten-year limited warranty.

Advanced data encryption

The 850 PRO provides the same data encryption features as the 840 EVO. 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 PRO is compliant with advanced security management solutions (TCG Opal and IEEE 1667). Magician will guide you through "How to use security features". Furthermore, users can erase or initialize data with the crypto erase service with PSID

Efficient Power Management

Less Power consumption for active and stand-by states

Even with all of the above performance improvements, advances in the design of the MEX Controller and the use of the new technology of 3D V-NAND have enabled us to make the 850 PRO one of the most energy-efficient drives on the market. Idle power is almost the same as 840 PRO and the active (average) write power has been dramatically reduced up to 40% due to 3D V-NAND technology.

Moreover, when DEVSLP is enabled, the power consumption of 850 PRO is below 2mW.

Technical Specifications

Samsung SSD 850 PRO	
Usage Application	Client PCs
Capacity	128B, 256B, 512GB, 1TB(1,024GB)
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	Samsung 3-core MEX Controller
NAND Flash Memory	Samsung 32 layer 3D V-NAND
DRAM Cache Memory	256MB (128GB) or 512MB(256GB&512GB) or 1GB (1TB) LPDDR2
Performance*	Sequential Read: Max. 550 MB/s
	Sequential Write*: Max. 520 MB/s (256GB/512GB/1TB) Max. 470 MB/s (128GB)
	4KB Random Read (QD1): Max. 10,000 IOPS
	4KB Random Write(QD1): Max. 36,000 IOPS
	4KB Random Read(QD32): Max. 100,000 IOPS
	4KB Random Write(QD32): Max. 90,000 IOPS
TRIM Support	Yes (Requires OS Support)
Garbage Collection	Yes
S.M.A.R.T	Yes
Security	AES 256-bit Full Disk Encryption (FDE) TCG/Opal V2.0, Encrypted Drive(IEEE1667)
Weight	Max. 66g (1TB)
Reliability	MTBF: 2 million hours
TBW	150 TBW (Terabytes Written)
Power Consumption**	Active Read (Average): Max. 3.3W(1TB) Active Write (Average): Max. 3.0W(1TB) Idle : Max. 0.4W Device Sleep: 2mW
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 0.5msec, 3 axis
Warranty	10 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 i5-2500K @ 3.3GHz, DDR3 1600MHz 4GB, OS – Windows7 Ultimate x64 SP1
IRST 11.5.4.1001, MS performance guide pre-condition Intel® Z68

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

Product Lineup

Density	Model Name	Box Contents	Model Code
128 GB	MZ-7KE128	Samsung SSD 850 PRO 128GB Warranty statement Installation guide Software CD	MZ-7KE128BW MZ-7KE128B/KR MZ-7KE128BW/CN
256 GB	MZ-7KE256	Samsung SSD 850 PRO 256GB Warranty statement Installation guide Software CD	MZ-7KE256BW MZ-7KE256B/KR MZ-7KE256B/CN
512 GB	MZ-7KE512	Samsung SSD 850 PRO 512GB Warranty statement Installation guide Software CD	MZ-7KE512BW MZ-7KE512B/KR MZ-7KE512B/CN
1TB(1,024GB)	MZ-7KE1T0	Samsung SSD 850 PRO 1TB Warranty statement Installation guide Software CD	MZ-7KE1T0BW MZ-7KE1T0B/KR MZ-7KE1T0B/CN

For more information, please visit

www.samsung.com/ssd.

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