Samsung SSD 850 PRO
Data Sheet, Rev.3 (Jan., 2017)

Summary

- SATA 6Gb/s SSD for Client PCs
- 2.5 inch form factor
- Samsung 3D V-NAND MLC
- 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 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 better performance using a smaller footprint. Samsung's 3D V-NAND technology is a breakthrough in overcoming the density limits currently faced with the conventional planar NAND architecture.

The Samsung SSD 850 PRO is a brand new successor of the 840 PRO, Samsung's premium SSD product. The 850 PRO is powered by Samsung's 3D V-NAND technology. In 2013, Samsung mass-produced 3D V-NAND products for datacenters which have already been proved in the market. And 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

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up to twice the write speed[1] than that of the traditional 2D planar NAND flash for ultimate read and write performance. By changing to the layer cylindrical cell structure, more cells can be stacked vertically, resulting in 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 (Real-time Accelerated Processing of I/O Data) mode, you can boost its optional higher speeds - up to almost twice faster write performance speeds than those of the previous model.[2] The 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

  Samsung's 3D V-NAND technology is built to handle 150 Tera Bytes Written (TBW) for 128GB and 256GB, 300 TBW for 512GB and 1TB, 450TBW for 2TB and 600TBW for 4TB. 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 does. The Self-Encrypting Drive (SED) security technology will help keep your data safe. It includes an AES 256-bit hardware-based encryption engine to ensure that your personal files remain secure. A hardware-based encryption engine secures your data with significantly reduced performance degradation that you may experience with a

software-based encryption. Also, the 850 PRO is compliant with advanced security management solutions (TCG Opal and IEEE 1667). Magician will guide you through the security features. Furthermore, users can delete 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, the use of the new technology of 3D V-NAND have enabled us to make the 850 PRO as one of the most energy-efficient drives on the market. Its idle power is almost the same as the 840 PRO's and its active (average) write power has been dramatically reduced up to 40% in comparison to the 840 PRO's due to the 3D V-NAND technology.

[1,2] Compare to Samsung 840 EVO (140MB/s), After TurboWrite performance, based on Samsung's official specification

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Technical Specifications

Samsung SSD 850 PRO						
Usage Application	Client PCs					
Interface	SATA 6Gb/s (compatible with SATA 3Gb/s and SATA 1.5Gb/s)					
Form Factor	2.5 inch					
Dimensions(LxWxH)	100 x 69.85 x 6.8 (mm)					
Hardware Information	**Capacity**	128GB	256GB	512GB	1TB	2TB	4TB
	Controller	MEX	MGX		MHX		
	NAND Flash	Samsung 3D V-NAND MLC					
	DRAM Cache	256MB LP DDR2	512MB LP DDR3		1GB LP DDR3	2GB LP DDR3	4GB LP DDR3
Performance* (Up to)	**Sequential Read**	550 MB/s					
	Sequential Write	470MB/s	520MB/s				
	Random Read(QD1)	10,000 IOPS					
	Random Write(QD1)	36,000 IOPS					
	Random Read(QD32)	100,000 IOPS					
	Random Write(QD32)	90,000 IOPS					
Supporting features	TRIM(Requires OS Support), Garbage Collection, S.M.A.R.T					
Security	AES 256-bit Full Disk Encryption (FDE) TCG/Opal V2.0, Encrypted Drive(IEEE1667)					
Weight	Max. 66g					
Reliability	MTBF: 2 million hours					
Total Bytes Written	150 TBW(Terabytes Written)	300 TBW		450TBW	600TBW	
Power Consumption** (Typical)	Active Read (Average): Max. 3.3W Active Write (Average): Max. 3.4W Idle(DIPM on): Max. 70mW(4TB) Device Sleep: 10mW(4TB)					
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 i7-4790K @ 4.0GHz, DDR3 1600MHz 8GB, OS – Windows7 Ultimate x64 SP1
　　　　　　　　　　　　IRST 13.0.3.1001, MS performance guide pre-condition Intel® Z97, CPU C-States Disabled
**　Power consumption measured with IOmeter 1.1.0 version with Intel i7-5820K, 3.3GHz, Samsung DDR3 8GB, ASUS X99M
　　WS/SE OS- Windows10 PRO x64

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Product Lineup

Density	Model Name	Box Contents	Model Code
128 GB*	MZ-7KE128	Samsung SSD 850 PRO 128GB Warranty statement and Installation guide	MZ-7KE128BW MZ-7KE128B/KR MZ-7KE128B/CN
256 GB*	MZ-7KE256	Samsung SSD 850 PRO 256GB Warranty statement and Installation guide	MZ-7KE256BW MZ-7KE256B/KR MZ-7KE256B/CN
512 GB*	MZ-7KE512	Samsung SSD 850 PRO 512GB Warranty statement and Installation guide	MZ-7KE512BW MZ-7KE512B/KR MZ-7KE512B/CN
1TB(1,024GB*)	MZ-7KE1T0	Samsung SSD 850 PRO 1TB Warranty statement and Installation guide	MZ-7KE1T0BW MZ-7KE1T0B/KR MZ-7KE1T0B/CN
2TB(2,048GB*)	MZ-7KE2T0	Samsung SSD 850 PRO 2TB Warranty statement and Installation guide	MZ-7KE2T0BW MZ-7KE2T0B/KR MZ-7KE2T0B/CN
4TB(4,096GB*)	MZ-7KE4T0	Samsung SSD 850 PRO 4TB Warranty statement and Installation guide	MZ-7KE4T0BW MZ-7KE4T0B/KR MZ-7KE4T0B/CN

* 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 from that indicated on the product label.
  For more information, please visit www.samsung.com/ssd.
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