

Make your mark  
with a new caliber of performance & endurance

**SAMSUNG**  
Solid State Drive



## Samsung SSD 850 EVO

**Powered by 3D V NAND technology, maximizing everyday computing experiences**

Introducing the SSD that transform your computer into one that's fiercely rapid and powerful. Transfer massive data in seconds while working with prolonged battery life. The best part? It will stand up to time a lot longer than its predecessors.

**SAMSUNG**

# Ramped up performance for everyday use

## Obtain higher caliber SSD performance and endurance powered by 3D V-NAND technology

If you're looking for the next great innovation in SSD performance and worry-free reliability, look no further with the Samsung SSD 850 EVO. Boasting the world's first 3D Vertical-NAND (V-NAND) SSD, the 850 EVO brings professional-caliber computing to the end consumer, delivering optimized performance for everyday use. Whether you're an avid gamer or Internet surfer, you'll find that the 850 EVO delivers lightning-fast speeds - the fastest on the market. The 850 EVO also brings you unmatched endurance and reliability to handle whatever task you throw at it - and it does it superbly. Plus, it delivers more efficient power management than you ever dreamed possible.



## Discover the advantages of 3D V-NAND technology

The secret behind Samsung's landmark 3D V-NAND technology consists of three important innovations: materials, structure and integration, which result in more capacity, faster speed, outstanding endurance and superb power efficiency.

The vertical architecture enables more memory cells to fit in a NAND chip in less space for significantly more capacity resulting in higher data quality. Cell-to-cell interference is virtually eliminated, enabling data to be written much faster for better performance. Using non-conductive insulators that experience less stress and are more resistant to wear help maintain cell integrity and prevent data corruption for greater endurance. And all this is achieved with significantly less power consumption that you would expect - in fact, up to 50 percent savings in active writing power.

## Kick up your PC's speed with performance-enhancing features



**TurboWrite**

The 850 EVO provides optimized performance for everyday computing use, delivering an over 10 percent improved user experience (UX) compared with its predecessor\*. Equipped with TurboWrite technology, the 850 EVO provides fast random write speeds up to 1.9 times that of the 840 EVO in the 120/250GB models\*\*. TurboWrite technology accelerates write speeds by creating a high-performance write buffer in the SSD. First, data is transferred to the high-performance buffer at accelerated speeds. Then, when the write operation exceeds the size of the buffer during idle periods, the data is moved from the buffer to the primary storage region of the SSD at "after TurboWrite" speeds. The buffer size is optimized for everyday PC use and typically delivers TurboWrite accelerated speeds.

\* PCMark7 (250GB) : 6,700 (840 EVO) < 7,600 (850 EVO)

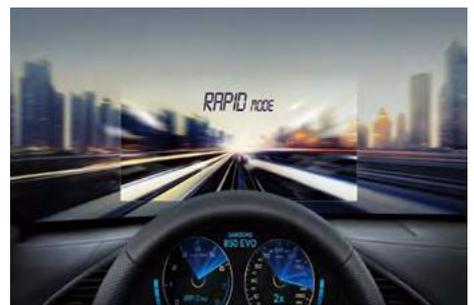
\*\* Random Write (QD32, 120GB) : 36,000 IOPS (840 EVO) < 88,000 IOPS (850 EVO)



**Enhanced RAPID mode**

If you need to kick into high gear, the RAPID mode puts the pedal to the metal - just like shifting gears in a car. Magician software gives you the ability to gain 2 times faster performance when shifting to the RAPID mode\* by processing data on a system level using free PC memory (DRAM) as cache. The maximum memory in RAPID mode has increased from 1GB, in the previous version, to up to 4GB with the 850 EVO when implementing 16GB of DRAM, for an enhanced UX. You'll experience higher performance and more efficient command processing, depending on your PC's memory, which improves further with repetitive tasks. With accelerated speeds, you can vastly improve queue depth (QD) 1 random write performance to almost the same level as QD32 - achieving blazing-fast speeds.

\* PCMark7 RAW (250GB) : 7,500 < 15,000 (RAPID mode)



# Worry-free reliability with superb power efficiency and security

## Choose an SSD that will perform in any circumstance



WARRANTY

When it comes to endurance, the 850 EVO won't quit before you do. The 850 EVO delivers enhanced reliability and improved sustained performance - up to 30 percent more than the previous 840 EVO model\*. Samsung's V-NAND technology is built to handle up to 150 Terabytes Written (TBW), double that of the 840 EVO\*\*. Plus, it comes with the industry's top-level, five-year limited warranty.

\* Sustained Performance (250GB) : 3,300 IOPS (840 EVO) < 6,500 IOPS (850 EVO). Performance was measured after a 12-hour "Random Write" test.

\*\* TBW : 43 (840 EVO) < 75 (850 EVO 120/250GB), 150 (850 EVO 500GB/1TB)

	850 EVO (120/250GB)	850 EVO (500GB/1TB)
Total Bytes Written (TBW)	75	150
Warranty (year)	5	

## Maintain staying power without consuming power



Efficient Power Management

Samsung is known for its innovations in efficient, power management technologies that help you do more, longer and more productively. And the 850 EVO is no exception, boasting phenomenally low idle power consumption rates. Considering that SSDs spend most of their time in idle mode, this is an extremely important factor in power efficiency. As a matter of fact, the 850 EVO fully supports the sleep mode on the Ultrabook™, consuming only 2m watts of power. Plus, it offers higher performance while consuming 25 percent less power\* during write operations than the 840 EVO. The efficient power management of the 850 EVO is thanks to its 3D V-NAND technology, which consumes half the power of a 2D planar NAND.

\* Power (250GB): 3.2 Watt (840 EVO) > 2.4 Watt (850 EVO)



## Protect your valuable data without compromising performance



Data Security

When you travel with your laptop, you not only need to safeguard your PC's hardware, but your personal data, as well. If your laptop is equipped with the 850 EVO, you can rest easy. The 850 EVO's Self-Encrypting Drive (SED) technology will help keep your laptop safe, even if you lose it. The drive includes an AES-256-bit hardware-based, full disk encryption engine that secures your data without performance degradation, typically experienced with software-based encryption. The SED technology complies with the Trusted Computing Group (TCG) Opal v2.0 standards, protecting Physical Security ID (PSID), and is compatible with the Microsoft® eDrive Institute of Electrical and Electronics Engineers® (IEEE) 1667 protocol. Samsung offers three security features you can choose from to suit your specific needs. Plus, you can erase or initialize data with the crypto erase service through customer service.

When you're totally immersed in your work or enthralled in a competitive video game, the last thing you want to happen is for your computer to overheat. However, the 850 EVO won't let that happen thanks to its Dynamic Thermal Guard protection, which monitors and maintains the drive's optimal operating temperature. The throttle feature automatically drops the SSD's temperature when necessary to protect your data and ensure the responsiveness you expect. It keeps your PC cool, even if you overwork it - and you'll keep your cool, too.



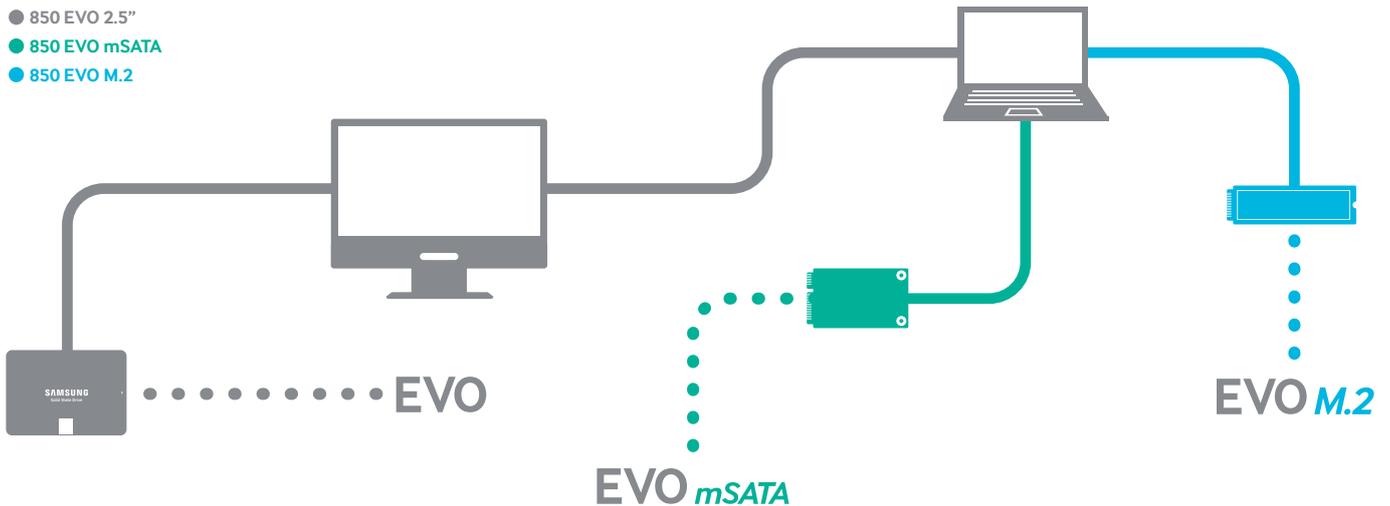
Dynamic Thermal Guard



# Variety and seamless integration from a respected leader in consumer SSDs

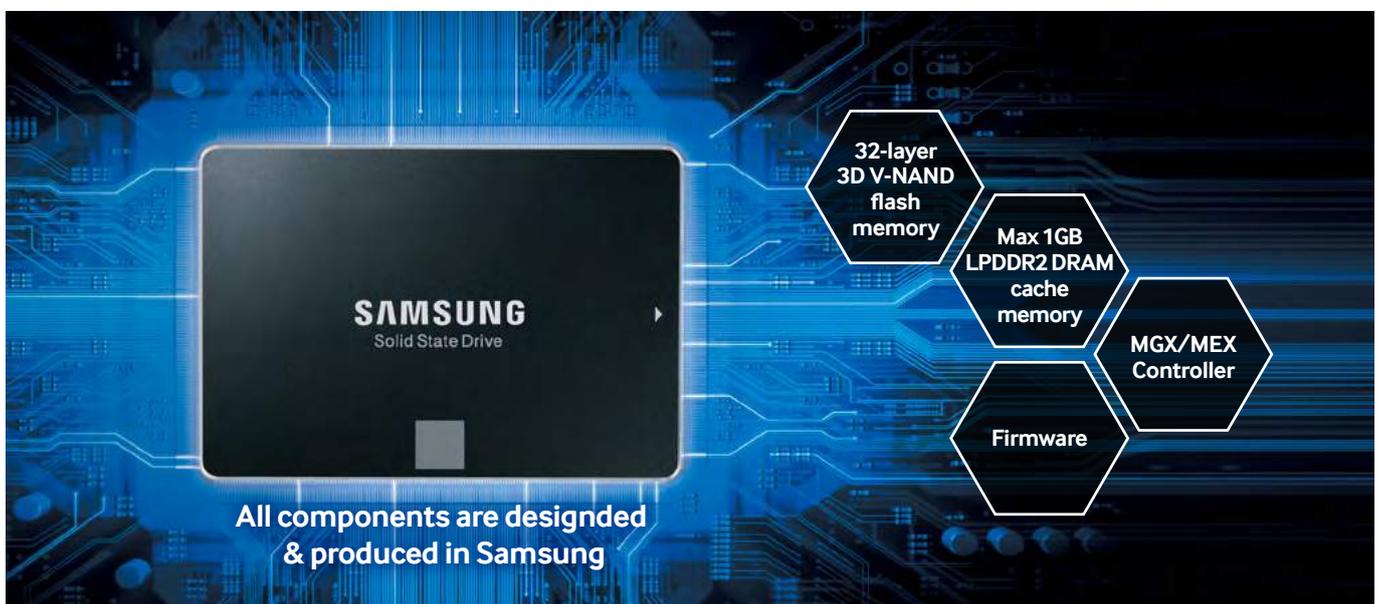
## Get the fit that's just right for your device

We all have different devices and sometimes one size doesn't fit all. Don't worry. The 850 EVO comes in a variety of form factors so you can get the one that's just right for your needs. Choose from 2.5 inch, mSATA and M.2 for convenient, optimized integration with your device.



## Achieve optimal integration with components that work flawlessly together

The NAND flash memory, the controller, the DRAM and the firmware are the four most crucial components of any SSD. And the integration of each of these components is critically important in designing a high-quality, long-lasting SSD you can rely on. Samsung is one of a handful of manufacturers that actually designs all four of these components in-house. And among those who do, Samsung is the one with the most experience in the SSD market. Samsung has intimate knowledge of every component and its parts. Therefore, it can fine-tune them at each stage of development to ensure they work seamlessly together. The result is enhanced performance with a 32-layer 3D V-NAND flash memory, lower power consumption with an up to 1GB LPDDR2 DRAM cache memory and improved energy-efficiency controller and firmware.



# Media Reviews



It's difficult to even call the new EVO a mainstream SSD since the performance, endurance, and warranty are in line with flagship products from other companies. Samsung set the bar very high for the mainstream SSD market.

**TweakTown**



Samsung hasn't stopped impressing me in the SSD space. The 850 EVO is yet another showcase of Samsung's engineering talent and truth to be told there is a lot of good in the 850 EVO.

**ANANDTECH**



Against competitors, Samsung's NAND technology is not only superior in performance and endurance, but it's also at least 6-12 months ahead of everyone else.

As for the Samsung 850 EVO, personally I see it being the best mainstream drive on the market at least until 2H2015. It has everything most consumers would want or need from a SSD.

**Custom PC**




Small file transfers with low queues depths, which is what you'd expect to see with most client workloads, were also very good. If you go back and look at all of the numbers, the Samsung SSD 850 EVO is a clear winner in terms of performance. You can't ask for much more in a solid state drive.

**HOT hardware**



It would be fair to say we are big fans of Samsung SSDs, but that comes from experience.

**Hardware Heaven**

## Product Lineup

Density	Model Name	Box Contents
120GB	MZ-75E120	Samsung SSD 850 EVO 120GB Warranty statement Installation guide Software CD
250GB	MZ-75E250	Samsung SSD 850 EVO 250GB Warranty statement Installation guide Software CD
500GB	MZ-75E500	Samsung SSD 850 EVO 500GB Warranty statement Installation guide Software CD
1TB (1,000GB)	MZ-75E1T0	Samsung SSD 850 EVO 1TB Warranty statement Installation guide Software CD

## Package-Set



# 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 : 75 TBW	
	500GB/1TB : 150 TBW	
Power Consumption***	Active Read (Average) : Max. 3.7W (1TB)      Idle : Max. 50mW	
	Active Write (Average) : Max. 4.4W (1TB)      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-year 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(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



## About Samsung Electronics Co., Ltd.

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