

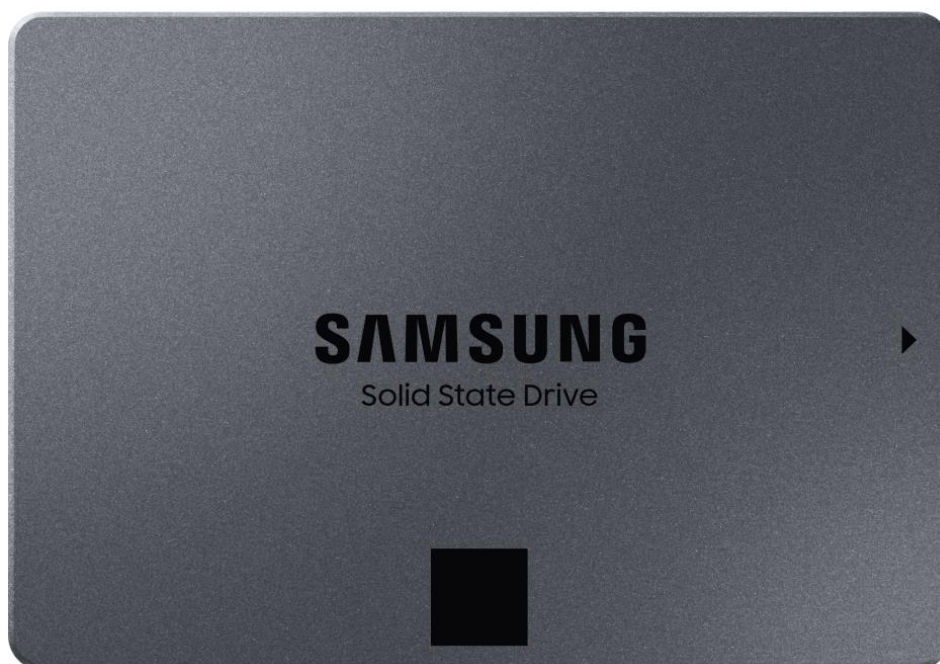
# Samsung V-NAND SSD 860 QVO

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2018 Data Sheet

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Revision 1.0



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## Revision History

Revision Number	Description	Revision Date
001	Initial Release	October 2018

## The Quality and Value Optimized SSD, The 860 QVO

Samsung, which first brought the planar 3-bit MLC based SSD, 840 in 2012 and the V-NAND SSDs, 850 PRO and 850 EVO in 2014 to the market, continuously strives to improve product reliability and performance. With its proven V-NAND technology, Samsung brings 4-bit MLC V-NAND, a new paradigm in the NAND Flash world.

The Samsung SSD 860 QVO is the Samsung's first 4-bit MLC client SATA SSD with integrated cutting-edge V-NAND and a fine-tuned MJX Controller. It gives optimized quality and value to general users who requires cost effective terabyte capacity SSDs with optimal performance.

### Optimal Performance for Everyday Computing Experiences

The 860 QVO, with the virtues of its highly optimized and well-organized integration of V-NAND 4bit MLC, MJX Controller, DRAM and specially-designed Intelligent TurboWrite, offers better performance for real-world computing experiences. The 860 QVO delivers top-notch sequential read and write performance (up to 550MB/s for reads, up to 520MB/s for writes) that are approaching close to the SATA interface limits (600MB/s) and also provides highly competitive random performances (up to 97K IOPS for read, up to 89K IOPS for writes).

Through the long history of efforts and expertise in the industry, Samsung has launched the 4-bit MLC based SSD with improved reliability and enhanced Intelligent TurboWrite to overcome its physical structure. Intelligent TurboWrite featured in 860 QVO identifies user workloads intelligently and designates the appropriate SLC buffer which Samsung has defined based on studies on recent data trends.

### Proven Quality and Reliability

With Samsung's confidence in its NAND reliability, the refined MJX controller and advanced ECC algorithm, the 860 QVO promises to deliver worry-free endurance up to 1,440TB of Total Bytes Written\* along with a 3-year limited warranty.

The 860 QVO provides multiple advanced data encryption features like Self-Encrypting Drive (SED) security technology that will help keep data safe at all times. The 860 QVO includes an AES 256-bit hardware-based encryption engine to ensure that your personal files remain secure. Also, the 860 QVO is compliant with various advanced security management solutions (TCG Opal and Encrypted Drive-IEEE1667).

\*All documented endurance test results are obtained in compliance with JESD218 Standards. Please visit [www.jedec.org](http://www.jedec.org) for detailed information on JESD218 Standards

### Expanded Compatibility

860 QVO adopts the MJX controller originally designed to support all kinds of SATA applications and highly optimized to cover various types of system environments. The MJX controller is widely proven by the previous 860 EVO and PRO. The 860 QVO completely supports the Linux operating system by providing queued TRIM.

### Terabyte Capacity with Affordable Price

The 860 QVO delivers terabyte capacities at an affordable price-point thanks to the 4-bit MLC NAND architecture, which allows more storage in one cell, making it possible to build an SSD up to 16TB in a 2.5" 7mmT form factor.\* Now, consumers can easily transition to a single, high-capacity SSD at a reduced cost, while eliminating the need to use a combination of a low-capacity SSD as a boot drive and a high-capacity HDD as a data storage drive. It makes the users experience the full performance of SSD with large capacities.

\* with the current MJX controller, 8TB is the maximum capacity. With the 2.5" 15mmT form factor and the new controller developed, 32TB is available to provide.

### Samsung Data Migration and Magician Software

The 860 QVO comes with Samsung Data Migration and Magician Software, which is easy to install and makes management of you SSD simple.\* Samsung Data Migration software is uncomplicated to use – yet provides a very powerful "Custom Cloning" feature that makes migration effortless even when the source data is greater than the SSD's capacity. Magician provides personalized firmware checks and additional functions tailored for individual users' drives. It even updates the firmware automatically to make sure that the drives' performance stays up to date.

\*To download Samsung Data Migration and Magician, please visit [www.samsung.com/samsungssd](http://www.samsung.com/samsungssd)

## TECHNICAL SPECIFICATIONS

### Samsung SSD 860 QVO

Usage Application	Client PCs			
Interface	SATA 6 Gbps Interface, compatible with SATA 3 Gbps & 1.5 Gbps interfaces			
Hardware Information	Capacity <sup>1)</sup>	1TB	2TB	4TB
	Controller	Samsung MJX Controller		
	NAND Flash Memory	Samsung 4bit MLC V-NAND		
	DRAM Cache Memory	1GB LPDDR4	2GB LPDDR4	4GB LPDDR4
	Dimension	100x 69.85x 6.8(mm)		
	Form Factor	2.5 inch		
Performance (Up to.) <sup>2)</sup>	Sequential Read	550 MB/s		
	Sequential Write <sup>3)</sup>	520 MB/s		
	4KB Ran. Read (QD1) <sup>4)</sup>	7,500	7,500	7,500
	4KB Ran. Write (QD1) <sup>4)</sup>	42,000	42,000	42,000
	4KB Ran. Read (QD32) <sup>5)</sup>	96,000	97,000	97,000
	4KB Ran. Write (QD32) <sup>5)</sup>	89,000	89,000	89,000
Power Consumption <sup>5)</sup>	Idle	DIPM on	30mW	30mW
	Active (Avg.)	Read/Write	2.1W/2.2W	2.3W/3.1W
	Device Sleep		3mW	3.5mW
Reliability	Temp.	Operating	0°C to 70°C	
		Non-Operating	-45°C to 85°C	
	Humidity		5% to 95% non-condensing	
	Shock	Non-Operating	1,500G, duration: 0.5ms, 3 axis	
	Vibration	Non-Operating	20~2,000Hz, 20G	
MTBF		1.5 million hours		
Warranty	Total Byte Written <sup>7)</sup>	360TB	720TB	1,440TB
	Period	3 years limited <sup>8)</sup>		
Supporting Features	TRIM(Required OS support), Garbage Collection, S.M.A.R.T			
Data Security	AES 256-bit Full Disk Encryption, TCG/Opal V2.0, Encrypted Drive(IEEE1667)			

1) 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.

2) Sequential performance measurements are based on CrystalDiskMark v. 5.0.2. Random performance measurements are based on Iometer1.1.0. Performance may vary based on SSD's firmware version, system hardware & configuration. Test system configuration: Intel® Core i5-3550 CPU@3.3 GHz, DDR3 1333MHz 4GB, OS-Windows 7 Ultimate 64bit, Chipset-ASUS P8H77-V

3) Sequential write performance measurements are based on Intelligent TurboWrite technology. Performances after Intelligent TurboWrite region are 80 MB/s (1TB), 160 MB/s (2/4TB)..

4) QD1 Random performances after Intelligent TurboWrite are 4.4K IOPS(1/2/4TB) for reads, 21K IOPS(1TB) 38K IOPS(2/4TB) for writes.

5) QD32 Random performances after Intelligent TurboWrite are 36K IOPS (1TB), 60K IOPS (2/4TB) for reads, 21K IOPS(1TB), 40K IOPS(2TB), 42K IOPS(4TB) for writes.

6) Power consumption is measured with Iometer1.1.0 version with Intel Core i7-7700K @ 4.2GHz, SAMSUNG DDR4 16GB, Gigabyte GA-Z270X, OS – Windows 10 PRO K x64

7) All documented endurance test results are obtained in compliance with JESD218 Standards. Please visit [www.jedec.org](http://www.jedec.org) for detailed information on JESD218 Standards

8) Please refer to the detailed warranty statement here at <http://samsung.com/samsungssd>

## PRODUCT LINEUP

Density	Model Name	Box Contents	Model Code
1TB (1,000GB*)	MZ-76Q1T0	Samsung SSD 860 QVO 1TB Warranty Statement	MZ-76Q1T0BW MZ-76Q1T0B/AM MZ-76Q1T0B/CN
2TB* (2,000GB*)	MZ-76Q2T0	Samsung SSD 860 QVO 2TB Warranty Statement	MZ-76Q2T0BW MZ-76Q2T0B/AM MZ-76Q2T0B/CN
4TB (4,000GB*)	MZ-76Q4T0	Samsung SSD 860 QVO 4TB Warranty Statement	MZ-76Q4T0BW MZ-76Q4T0B/AM MZ-76Q4T0B/CN

\* GB: 1GB = 1,000,000,000 bytes by IDEMA. The actual usable capacity may be less than the labeled capacity. For more information, including but not limited to the warranty provided for this product, please visit [www.samsung.com/ssd](http://www.samsung.com/ssd) and [www.samsungssd.com](http://www.samsungssd.com).