

Samsung SSD 950 PRO M.2

Data Sheet Rev.1.2 (June 2016)



Summary

- PCIe 3.0 x4 NVMe Express SSD for Client PCs
- M.2 (2280)
- Samsung V-NAND
- Samsung Magician Software for SSD management

V-NAND Technology and THE SAMSUNG SSD 950 PRO

Samsung's unique and innovative V-NAND flash memory architecture is a breakthrough in overcoming the density limitations, performance and endurance of today's conventional planar NAND architecture. V-NAND is fabricated by stacking 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.

This cutting-edge V-NAND-based NVMe SSD supports PCI Express® Gen 3 x4 lanes, providing a higher bandwidth and lower latency to process a massive amount of more data than previous-generation SATA SSDs. Presented in a compact M.2 form factor, the future-oriented 950 PRO is ideal for professionals who want cutting-edge performance from their high-end PCs and workstations.

Experience next-generation ultimate SSD today

The 950 PRO NVMe SSD is the ultimate flash storage solution, designed with tomorrow's technology today. Providing an enhanced bandwidth, it's ideal for intensive workloads, such as computer-aided design, data analysis and engineering simulations. It

outperforms SATA SSDs with 4.5X faster sequential read (2,500 MB/s) and 2.5X faster sequential write speeds (1,500 MB/s). Plus, the 950 PRO boasts random read/write speeds of up to whopping 300K/110K IOPS.

Maximize endurance reliability under heavy workloads

Maximize endurance under heavy workloads

The innovative V-NAND technology designed into the 950 PRO strengthens the endurance of the SSD through insulators that cause less stress and are more resistant to wear, prolonging the lifespan of the SSD. This state-of-the-art technology has been tested for endurance on client systems under heavy workloads over a 5-year warranty period. These tests ensure that the 950 PRO will maintain a high level of sustained performance for long periods of time under heavy workloads..

Save power while maintaining peak performance

If you're in the midst of performing a complex data analysis or engineering simulation on your laptop, the last thing you want to have happen is your battery runs out. Designed to consume 5.7 W at peak workloads, the 950 PRO secures battery life while maintaining superior performance levels. The Active State Power Management (ASPM) mechanism built into the 950 PRO, which is similar to the device sleep mode in a SATA interface, reduces power consumption. In standby mode, the 950 PRO consumes only 2.5 mW of power, half the power consumption of an SATA (compared to 850 PRO) in Device Sleep Mode.

Dynamic Thermal Throttling Protection

In most cases of data transfers, heavy workloads can induce heat and result in high temperatures. Once temperatures reach a threshold, memory performance may malfunction. As the leader in SSD memory solutions, we equipped the 950 PRO with Dynamic Thermal Throttling Protection technology to automatically monitor and maintain optimal operating temperature to reduce the risks of overheating.

Technical Specifications

Samsung SSD 950 PRO			
Usage Application	Client PCs		
Capacity	256GB, 512GB		
Dimensions (LxWxH)	Max 80.15 x Max 22.15 x Max.2.38 (mm)		
Interface	PCIe 3.0 x4 (up to 32Gb/s) NVMe 1.1		
Form Factor	M.2(2280) [†]		
Controller	Samsung UBX controller		
NAND Flash Memory	Samsung V-NAND		
DRAM Cache Memory	512MB LPDDR3		
Performance*		256GB	512GB
	Sequential Read:	Up to 2,200 MB/s	Up to 2,500 MB/s
	Sequential Write**:	Up to 900 MB/s	Up to 1,500 MB/s
	4KB Random Read (QD32 Thread 4)	Up to 270K IOPS	Up to 300K IOPS
	4KB Random Write(QD32 Thread 4)	Up to 85K IOPS	Up to 110K IOPS
	4KB Random Read(QD1 Thread 1):	Up to 11K IOPS	Up to 12K IOPS
	4KB Random Write(QD1 Thread 1):	Up to 43K IOPS	Up to 43K IOPS
Data Security	AES 256-bit for User Data Encryption ^{††}		
Weight	Max. 10g (512GB)		
Reliability	MTBF : 1.5 million hours		
Power Consumption**	Active Read/Write (Average): Max. 5.6W(512GB) / Max.5.7 W(512GB) Idle : 70mW DEVSLP(L1.2 mode) : 2.5mW		
Supporting features	TRIM(Required OS support), Garbage Collection, S.M.A.R.T		
Temperature	Operating Temp : 0°C to 70°C (Measured by SMART Temperature. Proper airflow recommended)		
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		
TBW	256GB : 200Terabytes-Written(TBW), 512GB : 400TBW		

* Sequential performance measurements based on Crystal Disk Mark 5.0.2 and Random performance measurements based on Iometer 1.1.0. Performance may vary based on SSD's firmware version, system hardware & configuration. Test system configuration : Intel Core i5-6600K @ 3.5GHz, DDR3 1600MHz 8GB, OS – Windows10 x64, Mainboard: MSI (Skylake), Model : Z170 KRAIT Gaming

**Power consumption measured with Iometer 1.1.0 with Intel i7-4770K(Haswell, 3.5GHz), DDR3 8GB, ASRock Z87 Extreme9/ac, APST on, OS- Windows7 Ultimate x64 SP1

†M.2 is a specification of form factor for ultra-thin PCs, The M.2 standard allows widths 12, 16, 22 and 30mm and lengths of 16, 26, 30, 38, 42, 69, 80 and 110 mm, Commercially M.2 is popular with width 22mm and lengths 30, 42, 60, 80 and 110mm. Samsung provides the most popular formfactor with 22mm X 80mm model (i.e., 2280) to consider user convenience.

†† The plan to provide a firmware update to enable TCG/OPAL and IEEE1667 has been put on hold due to the currently very restricted availability of commercial security software.

Product Lineup

Density	Model Name	Box Contents	Model Code
256 GB*	MZ-VKV256	Samsung SSD 950 PRO 256GB Warranty statement	MZ-V5P256BW
512 GB*	MZ-VKV512	Samsung SSD 950 PRO 512GB Warranty statement	MZ-V5P512BW

* 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.

For more information, please visit

www.samsung.com/ssd and www.samsungssd.com

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