Samsung V-NAND SSD 990 PRO with Heatsink

2023 Data Sheet

Revision 3.0



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TECHNICAL SPECIFICATIONS

Samsung SSD 990 PRO with Heatsink					
Usage Application	Client PCs, PlayStation®5				
Interface	PCIe Gen 4.0 x4, NVMe 2.0				
Hardware Information	Capacity[1]		1TB	2TB	4TB
	Controller		Samsung in-house Controller		
	NAND Flash Memory		Samsung V-NAND TLC		
	DRAM Cache Memory		1GB LPDDR4	2GB LPDDR4	4GB LPDDR4
	Dimension		Max 80.15 x Max 25 x Max 8.88 (mm)		
	Form Factor		M.2 (2280)		
Performance (Up to.)[2] [3] [4]	Sequential Read		7,450 MB/s	7,450 MB/s	7,450 MB/s
	Sequential Write		6,900 MB/s	6,900 MB/s	6,900 MB/s
	QD 1 Thread 1	Ran. Read	22K IOPS	22K IOPS	22K IOPS
		Ran. Write	80K IOPS	80K IOPS	80K IOPS
	QD 32 Thread 16	Ran. Read	1,200K IOPS	1400K IOPS	1600K IOPS
		Ran. Write	1,550K IOPS	1,550K IOPS	1,550K IOPS
Power Consumption (Up to)[5]	Idle (APST on)		50mW	55mW	55mW
	Active (Avg.)	Read	5.5 W	6.1W	6.5W
		Write	5.2 W	5.5W	5.7W
	L1.2 mode		5 mW		5.8mW
Reliability	Temp.	Operating	0°C to 70°C (Measured by S.M.A.R.T. Temperature Proper airflow recommended)		
		Non-Operating	-40°C to 85°C		
	Humidity		5% to 95% non-condensing		
	Shock	Non-Operating	1,500G(Gravity), duration: 0.5ms, 3 axis		
	Vibration	Non-Operating	20~2,000Hz, 20G		
	MTBF		1.5 million hours		
Warranty[6]	TBW		600TB	1,200TB	2400TB
	Period		5 years limited		
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) 1GB = 1,000,000,000 bytes by IDEMA. A certain portion of capacity may be used for system file and maintenance use, thus the actual available capacity may differ from the labeled capacity.
2) 990 PRO is backward compatible with PCIe 3.0.
3) Sequential and random performance measurements are based on IOmeter1.1.0. Performance may vary based on SSD's firmware version, system hardware & configuration. Test System: AMD Ryzen 7 5800X 8-Core Processor CPU@3.80GHz, DDR4 3600MHz 16GBx2, OS-Windows 10 Pro 64bit, Chipset-ASRock-X570-Taichi
4) Sequential and random write performance was measured with Intelligent TurboWrite technology being activated. Intelligent TurboWrite operates only within a specific data transfer size. For detailed information, please contact your local service center
5) Power consumption is measured with IOmeter1.1.0 version with AMD Ryzen 7 5800X 8-Core Processor CPU@3.80GHz, DDR4 3600MHz 16GBx2, OS-Windows 10 Pro 64bit, Chipset-ASRock-X570-Taichi
6) Samsung's warranty will be void if any of the following instructions violated.
   - When assembling the 990 PRO, do not overtighten the 990 PRO with Heatsink to the motherboard.
   - The 990 PRO with Heatsink has a pre-installed heat sink and it should not be removed as it can damage the device.
   - The max dimensions of the 990 PRO with Heatsink with heatsink are 80.15 mm [L] x 25 mm [W] x 8.88 mm [H]. Please check your host system provides sufficient space for installation in advance.
   - Product warranty will be void if a heatsink is removed from 990 PRO with Heatsink.
7) All documented endurance test results are in compliance with JESD218 Standards. Please visit www.jedec.org for detailed information on JESD218 Standards. TBW means Terabytes Written, Warranty provides coverage for the stated time period or the TBW, whichever comes first. Please refer to the detailed warranty statement here at http://www.samsung.com/samsungssd
8) The LED display color may appear different from the color setting due to viewing angles and/or environmental factors

PRODUCT LINEUP

Density	Model Name	Box Contents	Model Code
1TB (1,000GB*)	MZ-V9P1T0	Samsung SSD 990 PRO with Heatsink 1TB Warranty Statement	MZ-V9P1T0CW MZ-V9P1T0GW
2TB (2,000GB*)	MZ-V9P2T0	Samsung SSD 990 PRO with Heatsink 2TB Warranty Statement	MZ-V9P2T0CW MZ-V9P2T0GW
4TB (4,000GB*)	MZ-V9P4T0	Samsung SSD 990 PRO with Heatsink 4TB Warranty Statement	MZ-V9P4T0CW MZ-V9P4T0GW

* GB: 1GB = 1,000,000,000 bytes. 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, and to download the latest software & manuals, please visit www.samsung.com/ssd and www.samsungssd.com.

TEST CONFIGURATION

Below you will find a list of system configurations Samsung used to obtain the results reported in this Data Sheet. Performance/power data was measured with the SSD as a secondary drive in a fan cooling desktop system.

	Read/Write Performance	Power Consumption
Interface	PCIe Gen 4.0 x4	PCIe Gen 4.0 x4
OS	Windows 10 Pro 64bit	Windows 10 Pro 64bit
CPU	AMD Ryzen 7 5800X 8-Core CPU@3.80GHz	AMD Ryzen 7 5800X 8-Core CPU@3.80GHz
Memory	DDR4 3600MHz 16GBx2	DDR4 3600MHz 16GBx2
Chipset	ASRock-X570-Taichi	ASRock-X570-Taichi
Test Program	IOmeter 1.1.0	IOmeter 1.1.0

Revision History

Revision Number	Description	Revision Date
1.0	Initial Release	October, 2022
2.0	Heatsink Max Dimension Revised	June , 2023
3.0	4TB Capacity added / Power consumption value revised	July, 2023