Samsung V-NAND SSD 980 PRO with Heatsink

2023 Data Sheet

Revision 2.0

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TECHNICAL SPECIFICATIONS

Samsung SSD 980 PRO with Heatsink				
Usage Application	Client PCs			
Interface	PCIe Gen 4.0 x4, NVMe 1.3c			
Hardware Information	Capacity[1]		1TB	2TB
	Controller		Samsung in-house Controller	
	NAND Flash Memory		Samsung V-NAND 3bit MLC	
	DRAM Cache Memory		1GB LPDDR4	2GB 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		7,000 MB/s	7,000 MB/s
	Sequential Write		5,000 MB/s	5,100 MB/s
	QD 1 Thread 1	Ran. Read	22K IOPS	22K IOPS
		Ran. Write	60K IOPS	60K IOPS
	QD 32 Thread 16	Ran. Read	1,000K IOPS	1,000K IOPS
		Ran. Write	1,000K IOPS	1,000K IOPS
Power Consumption (Up to)[5]	Idle (ASPT on)		35mW	
	Active (Avg.)	Read	6.2 W	6.1W
		Write	5.7 W	5.6W
	L1.2 mode		5 mW	
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
	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) 980 PRO with Heatsink is backward compatible with PCIe 3.0. Sequential performances (up to): 3500 MB/s for reads, 3450 MB/s (1TB), 3470MB/s (2TB) for writes. Random performances (up to): 690K IOPS (1TB), 680K IOPS (2TB) for reads, 660K IOPS (1TB), 630K IOPS (2TB) for writes.
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 9 3900X 12-Core Processor CPU@3.79GHz, DDR4 2666MHz 16GBx2, OS-Windows 10 Pro 64bit, Chipset-ASUS-X570-ROG CROSSHAIR VIII FORMULAv
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 3700X 8 Core @3.6GHz, DDR4 8GBx2, OS-Windows 10 Pro 64bit, Chipset-GIGABYTE-X570-AORUS MASTER
6) Samsung's warranty will be void if any of the following instructions violated.
- When assembling the 980 PRO, do not overtighten the 980 PRO with Heatsink to the motherboard.
- The 980 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 980 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 980 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

PRODUCT LINEUP

Density	Model Name	Box Contents	Model Code
1TB (1,000GB*)	MZ-V8P1T0	Samsung SSD 980 PRO with Heatsink 1TB Warranty Statement	MZ-V8P1T0CW
2TB (2,000GB*)	MZ-V8P2T0	Samsung SSD PRO with Heatsink PRO 2TB Warranty Statement	MZ-V8P2T0CW

* 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. All performance data was measured with the SSD as a secondary drive

	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 9 3900X 12-Core CPU@3.79GHz	AMD Ryzen 7 3700X 8 Core @3.6GHz
Memory	DDR4 2666MHz 16GBx2	DDR4 8GBx2
Chipset	ASUS-X570-ROG CROSSHAIR VIII FORMULAv	GIGABYTE-X570-AORUS MASTER
Test Program	IOmeter 1.1.0	IOmeter 1.1.0

The test values in the review were obtained under the following BIOS settings.
1) BIOS version: 1201(2019/11/18)
2) Advanced/AMD CBS/CPU Common Options/Global C-state Control: Auto -> Disabled
3) Overclock
    3-1) Ai Overclock Tuner: Default -> Manual
    3-2) Memory Frequency: Auto -> DDR4-3600MHz
    3-3) Core Performance Boost: Auto -> Disabled
    3-4) CPU Core Ratio: Auto -> 43.75
    3-5) Precision Boos Overdrive/Precision Boost Overdrive: Auto -> Disabled
    3-6) DRAM Timing Control/DRAM CAS# Latency: Auto -> 17
        DRAM Timing Control/Trcdrd : Auto -> 19
        DRAM Timing Control/Trcdwr : Auto -> 19
        DRAM Timing Control/DRAM RAS# PRE Time: Auto -> 18
        DRAM Timing Control/DRAM RAS# ACT Time: Auto -> 36
    3-7) DRAM Voltage: Auto -> 1.35

Revision History

Revision Number	Description	Revision Date
1.0	Initial Release	October, 2021
2.0	Heatsink Max Dimension Revised	June, 2023