

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 |
| 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) | | | | |

- 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.
- 990 PRO is backward compatible with PCIe 3.0.
- 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
- 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
- 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
- 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.
- All documented endurance test results are in compliance with JEDEC218 Standards. Please visit www.jedec.org for detailed information on JEDEC218 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>
- 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 |