Samsung PM983 NVMe PCIe SSD
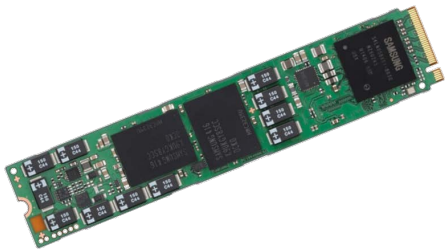
Highlights

Samsung PM983 delivers:

- **Unmatched Flexibility**
  Three separate form factors enable you to find the product that best fits your density and performance needs.

- **High-Performance**
  Four times the performance of SATA SSDs, using Samsung 3D V-NAND and an optimized Samsung NVMe controller with a native PCIe Gen 3.0 x4 host interface supplies 32 Gb/s of bandwidth.

- **Exceptional Value**
  The same low cost per gigabyte as slower SATA SSDs. By providing four times the IOPS per dollar, data center operators can continue to scale workload utilization on their servers, decreasing the cost of computing.

Data center architects face challenging requirements when delivering reliable computing and storage resources at the lowest total cost. Data center servers require high levels of I/O performance to keep their CPUs fully utilized, and high system density, to minimize total cost. The storage systems supplying that I/O performance need to deliver consistent performance and latency to all tenant virtual machines 24/7, 365 days a year. Considering each of these factors, IT and data center managers are tasked with finding optimal storage solutions.

Samsung provides data centers with solid-state drives (SSDs) that deliver exceptional performance in cloud applications, such as content delivery networks (CDN), infrastructure as a service (IaaS), shared hosting, NoSQL databases, and cloud data storage. Compared to SATA SSDs, these high-performing NVMe SSDs deliver four times the read performance and lower latency, while still maintaining SATA cost and low-power consumption. As a pioneer in NVMe SSDs, Samsung has been delivering the advantages of industry standard NVMe performance longer than anyone else. Samsung also has the advantage of being a vertically integrated supplier of SSDs, providing the highest levels of quality.

The Samsung PM983 SSD allows data center architects to deliver the highest storage capacity and performance.

Random 4kB Performance

	PM983	SATA SSD
Read		
Write		

Sequential Performance

	PM983	SATA SSD
Read		
Write		
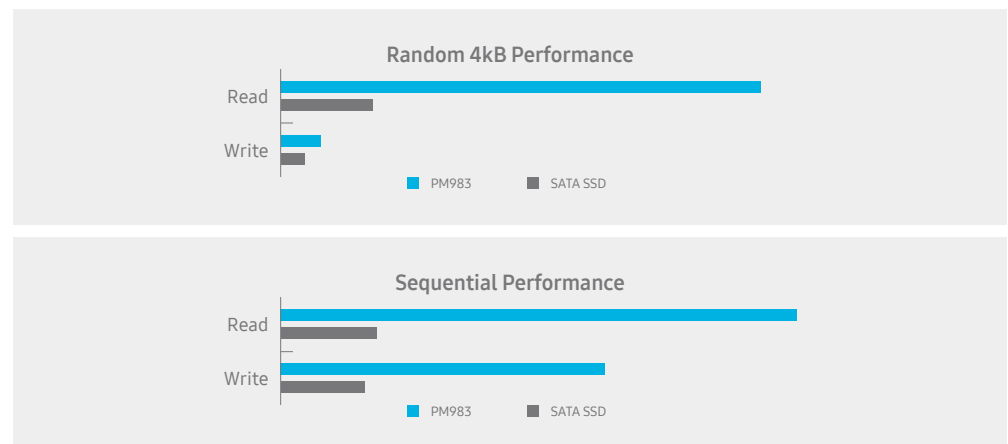
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NF1, Samsung's highest density form factor

By building the NF1 form factor for SSDs in 1U servers, maximum system density can be achieved.

Starting with drive capacity, the NF1 form factor can support twice the capacity of contemporary U.2 7mm thick SSDs, and up to four-times the capacity of contemporary M.2 SSDs. Samsung's PM983 NF1 offers capacities of up to 15.36TB.

Furthermore, the NF1 form factor allows up to 36 front-accessible SSDs to fit in a single 1U server. Compared to a typical 2U server using 24 U.2 SSDs, the Samsung NF1 allows three times the number of front- accessible SSDs per rack unit. With this combination of higher drive capacity and higher system-level density, NF1 enables up to six times the storage capacity of traditional U.2 SSDs in the same node footprint.

Common form factor, uncommon performance

The PM983 2.5" U.2 offers extreme performance worthy of your most demanding workloads. With random read speeds of up to 540K IOPS, the PM983 U.2 NVMe leaves SATA in the dust.

Break barriers, not the bank

What's the most critical metric for your data center project? Capacity? Performance? Cost? With the PM983, you don't have to choose. A single SSD that can satisfy projects of almost any size or budget.

Optimized for at-scale data centers

To meet the demand for high-utilization, high-duty cycle data centers, the PM983 SSD utilizes firmware that prioritizes quality of service (QoS). This enables sustained random workloads, to keep all virtual machines running quickly and smoothly. The firmware is optimized for always-on, always-busy workloads ready to respond rapidly to incoming work requests. The Samsung PM983 SSD also leverages the same controller and NAND flash memory as high volume laptop PCs, allowing data centers to deploy NVMe SSDs cost-effectively at scale.

Enterprise-grade power loss protection

During normal power-off periods, the host server allocates time to preserve data integrity by transmitting a standby command to each device. In the event of an unexpected power loss, though, the cached data in a storage device's internal buffers (DRAM) can be lost. This can occur with unexpected power outages, or when users unplug devices from the system. However, the Samsung PM983 SSD has been designed to prevent data loss resulting from unexpected power shutdowns with its power-loss protection architecture. Upon detection of a failure, the SSD immediately uses the stored energy from tantalum capacitors to provide enough time to transfer the cached data in DRAM to the flash memory, ensuring no loss of data.

Samsung PM983 specifications

Form factor	NF1	M.2	2.5" U.2
Capacity	3.84 TB, 7.68 TB, and 15.36 TB	960 GB, 1.92 TB, and 3.82 TB	960 GB, 1.92 TB, and 3.82 TB, 7.68 TB
Host interface	PCIe Gen 3 x4 @ 32 Gb/s	PCIe Gen 3 x4 @ 32 Gb/s	PCIe Gen 3 x4 @ 32 Gb/s
NAND flash memory	Samsung V-NAND	Samsung V-NAND	Samsung V-NAND
Power consumption	Active 8.7/10.6 W, Idle 4.0 W (typical)	Active 8W, Idle 2.6 W (typical)	Active 10.6 W, Idle 4.0 W (typical)
Uncorrectable Bit Error Rate (UBER)	1 sector per 10^17 bits read	1 sector per 10^17 bits read	1 sector per 10^17 bits read
Mean Time Between Failure (MTBF)	2,000,000 hours	2,000,000 hours	2,000,000 hours
Endurance	1.3 DWPD for 3 years	1.3 DWPD for 3 years	1.3 DWPD for 3 years
Sequential read	Up to 3,000 MB/s	Up to 3,000 MB/s	Up to 3,200 MB/s
Sequential write	Up to 1,900 MB/s	Up to 1,400 MB/s	Up to 2,000 MB/s
Random read	Up to 520,000 IOPS	Up to 480,000 IOPS	Up to 540,000 IOPS
Random write	Up to 45,000 IOPS	Up to 42,000 IOPS	Up to 55,000 IOPS
Physical Dimensions	30.5 x 110 x 4.8 mm	22 x 110 x 3.8 mm	70 x 100 x 7 mm

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