Samsung PM1733 NVMe SSD

A New Generation of Flash Technology

Product Brief

WELCOME TO A NEW ERA OF PERFORMANCE AND RELIABILITY

Maximize your data transmission and data integrity with Samsung's highly reliable, high-performance PM1733 SSD

Enterprise environments have unique requirements to ensure their storage hardware operates optimally 24/7, 365 days a year. Varied levels of performance with low latency is essential. It is also critical that these environments remain stable when processing countless read and write workloads. The most crucial criteria of all is protection from data corruption or loss due to unexpected power outages. Considering each of these factors, IT and data center managers are tasked with finding high performing and extremely dependable memory solutions.

For the first time, Samsung is introducing three new technologies on a single solid state drive – the PM1733. Samsung's SSD virtualization allows each PM1733 to be divided into 64 separate virtual drives. V-NAND® Machine Learning enables the SSD to accurately predict and verify cell characteristics, as well as detect any variations in circuit patterns. Furthermore, the drive features revolutionary "fail-in-place" (FIP) technology, which allows the PM1733 to identify failing NAND cells, and actually recover then relocate the data without interrupting normal operations or impacting performance. The PM1733 is the first of a new class of "never-die" SSDs - brought to you only by Samsung, the leader in flash technology.

Highlights

Samsung PM1733 delivers:

- **Extreme performance** Featuring support for PCIe Gen 4, the PM1733 delivers up to 7GB/s Sequential and 1.5M IOPS Random Read speeds, making it the highest performing SSD ever.

- **Revolutionary Reliability** Samsung's new Fail-in-Place technology coupled with V-NAND® Machine Learning gives the PM1733 unmatched durability.*

- **Unmatched Flexibility** The PM1733 supports a range of capacities, from 1.6TB to an industry leading 15.36TB. In addition, each PM1733 can be virtually provisioned, offering up to 64 separate virtual drives.

The NVMe advantage

The NVMe protocol was built from the ground up to maximize flash storage performance and minimize latency. PM1733 offers 40% and 60% improvements in latency over SSDs using SAS and SATA protocols.
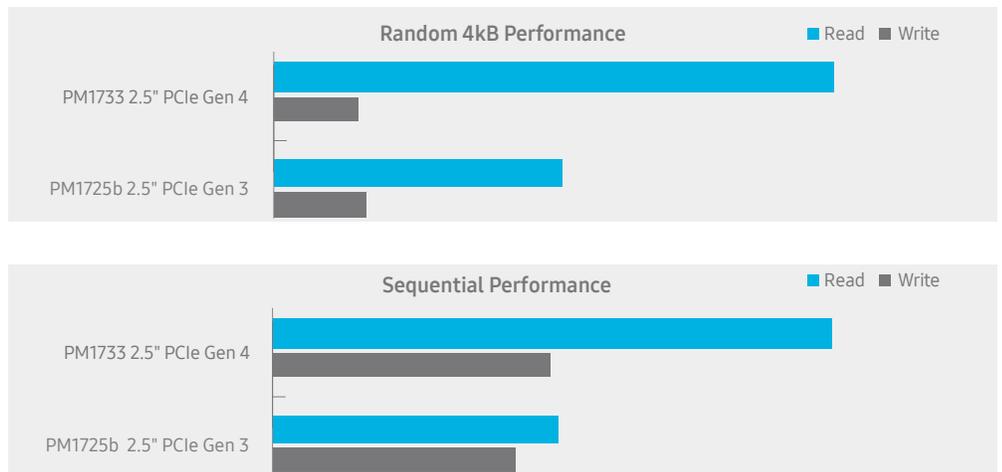
Samsung PM1733 Performance: PCIe Gen 4 vs PCIe Gen 3

Random 4kB Performance — Read, Write

- PM1733 2.5" PCIe Gen 4
- PM1725b 2.5" PCIe Gen 3

Sequential Performance — Read, Write

- PM1733 2.5" PCIe Gen 4
- PM1725b 2.5" PCIe Gen 3

Physical and Digital Flexibility to fit your needs

The PM1733 supports PCIe Gen 3 and PCIe Gen 4, and is available in several capacities. In addition, its firmware can be modified by the user to exchange some drive capacity for additional endurance. These features provide you with the flexibility to bring top-tier performance and reliability to a variety of architectures and environments.

The PM1733 is configured as capacity-optimized, providing 1 DWPD at 1.92TB, 3.84TB, 7.68TB, and 15.36TB. Alternatively, it can be reconfigured for endurance and performance optimization, with 3 DWPD at 1.6TB, 3.2TB, 6.4TB and 12.8TB. The capacity-optimized version is most popular when utilizing dual port functionality in all-flash-array applications.

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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 storage device. In the event of an unexpected power loss, though, the cached data in a 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 PM1733 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.

Delivering highly optimized performance for various data center applications

The Samsung PM1733 SSD is optimized to excel in virtually any data center scenario. This enterprise-level, ultra-high performance SSD provides exceptional random read speeds and is particularly suitable for read-intensive data center applications.

Delivering Dual-Port NVMe to the Enterprise

PM1733 supports dual-port functionality, enabling high-availability via two access paths to the storage array controller. This delivers the reliability, availability and serviceability (RAS) that is required for enterprise storage, allowing SAS SSDs to be replaced by high-performance NVMe SSDs in all-flash-array architectures.

GET THE MOST FROM YOUR FLASH

- Samsung's SSD virtualization technology allows a single SSD to be subdivided into a maximum of 64 smaller SSDs, providing independent virtual workspaces. It also enables SSDs to take on certain tasks typically carried out by the server CPUs, such as Single-Root I/O Virtualization (SR-IOV), requiring fewer server CPUs and SSDs. This significantly reduces the server footprint, for enhanced overall IT efficiency.

- V-NAND® Machine Learning, a new functionality available only on the Samsung PM1733, helps the SSD to accurately predict and verify cell characteristics, as well as detect any variation among circuit patterns through big data analytics. This capability allows the PM1733 to offer the superior data reliability, greater performance, and more efficient use of capacity needed in server and data center storage systems.

Additional Available Features‡

- Fail-In-Place technology: Ensures the SSD operates normally even when errors occur at the chip level.

- Zoned Namespace: PM1733 is capable of supporting ZNS implementations

- FIPS compliance: PM1733 can be FIPS certified to satisfy government requirements.

Samsung PM1733 specifications

Form factor	U.2 / 2.5"
Capacity	1.92 TB, 3.84 TB, 7.68TB, and 15.36TB
Host interface	PCIe Gen 3/4 x4
Spec Compliance	NVMe spec rev. 1.3 PCI Express base specification rev. 4.0
NAND flash memory	Samsung V-NAND®
Power consumption (Active/Idle)	20W/8.5W
Uncorrectable Bit Error Rate (UBER)	1 sector per 10^17 bits read
Mean Time Between Failure (MTBF)	2,000,000 hours
Endurance	1 DWPD for 5 years
Sequential read	**Gen 3:** 3,500 MB/s, **Gen 4:** 7,000 MB/s
Sequential write	**Gen 3:** 3,200 MB/s, **Gen 4:** 3,500 MB/s
Random read	**Gen 3:** 800K IOPS, **Gen 4:** 1.5M IOPS
Random write	**Gen 3 & 4:** Up to 135,000 IOPS
Physical Dimensions	69 x 100 x 15 mm
Encryption Supported	TCG Opal 2.0
Manageability	NVMe-MI 1.0a compliant
Bytes per sector	512, 520, 4096, 4104, 4160 Bytes
Operating Temperature	0 - 70º C

*Additional features require custom firmware implementation. Details available from your Samsung representative.

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