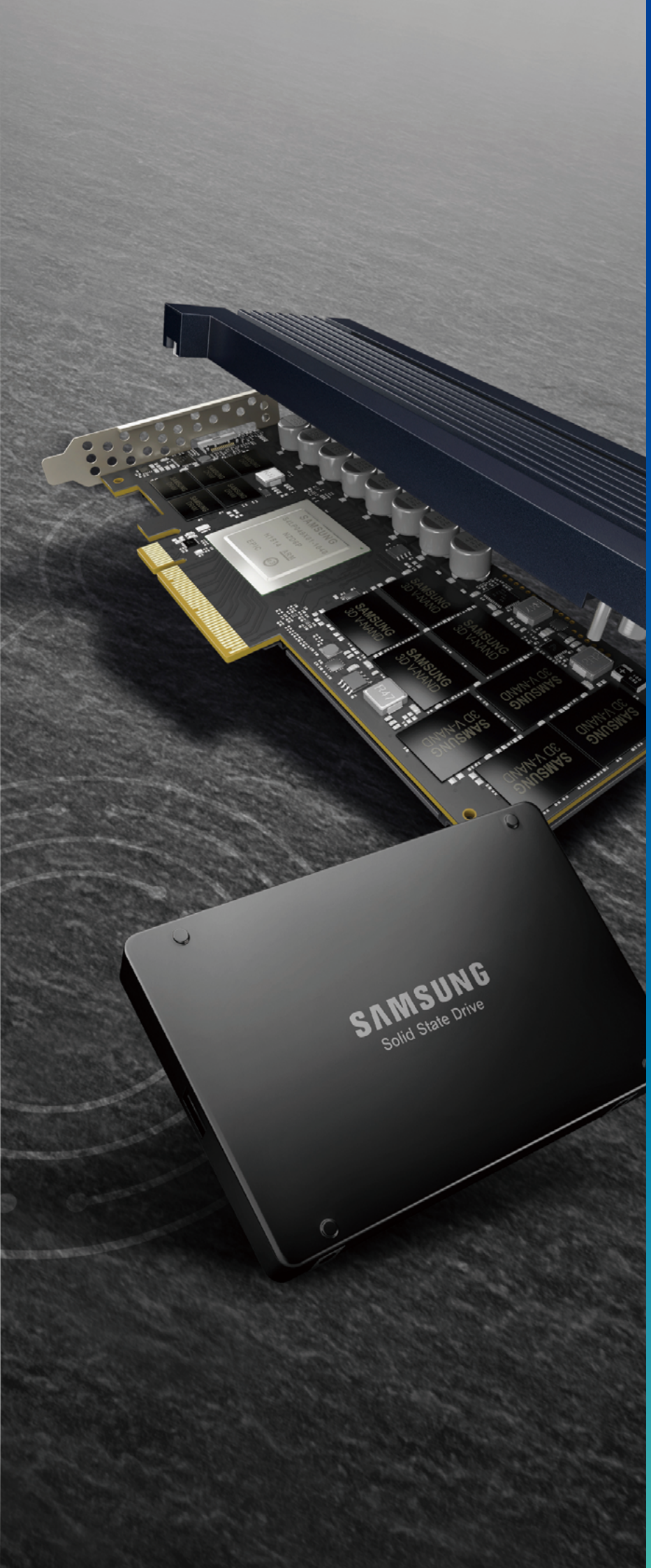

Samsung PM1725a NVMe SSD

Exceptionally fast speeds and low latency for enterprise applications

Brochure

SAMSUNG

Extreme performance from an SSD technology leader

Maximize data transfer with the high-performance, reliable PM1725a

Enterprise environments have unique requirements to ensure that they operate optimally 24/7, 365 days a year. A varied level of performance with low latency is essential. It is also critical that these environments remain stable when processing various read and write workloads. And the most crucial criteria of all are 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, dependable memory solutions. Samsung is well-equipped to offer superb enterprise environment SSDs. The drives deliver exceptional performance in multithread applications, such as compute and virtualization, relational databases, and storage. These high-performing SSDs also provide outstanding reliability for continual operation regardless of unanticipated power loss. Their reliability also extends to non-interrupt service in case a failure occurs on one of the paths to a port. Using its proven expertise and wealth of experience in cutting-edge SSD technology, Samsung memory solutions helps data centers operate continually at the highest performance levels. Samsung has the added advantage of being the sole manufacturer of all of its SSD components. This advantage helps ensure end-to-end integration, quality assurance and the utmost compatibility.

Samsung PM1725a NVMe SSD delivers:

Exceptional value: The PM1725a utilizes Samsung V-NAND flash memory, which features a unique design that stacks 48 layers on top of another. It also employs cost-effective TLC (triple-level cell) flash memory, which delivers higher reliability than MLC (multi-level cell) planar NAND flash memory SSDs. With this architecture, the PM1725a can deliver enterprise-level performance economically.

Consistently high performance: The PM1725a HHHL (half-height, half-length) card delivers a wide bandwidth of up to 6,200/2,600 MB/s sequential R/W speeds respectively, using under 23 W of power. It delivers up to 1,000K and 180K IOPS for random 4KB read and write, respectively. The PM1725a 2.5-inch SSD delivers a bandwidth of up to 3,300/3,000 MB/s for sequential R/W and up to 800K/160K IOPS for random 4KB R/W, respectively. The PM1725a delivers QoS (quality of service, 99%) of 160µs and 100µs for random 4KB writes.

Outstanding reliability: Even though the PM1725a employs a TLC V-NAND flash memory, it boasts 5 DWPD (drive writes per day) for 5 years. This rate translates to writing a total of 32 TB each day during that time, which means users can write 6,400 files of 5 GB-equivalent data every day. This level of reliability is more than sufficient for enterprise storage systems that have to perform ultrafast transmissions of large amounts of data.

High density: By fitting more memory into a V-NAND chip, it provides significantly more capacities of up to 6.4 TB in both the PM1725a 2.5-inch and HHHL card SSDs. Depending on your storage requirements and applications, 800 GB, 1.6TB, 3.2 TB and 6.4 TB capacities are available.

Optimized for enterprise environments

The Samsung PM1725a SSD is optimized to excel in virtually any data center scenario. This enterprise-level, ultra-high performance SSD provides unsurpassed random read performance and is particularly suitable for read-intensive data center applications. When compared with other standardized Samsung SSDs, the PM1725a SSD provides the highest random read IOPS performance. The PM1725a is equipped with Samsung 3rd-generation TLC V-NAND technology. This technology eliminates performance and reliability issues that result from capacity limitations found in planar NAND technologies. The Samsung V-NAND technology delivers reliable and consistent performance at lower costs for today's demanding data-centric world.

Samsung PM1725a puts an end to performance and efficiency bottlenecks

Superb performance over SAS SSDs

The PM1725a uses a state-of-the-art NVMe interface to overcome bottlenecks experienced in SAS (serial-attached SCSI) and SATA interfaces. Furthermore, the PM1725a employs the highest density to successfully process intensive and heavy enterprise workloads. The following figures compare the performance of a Samsung enterprise SAS SSD, which uses MLC V-NAND flash memory, with the TLC-based PM1725a. With comparable cost, the PM1725a provides up to 4.3 times more bandwidth than the MLC-based SAS SSD for sequential read and up to 5 times more IOPS for 4 KB random read.

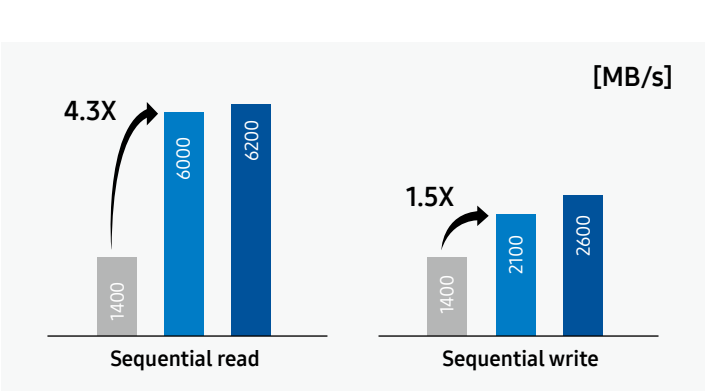

Figure 1. Sequential R/W performance comparison between an MLC SAS SSD and the 1.6 and 3.2 TB TLC PM1725a

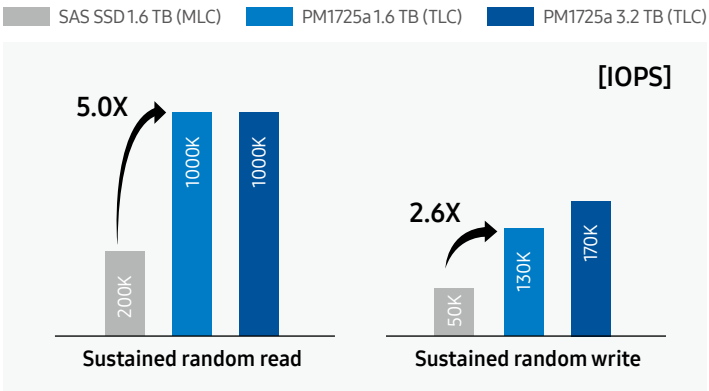

Figure 2. Sustained random R/W performance comparison between an MLC SAS SSD and the 1.6 and 3.2 TB PM1725a

Enterprise-grade power-loss protection

During normal power-off periods, the host server allocates time to maintain data integrity by transmitting standby commands to each device. In the event of an unexpected power loss, though, 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. This process helps ensure no loss of data.

Power loss can occur with power outages or when users unplug devices from the system. However, the PM1725a NVMe SSD has been designed to prevent data loss with its PLP (power-loss protection) architecture. In the event of sudden power off or power failure, the PLP solution can help ensure that data issued by the host system is written to the storage media to reduce the risk of loss of data.

Dual-port capability

IT and data center managers need features that can provide access to storage data without interruptions.

Samsung has taken this need into consideration by including a key feature that provides access by smartly using dual-port PCIe® (PCI Express®) SSDs to get the most out of high availability.

Samsung has enabled this feature in the PM1725a 2.5-inch drives, which provides the ability to create two fault domains and increases availability, providing non-interrupt service for accessing storage data. Even if a failure occurs in one of the paths to a port, preventing access along that path, the device is still accessible using the second port. The PM1725a provides virtually non-stop service with this dual-port feature support.

Multi-namespace

The PM1725a supports multiple namespaces, where a single SSD can be partitioned into multiple hardware partitions.

A namespace can be assigned to multiple hosts or dedicated to a single host. The PM1725a supports up to 32 multiple namespaces.

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Technical specifications

	Samsung PM1725a	
Form factor	2.5 inch	HHHL
Capacity [1]	800 GB, 1.6 TB, 3.2 TB, 6.4 TB	1.6 TB, 3.2 TB, 6.4 TB
Host interface	PCI Express Gen3 x 4, NVMe	PCI Express Gen3 x 8, NVMe
Spec compliance	PCI Express base specification rev. 3.0, NVM Express spec rev. 1.2, enterprise SSD form factor ver. 1.0a	
Sequential read [2]	Up to 3,300 MB/s	Up to 6,200 MB/s
Sequential write [2]	Up to 3,000 MB/s	Up to 2,600 MB/s
Random read	Up to 800,000 IOPS	Up to 1,000,000 IOPS
Random write	Up to 160,000 IOPS	Up to 180,000 IOPS
Latency, read/write [3]	90/30 µs	120/20 µs
Quality of Service, read/write (99%) [4]	170/100 µs	160/100 µs
Power consumption [5]	Active Max. 23 W, Idle : 8 W	Active Max. 21 W, Idle : 7.5 W
Physical dimensions	69.85 x 100.20 x 15.00 mm	69.90 x 167.65 x 18.71 mm
Weight	Max 170 g	Max 310 g
NAND flash memory	Samsung V-NAND	
MTBF [6]	2,000,000 hours	
UBER [7]	1 sector per 1017 bits read	
Endurance [8]	5 DWPD for 5 years	

1. 1TB = 1,000,000,000,000 Bytes, 1GB = 1,000,000,000 Bytes, Unformatted Capacity. User accessible capacity may vary depending on operating environment and formatting.
2. Sequential performance with queue depth 32 by 16 worker and random performance measured using FIO in CentOS 7.0 with queue depth 32 by 16 workers. Actual performance may vary depending on use conditions and environment.. 1 MB/sec = 1,000,000 bytes/sec was used in sequential performance.
3. The random/sequential read/write latency is measured by using FIO in CentOS 7.0 and 4KB transfer size with queue depth 1 on a random/sequential workload of sustained state, respectively.
4. QoS is measured using FIO (99%) with queue depth 1 on 4 KB random read and write as the maximum round-trip time taken for 99 % of commands to host. Performance(IOPS) consistency measured using FIO with queue depth 128. IOPS Consistency (%) = (IOPS in the 99.9% slowest 1-second interval)/(average IOPS during the test).
5. Power consumption was measured in the 12V power pins of the connector plug in SSD. The active and idle power is defined as the highest averaged power value, which is the maximum RMS average value over 100 ms duration. The measurement condition for active power is assumed for 100% sequential read or write using IOMeter2006 on Windows Win Server 2012 R2. The idle state is defined as the state that the host system can issue any commands into SSD at any time.
6. Mean Time between Failures (MTBF) is the estimated time between failures occurring during SSD operation.
7. Uncorrectable Bit Error Rate (UBER) is a metric for the rate of occurrence of data errors, equal to the number of data errors per bits read as specified in the JESD218 document of JEDEC standard.
8. Drive Write Per Day (DWPD), the endurance of SSD in enterprise application is defined as the maximum number of drive writes per day that can meet the requirements specified in the JESD218 document of JEDEC standard.

For more information

For more information about the Samsung PM1725a NVMe SSD, visit **www.samsung.com/semiconductor**.

About Samsung Electronics Co., Ltd.

Samsung inspires the world and shapes the future with transformative ideas and technologies. The company is redefining the worlds of TVs, smartphones, wearable devices, tablets, digital appliances, network systems, and memory, system LSI and LED solutions. For the latest news, please visit the Samsung Newsroom at **news.samsung.com.**

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