PRODUCT BRIEF

Intel® SSD D3-S4510 and D3-S4610 Series
Data Center (DC), SATA (S)

Storage Inspired. Infrastructure Optimized.

Replace HDDs with the highly efficient Intel® SSD D3-S4510 and D3-S4610 Series to reduce storage operating cost, and accelerate read-intensive workloads with power-efficient performance.

Move to more efficient storage while preserving your legacy infrastructure. Replacing HDDs with the Intel® SSD D3-S4510 and D3-S4610 Series based on 64-layer Intel® 3D NAND TLC, reduces the storage operating cost, accelerates read-intensive workloads at higher service levels and improves overall system dependability and flexibility.

These reliable SSDs meet demanding service level requirements while increasing server efficiency. Innovative SATA firmware and the latest generation of Intel® 3D NAND make SSD D3-S4510 and D3-S4610 compatible with existing SATA setups for an easy storage upgrade.

Key Benefits

- **Compatible with existing SATA setups for easy storage upgrade**
- **Up to 6x lower power[3] and lower cooling[3] requirements than 2.5-inch HDDs**
- **3.2x more data in the same amount of space[2]**
- **Up to 4.2x lower annualized failure rates (AFR) for fewer drive replacements[5]**
- **Up to 300x more IOPS/TB[4] than HDDs**

Reduce Operating Cost While Preserving Infrastructure Investment

Built for compatibility with legacy infrastructures, the SSD D3-S4510 and D3-S4610 minimize the costs associated with modernizing your data center. Available in a variety of capacities, from 240GB up to 7.68TB, in a standard 2.5-inch, and M.2 form factor, the larger capacity drives consume up to 6x lower power[1] and have up to 6x lower cooling[1] requirements than 2.5-inch HDDs. The SSD D3-S4510 and D3-S4610 also enable 3.2x more data to be stored in the same amount of space.[2]

Accelerate Read-Intensive Workloads with Power-Efficient Performance

Simply by integrating SSDs into the environment, organizations can improve server agility with up to 300x more IOPS/TB[4] than HDDs, supporting more users and better services to grow the business without expanding the server footprint. Additionally, the Flex Workload feature enables a common drive type to cover more workloads with flexible capacity, flexible endurance, and flexible power-efficient performance.

Improve System Reliability and Flexibility

The reliability of the SSD D3-S4510 and D3-S4610 reduces the need for drive replacement that is necessary with HDDs. With a 4.2x lower annualized failure rate (AFR) compared to HDDs, IT departments will spend less time and expense replacing or upgrading storage devices.[5] Equally important, once the SSDs are installed, the innovative SATA firmware completes updates without reset, reducing downtime.

Minimize Service Disruptions

For years, Intel has been a leader in providing trusted data center SSDs that maximize data continuity in enterprise and cloud data centers. That reputation continues with the D3-S4510 and D3-S4610 and their key capabilities that help ensure more uptime:

- Consistently delivers durable performance to optimize service level continuity
- End-to-end data protection helps keep data safe—even in the event of a power loss
- Up to 4.2x lower annualized failure rates (AFR) means fewer drive replacements[5]
- Innovative firmware completes updates without server reset, reducing downtime
- Simplified configurations reduce risk of component failure and streamline maintenance

Features At-a-Glance[3]	
Capacity	**S4510**: 2.5in - 240GB, 480GB, 960GB, 2TB (1.92TB), 4TB (3.84TB), 8TB (7.68TB)[ǂ] M.2 - 240GB, 480GB, 960GB
	S4610: 2.5in - 240GB, 480GB, 960GB, 2TB (1.92TB), 4TB (3.84TB), 8TB (7.68TB)[ǂ]
Performance[3]	128KB Sequential Read/Write – up to 560/510 MB/s
	S4510: 4KB Random Read/Write – up to 97,000/36,000 IOPS
	S4610: 4KB Random Read/Write – up to 97,000/51,000 IOPS
Reliability	Designed for end-to-end data protection from silent data corruption, uncorrectable bit error rate < 1 sector per 10^{17} bits read
Power	**S4510**: Active power up to 3.6W; Idle power up to 1.1W
	S4610: Active power up to 3.7W; Idle power up to 1.1W
Interface	SATA 6Gb/s
Form Factor	**S4510**: 2.5in x 7mm; M.2 2280
	S4610: 2.5in x 7mm
Media	Intel 3D NAND, TLC
Endurance	**S4510**: up to 2 DWPD
	S4610: 3 DWPD
Warranty	5-year limited warranty

Fore more up-to-date product specifications, visit ark.intel.com

To learn more, visit www.intel.com/ssd

[ǂ]Available in 2019

1. The power and cooling claims are based on measurements versus a market available HDD. Intel® SSD D3-S4510, 960 GB and Seagate Enterprise Performance 10K HDD 900GB 2.5" SAS 12Gbs Model ST900MM0168. Both testing a workload of 128 KB (131,072 bytes) at a Queue Depth equal to 32 sequential writes using FIO*. The benefit calculated as a function of the workload efficiency ratio by lower power ratio. Source – Intel. Source for average power data for Seagate drive from https://www.seagate.com/www-content/datasheets/pdfs/enterprise-performance-10k-hddDS1785-8C-1607US-en_US.pdf
2. Increase data stored per rack unit up to 3.2x vs. 2.5" HDD; Intel® SSD D3-S4510 at 2.5" 7.68TB (available 2019) vs. Seagate Enterprise* Performance 10K SAS HDD 2.5" 2.4TB. Source: Intel
3. System Configuration: Motherboard- H270N-WIFI-CF (Gigabyte Technology Co.); CPU- model name Intel ® Core™ i7-17700 CPU @ 3600Hz; - BIOS version- F8d (American Megatrends Inc.); amount of DRAM- Mem total – 8052144KB; OS version – CentOS 7.5; Kernel version – 4.17; FIO version – 3.1
4. The performance per 1TB claim is based on measurements versus a market available HDD. Intel® SSD D3-S4510, 960 GB and Seagate Enterprise Performance 10K HDD 900GB 2.5" SAS 12Gbs Model ST900MM0168. Both testing a workload of 4 KB (4,096 bytes) at a queue depth equal to 32 random reads using FIO*. Performance advantage is normalized to 1TB of drive capacity. Source – Intel.
5. Based on datasheet AFR target of .44% for Intel® SSD D3-S4510 vs industry AFR Average (1.84%): Source for Intel® SSD D3-S4510 – Intel, source for industry AFR average - Backblaze.com https://www.backblaze.com/blog/hard-drive-stats-for-q1-2018/. For this claim, "better reliability" means a lower annual failure rate (AFR) for the product.

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The benchmark results may need to be revised as additional testing is conducted. The results depend on the specific platform configurations and workloads utilized in the testing, and may not be applicable to any particular user's components, computer system or workloads. The results are not necessarily representative of other benchmarks and other benchmark results may show greater or lesser impact from mitigations.

Tests document performance of components on a particular test, in specific systems. Differences in hardware, software, or configuration will affect actual performance. Consult other sources of information to evaluate performance as you consider your purchase.

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