

## 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, 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 reliability 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.



### Reduce Operating Cost While Preserving Infrastructure Investment

Built for compatibility in 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 form factor, the larger capacity drives consume up to 6x lower power<sup>3</sup> and have up to 6x lower cooling<sup>3</sup> 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.<sup>2</sup>

### Key Benefits

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

### 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<sup>4</sup> 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.<sup>5</sup> 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 with 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<sup>5</sup>
- Innovative firmware completes updates without server reset, reducing downtime
- Simplified configurations reduce risk of component failure and streamline maintenance

Features At-a-Glance <sup>1</sup>	
Capacity	<b>S4510:</b> 2.5in - 240GB, 480GB, 960GB, 2TB (1.92TB), 4TB (3.84TB), 8TB (7.68TB) <sup>‡</sup> <b>S4610:</b> 2.5in - 240GB, 480GB, 960GB, 2TB (1.92TB), 4TB (3.84TB), 8TB (7.68TB) <sup>‡</sup>
Performance <sup>3</sup>	128KB Sequential Read/Write – up to 560/510 MB/s <b>S4510:</b> 4KB Random Read/Write – up to 97,000/36,000 IOPS <b>S4610:</b> 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 <sup>17</sup> bits read
Power	<b>S4510:</b> Active power up to 3.6W; Idle power up to 1.1W <b>S4610:</b> Active power up to 3.7W; Idle power up to 1.1W
Interface	SATA 6Gb/s
Form Factor	<b>S4510:</b> 2.5in x 7mm <b>S4610:</b> 2.5in x 7mm
Media	Intel 3D NAND, TLC
Endurance	<b>S4510:</b> up to 2 DWPD <b>S4610:</b> 3 DWPD
Warranty	5-year limited warranty



To learn more, visit [www.intel.com/ssd](http://www.intel.com/ssd)

<sup>‡</sup>Available in 2019

1. 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

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. 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](https://www.seagate.com/www-content/datasheets/pdfs/enterprise-performance-10k-hddDS1785-8C-1607US-en_US.pdf)

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.

Intel technologies' features and benefits depend on system configuration and may require enabled hardware, software or service activation. Performance varies depending on system configuration. No computer system can be absolutely secure. Check with your system manufacturer or retailer or learn more at intel.com.

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.

No license (express or implied, by estoppel or otherwise) to any intellectual property rights is granted by this document. Intel disclaims all express and implied warranties, including without limitation, the implied warranties of merchantability, fitness for a particular purpose, and non-infringement, as well as any warranty arising from course of performance, course of dealing, or usage in trade.

All information provided here is subject to change without notice. Contact your local Intel sales office or your distributor to obtain the latest specifications and before placing your product order. The products described in this document may contain design defects or errors known as errata which may cause the product to deviate from published specifications. Current characterized errata are available on request.

Results have been estimated or simulated using internal Intel analysis or architecture simulation or modeling, and provided to you for informational purposes.

Cost reduction scenarios described are intended as examples of how a given Intel-based product, in the specified circumstances and configurations, may affect future costs and provide cost savings. Circumstances will vary. Intel does not guarantee any costs or cost reduction.

Intel and the Intel logo are trademarks of Intel Corporation in the U.S. and/or other countries. \*Other names and brands may be claimed as the property of others.