



# Ultrastar® SS300

## Highlights

- 3D MLC or TLC NAND Flash for ultra-high performance and endurance
- Best IOPs/Watt for reduced TCO
- 12Gb/s SAS interface for maximum throughput
- Advanced power loss data management technology
- Self-encrypting models conform to TCG's Enterprise specification

## Applications/Environments

- Ultra-high performance tier-0 enterprise storage
- Enterprise-class servers and high performance computing
- Space and/or power constrained environments
- Online Transaction Processing (OLTP)
- Video pre/post-production
- Financial and e-commerce
- Database analytics



3.2TB – 400GB | MLC  
7.68TB – 480GB | TLC  
2.5-inch SFF | SAS 12Gb/s

## Increase Productivity and Operational Efficiency by Boosting IOPS Performance with SAS SSDs

As data centers and enterprises struggle to manage the growing abundance and availability of data, the next generation of SAS SSDs with enhanced performance and endurance arrives to help address data access challenges. The Ultrastar® SS300 solid-state drive (SSD) is offered in a 2.5-inch small form factor that delivers ultra-high performance to power through the most challenging workloads.

Designed with a 12Gb/s SAS interface for seamless integration into enterprise environments, the Ultrastar SS300 delivers high sequential throughput, up to 2100MB/s read at 14W power. Available with capacities from 7.68TB to 400GB, the SS300 delivers up to 400,000 read and 200,000 write IOPS—double the speed of current 12Gb/s SSDs—providing rapid access to “hot” enterprise data for higher productivity and operational efficiency. The Ultrastar SS300 family offers significant value in terms of IOPS per Watt, reducing total cost of ownership (TCO) through low power consumption, efficient cooling and reduced space requirements.

## Data Durability and Security with Industry-Leading Quality and Reliability

Ultrastar SS300 combines enterprise-grade 3D MLC or TLC NAND flash memory, advanced endurance management firmware and power loss data management techniques to extend reliability, endurance, and sustained performance over the life of the SSD. The Ultrastar SS300 family achieves an extraordinary 0.35% annual failure rate (AFR) or 2.5 million hours mean-time-between-failure (MTBF). The 3.2TB 10 DW/D capacity Ultrastar SSD endures up to 59 petabytes (PB) of random writes over the life of the drive—the equivalent of writing 16 terabytes (TB) per day for five years.

For complete end-to-end data protection and reliability, the Ultrastar SS300 family incorporates the T10 Data Integrity Field (DIF) standard, extended error correction code (ECC), Exclusive-OR (XOR) parity to protect against flash die failure, parity-checked internal data paths without an external write cache, and an exclusive power loss data management feature that does not require supercapacitors. The Ultrastar SS300 family is backed by a five year limited warranty, or the maximum Petabytes (PB) written (based on capacity), whichever comes first.

## Trust Your Storage Systems with SSD Products Developed by Experts in Enterprise Storage

The HGST brand leverages decades of proven enterprise storage expertise in Serial Attached SCSI (SAS) design, reliability, firmware, customer qualification and system integration to the Ultrastar SS300 family. The synergistic relationship between the new throughput-enhancing SSDs and traditional HDDs provides cost effective, end-to-end enterprise-class storage options, delivering reliability, compatibility, capacity, cost and system performance. This combination makes HGST-brand storage drives an ideal choice to help meet escalating reliability, endurance, and performance in the most demanding enterprise environments.

## Features & Benefits

Feature / Function	Benefits
<b>Performance</b> <ul style="list-style-type: none"> <li>• SAS 12Gb/s interface</li> <li>• MLC NAND flash memory</li> <li>• 2100 / 2050 MB/s sequential R/W</li> <li>• 400K / 200K IOPS random R/W</li> <li>• 285K IOPS on 70/30 mixed R/W</li> </ul>	<ul style="list-style-type: none"> <li>• 12G Active-Active Dual port &amp; 12G single/dual port for enhanced reliability</li> <li>• Highest read/write performance at 14W operating power</li> <li>• Maximum throughput and IOPs for ultra-fast access to data. Double write performance of other 12Gb/s SAS SSD</li> </ul>
<b>Power</b> <ul style="list-style-type: none"> <li>• 9, 11 &amp; 14 Watt options</li> </ul>	<ul style="list-style-type: none"> <li>• Higher IOPS performance with higher power options</li> </ul>
<b>Capacity</b> <ul style="list-style-type: none"> <li>• 7.68TB to 400GB</li> </ul>	<ul style="list-style-type: none"> <li>• More capacity in standard form factor with lower Watts/TB</li> </ul>
<b>Reliability</b> <ul style="list-style-type: none"> <li>• 0.35% AFR (2.5M hours MTBF)</li> <li>• 1E-17 bit error rate</li> <li>• Power loss data management</li> <li>• Unlimited reads, up to 59 PB writes</li> <li>• T10 end-to-end data protection</li> <li>• Exclusive-OR (XOR) NAND</li> </ul>	<ul style="list-style-type: none"> <li>• Reduced field replacement effort</li> <li>• Enhanced error detection and correction for optimal data integrity</li> <li>• Assures data integrity during power failure</li> <li>• Support for extreme write-intensive applications</li> <li>• Protection against flash die failure</li> </ul>
<b>Data Security</b> <ul style="list-style-type: none"> <li>• Crypto Sanitize models</li> <li>• TCG encryption models</li> <li>• TCG + FIPS encryption models</li> </ul>	<ul style="list-style-type: none"> <li>• Enables swift drive redeployment and retirement</li> <li>• Hardware-based encryption protects data from unauthorized use</li> </ul>
<b>Integration</b> <ul style="list-style-type: none"> <li>• HDD architecture commonality</li> <li>• Extensive systems integration and test lab</li> </ul>	<ul style="list-style-type: none"> <li>• Compatibility with Ultrastar SAS HDD</li> <li>• Experienced interoperability and compliance testing</li> </ul>



a Western Digital brand

# Ultrastar® SS300

## Specifications

	MLC NAND Technology		TLC NAND Technology
<b>Model:</b>	x in Model Number denotes Encryption level: 0 = Instant Secure Erase 1 = TCG Encryption 4 = No Encryption, Secure Erase 5 = TCG + FIPS		
	HUSMM3232ASS20x HUSMM3216ASS20x HUSMM3280ASS20x HUSMM3240ASS20x	HUSMR3232ASS20x HUSMR3216ASS20x HUSMR3280ASS20x HUSMR3240ASS20x	HUSTR7676ASS20x HUSTR7638ASS20x HUSTR7619ASS20x HUSTR7696ASS20x HUSTR7648ASS20x
<b>Configuration</b>	SAS 6/12Gb/s supports Wide port @ 12Gb/s		
Interface	SAS 6/12Gb/s supports Wide port @ 12Gb/s		
Capacity <sup>1</sup>	3.2TB/1.6TB/800GB/400GB		768TB/3.84TB/1.9TB/960GB/480GB
Endurance (Drive Writes per Day - DW/D) <sup>2</sup>	10		3
Endurance (max PB, Rnd write) <sup>2</sup>	59 / 29 / 15 / 7		175 / 8.5 / 4.5 / 2
Form Factor	2.5-inch SFF		
Flash Memory Technology	3D Multi-Level Cell (MLC) NAND		3D Tri-Level Cell (TLC) NAND
<b>Performance<sup>3</sup></b>			
Read Throughput (max MB/s, Seq, 128KiB)	2100		2100
Write Throughput (max MB/s, Seq, 128KiB)	2050		1250
Read IOPS (max, Rnd 4KiB)	400K		400K
Write IOPS (max, Rnd 4KiB)	200K		170K
Mixed IOPS (70/30 R/W, max R/W, 4KiB)	285K		265K
Latency <sup>4</sup> (µs, max)	85		85
<b>Reliability</b>			
Error Rate (non-recoverable, bits read)	1 in 10 <sup>17</sup>		
MTBF <sup>5</sup> (M hours)	2.5		
Annualized Failure Rate <sup>4</sup> (AFR)	0.35%		
Availability (hrs/day x days/week)	24x7		
Limited Warranty <sup>6</sup>	5 years or Max PB written, whichever occurs first		
<b>Power</b>			
Requirement (+/- 5%)	+5 VDC, +12VDC		
Operating Modes (W, typical)	9, 11, 14		
Idle (W, max)	<3.2TB: 3.7, ≥ 3.2TB: 4.7		
<b>Physical Size</b>			
z-height (mm)	15		
Dimensions (width x depth, mm)	70.1 x 100.6		
Weight (max, g)	140		
<b>Environmental</b>			
Operating Temperature <sup>7</sup>	0° to 60° C		
Non-operating Temperature	-40° to 80° C		
Shock (half-sine wave, G)	1000G (0.5ms), 500G (2ms)		
Vibration, random (G RMS, 5 to 700Hz)	2.16 (XYZ)		

### How to Read the Ultrastar Model Number

HUSMM3232ASS201=3.2TB, SAS 12Gb/s, TCG encryption

H = HGST

U = Ultrastar

S = Standard

MM = NAND type/endurance

(MM=MLC/mainstream endurance, MR=MLC/read-intensive,

TR=TLC/read intensive)

32 = Full capacity (3.2TB)

32 = Capacity of this model

(76=7.6TB, 38=3.84TB 32=3.2TB, 19=1.92TB, 16=1.2TB,

96=960GB, 80=800GB, 48=480GB, 40=400GB)

A = Generation code

S = Small form factor (2.5" SFF)

S2 = Interface, SAS 12Gb/s

1 = Encryption setting

(0=Instant Secure Erase, 1=TCG encryption,

4=No encryption/Secure Erase, 5 = TCG+FIPS)

<sup>1</sup> One megabyte (MB) is equal to one million bytes, one gigabyte (GB) is equal to 1,000MB (one billion bytes) and one terabyte (TB) is equal to 1,000GB (one trillion bytes) when referring to solid-state capacity. Accessible capacity will vary from the stated capacity due to formatting and partitioning of the drive, the computer's operating system, and other factors.

<sup>2</sup> Endurance rating based on DW/D using 4KiB random write workload over 5 years.

<sup>3</sup> Performance will vary by capacity point, or with the changes in useable capacity. Consult product manual for further details. All performance measurements are in full sustained mode and are peak values. Preliminary and subject to change.

<sup>4</sup> Average R/W latency at 4KiB QD=1

<sup>5</sup> MTBF and AFR targets are based on a sample population and are estimated by statistical measurement and acceleration algorithms under median operating conditions. MTBF and AFR rating do not predict an individual drive's reliability and do not constitute a warranty.

<sup>6</sup> The warranty for the product will expire on the earlier of (i) the date when the flash media has reached one-percent (1%) of its remaining life or (ii) the expiration of the time period associated with the product.

<sup>7</sup> Internal drive temperature as measured via the drive's temperature sensor.