

Ultrastar™ SSD400M

Enterprise Solid State Drives

Highlights

- MLC NAND Flash for ultra-high performance and endurance
- Best IOPS/Watt for reduced TCO
- 6Gb/s SAS interface for maximum throughput
- Advanced Power-loss Data Management technology
- Trusted Computing Group's (TCG) Self-encrypting models designed to Enterprise A 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 eCommerce
- Database Analytics
- Cloud Computing

Features and Benefits

	Feature / Function	Benefits
Performance	SAS 6Gb/s MLC NAND Flash Memory 495 / 385 MB/s Sequential R/W 56K / 24K IOPS Random R/W	Supports dual port for enhanced reliability Highest write performance Max throughput and IOPs for ultra-fast access to data 100x faster than typical HDD
Power	5.5 Watts, typical	Up to 60% less power than 3.5-inch 15K RPM HDD
Capacity¹	400GB, 200GB	More capacity for less space and power
Reliability	0.44% AFR (2M Hours MTBF ²) 1E-16 Bit Error Rate (BER) T10 End-to-end Data Protection Exclusive-OR (XOR) NAND Power-loss Data Management Unlimited reads, up to 7.3PB ¹ writes (400GB)	Reduced field replacement effort Enhanced error detection and correction for optimal data integrity Protection against flash die failure Enhances data integrity during power failure Maximum endurance over the life of SSD
Integration	HDD architecture commonality Global Systems Integration & Test Labs	Compatibility with Ultrastar SAS/FC HDD Extensive interoperability and compliance testing

Proven Enterprise Storage Experience

HGST leverages decades of proven enterprise storage expertise in Serial Attached SCSI (SAS) design reliability, firmware, customer qualification and system integration to the new Ultrastar SSD400M solid-state drive (SSD) family. The synergistic relationship between HGST's new throughput-enhancing SSDs and traditional HDDs provides cost effective, end-to-end enterprise-class storage solutions, delivering reliability, compatibility, capacity, cost and system performance. This combination makes HGST a leading HDD/SSD provider with the experience and technology needed to meet escalating reliability, endurance, and performance in the most demanding enterprise environments.

Maximum Performance, Reliability and Endurance

The new Ultrastar SSD400M delivers high sequential throughput, up to 495MB/s read and 385MB/s write (6Gb SAS) in a compact 2.5-inch form factor. The SSD400M also delivers up to 56,000 read and 24,000 write IOPS, reaching speeds 100 times faster than HDDs, allowing rapid access to "hot" enterprise data for improved productivity and operational efficiency. Since fewer SSDs are required to achieve the same HDD IOPS performance, the Ultrastar SSD400M family offers significant value in terms of IOPS per Watt, while reducing total cost of ownership (TCO) through low power consumption, efficient cooling and reduced space requirements.

The Ultrastar SSD400M combines enterprise-grade MLC 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. This MLC SSD from HGST achieves an extraordinary 0.44% annual failure rate (AFR) or two-million-hour mean time between failure (MTBF). The 400GB capacity Ultrastar SSD400M endures up to 7.3 petabytes (PB) of random writes over the life of the drive – the equivalent of writing 4 terabytes (TB) per day for five years.

For complete end-to-end data protection and reliability, the Ultrastar SSD400M 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 SSD400M family is backed by a five-year limited warranty, or the maximum petabytes (PB) written (based on capacity).



400GB and 200GB MLC
2.5-inch SFF | SAS 6Gb/s



HGST Quality and Service

HGST's Ultrastar SSD400M family extends the company's long-standing tradition of performance and reliability leadership. A balanced combination of new and proven technologies enables high reliability and availability to customer data.

HGST drives are backed by an array of technical support and services, which may include customer and integration assistance. HGST is dedicated to providing a complete portfolio of HDD/SSD solutions to satisfy today's monumental computing needs.

How to read the Ultrastar model number

HUSML4040ASS600 = 400GB, SAS 6Gb/s

H = HGST

U = Ultrastar

S = Standard

ML = Multi-level cell (NAND)

40 = Full capacity — 400GB

40 = Capacity this model, 40 = 400GB
(20 = 200GB, 10 = 100GB)

A = Generation code

S = Small Form Factor (vs. L for Large FF)

S6 = Interface, SAS 6Gb/s

0 = Reserved

0 = Reserved (1= TCG Encryption)

Information and Technical Support

www.hgst.com (Main Web site)

www.hgst.com/partners (Partner Web site)

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Asia Pacific

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Program Support

Partners First Program

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Specifications

Models	HUSML4040ASS600 HUSML4040ASS601 HUSML4020ASS600 HUSML4020ASS601
Configuration	
Interface	SAS 6Gb/s
Capacity (GB) ¹	400 / 200
Form factor	2.5-inch SSD
Flash memory technology	Multi-level cell (MLC)
Performance	
Read Throughput (max MB/s, sequential 64K)	495
Write Throughput (max MB/s, sequential 64K)	385
Read IOPS (max IOPS, random 4K)	56,000
Write IOPS (max IOPS, random 4K)	24,000
Reliability	
Error rate (non-recoverable, bits read)	1 in 10 ¹⁶
MTBF ² (M hours)	2.0
Availability (hrs/day x days/wk)	24x7
Endurance (max PB ¹ , random write)	7.3 / 3.7
Power	
Requirement	+5 VDC (+/-5%) +12 VDC (+/-5%)
Operating, (W, typical)	5.5
Idle (W)	1.7
Power consumption efficiency (IOPS/Watt)	8,360
Physical size	
z-height (mm)	15.0
Dimensions (width x depth, mm)	70.1 x 100.6
Weight (g, max)	187
Environmental (operating)	
Ambient temperature	0° to 60° C
Shock (half-sine wave)	1000G (0.5ms) 500G (2ms)
Vibration, random (G RMS)	2.16, all axes 5 to 700 Hz
Environmental (non-operating)	
Ambient temperature	-55° to 95° C
Shock (half-sine wave)	1000G (0.5ms) 500G (2ms)
Vibration, random (G RMS)	2.16, all axes 5 to 700 Hz

¹ One gigabyte (GB) is equal to one billion bytes when referring to hard drive and SSD capacity. One terabyte (TB) equals 1,000GB, and one petabyte (PB) equals 1,000TB. Accessible capacity will vary depending on the operating environment and formatting.

² MTBF target is based on a sample population and is estimated by statistical measurements and acceleration algorithms under nominal operating conditions. MTBF ratings are not intended to predict an individual drive's reliability. MTBF does not constitute a warranty.

