Ultrastar™ SSD400S
ENTERPRISE SOLID STATE DRIVES

HITACHI
Inspire the Next

Enterprise-class SSDs deliver ultra-high performance, reliability and endurance

Highlights
> SLC NAND Flash for ultra-high performance and endurance
> Best IOPS/Watt for reduced TCO
> 6Gb/s SAS or 4Gb/s FCAL interfaces for maximum throughput
> Advanced Power-loss Data Management technology

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)
> Database Analytics
> Cloud Computing
> Video pre-production
> Financial, eCommerce

400GB | SLC
3.5-inch LFF | FCAL 4Gb/s
2.5-inch SFF | SAS 6Gb/s

Features and Benefits

	Feature / Function	Benefits
Performance	SAS 6Gb/s or FCAL 4Gb/s SLC NAND Flash Memory 516 / 458 MB/s Sequential R/W 41K / 21K IOPS Random R/W	Supports dual port for enhanced reliability Highest write performance and endurance Max throughput and IOPs for ultra-fast access to data. 100x faster than typical HDD
Power	5.5 Watts, typical	Power efficient operation, up to 60% less power than 3.5" 15K RPM HDDs
Capacity[1]	400GB, 200GB, 100GB	More capacity for less space and power
Reliability	0.44% AFR (2M Hours MTBF) 1E-16 Bit Error Rate (BER) T10 End-to-end Data Protection Exclusive-OR (XOR) NAND Power-loss Data Management Unlimited reads, up to 35PB writes	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
Hitachi GST leverages decades of proven enterprise storage expertise in Serial Attached SCSI (SAS) and Fibre Channel (FC) design reliability, firmware, customer qualification and system integration in the new Ultrastar™ SSD400S solid-state drive (SSD) family. The synergistic relationship between Hitachi'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. Hitachi GST storage products are the clear choice for the most demanding enterprise environments.

Maximum performance, reliability and endurance
The new Ultrastar SSD400S family delivers the highest sequential throughput, up to 516MB/s read / 458MB/s write, and up to 41K read / 21K write random IOPS. Reaching speeds 100 times faster than HDDs, SSDs enable 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 new Ultrastar SSD400S 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 SSD400S family combines enterprise-grade SLC NAND flash memory, advanced endurance management firmware and exclusive Power-loss Data Management technology to extend reliability, endurance, and sustained performance over the life of the SSD. The Ultrastar SSD family achieves an extraordinary 0.44% annual failure rate (AFR) and endures up to 35PB of random writes over the life of the drive—the equivalent of writing 19.2 TB per day for five years! For complete end-to-end data protection and reliability, the Ultrastar SSD400S family incorporates the T10 Data Integrity Field (DIF) standard, extended error correction code (ECC), Exclusive-OR (XOR) parity to protect against flash die failure and parity-checked internal data paths without an external write cache. The Ultrastar SSD400S family is backed by a five-year limited warranty.

Eco-friendly storage
The Ultrastar SSD400S family demonstrates Hitachi ecological leadership with its halogen-free design and power-efficient operation. Both these features helped qualify the drive for the Hitachi EcoTrac classification, which identifies products that minimize environmental impact in the areas of product design, manufacturing, operation and disposal.

Ultrastar™ SSD400S

Specifications

Model(s)	HUSSL4040ASS600 HUSSL4020ASS600 HUSSL4010ASS600	HUSSL4040ALF400 HUSSL4020ALF400 HUSSL4010ALF400
Configuration		
Interface	SAS 6Gb/s	FCAL 4Gb/s
Capacity (GB)[1] at 512 Bytes/sector	400 / 200 /100	←
Form factor	2.5"	3.5"
Flash memory technology	Single-level cell (SLC)	←
Performance		
Read Throughput (max MB/s, sequential 64K)	516	390
Write Throughput (max MB/s, sequential 64K)	458	340
Read IOPS (max IOPS, random 4K)	41,000	←
Write IOPS (max IOPS, random 4K)	21,000	←
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)	35 / 18 / 9	←
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	15.25
Dimensions (width x depth, mm)	70.1 x 100.6	101.6 x 147.0
Weight (g, max)	187	227
Environmental (Operating)		
Ambient temperature	0 to 60° C	←
Shock (half-sine wave)	1000G (0.5ms) 500G (2ms)	← ←
Vibration, random (G RMS)	2.17, all axes 5 to 700 Hz	← ←
Environmental (Non-operating)		
Ambient temperature	-55 to 95° C	←
Shock (half-sine wave)	1000G (0.5ms) 500G (2ms) 100G (11ms)	← ← ←
Vibration, random (G RMS)	3.13, all axes 5 to 800 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.

Hitachi quality and service

Hitachi's Ultrastar SSD400S 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.

Hitachi drives are backed by an array of technical support and services, which may include customer and integration assistance. Hitachi 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
HUSSL4040ASS600 = 400GB, SAS 6Gb/s
H = Hitachi
U = Ultrastar
S = Standard
SL = Single-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 (F4 = FCAL 4Gb/s)
0 = Reserved
0 = Reserved

Information and Technical Support
www.hitachigst.com (Main Web site)

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

North America
support_usa@hitachigst.com
Toll free: 1 888 426-5214

Asia Pacific
support_ap@hitachigst.com / 65 6840 9595

EMEA and UK
support_uk@hitachigst.com / 44 20 7133 0032

Germany
support_uk@hitachigst.com / 49 6929 993601

Program Support
Partners First™ Program
channelpartners@hitachigst.com

Hitachi Global Storage Technologies