Product Overview

CHEETAH 15K.5

Best price/performance, lowest cost of ownership disc drive

300, 146 and 73GB • 15K RPM • Ultra320 SCSI
3 Gbit/sec SAS • 4 Gbit/sec FC

Key Features and Benefits

- Perpendicular recording is fundamentally superior, delivering 300GB capacity with 30 percent faster sequential performance and the highest reliability rating of any 3.5-inch drive in the industry.
- Enables higher performance with fewer drives, reducing supporting infrastructure, maintenance and space needs while boosting system reliability
- 30 percent more IOPS and over 20 percent faster response times than 3.5-inch 10K drives; first drive to break 100-Mbyte sustained transfer rate barrier
- Reduces RAID rebuild times while minimizing reliability risk exposure; nonrecoverable error rate has been improved by a factor of 10.

Best-Fit Applications

All mainstream enterprise applications, such as:

- E-mail
- Business processing
- Transaction processing
- Decision support
- Storage Area Networks (SAN)
- Networked Attached Storage (NAS)
- Internet and e-commerce

**Seagate
5-Year
Warranty**

CHEETAH 15K.5

Best price/performance, lowest cost of ownership disc drive

Seagate

Product Description

The new Cheetah 15K.5 enterprise disc drive employs innovative perpendicular recording technology to set new standards for storage cost-effectiveness. While doubling available capacity to 300GB, the Cheetah 15K.5 also delivers 36 percent higher sequential performance. This enables enterprises to meet their throughput and capacity requirements with fewer drives, significantly reducing total cost of ownership (TCO). Seagate® designed the Cheetah 15K.5 for maximum reliability in demanding enterprise applications, including a nonrecoverable error rate that's been improved by a factor of 10. Cheetah 15K.5 incorporates such Seagate-exclusive features as IRAW (Idle Read After Write), enhanced ECC (Error Correction Code) and BMS (Background Media Scan) to safeguard data integrity in the most rigorous environments.

The Seagate Advantage

- Fifth-generation Cheetah 15K is the fastest, highest capacity and most reliable ever; delivers lower TCO for a wide variety of enterprise applications.

- Cheetah 15K.5 employs perpendicular recording technology to deliver 300GB capacity with 30 percent faster sequential performance.

- Nonrecoverable error rate has been improved by a factor of 10, safeguarding data integrity and reducing risk exposure during RAID rebuilds.

Enabling New Opportunities

- Cheetah 15K.5 drives employ perpendicular recording to enable systems with an unprecedented blend of storage performance, capacity and reliability.

- Cheetah 15K.5 drives offer lasting value, ensuring systems can keep up with growing performance and capacity needs over a longer period of time.

- Cheetah 15K drives have the highest field-proven reliability of any 3.5-inch drives in the world, and boost system reliability even further due to the need for fewer drives.

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Specifications

Capacity (GB)	300, 146, 73
Seek Time, Read/Write (average, msec)	3.5/4.0
Transfer Rate, Sustained (Mbytes/sec)	Up to 125
Reliability Rating at Full 24x7 Operation (AFR)	0.62%
Nonrecoverable Read Errors per Bits Read	1 sector per 10^{16}
Power Consumption SCSI (W, Idle)	12.6 (300GB), 8.0 (146GB), 8.1 (73GB)
Interface	Ultra320 SCSI, 3 Gbit/sec Serial Attached SCSI (SAS), 4 Gbit/sec Fibre Channel
Warranty (years)	5

Cheetah® 15K.5

Mainstream enterprise hard drive storage

Seagate

Lowest Cost of Ownership

- Fifth-generation Cheetah 15K drive is the fastest, highest capacity and most reliable ever.
- Cheetah 15K.5 drive performance and reliability enable lower TCO for enterprise applications.
- 15K RPM and fast seek times deliver the fastest time-to-data, resulting in 30 percent more IOPS and over 20 percent faster response times than 3.5-inch 10K drives.
- Higher performance with fewer drives—reducing support infrastructure, physical space requirements and storage management costs
- The highest reliability of any 3.5-inch drive, and increased system reliability due to the need for fewer drives

Highest Reliability

- Seagate continues to focus on reliability and data protection. New features in this generation have improved the nonrecoverable error rate by a factor of 10.
- Seagate-exclusive IRAW (Idle Read After Write) enhances data protection by verifying—during drive idle time—that data in the drive buffer was properly written.
- Seagate-exclusive enhanced Error Correction Code better maintains performance throughout the life of the drive and reduces the probability of lost data.
- The second generation of Seagate-exclusive Background Media Scan (BMS) proactively scans the media for potential defects during drive idle time. It enables incipient errors to be corrected before data is lost.
- The Cheetah 15K.5 drive is designed and manufactured by the same teams that successfully delivered the past four award-winning generations.

Seagate Service Centers—Worldwide Support

- Presales and technical support at 1-800-SEAGATE
- Expert email support and complete historical web content available online
- Experienced support staff
- Seagate Design Service Centers (DSC) help companies transform innovative ideas into viable products.
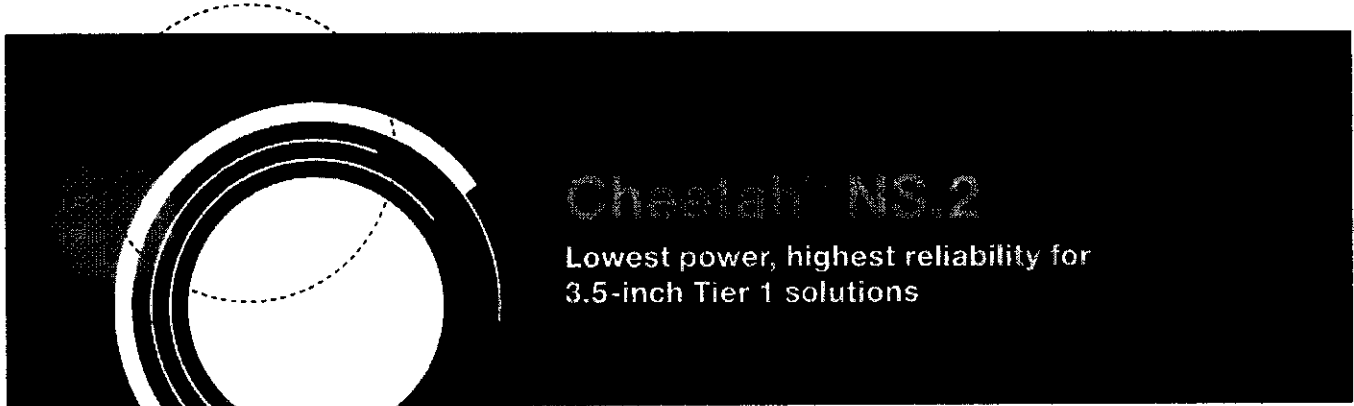
Specifications	300 GB[1]	146.8 GB[1]	73.4 GB[1]
Model Number	ST3300855LW/LC/FC/SS	ST3146855LW/LC/FC/SS	ST373455LW/LC/FC/SS
Capacity			
Formatted 512 Kbytes/Sector (GB)	300	146.8	73.4
External Transfer Rate (MB/s)			
Ultra320 SCSI	320	320	320
4-Gb/s Fibre Channel	400	400	400
3-Gb/s Serial Attached SCSI	300	300	300
Performance			
Spindle Speed (RPM)	15K	15K	15K
Average Latency (ms)	2.0	2.0	2.0
Seek Time			
Average Read/Write (ms)	3.5/4.0	3.5/4.0	3.5/4.0
Track-to-Track Read/Write (ms)	0.2/0.4	0.2/0.4	0.2/0.4
Transfer Rate			
Internal (Mb/s)	960 to 1607	960 to 1607	960 to 1607
Internal Formatted (MB/s)	89 to 150	89 to 150	89 to 150
Sustained (MB/s)	73 to 125	73 to 125	73 to 125
Cache, Multisegmented (MB/s)	16	16	16
Configuration/Organization			
Discs	4	2	1
Heads	8	4	2
Nonrecoverable Read Errors per Bits Read	1 sector per 10E16	1 sector per 10E16	1 sector per 10E16
Annualized Failure Rate (AFR)	0.62%	0.62%	0.62%
Power Management			
Typical (W)			
SCSI	17.6	14.2	13.6
Fibre Channel	18.8	16.5	14.7
SAS	17.4	14.9	13.7
Power Idle (W)			
SCSI	12.5	9.6	8.1
Fibre Channel	13.7	10.7	9.2
SAS	13.2	11.2	8.4
Environmental			
Temperature, Operating (°C)	5 to 55	5 to 55	5 to 55
Temperature, Nonoperating (°C)	–40 to 70	–40 to 70	–40 to 70
Shock, Operating: 2 ms (Gs)	60	60	60
Shock, Nonoperating: 2 ms (Gs)	250	250	250
Acoustics Idle (bels—sound power)	3.6	3.6	3.6
Vibration, Operating: <400 Hz (Gs)	1.0	1.0	1.0
Vibration, Nonoperating: <400 Hz (Gs)	2.0	2.0	2.0
Physical			
Height (in/mm)	1.0/25.4	1.0/25.4	1.0/25.4
Width (in/mm)	4.0/101.6	4.0/101.6	4.0/101.6
Depth (in/mm)	5.75/146.05	5.75/146.05	5.75/146.05
Weight (lb/kg)	1.5/0.771	1.5/0.771	1.5/0.771
Warranty			
Limited Warranty (years)	5	5	5

[1] One gigabyte, or GB, equals one billion bytes when referring to hard drive capacity.

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Seagate ®

Cheetah NS.2

Lowest power, highest reliability for
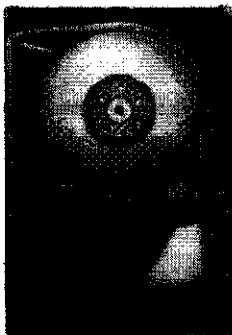3.5-inch Tier 1 solutions

600, 450 and 300 GB · 10K RPM · 6-Gb/s SAS 2.0 (600 GB and 450 GB) and 4-Gb/s FC

Key Advantages

- Lowest-power 3.5-inch Tier 1 drive (over 20 percent lower than any other 3.5-inch Tier 1 drive)
- Highest-capacity Tier 1 drive (600 GB)
- Highest reliability rating in the industry
- Seagate PowerTrim™ technology dynamically reduces power usage.
- Supports 6-Gb/s SAS 2.0 (600 GB and 450 GB) and 4-Gb/s FC
- Government-grade Self-Encrypting Drive option[1]

Best-Fit Applications

- Email
- Business processing
- Transaction processing
- Decision support
- Storage area networks
- Networked attached storage
- Internet and e-commerce

1 The Self-Encrypting Drive option is available only to major OEMs.

Cheetah NS.2

Lowest power, highest reliability
for 3.5-inch Tier 1 solutions

Seagate ®

Product Description

Seagate Cheetah NS.2 drives reduce costs
for 3.5-inch Tier 1 solutions, helping to sustain
business. It has up to 600 GB of capacity, which
is the highest capacity of any Tier 1 mission-
critical drive. This higher capacity reduces storage
costs per GB and increases capacity per watt.
The drive also includes Seagate PowerTrim
technology, which dynamically optimizes drive
power consumption at all levels of activity. The
Cheetah NS.2 drive has over 20 percent lower
power consumption than any 3.5-inch Tier 1
mission-critical drive.

The Cheetah NS.2 drive is leveraged from the
highly successful Cheetah 15K.6 platform,
and has the industry's highest reliability rating,
reducing drive replacement costs. The drive is
available with a SAS (600 GB and 450 GB) or FC
interface. The SAS drives will support 6-Gb/s
transfer rates as part of the new SAS 2.0 feature
set. SAS 2.0 was developed to provide additional
signal and data integrity features to enable SAS
to be ideally suited for use in high-end network
storage applications.

The Cheetah NS.2 drive is the second
generation of Cheetah drives available as a
Self-Encrypting Drive for designated OEMs,
providing government-grade data security and
instant secure erase for drives reused, recycled or
returned for expired lease, repair or warranty.

Specifications

Capacity	600, 450 and 300 GB
Interface	6-Gb/s SAS 2.0 (600 and 450 GB), 4-Gb/s FC
Spindle Speed	10,000 RPM
Reliability	0.55% AFR/1.6M hours MTBF
Cache	16 MB
Form factor	3.5-inch

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Cheetah® NS.2

Lowest power, highest reliability for 3.5-inch Tier 1 solutions

Seagate

Lowest Cost of Ownership

- The Seagate Cheetah NS.2 drive is the lowest-power, highest-capacity and highest-reliability solution for 3.5-inch Tier 1 requirements.

- Lower watts/GB ratio helps achieve reduced power and cooling costs while optimizing capacity requirements.

MTBF Improvement

- Seagate continues to focus on reliability and data protection. MTBF is increased to 1.6 million hours.

- Enhanced error correction code better maintains performance throughout the life of the drive and reduces the probability of lost data.

- Seagate-exclusive Background Media Scan proactively scans the media for potential defects during drive idle time. It enables incipient errors to be corrected before data is lost.

- Our Quick and Robust Download feature loads new firmware in less than 2 seconds, and built-in protection ensures no corruption in the event of a power failure during firmware switch.

Seagate Global Customer Support

- Get presales and technical support at support.seagate.com.

- Visit our knowledge base for answers to common support questions.

- Find documentation for current and legacy drives.

- Utilize our online troubleshooting and diagnostic tools.

- Download DiscWizard™ to help migrate data from an older drive.

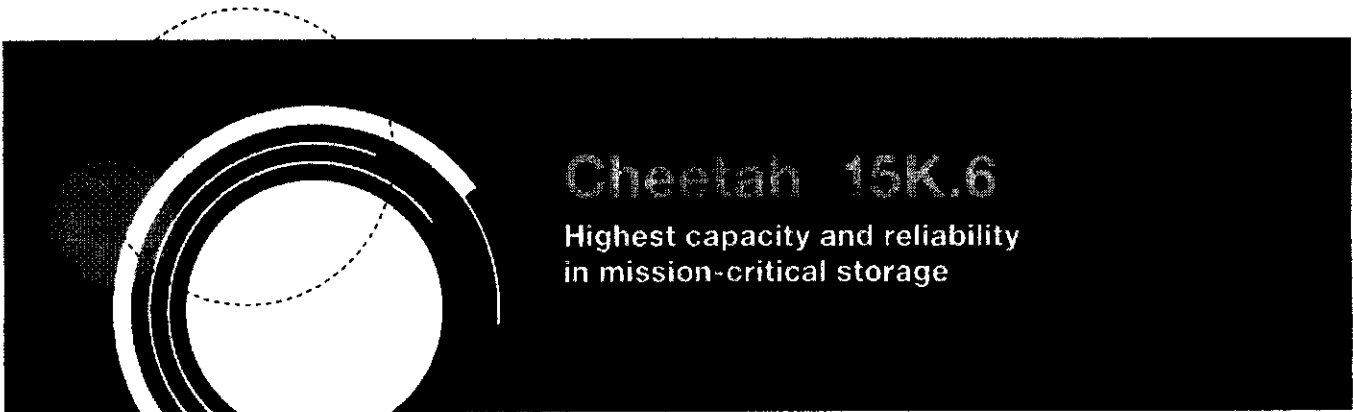- Seagate also offers multi-lingual phone, email and chat support.

Specifications	600 GB[1]	450 GB[1]	300 GB[1]
Model Number	ST3600002FC ST3600002SS	ST3450802FC ST3450802SS	ST3300602FC
Capacity			
Formatted 512 KB/Sector (GB)	600	450	300
Performance			
External Transfer Rate			
4-Gb/s Fibre Channel (MB/s)	400	400	400
6-Gb/s SAS 2.0[2] (MB/s)	600	600	
Spindle Speed (RPM)	10K	10K	10K
Average Latency (ms)	3.00	3.00	3.00
Seek Time			
Average Read/Write (ms)	3.8/4.4	3.8/4.4	3.8/4.4
Track-to-Track Read/Write (ms)	0.2/0.2	0.2/0.2	0.2/0.2
Transfer Rate			
Maximum Internal (Mb/s)	1840	1840	1840
Typical Sustained (MB/s)	150	150	150
Cache, Multisegmented (MB)	16	16	16
Configuration/Reliability			
Disks	4	3	2
Heads	8	6	4
Nonrecoverable Read Errors per Bits Read	1 sector per 10E16	1 sector per 10E16	1 sector per 10E16
Reliability Rating at Full 24x7 Operation (Annualized Failure Rate/MTBF hours)	0.55%/1,600,000	0.55%/1,600,000	0.55%/1,600,000
Power			
Typical Operating (W)			
4-Gb/s Fibre Channel	10.07	9.54	9.3
6-Gb/s SAS 2.0[2]	9.75	9.15	
Idle (W)			
4-Gb/s Fibre Channel	6.49	5.96	5.6
6-Gb/s SAS 2.0[2]	6.22	5.74	
Environmental			
Temperature, Operating (°C)	5 to 55	5 to 55	5 to 55
Temperature, Nonoperating (°C)	−40 to 70	−40 to 70	−40 to 70
Shock, Operating (Read Only): 2 ms (Gs)	60	60	60
Shock, Nonoperating: 2 ms (Gs)	300	300	300
Acoustics, Idle (bels—sound power)	3.3	3.3	3.3
Vibration, Operating (Gs)	1.0	1.0	1.0
Vibration, Nonoperating (Gs)	3.0	3.0	3.0
Physical			
Height (in/mm)	1.0/25.4	1.0/25.4	1.0/25.4
Width (in/mm)	4.0/101.6	4.0/101.6	4.0/101.6
Depth (in/mm)	5.76/146.52	5.76/146.52	5.76/146.52
Weight (lb/kg)	1.51/0.686	1.51/0.686	1.48/0.671

1 One gigabyte, or GB, equals one billion bytes and one terabyte, or TB, equals one trillion bytes when referring to hard drive capacity.

2 SAS interface is 6-Gb/s capable and 3-Gb/s verified. The drive will negotiate 6-Gb/s speeds on 6-Gb/s HBA or Expander. Verification of 6 Gb/s will occur at a later date.

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Seagate

Cheetah 15K.6

Highest capacity and reliability in mission-critical storage

450, 300 and 146 GB • 15K RPM • 3-Gb/s Serial Attached SCSI (SAS) and 4-Gb/s FC
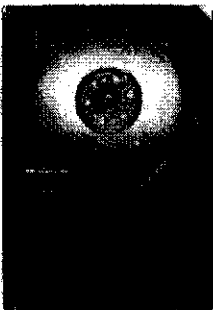
Key Advantages

- Second-generation perpendicular recording delivers up to 450-GB capacity.

- Unprecedented performance with a 30 percent increase in sustained data rate of up to 171 MB/s

- Industry's highest 3.5-inch drive reliability at 1.6-million-hours MTBF.

- Seagate proprietary PowerTrim™ technology provides a 62 percent improvement in GBs/watt at idle.

- Advanced read/write technology delivers nonrecoverable error rate of 1x10E16

- Available in FC or SAS interfaces

Best-Fit Applications

All mainstream enterprise applications, such as:

- Email
- Business processing
- Transaction processing
- Decision support
- Storage area networks
- Networked attached storage
- Internet and e-commerce

Seagate
5-Year
Warranty

Cheetah 15K.6
Cheetah 15K.6 FDE

Highest capacity, reliability and security in mission-critical storage

Seagate

The Seagate Advantage

The Seagate® Cheetah® 15K.6 and Cheetah 15K.6 FDE drives have a SAS or FC interface and are the highest-performing drives in 3.5-inch storage with a maximum sustained transfer rate of 164 MB/sec, representing a 28 percent increase in sustained data transfer rate over its predecessor. Second-generation perpendicular recording provides 450 GB of storage capacity with state-of-the-art recording technology and comprehensive data integrity protection, enabling an error rate of 1x10E16 and an MTBF of 1.6 million hours (0.55 percent AFR).

The Cheetah 15K.6 and Cheetah 15K.6 FDE drives include Seagate PowerTrim technology, which dynamically optimizes drive power consumption at all levels of activity. With PowerTrim technology, the drives deliver the highest performance in its class without increasing power consumption. The drives lower idle and operational power requirements from the prior generation—as much as 61 percent in watts/GB—while increasing overall sustained data transfer rates by 28 percent at 164 MB/s.

Highest Capacity and Reliability

Seagate Cheetah 15K.6 and Cheetah 15K.6 FDE drives provide the highest sequential and transactional performance of any 3.5-inch drive in the enterprise market. Utilizing second-generation perpendicular recording technology and available in capacities of 450, 300 and 146 GB, these Cheetah family drives provide an unprecedented blend of storage capacity and performance. Add to that the highest 3.5-inch reliability in the industry at 1.6 million hours MTBF (0.55 percent AFR), a choice of FC or SAS interfaces, and a 5-year limited warranty, and you have a star performer for mission-critical SAN, NAS, transactional processing and Internet applications.

*The Cheetah 15K.6 FDE drive is available only to major OEM suppliers.

Specifications

Capacity (GB)	450, 300 and 146
Interface	SAS, FC
Cache (MB)	16
Spindle Speed (RPM)	15,000

Self-Encrypting Drives in the Data Center

The Seagate Cheetah 15K.6 FDE* drive is part of the Seagate Secure™ portfolio of self-encrypting drives, providing superior security and manageability. From the moment the drive is removed from the data center, whether intentionally or otherwise, the data on the drive is secure. The key features and benefits of self-encrypting drives include:

• Secures data, preventing data breach, avoiding fees and data privacy law notification costs

• Always-on encryption, whether the drive is moved, stored, returned or retired

• Dramatically reduces drive decommissioning costs

• Transparent to the OS, applications, databases, database administrators and application developers

• Enables secure erase of drives for disposal, repurposing, and secure warranty and lease return

• Standards based, designed for interoperability

• Reduces complexity of key management and tracking, and eases proof of compliance

• Automatically maintains high system performance so there is less need for data classification

• Enables full storage system data compression and de-duplication, saving storage space

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Cheetah® 15K.6

Highest capacity and reliability in mission-critical storage

Seagate

Lowest Cost of Ownership

- Sixth-generation Seagate® Cheetah 15K drive is the fastest, highest capacity and most reliable ever.

- Cheetah 15K.5 drive performance and reliability enable lower TCO for enterprise applications.

- Lower watts/GB ratio helps achieve reduced power and cooling costs while optimizing capacity requirements.

- Higher performance with fewer drives—reducing support infrastructure, physical space requirements and storage management costs

- The highest reliability of any 3.5-inch drive, with increased system reliability due to the need for fewer drives

MTBF Improvement

- Seagate continues to focus on reliability and data protection. MTBF is increased to 1.6 million hours.

- Seagate-exclusive enhanced Error Correction Code better maintains performance throughout the life of the drive and reduces the probability of lost data.

- The second generation of Seagate-exclusive Background Media Scan proactively scans the media for potential defects during drive idle time. It enables incipient errors to be corrected before data is lost.

- Our new Quick and Robust Download feature loads new firmware in less than 2 seconds and built-in protection ensures no corruption in the event of a power failure during firmware switch.

Seagate Global Customer Support

- Get presales and technical support at support.seagate.com.

- Visit our knowledge base for answers to common support questions.

- Find documentation for current and legacy drives.

- Utilize our online troubleshooting and diagnostic tools.

Specifications	450 GB[1]	300 GB[1]	146 GB[1]
Model Number	ST3450856SS/FC	ST3300656SS/FC	ST3146356SS/FC
Capacity			
Formatted 512 Kbytes/Sector (GB)	450	300	146.3
External Transfer Rate (MB/s)			
Fibre Channel	400	400	400
3-Gb/s Serial Attached SCSI	300	300	300
Performance			
Spindle Speed (RPM)	15K	15K	15K
Average Latency (ms)	2.0	2.0	2.0
Seek Time			
Average Read/Write (ms)	3.4/3.9	3.4/3.9	3.4/3.9
Track-to-Track Read/Write (ms)	0.2/0.4	0.2/0.4	0.2/0.4
Transfer Rate			
Internal (Mb/s)	1051 to 2225	1051 to 2225	1051 to 2225
Sustained (MB/s, 1000 x 1000)	171 to 110	171 to 110	171 to 110
Cache, Multisegmented (MB/s)	16	16	16
Configuration/Organization			
Discs	4	3	2
Heads	8	6	3
Nonrecoverable Read Errors per Bits Read	1 sector per 10E16	1 sector per 10E16	1 sector per 10E16
Reliability Rating at Full 24x7 Operation (AFR)	0.55%	0.55%	0.55%
Power Management			
Typical (W)			
Fibre Channel	17.0	16.1	15.0
SAS	17.3	15.8	14.4
Power Idle (W)			
Fibre Channel	12.0	11.2	9.7
SAS	12.4	11.1	9.6
Environmental			
Temperature, Operating (°C)	5 to 55	5 to 55	5 to 55
Temperature, Nonoperating (°C)	−40 to 70	−40 to 70	−40 to 70
Shock, Operating: 2 ms (Gs)	60	60	60
Shock, Nonoperating: 2 ms (Gs)	250	250	250
Acoustics Idle (bels—sound power)	3.6	3.6	3.6
Vibration, Operating: <400 Hz (Gs)	1.0	1.0	1.0
Vibration, Nonoperating: <400 Hz (Gs)	2.0	2.0	2.0
Physical			
Height (in/mm)	1.0/25.4	1.0/25.4	1.0/25.4
Width (in/mm)	4.0/101.6	4.0/101.6	4.0/101.6
Depth (in/mm)	5.75/146.05	5.75/146.05	5.75/146.05
Weight (lb/kg)	1.56/0.709	1.53/0.694	1.49/0.674
Warranty			
Limited Warranty (years)	5	5	5

[1] One gigabyte, or GB, equals one billion bytes and one terabyte, or TB, equals one trillion bytes when referring to hard drive capacity.

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Product Overview

Cheetah® 15K.7

Highest 3.5-inch Tier 1 performance, capacity and reliability

Key Features and Benefits

- Highest-performance 3.5-inch drive
- Highest-capacity Tier 1 drive (600 GB)
- Highest reliability rating in the industry
- Seagate® PowerTrim™ technology dynamically reduces power usage.
- Supports 6-Gb/s SAS 2.0 and 4-Gb/s FC interfaces
- Reduces RAID rebuild times while minimizing reliability risks
- Government-grade Self-Encrypting Drive option[1]

Best-Fit Applications

- Email
- Business processing
- Transaction processing
- Decision support
- Storage area networks
- Networked attached storage
- Internet and e-commerce

1 The Self-Encrypting Drive option is available only to major OEMs.

Cheetah 15K.7

Highest 3.5-inch Tier 1 performance, capacity and reliability

Seagate

Product Description

Seagate Cheetah 15K.7 drives reduce costs for 3.5-inch Tier 1 solutions, helping to sustain business. They have the highest performance, capacity and reliability of any 3.5-inch Tier 1 drive. The drive has up to 600 GB of capacity, which reduces storage costs per GB and increases capacity per watt. The Cheetah 15K.7 drive includes Seagate PowerTrim technology, which dynamically optimizes drive power consumption at all levels of activity.

The drive is leveraged from the highly successful Cheetah 15K.6 platform and has the industry's highest reliability rating, reducing drive replacement costs. The drive is available with a SAS or FC interface and is the highest-performing 3.5-inch drive in the world. The drive reduces RAID rebuild times while minimizing reliability risks. The SAS drives will support 6-Gb/s transfer rates as part of the new SAS 2.0 feature set. SAS 2.0 was developed to provide additional signal and data integrity features to enable SAS to be ideally suited for use in high-end network storage applications.

The Cheetah 15K.7 drive is the second generation of Cheetah drives available as a Self-Encrypting Drive[1], providing government-grade data security and instant secure erase for drives reused, recycled or returned for expired lease, repair or warranty.

[1] The Self-Encrypting Drive option is available only to major OEMs.

Specifications

Capacity	600, 450, 300 GB
Interface	6 Gb/s SAS 2.0, 4 Gb/s FC
Spindle Speed	15,000 RPM
Reliability	0.55% AFR/1.6M hours MTBF
Cache	16 MB
Form factor	3.5-inch

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1-800-SEAGATE (1-800-732-4283)

Constellation

2.5-inch Tier 2/nearline drive
with the lowest enterprise power usage

500 GB and 160 GB · 7200 RPM · SAS 6Gb/s,

SAS 3Gb/s, SATA 3Gb/s and SATA 1.5Gb/s

Key Advantages

- Industry's first 2.5-inch, 15-mm enterprise-class nearline drive for dense. space-constrained data centers
- Lowest operating power and enhanced PowerChoice™ host-selectable power options for unprecedented power savings (up to 54 percent—as low as 1.1 W) during slow or idle periods
- The industry's highest-reliability 7200-RPM drive, designed for 24x7 operation
- Best-in-class rotational vibration tolerance ensures unrivalled performance in high spindle-density applications, and multi-drive firmware maximizes system availability.
- Choose SAS for the seamless Tier 2 enterprise experience, with improved data integrity. SAS 2.0 enables faster data access (6Gb/s) and larger topologies over greater distances, increasing system scalability, data throughput and connectivity.
- Government-grade Self-Encrypting Drive security available on SAS models.
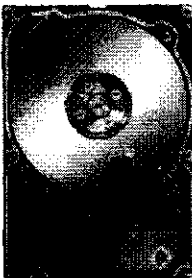
Best-Fit Applications

- Storage-hungry business applications
- Storage area networks (SAN) and network attached storage (NAS)
- Maximum-capacity servers and blade servers
- Rich media content storage—audio, video, image
- Reference and compliance data storage
- Enterprise backup and restore—D2D, virtual tape
- Collaboration—email, messaging
- Infrastructure—Web, print, file

**Seagate
5-Year
Warranty**

Constellation

First 2.5-inch nearline drive boasts the industry's lowest power usage for the enterprise.

Seagate ®

The Seagate Advantage

The Seagate® Constellation™ drive is the first 2.5-inch hard drive for Tier 2/nearline environments. It offers the best combination of power efficiency, nearline performance, enterprise-class reliability, capacity and data security. It delivers on the Seagate Unified Storage™ architecture, converging disparate disk drive interfaces, diverse form factors and data security towards ONE best-of-breed foundation for robust yet simple storage solutions.

The drive offers the lowest power consumption of any enterprise drive on the market, provides the highest capacity for a 2.5-inch hard drive at 500 GB for integrators and OEMs offering eco-friendly nearline server and storage solutions, and enables OEMs and system designers to sell more systems—especially into space-constrained IT environments.

The Constellation drive extends the industry's best 2.5-inch field-proven reliability into a high-capacity nearline drive based on Seagate enterprise experience. This nearline drive offers an MTBF of 1.2 million hours for economical, enterprise-grade reliability.

The Constellation drive's implementation of 6-Gb/s SAS 2.0 improves scalability, which makes this drive ideally suited for use in high-end network storage solutions. It is the industry's first 2.5-inch nearline drive to implement the new SAS 2.0 feature set and is the world's first nearline drive to operate at 6-Gb/s transfer rates.

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1-800 SEAGATE (1-800-732-4283)

Specifications

Capacities (GB)	500 SAS and SATA; 160 (SATA only)
Interface	SAS, SATA
Spindle speed (RPM)	7200
Power (SAS)	2.8 W typical idle, 3.8 W operating

Constellation™

2.5-inch Tier 2/nearline drive
with the lowest enterprise power usage

Seagate

Built On Seagate Unified Storage architecture

- Small form factor—15 mm z-height provides a dense, eco-friendly, robust platform for easy integration.
- SAS 2.0—6 Gb/s enables larger topologies at higher throughput and provides a higher signal strength over longer distances for improved scalability.
- Self-Encrypting Drive option for government-grade security.

Enhanced Choices With Enterprise Capabilities

- PowerChoice host-selectable power options (1 through 4) further reduce power consumption to an unprecedented low of 1.1 W.
- With a choice of either SATA 3Gb/s or SAS 6Gb/s interfaces, utilizes perpendicular recording technology to deliver the industry's highest-capacity 2.5-inch nearline drive
- Enterprise-class firmware features and best-in-class rotational vibration tolerance maximizes system availability and performance in multi-drive systems. Seagate proprietary Workload Management technology helps systems keep drives cool.
- The best 7200-RPM reliability for 24x7 business-critical applications with an MTBF of 1.2M hours and an nonrecoverable error rate of 1 sector per 10E15—from a trusted source and backed by a 5-year limited warranty.

Seagate Global Customer Support

- Get presales and technical support at support.seagate.com.
- Visit our knowledge base for answers to common support questions.
- Find documentation for current and legacy drives.
- Utilize our online troubleshooting and diagnostic tools.

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Specifications	500 GB[1]		160 GB[1]
Model Number	ST9500430SS ST9500431SS (SED)	ST9500530NS	ST9160511NS
Interface	SAS 2.0	SATA	SATA
Interface Access Speed	SAS 6Gb/s SAS 3Gb/s SAS 1.5Gb/s	SATA 3Gb/s SATA 1.5Gb/s	SATA 3Gb/s SATA 1.5Gb/s
Self Encrypting Drive (SED) Government Grade Security	Yes	—	—
Performance			
Spindle Speed (RPM)	7200	7200	7200
Average Latency (ms)	4.16	4.16	4.16
Seek Time			
Average Read/Write (ms)	8.5/9.5	8.5/9.5	8.5/9.5
Track-to-Track Read/Write (ms)	0.8/1.0	0.8/1.0	0.8/1.0
Maximum Sustained Transfer Rate (MB/s)	97	95	95
Cache, Multisegmented (MB)	16	32	32
Configuration/Organization			
Bytes per Sector	512, 520, 524, 528	512	512
Reliability/Data Integrity			
Mean Time Between Failures (MTBF, hours)	1.2 million	1.2 million	1.2 million
Reliability Rating at Full 24x7 Operation (AFR)	0.73%	0.73%	0.73%
Nonrecoverable Read Errors per Bits Read	1 sector per 10E15	1 sector per 10E15	1 sector per 10E15
Error Control/Correction (ECC)	10 bit	10 bit	10 bit
Interface Ports	Dual	Single	Single
Limited Warranty (years)	5	5	5
Power Management			
Power Supply Requirements	+12V and +5V	+12V and +5V	+12V and +5V
Typical Operating, Random Read (W)	4.0	3.5	2.8
Idle (W)	2.9	2.6	2.3
PowerChoice™ option, 1 to 4 range (W)	1.3 to 2.9	1.1 to 2.4	1.1 to 2.1
Environmental			
Rotational Vibration @ 1800 Hz (rad/sec²)	16	16	16
Vibration			
Operating, <400 Hz (Gs)	0.5	0.5	0.5
Nonoperating, <500 Hz (Gs)	2.4	2.4	2.4
Shock			
Operating, 2 ms (Gs)	70	70	70
Nonoperating, 1 ms and 2 ms (Gs)	400	400	400
Temperature			
Operating (°C)	5 to 55	5 to 55	5 to 55
Nonoperating (°C)	−40 to 70	−40 to 70	−40 to 70
Acoustics			
Typical Idle (bels)	2.3	2.3	1.9
Typical Operating (bels)	2.6	2.6	2.5
Physical			
Height (in/mm)	0.583/14.8	0.583/14.8	0.583/14.8
Width (in/mm)	2.76/70	2.76/70	2.76/70
Depth (in/mm)	3.957/100.5	3.957/100.5	3.957/100.5
Weight (lb/g)	0.43/0.196	0.43/0.196	0.41/0.186

[1] One gigabyte, or GB, equals one billion bytes and one terabyte, or TB, equals one trillion bytes when referring to hard drive capacity.

Seagate

Barracuda 7200.12

The industry's leading combination of
capacity, performance and reliability

**1 TB, 750 GB, 500 GB, 320 GB, 250 GB, 160 GB ·
7200 RPM · SATA 3Gb/s with NCQ**

Key Advantages

- Sustainable technology for a green world:
  - Typically 70 percent or more of the materials used to build
    the drive is recycled.
  - Complies with the RoHS directive and several non-regulatory restrictions.
- 12th generation of the world's most popular desktop hard drive
- Ships with the most reliable and proven perpendicular magnetic recording
  technology
- Delivers high performance:
  - 125-MB/s maximum sustained data rate
  - Up to 3-Gb/s instantaneous burst
  - 32-MB cache on 1-TB and 750-GB drives, 16-MB cache on 500-GB and
    320-GB drives, 8-MB cache on 250-GB and 160-GB drives

Best-Fit Applications

- Workstations
- Desktop RAID
- Gamer PCs
- High-end PCs
- Mainstream PCs
- USB/FireWire/eSATA personal external storage
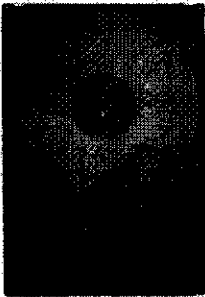
Barracuda 7200.12

The industry's leading combination of capacity, performance and reliability

Seagate

The Seagate Advantage

By now the world knows that Seagate®
Barracuda® 7200 drives, from the world's premier
storage provider, deliver years of reliable service
and high performance. This is a product family
that has been strengthened and refined over
12 generations. It embodies the highest levels
of reliability, performance and capacity. And this
latest generation is a leader in environmentally
friendly storage.

The drive is available in capacities of 1 TB and 750
GB with 32-MB cache, 500 GB and 320 GB with
16-MB cache, and 250 GB and 160 GB with 8-MB
cache. The Barracuda 7200.12 drive is an ideal
choice for workstations, desktop RAID, gaming
PCs, high-end PCs, mainstream PCs and USB/
FireWire/eSATA external storage.

Advantages of Perpendicular Recording

After years of pioneering research at
Seagate, perpendicular recording is now a
proven technology. It increases capacity and
dependability by storing data vertically, rather
than horizontally. And vertically stored data bits
mean increased data density—which means
higher performance to increase productivity.

To Learn More·

Perpendicular
Recording

The Barracuda 7200.12
drive uses fourth-generation
Seagate perpendicular
magnetic recording
technology to increase
capacity and dependability
by storing data bits vertically
rather than horizontally.

Additional Features

- Best-in-class environmental specifications and
  reliability features

- Adaptive Fly Height offers consistent read/write
  performance from the beginning to the end of
  your computing workload.

- Clean Sweep automatically calibrates your
  drive.

- Enhanced G-Force Protection™ defends
  against handling damage.

- Seagate SoftSonic™ motor enables ultra-quiet
  operation.

The Eco-Friendly Choice

The Barracuda 7200.12 drive delivers excellent
power savings without sacrificing drive or
system performance, giving customers the
ability to manufacture eco-friendly PC systems
and external storage systems that meet energy
savings requirements.

Seagate hard drives have long been produced
with the environment in mind, and not just with
low power consumption. With Seagate and the
Barracuda 7200.12 drive, our customers can
have the best of both worlds—top hard-drive
performance and the satisfaction of knowing they
are using a high-capacity drive with a very small
eco-footprint.

Specifications

Capacity	1 TB, 750 GB, 500 GB, 320 GB, 250 GB and 160 GB
Interface	SATA 3Gb/s NCQ
Cache (MB)	32 MB (1 TB, 750 GB) 16 MB (500 and 320 GB) 8 MB (250 and 160 GB)
Sustained Data Rate (MB/s)	Up to 125
Spindle Speed (RPM)	7200
Shock, Operating: 2 ms (Gs)	70
Shock, Nonoperating: 1 ms (Gs)	300 (1 TB)
Acoustics, Idle (bels)	2.5 (1 TB)
Acoustics, Seek (bels)	2.7 (1 TB)

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Barracuda® 7200.12

The industry's leading combination of capacity, performance and reliability

Seagate

Specifications	1 TB¹	750 GB¹	500 GB¹	320 GB¹	250 GB¹	160 GB¹
Model Number	ST31000528AS	ST3750528AS	ST3500418AS	ST3320418AS	ST3250318AS	ST3160318AS
Interface Options	SATA 3Gb/s NCQ	SATA 3Gb/s NCQ	SATA 3Gb/s NCQ	SATA 3Gb/s NCQ	SATA 3Gb/s NCQ	SATA 3Gb/s NCQ
Performance						
Transfer Rate, Max Ext (MB/s)	300	300	300	300	300	300
Sustained Data Rate OD (MB/s)	125	125	125	125	125	125
Cache (MB)	32	32	16	16	8	8
Average Latency (ms)	4.17	4.17	4.17	4.17	4.17	4.17
Spindle Speed (RPM)	7200	7200	7200	7200	7200	7200
Configuration/Organization						
Bytes per Sector	512	512	512	512	512	512
Reliability/Data Integrity						
Contact Start-Stops	50,000	50,000	50,000	50,000	50,000	50,000
Nonrecoverable Read Errors per Bits Read	1 per 10E14	1 per 10E14	1 per 10E14	1 per 10E14	1 per 10E14	1 per 10E14
Annualized Failure Rate	0.34%	0.34%	0.34%	0.34%	0.34%	0.34%
Power Management						
Startup Current +12V Peak (A, ±10%)	2.0	2.0	2.0	2.0	2.0	2.0
Operating, Average (W)	<9.4	<9.4	<8.0	<8.0	<8.0	<8.0
Idle, Average (W)	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Environmental						
Temperature (°C)						
Operating	0 to 60	0 to 60	0 to 60	0 to 60	0 to 60	0 to 60
Nonoperating	–40 to 70	–40 to 70	–40 to 70	–40 to 70	–40 to 70	–40 to 70
Shock (Gs)						
Operating: 2 ms	70	70	70	70	70	70
Nonoperating: 1 ms	300	300	350	350	350	350
Acoustics (bels – sound power)						
Idle	2.5	2.5	2.6	2.6	2.6	2.6
Seek	2.7	2.7	2.75	2.75	2.75	2.75
Physical						
Height (in/mm)	1.02/26.1	1.02/26.1	0.78/20	0.78/20	0.78/20	0.78/20
Width (in/mm)	4.00/101.6	4.00/101.6	4.00/101.6	4.00/101.6	4.00/101.6	4.00/101.6
Depth (in/mm)	5.87/146.99	5.87/146.99	5.87/146.99	5.87/146.99	5.87/146.99	5.87/146.99
Weight (lb/kg)	1.4/0.64	1.4/0.64	1.2/0.54	1.2/0.54	1.2/0.54	1.2/0.54

1 One gigabyte, or GB, equals one billion bytes and one terabyte, or TB, equals one trillion bytes when referring to hard drive capacity.

The Eco-Friendly Choice

The Seagate® Barracuda® 7200.12 drive delivers power savings without sacrificing performance. Customers can manufacture eco-friendly PC and external storage systems that meet energy-savings requirements.

The drive combines proven technology with expert manufacturing to deliver up to 1 TB of desktop storage. Customers can have the best of both worlds—top hard-drive performance and a high-capacity drive with a very small eco-footprint. Seagate minimizes the impact of our products and operations on the environment with efficiency measures, such as replacing or renovating less-efficient equipment, resulting in a 20 percent increase in production efficiency on a per-hard-drive basis. This delivered a 158.93 million kWh savings in six months, or enough energy to power nearly 15,000 U.S. homes for one year. Seagate also has deployed aggressive waste minimization and recycling programs in facilities worldwide.

The Barracuda product family complies with the RoHS directive on hazardous materials.

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Maxtor

An Ideal Combination of Performance,
Durability and Low Power Consumption for
Mainstream Mobile Storage Applications

80, 60 and 40 GB • 5400 RPM
2.5-inch mobile

Key Advantages

- 5400-RPM drives deliver higher performance and superior value compared to 4200-RPM drives.
- Low power consumption lets laptop users work longer between battery charges.
- MobileMax drives are optimized to operate when powered from a single USB cable in external storage applications.
- Rugged design fits the lifestyle of users on the go.

Best-Fit Applications

- Mainstream laptop/whitebook
- External storage
- Industrial applications
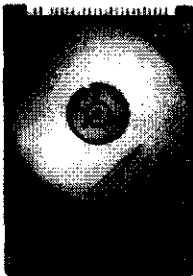
MobileMax

Reliability and Value for Mainstream Laptop PC Applications

Maxtor®

Maxtor Brand and the Seagate Advantage

Maxtor is now part of the Seagate family of brands and products. Maxtor products gain the advantages of world-class Seagate manufacturing and operations. MobileMax drives share the benefits of Seagate technical and product design leadership. The resulting benefits are a predictable supply of robust and reliable products that meet customers' needs.

Product Description

MobileMax is a 2.5-inch laptop drive targeted at mainstream laptop and whitebook PC computers, and external storage applications that require a value solution with desktop-like performance and low power consumption.

Best-Fit Applications

If you're building mainstream notebook or laptop systems, there's a MobileMax drive that's just right for you and your budget. MobileMax drives provide the right combination of capacity and performance with reliability and value.

- Mainstream laptop computers
- Whitebooks
- External mobile storage devices
- Industrial applications requiring a smaller form factor

Additional Features

- 5400-RPM drives deliver higher performance and superior value compared to 4200-RPM drives.

- Low power consumption allows mainstream laptop users to work longer between battery charges. Users backing up data with external mobile storage devices can enjoy the freedom of fewer cables because the start-up current of MobileMax is optimized to operate from a single USB port on most systems.

- The ruggedness and robust design of MobileMax drives assures reliable operation.

- MobileMax drives conform to the requirements of the European Union Directive in Restriction of Hazardous Substances (RoHS).

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1-800-SEAGATE (1-800-732-4283)

Specifications	
Capacity (GB)	40, 60, 80
Interface	Ultra ATA/100
Cache (MB)	2
Spin Speed (RPM)	5400
Shock , Operating, 2 ms (G)	250
Shock, Nonoperating, 1 ms (G)	900
Seek power consumption (W)	2
Idle/standby power consumption (W)	0.95/0.25

MobileMax

An Ideal Combination of Performance, Durability and Low Power Consumption for Mainstream Mobile Storage Applications

Maxtor

### Mainstream 5400-RPM Performance

With laptop computers becoming more popular, users expect a level of performance similar to legacy desktop systems, which MobileMax offers. Faster drives are also required for users to take full advantage of faster backups using external drives with USB 2.0. The 5400-RPM spin speed provides the best value in performance—outpacing slower 4200-RPM mobile drives at a mainstream, competitive price.

Durable

Whether it be for a laptop or external storage, a durable drive is a must for mobile applications. Able to withstand 900Gs of nonoperating shock and 250Gs of operating shock, MobileMax is rugged enough for users on the go.

Low Power Consumption

With low power consumption, MobileMax allows mainstream laptop users to work and play longer between battery charges. And users backing up their data with external mobile storage devices can enjoy the freedom of fewer cables, because the start-up current of MobileMax is optimized to operate from a single USB cable on most systems.

RoHS Compliant

MobileMax supports the EU directive for Restriction of Hazardous Substances (RoHS)*. All available MobileMax drives are RoHS-compliant.

*Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003

Specifications	80 GB	60 GB	40 GB
Model Number	STM980215A	STM960212A	STM940215A
Interface (MB/s)	Ultra ATA/100	Ultra ATA/100	Ultra ATA/100
Performance			
Transfer Rate			
Sustained Internal (MB/s)	42	42	42
Maximum External (MB/s)	100	100	100
Cache, Multisegmented (MB)	2	2	2
Average Seek (msec)	12.5	12.5	12.5
Average Latency (msec)	5.6	5.6	5.6
Spin Speed	5400	5400	5400
Configuration/Organization			
Discs	1	1	1
Heads	2	2	1
Bytes per Sector	512	512	512
Reliability/Data Integrity			
Head-Rest Method	Ramp Load	Ramp Load	Ramp Load
Load/Unload Cycles	600,000	600,000	600,000
Nonrecoverable Read Errors per Bits Read	1 per 10¹⁴	1 per 10¹⁴	1 per 10¹⁴
Power Management			
Startup Current 5v (amps max)	1.0	1.0	1.0
Power Mgmt (watts)			
Seek	2.0	2.0	2.0
Read/Write	2.0/1.6	2.0/1.6	2.0/1.6
Idle/Standby	0.80/0.26	0.80/0.26	0.80/0.26
Environmental			
Temperature, Operating (°C)	5 to 55	5 to 55	5 to 55
Temperature, Nonoperating (°C)	–40 to 70	–40 to 70	–40 to 70
Shock, Operating: 2 msec (Gs)	250	250	250
Shock, Nonoperating: 2 msec (Gs)	900	900	900
Acoustics (bels—sound power)			
Idle	2.4	2.4	2.4
Seek	2.9	2.9	2.9
Physical			
Height (in/mm)	.374/9.5	.374/9.5	.374/9.5
Width (in/mm)	2.75/69.85	2.75/69.85	2.75/69.85
Depth (in/mm)	3.945/100.2	3.945/100.2	3.945/100.2
Weight (lb/kg)	.22/100	.22/100	.22/100
Warranty			
Limited Warranty (years)	3	3	3

*Capacity calculated as 1 Gbyte = 10⁹ bytes

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1-800-SEAGATE (1-800-732-4283)

1.8-Inch Hard Disk Drives

Toshiba is the undisputed leader in small form factor hard disk drives HDD). Our full small form factor hard disk drive product line continues to push mobile PC's and Consumer Electronics to new performance heights. Toshiba's superior technical innovations in the mobile 2.5-inch HDD space have helped us bring the versatile 1.8-inch HDD to market. Built with the performance and reliability characteristics that have made the company's HDD products the drive of choice in today's most popular MP3 players, notebooks, automotive jukebox systems, and portable handheld GPS units. With capacities ranging from up to 320GB* and two form factors, 1.8-inch and 2.5-inch, Toshiba has the right drive hard drive for you.

Proving our technology leadership, Toshiba is the first company to ship the Perpendicular Magnetic Recording technology (PMR) on hard disk drives. Toshiba's popular 1.8-inch HDD is the first product to ship with PMR technology. Toshiba now can deliver massive amounts of storage in a hard disk drive that is the size of a credit card, and lighter then a traditional cellular telephone.

Our popular 1.8-inch drive is the market share leader in this form factor and provides the combination of the highest operating and non-operating shock spec. in a credit card size drive. Toshiba's very popular 1.8-inch HDD can be found in today's hottest MP3 player, portable GPS system, and ultra-thin and light mobile computers. Imagine what you can do with all that storage capacity in a hard disk drive that can easily fit in the palm of your hand!

When you need a hard drive that can deliver unprecedented performance in today's demanding mobile environments think TOSHIBA! Click here to read Toshiba's warranty statement for Hard Disk Drives.

PMR Tech Brief PDF
"Winning the Race to Deliver a Breakthrough Storage Technology:
The Road to PMR and its Impact on Consumer Electronics Devices Toshiba Storage Device Division "

Developers who are interested in discussing new consumer or computer product applications can contact us by phone, fax or by filling out an on-line form.

1.8-Inch Hard Disk Drives

SATA

MK1229GSG/MK1629GSG/MK2529GSG 5400RPM 120 - 250GB* 1.8-Inch HDD Series   More ›

MK**17GSG 5400RPM 80/160GB* 1.8-Inch HDD Series   More ›

MK**16GSG 5400RPM 80/120GB* 1.8-Inch HDD Series   More ›

PATA

MK1231GAS/MK8031GAS/MK2431GAH 4200RPM 80 - 240GB* 1.8-Inch HDDs   More ›

MK1214GAH 4200RPM 120GB* 1.8-Inch HDD   More ›

MK1011GAH 4200RPM 100GB* 1.8-Inch CE PMR HDD   More ›

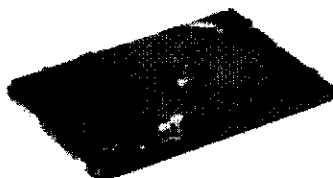MK8009GAH 4200RPM 80GB* 1.8-Inch CE PMR HDD   More ›

MK8025GAL 4200RPM 80GB* 1.8-Inch HDD   More ›

1.8-Inch SATA HDD 250/160/120GB*

MK2529GSG/MK1629GSG/MK1229GSG

Toshiba, the pioneer in small form factor hard disk drives (HDDs), continues to deliver innovative storage solutions with the addition of three new high-capacity, high-performance Serial ATA 1.8-inch HDDs. The MK**29GSG family features the industry's first quarter-terabyte 1.8-inch HDD along with 120GB and 160GB capacity drives.

Combined with the new micro-SATA connector, Serial-ATA 3.0Gb/s interface and 5400 RPM spin speed, the MK**29GSG family offers small and light-weight solutions, at increased data transfer rates for enhanced performance, in sub-notebook PCs.

MK2529GSG 1.8-inch HDD
Winner of the Storage Visions™ 2009
Visionary Products Consumer Home Storage Award

MKxx29GSG Data Sheet

Key Features   **Specifications**   **Support**

1.8-inch Footprint With Up To A Quarter-Terabyte (250 GB*) Of Capacity

5400RPM Spin Speed

Host Transfer Rate Up To 3.0 Gb/s

Serial ATA 2.6 / ATA-8 Interface

Micro-SATA Connector

8MB Cache Buffer For User Data

One Gigabyte (1 GB) means 10^9 = 1,000,000,000 bytes using powers of 10. A computer operating system, however, reports storage capacity using powers of 2 for the definition of 1 GB = 2^{30} = 1,073,741,824 bytes, and therefore shows less storage capacity. Available storage capacity will also be less if the computer includes one or more pre-installed operating systems, pre-installed software applications, or media content. Actual formatted capacity may vary.

Subject to Change: While Toshiba has made every effort at the time of publication to ensure the accuracy of the information provided herein, product specifications, configurations, prices, system/component/options availability are all subject to change without notice.

1.8-Inch SATA HDD 250/160/120GB*
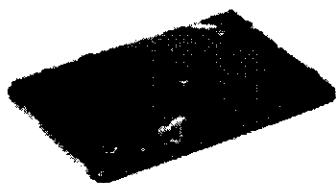
MK2529GSG/MK1629GSG/MK1229GSG

Toshiba, the pioneer in small form factor hard disk drives (HDDs), continues to deliver innovative storage solutions with the addition of three new high-capacity, high-performance Serial ATA 1.8-inch HDDs. The MK**29GSG family features the industry's first quarter-terabyte 1.8-inch HDD, along with 120GB and 160GB capacity drives.

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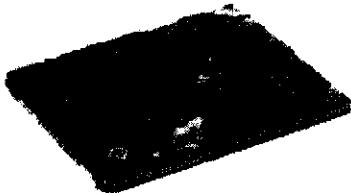Key Features   Specifications   Support

	MK2529GSG (HDD1F07)	MK1629GSG (HDD1F08)	MK1229GSG (HDD1F09)
Basic Specification			
Formatted Capacity*	250GB	160GB	120GB
Number of Data Heads	4	4	2
Number of Disks	2	2	1
Interface	SATA 3.0 Gb/s (and SATA 1.5 Gb/s) Serial ATA Revision 2.6 (ATA-8)		
Interface Transfer Rate	3.0Gb/sec		
Media Transfer Rate	Up to 707.9Mbps		
Areal Density (max)	Up to 378.8 Gb/in^2		
Bytes per Sector (Host/Disk)	512		
Logical Blocks (LBA)	488,397,166	312,581,808	234,441,648
Environmental Compliance	RoHS Compliant		
Performance			
Buffer	8MB		
Rotational Speed	5400rpm		
Average Latency	5.55		
Internal Transfer Rate (Mb/sec)	332.0 - 707.9	217.0 - 453.0	318.8 - 684.1
Average Seek Time	3ms		
Track-to-Track Seek Time	15ms		
Maximum Seek Time	26ms		
Reliability			
Load/Unload Cycles	600.000		
Error Rates Non-recoverable	1 in 10^{14} bits		
Supply Voltage			
Allowable Voltage	3.3V +/- 5%		
Power Consumption			
Start	2.5W		
Seek	1.2W		

1.8-Inch PATA 80 - 240GB HDDs
MK2431GAH/1231GAL/MK8031GAL

Offering up to 240GB[1] in the 1.8-inch form factor, the Toshiba MK**31GAL/GAH hard disk drive series provides industry leading storage solutions for compact and handheld applications using the Parallel ATA interface. The MK**31GAL line features two single-platter, 5 millimeter-high 80GB[1] and 120GB[1] models, while the high-end, MK2431GAH uses 2-platters in an 8 millimeter-tall package to achieve 240GB[1] in storage capacity.

The media design and low-power consumption options make the MK**31GAL/GAH drives suitable for integration into portable media players, digital video camcorders and Linux-based, ultraportable PC applications. The 1.8-inch series represents Toshiba's commitment to enhancing the environmental soundness of its products by eliminating certain hazardous and toxic substances[2] used in the drive components, as well as enhancing the powerefficiency of all new hard drives designed and produced by Toshiba since late 2008.

MK**31GAH/GAL Data Sheet

Key Features   **Specifications**   **Support**

1.8-inch Footprint with up to 240GB[1] of Capacity

4200 RPM Spin Speed

Parallel-ATA Interface

Low Power Consumption
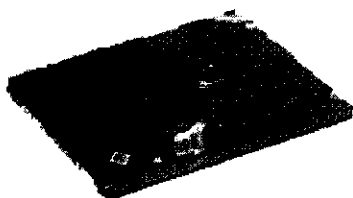
RoHS-compatible[3] and Eco-conscious Design[2]

[1] _One Gigabyte (1 GB) means 10^9 = 1,000,000,000 bytes using powers of 10. A computer operating system, however, reports storage capacity using powers of 2 for the definition of 1 GB = 2^{30} = 1,073,741,824 bytes, and therefore shows less storage capacity. Available storage capacity will also be less if the computer includes one or more pre-installed operating systems, pre-installed software applications, or media content. Actual formatted capacity may vary._

[2] _Free of brominated flame retardants (BFR) and polyvinyl chloride (PVC); hazardous halogens, antimony trioxide and red phosphorous also eliminated from all components in the hard drive._

[3] _RoHS Compatible: This product is compatible with European Union Directive 2002/95/ EC. Restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS), which restricts use of lead, cadmium, mercury, hexavalent chromium, PBB, and PBDE._

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Key Features	Specifications	Support	MK1231GAL (HDD1813)	MK8031GAL (HDD1814)	MK2431GAH (HDD1905)
Data Storage Physical					
Per drive, formatted[1]			120GB	80GB	240GB
Number of Platters			1		2
Areal Density (max)			344Gb/in^2	229Gb/in^2	344Gb/in^2
Data Transfer Rates					
Interface Transfer Rate			100MB/sec		
Media Transfer Rate (max)			488Mbps (max)	324Mbps (max)	488Mbps
Other					
Average Seek Time			15ms		
Energy Consumption Efficiency			0.0028W/GB	0.0038W/GB	0.0013W/GB
Rotational Speed			4200rpm		
Interface			Parallel ATA (PATA)		
Buffer			8MB		

Physical & Environmental Specs

Dimensions/Weight			
Height	0.20" (5mm)		0.31" (8mm)
Width	2.13" (54mm)		2.13" (54mm)
Depth	2.79" (71mm)		2.79" (71mm)
Weight	1.69 oz (48g)		2.08 oz (59g)
Shock			
Operating Shock	5,880 m/s^2 (600G/2.0ms)		4,900 m/s^2 (500G/2.0ms)
Non-Operating Shock	14,700 m/s^2 (1,500G/1.0ms)		