

ThinkSystem 5300 Mainstream 6Gb SATA SSDs

Product Guide

The ThinkSystem 5300 Mainstream SATA 6Gb solid-state drives (SSDs) use Micron 96-layer 3D NAND flash memory technology with a 6Gbps SATA interface. They provide an affordable solution for mixed read/write applications such as cache in transactional applications and high-speed storage for enterprise databases.



Figure 1. ThinkSystem 5300 Mainstream SATA 6Gb SSDs

Did you know?

The 5300 Series of SATA SSDs are the follow-on to the 5200 line of SSDs. The two series share the same controller, firmware, interface and features. The key difference is that the 5300 Series uses a new 96-layer 3D NAND storage medium compared to the 64-layer technology in the 5200. The 5300 drives have higher endurance and lower latency compared to the 5200 SSDs.

Lenovo also offers high-performance self-encrypting drives (SEDs) in the 5300 Mainstream Series. These SSDs adhere to the Trusted Computing Group Enterprise Security Subsystem Class cryptographic standard (TCG Enterprise SSC). Read about them in the [ThinkSystem 5300 Mainstream 6Gb SATA SED SSD product guide](#).

Part number information

The following table lists the ThinkSystem part numbers.

Table 1. ThinkSystem ordering information

Part number	Feature	Description
2.5-inch hot-swap drives - ThinkSystem		
4XB7A17087	B8J1	ThinkSystem 2.5" 5300 240GB Mainstream SATA 6Gb Hot Swap SSD
4XB7A17088	B8HY	ThinkSystem 2.5" 5300 480GB Mainstream SATA 6Gb Hot Swap SSD
4XB7A17089	B8J6	ThinkSystem 2.5" 5300 960GB Mainstream SATA 6Gb Hot Swap SSD
4XB7A17090	B8JE	ThinkSystem 2.5" 5300 1.92TB Mainstream SATA 6Gb Hot Swap SSD
4XB7A17091	B8J7	ThinkSystem 2.5" 5300 3.84TB Mainstream SATA 6Gb Hot Swap SSD
3.5-inch hot-swap drives - ThinkSystem		
4XB7A17096	B8JL	ThinkSystem 3.5" 5300 240GB Mainstream SATA 6Gb Hot Swap SSD
4XB7A17097	B8JF	ThinkSystem 3.5" 5300 480GB Mainstream SATA 6Gb Hot Swap SSD
4XB7A17098	B8J0	ThinkSystem 3.5" 5300 960GB Mainstream SATA 6Gb Hot Swap SSD
4XB7A17099	B8HR	ThinkSystem 3.5" 5300 1.92TB Mainstream SATA 6Gb Hot Swap SSD
4XB7A17100	B8HX	ThinkSystem 3.5" 5300 3.84TB Mainstream SATA 6Gb Hot Swap SSD

Features

The 5300 Mainstream SATA SSDs have the following features:

- Industry standard 2.5-inch or 3.5-inch form factors
- New generation 96-layer 3D TLC NAND flash memory
- Suitable for mixed read/write workloads with an endurance of between 2.5 and 5 drive writes per day (DWPD) for 5 years
- 6 Gbps SATA host interface
- High reliability and enhanced ruggedness
- MTTF of 3 million device hours - 50% more than most drives
- Absence of moving parts to reduce potential failure points in the server
- S.M.A.R.T. support
- Advanced Encrypting Standard (AES) 256-bit encryption

SSDs have a huge but finite number of program/erase (P/E) cycles, which affect how long they can perform write operations and thus their life expectancy. Mainstream SSDs typically have a better cost per read IOPS ratio but lower endurance and performance compared to Performance SSDs. SSD write endurance is typically measured by the number of program/erase cycles that the drive can incur over its lifetime, which is listed as total bytes written (TBW) in the device specification.

The TBW value that is assigned to a solid-state device is the total bytes of written data that a drive can be guaranteed to complete. Reaching this limit does not cause the drive to immediately fail; the TBW simply denotes the maximum number of writes that can be guaranteed. A solid-state device does not fail upon reaching the specified TBW. However, at some point after surpassing the TBW value (and based on manufacturing variance margins), the drive reaches the end-of-life point, at which time the drive goes into read-only mode. Because of such behavior, careful planning must be done to use SSDs in the application environments to ensure that the TBW of the drive is not exceeded before the required life expectancy.

For example, the 5300 Mainstream 1.92 TB drive has an endurance of 17,520 TB of total bytes written (TBW). This means that for full operation over five years, write workload must be limited to no more than 9,600 GB of writes per day, which is equivalent to 5.0 full drive writes per day (DWPD). For the device to last three years, the drive write workload must be limited to no more than 16,000 GB of writes per day, which is equivalent to 8.3 full drive writes per day.

Technical specifications

The following table presents technical specifications for the 5300 Mainstream SATA SSDs.

Tip: Drives listed in this product guide are the Lenovo versions of the Micron 5300 MAX family of SSDs.

Table 2. Technical specifications

Feature	240 GB drive	480 GB drive	960 GB drive	1.92 TB drive	3.84 TB drive
Interface	6 Gbps SATA	6 Gbps SATA	6 Gbps SATA	6 Gbps SATA	6 Gbps SATA
Capacity	240 GB	480 GB	960 GB	1.92 TB	3.84 TB
Endurance (drive writes per day)	5.0 DWPD	5.0 DWPD	5.0 DWPD	5.0 DWPD	3.5 DWPD
Endurance (total bytes written)	2190 TB	4380 TB	8760 TB	17,520 TB	24,528 TB
Data reliability	< 1 in 10 ¹⁷ bits read	< 1 in 10 ¹⁷ bits read	< 1 in 10 ¹⁷ bits read	< 1 in 10 ¹⁷ bits read	< 1 in 10 ¹⁷ bits read
MTTF	3,000,000 hours	3,000,000 hours	3,000,000 hours	3,000,000 hours	3,000,000 hours
IOPS reads (4 KB blocks)	82,000	95,000	95,000	95,000	95,000
IOPS writes (4 KB blocks)	60,000	60,000	75,000	70,000	34,000
Sequential read rate (128 KB blocks)	540 MBps	540 MBps	540 MBps	540 MBps	540 MBps
Sequential write rate (128 KB blocks)	380 MBps	460 MBps	520 MBps	520 MBps	520 MBps
Read latency (seq)	175 µs	175 µs	175 µs	175 µs	250 µs
Write latency (seq)	300 µs	100 µs	100 µs	100 µs	200 µs
Shock, non-operating	1,500 G (Max) at 0.5 ms	1,500 G (Max) at 0.5 ms	1,500 G (Max) at 0.5 ms	1,500 G (Max) at 0.5 ms	1,500 G (Max) at 0.5 ms
Vibration, non-operating	3.13 G _{RMS} (5-800 Hz)	3.13 G _{RMS} (5-800 Hz)	3.13 G _{RMS} (5-800 Hz)	3.13 G _{RMS} (5-800 Hz)	3.13 G _{RMS} (5-800 Hz)
Typical power (R / W)	2.5 / 3.0 W	2.5 / 3.1 W	2.8 / 3.4 W	3.0 / 3.8 W	2.5 / 3.8 W

Server support

The following tables list the ThinkSystem servers that are compatible.

Table 3. ThinkSystem server support (Part 1)

Part number	Description	Intel 2S								AMD			
		ST550 (7X09/7X10)	SR530 (7X07/7X08)	SR550 (7X03/7X04)	SR570 (7Y02/7Y03)	SR590 (7X98/7X99)	SR630 (7X01/7X02)	SR650 (7X05/7X06)	SR670 (7Y36/37/38)	SR635 (7Y98/7Y99)	SR655 (7Y00/7Z01)	SR645 (7D2Y/7D2X)	SR665 (7D2W/7D2V)
2.5-inch hot-swap drives - ThinkSystem													
4XB7A17087	ThinkSystem 2.5" 5300 240GB Mainstream SATA 6Gb Hot Swap SSD	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y
4XB7A17088	ThinkSystem 2.5" 5300 480GB Mainstream SATA 6Gb Hot Swap SSD	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y
4XB7A17089	ThinkSystem 2.5" 5300 960GB Mainstream SATA 6Gb Hot Swap SSD	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y
4XB7A17090	ThinkSystem 2.5" 5300 1.92TB Mainstream SATA 6Gb Hot Swap SSD	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y
4XB7A17091	ThinkSystem 2.5" 5300 3.84TB Mainstream SATA 6Gb Hot Swap SSD	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y
3.5-inch hot-swap drives - ThinkSystem													
4XB7A17096	ThinkSystem 3.5" 5300 240GB Mainstream SATA 6Gb Hot Swap SSD	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y
4XB7A17097	ThinkSystem 3.5" 5300 480GB Mainstream SATA 6Gb Hot Swap SSD	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y
4XB7A17098	ThinkSystem 3.5" 5300 960GB Mainstream SATA 6Gb Hot Swap SSD	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y
4XB7A17099	ThinkSystem 3.5" 5300 1.92TB Mainstream SATA 6Gb Hot Swap SSD	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y
4XB7A17100	ThinkSystem 3.5" 5300 3.84TB Mainstream SATA 6Gb Hot Swap SSD	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y

Table 4. ThinkSystem server support (Part 2)

Part number	Description	E		1S Intel				4S Intel						Dense/ Blade			
		SE350 (7Z46/7D1X)	ST50 (7Y48/7Y50)	ST250 (7Y45/7Y46)	SR150 (7Y54)	SR250 (7Y51/7Y52)	SR850 (7X18/7X19)	SR850P (7D2F/2D2G)	SR860 (7X69/7X70)	SR950 (7X11/12/13)	SR850 V2 (7D31/32/33)	SR860 V2 (7Z59/7Z60)	SD530 (7X21)	SD650 (7X58)	SN550 (7X16)	SN850 (7X15)	
2.5-inch hot-swap drives - ThinkSystem																	
4XB7A17087	ThinkSystem 2.5" 5300 240GB Mainstream SATA 6Gb Hot Swap SSD	N	N	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y
4XB7A17088	ThinkSystem 2.5" 5300 480GB Mainstream SATA 6Gb Hot Swap SSD	N	N	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y
4XB7A17089	ThinkSystem 2.5" 5300 960GB Mainstream SATA 6Gb Hot Swap SSD	N	N	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y
4XB7A17090	ThinkSystem 2.5" 5300 1.92TB Mainstream SATA 6Gb Hot Swap SSD	N	N	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y
4XB7A17091	ThinkSystem 2.5" 5300 3.84TB Mainstream SATA 6Gb Hot Swap SSD	N	N	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y
3.5-inch hot-swap drives - ThinkSystem																	
4XB7A17096	ThinkSystem 3.5" 5300 240GB Mainstream SATA 6Gb Hot Swap SSD	N	N	Y	N	Y	N	N	N	N	N	N	N	N	N	N	N
4XB7A17097	ThinkSystem 3.5" 5300 480GB Mainstream SATA 6Gb Hot Swap SSD	N	N	Y	N	Y	N	N	N	N	N	N	N	N	N	N	N
4XB7A17098	ThinkSystem 3.5" 5300 960GB Mainstream SATA 6Gb Hot Swap SSD	N	N	Y	N	Y	N	N	N	N	N	N	N	N	N	N	N
4XB7A17099	ThinkSystem 3.5" 5300 1.92TB Mainstream SATA 6Gb Hot Swap SSD	N	N	Y	N	Y	N	N	N	N	N	N	N	N	N	N	N
4XB7A17100	ThinkSystem 3.5" 5300 3.84TB Mainstream SATA 6Gb Hot Swap SSD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N

Operating system support

SATA SSDs operate transparently to users, storage systems, applications, databases, and operating systems.

Operating system support is based on the controller used to connect to the drives. Consult the controller product guide for more information:

- RAID controllers: <https://lenovopress.com/servers/options/raid>
- SAS HBAs: <https://lenovopress.com/servers/options/hba>

Warranty

The 5300 Mainstream SATA SSDs carry a one-year, customer-replaceable unit (CRU) limited warranty. When the SSDs are installed in a supported server, these drives assume the system's base warranty and any warranty upgrades.

Solid State Memory cells have an intrinsic, finite number of program/erase cycles that each cell can incur. As a result, each solid state device has a maximum amount of program/erase cycles to which it can be subjected. The warranty for Lenovo solid state drives (SSDs) is limited to drives that have not reached the maximum guaranteed number of program/erase cycles, as documented in the Official Published Specifications for the SSD product. A drive that reaches this limit may fail to operate according to its Specifications.

Physical specifications

The drives have the following physical specifications (approximate, without the tray):

- Height: 7 mm (0.3 in.)
- Width: 70 mm (2.8 in.)
- Depth: 100 mm (4.0 in.)
- Weight: 70 g (2.5 oz)

Shipping dimensions and weight - 2.5-inch drives (approximate, including the tray):

- Height: 63 mm (2.5 in.)
- Width: 174 mm (6.9 in.)
- Depth: 133 mm (5.2 in.)
- Weight: 434 g (1.0 lb)

Shipping dimensions and weight - 3.5-inch drives (approximate, including the tray):

- Height: 95 mm (3.7 in.)
- Width: 257 mm (10.1 in.)
- Depth: 193 mm (7.6 in.)
- Weight: 484 g (1.1 lb)

Operating environment

The SSDs are supported in the following environment:

- Operating temperature: 0 to 70°C (32 to 158°F)
- Non-operating temperature: -40 to 85°C (-40 to 185°F)
- Relative humidity: 5 to 95% (non-condensing)

Agency approvals

The 5300 Mainstream SATA SSDs conform to the following regulations:

- Micron Green Standard
- Built with sulfur resistant resistors
- CE (Europe): EN 55032 Class B, RoHS
- FCC: CFR Title 47, Part 15 Class B
- UL: UL-60950-1, 2nd Edition
- BSMI (Taiwan): approval to CNS 13438
- RCM (Australia, New Zealand): AS/NZS CISPR32 Class B
- KCC RRL (Korea): approval to KN 32 Class B, KN 35 Class B
- W.E.E.E.: Compliance with EU WEEE directive 2002/96/EC.
- TUV (Germany): approval to IEC60950/EN60950
- VCCI (Japan): 2015-04 Class B
- IC (Canada): CISPR32 Class B: Canadian ICES-003:2016

Related publications and links

For more information, see the following documents:

- Product Guide on ThinkSystem 5300 Mainstream 6Gb SATA SED SSDs
<https://lenovopress.com/lp1256>
- Lenovo ThinkSystem storage options product page
<https://lenovopress.com/lp0761-storage-options-for-thinksystem-servers>
- Micron 5300 series product page
<https://www.micron.com/5300>
- ServerProven for SSDs
<http://www.lenovo.com/us/en/serverproven>
- Lenovo RAID Introduction
<https://lenovopress.com/lp0578-lenovo-raid-introduction>
- Lenovo RAID Management Tools and Resources
<https://lenovopress.com/lp0579-lenovo-raid-management-tools-and-resources>

Related product families

Product families related to this document are the following:

- [Drives](#)

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