SanDisk® X210 SSD (Solid State Drive)

Introducing SATA 6 Gb/s High Performance, Reliable, and Low Power for an Enhanced User Experience.

SanDisk X210 SSD Benefits:

- SATA Revision 3.1 6 Gb/s Compliant; Backwards Compliant to SATA Revision 2.0 3 Gb/s & SATA Revision 1.0 1.5 Gb/s
- ATA Command Set ACS
- NCQ Support up to Queue Depth = 32
- Support for TRIM
- S.M.A.R.T Feature Supported

Advanced Flash Management:

- nCache™ - Non-volatile Write Cache
- Dynamic and Static Wear-leveling
- Bad Block Management
- Background Garbage Collection

Advanced Features:

- Tiered Caching - Volatile and Non-volatile Cache
- Supports Multi-stream - Improves User Experience in Multitasking Systems
- Minimal Write Amplification - Increases Endurance and Performance
- Support for Thermal Throttling
- Windows® WHCK Certified

The X210 is SanDisk's high-end SATA SSD designed for the client computing and data center and server markets. Based on 19nm MLC NAND flash, it introduces a new set of features and enhancements to support businesses that prioritize fast, consistent access to data, such as search engine and cloud storage providers and streaming media companies. Built to provide leading performance in read-intensive environments, the X210 also significantly reduces I/O bottlenecks and greatly improves random I/O performance and multi-stream capabilities.

Full Vertical Integration - For over 25 years, SanDisk has been driving the future of flash memory solutions by delivering innovative design and form factors through vertically integrated manufacturing capabilities. SanDisk works closely with partners to enable the creation of products that people and businesses have come to rely on and lowering costs to make them more accessible. Today, SanDisk continues the uncompromising pursuit of excellence that has distinguised the company as the go-to flash memory resource for companies and consumers, alike.

Testing - From NAND manufacturing facility to assembly and testing, SanDisk's commitment to delivering tried and true products to partners remains a top priority.

High Quality - Each SSD goes through rigorous performance and durability testing cycles before it lands in the hands of OEM customers. This ensures that every drive stands up to tough operating conditions and lives up to SanDisk quality standards .

Performance

At the heart of the X210 is a high performance controller and SanDisk's own 19nm All Bit Line (ABL) architecture. All Bit Line architecture offers twice the parallelism of conventional Half Bit Line (HBL) architectures; increasing both performance and endurance.

The drive also supports a unique feature to improve random write performance and ensure a very positive user experience. Modern operating systems mostly access the storage device using small access blocks, with the majority being 4KB access blocks. The small logical access blocks conflict with the physical block structure (>1MB) for the newer generation flash memory technology. To bridge this difference, the X210 employs three storage layers:

Volatile cache - DDR DRAM cache

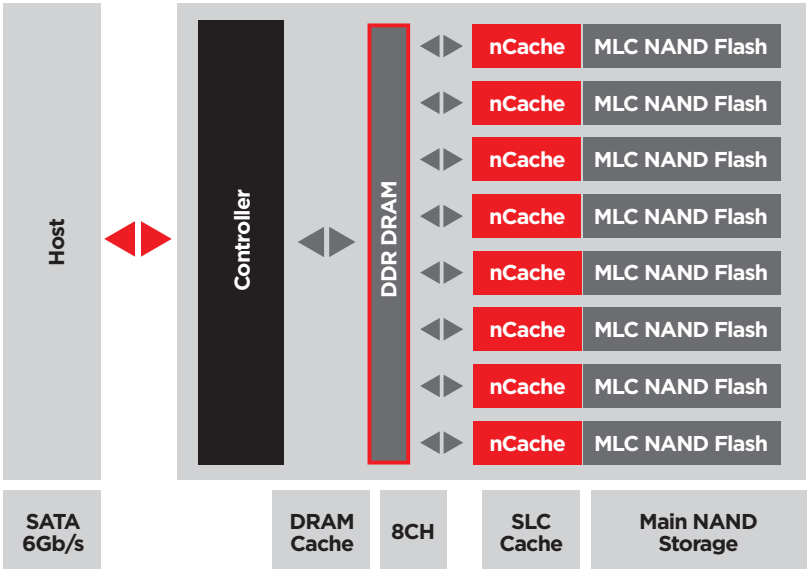
nCache™ - A non-volatile flash write cache

Mass storage – MLC NAND flash

The nCache is used to accumulate small writes (called segments) at high speed and then flushes and consolidates them to larger MLC sections of the NAND Flash memory array.

Power Management

The X210 employs DEVSLP SATA low power mode, which further reduces the device's power consumption in the IDLE state. This is important as extending the time between battery charges has become critical in mobile devices. DEVSLP enables the device, and optionally the host, to completely shut off their SATA PHY, resulting in much lower power consumption compared to Slumber SATA lower power mode.



SanDisk® X210 SSD Product Features and Specifications

Specifications are preliminary and subject to change

Device	SanDisk X210 SSD		
Form Factor	7mm 2.5-inch Cased		
Interface	SATA Revision 3.1 (6 Gb/s) backward compatible to SATA Revision 2.0 (3 Gb/s) and SATA Revision 1.0 (1.5 Gb/s)		
Performance[1]	128GB	256GB	512GB
Seq. Read up to (MB/s)[2]	505	505	505
Seq. Write up to (MB/s)[2]	330	470	470
Ran. Read up to (IOPS)[2]	86k	88k	89k
Ran Write up to (IOPS)[2]	55k	60k	58k
Endurance (TBW)[3]	>80	>80	>80
Latency Read[4]	60µs	60µs	60µs
Latency Write[4]	65µs	65µs	65µs
Power (Average)	128GB	256GB	512GB
Active Power (W)[5]	0.11	0.11	0.11
Max Read Operating (W)	2.9	3.0	2.9
Max Write Operating (W)	3.7	4.6	5.0
Slumber (mW)	80	80	80
DEVSLP (mW)[6]	4.8	5.0	15.0
MTBF[8]	Up to 2,000,000 hours		
UBER	<1 sector in 10E-16 bits		
Weight (g)[7]	54	57	57
Size	2.5" SFF-8223 &-8201	7.0mm x 69.85mm x 100.5mm	
Environmental			
Operating Temperatures	0°C to 70°C		
Non-operating Temperatures	-55°C to 85°C		
Operating Vibration	5.0 gRMS, 10 – 2000 Hz		
Non-operating Vibration	4.9 gRMS, 7 – 800 Hz		
Operating/Non-operating Shock	1,500 G @0.5 msec half sine		
Certifications	FCC, CE, UL, ULc, TUV, KC, BSMI, ACA, VCCI		

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Specifications subject to change without notice.
[1] 1 gigabyte (GB) = 1 billion bytes. 1 terabyte (TB) = 1 trillion bytes. Some capacity not available for data storage.
[2] Up to stated speed. Based on internal testing; performance may vary depending upon drive capacity, host device, OS and application. 1 megabyte (MB) = 1 million bytes.
[3] Approximations based on SanDisk internal metrics, that quantifies how much data can be written to a SSD in its lifespan expressed in terabytes written (TBW).
[4] Performance for 256GB product on SATA 6Gb/s host, Queue Depth = 32. Based on internal testing; performance may vary.
[5] Power measurements in 25°C. Based on FW version with HIPM-enable.
[6] Typical power for 256GB product.
[7] Dimensions and weight vary based on form factor and capacity.
[8] MTBF – Mean Time Between Failures based on parts stress analysis.

SanDisk®

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