

SandForce® SF3700 Family

ENTERPRISE FLASH CONTROLLERS Data Sheet

Key Features and Benefits

- Scalable and flexible SF3000 architecture
- Native PCIe NVMe and SATA interfaces in a single ASIC design
- Up to 2TB capacity
- DuraWrite™ data reduction efficiently maximizes SSD endurance
- SHIELD™ error correction implements LDPC with DSP to ensure data integrity even as flash ages
- Enhanced RAISE™ data protection can recover page, block and die failures
- Dual AES-256 hardware encryption secures data at rest
- Power-fail circuitry prevents data loss due to power faults in enterprise applications
- Single-chip, DRAM-less solution enables small form factors and low BOM cost
- Complete solution including ASIC, FW, RDK and development tools

The growing trends toward big data and portable computing create new requirements for data storage. Solid state drives offer compelling benefits, ranging from high performance and low latency for hyperscale data centers to low power consumption for client computing. The SF3700 family, the third generation of Seagate® SandForce flash controllers, enables SSD manufacturers to build robust PCIe NVMe and SATA flash storage solutions for enterprise applications.

Scalable and Flexible Architecture

The SF3000 architecture is scalable and flexible, delivering exceptional performance, reliability, data security and supporting rapid adoption of the latest flash technologies.

Native PCI Express Interface

The SF3700 family enables enterprise PCIe solid state storage. It supports NVMe protocol across PCIe to deliver ultimate performance, and offers compatibility with a broad range of platforms.

Endurance and Reliability

As NAND flash memory geometries shrink, delivering the endurance and reliability that customers demand becomes more challenging. The SF3700 family combines several techniques to extend flash memory life and maintain data integrity. Next-generation DuraWrite data reduction lowers write amplification and P/E cycles to maximize SSD endurance. SHIELD advanced error correction further extends flash memory life by implementing an LDPC code that combines hard-decision, soft-decision, DSP and adaptive ECC.

Data Protection

SF3700 flash controllers provide superior data protection with enhanced RAISE (Redundant Array of Independent Silicon Elements) technology that includes new levels of data protection and additional redundancy for mission-critical enterprise solutions, ensuring access to data even after a page, block or full die fault. RAISE technology provides the protection and reliability of RAID on a single drive without the 2x write overhead of parity.



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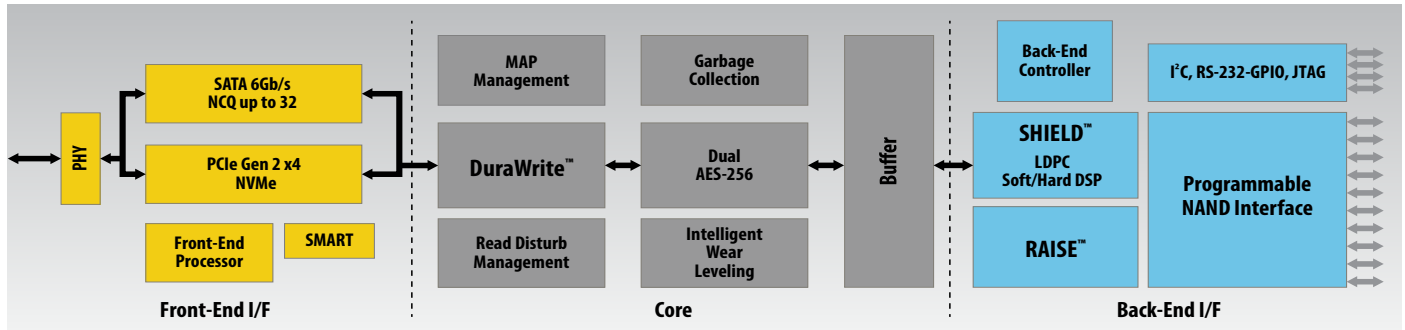


Figure 1. Seagate® SandForce® SF3700 Block Diagram

Seagate® SandForce® SF3700 Flash Controller Family	SF3739	SF3759
Applications	Value Enterprise	Enterprise Caching Enterprise Storage
DuraClass™ Technology	DuraWrite™ data reduction Enhanced RAISE™ data protection SHIELD™ error correction Intelligent block management and wear leveling Intelligent read disturb management Intelligent garbage collection Intelligent data retention optimization Power/performance balancing Thermal threshold management	
Architecture	SF3000	
Host Interface	SATA 6Gb/s PCIe Gen2 x4 (NVMe)	
Max Capacity Supported ¹	2TB	
Performance ²	Sequential Read: up to 1600MB/s Sequential Write: up to 670MB/s Random Read (4K): up to 130,000 IOPS Random Write (4K): up to 80,000 IOPS Random 70R/30W mix: up to 100,000 IOPS	
Flash Memory Support	MLC, TLC 9 channels up to 400MT/s ONFi 2.0/3.0, Toggle 1.0/2.0	SLC, eMLC, MLC, TLC, 9 channels up to 400MT/s ONFi 2.0/3.0, Toggle 1.0/2.0
Sector Size	512B (SATA) 4KB (PCIe NVMe)	
Security	Dual AES-256 encryption TCG Enterprise (Optional only with SF3759)	
Reliability	SHIELD™ error correction Full end-to-end CRC protection	
Data Protection	RAISE 1 + Fractional RAISE RAISE 2 + Auto-reallocation	
Power Fail Protection	FW + partial + full	
Package	624-ball FCBGA - 17 × 17 mm, 0.65 mm pitch	
Compliance	RoHS, halogen-free, green	

Note: These specifications are preliminary and subject to change.

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

² Performance data is based on estimates under certain workload conditions, and is subject to change. For more information please contact your local Seagate technical representative.

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