

PRODUCT BRIEF

SF-2500 & SF-2600 Enterprise SSD Processors

Features

- Second generation SSD Processor which enables standard Flash memory to operate in enterprise storage environments
- 6Gb/s SATA III with NCQ (SAS and PCIe with a third-party bridge)
- Maintains the highest level of read and write performance (up to 60K IOPS & 500MB/s)
- AES-256/128, ATA & TCG Enterprise security protocols for automatic double encryption at the drive level ensures the best secure data protection
- Non-512B sector support for SAS environments
- Supports the latest 3xnm & 2xnm SLC & MLC Flash memory with Asych/Toggle/ONFI2 interfaces
- Enhanced ECC enables data protection to be up to 10x stronger than the best HDD
- DuraClass™ technology provides best-in-class endurance, performance, and power efficiency
- DuraWrite™ technology enables enterprise SSD deployment using the MLC flash without sacrificing performance
- Up to 512GB capacity
- Single chip, "DRAM-less" solution for small form factor support, and lowest BOM cost for any enterprise SSD

Overview

The SSD market is growing and changing rapidly along with the evolution of new interface technologies, high-density NAND flash, and mission-critical enterprise storage needs, which provides both challenges and opportunities. SandForce® SF-2500/2600 – the second generation of SandForce Enterprise SSD Processors – continue accelerating SSD deployment in I/O intensive enterprise storage applications. These devices are designed to enable standard high density NAND Flash memory to reliably operate in SATA-, SAS- and PCIe-based enterprise storage applications without compromising performance. The SF-2500/2600 SSD Processors have integrated enhanced DuraClass™ Technology that is architected to leverage advanced SLC and MLC NAND Flash memory, and deliver best-in-class performance, endurance, security, and power efficiency in a single chip solution that does not require an additional DRAM cache, or other costly patches.

Endurance and Longevity

While the new generations of NAND Flash memory is developed with shrinking silicon geometries to reach higher densities, its endurance is significantly dropping. DuraWrite™ technology optimizes writes to the Flash memory over conventional controllers increasing the overall endurance and reliability of the complete SSD. Highly intelligent block management and wear leveling also extends the overall endurance. With this technology, even MLC-based SSDs can operate in enterprise environments for 5+ years.

Performance

SSDs greatly outperform traditional HDDs, and in

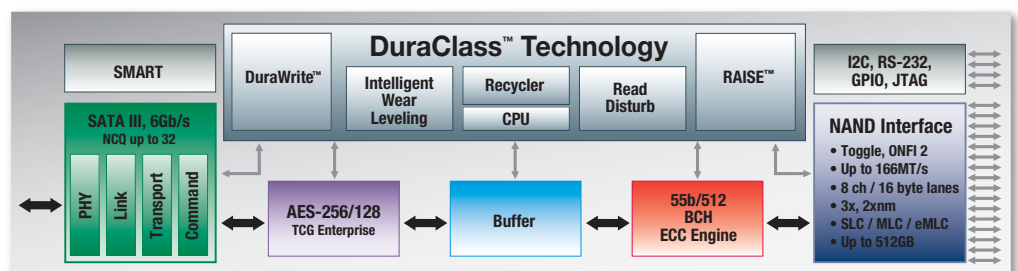
many cases reach the limits of the bus interface. Advanced high-speed SATA/SAS/PCIe interfaces have been implemented in newer systems to remove this performance bottleneck. SSDs are perfect to take advantage of that higher speed interface. SandForce SSD Processors deliver performance that maximizes the throughput of a 6Gb/s SATA interface with balanced read/write speeds. It is critical to have write speeds on par with read speeds to keep the enterprise class system performance highly effective. Also the SF-2600 with non-512B sector support enables maintaining high- performance in SAS environments.

Security

Data security is becoming a critical component in the digital age. SandForce SF-2500/2600 SSD Processors feature high-level security protocols to protect the security of data stored in Flash memory. DuraClass technology automatically stores data in a highly secure AES-256/128 hardware encrypted format, that double encrypts the data. The SF-2500/2600 SSD Processors also support TCG Enterprise security requirements.

Data Protection and Reliability

The SF-2500/2600 SSD Processors provide up to 100x greater data protection than leading enterprise HDDs. This comes from a combination of a superior higher-level BCH ECC algorithm with up to 55 bits/512 Byte sector protection and the unique RAISE™ (Redundant Array of Independent Silicon Elements) technology. RAISE provides the protection and reliability of RAID on a single drive without the 2x write overhead of parity.



SF-2500 Block Diagram

SF-2500 & SF-2600 Enterprise SSD Processors

DuraClass™ Technology:	DuraWrite™ extends the endurance of SSDs Intelligent Block Management and Wear Leveling Intelligent Read Disturb Management Intelligent “Recycling” for advanced free space management (Garbage Collection) RAISE™ (Redundant Array of Independent Silicon Elements) Intelligent Data Retention optimization Best-in-Class ECC protection for longest data retention and drive life
Host Interface:	SATA III Compliant, 6Gb/s, 3Gb/s and 1.5Gb/s support Native Command Queuing (up to 32 commands) SMART Command Transport
Max Capacity Supported:	512GB* (using 32Gb or 64Gb/die components)
Performance (sustained):	Sequential Read & Write Transfer: Up to 500MB/s (@128KB blocks) Random Read & Write IOPS: Up to 60,000 (@4KB blocks)
Sector Size Support:	SF-2500: 512B SF-2600: 520, 524, 528, 4K+DIF
Flash Memory Support:	MLC, eMLC & SLC; 3xnm, 2xnm (Asynch, Toggle, ONFi2; up to 166MT/s)
Power Consumption:	Typical: ~1.5W (est.)
Security:	Data Encryption: AES-256/128, TCG Enterprise
Protection:	ECC Recovery: Up to 55 bits correctable per 512-byte sector (BCH) Unrecoverable Read Errors: Less than 1 sector per 10 ¹⁷ bits read
Reliability:	MTTF: 10,000,000 operating hours Supports enterprise life cycle (5+ years)
Operating Temperature:	Commercial: 0°C to 70°C ambient Industrial: -40°C to 85°C ambient
Package:	400-Pin TFBGA – 14x14mm, 0.65mm pitch, 16 byte lanes
Compliance:	RoHS, Halogen-Free, Green

Ordering Information

Part Number:	Description:	Capacity:*	Memory Type:	IOPS sustained:***	Temperature
SF-2682VA1-SCD	Enterprise SAS**	32GB - 512GB	MLC/eMLC/SLC	Up to 60,000	Commercial
SF-2682VA1-ICB	Enterprise SAS**	32GB - 512GB	MLC/eMLC/SLC	Up to 60,000	Industrial
SF-2582VA1-SCD	Enterprise SATA	32GB - 512GB	MLC/eMLC/SLC	Up to 60,000	Commercial
SF-2582VA1-ICB	Enterprise SATA	32GB - 512GB	MLC/eMLC/SLC	Up to 60,000	Industrial

* 1GB=1 billion bytes

** SATA Interface with SAS enhancements behind SAS/SATA bridges

*** Random read & write performance @ 4KB blocks



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