SMART®
Modular Technologies

mSATA

SMART Modular Technologies' mSATA industrial-grade embedded SATA module solid state drive products support the server, storage, networking and data communications OEM markets. The mSATA products are ideal for applications requiring reliable internal storage, yet demand a small footprint. These embedded products can also be employed for embedded computing, medical, automotive and industrial applications. The mSATA modules can be used for storing and executing boot up code, OS systems, and also for data tables and general purpose storage. The low power consumption and fast data throughput are major advantages of the SMART's mSATA products over traditional rotating hard disk drives (HDDs).

The mechanical dimensions of the mSATA products are compatible with both standoff and card guide mounting methods. The mSATA modules are fully MO-300 compliant. Utilizing an industry standard SATA interface and connector, mSATA products easily integrate into a host system without any special BIOS modifications or additional device drivers.

The mSATA XL+ provides SATA III interface performance for industrial embedded applications with lower drive capacity needs. The mSATA XP+ SATA III offers high level sequential and random read/write performance in high-capacity drives for transaction intensive applications. The X10 is SMART's latest product and has enterprise class features, including End-to-End data protection, and over provisioning for better endurance.

SMART offers both single-level cell (SLC) and multi-level cell (MLC) mSATA products. SMART's industrial-grade mSATA products provide enhanced reliability by incorporating onboard error detection and correction, as well as static wear leveling algorithms, producing reliable operation over the product life cycle.

SMART's mSATA products support Self-Monitoring Analysis and Reporting Technology (S.M.A.R.T.), which is designed to reduce field failures and unscheduled service maintenance. By providing an accurate forecast of the expected lifespan, S.M.A.R.T. enables a reliable monitoring application that efficiently guarantees a 24/7 service availability.

Features & Benefits

- Advanced wear leveling – static and dynamic wear leveling
- Advanced Error Detection/Correction circuitry for superior data reliability
- Self-Monitoring Analysis and Reporting Technology (S.M.A.R.T. support
- Supports for 48bit LBA addressing with larger maximum transfer size
- Improved shock and vibration performance over rotating media

Product Family Overview

	Capacity	Performance Sequential
mSATA XL+		
MO-300 Standard SLC	8GB to 64GB	510MB/s Read (max) 140MB/s Write (max)
MO-300 Standard MLC I-temp	16GB to 64GB	530MB/s Read (max) 190MB/s Write (max)
mSATA XP+		
MO-300 Standard SLC	8GB to 128GB	510MB/s Read (max) 380MB/s Write (max)
mSATA X10		
MO-Standard MLC	60GB to 480GB	530MB/s Read (max) 380MB/s Write (max)
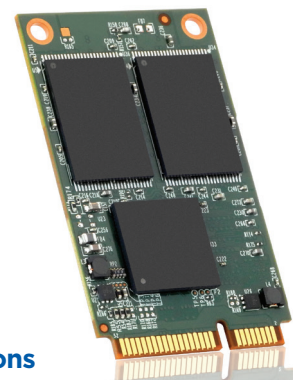
Applications

- NAS / SAN storage systems
- x86 server-storage appliances
- Distributed scale-out cloud servers
- Telecom and networking routers and switches
- ATCA compute blades
- Single board computers for defense, gaming and industrial control applications

Specifications

	mSATA XL+		mSATA XP+	mSATA X10
Performance				
	MLC	SLC	SLC	MLC
Host Interface Rate (maximum)	6.0Gbps			
Number of Flash Channels	4		8	4
Capacities	16GB to 128GB	8GB to 64GB	8GB to 128GB	60GB to 480GB
Sequential Read (maximum)	530MB/s	510MB/s	510MB/s	530MB/s
Sequential Write (maximum)	190MB/s	140MB/s	380MB/s	380MB/s
Random Read (maximum)	45K IOPS	46K IOPS	>40K IOPS	>80 IOPS
Random Write (maximum)	30K IOPS	27K IOPS	>60k IOPS	>88K IOPS
Reliability				
Data Reliability	< 1 Non-Recoverable Error in 10^{15} bits read			
Data Retention	10 years >90% life remaining 1 year at the end of life			
Endurance	2.5TB per GB in capacity (MLC) 85TB per GB in capacity (SLC)		85TB per GB in capacity (SLC)	2.5TB per GB in capacity
Error Correction / Error Detection (BCH)	Up to 43 bits per 1 KByte for MLC Up to 68 bits per 1 KByte for SLC			Up to 75 bits for every 2 Kbyte sector
Environmental				
Shock – Non-Operating	1500 *g* half-sine, 0.5 msec, 1 shock along each axis, X,Y,Z in each direction			
Shock – Operating	50 *g* half sine, 11 msec, 3 shocks along each axis, X,Y,Z in each direction			
Vibration – Operating	16.4 *g* rms 10-2000Hz, 3 axes			
Operating Temperature	C-temp: 0°C to 70°C (MLC and SLC) I-temp: -40ºC to +85ºC (SLC only)			
Storage Temperature	-25°C to 85°C (MLC) -55°C to 85°C (SLC)			
Humidity	10% to 90%, non-condensing, relative humidity			
Altitude	24,384 m [80,000 ft]			
Physical				
Length	50.80 mm			
Width	29.9 mm			
Height	< 4.85 mm			

mSATA XL+ Ordering Information

Part Number	Capacity
SLC Commercial Grade	
SH9MST6D8GJS01	8GB
SH9MST6D16GJS01	16GB
SH9MST6D32GJS01	32GB
SH9MST6D64GJS01	64GB
SLC Industrial Grade	
SH9MST6D8GJSI01	8GB
SH9MST6D16GJSI01	16GB
SH9MST6D32GJSI01	32GB
SH9MST6D64GJSI01	64GB
SH9MST6D128GJMI21	128GB
MLC Industrial Grade	
SH9MST6D016GJMI21	16GB
SH9MST6D032GJMI21	32GB
SH9MST6D064GJMI21	64GB

mSATA XP+ Ordering Information

Part Number	Capacity
SLC Commercial Grade	
SH9MST6D008GHS02	8GB
SH9MST6D016GHS02	16GB
SH9MST6D032GHS02	32GB
SH9MST6D064GHS02	64GB
SH9MST6D128GHS02	128GB
SLC Industrial Grade	
SH9MST6D008GHSI02	8GB
SH9MST6D016GHSI02	16GB
SH9MST6D032GHSI02	32GB
SH9MST6D064GHSI02	64GB
SH9MST6D128GHSI02	128GB

mSATA X10 Ordering Information

Part Number	Capacity
MLC Commercial Grade	
SV9MST6D060GLM21	60GB
SV9MST6D120GLM21	120GB
SV9MST6D240GLM21	240GB
SV9MST6D480GLM21	480GB

Contact information

Corporate Headquarters/North America: T: (+1) 800-956-7627 • T: (+1) 510-623-1231 • F: (+1) 510-623-1434 • E: info@smartm.com

Customer Service: T: (+1) 978-303-8500 • E: customers@smartm.com

Latin America: T: (+55) 11 4417-7200 • E: sales.br@smartm.com

EMEA: T: (+44) 7825-084427 • E: sales.euro@smartm.com

Asia/Pacific: T: (+65) 6678-7670 • E: sales.asia@smartm.com

For more information, please visit: **www.smartm.com**

SMART®
Modular Technologies