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MUS-IND25S3XXXXXX

2.5" SATAIII Industrial Solid State Drive

Data Sheet

Version 1.1

Aug, 2013



Revision History

Revision	Date	Description
1.1	Aug, 2013	Release

Confidential

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1. Overview

1.1 Product Description

This series of products are designed with a SATAIII interface for advanced industrial applications which require both high stability and high performance, goes through three proofing tests and high reliability environmental tests such as Wide Temperature Test and Shock/Vibration test. Maximus 2.5" SATAIII supports Over Load Protect and Power Failure Protect, with a fully compliant with defense selected & tested standards. Maximus 2.5" SATAIII products have high stability and reliability and can do perfectly well under lots of applications which involves severe environments. Maximus 2.5" SATAIII has a capacity range from 32GB~2TB and can be adapted to applications such as Rugged Computer, Panel PC, Video Recording, Industrial Systems, Systems Integration, Embedded Systems, Surveillance, Server, RAID, Defense etc. All of this series are manufactured with best-class components under strict tests and technologies, and are 100% proven by series of complicated and complete and long term tests.

1.2 Key Features

- Fully compatible with SATA III 6.0 Gb/s
- Capacity 32GB~1TB
- Enhanced endurance by dynamic/static wear-leveling^①
- Support dynamic power management
- Enhanced Power Failure Protect Function
- Enhanced Over Load Protect Function
- Automatic Bad-block management^②
- Support Trim and NCQ (Native Command Queuing) command
- Support BCH ECC 55-bits correctable in 512-bytes sector

Notes:

- ① The controller supports static/dynamic wear leveling. When the host writes data, the controller will find and use the block with the lowest erase count among the free blocks. When the free blocks' erase count is higher than the data blocks', it will activate the static wear leveling, replacing the not so frequently used user blocks with the high erase count free blocks.
- ② When the flash encounters ECC failed, program fail or erase fail, the controller will mark the block as bad block to prevent the used of this block and caused data lost later on.

2. Product Specifications

2.1 Capacity

Model Name	Raw Capacity ^①
MUS-IND25S3XX32S/M	32GB/SLC/MLC
MUS-IND25S3XX64S/M	64GB/SLC/MLC
MUS-IND25S3XX128S/M	128GB/SLC/MLC
MUS-IND25S3XX180S/M	180GB/SLC/MLC
MUS-IND25S3XX256S/M	256GB/SLC/MLC
MUS-IND25S3XX320S/M	320GB/SLC/MLC
MUS-IND25S3XX512S/M	512GB/SLC/MLC
MUS-IND25S3XX1024S/M	1024GB/SLC/MLC
MUS-IND25S3XX2048S/M	2048GB/SLC/MLC

Notes:

① 1 GB = 1024MB=1,000,000,000 bytes; 1 sector = 512 bytes.

2.2 Cache Size

Cache Size: Support 64MB Cache

2.3 Physical Specification

Form Factor	2.5 inch
Connector	SATA 7PIN+15 PIN Male Connector
Dimensions (mm)	100.2mm±0.2×69.85mm±0.2×9mm±0.2
Weight	<120g
Input Voltage	5V±5%

2.4 Environmental Specification

Operating Temperature		Standard Grade (0℃ ~+70℃) Wide Grade (-20℃ ~+70℃) Industrial Grade(-25℃~+85℃) Extended Grade (-40℃ ~+85℃)
Storage Temperature		-55℃ to 95℃
Humidity	Operating	95% (Non-condensing)
	Non-Operating	95% (Non-condensing)
Vibration		Jet(Random) Vibration, 10-2000Hz, 16.4G(X, Y, Z)
Shock		Non-operating 1500G peak, 0.5ms Operating 50G peak, 11ms
Altitude		80,000 feet, 25° C
Burn-in Test		72Hours
Falling Test		1.5m Free fall
Average Access time		0.1ms
Built-in UPS		Optional
Conformal Coating		Anti-Acid, Anti-mould, Anti-Dust(optional)
Power Loss Protection		On-board back-up power units are provided, it works with special designed FW and hardware circuits to protect user data integrity during emergency power loss.
Power Consumption		Idle / Stand-by 260mA@5.0V Sustained Read 500mA@5.0V Sustained Write 650mA@5.0V

2.5 Performance^①

Capacity	Flash type	Sequential Read Up to ^②	Sequential Write up to ^②	IOPS Random Read (4KB QD32) Up to ^③	IOPS Random Write (4KB QD32) up to ^③
32GB	MLC	355	278	23300	23500
	SLC	378	337	25500	23200
64GB	MLC	377	245	24000	23000
	SLC	396	307	24800	24200
128GB	MLC	424	278	25500	24200
	SLC	433	331	26000	24400
180GB	MLC	448	310	28000	25000
	SLC	454	319	28500	25200
256GB	MLC	481	303	32700	25400
	SLC	496	401	32200	25800
320GB	MLC	501	415	33200	26200
	SLC	508	430	34200	27000
512GB	MLC	515	470	36400	28200
	SLC	515	470	37000	28400
1024GB	MLC	525	525	38600	28700
	SLC	525	525	39000	29000
2048GB	MLC	535	525	38600	28700
	SLC	555	545	39900	29900

Note:

① Test platform: ASUS P8H67-M, CPU i3-2100, DDR III 2GB, Windows® 7 32bit with AHCI mode.

Flash mode: Synchronous. Write/Read Speed can reach 550MB/s Max.

② Tested base on Crystal Disk Mark (Version 3.1.1), default test data(Random), copied file 2000MB, unit MB/s.

③ Tested base on IOmeter 2009, unit IOPS. IOPS can reach 50,000 Max as per real working environment.

2.6 Reliability

Data Retention	15 years at 25°C		
MTBF	>2,000,000 hours		
Write Endurance	Capacity	MLC	SLC
	32GB	40TB	1300TB
	64GB	80TB	2600TB
	128GB	160TB	5200TB
	180GB	240TB	8800TB
	256GB	320TB	10400TB
	320GB	480TB	16000TB
	512GB	640TB	20800TB
	1024GB	1280TB	41600TB

Notes: Endurance=Capacity*P/E cycle/WAI

The capacity refers to raw capacity

2.7 Temperature Sensor

Temperature sensor	Yes	No
	Support	

2.8 /2.9 Product Ecological Compliance & Certificate



CE:

EN 55022:2010(CLASS B) EN 55024:2010 EN 50155:2010

EN 61000-3-2+A2:2009 iec 61000-4-2:2008

EN 61000-3-3:2008 iec 61000-4-3:2010

IEC 61000-4-4:2012

IEC 61000-4-5:2005

IEC 61000-4-6:2008

IEC 61000-4-8:2009

IEC 61000-4-11:2004

FCC:

47 CFR, Part2, Part15, CISPR PUB. 22

ROHS

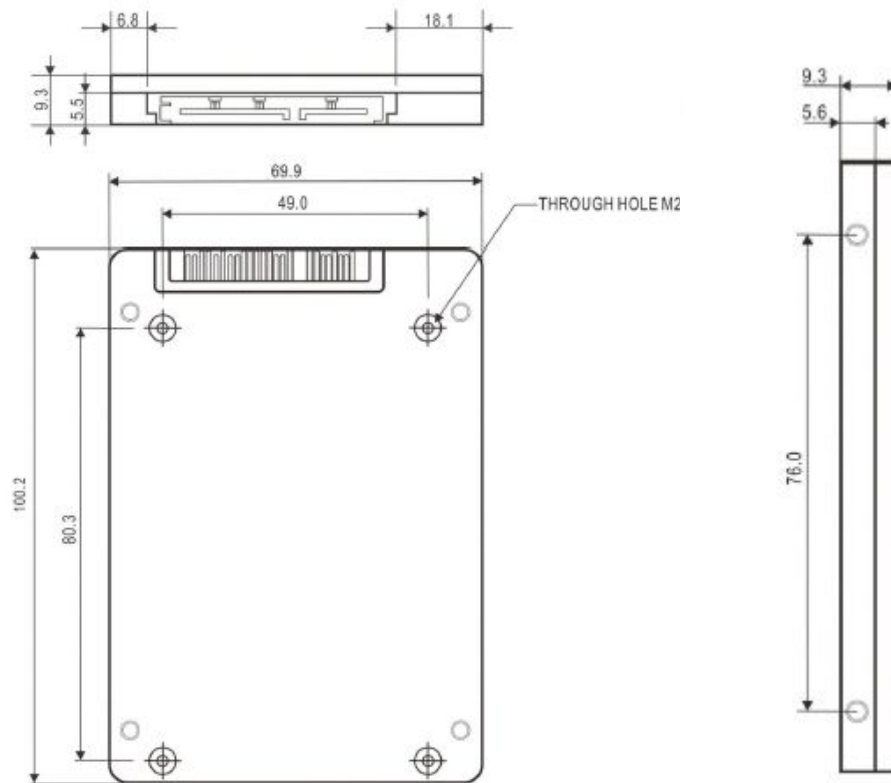
MIL-STD-810F

SATAII (SATA Rev.2.25)

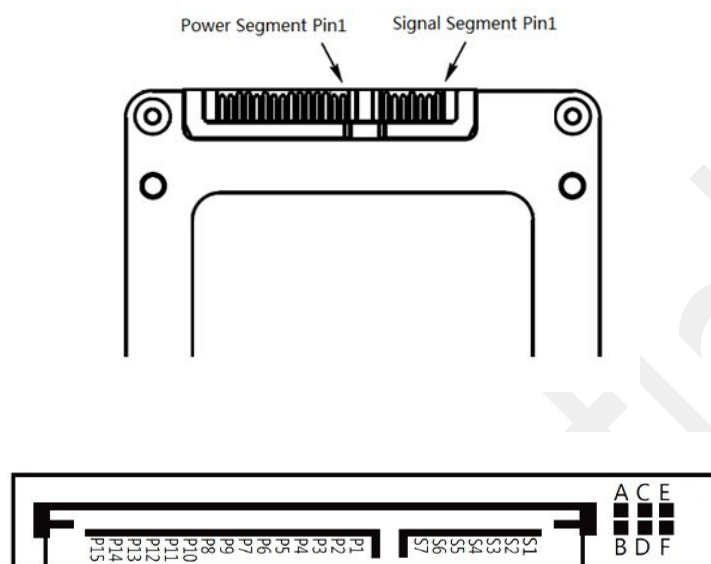
Up to ATA/ATAPI-7(Including S.M.A.R.T)

3. Mechanical Information

3.1 Dimensions



3.2 Pin Locations

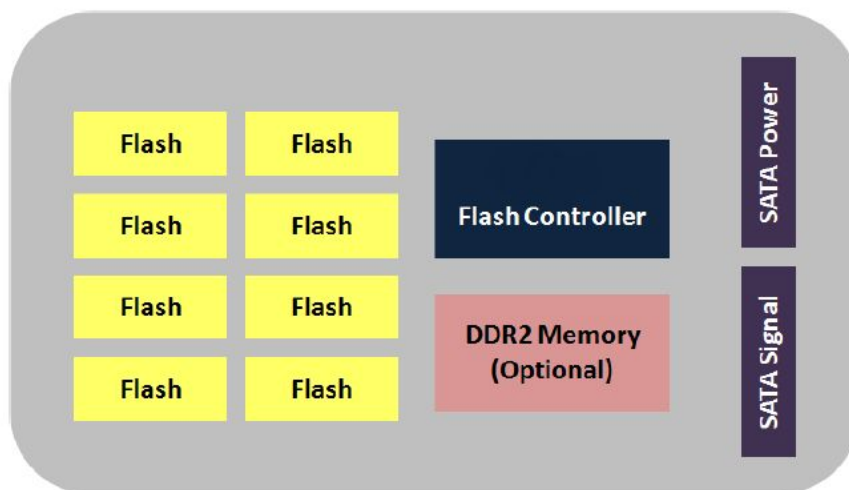


3.3 Signal Descriptions

Pin	Function	Definition
S1	GND	Ground
S2	RX+	Differential signal pair RX
S3	RX-	
S4	GND	Ground
S5	TX-	Differential signal pair TX
S6	TX+	
S7	GND	Ground
P1	NC	NC
P2	NC	NC
P3	NC	NC
P4	GND	Ground
P5	GND	Ground
P6	GND	Ground
P7	V5	5V Power
P8	V5	5V Power

P9	V5	5V Power
P10	GND	Ground
P11	DAS/DSS	Device Activity Signal
P12	GND	Ground
P13	NC	NC
P14	NC	NC
P15	NC	NC

3.4 Product Block Diagram



4. Model Name Rules

MUS-IND 25 S3 XX XX X X

Abbreviation	Referring to
MUS	Maximus Brand Name
IND	Advanced Industrial Series
25	2.5 inch
S3	SATAIII interface
XX	Temperature Range. "ST" for Standard Grade, "WT" for Wide Grade, "IT" for Industrial Grade, "ET" for Extended Grade
XX	Capacity
X	NAND Flash Type. "M" for MLC, "S" for SLC
X	Reserved for "E" and "D", "E" refers to "Secure Erase", "D" refers to "Physical Destruction"

Note: The Abbreviations in the form are corresponded under an order of "from left to the right" in the Model Name above.

The capacity refers to raw capacity not practical capacity.



5. Contact Information

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