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MUS-INDHSS2XXXXX

2.5" Half Slim SATAII 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 for advanced industrial applications, goes through three proofing tests and high reliability environmental tests such as Wide Temperature Test and Shock/Vibration test. Maximus 2.5" Half Slim SATAII supports Over Load Protect and Power Failure Protect, with a fully compliant with defense selected & tested standards. Maximus 2.5" Half Slim SATAII products have high stability and reliability and can do perfectly well under lots of applications which involves severe environments. Maximus 2.5" Half Slim SATAII has a capacity range from 4GB~128GB and can be adapted to applications such as Rugged Computer, Panel PC, 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 II 3.0 Gb/s standard
- Capacity 4GB~128GB
- 2.5" Half Slim Form factor
- Enhanced endurance by dynamic/static wear-leveling^①
- Support dynamic power management
- Enhanced Power Failure Protect Function
- Support S.M.A.R.T function
- Automatic Bad-block management^②
- Support Trim and NCQ (Native Command Queuing) command
- Support BCH ECC 12 9-bits in 1024 bytes

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-INDHSS2ST04S/M	4GB/SLC/MLC
MUS-INDHSS2ST08S/M	8GB/SLC/MLC
MUS-INDHSS2ST16S/M	16GB/SLC/MLC
MUS-INDHSS2ST32S/M	32GB/SLC/MLC
MUS-INDHSS2ST64S/M	64GB/SLC/MLC
MUS-INDHSS2ST128S/M	128GB/SLC/MLC

Notes:

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

2.2 Cache Size

Cache Size: 128MB supported

2.3 Physical Specification

Form Factor	2.5 inch Half Slim
Connector	Standard SATAII Connector
Dimensions (mm)	54.0mm±0.2×39.8mm±0.2×4.0mm±0.2
Weight	<60g
Input Voltage	5V±5%

2.4 Environmental Specification

Operating Temperature		Standard Grade (0~+70℃) Extended Grade (-40℃~+85℃)
Storage Temperature		-55℃ to 95℃
Humidity	Operating	95% (Non-condensing)
	Non-Operating	95% (Non-condensing)
Vibration		20G (40 to 2000Hz)
Shock		2000G at 0.3ms half sine wave
Altitude		80,000 feet, 25° C
Burn-in Test		72Hours
Falling Test		1.5m free fall
Average Access Time		0.2ms
Built-in UPS		/
Conformal Coating		Anti-acid, Anti-mould, Anti-dust(optional)
Encryption		AES-128 Bit
Average Access Time		0.1ms
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 ^②	Sequential Write ^②	IOPS Random Read (4KB QD32) ^③	IOPS Random Write (4KB QD32) ^③
4GB	MLC	120	90	12000	11000
	SLC	124	98	12000	11000
8GB	MLC	130	105	13300	12500
	SLC	138	110	15500	13200
16GB	MLC	145	115	14000	13000
	SLC	150	120	15800	15200
32GB	MLC	160	125	14500	13200



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	SLC	165	130	16000	15400
64GB	MLC	170	135	15700	14000
	SLC	178	140	16200	15800
128GB	MLC	190	154	16400	14200
	SLC	205	160	17200	16100

Note:

- ① Test platform: ASUS P8H67-M, CPU i3-2100, DDR III 2GB, Windows® 7 32bit with AHCI mode.
Flash mode: Synchronous.
- 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. The IOPS can reach 30,000 max as per real environment.

2.6 Reliability

Data Retention	15 years at 25°C		
MTBF	2,000,000 hours		
Write Endurance	Capacity	MLC	SLC
	4GB	5TB	160TB
	8GB	10TB	325TB
	16GB	20TB	650TB
	32GB	40TB	1300TB
	64GB	80TB	2600TB
	128GB	160TB	5200TB

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

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 61000-3-2 : 2006+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:

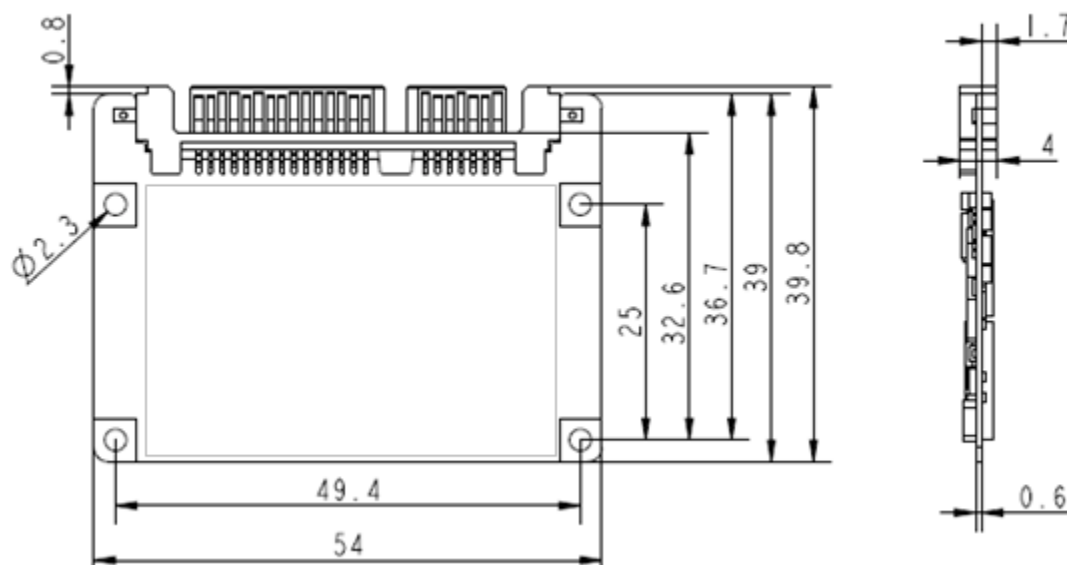
47 CFR, Part2, Part15, CISPR PUB. 22

RoHs

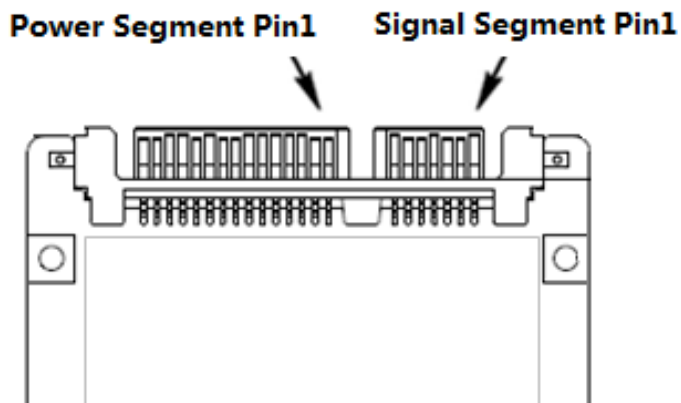
MIL-STD-810F
SATA II (SATA Rev. 2.5)
Up to ATA/ATAPI-7 (Including S.M.A.R.T)

3. Mechanical Information

3.1 Dimensions



3.2 Pin Locations

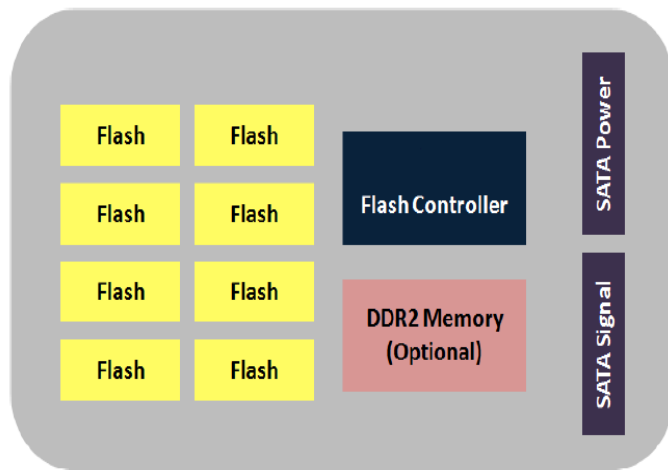


3.3 Signal Descriptions

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 HS S2 XX XX X

Abbreviation	Referring to
MUS	Maximus Brand Name
IND	Advanced Industrial Series
HS	Half Slim
S2	SATAII interface
XX	Temperature Range. "ST" for Standard Grade, "ET" for Extended Grade
XX	Capacity
X	NAND Flash Type. "M" for MLC, "S" for SLC

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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