



2.5" SSD M3A Product Datasheet



Product Specification Morex 2.5" SSD A3A



MOREX INFORMATION ENT., CO., LTD.

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Form Factor

- 2.5" SSD (SFF-8201)

NAND Flash Type

- 3D-MLC

Capacities

- 32GB, 64GB, 128GB, 256GB, 512GB

Performance

- Sequential Read (max): 547 MB/sec
- Sequential write (max): 479 MB/sec
- Random Read (max): 67300 IOPS
- Random write (max): 79000 IOPS

Supply Voltage

- 5V±5%

Power Consumption

- Idle mode: 0.6W (5Vx120mA)
- Active mode(max): 6W (5Vx1.2A)

Temperature Ranges

- Operating:
- Standard: 0°C~+70°C
 - Extended: -25°C~+85°C
 - Industrial: -40°C~+85°C
- Storage:
- -55°C to 95°C

Shock & Vibration

- Shock: 1500G@0.5ms
- Vibration: 20G (7~2KHz)

MTBF

- > 3,000,000 hours

Compliance With

- Serial ATA Revision 3.1 specifications
- SATA3 (6Gb/s) interface
- Backward compatible with SATA1 (1.5Gb/s) and SATA2 (3Gb/s) interface
- ATA/ATAPI-8 and ACS-2 command set
- Data set management command (TRIM)
- SATA Device Sleep (DEVSLP)
- Self-Monitoring, Analysis, and Reporting Technology (S.M.A.R.T)

Data Protection and Reliability

- Built-in hardware ECC, enabling up to 66-bit correction per 1KB
- Supports ATA8 security feature set
- Internal data shaping technique increases data endurance
- Global wear leveling algorithm

Certificates and Declarations

- FCC
- CE
- RoHS
- REACH
- WEEE



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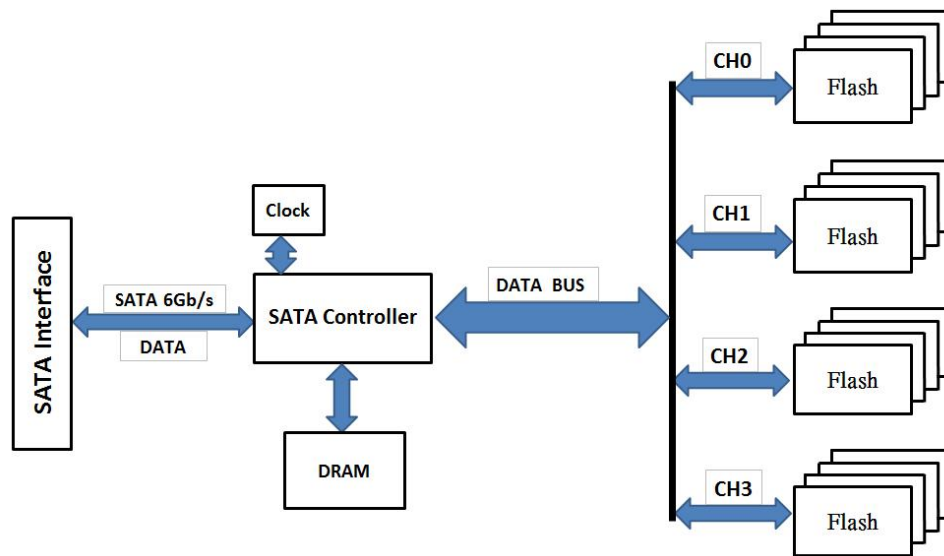
1. Overview

1.1 Introduction

The **Morex** 2.5" SSD series are solid state drives compliant with the standard SFF-8201 specification. Supporting larger capacities, faster read/write speeds, along with robust aluminum pressure die casting enclosure, **Morex** 2.5" SSD series offer supreme performance and extreme reliability to operate in harsh environments with wide temperature ranges and high levels of shock and vibration.

Morex 2.5" SSD A3A series incorporates advanced 3D MLC flash, which boosts storage performance and endurance. 3D NAND technology stacks flash cells vertically and this dramatically increases density. As 3D NAND flash expands the number of bits per square millimeter, their wafer capacity and bit output also increases. The manufacturing of 3D NAND reduces the cost per gigabyte and enhances endurance and reliability.

1.2 Block Diagram



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2. Product Specifications

2.1 Capacity

Raw Capacity	Cylinder	Head	Sector	Capacity	LBA*
32GB	16383	16	63	29.82GB	62533296
64GB	16383	16	63	59.63GB	125045424
128GB	16383	16	63	119.24GB	250069680
256GB	16383	16	63	238.47GB	500118192
512GB	16383	16	63	476.94GB	1000215216

Note: *One LBA = 512 Bytes.

2.2 Performance

Brand	Capacity	Sequential Read MB/sec (Max.)	Sequential Write MB/sec (Max.)	Random Read IOPS (4KB QD32)	Random Write IOPS (4KB QD32)
Micron	32GB	134	45	7.5K	11.3K
	64GB	267	89	14.6K	22.4K
	128GB	526	177	28.2K	44.2K
	256GB	528	331	49K	64.5K
	512GB	547	479	67.3K	79K

Note: Test tool: CrystalDiskMark 3.03

* Sequential performance is measured by file size 1000MB.

**Random performance is measured by 4KB Queue Depth 32.



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2.3 Power Characteristics

Supply Voltage	Parameter Specification
Input Voltage	5V±5%
Power Consumption	Specification (W)
Idle (max.)	0.6W (5Vx120mA)
Active (max.)	6W (5Vx1.2A)

2.4 Environmental Conditions

Environment	Specification
Storage Temperature	55°C~+95°C
Operating Temperature	0°C+70°C (Standard) ; -25°C~+85°C (Extended); -40°C~+85°C (Industrial)
Vibration*	20G (7~2K Hz)
Shock**	1500G@0.5ms
Humidity	Relative Humidity: 10-95%, non-condensing
MTBF***	>3,000,000 hours

Note: *Vibration reference to IEC 60068-2-6 testing standard.

**Shock reference to IEC 60068-2-27 testing standard.

***MTBF prediction is based on Telcordia SR-332.

2.5 Total Bytes Written

Capacity	Endurance - TBW*
32GB	58TB
64GB	117TB
128GB	235TB
256GB	471TB
512GB	943TB

Note: * TBW calculation is tested upon JEDEC JESD218A & 219A standards.



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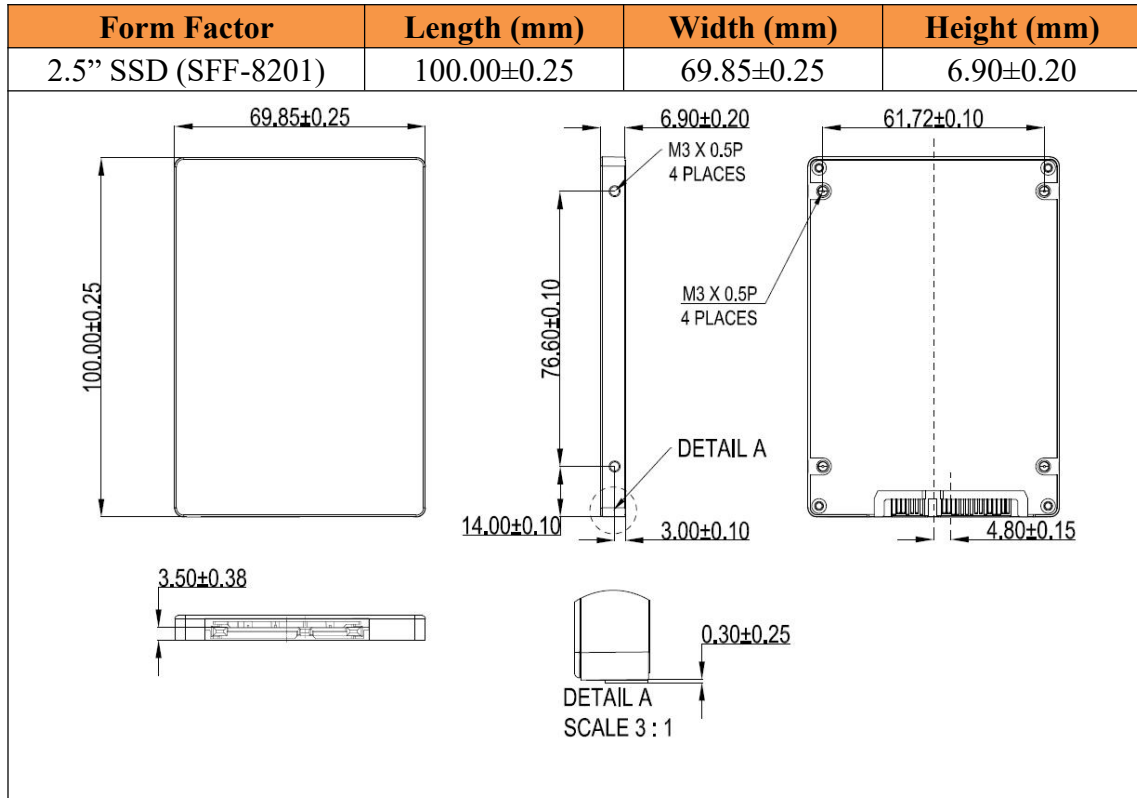
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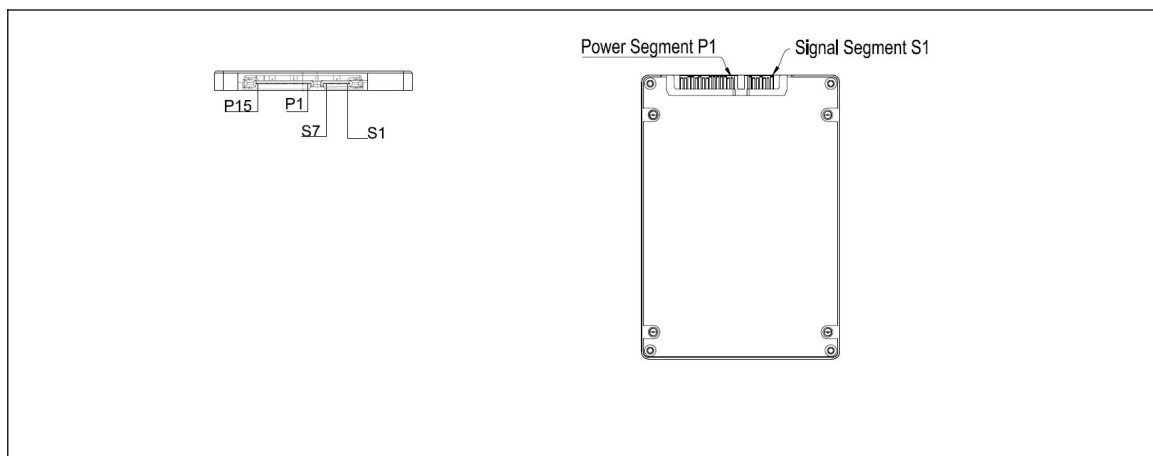
3. Mechanical Information

3.1 Dimensions



Notes: All dimensions are in millimeters.

3.2 Connector Pin Signal Location





3.3 Connector Pin Signal Definitions

PIN #	Function
S1	Ground
S2	Host side A+ (TXP) / Device side B+(RXP)
S3	Host side A- (TXN) / Device side B-(RXN)
S4	Ground
S5	Host side B- (RXN) / Device side A-(TXN)
S6	Host side B+ (RXP) / Device side A+(TXP)
S7	Ground

P1	NC
P2	NC
P3	DEVSLP
P4	Ground
P5	Ground
P6	Ground
P7	5V
P8	5V
P9	5V
P10	Ground
P11	DAS/ DSS
P12	Ground
P13	NC
P14	NC
P15	NC



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4. Software Information

4.1 Software Function

- ATA Security
- S.M.A.R.T
- TRIM

4.2 SMART Attributes

The following table defines the vendor specific data in byte 2 to 361 of the 512-byte SMART data.

Attribute ID	Raw Attribute Value							Attribute Name
01	MSB	00	00	00	00	00	00	Read error rate
05	LSB	MSB	00	00	00	00	00	Reallocated sectors count
09	LSB			MSB	00	00	00	Power-on hours
0C	LSB			MSB	00	00	00	Power cycle count
A0	LSB			MSB	00	00	00	Uncorrectable sector count when read/write
A1	LSB	MSB	00	00	00	00	00	Number of valid spare block
A3	LSB	MSB	00	00	00	00	00	Number of initial invalid block
A4	LSB			MSB	00	00	00	Total erase count
A5	LSB			MSB	00	00	00	Maximum erase count
A6	LSB			MSB	00	00	00	Minimum erase count
A7	LSB			MSB	00	00	00	Average erase count
A8	LSB			MSB	00	00	00	Max erase count of spec
A9	LSB			MSB	00	00	00	Remain Life (percentage)
AF	LSB			MSB	00	00	00	Program fail count in worst die
B0	LSB	MSB	00	00	00	00	00	Erase fail count in worst die
B1	LSB			MSB	00	00	00	Total wear level count

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B2	LSB	MSB	00	00	00	00	00	00	Runtime invalid block count
B5	LSB			MSB	00	00	00	00	Total Program Fail Count
B6	LSB	MSB	00	00	00	00	00	00	Total Erase Fail Count
BB	LSB			MSB	00	00	00	00	Uncorrectable Error Count
C0	LSB	MSB	00	00	00	00	00	00	Power-off Retract Count
C2	MSB	00	00	00	00	00	00	00	Controlled Temperature
C3	LSB			MSB	00	00	00	00	Hardware ECC Recovered
C4	LSB			MSB	00	00	00	00	Reallocation Event Count
C6	LSB			MSB	00	00	00	00	Uncorrectable Error Count Off-line
C7	LSB	MSB	00	00	00	00	00	00	Ultra DMA CRC Error Count
E1	LSB							MS B	Total LBAs Written (each write unit = 32MB)
E8	LSB	MSB	00	00	00	00	00	00	Available Reserved Space
F1	LSB							MS B	Total LBAs Written (each write unit = 32MB)
F2	LSB							MS B	Total LBAs Read (each read unit = 32MB)

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