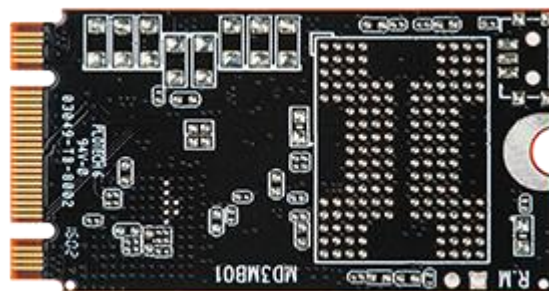
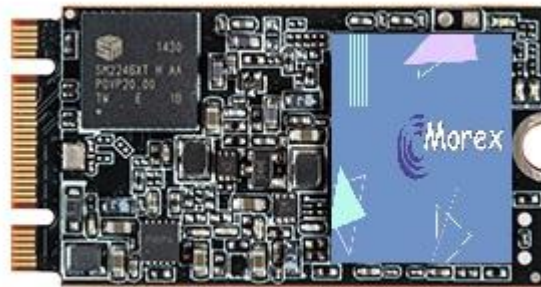




Product Specification

Morex M.2 SATA (2242) M3B



MOREX INFORMATION ENT., CO., LTD.

11F,-8 NO. 716, ZHONGZHEN RD., ZHONGHE DIST., NEW TAIPEI CITY 23552, TAWIAN (R.O.C.)

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Form Factor

- M.2 SATA (2242)

NAND Flash Type

- MLC

Capacities

- 16GB, 32GB, 64GB, 128GB, 256GB

Performance

- Sequential Read (max): 520 MB/sec
- Sequential write (max): 197 MB/sec
- Random Read (max): 33700 IOPS
- Random write (max): 46700 IOPS

Supply Voltage

- 3.3V±5%

Power Consumption

- Idle mode: 0.264W (3.3Vx80mA)
- Active mode(max): 0.825W (3.3Vx250mA)

Temperature Ranges

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

MTBF

- > 3,000,000 hours

Hardware Function Switch (Optional)

- Write Protect
- Quick Erase

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



Revision History

Version	Description	Date
1.0	Internal release	2015/10/12
1.1	Part Number Recode	2015/10/25
1.2	Official release	2016/01/11
1.3	Add Toshiba solution	2016/07/22
2.0	Update TBW	2016/11/28
2.5	Add certificates	2017/01/09

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1. Overview

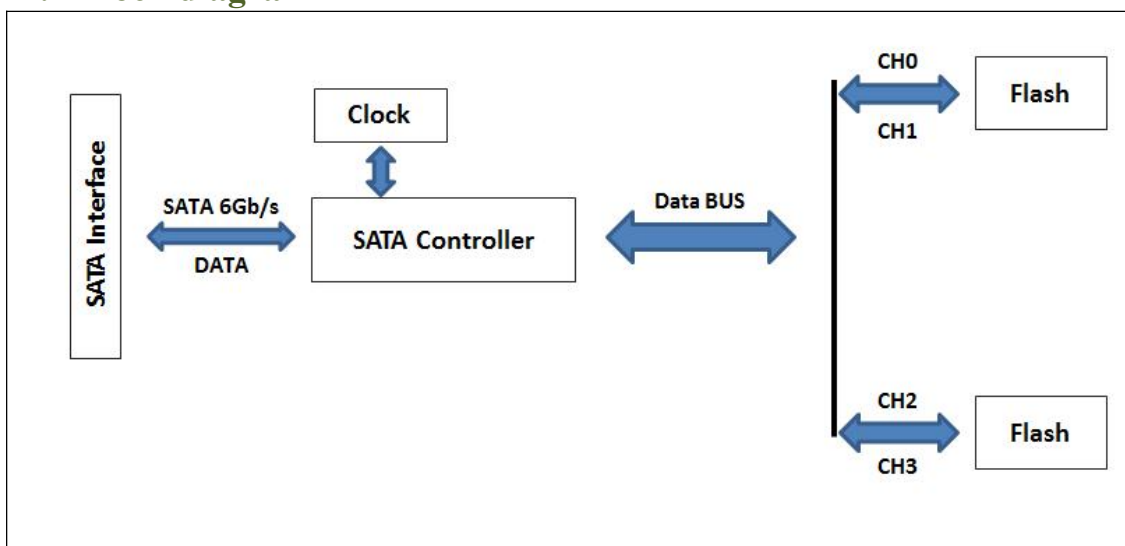
1.1 Introduction

Morex M.2 SSD is a compact SSD with M.2 (NGFF) industrial standard and SATA 3 (6.0Gb/s) interface. M.2 SSD products can be configured as boot drives or data storage devices, providing better performance and efficiency with faster read/write speeds, while reducing startup, file transfer, and software application load times.

Morex can also provide specialized services to OEMs designing customized hardware and systems by offering:

- Locked BOM control with customer product change notification (PCN)
- Pre-installed software, custom software imaging and ID strings
- Custom packaging and labeling
- Comprehensive supply-chain management
- Customer specified testing
- Localized Field Application Engineering for complete pre- and post-sale technical support

1.2 Block diagram



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2. Product Specifications

2.1 Capacity

Raw Capacity	Cylinder	Head	Sector	Capacity	LBA*
16GB	16383	16	63	14.91GB	31277232
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

Note: *One LBA = 512 Bytes.

2.1 Performance

Brand	Capacity	Sequential Read MB/sec (Max.)	Sequential Write MB/sec (Max.)	Random Read IOPS (4KB QD32)	Random Write IOPS (4KB QD32)
Micron	16GB	129	22	5.7K	5K
	32GB	258	43	11.2K	10.4K
Toshiba	64GB	348	101	18.7K	20.2K
	128GB	520	197	33.7K	46.7K
	256GB	520	197	33.7K	46.7K

Note: Test tool: CrystalDiskMark 3.03

* Sequential performance is measured by file size 1000MB.

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

2.3 Power Characteristics

Supply Voltage	Parameter Specification
Input Voltage	3.3V±5%
Power Consumption	Specification (W)
Idle (max.)	0.264W (3.3Vx80mA)
Active (max.)	0.825W (3.3Vx250mA)



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

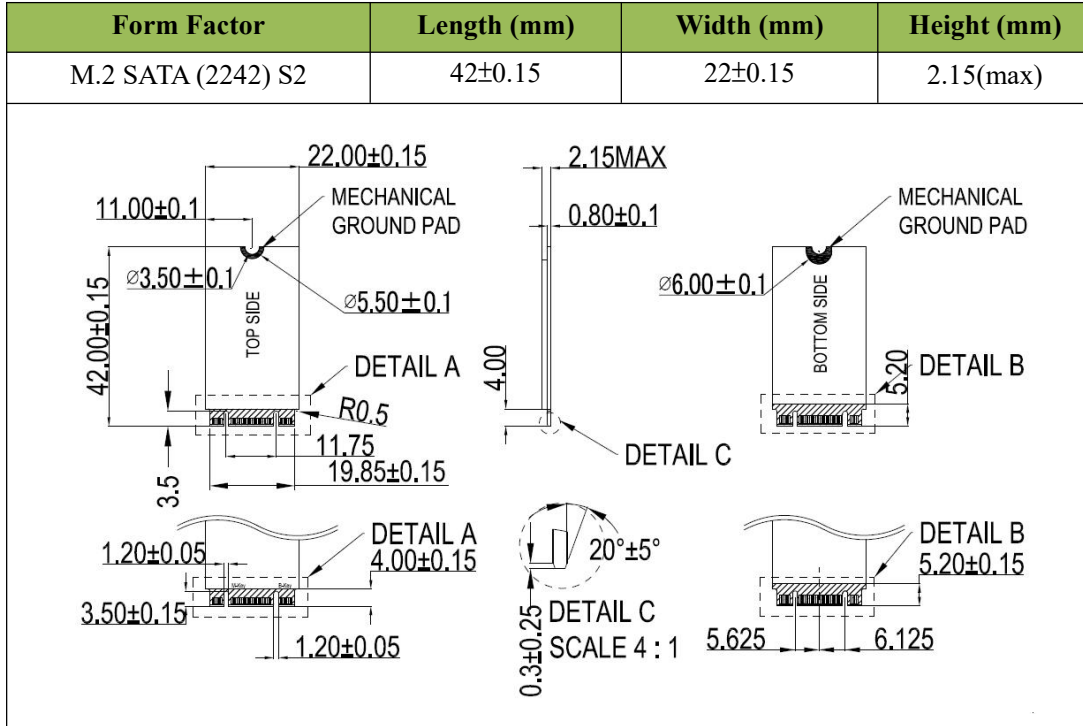
Capacity	Endurance - TBW*
16GB	12TB
32GB	24 TB
64GB	49 TB
128GB	98 TB
256GB	197 TB

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

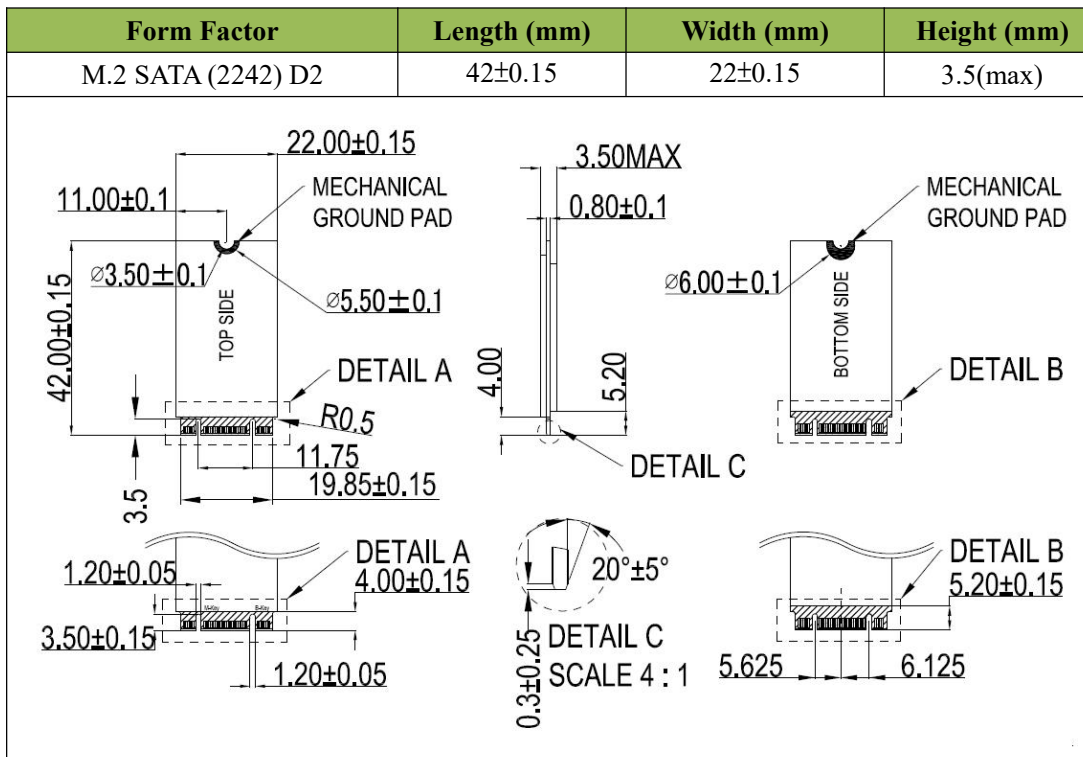


3. Mechanical Information

3.1 Dimensions



Notes: All dimensions are in millimeters.



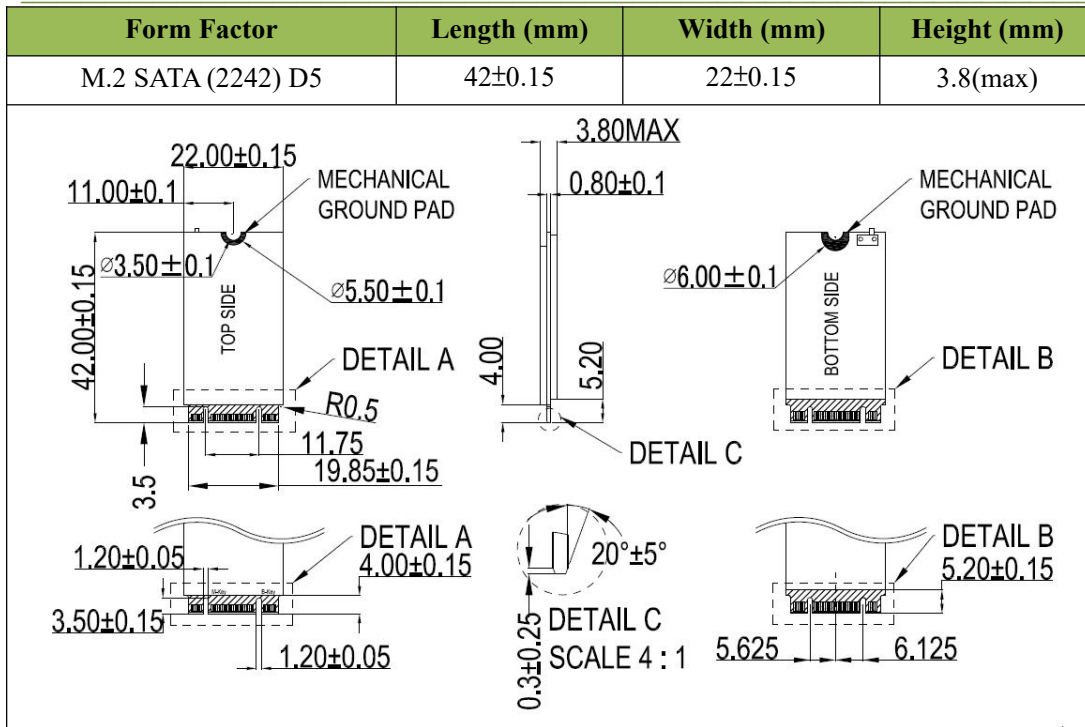
Notes: All dimensions are in millimeters.

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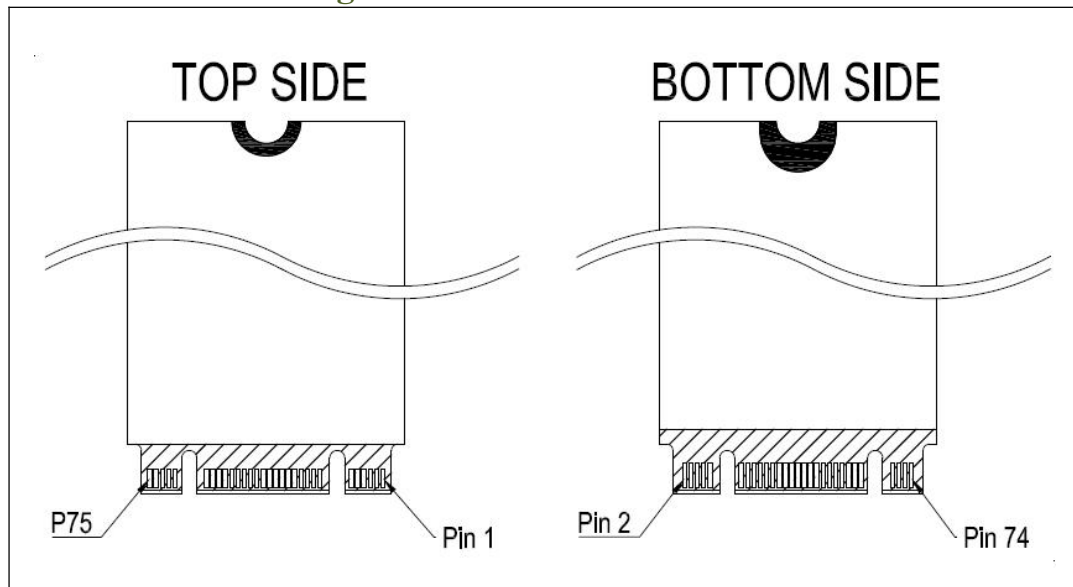
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Notes: All dimensions are in millimeters.

3.2 Connector Pin Signal Location



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3.3 Connector Pin Signal Location

PIN #	Function
74	3.3V
72	3.3V
70	3.3V
68	N/C
	Module Key
	Module Key
	Module Key
	Module Key
58	N/C
56	N/C
54	N/C
52	N/C
50	N/C
48	N/C
46	N/C
44	N/C
42	N/C
40	N/C
38	DEVSLP (I)(0/3/3V)
36	N/C
34	N/C
32	N/C
30	N/C
28	N/C
26	N/C
24	N/C
22	N/C
20	N/C
	Module Key
	Module Key
	Module Key
	Module Key
	Module Key
10	DAS/DSS#(I/O)
8	N/C
6	N/C
4	3.3V
2	3.3V

PIN #	Function
75	CONFIG_2=GND
73	GND
71	GND
69	CONFIG_1=GND
67	N/C
	Module Key
	Module Key
	Module Key
	Module Key
57	GND
55	N/C
53	N/C
51	GND
49	SATA B+
47	SATA B-
45	GND
43	SATA A-
41	SATA A+
39	GND
37	N/C
35	N/C
33	GND
31	N/C
29	N/C
27	GND
25	N/C
23	N/C
21	CONFIG_0=GND
	Module Key
	Module Key
	Module Key
	Module Key
	Module Key
11	N/C
9	N/C
7	N/C
5	N/C
3	GND
1	CONFIG_3=GND



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
0x01	MS B	0	0	0	0	0	Read error rate
0x05	LSB	MSB	0	0	0	0	Reallocated sectors count
0x09	LSB			MSB	0	0	Reserved
0x0C	LSB			MSB	0	0	Power cycle count
0xA0	LSB			MSB	0	0	Uncorrectable sector count when read/write
0xA1	LSB	MSB	0	0	0	0	Number of valid spare block
0xA2	LSB	MSB	0	0	0	0	Number of cache data block
0xA3	LSB	MSB	0	0	0	0	Number of initial invalid block
0xA4	LSB			MSB	0	0	Total erase count
0xA5	LSB			MSB	0	0	Maximum erase count
0xA6	LSB			MSB	0	0	Minimum erase count
0xA7	LSB			MSB	0	0	Average erase count
0xC0	LSB			MSB	0	0	Power-off retract count
0xC2	MS B	0	0	0	0	0	Controlled temperature
0xC3	LSB			MSB	0	0	Hardware ECC recovered
0xC4	LSB			MSB	0	0	Reallocation event count
0xC7	LSB	MSB	0	0	0	0	Ultra DMA CRC error count
0xF1	LSB			MSB	0	0	Total LBAs written (each write unit = 32MB)
0xF2	LSB			MSB	0	0	Total LBAs read (each read unit = 32MB)



5. Product Ordering Information

5.1 Part Number Naming Guide

1	2	3	4	5	6	7	8	9	10	11	12	13
F	2	5	6	D	3	M	B	T	4	S	0	0

1. Morex Product

F: Flash
R: Dram

7. Flash Type

M: MLC

10. Flash Q'ty

1: 1pc Flash
2: 2pcs Flash

2~4. Density

16G: 16GB
32G: 32GB
64G: 64GB
128: 128GB
256: 256GB

8. Controller Model

B: 2246XT
B: 2246EN

11. Operating Temperature

S: Standard 0°C to 70°C
E: Extended -25°C to 85°C
W: Industrial -40°C to 85°C

9. Flash Vendor

M: Micron
T: Toshiba
6: Micron TSOP

12~13 Customize Code

00: Standard Product

5. Form Factor

I: 2.5" SSD
D: M.2 SATA (2242)
B : mSATA

6. Generation

3: SATA III/ 3.0