



SATAIII M.2 2242 Solid State Drive

128GB、256GB、512GB

Product Datasheet

Version 1.4

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Revision History

Revision	Date	Modified By	Description
1.0	2019/04/08	Rain Wang	Initial Release
1.1	2019/07/25	Rain Wang	Detail modification
1.2	2020/10/29	Taocheng	Change Model Name
1.3	2022/08/10	Weixian Yan	Update power consumption
1.4	2023/03/23	Taocheng	Increase 128GB Spec.



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1. General Description

The M.2 2242 SSD include capacity range from 128GB to 512GB. M.2 2242 series designed with SATAIII interface and complies with SATA Rev3.1 spec. M.2 2242 features distinct advantages of NAND Flash Disk than traditional HDD as well supports NCQ command set, S.M.A.R.T. feature and Trim command.

M.2 2242 is a cost effective solution with high performance and low power consumption which uses high performance flash memory using 3D TLC NAND flash with DDRII interface to perform high sequential and random access capability.

2. Product Overview

The following table lists the models of M.2 2242 series SSD.

No.	Product Name	Capacity	NAND Flash	Form Factor
1	HC128GS6HA7T	128GB	3D TLC	M.2 2242 SATA
2	HC256GS6HA7T	256GB	3D TLC	M.2 2242 SATA
3	HC512GS6HA7T	512GB	3D TLC	M.2 2242 SATA

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3. Product Specification

3.1. Key Feature

- Capacity : 128GB/256GB/512GB
- Form-Factor : M.2 22mm x42mm
- SATA Interface Compatibility
 - Complies With SATA Rev3.1/6Gbps/Backward
 - Complies With ATA-8 Standard
 - S.M.A.R.T. / NCQ / TRIM Supported
- Specific Feature
 - MTBF : 2,000,000 hours
 - TBW : 128GB/100, 256GB/200, 512GB/400
 - Performance : Read up to 520MB/s & Write up to 510MB/s
 - IOPS (4K-64 Thrd) : Read 40K & Write 76K
- Input Power : DC 3.3V +/-5%
- RoHS Compliant
- Power Consumption (Maximum) : <1 W
- Operating Temperature Range : 0℃ ~ 70℃
- Storage Temperature Range : -40℃ ~ 85℃

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3.2. Capacity

Model	M.2 2242		
Capacity	128GB	256GB	512GB

3.3. Performance

3.3.1. Read/Write & CDM Performance

Item	Crystal Disk Mark 8.0.0 (x64)		
Capacity	128GB	256GB (MB/s)	512GB (MB/s)
Sequential Q8T1 Read	480	500	520
Sequential Q8T1 Write	450	510	500
4K-Q32T1 Read	180	270	260
4K-Q32T1 Write	300	270	270
Note:1.) Seq. Read & Write speed test by CDM, The Test Platform Z370, Test system Win10 (64Bit). 2.) Performance may vary based on SSD capacity, hardware test platform, test software, Operating system, and other system variables.			

3.3.2. Read/Write & AS-SSD Performance

Item	AS SSD BenchMark 1.9		
Capacity	128GB	256GB (MB/s)	512GB (MB/s)
Sequential Read	480	480	500
Sequential Write	450	470	480
Capacity	128GB(iops)	256GB (iops)	512GB (iops)
4K-64Thrd Read	28,800	39,000	40,000
4K-64Thrd Write	72,000	76,000	76,000
Note:1.) Seq. Read & Write speed test by AS-SSD with Random pattern, The Test Platform Z370 Test system Win10 (64Bit). 2.) Performance may vary based on SSD capacity, hardware test platform, test software, Operating system, and other system variables			

3.4. Electrical

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3.4.1. Operating Voltage

Item	Operating Voltage
Input Power	DC 3.3V $\pm$ 5%
Maximum Ripple	100mV p-p or less

3.4.2. Power Consumption

Mode	128GB	256GB	512GB	Unit
Idle	0.25	0.25	0.25	W
Sequential Read	0.70	0.75	0.75	W
Sequential Write	0.75	0.80	0.80	W
Note: : 1.) Measured by CDM(Crystal Disk Mark 8.0.0 (x64), The test result is the maximum value. 2.) The system conditions and test environment may affect test result				

3.5. Environmental Conditions

Item	Operating	Non-Operating
Temperature	0° C to 70° C	-40° C to 85° C

3.6. Reliability

3.6.1. MTBF

Item	Value
MTBF	2,000,000 Hours
Remark: Mean Time Between Failures (MTBF)	

3.6.2. TBW

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Total Byte Written	128GB	256GB	512GB
(TBW)	100	200	400

4. S. M. A. R. T Support

The S. M. A. R. T is about the computer data drive monitoring system during operation and reponse the drive status and “health”. S. M. A. R. T. (Self-Monitoring, Analysis and Reporting Technology; often written as SMART) is a monitoring system included in computer hard disk drives (HDDs), solid-state drives (SSDs). Its primary function is to detect and report various indicators of drive reliability with the intent of anticipating imminent hardware failures

When S. M. A. R. T. data indicates a possible imminent drive failure, software running on the host system may notify the user so preventative action can be taken to prevent data loss, and the failing drive can be replaced and data integrity maintained. Below table shows the S. M. A. R. T command set.

ID	Attribute Name	Comment
0x01	Read Error Rate	TotalNewBadCnt/TotalHostRdCnt
0x05	Reallocated Sectors Count	TotalNewBadCnt
0x09	Power-On Hours Count	Number of hours elapsed in the power-on state. The value shall be incremented by one every one hour.
0x0C	Drive Power Cycle Count	Number of device power cycling. The value shall be incremented by one on each power cycling after disk initialization is done
0xA0	Online incorrect Sector Count	Uncorrectable Sector Count when read/write
0xA1	Number Of Valid Spare Blocks	Number of valid spare block
0xA3	Number of initial invalid block	Number of initial invalid block
0xA4	Total Erase Count (TLC Block)	Total erase count
0xA5	Maximum P/E Cycles (TLC)	Maximum erase count
0xA6	Minimum P/E Cycles (TLC)	Minimum Erase count

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0xA7	Average P/E Cycles (TLC)	Average erase count
0xA8	Max Erase Count in Spec	Max Erase Count of Spec
0xA9	Remain Life Percentage	Remain Life(%)
0xAF	Worst Component Program Fail Count	Program fail count in worst die
0xB0	Worst Component Erase Fail Count	Erase fail count in worst die
0xB1	Wear leveling Count	Total wear level count
0xB2	Grown Bad Block Count	Runtime invalid block count
0xB5	Program Fail Count	Total program fail count
0xB6	Erase Fail Count	Total Erase fail count
0xC0	Sudden Power Count	Number of times unexpected power off occurred. (power off when drive is in active state) The value shall be incremented by one on each unexpected power off.
0xC2	Enclosure Temperature	On-chip temperature sensor value.
0xC3	Hardware ECC recovered	Retry Pass Count
0xC4	Reallocation Event Count	Retry Fail Count
0xC5	Current Pending Sector Count	waiting move sector count
0xC6	Reported Uncorrectable Errors	Total uncorrectable count when off-line
0xC7	CRC Error Count	Ultra DMA CRC Error Count
0xE8	Available Reserve Space	Remain Space(%)
0xF1	Host 32MB/unit Written (TLC)	Total LBAs Written (each write unit = 32MB)
0xF2	Host 32MB/unit Read (TLC)	Total LBAs Read (each read unit = 32MB)
0xF5	NAND 32MB/unit Written (TLC)	Total sector write to flash (each write unit = 32MB)

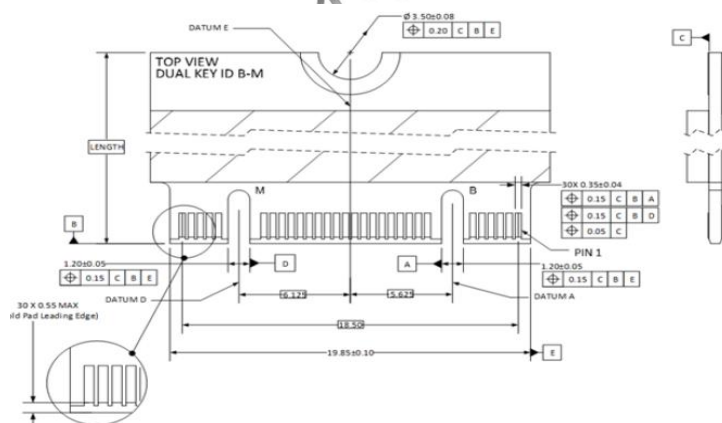
5. Pin assignment and descriptions

5.1....M.2 B+M Key Interface

74	3.3V	CONFIG_2=GND	75
72	3.3V	GND	73
70	3.3V	GND	71
68	SUSCLK(32KHz) (I) (0/3.3V)	CONFIG_1=GND	69
66	M Key	N/C	67
64	M Key	M Key	65
62	M Key	M Key	63
60	M Key	M Key	61
58	Reserved for MFG_CLOCK	M Key	59
56	Reserved for MFG_CLOCK	GND	57
54	N/C	N/C	55
52	N/C	N/C	53
50	N/C	GND	51
48	N/C	SATA-A+	49

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5. 2.....Dual Key B+M



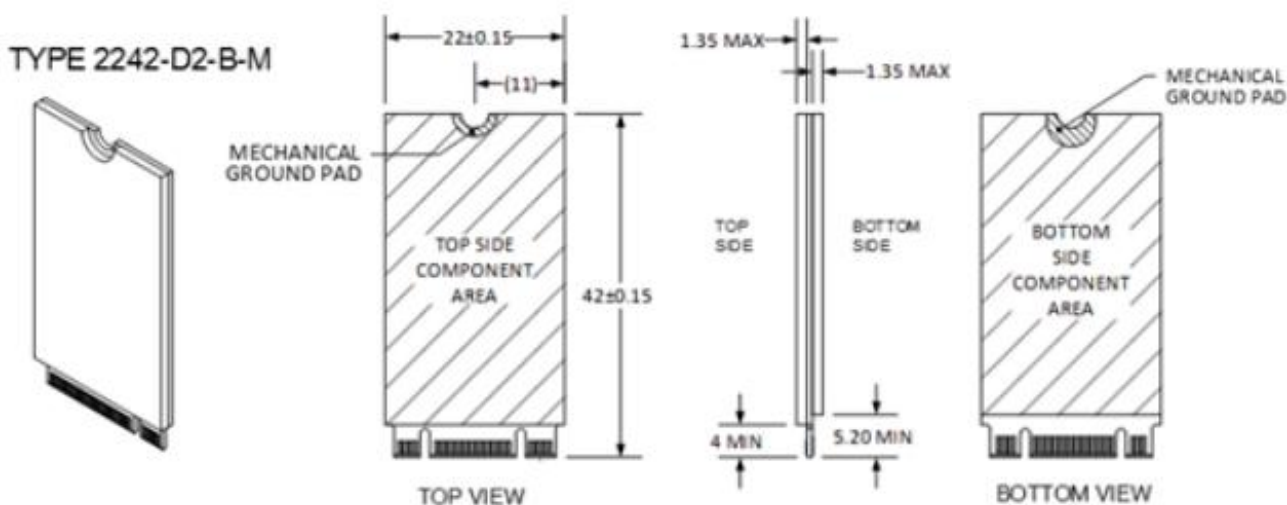
6. Product Mechanical Specification

6.1. Dimensions and Weight

Model	Length (mm)	Width (mm)
128GB	22 ± 0.15	42 ± 0.15
256GB	22 ± 0.15	42 ± 0.15
512GB	22 ± 0.15	42 ± 0.15

6.2 Dimension Drawing

Unit : mm



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