MS800 Series

mSATA Solid State Drive Datasheet

Product Feature

- **Capacity: 32GB,64GB,128GB,256GB,512GB**
- **Flash Type: MLC NAND FLASH**
- **Form factor: mSATA**
- **Interface standard: Serial ATA Revision 3.0, 6Gbps**
- **Performance: read up to 563 MB/s, write up to 401 MB/s**
- **Operating temperature range: 0 to +70℃**

NOTE: INFORMATION IN THIS PRODUCT SPECIFICATION IS SUBJECT TO CHANGE AT ANYTIME WITHOUT NOTICE.ALL PRODUCT SPECIFICATIONS ARE PROVIDED FOR REFERENCE ONLY.

Contents

Revision History

Version	Date	Description
V1.0	2014-05-12	-Initial Release
V1.1	2014-09-02	-Add 512GB performance
V1.2	2015-04-22	-Update performance
V1.3	2015-11-18	-Update performance
V1.4	2017-06-08	-Add 32GB performance

1. Overview

The **MS800** mSATA Series SSD (solid state Drive) fully consists of semiconductor devices using NAND Flash Memory which provide high reliability and high performance for a storage media. The case-less mSATA design is significantly smaller than a 2.5-inch Hard Disk Drive. This design makes it ideal for small form factor computing platform such as notebooks.

The **MS800** mSATA Series SSD product electrically complies with the SATAIII standards and is electrically compatible with a serial ATA disk drive. In order to meet the high quality, the mSATA Series SSD products utilize Multi-Level Cell (MLC) NAND Flash Memory. Moreover, to ensure the data integrity, many advanced technologies are used such as dynamic bad block management, dynamic and static wear-leveling, and error correction code (ECC). The mSATA Series SSD drastically outperforms conventional Hard Disk Drives. In addition, the mSATA Series could also provide rugged features in industrial PC under an extreme environment with a high MTBF.

2. Product Specification

Table 1 Basic Spec

Model Name	Capacity	Form Factor	Interface	Dimension (mm)	Flash Type	Weight	Operating Temp. (℃)	Storage Temp. (℃)
MS800	32GB~512GB	mSATA	SATA3.0 6Gbps	50.8*29.85* 4.85	MLC NAND FLASH	<10g	0 to +70	-40 to +85

Table 2 Performance

Capacity	ATTO R/W(MB/s)		AS SSD ((MB/s)				4KB Random IOPS	
			Seq. R/W		4KB R/W		Read	Write
32GB	275	55	259.7	53.71	14.17	45.84	17235	10981
64GB	510	84	471.91	81.18	14.35	66.88	21508	18042
128GB	520	160	498.95	153.55	16.01	98.9	30137	34182
256GB	510	273	483.38	262.52	13.06	97.51	33034	53516
512GB	563	401	515.74	382.82	23.17	55.71	69264	70063

Table 3 Power consumption

Capacity	Idle	Read	Write	Unit
32GB	0.26	1.0	1.1	**W**
64GB	0.27	1.1	1.31	**W**
128GB	0.27	1.22	2.03	**W**
256GB	0.28	1.28	3.18	**W**
512GB	0.28	1.50	3.30	**W**

Table 4 Endurance and Reliability

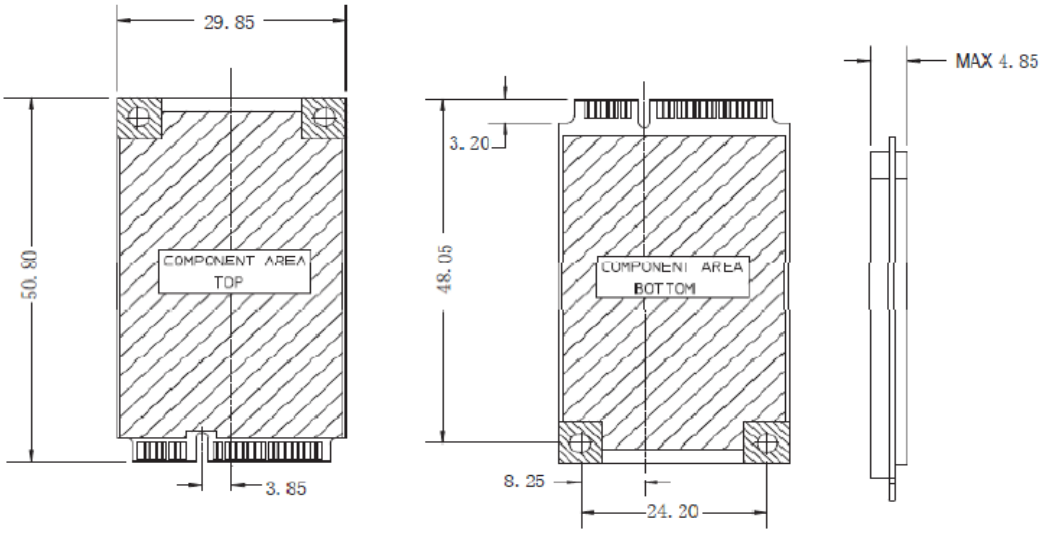
Endurance	Write	32GB	64GB	128GB	256GB	512GB	
		75TB	130TB	262TB	524TB	1048TB	
	Read	unlimited					
Reliability		MBTF : 2 million hours, Crystal Frequency: 50MHz					
		Data retention :>10years @ 25℃					
		ECC recovery: Up to 66 bits correctable per 1024-byte (BCH)					
		Supports dynamic power management					
		Support global wear-leveling, bad block management algorithm					
		Support SMART, TRIM function					

3. Dimension Specifications

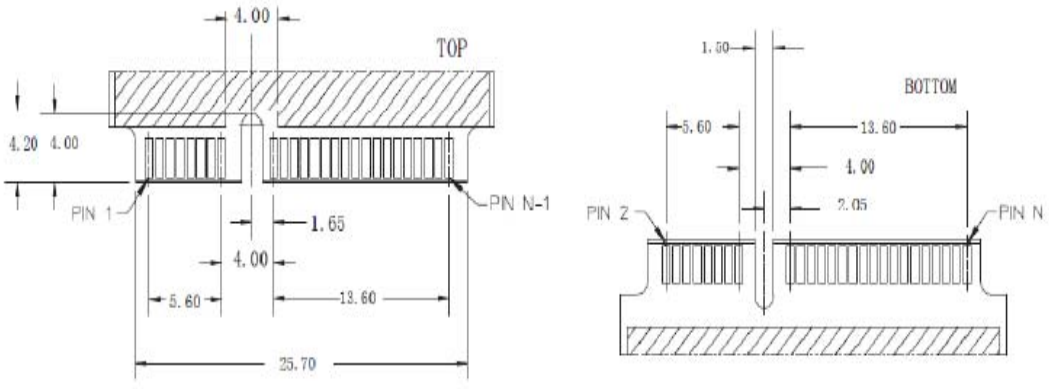
3.1 Physical dimensions

Table 5 Physical dimensions 9mm

Length（mm）	Width（mm）	Height（mm）
50.80 ± 0.2	29.85 ± 0.2	<4.85



3.2 Interface Description



3.3 Pin Assignments

Table 6 Pin Assignments

Pin#	Assignment	Description	Pin#	Assignment	Description
1	N/A	N/A	27	GND	Return Current Path
2	+3.3V	3.3V source	28	N/A	N/A
3	N/A	N/A	29	GND	Return Current Path
4	GND	Return Current Path	30	N/A	N/A
5	N/A	N/A	31	-A(port 1)	SATA Differential RX- based on SSD
6	N/A	N/A	32	N/A	N/A
7	N/A	N/A	33	+A(port 1)	SATA Differential RX+ based on SSD
8	N/A	N/A	34	GND	Return Current Path
9	GND	Return Current Path	35	GND	Return Current Path
10	N/A	N/A	36	Reserved	No Connect
11	N/A	N/A	37	GND	Return Current Path
12	N/A	N/A	38	Reserved	No Connect
13	N/A	N/A	39	+3.3V	3.3V Source
14	N/A	N/A	40	N/A	N/A
15	GND	Return Current Path	41	+3.3V	3.3V Source
16	N/A	N/A	42	N/A	N/A
17	N/A	N/A	43	GND	Return Current Path
18	GND	Return Current Path	44	N/A	N/A
19	N/A	N/A	45	Reserved	N/A
20	N/A	N/A	46	N/A	N/A
21	GND	Return Current Path	47	N/A	N/A
22	N/A	N/A	48	N/A	N/A
23	+B(port 1)	SATA Differential TX+ based on SSD	49	N/A	N/A
24	+3.3V	3.3V Source	50	GND	Return Current Path
25	-B(port 1)	SATA Differential TX- based on SSD	51	GND	Return Current Path
26	GND	Return Current Path	52	+3.3V	3.3V Source

4. Reliability Specification

4.1 ECC Descriptions

In the specific ECC algorithm utilizes a Bose, Chaudhuri and Hocquengham (BCH) ECC algorithm. When a BCH 16 ECC algorithm encodes the data in the NAND flash memory, the parity code generated in the encoding process may occupy 28 bytes of the spare area in each page. When a BCH 24 ECC algorithm encodes the data in the NAND flash memory, the parity code generated in the encoding process may occupy 42 bytes of the spare area in each page. When a BCH 16 algorithm decodes the data in the NAND flash memory, the data can be decoded correctly if the error bit happened in two sectors (1024Bytes) is 16. When a BCH 24 algorithm decodes the data in the NAND flash memory, the data can be decoded correctly if the error bit happened in two sectors is 24.

4.2 Advance Wear-Leveling Algorithm

The NAND flash devices are limited by a certain number of write cycles. When using a file system, frequent file table updates is mandatory. If some area on the flash wears out faster than others, it would significantly reduce the lifetime of the whole device, even if the erase counts of others are far from the write cycle limit. Thus, if the write cycles can be distributed evenly across the media, the lifetime of the media can be prolonged significantly. The scheme is achieved both via buffer management and specific advanced wear leveling to ensure that the lifetime of the flash media can be increased, and the disk access performance is optimized as well.

4.3 S.M.A.R.T Function

S.M.A.R.T. is an acronym for Self-Monitoring, Analysis and Reporting Technology, an open standard allowing disk drives to automatically monitor their own health and report potential problems. It protects the user from unscheduled downtime by monitoring and storing critical drive performance and calibration parameters. Ideally, this should allow taking proactive actions to prevent impending drive failure. SMART feature adopts the standard SMART command B0h to read data from the drive. When the SMART Utility running on the host, it analyzes and reports the disk status to the host before the device is in critical condition.

5. Ordering Information

Table 7 Ordering Information

Model Name	Part Number	Capacity
MS800	TKCMI59DSS800-032	32GB
	TKCMI59DSS800-064	64GB
	TKCMI59DSS800-128	128GB
	TKCMI59DSS800-256	256GB
	TKCMI59DSS800-512	512GB

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