

Product Specification

| Rev. 1.2 |

G2 Silver

Industrial 2.5" SATA SSD datasheet

60GB – 2,048GB



Author: Charley Chang



Table of Content

List of Contents

1. PRODUCT SUMMARY	4
2. ORDER INFORMATION	5
3. PRODUCT INFORMATION	6
3.1 BLOCK DIAGRAM	6
3.2 PRODUCT FEATURES	7
4. PRODUCT SPECIFICATION	9
4.1 PERFORMANCE	9
4.2 ENDURANCE AND RELIABILITY	11
4.2.1 Endurance.....	11
4.2.2 Reliability.....	11
4.3 POWER SUPPLY	12
4.4 POWER CONSUMPTION	12
5. ENVIRONMENTAL SPECIFICATIONS	13
5.1 TEMPERATURE AND HUMIDITY	13
5.2 SHOCK AND VIBRATION	13
5.3 EMC	13
6. INTERFACE	14
6.1 PIN ASSIGNMENT AND DESCRIPTIONS	14
7. PHYSICAL DIMENSIONS	15
8. COMMAND SET	16
8.1 SUPPORTED COMMAND LIST	16
8.2 IDENTIFY DEVICE DATA	18
9. REVISION HISTORY	22

List of Figures

FIGURE 1 – BLOCK DIAGRAM	6
FIGURE 2 – PIN LOCATIONS	14
FIGURE 3 – DEVICE PHYSICAL DIMENSION	15

List of Tables

TABLE 1 – PART NUMBERS	5
TABLE 2 – PEAK PERFORMANCE	9
TABLE 3 – SUSTAINED PERFORMANCE	10
TABLE 4 – TERA BYTES WRITTEN	11
TABLE 5 – RELIABILITY	11
TABLE 6 – SUPPLY VOLTAGE	12
TABLE 7 – POWER CONSUMPTION	12
TABLE 8 – HIGH TEMPERATURE TEST CONDITION	13
TABLE 9 – MECHANICAL TEST CONDITION	13
TABLE 10 – EMC COMPLIANCE	13
TABLE 11 – SIGNAL SEGMENT PIN ASSIGNMENT AND DESCRIPTIONS	14
TABLE 12 – POWER SEGMENT PIN ASSIGNMENT AND DESCRIPTIONS	14
TABLE 13 – ATA COMMAND LIST	16
TABLE 14 – RETURN DATA OF IDENTIFY DEVICE COMMAND	18
TABLE 15 – LIST OF DEVICE IDENTIFICATION FOR EACH CAPACITY	21

1. Product Summary

CAPACITY RANGE:	60GB – 2,048GB
FORM FACTOR:	2.5"
HOST INTERFACE:	SATA Rev. 3.2 SATA 3.0 6Gb/s Backward compatible to SATA 3Gb/s, 1.5Gb/s
PERFORMANCE:	Sequential read: up to 530 MB/s Sequential write: up to 490 MB/s Random read: up to 93.5K IOPS Random write: up to 82.5K IOPS
RELIABILITY:	MTBF: 2 million hours UBER: <1 sector / 10 ¹⁶ bits read
OPERATING TEMPERATURE:	Standard: 0°C ~ 70°C Or Industrial: -40°C ~ 85°C
STORAGE TEMPERATURE:	-40°C ~ 85°C
SPECIAL FEATURES:	Thermal throttling Thermal Monitor Security: AES256(optional) TCG OPAL2.0(optional)
COMPLIANCES:	RoHS*, CE*, FCC*, WEEE*

*Note: Please contact with Intelligent Memory represent for the detail of compliance conformity.

2. Order Information

Table 1 – Part Numbers

Part Number	Capacity	Operating Temperature range
IMS325A8M2A2A1C3A7x0yyy	60GB	0°C ~ 70°C
IMS325A8M2A2A1C3A8x0yyy	64GB	
IMS325B1M2A2A1C3A9x0yyy	120GB	
IMS325B1M2A2A1C3B1x0yyy	128GB	
IMS325B3M2A2A1C3B2x0yyy	240GB	
IMS325B3M2A2A1C3B3x0yyy	256GB	
IMS325B5M2A2A1C3B4x0yyy	480GB	
IMS325B5M2A2A1C3B5x0yyy	512GB	
IMS325B7M2A2A1C3B6x0yyy	960GB	
IMS325B7M2A2A1C3B7x0yyy	1,024GB	
IMS325B9M2A2A1C3B8x0yyy	1,920GB	
IMS325B9M2A2A1C3B9x0yyy	2,048GB	
IMS325A8M2A2A1I3A7x0yyy	60GB	-40°C ~ 85°C
IMS325A8M2A2A1I3A8x0yyy	64GB	
IMS325B1M2A2A1I3A9x0yyy	120GB	
IMS325B1M2A2A1I3B1x0yyy	128GB	
IMS325B3M2A2A1I3B2x0yyy	240GB	
IMS325B3M2A2A1I3B3x0yyy	256GB	
IMS325B5M2A2A1I3B4x0yyy	480GB	
IMS325B5M2A2A1I3B5x0yyy	512GB	
IMS325B7M2A2A1I3B6x0yyy	960GB	
IMS325B7M2A2A1I3B7x0yyy	1,024GB	
IMS325B9M2A2A1I3B8x0yyy	1,920GB	
IMS325B9M2A2A1I3B9x0yyy	2,048GB	

Note:

IMS325zzM2A2A1r3zzx0000

x:

A: without TCG-OPAL2.0

T: with TCG-OPAL2.0

yyy: Bulk code

3. Product Information

I'M's 2.5 inch SATA SSD Silver product family features a SATA III interface and offers reliable high speed data throughput in various access modes. It is available in capacities up to 2,048GB, with customizable settings for Overprovisioning or Thermal Throttling.

3.1 Block Diagram

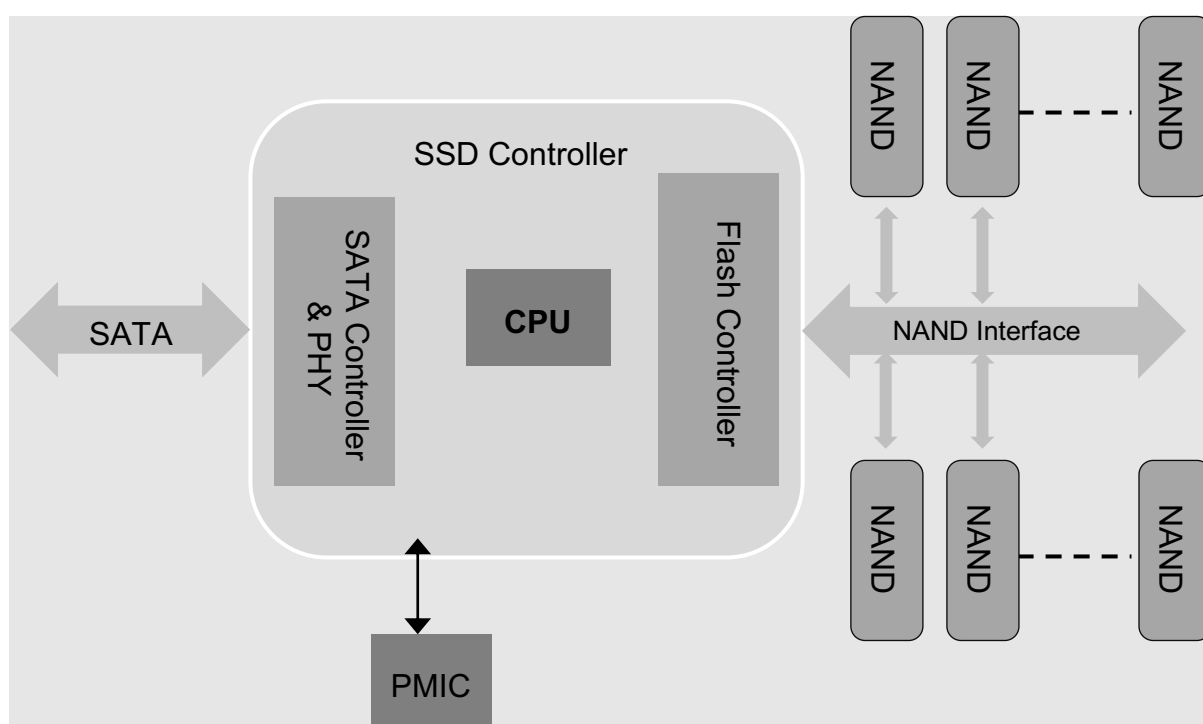


Figure 1 – Block Diagram

3.2 Product Features

Electrical/Physical Interface: SATA

- Compliant with SATA Revision 3.2.
- Compatible with SATA 1.5Gbps, 3Gbps and 6Gbps interface.
- Supports expanded register for SATA protocol 48 bits addressing mode.
- Supports power management.

Advanced Flash Management Features

LDPC ECC (Low Density Parity Check Error Correction Code)

The deterioration of the flash memory cell over time and the disruptions from neighboring flash memory pages can lead to random bit errors in the stored data. While the chances of any given data bit being corrupted is quite small, the vast number of data bits in a storage system makes the likelihood of data corruption a very real possibility. Error detection and correction codes are used in flash memory storage systems to protect the data from corruption.

Static and Dynamic Wear Leveling

Wear leveling is a process that helps reduce premature wearing out of NAND Flash devices. The Flash controller manages access to the NAND Flash memory devices and determines how the NAND Flash blocks are used. In most cases, the NAND Flash controller maintains a lookup table to translate the memory array's physical block address (PBA) to the logical block address (LBA) used by the host system known as Physical to Logical Address Translation Table.

Bad Block Management

Bad blocks are blocks that include one or more invalid bits, and their reliability is not guaranteed. Blocks that are identified and marked as bad by the manufacturer are referred to as "Initial Bad Blocks". Bad blocks that are developed during the lifespan of the flash are named "Later Bad Blocks"

S.M.A.R.T. functionality

SMART, an acronym for Self-Monitoring, Analysis and Reporting Technology, is an open standard that allows a hard disk drive to automatically detect its health and report potential failures. When a failure is recorded by SMART, users can choose to replace the drive to prevent unexpected outage or data loss. Moreover, SMART can inform users of impending failures while there is still time to perform proactive actions, such as copy data to another device.

Overprovision

Over provisioning is a technique used in the design of flash SSDs and flash media cards. By providing extra memory capacity (which the user can't access) the SSD controller can more easily create pre-erased blocks ready to be used in the virtual pool.

Overprovisioning improves:

- Write performance & IOPS
- Reliability & endurance

Thermal Throttling

Thermal throttling is designed to prevent any components in a SSD from over-heating during read and write operations. Intelligent Memory SSD implemented an on-die thermal sensor and with its accuracy; firmware can apply different levels of throttling to achieve the purpose of protection efficiently and proactively via temperature monitoring.

Security Features

Secure Erase

PSID (Optional for TCG OPAL 2.0)

Write Protection (Optional)

Lifetime & Endurance Management

Terabytes Written (TBW)

Media Wear Indicator

4. Product Specification

4.1 Performance

We specify the performance of our NAND products as below:

- **"Peak"** describes the measured performance when the product is new and unused. It is commonly used by vendors in their datasheets. However, SSDs by design reduce performance after a relatively short usage period, so peak values cannot be used to predict an application's longer-term performance.
- **"Sustained"** describes the guaranteed average performance of the SSD and is in most cases more relevant for system designers to understand if a specific SSD will work reliably within the required parameters of an application. Sustained performance is usually not specified in datasheets which makes it harder to compare different products

We are specifying peak performance for easier comparison of I'M's products with other solutions but recommend considering sustained performance values when selecting the most suitable solution for an application.

Table 2 – Peak Performance

Capacity	Sequential performance		Random Performance	
	Read (MB/s)	Write (MB/s)	4K Read (IOPS)	4K Write (IOPS)
60GB/64GB	375	260	16.7K	58.0K
120GB/128GB	530	440	30.5K	74.5K
240GB/256GB	530	470	57.0K	80.5K
480GB/512GB	530	480	82.5K	81.5K
960GB/1,024GB	530	490	93.5K	82.0K
1,920GB/2,048GB	515	490	35.5K	82.5K
Notes: 1. Peak performance measured in Fresh Out of the Box (FOB) condition 2. Sequential performance is measured 1GB data size with 128KB transfer size; QD32 and 4KB align with IO Meter. 3. Random performance tested with IO Meter: 4KB random write with QD32. 4. Performance may differ depending on application and platform.				

Table 3 – Sustained Performance

Capacity	Sequential performance		Random Performance	
	Read (MB/s)	Write (MB/s)	4K Read (IOPS)	4K Write (IOPS)
60GB/64GB	350	48.0	16.0K	2.3K
120GB/128GB	515	52.5	29.9K	2.3K
240GB/256GB	525	113	55.5K	4.6K
480GB/512GB	525	195	81.2K	7.3K
960GB/1,024GB	525	290	92.4K	8.5K
1,920GB/2,048GB	470	259	34.5K	8.1K

Notes:

- Sustained performance specified average speed measured with following conditions.
 - Data among written over twice of the user capacity.
 - Measured with long duration test over whole user data area.
- Sequential performance is measured with 128KB transfer size, QD32 and 4KB align with IO Meter over 100% user data area and at Steady State condition.
- Random performance tested with IO Meter: 4KB size random write with QD32 over 100% user data area and at Steady State conditions.
- Performance may differ according to application and platform.

4.2 Endurance and Reliability

4.2.1 Endurance

Intelligent Memory defines Endurance with a comprehensive measure of TBW (Tera Bytes Written). By considering TBW, we recognize that P/E cycles alone do not provide a complete picture of the drive's endurance capabilities. TBW considers the total amount of data that can be written to the drive throughout its operational lifespan, offering a more accurate estimation of longevity.

The workload patterns can vary greatly among different users and applications. These are specified by JEDEC in the document JESD219A. We test the drives based on these workloads. Factors like write-intensive workloads, frequent data modifications, and large file transfers can impact the endurance of a storage device. By considering TBW, we can better align their products with the specific needs and expectations of their diverse customer base.

In the JEDEC document JESD219A, the importance and requirements of considering a guard bank of 2 as wear levelling factor when calculating TBW is being specified. This takes into account the additional write operations that occur during normal usage, ensuring accurate estimations of the expected lifetime of the storage device. This approach provides a more realistic assessment of the TBW, which is crucial for users and organizations relying on accurate specifications for their storage solutions.

Table 4 – Tera Bytes Written

Capacity	TBW	
	JEDEC Client Workload	JEDEC Enterprise Workload
60/64GB	150	28
120/128GB	300	44
240/256GB	600	109
480/512GB	1200	255
960/1,024GB	2400	496
1,920/2,048GB	4800	971
Notes: 1. TBW values are measured based on Enterprise and Client workloads specified according JEDEC standards in JESD219A. 2. Actual lifetime may vary depending on platform and application.		

4.2.2 Reliability

Table 5 – Reliability

Parameter	Value
UBER	Uncorrectable Bit Error Rate (UBER) < 1 sector per 10^{16} bits read
MTBF	2,000,000 Hours

4.3 Power Supply

Table 6 – Supply Voltage

Supply Voltage	
Parameter	Rating
Operative Voltage	5.0V, +/-5%
Rise Time (Max/Min)	100ms/0.1ms
Fall Time (Max/Min)	5s/1ms
Min. Off Time*1	1s
Notes *1: Minimum time between power removed from SSD (Vcc < 100 mW) and power re-applied to the drive	

4.4 Power Consumption

Table 7 – Power Consumption

Capacity	Read		Write		Idle
	Max.	Avg.	Max.	Avg.	Avg.
60GB/64GB	1,050	1,000	900	750	210
120GB/128GB	1,280	1,250	1,215	910	210
240GB/256GB	1,340	1,310	1,455	1,170	210
480GB/512GB	1,315	1,305	1,770	1,460	210
960GB/1,024GB	1,470	1,450	2,030	1,865	210
1,920GB/2,048GB	1,560	1,505	1,960	1,780	210

Unit: mW

5. Environmental Specifications

5.1 Temperature and Humidity

Table 8 – High Temperature Test Condition

High Temperature Test			
Test Item		Temperature Standard/Wide Temp	Humidity
High Temperature Test	Operation	70°C/85°C	0% RH
	Storage	85°C	0% RH
Low Temperature Test	Operation	0°C /-40°C	0% RH
	Storage	-40°C	0% RH
High Humidity Test	Operation	40°C	90% RH
	Storage	40°C	93% RH
Temperature Cycle Test	Operation	0°C-70°C/-40°C-85°C	—
	Storage	-40°C ~ 85°C	—

Notes: 1. Operation temperature is measured by device temperature sensor. Airflow is suggested and it will allow device to be operated at appropriate temperature for each component during heavy workloads environment.

5.2 Shock and Vibration

Table 9 – Mechanical Test Condition

Items			Condition
Shock	Operating	Acceleration Force	50G, (11ms duration, half sine wave)
	Non-operating		1500G, (0.5ms duration, half sine wave)
Vibration	Non-operating	Frequency/Acceleration	10Hz~2000Hz(peak)/10G

5.3 EMC

Table 10 – EMC Compliance

Items	Condition
ESD Compliance	EN 55024, CISPR 24 EN 61000-4-2 IEC 61000-4-2
EMI Compliance	EN 55032, CISPR 32(CE) CNS 13438 (BSMI) ANSI C63.4 (FCC) VCCI-CISPR 32 (VCCI)

6. Interface

6.1 Pin Assignment and Descriptions

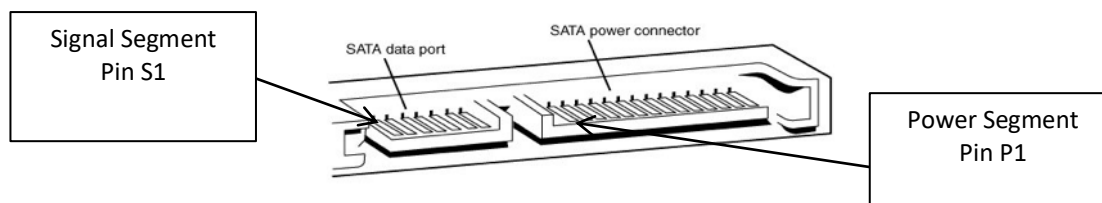


Figure 2 – Pin Locations

Table 11 – Signal Segment Pin Assignment and Descriptions

Pin #	Function
S1	GND
S2	A+ (Differential Signal Pair A)
S3	A – (Differential Signal Pair A)
S4	GND
S5	B – (Differential Signal Pair B)
S6	B+ (Differential Signal Pair B)
S7	GND

Table 12 – Power Segment Pin Assignment and Descriptions

Pin #	Function
P1	Not Used (3.3V)
P2	Not Used (3.3V)
P3	DEVSLP (not support)
P4	GND
P5	GND
P6	GND
P7	5V pre-charge
P8	5V
P9	5V
P10	GND
P11	Reserved
P12	GND
P13	Not Used (12V pre-charge)
P14	Not Used (12V)
P15	Not Used (12V)

7. Physical Dimensions

100.00mm(L) x 69.85mm(W) x 7.00mm(H)

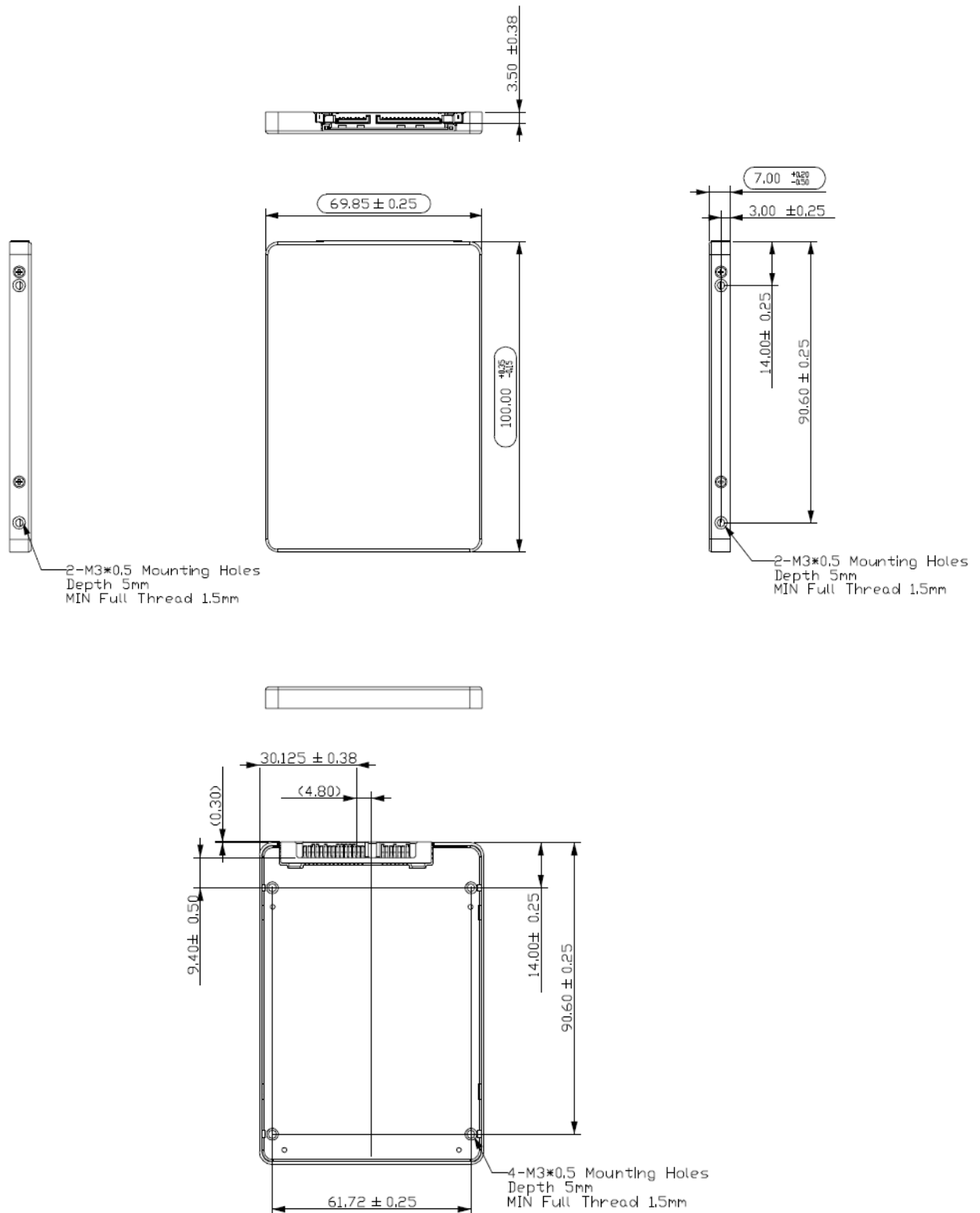


Figure 3 – Device Physical Dimension

8. Command Set

8.1 Supported Command List

Table 13 – ATA Command List

Description	Op Code			Description	Op Code	
CFA Write Sectors Without Erase	38h			Recalibrate	10h-1Fh	
Check Power Mode	E5h			Sanitize	B4h	
Data Set Management	06h			Security Disable Password	F6h	
Device Configuration	B1h			Security Erase Prepare	F3h	
Disable Device Automatic Partial to Slumber transitions	EFh	90h	07h	Security Erase Unit	F4h	
Disable Device Sleep	EFh	90h	09h	Security Freeze Lock	F5h	
Disable Device-initiated interface power state (DIPM) transitions	EFh	90h	03h	Security Set Password	F1h	
Disable DMA Setup FIS Auto-Activate optimization	EFh	90h	02h	Security Unlock	F2h	
Disable read look-ahead	EFh	55h		Seek	70h-7Fh	
Disable reverting to power-on defaults	EFh	66h		Set Features	EFh	
Disable Software Settings Preservation (SSP)	EFh	90h	06h	Set Max Address	F9h	
Disable the APM feature set	EFh	85h		SET MAX FREEZE LOCK	F9h	04h
Disable use of SATA feature set	EFh	90h		SET MAX SET PASSWORD	F9h	01h
Disable volatile write cache	EFh	82h		SET MAX UNLOCK	F9h	03h
Download Microcode	92h			SET MAXLOCK	F9h	02h
Download Microcode DMA	93h			Set Multiple Mode	C6h	
Enable Device Automatic Partial to Slumber transitions	EFh	10h	07h	Set Native Max Address EXT	37h	
Enable Device Sleep	EFh	10h	09h	Set transfer mode	EFh	03h
Enable Device-initiated interface power state (DIPM) transitions	EFh	10h	03h	Sleep	E6h	
Enable DMA Setup FIS Auto-Activate optimization	EFh	10h	02h	SMART	B0h	
Enable read look-ahead	EFh	Aah		SMART DISABLE OPERATIONS	B0h	D9h
Enable reverting to power-on defaults	EFh	CCh		SMART ENABLE OPERATIONS	B0h	D8h
Enable Software Settings Preservation (SSP)	EFh	10h	06h	SMART ENABLE/DISABLE ATTRIBUTE AUTOSAVE	B0h	D2h
Enable the APM feature set	EFh	05h		SMART ENABLE/DISABLE AUTOMATIC OFF-LINE	B0h	DBh
Enable use of SATA features et	EFh	10h		SMART EXECUTE OFF-LINE IMMEDIATE	B0h	D4h
Enable volatile write cache	EFh	02h		SMART READ ATTRIBUTE THRESHOLDS	B0h	D1h

Execute Device Diagnostic	90h	SMART READ DATA	B0h	D0h
Flush Cache	E7h	SMART READ LOG	B0h	D5h
Flush Cache EXT	EAh	SMART RETURN STATUS	B0h	DAh
Identify Device	ECh	SMART SAVE ATTRIBUTE VALUES	B0h	D3h
Idle	E3h	SMART WRITE LOG	B0h	D6h
Idle Immediate	E1h	Standby	E2h	
Initialize Device Parameters	91h	Standby Immediate	E0h	
NOP	00h	Write Buffer	E8h	
Read Buffer	E4h	Write Buffer DMA	EBh	
READ BUFFER DMA	E9h	Write DMA	CAh	
Read DMA	C8h	Write DMA EXT	35h	
Read DMA EXT	25h	Write DMA FUA EXT	3Dh	
Read DMA without Retry	C9h	Write DMA without Retry	CBh	
Read FPDMA Queued	60h	Write FPDMA Queued	61h	
Read Log DMA EXT	47h	Write Log DMA EXT	57h	
Read Log EXT	2Fh	Write Long EXT	3Fh	
Read Multiple	C4h	Write Multiple	C5h	
Read Multiple EXT	29h	Write Multiple EXT	39h	
Read Native Max Address	F8h	Write Multiple FUA EXT	CEh	
Read Native Max Address EXT	27h	Write Sectors	30h	
Read Sectors	20h	Write Sectors EXT	34h	
Read Sectors EXT	24h	Write Sectors without Retry	31h	
Read Sectors without Retry	21h	Write Uncorrectable EXT	45h	
Read Verify Sectors	40h	Zero EXT	44h	
Read Verify Sectors EXT	42h			
Read Verify Sectors without Retry	41h			

8.2 Identify Device Data

Table 14 – Return Data of Identify Device Command

Word	F : Fixed V : Variable X : Both	Default Value	Description
0	F	0040h	General configuration bit-significant information
1	X	*1	Obsolete – Number of logical cylinders
2	V	C837h	Specific configuration
3	X	0010h	Obsolete – Number of logical heads (16)
4-5	X	00000000h	Retired
6	X	003Fh	Obsolete – Number of logical sectors per logical track(63)
7-8	V	00000000h	Reserved for assignment by the Compact Flash Association
9	X	0000h	Retired
10-19	F	Varies	Serial number (20 ASCII characters)
20-21	X	0000h	Retired
22	X	0000h	Obsolete
23-26	F	Varies	Firmware revision (8 ASCII characters)
27-46	F	Varies	Model number (xxxxxxxx)
47	F	8010h	7:0- Maximum number of sectors transferred per interrupt on MULTIPLE commands
48	F	4000h	Trusted Computing feature set options(not support)
49	F	2F00h	Capabilities
50	F	4000h	Capabilities
51-52	X	000000000h	Obsolete
53	F	0007h	Words 88 and 70:64 valid
54	X	*1	Obsolete – Number of logical cylinders
55	X	0010h	Obsolete – Number of logical heads (16)
56	X	003Fh	Obsolete – Number of logical sectors per track (63)
57-58	X	*2	Obsolete – Current capacity in sectors
59	F	DD10h	Number of sectors transferred per interrupt on MULTIPLE commands
60-61	F	*3	Maximum number of sector (28bit LBA mode)
62	X	0000h	Obsolete
63	F	0407h	Multi-word DMA modes supported/selected
64	F	0003h	PIO modes supported
65	F	0078h	Minimum Multiword DMA transfer cycle time per word
66	F	0078h	Manufacturer's recommended Multiword DMA transfer cycle time
67	F	0078h	Minimum PIO transfer cycle time without flow control

68	F	0078h	Minimum PIO transfer cycle time with IORDY flow control
69	F	1F00h	Additional Supported (support download microcode DMA)
70	F	0000h	Reserved
71-74	F	0000000000000000h	Reserved for IDENTIFY PACKET DEVICE command
75	F	001Fh	Queue depth
76	F	C50Eh	Serial SATA capabilities
77	F	0006h	Serial ATA Additional Capabilities
78	F	044Ch	Serial ATA features supported
79	V	0040h	Serial ATA features enabled
80	F	0FF8h	Major Version Number
81	F	0000h	Minor Version Number
82	F	746Bh	Command set supported
83	F	7D09h	Command set supported
84	F	4163h	Command set/feature supported extension
85	V	7469h	Command set/feature enabled
86	V	BC01h	Command set/feature enabled
87	V	4163h	Command set/feature default
88	V	007Fh	Ultra DMA Modes
89	F	000Ah	Time required for security erase unit completion
90	F	001Eh	Time required for Enhanced security erase completion
91	V	0000h	Current advanced power management value
92	V	FFFEh	Master Password Revision Code
93	F	0000h	Hardware reset result. The contents of the bits (12:0) of this word can be changed only during the execution of hardware reset.
94	V	0000h	Vendor's recommended and actual acoustic management value
95	F	0000h	Stream Minimum Request Size
96	V	0000h	Streaming Transfer Time – DMA
97	V	0000h	Streaming Access Latency – DMA and PIO
98-99	F	0000h	Streaming Performance Granularity
100-103	V	*4	Maximum user LBA for 48 bit Address feature set
104	V	0000h	Streaming Transfer Time – PIO
105	F	0004h	Maximum number of 512-byte blocks per DATA SET MANAGEMENT command
106	F	4000h	Physical sector size/Logical sector size
107	F	0000h	Inter-seek delay for ISO-7779 acoustic testing in microseconds
108-111	F	0000000000000000h	Unique ID
112-115	F	0000000000000000h	Reserved
116	V	0000h	Reserved
117-118	F	00000000h	Words per logical Sector
119	F	4018h	Supported settings

120	F	4018h	Command set/Feature Enabled/Supported
121-126	F	0000h	Reserved
127	F	0000h	Removable Media Status Notification feature set support
128	V	0021h	Security status
129-140	X	0000h	Vendor specific
141	X	0000h	Vendor specific
142-159	X	00000h	Vendor specific
160	F	00000h	Compact Flash Association (CFA) power mode 1
161-167	X	00000h	Reserved for assignment by the CFA
168	F	3h 2.5 inch 4h 1.8 inch 5h Less than 1.8 inch	Device Nominal Form Factor
169	F	0001h	DATA SET MANAGEMENT command is supported
170-173	F	0000h	Additional Product Identifier
174-175	X	0000h	Reserve
176-205	V	0000h	Current media serial number
206	F	0000h	SCT Command Transport
207-208	F	0000h	Reserved
209	F	4000h	Alignment of logical blocks within a physical block
210-211	V	0000h	Write-Read-Verify Sector Count Mode 3 (not support)
212-213	F	0000h	Write-Read-Verify Sector Count Mode 2 (not support)
214-216	X	0000h	NV Cache relate (not support)
217	F	0001h	Non-rotating media device
218	F	0000h	Reserved
219	F	0000h	NV Cache relate (not support)
220	V	0000h	Write read verify feature set current mode
221	X	0000h	Reserved
222	F	107Fh	Transport major version number
223	F	0000h	Transport minor version number
224-229	X	0000h	reserved
230-233	F	0000h	Extend number of user addressable sectors
234	F	0001h	Minimum number of 512-byte data blocks per DOWNLOAD MICROCODE command for mode 03h
235	F	FFFEh	Maximum number of 512-byte data blocks per DOWNLOAD MICROCODE command for mode 03h
236-242	X	0000h	Reserved
243	F	0000h	Security Feature 4000: Self Encrypting Drive
244-254	F	0000h	Reserved
255	X	XXA5h XX is variable	Integrity word (Checksum and Signature)

Table 15 – List of Device Identification for Each Capacity

Capacity (GB)	*1 (Word 1 / Word 54)	*2 (Word 57 – 58)	*3 (Word 60 – 61)	*4 (Word 100 – 103)
60	3FFFh	FBFC10h	6FCCF30h	6FCCF30h
64	3FFFh	FBFC10h	7740AB0h	7740AB0h
120	3FFFh	FBFC10h	DF94BB0h	DF94BB0h
128	3FFFh	FBFC10h	EE7C2B0h	EE7C2B0h
240	3FFFh	FBFC10h	FFFFFFFFh	1BF244B0h
256	3FFFh	FBFC10h	FFFFFFFFh	1DCF32B0h
480	3FFFh	FBFC10h	FFFFFFFFh	37E436B0h
512	3FFFh	FBFC10h	FFFFFFFFh	3B9E12B0h
960	3FFFh	FBFC10h	FFFFFFFFh	6FC81AB0h
1,024	3FFFh	FBFC10h	FFFFFFFFh	773BD2B0h
1,920	3FFFh	FBFC10h	FFFFFFFFh	DF8FE2B0h
2,048	3FFFh	FBFC10h	FFFFFFFFh	EE7752B0h

9. Revision History

Revision	Descriptions	Release Date
1.0	First release	Jan, 2023
1.1	Revised Part numbers with OPAL Add 60GB/64GB	Jul, 2023
1.2	Endurance with JEDEC Client Workload added	Nov, 2023