innodisk

Total Solution For
Industrial Flash Storage

2.5" SATA SSD

3MG2-P Series

Customer: _____

Customer Part Number: _____

Innodisk Part Number: _____

Innodisk Model Name: _____

Date: _____

Innodisk Approver	Customer Approver

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Revision History

Revision	Description	Date
Preliminary	First Released	July, 2014
Rev 1.0	Add 1TB LBA Update ME drawing Update Performance	August, 2014
Rev 1.1	Add CE/FCC	August, 2014
Rev 1.2	Modify TBW info.	October, 2014
Rev 1.3	Update ME info.	October, 2014
Rev 2.0	Support Micron MLC Add 9.2mm height housing info.	December, 2014
Rev 2.1	Remove flash endurance SPEC	Jan., 2015
Rev 2.1.1	Modify part number rule	Jan., 2015
Rev 2.2	Update performance of Micron solution	Feb., 2015
Rev 2.3	Update performance of Micron solution	Apr., 2015
Rev 2.4	Update ME drawing Modify 8GB/16GB LBA	Apr., 2015
Rev 2.5	Add SMART feature set	May, 2015
Rev 2.6	Update TBW Update random performance	May, 2015
Rev 2.7	Add iCell function (optional)	Jul., 2015
Rev 2.8	Add Quick erase function (optional)	Jul., 2015
Rev 3.0	Add 2TB	Oct., 2015
Rev 3.1	Update part number rule for Toshiba 15nm	Oct., 2015
Rev 3.2	Update Performance for Toshiba 15nm	Dec., 2015
Rev 3.3	Add 1TB performance with 15nm Update 2TB performance	Jan., 2016

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1. Product Overview

1.1 Introduction of Innodisk 2.5” SATA SSD 3MG2-P

Innodisk 2.5” SATA SSD 3MG2-P products provide high capacity flash memory Solid State Drive (SSD) that electrically complies with Serial ATA (SATA) standard. It supports SATA III standard (6.0GHz) with high performance. Innodisk 2.5” SATA SSD 3MG2-P is designed for industrial field, and supports several standard features, including TRIM, NCQ, and S.M.A.R.T. The SSD have good performance, no latency time and small seek time. It effectively reduces the booting time of operation system and the power consumption is less than hard disk drive (HDD).

1.2 Product View and Models

Innodisk 2.5” SATA SSD 3MG2-P is available in follow capacities:

2.5” SATA SSD 3MG2-P 8GB
2.5” SATA SSD 3MG2-P 16GB
2.5” SATA SSD 3MG2-P 32GB
2.5” SATA SSD 3MG2-P 64GB
2.5” SATA SSD 3MG2-P 2TB
2.5” SATA SSD 3MG2-P 128GB
2.5” SATA SSD 3MG2-P 256GB
2.5” SATA SSD 3MG2-P 512GB
2.5” SATA SSD 3MG2-P 1TB



Figure 1: Innodisk 2.5” SATA SSD 3MG2-P

1.3 SATA Interface

Innodisk 2.5” SATA SSD 3MG2-P supports SATA III interface, and compliant with SATA I and SATA II. SATA III interface can work with Serial Attached SCSI (SAS) host system, which is used in server computer. Innodisk 2.5” SATA SSD 3MG2-P is compliant with Serial ATA Gen 1, Gen 2 and Gen 3 specification (Gen 3 supports 1.5Gbps /3.0Gbps/6.0Gbps data rate). SATA connector uses a 7-pin signal segment and a 15-pin power segment.

1.4 2.5-inch Form Factor

The Industry-standard 2.5-inch form factor design with metal material case is easy for installation, which has a compact design 69.85mm (W) x 100.00mm (L) x 6.90mm (H)/ 70.00mm (W) x100.00mm (L) x 6.80mm (H)/69.85mm (W) x 100.00mm (L) x 9.50mm (H).

2. Product Specifications

2.1 Capacity and Device Parameters

2.5” SATA SSD 3MG2-P device parameters are shown in Table 1.

Table 1: Device parameters

Capacity	LBA	Cylinders	Heads	Sectors	User Capacity(MB)
8GB	13695696	13587	16	63	6687
16GB	29323728	16383	16	63	14318
32GB	60579792	16383	16	63	29580
64GB	121138416	16383	16	63	59150
128GB	242255664	16383	16	63	118289
256GB	484490160	16383	16	63	236567
512GB	968959152	16383	16	63	473124
1TB	1937897136	16383	16	63	946238
2TB	3875733504	16383	16	63	1892448

2.2 Performance

Burst Transfer Rate: 6.0Gbps

Table 2: Performance

	Capacity	8GB**	16GB**	32GB	64GB	128GB	256GB	512GB	1TB	2TB
Toshiba A19	Sequential* Read (max.)	140 MB/s	290 MB/s	530 MB/s	520 MB/s	520 MB/s	520 MB/s	520 MB/s	520 MB/s	440 MB/s
	Sequential Write (max.)	21 MB/s	43 MB/s	87 MB/s	170 MB/s	350 MB/s	450 MB/s	450 MB/s	450 MB/s	420 MB/s
	4KB Random Read (QD32)	17,000 IOPS	32,000 IOPS	58,000 IOPS	70,000 IOPS	70,000 IOPS	70,000 IOPS	70,000 IOPS	70,000 IOPS	12,000 IOPS
	4KB Random Write (QD32)	5,000 IOPS	11,000 IOPS	23,000 IOPS	43,000 IOPS	64,000 IOPS	64,000 IOPS	64,000 IOPS	64,000 IOPS	15,600 IOPS

Note: *Performance based on CrystalDiskMark 3.03with file size 1000M

** 8GB is single channel; 16GB is dual channel

	Capacity	8GB **	16GB**	32GB**	64GB	128GB	256GB	512GB	1TB	2TB
Toshiba 15nm	Sequential* Read (max.)	140 MB/s	140 MB/s	270 MB/s	520 MB/s	520 MB/s	520 MB/s	520 MB/s	520 MB/s	440 MB/s
	Sequential Write (max.)	25 MB/s	25 MB/s	45 MB/s	90 MB/s	180 MB/s	350 MB/s	450 MB/s	460 MB/s	420 MB/s
	4KB Random Read (QD32)	14,000 IOPS	14,000 IOPS	27,000 IOPS	52,000 IOPS	75,000 IOPS	75,000 IOPS	75,000 IOPS	75,000 IOPS	12,000 IOPS
	4KB Random Write (QD32)	6400 IOPS	6400 IOPS	11,500 IOPS	23,000 IOPS	46,000 IOPS	83,000 IOPS	76,000 IOPS	78,000 IOPS	15,600 IOPS

Note: *Performance based on CrystalDiskMark 3.03with file size 1000M

** 8GB and 16GB is single channel; 32GB is dual channel

	Capacity	64GB	128GB	256GB	512GB	1TB	2TB
Micron	Sequential Read (max.)	440 MB/s	510 MB/s	520 MB/s	520 MB/s	520 MB/s	440 MB/s
	Sequential Write (max.)	70 MB/s	140 MB/s	300 MB/s	450 MB/s	450 MB/s	420 MB/s
	4KB Random Read (QD32)	70,000 IOPS	70,000 IOPS	70,000 IOPS	70,000 IOPS	70,000 IOPS	12,000 IOPS
	4KB Random Write (QD32)	17,000 IOPS	35,000 IOPS	64,000 IOPS	64,000 IOPS	64,000 IOPS	15,600 IOPS

Note: *Performance based on CrystalDiskMark 3.03 with file size 1000M

2.3 Electrical Specifications

2.3.1 Power Requirement

Table 3: Innodisk 2.5" SATA SSD 3MG2-P Power Requirement

Item	Symbol	Rating	Unit
Input voltage	V_{IN}	+5 DC +- 5%	V

2.3.2 Power Consumption

Table 4: Power Consumption

Mode	Power Consumption
Read	630 mA (max.)
Write	1.2 A (max.)
Idle	77 mA (max.)
DEVSLP Mode	3mW (min.)
Slumber Mode	30mW (min.)

* Target: 2.5" SATA SSD 3MG2-P 256GB

Mode	Power Consumption
Read	803 mA (max.)
Write	1.2 A (max.)
Idle	425 mA (max.)

* Target: 2.5" SATA SSD 3MG2-P 2TB

2.4 Environmental Specifications

2.4.1 Temperature Ranges

Table 5: Temperature range for 2.5" SATA SSD 3MG2-P

Temperature	Range
Operating	Standard Grade: 0°C to +70°C
	Industrial Grade:-40°C to +85°C
Storage	-55°C to +95°C

2.4.2 Humidity

Relative Humidity: 10-95%, non-condensing

2.4.3 Shock and Vibration

Table 6: Shock/Vibration Testing for 2.5" SATA SSD 3MG2-P

Reliability	Test Conditions	Reference Standards
Vibration	7 Hz to 2K Hz, 20G, 3 axes	IEC 68-2-6
Mechanical Shock	Duration: 0.5ms, 1500 G, 3 axes	IEC 68-2-27

2.4.4 Mean Time between Failures (MTBF)

Table 7 summarizes the MTBF prediction results for various 2.5" SATA SSD 3MG2-P configurations. The analysis was performed using a RAM Commander™ failure rate prediction.

- **Failure Rate**: The total number of failures within an item population, divided by the total number of life units expended by that population, during a particular measurement interval under stated condition.
- **Mean Time between Failures (MTBF)**: A basic measure of reliability for repairable items: The mean number of life units during which all parts of the item perform within their specified limits, during a particular measurement interval under stated conditions.

Table 7: 2.5” SATA SSD 3MG2-P MTBF

Product	Condition	MTBF (Hours)
Innodisk 2.5” SATA SSD 3MG2-P	Telcordia SR-332 GB, 25°C	>3,000,000

2.5 CE and FCC Compatibility

2.5” SATA SSD 3MG2-P conforms to CE and FCC requirements.

2.6 RoHS Compliance

2.5” SATA SSD 3MG2-P is fully compliant with RoHS directive.

2.7 Reliability

Parameter	Value
Read Cycles	Unlimited Read Cycles
Wear-Leveling Algorithm	Support
Bad Blocks Management	Support
Error Correct Code	Support
iData Guard	Support
Thermal Sensor	Support
TBW* (Total Bytes Written)	Unit: TB
8GB	7.79
16GB	15.58
32GB	31.16
64GB	62.33
128GB	124.67
256GB	249.35
512GB	498.7
1TB	997.4
2TB	1994.8
* Total bytes written is based on JEDEC 218 (Solid-State Drive Requirements and Endurance Test Method)	
** Lifespan is calculated by device written per day	

2.8 Transfer Mode

2.5” SATA SSD 3MG2-P support following transfer mode:

Serial ATA III 6.0Gbps

Serial ATA II 3.0Gbps

Serial ATA I 1.5Gbps

2.9 Pin Assignment

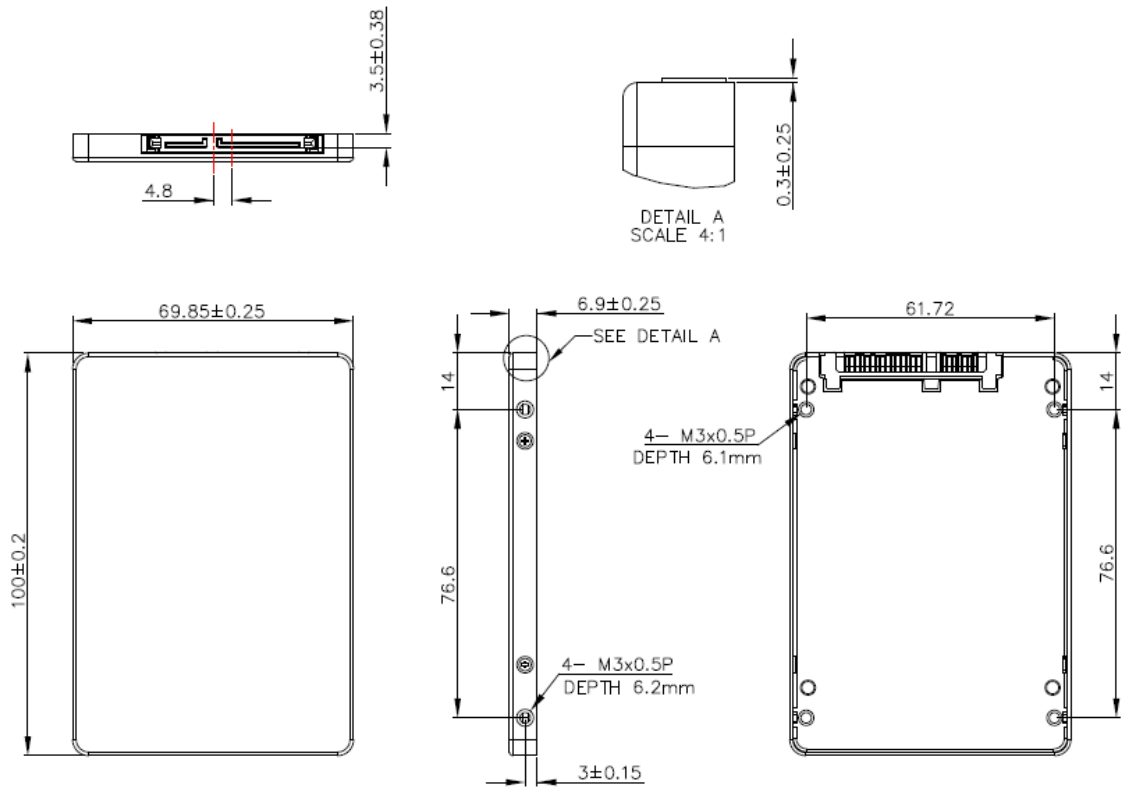
Innodisk 2.5” SATA SSD 3MG2-P uses a standard SATA pin-out. See Table 8 for 2.5” SATA SSD 3MG2-P pin assignment.

Table 8: Innodisk 2.5” SATA SSD 3MG2-P Pin Assignment

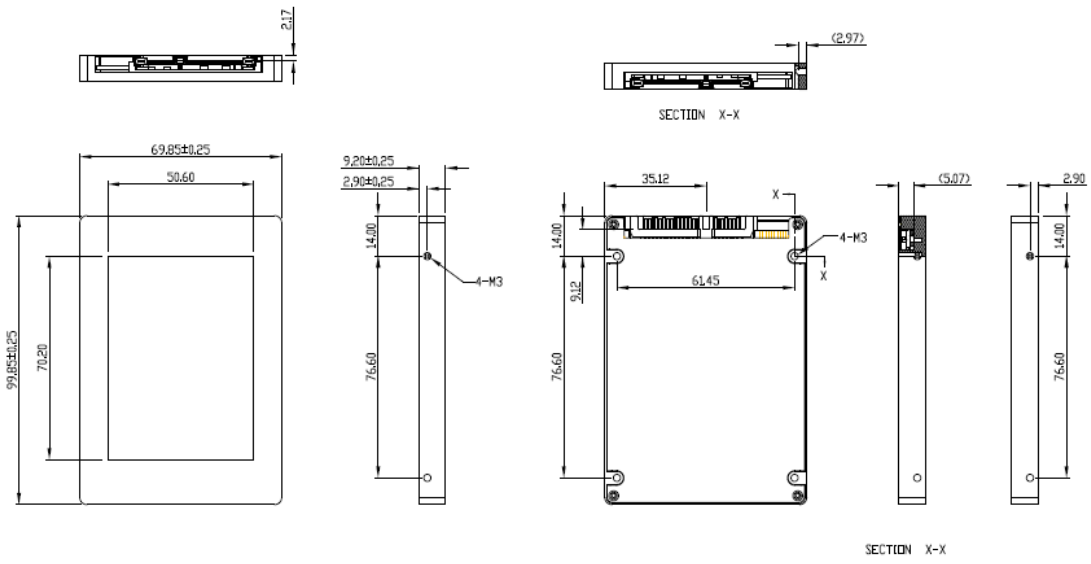
Name	Type	Description
S1	GND	NA
S2	A+	Differential Signal Pair A
S3	A-	
S4	GND	NA
S5	B-	Differential Signal Pair B
S6	B+	
S7	GND	NA
Key and Spacing separate signal and power segments		
P1	NC	NA
P2	NC	NA
P3	NC	NA
P4	GND	NA
P5	GND	NA
P6	GND	NA
P7	V5	5V Power, Pre-Charge
P8	V5	5V Power
P9	V5	5V Power
P10	GND	NA
P11	DAS/DSS	Device Activity Signal / Disable Staggered
P12	GND	NA
P13	NC	NA
P14	NC	NA
P15	NC	NA

2.10 Mechanical Dimensions

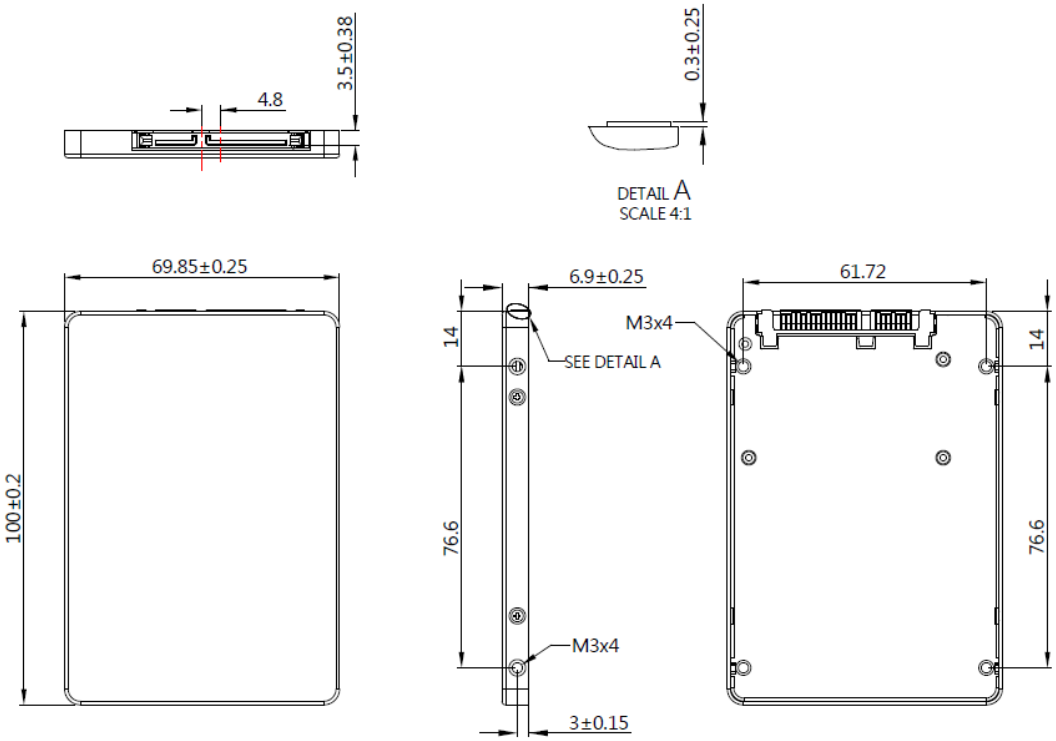
* DGS25-XXXD81SX1(A)XX(P)



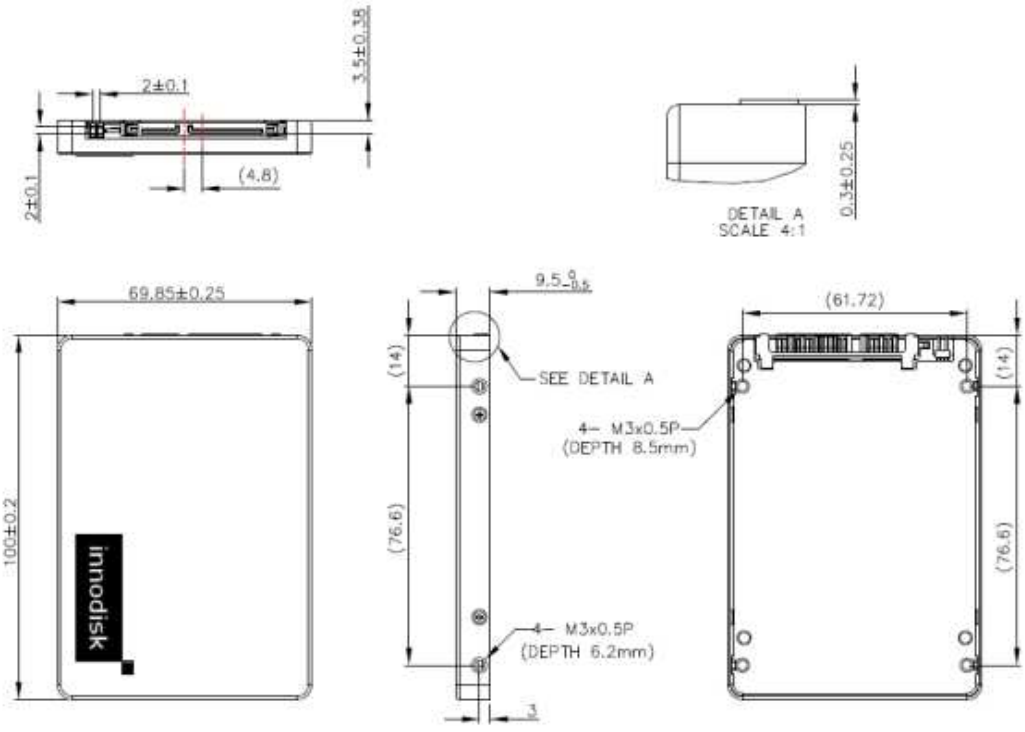
* DGS25-XXXD81SX2XX(P)



* DGS25-XXXD81SX3XX



*DGS25-02TD81SXAXX



2.11 Assembly Weight

An Innodisk 2.5” SATA SSD 3MG2-P within MLC flash ICs, 16GB’s weight is 100 grams approx. The total weight of SSD will be less than 135 grams.

2.12 Seek Time

Innodisk 2.5” SATA SSD 3MG2-P is not a magnetic rotating design. There is no seek or rotational latency required.

2.13 Hot Plug

The SSD support hot plug function and can be removed or plugged-in during operation. User has to avoid hot plugging the SSD which is configured as boot device and installed operation system.

Surprise hot plug : The insertion of a SATA device into a backplane (combine signal and power) that has power present. The device powers up and initiates an OOB sequence.

Surprise hot removal: The removal of a SATA device from a powered backplane, without first being placed in a quiescent state.

2.14 NAND Flash Memory

Innodisk 2.5” SATA SSD 3MG2-P uses Multi Level Cell (MLC) NAND flash memory, which is non-volatility, high reliability and high speed memory storage.

3. Theory of Operation

3.1 Overview

Figure 2 shows the operation of Innodisk 2.5” SATA SSD 3MG2-P from the system level, including the major hardware blocks.

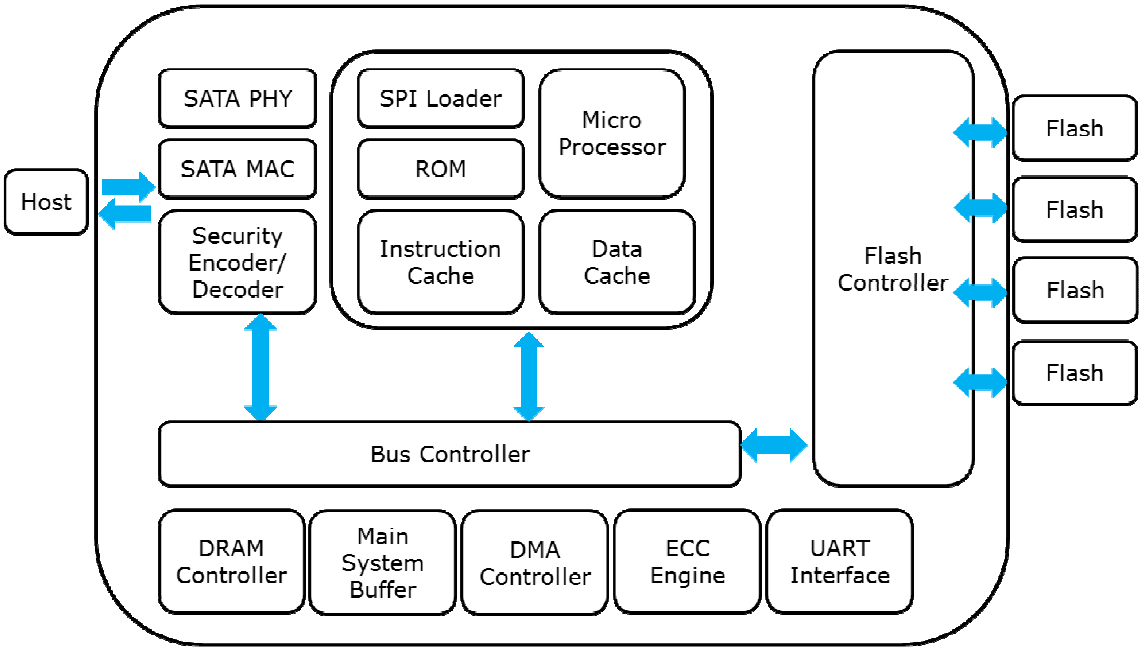


Figure 2: Innodisk FiD 2.5” SATA SSD 3MG2-P Block Diagram

Innodisk 2.5” SATA SSD 3MG2-P integrates a SATA III controller and NAND flash memories. Communication with the host occurs through the host interface, using the standard ATA protocol. Communication with the flash device(s) occurs through the flash interface.

* iCell is optional feature with different part number.

3.2 SATA III Controller

Innodisk 2.5” SATA SSD 3MG2-P is designed with ID 201, a SATA III 6.0Gbps (Gen. 3) controller, which supports external DDDR3 DRAM. The Serial ATA physical, link and transport layers are compliant with Serial ATA Gen 1, Gen 2 and Gen 3 specification (Gen 3 supports 1.5Gbps/3.0Gbps/6.0Gbps data rate). The controller has 4 channels for flash interface.

3.3 Error Detection and Correction

Highly sophisticated Error Correction Code algorithms are implemented. The ECC unit consists of the Parity Unit (parity-byte generation) and the Syndrome Unit (syndrome-byte computation). This unit implements an algorithm that can correct 66 bits per 1024 bytes in an ECC block. Code-byte generation during write operations, as well as error detection during read operation, is implemented on the fly without any speed penalties.

3.4 Wear-Leveling

Flash memory can be erased within a limited number of times. This number is called the ***erase cycle limit*** or ***write endurance limit*** and is defined by the flash array vendor. The erase cycle limit applies to each individual erase block in the flash device.

Innodisk 2.5” SATA SSD 3MG2-P uses a static wear-leveling algorithm to ensure that consecutive writes of a specific sector are not written physically to the same page/block in the flash. This spreads flash media usage evenly across all pages, thereby extending flash lifetime.

3.5 Bad Blocks Management

Bad Blocks are blocks that contain one or more invalid bits whose reliability are not guaranteed. The Bad Blocks may be presented while the SSD is shipped, or may develop during the life time of the SSD. When the Bad Blocks is detected, it will be flagged, and not be used anymore. The SSD implement Bad Blocks management, Bad Blocks replacement, Error Correct Code to avoid data error occurred. The functions will be enabled automatically to transfer data from Bad Blocks to spare blocks, and correct error bit.

3.6 iData Guard

Innodisk’s iData Guard is a comprehensive data protection mechanism that functions before and after a sudden power outage to SSD. Low-power detection terminates data writing before an abnormal power-off, while table-remapping after power-on deletes corrupt data and maintains data integrity. Innodisk’s iData Guard provides effective power cycling management, preventing data stored in flash from degrading with use.

3.7 Garbage Collection/TRIM

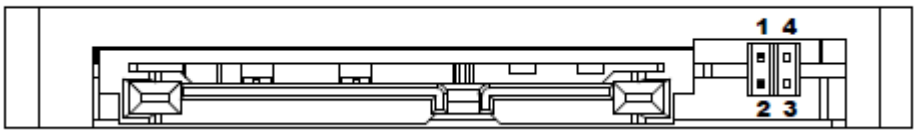
Garbage collection and TRIM technology is used to maintain data consistency and perform continual data cleansing on SSDs. It runs as a background process, freeing up valuable controller resources while sorting good data into available blocks, and deleting bad blocks. It also significantly reduces write operations to the drive, thereby increasing the SSD’s speed and lifespan.

3.8 iCell Technology (Optional)

iCell circuit is designed with several capacitors to be able to provide power after host power off. The SSD controller can write all DRAM buffer data to flash, so that is why 2.5” SATA SSD 3MG2-P can ensure all data can be written to disk without any data loss.

3.9 QEraser Function (Optional)

QEraser function is designed for emergency data erase in few seconds by providing ATA command or shorting QEraser Pins (Pin 1 and Pin 2) with an external jumper to erase all of data block.



3.9.1 QEraser Command FAh-66h

Use to erase data blocks. When the command is issued, the flash is erased immediately. This command causes the SSD to erase all user data blocks, including any reallocated blocks, while retaining all other system data and bad block information.

- Protocol: No Data

-Inputs

Table 9: Execute Quick Erase command for inputs information

Register	7	6	5	4	3	2	1	0
Features	66h							
Sector Count	Na							
LBA Low	Na							
LBA Mid	Na							
LBA High	Na							
Device	obs	na	obs	DEV	Na			
Status	FAh							

-Normal Outputs

Table 10: Quick Erase command for normal output information

Register	7	6	5	4	3	2	1	0

Error	Na							
Sector Count	Na							
LBA Low	Na							
LBA Mid	Na							
LBA High	Na							
Device	Na	Na	Na	DEV	Na	Na	Na	Na
Status	BSY	DRDY	Na	DSC	Na	Na	Na	ERR

Device register-

DEV shall specify the selected device.

Status register

BSY will be cleared to zero indicating command completion

DRDY will be set to one.

DF (Device Fault) will be cleared to zero.

DRQ will be cleared to zero

ERR will be cleared to zero.

4. Installation Requirements

4.1 2.5” SATA SSD 3MG2-P Pin Directions

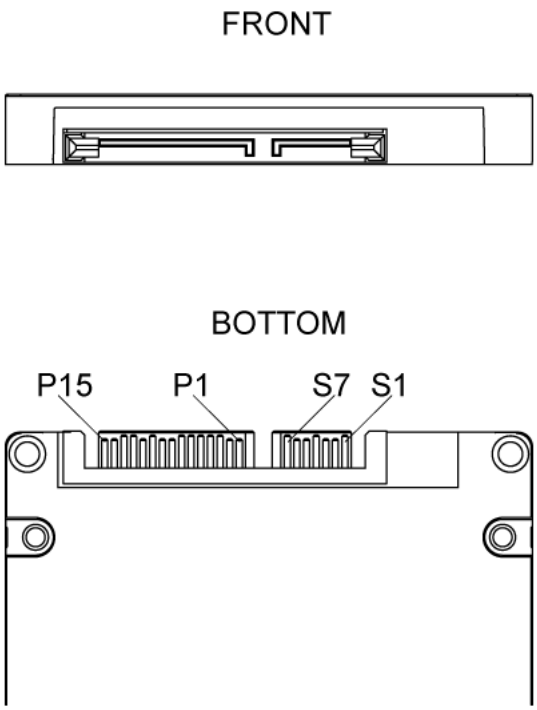


Figure 3: Signal Segment and Power Segment

4.2 Electrical Connections for 2.5” SATA SSD 3MG2-P

A Serial ATA device may be either directly connected to a host or connected to a host through a cable. For connection via cable, the cable should be no longer than 1meter. The SATA interface has a separate connector for the power supply. Please refer to the pin description for further details.

4.3 Form Factor

Please prepare following things:

- Screw driver.
- Four M3 screws.
- SATA single cable (7-pin, Maximum length l meter).
- SATA power cable (15-pin).

Please turn off your computer, and open your computer’s case. Find one of available 2.5-inch slot, and plug the SSD in. To use the screws fix the SSD. Plug in the SATA single cable, and power cable. Please boot the installation Operation System from CD-ROM, and install Operation System into SSD.

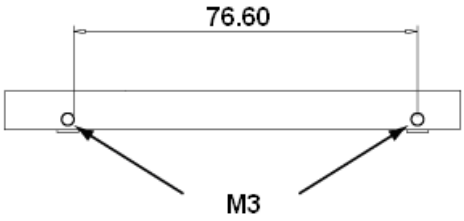


Figure 4: 2.5” SATA SSD 3MG2-P Mechanical Screw Hole

4.4 Device Drive

No additional device drives are required. Innodisk 2.5” SATA SSD 3MG2-P can be configured as a boot device.

5. SMART Feature Set

Innodisk 3MG2-P series support the SMART command set and defines some vendor-specific data to report SMART attributes of SSD.

Value	Command
D0h	Read Data
D1h	Read Attribute Threshold
D2h	Enable/Disable Autosave
D3h	Save Attribute Values
D4h	Execute OFF-LINE Immediate
D5h	Read Log
D6h	Return Status
D8h	Enable SMART Operations
D9h	Disable SMART Operations
DAh	Return Status

5.1 SMART Attributes

Innodisk 3MG2-P series SMART data attributes are listed in following table.

Attribute ID (hex)	**Raw Attribute Value**							**Attribute Name**
1 (01h)	MSB	00	00	00	00	00	00	Raw Read Error Rate
5 (05h)	LSB	MSB	00	00	00	00	00	Reallocated Sector Count
9 (09h)	LSB			MSB	00	00	00	Power-on Hours
12 (0Ch)	LSB			MSB	00	00	00	Power Cycle Count
160 (A0h)	LSB			MSB	00	00	00	Uncorrectable sector count when read/write
161 (A1h)	LSB	MSB	00	00	00	00	00	Number of valid spare block
163 (A3h)	LSB	MSB	00	00	00	00	00	Number of initial invalid block
164 (A4h)	LSB	MSB	00	00	00	00	00	Total erase count
165 (A5h)	LSB			MSB	00	00	00	Maxumum erase count
166 (A6h)	LSB			MSB	00	00	00	Minimum erase count
167 (A7h)	LSB			MSB	00	00	00	Average erase count
168 (A8h)	LSB			MSB	00	00	00	Max erase count of spec
169 (A9h)	LSB			MSB	00	00	00	Reman Life (percentage)
175 (AFh)	LSB			MSB	00	00	00	Program fail count in worst die
176 (B0h)	LSB			MSB	00	00	00	Erase fail count in worst die
177 (B1h)	LSB			MSB	00	00	00	Total wear level count

178 (B2h)	LSB	MSB	00	00	00	00	00	Runtime invalid block count
181 (B5h)	LSB			MSB	00	00	00	Total program fail count
182 (B6h)	LSB	MSB	00	00	00	00	00	Total erase fail count
187 (BBh)	LSB			MSB	00	00	00	Uncorrectable error count
192 (C0h)	LSB	MSB	00	00	00	00	00	Power-Off Retract Count
194 (C2h)	MSB	00	00	00	00	00	00	Controlled temperature
195 (C3h)	LSB			MSB	00	00	00	Hardware ECC recovered
196 (C4h)	LSB			MSB	00	00	00	Reallocation event count
198 (C6h)	LSB			MSB	00	00	00	Uncorrectable error count off-line
199 (C7h)	LSB	MSB	00	00	00	00	00	UltraDMA CRC error count
225 (E1h)	LSB						MSB	Total LBAs written (each write unit = 32MB)
232 (E8h)	LSB	MSB	00	00	00	00	00	Available reserved space
241 (F1h)	LSB						MSB	Total LBAs written (each write unit = 32MB)
242 (F2h)	LSB						MSB	Total LBAs read (each write unit = 32MB)

6. Part Number Rule

CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
	D	**G**	**S**	**2**	**5**	**-**	**3**	**2**	**G**	**D**	**8**	**1**	**B**	**C**	**1**	**Q**	**C**	**(P)**	**-**	**X**	**X**
Description	Disk	2.5″ SATA SSD 3MG2-P					Capacity			Category			Flash mode	Operation Temp.	Internal Control	CH.	Flash	icell		Customized Code	

Definition

Code 1st (Disk)	**Code 13th (Flash mode)**
D : Disk	S: Synchronous Flash
	B: Synchronous Flash for Toshiba 15nm
Code 2nd ~ 5th (Form Factor)	**Code 14th (Operation Temperature)**
GS25: 2.5″ SATA SSD 3MG2-P (EverGreen Series)	C: Standard Grade (0℃~ +70℃)
Code 7th ~9th (Capacity)	W: Industrial Grade (-40℃~ +85℃)
08G: 8GB	**Code 15th (Internal control)**
16G: 16GB	1/A: full size PCBA compliant to 7mm height housing
32G: 32GB	2/A*: compliant to 9mm height housing
64G: 64GB	*A in for 2TB only
A28: 128GB	3: slim PCBA compliant to 7mm height housing
B56: 256GB	**Code 16th (Channel of data transfer)**
C12:512GB	S: Single Channel
01T: 1TB	D: Dual Channels
02T: 2TB	Q: Quad Channels
Code 10th ~12th (Series)	
D81: 2.5″ SATA SSD 3MG2-P	**Code 17th (Flash Type)**
	C: Toshiba MLC
	N: Micron MLC
	Code 18th (iCell)
	P: iCell, reserved for optional function
	Code 20th ~21th (Customized code)

Appendix

宜鼎國際股份有限公司
Innodisk Corporation
Tel:(02)7703-3000 Fax:(02) 7703-3555 Internet: http://www.innodisk.com/

RoHS 自我宣告書(RoHS Declaration of Conformity)

Manufacturer Product: All Innodisk EM Flash and Dram products

一、 宜鼎國際股份有限公司（以下稱本公司）特此保證售予貴公司之所有產品，皆符合歐盟 2011/65/EU 關於 RoHS 之規範要求。

Innodisk Corporation declares that all products sold to the company, are complied with European Union RoHS Directive (2011/65/EU) requirement

二、 本公司同意因本保證書或與本保證書相關事宜有所爭議時，雙方宜友好協商，達成協議。

Innodisk Corporation agrees that both parties shall settle any dispute arising from or in connection with this Declaration of Conformity by friendly negotiations.

Name of hazardous substance	Limited of RoHS ppm（mg/kg）
Cd	< 100 ppm
Pb	< 1000 ppm
Hg	< 1000 ppm
Chromium VI（Cr+6）	< 1000 ppm
Polybromodiphenyl ether（PBDE）	< 1000 ppm
Polybrominated Biphenyls（PBB）	< 1000 ppm

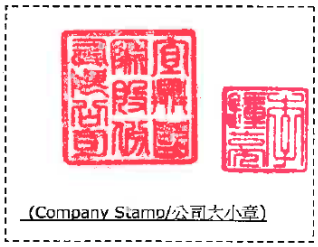
立 保 證 書 人 (Guarantor)

Company name 公司名稱： Innodisk Corporation 宜鼎國際股份有限公司

Company Representative 公司代表人： Richard Lee 李鐘亮

Company Representative Title 公司代表人職稱： CEO 執行長

Date 日期： 2014 / 07 / 29



(Company Stamp/公司大小章)

宜鼎國際股份有限公司
Innodisk Corporation

Tel:(02)7703-3000 Fax:(02) 7703-3555 Internet: http://www.innodisk.com/

REACH Declaration of Conformity

Manufacturer Product: All Innodisk EM Flash and Dram products

1.宜鼎國際股份有限公司（以下稱本公司）特此保證此售予貴公司之產品，皆符合歐盟化學品法案(Registration , Evaluation and Authorization of Chemicals；REACH)之規定(http://www.echa.europa.eu/de/candidate-list-table **last updated: 16/05/2014**)。所提供之產品包含：(1) 產品或產品所使用到的所有原物料；(2)包裝材料；(3)設計、生產及重工過程中所使用到的所有原物料。

We Innodisk Corporation hereby declare that our products are in compliance with the requirements according to the REACH Regulation (http://www.echa.europa.eu/de/candidate-list-table **last updated: 16/06/2014**). Products include： 1) Product and raw material used by the product； 2) Packaging material ；3) Raw material used in the process of design, production and rework

2.本公司同意因本保證書或與本保證書相關事宜有所爭議時，雙方宜友好協商，達成協議。

InnoDisk Corporation agrees that both parties shall settle any dispute arising from or in connection with this Declaration of Conformity by friendly negotiations.

立 保 證 書 人 (Guarantor)

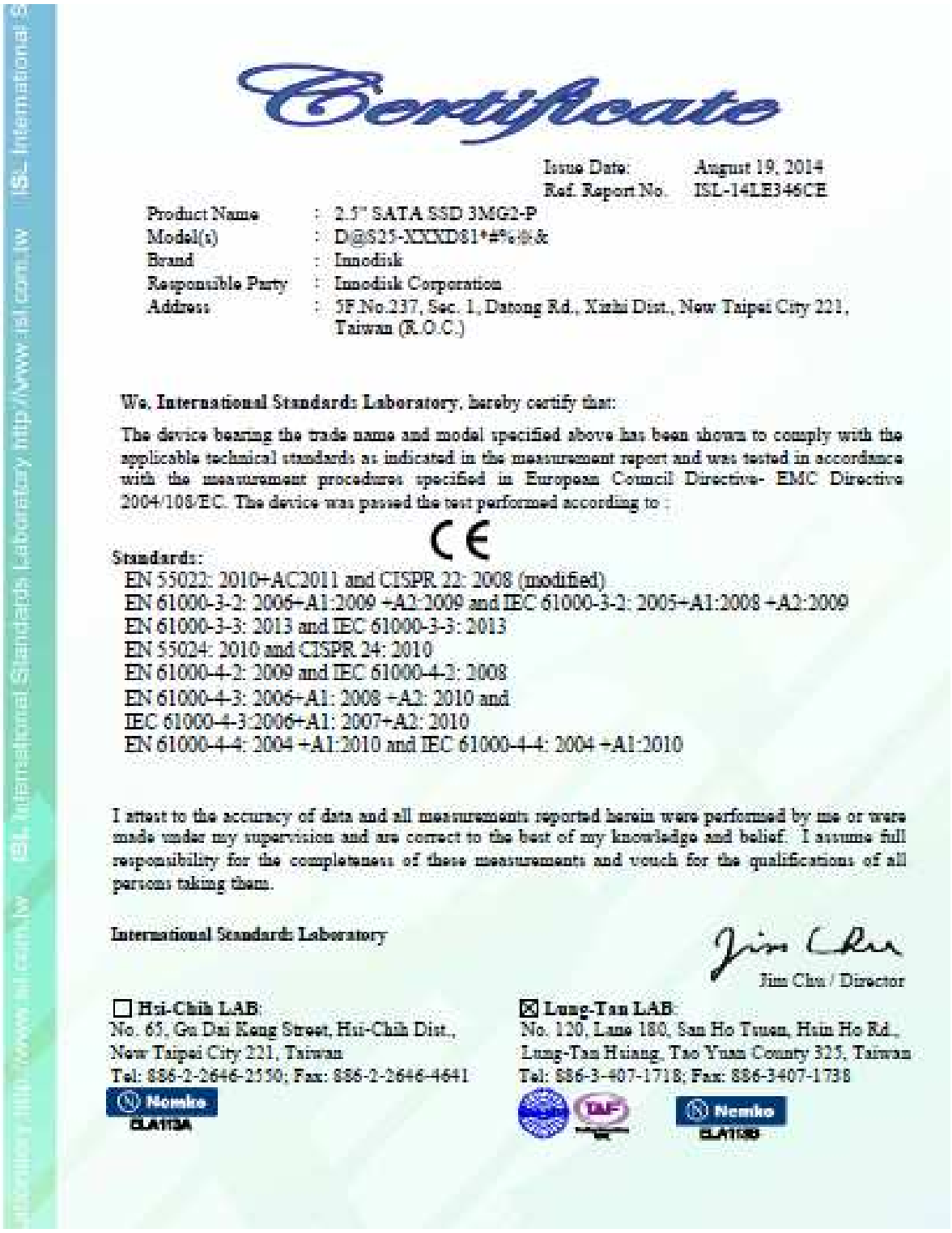
Company name 公司名稱： InnoDisk Corporation 宜鼎國際股份有限公司

Company Representative 公司代表人： Richard Lee 李鐘亮

Company Representative Title 公司代表人職稱： CEO 執行長

Date 日期： 2014 / 07 / 29

(Company Stamp/公司大小章)



Certificate

Issue Date: August 19, 2014
Ref. Report No. ISL-14LE346CE

Product Name	:	2.5" SATA SSD 3MG2-P
Model(s)	:	D@S25-XXXD81*#%!&&
Brand	:	Innodisk
Responsible Party	:	Innodisk Corporation
Address	:	5F.No.237, Sec. 1, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan (R.O.C.)

We, International Standard: Laboratory, hereby certify that:

The device bearing the trade name and model specified above has been shown to comply with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in European Council Directive- EMC Directive 2004/108/EC. The device was passed the test performed according to :

CE

Standards:

EN 55022: 2010+AC2011 and CISPR 22: 2008 (modified)
EN 61000-3-2: 2006+A1:2009 +A2:2009 and IEC 61000-3-2: 2005+A1:2008 +A2:2009
EN 61000-3-3: 2013 and IEC 61000-3-3: 2013
EN 55024: 2010 and CISPR 24: 2010
EN 61000-4-2: 2009 and IEC 61000-4-2: 2008
EN 61000-4-3: 2006+A1: 2008 +A2: 2010 and
IEC 61000-4-3:2006+A1: 2007+A2: 2010
EN 61000-4-4: 2004 +A1:2010 and IEC 61000-4-4: 2004 +A1:2010

I attest to the accuracy of data and all measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

International Standard: Laboratory

Jim Chu / Director

☐ Hsi-Chih LAB:
No. 65, Gu Dai Keng Street, Hsi-Chih Dist.,
New Taipei City 221, Taiwan
Tel: 886-2-2646-2550; Fax: 886-2-2646-4641

☒ Lung-Tan LAB:
No. 120, Lane 180, San Ho Tsuen, Hsin Ho Rd.,
Lung-Tan Hsiang, Tao Yuan County 325, Taiwan
Tel: 886-3-407-1718; Fax: 886-3407-1738

Certificate

Issue Date: August 19, 2014
Ref. Report No. ISL-14LE346FB

Product Name	:	2.5" SATA SSD 3MG2-P
Model(s)	:	D@S25-XXXD81*#%@&
Brand	:	Innodisk
Applicant	:	Innodisk Corporation
Address	:	5F.No.237, Sec. 1, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan (R.O.C.)

We, **International Standards Laboratory**, hereby certify that:

The device bearing the trade name and model specified above has been shown to comply with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified. (refer to Test Report if any modifications were made for compliance).

Standards:

FCC CFR Title 47 Part 15 Subpart B: 2012- Section 15.107 and 15.109
ANSI C63.4-2009
Industry Canada Interference-Causing Equipment Standard ICES-003 Issue 5: 2012

Class B

I attest to the accuracy of data and all measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

International Standards Laboratory

Jim Chu / Director

☐ **Hsi-Chih LAB:**
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New Taipei City 221, Taiwan
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