

2.5" SATA SSD

3IE2-P Series

Customer: _____

Customer

Part

Number: _____

Innodisk

Part

Number: _____

Innodisk

Model Name: _____

Date: _____

Innodisk Approver	Customer Approver

**Total Solution For
Industrial Flash Storage**

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REVISION HISTORY

Revision	Description	Date
Preliminary	First Released	April, 2016
Rev 1.0	Update Performance	Sep., 2016
Rev 1.1	Add 1TB performance	Jan., 2017
Rev 1.2	Update TBW and test workload	Mar., 2017
Rev 1.3	Modify Quick erase function	Aug., 2018
Rev 1.4	Update RoHS to 2019 version Add UL certification	Jun., 2019
Rev 1.5	Update Assembly Torque Information	Mar., 2023

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1. Product Overview

1.1 Introduction of Innodisk 2.5" SATA SSD 3IE2-P

iSLC [3IE2-P series], designed to outdo the endurance, performance and reliability of MLC-based solutions. Through the use of flash management algorithms, iSLC improves SSD endurance up to 20,000 times, increasing lifespans up to 7 times longer than MLC-based solutions. In addition, iSLC improves the performance of solid state drives, with similar write performance of SLC-based solutions, and with data quality that is on par with SLC technologies. The Innodisk iSLC series is cost efficient, boasting excellent benefits at only half the price of SLC-based solutions. Innodisk 2.5" SATA SSD 3IE2-P is SATA III 6Gb/s Flash based disk with iSLC technology, which delivers excellent performance and reliability making it the ideal solution for a variety of applications, including embedded system, industrial computing, and enterprise field. 3IE2-P 2.5" SSD not only performs unmatched performance, but also designed with Innodisk owned technical knowhow to ensure the data integrity and highest levels of reliability.

CAUTION *TRIM must be enabled.*

TRIM enables SSD's controller to skip invalid data instead of moving. It can free up significant amount of resources, extends the lifespan of SSD by reducing erase, and write cycles on the SSD. Innodisk's handling of garbage collection along with TRIM command improves write performance on SSDs.

1.2 Product View and Models

Innodisk 2.5" SATA SSD 3IE2-P is available in follow capacities:

- | | |
|---------------------------|----------------------------|
| 2.5" SATA SSD 3IE2-P 8GB | 2.5" SATA SSD 3IE2-P 128GB |
| 2.5" SATA SSD 3IE2-P 16GB | 2.5" SATA SSD 3IE2-P 256GB |
| 2.5" SATA SSD 3IE2-P 32GB | 2.5" SATA SSD 3IE2-P 512GB |
| 2.5" SATA SSD 3IE2-P 64GB | 2.5" SATA SSD 3IE2-P 1TB |



Figure 1: Innodisk 2.5" SATA SSD 3IE2-P

1.3 SATA Interface

Innodisk 2.5" SATA SSD 3IE2-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 3IE2-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).

2. Product Specifications

2.1 Capacity and Device Parameters

2.5" SATA SSD 3IE2-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

2.2 Performance

Burst Transfer Rate: 6.0Gbps

Table 2: Performance

	Capacity	8GB (2CH)	16GB (4CH)	32GB (4CH)	64GB (4CH)	128GB (4CH)
Toshiba 15nm (Slim inside)	Sequential Read (max.)	300 MB/s	300 MB/s	530 MB/s	530 MB/s	530 MB/s
	Sequential Write (max.)	140 MB/s	120 MB/s	240 MB/s	240 MB/s	450 MB/s
	4KB Random Read (QD32)	35,000 IOPS	35,000 IOPS	52,000 IOPS	52,000 IOPS	75,000 IOPS
	4KB Random Write (QD32)	35,000 IOPS	31,000 IOPS	49,000 IOPS	49,000 IOPS	80,000 IOPS
	Capacity	32GB (4CH)	64GB (4CH)	256GB (4CH)	512GB (4CH)	1TB (4CH)
Toshiba 15nm (Full PCBA)	Sequential Read (max.)	530 MB/s	530 MB/s	530 MB/s	530 MB/s	430 MB/s
	Sequential Write (max.)	300 MB/s	450 MB/s	450 MB/s	450 MB/s	410 MB/s
	4KB Random Read (QD32)	75,000 IOPS	75,000 IOPS	75,000 IOPS	75,000 IOPS	12,000 IOPS
	4KB Random Write (QD32)	80,000 IOPS	80,000 IOPS	80,000 IOPS	80,000 IOPS	15,600 IOPS

Note: *Performance based on CrystalDiskMark 5.01with file size 1000M

2.3 Electrical Specifications

2.3.1 Power Requirement

Table 3: Innodisk 2.5" SATA SSD 3IE2-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	351 mA (max.)
Write	457 mA (max.)
Idle	146 mA (max.)
DEVSLP Mode	3mW (min.)
Slumber Mode	30mW (min.)

* Target: 2.5" SATA SSD 3IE2-P 512GB

2.4 Environmental Specifications

2.4.1 Temperature Ranges

Table 5: Temperature range for 2.5" SATA SSD 3IE2-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 3IE2-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 3IE2-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 3IE2-P MTBF

Product	Condition	MTBF (Hours)
Innodisk 2.5" SATA SSD 3IE2-P	Telcordia SR-332 GB, 25°C	>3,000,000

2.5 CE and FCC Compatibility

2.5" SATA SSD 3IE2-P conforms to CE and FCC requirements.

2.6 RoHS Compliance

2.5" SATA SSD 3IE2-P is fully compliant with RoHS directive.

2.7 Reliability

Parameter	Value	
Read Cycles	Unlimited Read Cycles	
Flash endurance	20,000 P/E cycles	
Wear-Leveling Algorithm	Support	
Bad Blocks Management	Support	
Error Correct Code	Support	
TBW* (Total Bytes Written) Unit:TB		
Capacity	Sequential workload	Client workload
08GB	142	78.1
16GB	284.1	156.3
32GB	568.2	312.5
64GB	1136	625
128GB	2273	1250
256GB	4545	2500
512GB	9091	5000
1TB	18181	10000
*Note:		
1. Sequential: Mainly sequential write, tested by Vdbench.		
2. Client: Follow JESD218 Test method and JESD219A Workload, tested by ULINK. (The capacity lower than 64GB client workload is not specified in JEDEC219A, the values are estimated.)		
3. Based on out-of-box performance.		

2.8 Transfer Mode

2.5" SATA SSD 3IE2-P support following transfer mode:

Serial ATA III 6.0Gbps

Serial ATA II 3.0Gbps

Serial ATA I 1.5Gbps

2.9 Pin Assignment

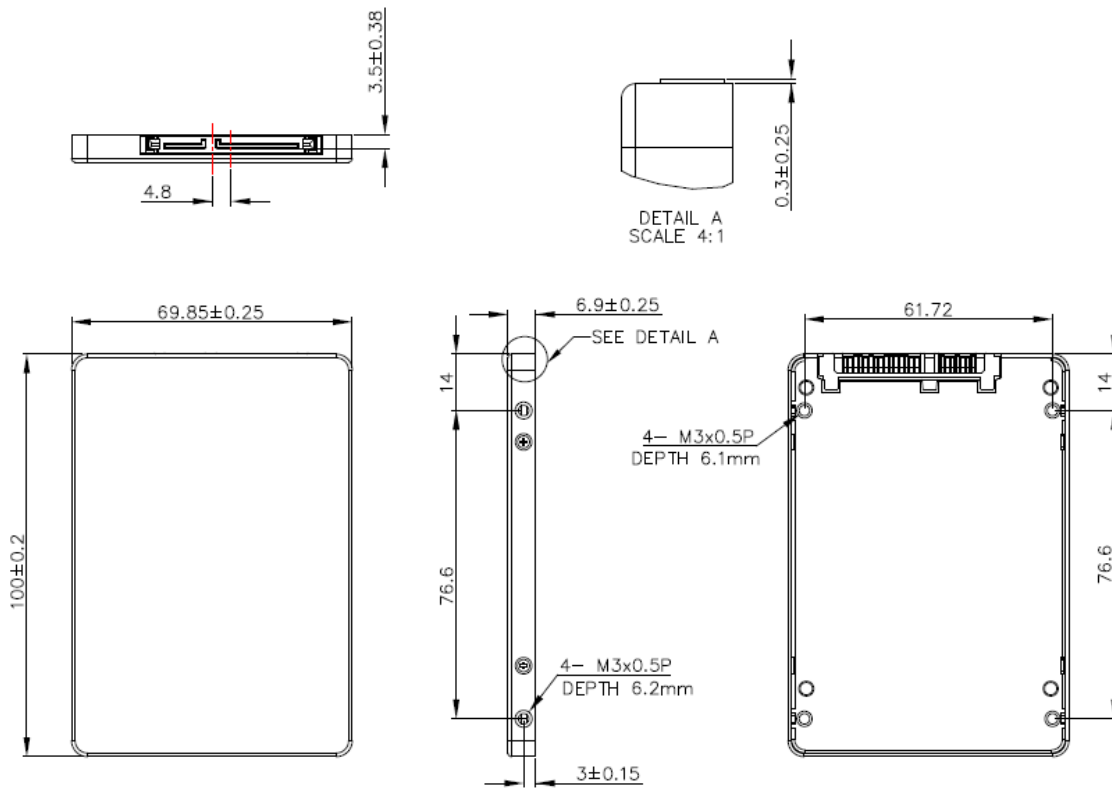
Innodisk 2.5" SATA SSD 3IE2-P uses a standard SATA pin-out. See Table 8 for 2.5" SATA SSD 3IE2-P pin assignment.

Table 8: Innodisk 2.5" SATA SSD 3IE2-P Pin Assignment

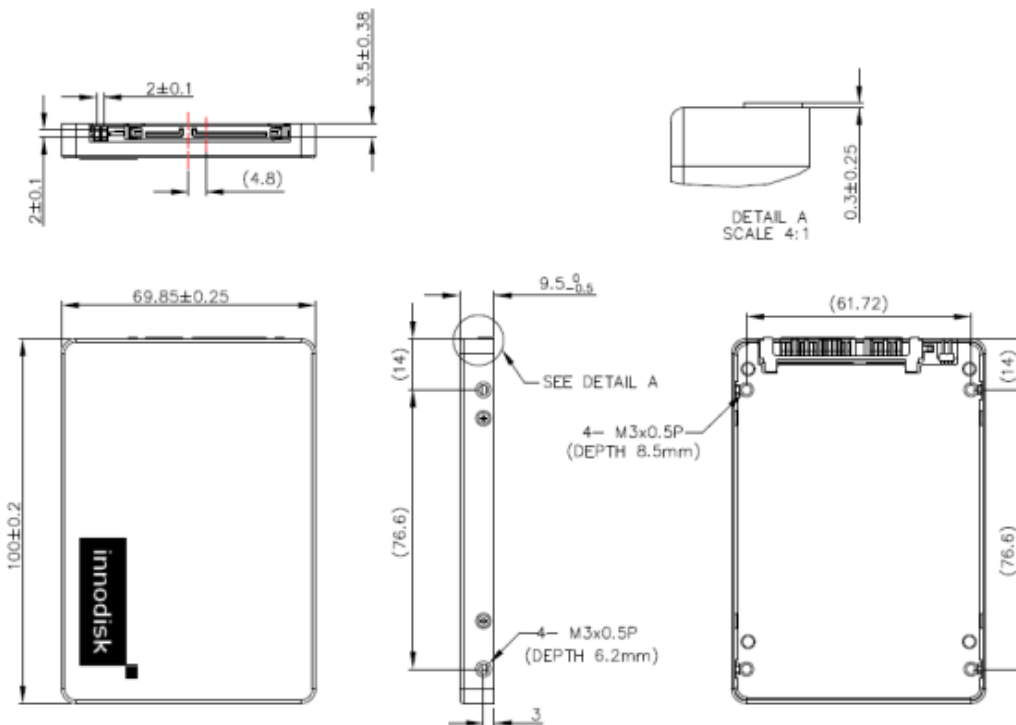
Name	Type	Description
S1	GND	NA
S2	A+	Differential Signal Pair A
S3	A-	
S4	GND	NA
S5	B-	Differential Signal Pair B
S6	B+	
S7	GND	NA
Key and Spacing separate signal and power segments		
P1	NC	NA
P2	NC	NA
P3	NC	NA
P4	GND	NA
P5	GND	NA
P6	GND	NA
P7	V5	5V Power, Pre-Charge
P8	V5	5V Power
P9	V5	5V Power
P10	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

8GB-512GB



1TB



2.11 Assembly Weight

An Innodisk 2.5" SATA SSD 3IE2-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 3IE2-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 3IE2-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 3IE2-P from the system level, including the major hardware blocks.

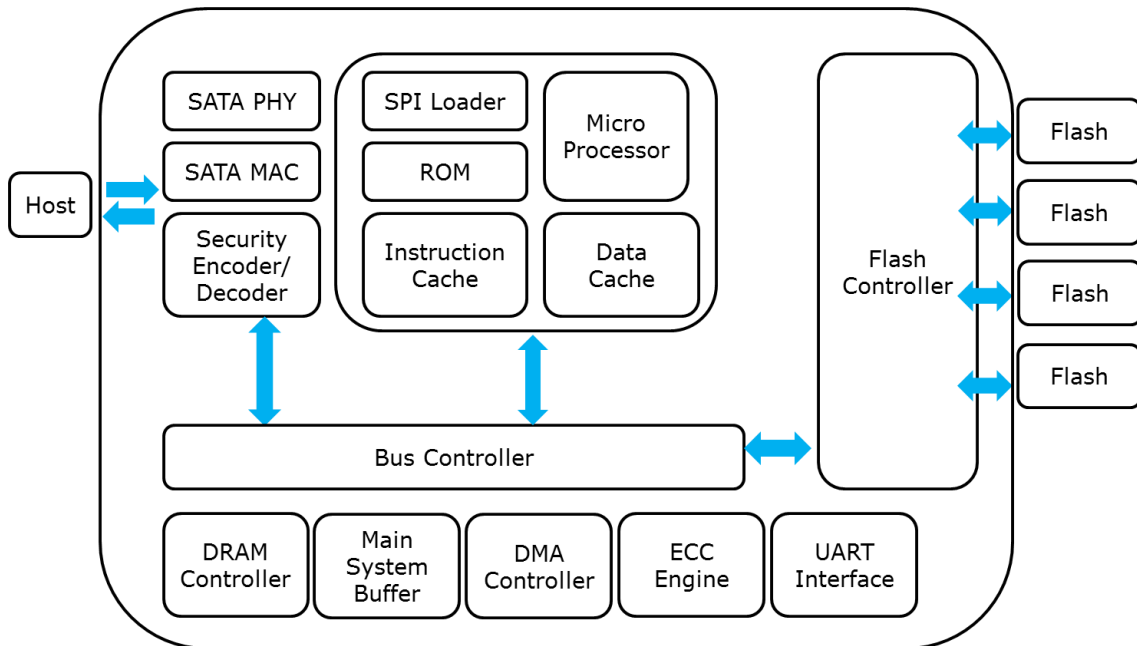


Figure 2: Innodisk FiD 2.5" SATA SSD 3IE2-P Block Diagram

Innodisk 2.5" SATA SSD 3IE2-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 3IE2-P is designed with ID 201, a SATA III 6.0Gbps (Gen. 3) controller, which supports external DDR3 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 3IE2-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 3IE2-P can ensure all data can be written to disk without any data loss.

3.9 Quick Erase (Optional: Customized Firmware)

Quick Erase function is designed for emergency data erase in few seconds by providing ATA command.

3.9.1 Quick Erase Command

- Protocol: No Data

-Inputs

Table 9: Execute Quick Erase command for inputs information

Register	7	6	5	4	3	2	1	0
Features	21h							
Sector Count	41h							
LBA Low	Na							
LBA Mid	Na							
LBA High	Na							
Device	1	1	1	0	Na			
Command	82h							

-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	obs	Na	obs	DEV	Na	Na	Na	Na
Status	BSY	DRDY	DF	Na	DRQ	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.

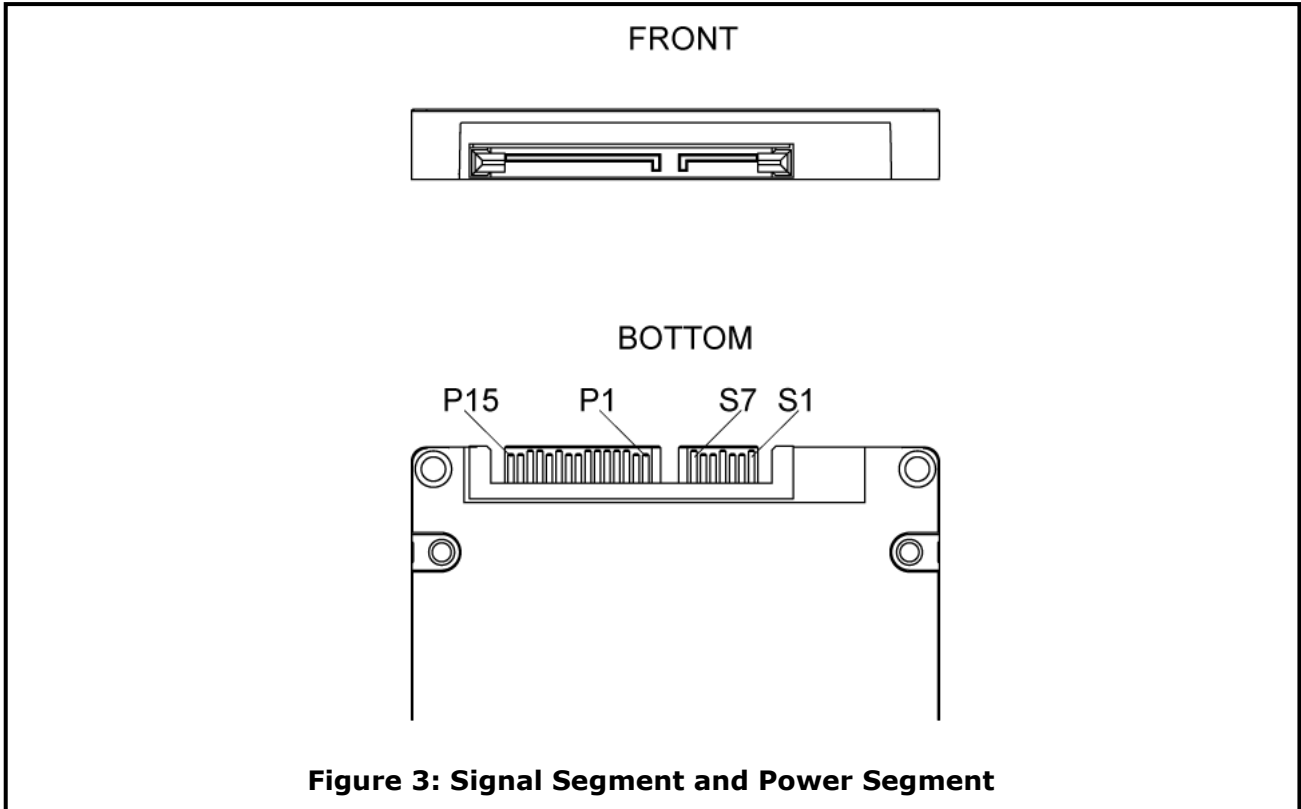
DF (Device Fault) will be cleared to zero.

DRQ will be cleared to zero

ERR will be cleared to zero.

4. Installation Requirements

4.1 2.5" SATA SSD 3IE2-P Pin Directions



4.2 Electrical Connections for 2.5" SATA SSD 3IE2-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. (Torque value is 2.0 ~ 2.5 Kgf.cm)
- SATA single cable (7-pin, Maximum length 1 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.

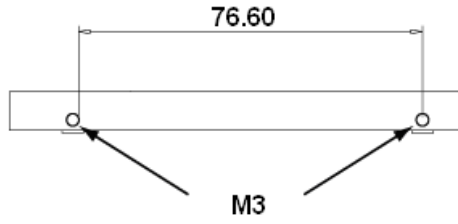


Figure 4: 2.5" SATA SSD 3IE2-P Mechanical Screw Hole

4.4 Device Drive

No additional device drives are required. Innodisk 2.5" SATA SSD 3IE2-P can be configured as a boot device.

5. SMART Feature Set

Innodisk 3IE2-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 3IE2-P series SMART data attributes are listed in following table.

Attribute ID (hex)	Raw Attribute Value							Attribute Name
	MSB						LSB	
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	Maximum 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	Remain 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	H	S	2	5	-	3	2	G	D	8	1	B	C	1	Q	C	(P)	-	X	X
Description	Disk	2.5" SATA SSD 3IE2-P					Capacity			Category			Flash mode	Operation Temp.	Internal Control	CH.	Flash	icell		Customized Code	
Definition																					
Code 1st (Disk)												Code 13th (Flash mode)									
D : Disk												B: Synchronous Flash for Toshiba 15nm									
Code 2nd ~ 5th (Form Factor)												Code 14th (Operation Temperature)									
HS25: 2.5" SATA SSD 3IE2-P												C: Standard Grade (0°C ~ +70°C)									
Code 7th ~9th (Capacity)												Code 15th (Internal control)									
08G: 8GB												Code 16th (Channel of data transfer)									
16G: 16GB												S: Single Channel									
32G: 32GB												D: Dual Channels									
64G: 64GB												Q: Quad Channels									
A28: 128GB												Code 17th (Flash Type)									
B56: 256GB												C: Toshiba MLC									
C12:512GB												Code 18th (iCell)									
01T:1TB												P: iCell, reserved for optional function									
Code 10th ~12th (Series)												Code 20th ~21th (Customized code)									
D81: 2.5" SATA SSD 3IE2-P																					

Appendix

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 及 (EU) 2015/863 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) and (EU) 2015/863 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.
- 三、本公司聲明我們的產品符合 RoHS 指令的附件中 (7a)、(7c-I) 允許豁免。
We declare, our products permitted by the following exemptions specified in the Annex of the RoHS directive.
- ※ (7a) Lead in high melting temperature type solders (i. e. lead-based alloys containing 85% by weight or more lead).
 - ※ (7C-I) Electrical and electronic components containing lead in a glass or ceramic other than dielectric ceramic in capacitors, e.g. piezoelectric devices, or in a glass or ceramic matrix compound.

Name of hazardous substance	Limited of RoHS ppm (mg/kg)
鉛 (Pb)	< 1000 ppm
汞 (Hg)	< 1000 ppm
鎘 (Cd)	< 100 ppm
六價鉻 (Cr 6+)	< 1000 ppm
多溴聯苯 (PBBs)	< 1000 ppm
多溴二苯醚 (PBDEs)	< 1000 ppm
鄰苯二甲酸二(2-乙基己基)酯 (DEHP)	< 1000 ppm
鄰苯二甲酸丁酯苯甲酯 (BBP)	< 1000 ppm
鄰苯二甲酸二丁酯 (DBP)	< 1000 ppm
鄰苯二甲酸二異丁酯 (DIBP)	< 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： Randy Chien 簡川勝



宜鼎國際股份有限公司
Innodisk Corporation

Company Representative Title 公司代表人職稱： Chairman 董事長

Date 日期： 2018 / 07 / 01



Certificate

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

Product Name : 2.5" SATA SSD 3MG2-P
Model(s) : D@S25-XXXX81*#%#&
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 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 in European Council Directive- EMC Directive 2004/108/EC. The device was passed the test performed according to :



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.

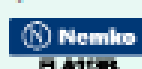
International Standards Laboratory

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 Tuen, 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-XXND81*#%*&
 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

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 Tel: 886-3-407-1718; Fax: 886-3-407-1738



**NOTICE OF COMPLETION
AND
AUTHORIZATION TO APPLY THE UL MARK**



2017-12-05

MR. Harrison Su
Innodisk Corporation
5th Fl 237 Sec 1 Datong Rd
Xizhi District
New Taipei, 22161, TW

Our Reference: File E496759 , Order: 12008974
Vol X1, Report: E496759-A1, Project: 4788204748
Vol. 1, Sec. 1

Your Reference:
Project Scope: UL/CUL Investigation:
(1) 2.5" SATA SSD 3MG2-P, Model DGS25-XXXD8##### (Where "X" in the Model Number could be defined as A-Z, 0-9 for capacity; "#" could be defined as A-Z, 0-9 or blank for marketing differentiation)

(2) 2.5" SATA SSD 3IE2-P, Model DHS25-XXXD8##### (Where "X" in the Model Number could be defined as A-Z, 0-9 for capacity; "#" could be defined as A-Z, 0-9 or blank for marketing differentiation)

Dear MR. Harrison Su:

Congratulations! UL's investigation of your product(s) has been completed under the above Reference Number and the product was determined to comply with the applicable requirements. This letter temporarily supplements the UL Follow-Up Services Procedure and serves as authorization to apply the UL Mark at authorized factories under UL's Follow-Up Service Program. To provide your manufacturer(s) with the intended authorization to use the UL Mark, you must send a copy of this notice to each manufacturing location currently authorized under File E496759, Vol X1 and Vol. 1.

Records in the Follow-Up Services Procedure covering the product are now being prepared and will be sent in the near future. Until then, this letter authorizes application of the UL Mark for 90 days from the date indicated above.

Additional requirements related to your responsibilities as the Applicant can be found in the document "Applicant responsibilities related to Early Authorizations" that can be found at the following web-site: <http://www.ul.com/EAResponsibilities>

Any information and documentation provided to you involving UL Mark services are provided on behalf of UL LLC (UL) or any authorized licensee of UL.

We are excited you are now able to apply the UL Mark to your products and appreciate your business. Feel free to contact me or any of our Customer Service representatives if you have any questions.

Very truly yours,

Jones Chang
Project Engineer
Jones.Chang@ul.com

Reviewed by:

Bruce A. Mahrenholz
CPO Director
Bruce.A.Mahrenholz@ul.com