HAGIWARA Solutions

Storage Catalog

Vol.13

SATA 6.0Gbps
Solid State Drive
2.5 inch SerialATA FLASH DRIVE
INDUSTRIAL GRADE
CE MADE IN JAPAN RoHS

SATA 6.0Gbps
C Fast™
1.0 inch SerialATA FLASH DRIVE
INDUSTRIAL GRADE
CE MADE IN JAPAN RoHS

Solid State Drive
SATA 6.0Gbps
CE RoHS MADE IN JAPAN

Solid State Drive
SATA 6.0Gbps
CE RoHS MADE IN JAPAN

HSP19037-A01
February 2020

Corporate Profile
Hagiwara Strengths
Group Synergy
3D NAND SSD
SSD(SATA)
SSD(PATA)
SD Card
USB Memory
DIMM
Security
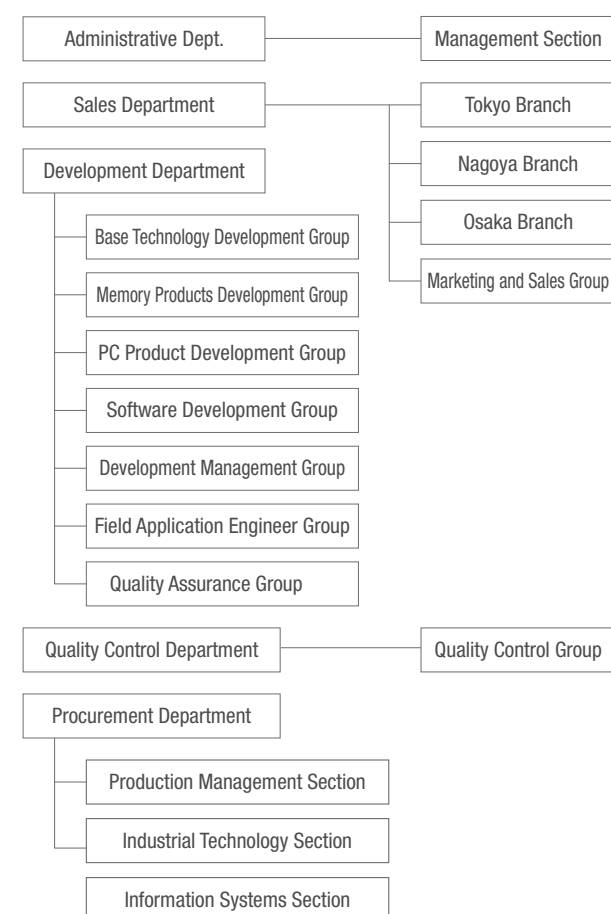Product / Service Features
Part Number Rules

HAGIWARA Solutions

**Memory & Flash Storage Solutions for Mission Critical Systems
in Industrial Applications and Social Infrastructures**

Company Profile

Company Name	Hagiwara Solutions Co., Ltd.
Headquarters	8th Floor, Pacific Square Nagoya Nishiki, 2-5-12 Nishiki, Naka-ku, Nagoya, Aichi 460-0003 Japan
Established	July 2011
Capital	JPY 50,000,000
Shareholder	Elecom Co., Ltd. (100%)
President and CEO	Junji Hada
Number of Employees	81 (as of Dec. 2019)
Fiscal Year End	March

Organization Chart

- Administrative Dept. — Management Section
- Sales Department — Tokyo Branch
  - Nagoya Branch
  - Osaka Branch
  - Marketing and Sales Group
- Development Department
  - Base Technology Development Group
  - Memory Products Development Group
  - PC Product Development Group
  - Software Development Group
  - Development Management Group
  - Field Application Engineer Group
  - Quality Assurance Group
- Quality Control Department — Quality Control Group
- Procurement Department
  - Production Management Section
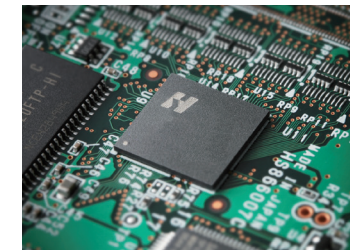 - Industrial Technology Section
 - Information Systems Section

Hagiwara Strengths

1 | A Pioneer in Industrial SSD

Since the release of the first SSD in 1997, we have been focusing on delivering reliable SSDs for industrial systems. The expertise developed through 22 years has enabled us to keep developing products optimized for industrial applications.

2 | Research & Development

Hagiwara is one of the few vendors that still develop SSD firmware in-house from the ground-up. Our decades of flash expertise allows us to cater to various customer needs as well as quickly identify the root cause in complex issues.
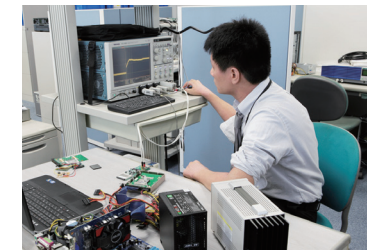
3 | Maximum Reliability

SSD that have passed our rigorous reliability test procedures under adverse conditions will provide stable performance 24/7 with the long term reliability.

4 | Commitment to Quality

To eliminate the possibility of SSD sudden failure due to initial defects of components, Hagiwara utilizes NAND flash screened and tested by flash chip vendors, while also performing comprehensive burn-in test on all products.

5 | Group Synergy

By combining a wide range of solutions and products from Elecom Group companies, we are able to provide reliable and higher value-added system solutions for embedded computing market.

In 2018, Hagiwara Solutions began developing, manufacturing and selling embedded PCs, motherboards and IoT gateways for industrial equipment, in addition to existing storage products. Refer to the Gateway & Board Catalog for information regarding the new products.

Group Synergy

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Hagiwara Strengths
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3D NAND SSD
SSD(SATA)
SSD(PATA)
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Artificial Intelligence

Deterioration Prediction Algorithms

Ultrasonic Diagnostics LSI

Ultra-low Power Pacemaker

Holter Monitor

Analog Sensors

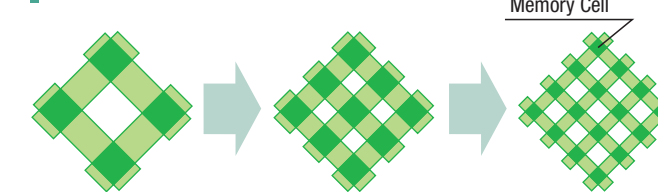Inter-board Wireless Communication

Supercomputer

Digital Signage

Logitec

Industrial PC/Tablet

Security Memory

AR Glass Module

Industrial Board

HAGIWARA Solutions

Industrial SSD

Solid State Drive

NAS

VR/AR

Low Frequency Medical Instrument

Wearable Measuring Instrument

AV Equipment

Smartphone/Tablet-related

Game-related

Memory/HDD

Network Equipment

EMS

Healthcare

PC-related

Wi-Fi Equipment

Telecommu-nications

LoRa/ Sigfox

V-low Multicast

Network Camera

Media Gateway

EOC Coaxial Modem

DX ANTENNA

D-CLUE Technologies

ELECOM
LIFESTYLE INNOVATION

Elecom Group Companies

ELECOM
LIFESTYLE INNOVATION

Elecom Co., Ltd.
www.elecom.co.jp

ELECOM is a fabless manufacturer of PC peripherals listed on the Tokyo Stock Exchange and a parent company of the ELECOM Group Companies. ELECOM's mission is to bridge innovation and people's lifestyles.

- Planning, development, manufacturing and sales of PC / Smartphone / tablet PC peripherals, Network related equipment, Office furniture.
- Network equipment installation service
- Cloud storage service

Logitec

Logitec INA Solutions Co., Ltd.
www.logitec.co.jp/inas

Business Line
- Development, design, manufacture and sale of PCs, PC peripherals and communication devices
- Data recovery service
- PC maintenance and repair service

DX ANTENNA

DX Antenna Co., Ltd.
www.dxantenna.co.jp

Business Line
- Various antennas and TV Receivers & Accessories
- CATV related devices
- Information transmission system related devices
- Security system related devices

D-CLUE Technologies

D-Clue Technologies Co., Ltd.
www.d-clue.com

Business Line
- Cutting-edge analog design services and solutions
- Optimal platforms and system solutions
- Research and development of high-performance analog and RF analog circuits
- Development and provision of platform products combining analog and firmware technologies

Corporate Profile

Hagiwara Strengths

Group Synergy

3D NAND SSD

SSD(SATA)

SSD(PATA)

SD Card

USB Memory

DIMM

Security

Product/Service Features

Part Number Rules

# Next-Generation Flash Memory 3D NAND

What is 3D NAND?

3D NAND is a next generation flash memory technology that stacks memory cell layers vertically to achieve significantly higher density than the traditional 2D (planer) NAND.

2D NAND

Memory Cell

The capacity is increased by shrinking the design rule and process technology node. Further chip shrink is extremely difficult as an increased bit error rate due to cell-to-cell interference.

3D NAND
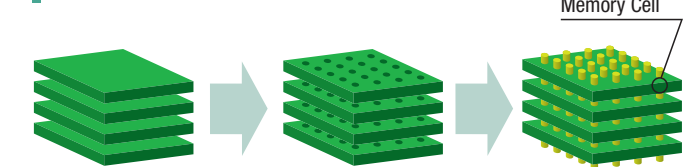
Memory Cell

Stacking memory cell layers vertically allows for a more relaxed NAND geometry and enables further capacity increase with better read/write performance.

Hagiwara Solutions 3D NAND SSD Product Features

High Reliability
- LDPC(Low Density Parity Check)
- Internal RAID
- Effiecient NAND management

Improved Performance
- SLC Cache

Reliable under Extreme Conditions
- Thermal Monitoring and Throttling
- Wide Operating Temperature: -40°C to +85°C

In-depth Device Monitoring
- Drive Monitor
- Real Time Clock for accurate power-on hour reporting during DevSleep

Extended Endurance : SLC & MLC mode
- Delivers x15 times higher endurance than the industrial 3D TLC NAND.

Improving Windows® 10 UWF Robustness   NEW

The Virtual Write Filter (VWF) provides an additional data protection layer to your UWF-enabled Windows® 10 environment.
No special device driver, resident software installation required.

*The VWF function is pre-loaded on compatible SSD models and can be activated via the optional VWF tool.
*Detailed specifications available upon NDA completion.

VWF Virtual Write Filter

VWF Compatible 3D NAND SSD models

| 2.5-inch | CFast | mSATA | M.2(2242) |

Network/Telecom

Gaming

Finance

MLC

HAGIWARA Solutions

Transportation

Medical

Automation

CFast (3D NAND)

SATA 6.0Gbps
SN1S-GP / RN1S-GP / HN1S-GP Series

Virtual Write Filter

Flash Memory		TLC	MLC mode	SLC mode
Capacity		60 GB to 240 GB	40 GB to 320 GB	20 GB to 160 GB
Host Interface		SATA 6.0Gbps		
Operating Voltage		3.3V±5%		
Operating Temperature	Commercial Temperature	0°C to 70°C		
	Wide Temperature	-40°C to 85°C		
Storage Temperature		-45°C to 90°C		
Operating Humidity		~ 85% (No Condensation)		
Storage Humidity		~ 95% (No Condensation)		
Dimensions (mm)		42.8 × 36.4 × 3.6		
DRAM Cache		●	●	●
Performance	Sequential Read (MB/s)	495	495	495
	Sequential Write (MB/s)	315	430	430
	Random Read (IOPS)	52,000	55,000	57,000
	Random Write (IOPS)	48,000	52,000	51,000
TBW*	20GB	-	-	580
	40GB	-	110	1,160
	60GB	45	-	-
	80GB	-	230	2,380
	120GB	90	-	-
	160GB	-	480	4,860
	240GB	180	-	-
	320GB	-	1,000	-
Power Consumption (mA)	Read (max.)	435	320	435
	Write (max.)	565	585	580
	Idle	165	120	170
	DevSleep	3	3	3
Warranty		1 year		

*TBW is based on JEDEC 219 Client workload.

	Static Wear Leveling	Refresh	Patrol Seek	Read Retry	Power Loss Alert	Fixed BOM	TCG Opal 2.0	S.M.A.R.T.	Life Indicator LED	DevSleep	Wide Temperature	Power Loss Recovery	Live Monitor	Drive Monitor	Thermal Sensor	RoHS	AIS
TLC	●	●	●	●	●	●	○	●	-	●	●	●	●	●	●	●	●
MLC mode	●	●	●	●	●	●	○	●	-	●	●	●	●	●	●	●	●
SLC mode	●	●	●	●	●	●	○	●	-	●	●	●	●	●	●	●	●

Static Wear Leveling   Refresh   Patrol Function   Read Retry   Power Loss Alert   Fixed BOM   TCG Opal 2.0   S.M.A.R.T.   Life Indicator LED   ●: Default   ○: Optional
Device Sleep   Wide Temperature   Power Loss Recovery   Live Monitor   Drive Monitor   Thermal Sensor   RoHS Compliant   Article Information Sheet

Dimensions

1.00   33.96   1.00
1.00   42.80
12.00   36.40   3.00
41.60
3.60MAX
1.15   25.53   4.70
0.70   0.60
(Unit: mm)

Part Number

Operating Temperature	TLC	MLC mode	SLC mode
0°C to 70°C	SN1S-xxxGP00SN	RN1S-xxxGP00SN	HN1S-xxxGP00SN
-40°C to 85°C	SN1S-xxxGP00JI	RN1S-xxxGP00JI	HN1S-xxxGP00JI

2.5-inch SATA SSD (3D NAND)

SATA 6.0Gbps
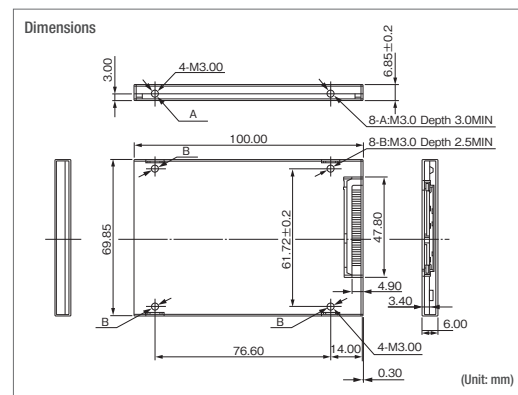SN2S-GP / RN2S-GP / HN2S-GP Series

Virtual Write Filter

Flash Memory		TLC	MLC mode	SLC mode
Capacity		60 GB to 960 GB	40 GB to 640 GB	20 GB to 320 GB
Host Interface		SATA 6.0Gbps		
Operating Voltage		5V±10%		
Operating Temperature	Commercial Temperature	0°C to 70°C		
	Wide Temperature	-40°C to 85°C		
Storage Temperature		-45°C to 90°C		
Operating Humidity		~ 85% (No Condensation)		
Storage Humidity		~ 95% (No Condensation)		
Dimensions (mm)		69.85 × 99.9 × 7.0		
DRAM Cache		●	●	●
Performance	Sequential Read (MB/s)	500	495	495
	Sequential Write (MB/s)	430	430	430
	Random Read (IOPS)	55,000	56,000	57,000
	Random Write (IOPS)	43,000	52,000	51,000
TBW*	20GB	-	-	580
	40GB	-	110	1,160
	60GB	45	-	-
	80GB	-	230	2,380
	120GB	90	-	-
	160GB	-	480	4,860
	240GB	180	-	-
	250GB	-	-	-
	320GB	-	1,000	11,800
	480GB	360	-	-
	500GB	-	-	-
	640GB	-	2,100	-
	960GB	720	-	-
	1000GB	-	-	-
	2000GB	-	-	-
Power Consumption (mA)	Read (max.)	360	350	335
	Write (max.)	570	585	425
	Idle	120	120	115
	DevSleep	10	10	10
Warranty		1 year		

*TBW is based on JEDEC 219 Client workload.

	Static Wear Leveling	Refresh	Patrol Seek	Read Retry	Power Loss Alert	Fixed BOM	TCG Opal 2.0	S.M.A.R.T.	Life Indicator LED	DevSleep	Wide Temperature	Power Loss Recovery	Live Monitor	Drive Monitor	Thermal Sensor	RoHS	AIS
TLC	●	●	●	●	●	●	○	●	-	●	●	●	●	●	●	●	●
MLC mode	●	●	●	●	●	●	○	●	-	●	●	●	●	●	●	●	●
SLC mode	●	●	●	●	●	●	○	●	-	●	●	●	●	●	●	●	●

Static Wear Leveling   Refresh   Patrol Function   Read Retry   Power Loss Alert   Fixed BOM   TCG Opal 2.0   S.M.A.R.T.   Life Indicator LED   ●: Default   ○: Optional
Device Sleep   Wide Temperature   Power Loss Recovery   Live Monitor   Drive Monitor   Thermal Sensor   RoHS Compliant   Article Information Sheet
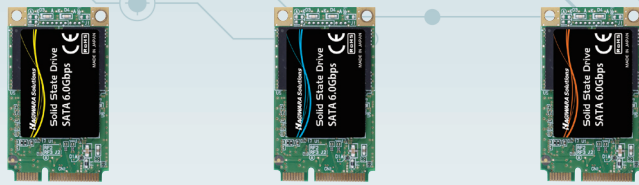
Dimensions

3.00   4-M3.00   6.85±0.2
100.00   8-A:M3.0 Depth 3.0MIN
B   8-B:M3.0 Depth 2.5MIN
69.85   61.72±0.2   47.80
A   B
4.90   3.40
76.60   14.00   6.00
4-M3.00
0.30
(Unit: mm)

Part Number

Operating Temperature	TLC	MLC mode	SLC mode
0°C to 70°C	SN2S-xxxGP00SN	RN2S-xxxGP00SN	HN2S-xxxGP00SN
-40°C to 85°C	SN2S-xxxGP00JI	RN2S-xxxGP00JI	HN2S-xxxGP00JI

mSATA (3D NAND)

SATA 6.0Gbps
SNMS-GP / RNMS-GP / HNMS-GP Series

Virtual Write Filter

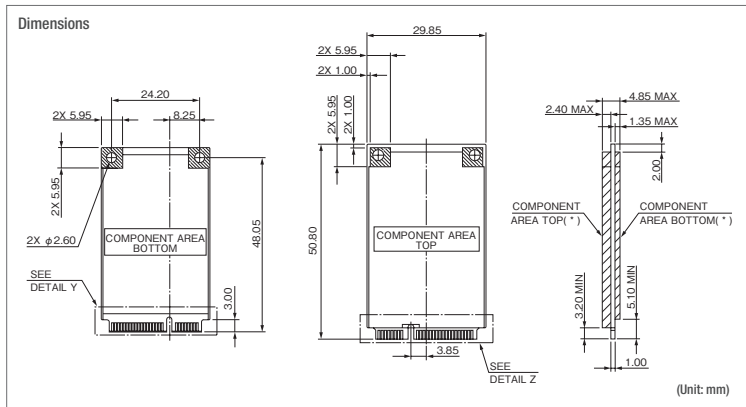| Flash Memory		TLC	MLC mode	SLC mode
Capacity		60 GB to 240 GB	40 GB to 320 GB	20 GB to 160 GB
Host Interface		SATA 6.0Gbps		
Operating Voltage		3.3V±5%		
Operating Temperature	Commercial Temperature	0°C to 70°C		
	Wide Temperature	-40°C to 85°C		
Storage Temperature		-45°C to 90°C		
Operating Humidity		~ 85% (No Condensation)		
Storage Humidity		~ 95% (No Condensation)		
Dimensions (mm)		29.85 × 50.8 × 4.0		
DRAM Cache		●	●	●
Performance	Sequential Read (MB/s)	495	495	495
	Sequential Write (MB/s)	280	430	430
	Random Read (IOPS)	51,000	53,000	57,000
	Random Write (IOPS)	48,000	46,000	51,000
TBW*	20GB	-	-	580
	40GB	-	110	1,160
	60GB	45	-	-
	80GB	-	230	2,380
	120GB	90	-	-
	160GB	-	480	4,860
	240GB	180	-	-
	320GB	-	1,000	-
Power Consumption (mA)	Read (max.)	420	320	310
	Write (max.)	545	585	415
	Idle	155	120	125
	DevSleep	3	3	3
Warranty		1 year		

*TBW is based on JEDEC 219 Client workload.

Static Wear Leveling · Refresh · Patrol · Read Retry · Power Loss Alert · Fixed BOM · TCG Opal 2.0 · S.M.A.R.T. · Life Indicator LED · DevSleep · Wide Temperature · Power Loss Recovery · Live Live Monitor · Live Drive Monitor · Thermal Sensor · RoHS · AIS

TLC	●	●	●	●	●	●	○	●	●	●	●	●	●	●	●	●	●
MLC mode	●	●	●	●	●	●		●	●	●	●	●	●	●	●	●	●
SLC mode	●	●	●	●	●	●	○	●	●	●	●	●	●	●	●	●	●

⚏ Static Wear Leveling   Refresh   Patrol Function   Read Retry   Power Loss Alert   Fixed BOM   TCG Opal 2.0   S.M.A.R.T.   Life Indicator LED   ●: Default ○: Optional
Device Sleep   Wide Temperature   Power Loss Recovery   Live Monitor   Drive Monitor   Thermal Sensor   RoHS Compliant   Article Information Sheet

Dimensions

(Unit: mm)

29.85 · 2X 5.95 · 2X 1.00 · 24.20 · 8.25 · 2X 5.95 · 2X 5.95 · 2X φ2.60 · 48.05 · 50.80 · COMPONENT AREA BOTTOM · COMPONENT AREA TOP · SEE DETAIL Y · 3.00 · 3.85 · SEE DETAIL Z · 4.85 MAX · 2.40 MAX · 1.35 MAX · 2.00 · COMPONENT AREA TOP(*) · COMPONENT AREA BOTTOM(*) · 3.20 MIN · 5.10 MIN · 1.00

Part Number

Operating Temperature	TLC	MLC mode	SLC mode
0°C to 70°C	SNMS-xxxGP00SN	RNMS-xxxGP00SN	HNMS-xxxGP00SN
-40°C to 85°C	SNMS-xxxGP00JI	RNMS-xxxGP00JI	HNMS-xxxGP00JI

M.2 2242 (3D NAND)

SATA 6.0Gbps
SN4S-GP / RN4S-GP / HN4S-GP Series

Virtual Write Filter

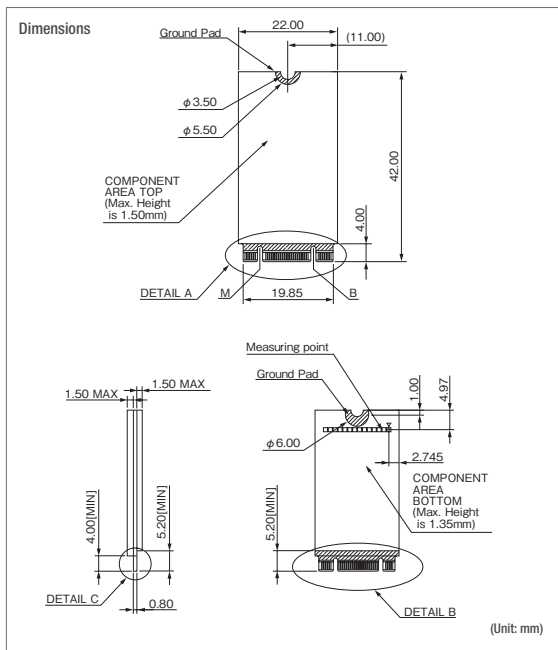| Flash Memory		TLC	MLC mode	SLC mode
Capacity		60 GB to 240 GB	40 GB to 320 GB	20 GB to 160 GB
Host Interface		SATA 6.0Gbps		
Operating Voltage		3.3V±5%		
Operating Temperature	Commercial Temperature	0°C to 70°C		
	Wide Temperature	-40°C to 85°C		
Storage Temperature		-45°C to 90°C		
Operating Humidity		~ 85% (No Condensation)		
Storage Humidity		~ 95% (No Condensation)		
Dimensions (mm)		22.0 × 42.0 × 3.85		
DRAM Cache		-	-	-
Performance	Sequential Read (MB/s)	495	495	495
	Sequential Write (MB/s)	280	430	310
	Random Read (IOPS)	51,000	50,000	42,000
	Random Write (IOPS)	48,000	46,000	48,000
TBW*	20GB	-	-	580
	40GB	-	110	1,160
	60GB	45	-	-
	80GB	-	230	2,380
	120GB	90	-	-
	160GB	-	480	4,860
	240GB	180	-	-
	250GB	-	-	-
	320GB	-	1,000	-
	480GB	-	-	-
	500GB	-	-	-
	640GB	-	-	-
	960GB	-	-	-
	1000GB	-	-	-
	2000GB	-	-	-
Power Consumption (mA)	Read (max.)	305	305	300
	Write (max.)	395	530	400
	Idle	120	125	125
	DevSleep	3	5	3
Warranty		1 year		

*TBW is based on JEDEC 219 Client workload.

Static Wear Leveling · Refresh · Patrol · Read Retry · Power Loss Alert · Fixed BOM · TCG Opal 2.0 · S.M.A.R.T. · Life Indicator LED · DevSleep · Wide Temperature · Power Loss Recovery · Live Live Monitor · Live Drive Monitor · Thermal Sensor · RoHS · AIS

TLC	●	●	●	●	●	●	○	●	●	●	●	●	●	●	●	●	●
MLC mode	●	●	●	●	●	●		●	●	●	●	●	●	●	●	●	●
SLC mode	●	●	●	●	●	●	○	●	●	●	●	●	●	●	●	●	●

⚏ Static Wear Leveling   Refresh   Patrol Function   Read Retry   Power Loss Alert   Fixed BOM   TCG Opal 2.0   S.M.A.R.T.   Life Indicator LED   ●: Default ○: Optional
Device Sleep   Wide Temperature   Power Loss Recovery   Live Monitor   Drive Monitor   Thermal Sensor   RoHS Compliant   Article Information Sheet

Dimensions

22.00 · (11.00) · Ground Pad · φ3.50 · φ5.50 · COMPONENT AREA TOP (Max. Height is 1.50mm) · 42.00 · 4.60 · DETAIL A · M · 19.85 · B · Measuring point · 1.50 MAX · 1.50 MAX · Ground Pad · φ6.00 · 4.00(MIN) · 5.20(MIN) · 5.20(MIN) · 1.00 · 4.97 · 2.745 · COMPONENT AREA BOTTOM (Max. Height is 1.35mm) · DETAIL C · 0.80 · DETAIL B

(Unit: mm)

Part Number

Operating Temperature	TLC	MLC mode	SLC mode
0°C to 70°C	SN4S-xxxGP00SN	RN4S-xxxGP00SN	HN4S-xxxGP00SN
-40°C to 85°C	SN4S-xxxGP00JI	RN4S-xxxGP00JI	HN4S-xxxGP00JI

2.5-inch SATA SSD (3D NAND)

SATA 6.0Gbps
KN2S-GN Series (K series)

Flash Memory		TLC
Capacity		250 GB to 2000 GB
Host Interface		SATA 6.0Gbps
Operating Voltage		5V±10%
Operating Temperature	Commercial Temperature	0°C to 70°C
Storage Temperature		-45°C to 90°C
Operating Humidity		~ 85% (No Condensation)
Storage Humidity		~ 95% (No Condensation)
Dimensions (mm)		69.85 × 99.9 × 7.0
DRAM Cache		●
Performance	Sequential Read (MB/s)	500
	Sequential Write (MB/s)	470
	Random Read (IOPS)	51,000
	Random Write (IOPS)	54,000
TBW*	20GB	-
	40GB	-
	60GB	-
	80GB	-
	120GB	-
	160GB	-
	240GB	-
	250GB	330
	320GB	-
	480GB	-
	500GB	700
	640GB	-
	960GB	-
	1000GB	1,390
	2000GB	2,850
Power Consumption (mA)	Read (max.)	240
	Write (max.)	360
	Idle	25
	DevSleep	-
Warranty		1 year

*TBW is based on JEDEC 219 Client workload.

	Static Wear Leveling	Refresh	Patrol Function	Read Retry	Power Loss Alert	Fixed BOM	TCG Opal 2.0	S.M.A.R.T.	Life Indicator LED	DevSleep	Wide Temperature	Power Loss Recovery	Live Monitor	Drive Monitor	Thermal Sensor	RoHS	AIS
TLC	●	●	●	●	●	-	●	-	-	-	●	●	●	●	●	●	●

●: Default　○: Optional

Static Wear Leveling　Refresh　Patrol Function　Read Retry　Power Loss Alert　Fixed BOM　TCG Opal 2.0　S.M.A.R.T.　Life Indicator LED
Device Sleep　Wide Temperature　Power Loss Recovery　Live Monitor　Drive Monitor　Thermal Sensor　RoHS Compliant　Article Information Sheet

Dimensions

4-M3.00
3.00
6.85±0.2
A
8-A:M3.0 Depth 3.0MIN
100.00
B-B:M3.0 Depth 2.5MIN
B
69.85
47.80
B
61.72±0.2
4.90
3.40
6.00
76.60
14.00
4-M3.00
0.30
B

(Unit: mm)

Part Number

Operating Temperature	TLC
0°C to 70°C	KN2S-xxxGN00SN

M.2 2280 (3D NAND)

SATA 6.0Gbps
KN8S-GN Series (K series)

Flash Memory		TLC
Capacity		250 GB to 2000 GB
Host Interface		SATA 6.0Gbps
Operating Voltage		3.3V±5%
Operating Temperature	Commercial Temperature	0°C to 70°C
Storage Temperature		-45°C to 90°C
Operating Humidity		~ 85% (No Condensation)
Storage Humidity		~ 95% (No Condensation)
Dimensions (mm)		22.0 × 80.0 × 3.85
DRAM Cache		●
Performance	Sequential Read (MB/s)	T.B.D.
	Sequential Write (MB/s)	
	Random Read (IOPS)	
	Random Write (IOPS)	
TBW*	20GB	T.B.D.
	40GB	-
	60GB	-
	80GB	-
	120GB	-
	160GB	-
	240GB	-
	250GB	330
	320GB	-
	480GB	-
	500GB	700
	640GB	-
	960GB	-
	1000GB	1,390
	2000GB	2,850
Power Consumption (mA)	Read (max.)	T.B.D.
	Write (max.)	
	Idle	
	DevSleep	
Warranty		1 year

*TBW is based on JEDEC 219 Client workload.

	Static Wear Leveling	Refresh	Patrol Function	Read Retry	Power Loss Alert	Fixed BOM	TCG Opal 2.0	S.M.A.R.T.	Life Indicator LED	DevSleep	Wide Temperature	Power Loss Recovery	Live Monitor	Drive Monitor	Thermal Sensor	RoHS	AIS
TLC	●	●	●	●	●	-	●	-	-	-	●	●	●	●	●	●	●

●: Default　○: Optional

Static Wear Leveling　Refresh　Patrol Function　Read Retry　Power Loss Alert　Fixed BOM　TCG Opal 2.0　S.M.A.R.T.　Life Indicator LED
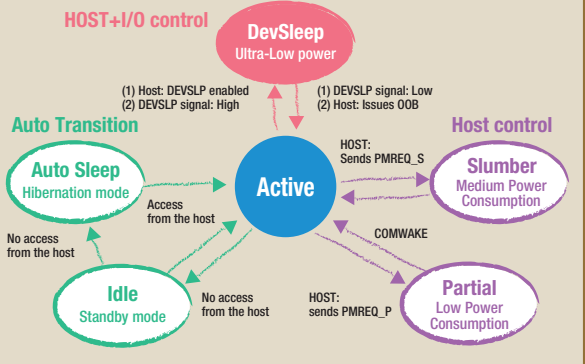Device Sleep　Wide Temperature　Power Loss Recovery　Live Monitor　Drive Monitor　Thermal Sensor　RoHS Compliant　Article Information Sheet

Dimensions

22.00
11.00
5.63
Ground Pad
φ3.50
φ5.50
1.50 MAX
1.50 MAX
2.745
φ6.00
Ground Pad
1.00
4.97
COMPONENT AREA TOP (Max. Height is 1.50mm)
80.00
COMPONENT AREA BOTTOM (Max. Height is 1.50mm)
4.00
4.00(MIN)
5.20(MIN)
5.20(MIN)
DETAIL A
19.85
M
B
DETAIL C
0.80
DETAIL B

(Unit: mm)

Part Number

Operating Temperature	TLC
0°C to 70°C	KN8S-xxxGN00SN

CFast

SATA 6.0Gbps
LFD10S-GD / XFD10S-GD / HFD10S-GD Series

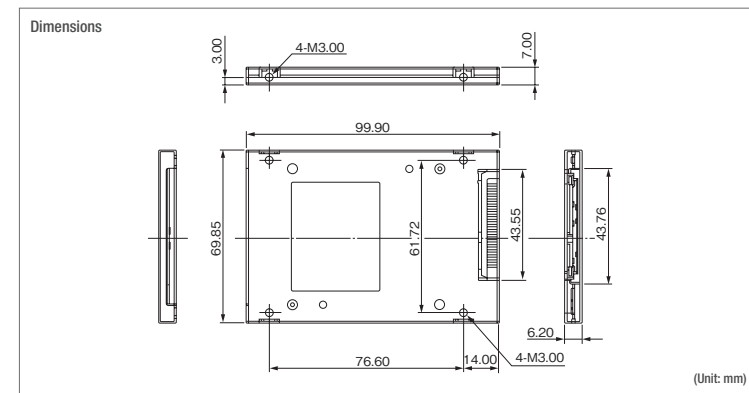| Flash Memory		MLC	Q-MLC	SLC
Capacity		30 GB to 240 GB	15 GB to 120 GB	7 GB to 60 GB
Host Interface		SATA 6.0Gbps		
Operating Voltage		3.3V±5%		
Operating Temperature	Commercial Temperature	0°C to 70°C		
	Wide Temperature	-25°C to 85°C		-40°C to 85°C
Storage Temperature		-45°C to 90°C		
Operating Humidity		~ 85% (No Condensation)		
Storage Humidity		~ 95% (No Condensation)		
Dimensions (mm)		42.8 × 36.4 × 3.6		
DRAM Cache		●	●	●
Performance	Sequential Read (MB/s)	430	460	480
	Sequential Write (MB/s)	320	410	350
	Random Read (IOPS)	44,000	47,000	45,000
	Random Write (IOPS)	62,000	61,000	50,000
TBW*	7GB	-	-	260
	15GB	-	91	530
	30GB	18	180	1,000
	60GB	36	360	2,100
	120GB	73	730	-
	240GB	150	-	-
Power Consumption (mA)	Read (max.)	350	350	450
	Write (max.)	680	450	580
	Idle	30	110	110
	DevSleep	3		
Warranty		1 year		

*TBW is based on JEDEC 219 Client workload.

	Static Wear Leveling	Refresh	Patrol	Read Retry	Power Loss Alert	Fixed BOM	TCG Opal 2.0	S.M.A.R.T.	Life Indicator LED	DevSleep	Wide Temperature	Power Loss Recovery	Live Monitor	Drive Monitor	Thermal Sensor	RoHS	AIS
MLC	●	●	●	●	●	●	○	●	-	●	●	●	●	●	●	●	●
Q-MLC	●	●	●	●	●	●	○	●	-	●	●	●	●	●	●	●	●
SLC	●	●	●	●	●	●	○	●	●	●	●	●	●	●	●	●	●

Static Wear Leveling　Refresh　Patrol Function　Read Retry　Power Loss Alert　Fixed BOM　TCG Opal 2.0　S.M.A.R.T.　Life Indicator LED　●: Default　○: Optional
Device Sleep　Wide Temperature　Power Loss Recovery　Live Monitor　Drive Monitor　Thermal Sensor　RoHS Compliant　Article Information Sheet

Dimensions

1.00　33.96　1.00
1.00
12.00
36.40
42.80
41.60
3.60MAX
1.15
3.00
25.53
4.70
0.70
0.60

(Unit: mm)

Part Number

Operating Temperature	MLC	Q-MLC	SLC
0°C to 70°C	LFD10S-xxxGD (A**AH)	XFD10S-xxxGD (A**AH)	HFD10S-xxxGD (A**AE)
-25°C to 85°C	LFD10S-xxxGD (A**AHS	XFD10S-xxxGD (A**AHS	-
-40°C to 85°C	-	-	HFD10S-xxxGD (A**AEI

DevSleep

DevSleep (Device Sleep)

Entering DevSleep greatly reduces standby power consumption.

HOST+I/O control

DevSleep
Ultra-Low power

(1) Host: DEVSLP enabled
(2) DEVSLP signal: High

(1) DEVSLP signal: Low
(2) Host: Issues OOB

Auto Transition

Host control

HOST:
Sends PMREQ_S

Auto Sleep
Hibernation mode

Active

Slumber
Medium Power Consumption

Access from the host

No access from the host

COMWAKE

Idle
Standby mode

No access from the host

HOST:
sends PMREQ_P

Partial
Low Power Consumption

2.5-inch SATA SSD

SATA 6.0Gbps
LFD25S-GD / XFD25S-GD / HFD25S-GD Series

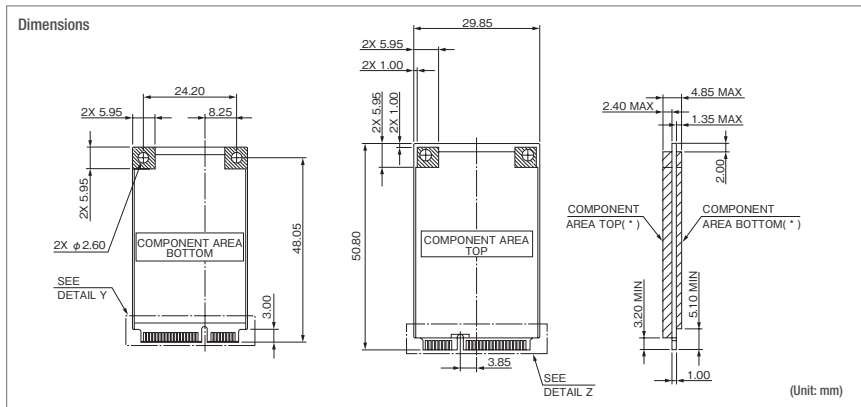| Flash Memory		MLC	Q-MLC	SLC
Capacity		30 GB to 480 GB	15 GB to 480 GB	7 GB to 240 GB
Host Interface		SATA 6.0Gbps		
Operating Voltage		5V±10%		
Operating Temperature	Commercial Temperature	0°C to 70°C		
	Wide Temperature	-25°C to 85°C		-40°C to 85°C
Storage Temperature		-45°C to 90°C		
Operating Humidity		~ 85% (No Condensation)		
Storage Humidity		~ 95% (No Condensation)		
Dimensions (mm)		69.85 x 99.9 x 7.0		
DRAM Cache		●	●	●
Performance	Sequential Read (MB/s)	440	480	500
	Sequential Write (MB/s)	450	450	380
	Random Read (IOPS)	52,000	53,000	54,000
	Random Write (IOPS)	56,000	53,000	61,000
TBW*	7GB	-	-	260
	15GB	-	91	530
	30GB	18	180	1,000
	60GB	36	360	2,100
	120GB	73	730	4,200
	240GB	150	1,700	9,700
	480GB	310	3,400	-
	960GB	620	-	-
Power Consumption (mA)	Read (max.)	410	290	440
	Write (max.)	770	320	520
	Idle	90	90	90
	DevSleep	10		
Warranty		1 year		

*TBW is based on JEDEC 219 Client workload.

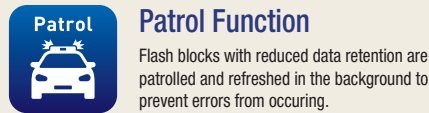|	Static Wear Leveling	Refresh	Patrol	Read Retry	Power Loss Alert	Fixed BOM	TCG Opal 2.0	S.M.A.R.T.	Life Indicator LED	DevSleep	Wide Temperature	Power Loss Recovery	Live Monitor	Drive Monitor	Thermal Sensor	RoHS	AIS
MLC	●	●	●	●	●	●	○	●	●	●	●	●	●	●	●	●	●
Q-MLC	●	●	●	●	●	●	○	●	●	●	●	●	●	●	●	●	●
SLC	●	●	●	●	●	●	○	●	●	●	●	●	●	●	●	●	●

Static Wear Leveling　Refresh　Patrol Function　Read Retry　Power Loss Alert　Fixed BOM　TCG Opal 2.0　S.M.A.R.T.　Life Indicator LED　●: Default　○: Optional
Device Sleep　Wide Temperature　Power Loss Recovery　Live Monitor　Drive Monitor　Thermal Sensor　RoHS Compliant　Article Information Sheet

Dimensions

3.00　4-M3.00　7.00
99.90
69.85
61.72
43.55
43.76
76.60　14.00　4-M3.00
6.20

(Unit: mm)

Part Number

Operating Temperature	MLC	Q-MLC	SLC
0°C to 70°C	LFD25S-xxxGD(A**AH)	XFD25S-xxxGD(A**AH)	HFD25S-xxxGD(A**AE)
-25°C to 85°C	LFD25S-xxxGD(A**AHS	XFD25S-xxxGD(A**AHS	-
-40°C to 85°C	-	-	HFD25S-xxxGD(A**AEI

TCG Opal 2.0

TCG Opal 2.0

Provides various security features such as preboot authentication, access control, and centralized management when combined with TCG Opal compatible software.

TCG Opal features

Pre-Boot Authentication	Access Control
- Authentication before OS-boot	- Set keys for multiple areas on the drive. - Read/Write control

Secure Erase	eDrive (Hardware Encryption)
- Instant Crypto-Erase - Erase garbage data including spare blocks.	-eDrive is a security storage specification defined by Microsoft for use with BitLocker.

mSATA

SATA 6.0Gbps
LFDMSS-GD / XFDMSS-GD / HFDMSS-GD Series

Flash Memory		MLC	Q-MLC	SLC
Capacity		30 GB to 240 GB	15 GB to 120 GB	7 GB to 60 GB
Host Interface		SATA 6.0Gbps		
Operating Voltage		3.3V±5%		
Operating Temperature	Commercial Temperature	0°C to 70°C		
	Wide Temperature	-25°C to 85°C		-40°C to 85°C
Storage Temperature		-45°C to 90°C		
Operating Humidity		~ 85% (No Condensation)		
Storage Humidity		~ 95% (No Condensation)		
Dimensions (mm)		29.85 x 50.8 x 4.0		
DRAM Cache		●	●	●
Performance	Sequential Read (MB/s)	430	460	470
	Sequential Write (MB/s)	320	410	330
	Random Read (IOPS)	34,000	48,000	48,000
	Random Write (IOPS)	60,000	62,000	53,000
TBW*	7GB	-	-	260
	15GB	-	91	530
	30GB	18	180	1,000
	60GB	36	360	2,100
	120GB	73	730	-
	240GB	150	-	-
Power Consumption (mA)	Read (max.)	350	350	440
	Write (max.)	670	470	550
	Idle	110	110	110
	DevSleep	3		
Warranty		1 year		

*TBW is based on JEDEC 219 Client workload.

Static Wear Leveling | Refresh | Patrol | Read Retry | Power Loss Alert | Fixed BOM | TCG Opal 2.0 | S.M.A.R.T. | Life Indicator | DevSleep | Wide Temperature | Power Loss Recovery | Live Monitor | Live Drive Monitor | Thermal Sensor | RoHS | AIS

	Static Wear Leveling	Refresh	Patrol	Read Retry	Power Loss Alert	Fixed BOM	TCG Opal 2.0	S.M.A.R.T.	Life Indicator	DevSleep	Wide Temperature	Power Loss Recovery	Live Monitor	Drive Monitor	Thermal Sensor	RoHS	AIS
MLC	●	●	●	●	●	●	○	●	●	●	●	●	●	●	●	●	●
Q-MLC	●	●	●	●	●	●	○	●	●	●	●	●	●	●	●	●	●
SLC	●	●	●	●	●	●	○	●	●	●	●	●	●	●	●	●	●

●: Default ○: Optional

Static Wear Leveling | Refresh | Patrol Function | Read Retry | Power Loss Alert | Fixed BOM | TCG Opal 2.0 | S.M.A.R.T. | Life Indicator LED
Device Sleep | Wide Temperature | Power Loss Recovery | Live Monitor | Drive Monitor | Thermal Sensor | RoHS Compliant | Article Information Sheet

Dimensions

(Unit: mm)

Patrol Function

Flash blocks with reduced data retention are patrolled and refreshed in the background to prevent errors from occuring.

Monitors the read count of each flash block

| Block | Page1 | Page2 | Page3 | .... | PageX |

Reads all pages of the flash block that has reached the pre-defined read count and check ECC.

| Block | Page1 | Page2 | Page3 | .... | PageX |

Read → ECC threshold exceeded

Refreshes the scanned block if the ECC threshold is exceeded.

| Block | Page1 | Page2 | Page3 | .... | PageX |

Refresh!

Part Number

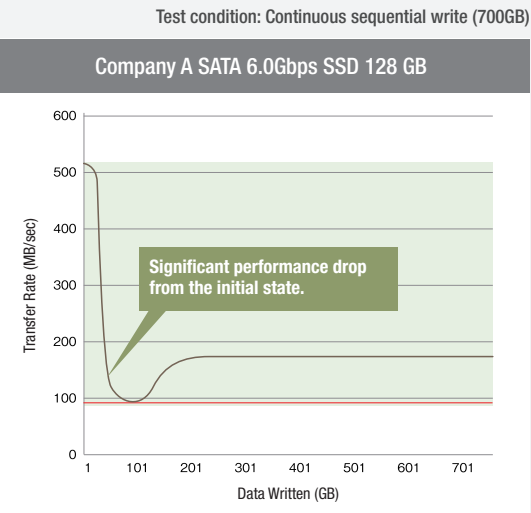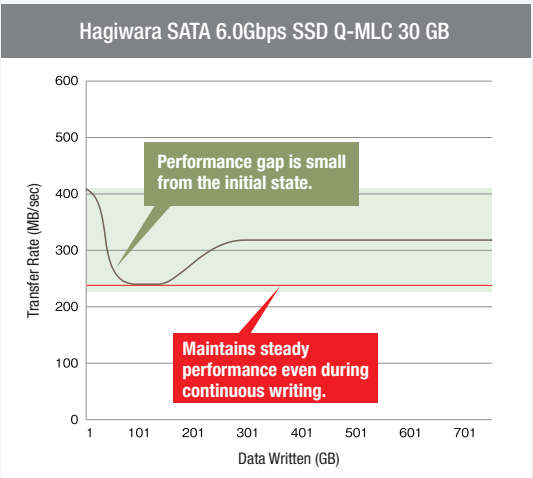| Operating Temperature	MLC	Q-MLC	SLC
0°C to 70°C	LFDMSS-xxxGD (A**AH)	XFDMSS-xxxGD (A**AH)	HFDMSS-xxxGD (A**AE)
-25°C to 85°C	LFDMSS-xxxGD (A**AHS	XFDMSS-xxxGD (A**AHS	-
-40°C to 85°C	-	-	HFDMSS-xxxGD (A**AEI

SATA 6.0Gbps SSD Product Features

Consistent Performance

Performance Comparison Hagiwara SSD is designed to prevent performance degradation under continuous write operation and delivers consistent performance.

Test condition: Continuous sequential write (700GB)

Hagiwara SATA 6.0Gbps SSD Q-MLC 30 GB

Performance gap is small from the initial state.

Maintains steady performance even during continuous writing.

Transfer Rate (MB/sec) vs Data Written (GB)

Company A SATA 6.0Gbps SSD 128 GB

Significant performance drop from the initial state.

Transfer Rate (MB/sec) vs Data Written (GB)

SSD Life Diagnostics Tool : Live Monitor

The Live Monitor is a Windows software tool which gathers essential information from a Hagiwara SSD to estimate drive life and help users optimize SSD configuration for their specific applications.

The tool also has the ability to calculate wear-leveling efficiency and estimate remaining life of SSD based on the real data. With the tangible data, users can optimize the performance of their host system with great accuracy.

Features

Device Information
- S.M.A.R.T. Values
- Temperature
- Life Estimate

Access Analysis *1
- Read/Write Ratio
- Data Transfer Size Ratio
- Sequential Access Ratio

Block Information *1
- Drive Map
- Utilization Rate
- Erase Count
- Read Count
- Reallocated Count

Device Settings *2
- Perform Secure Erase
- PSID Revert to reset TCG Opal settings
- Enable eDrive (IEEE1667)
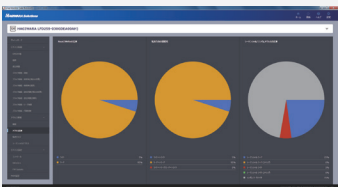
Other Functions *2
- Firmware Update
- PDF Report

*1 Compatible SATA 6.0Gbps models only
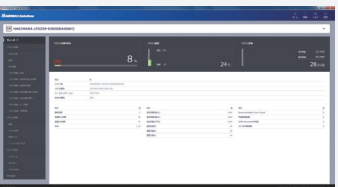*2 Target SSD must have corresponding functions.

Drive Monitoring

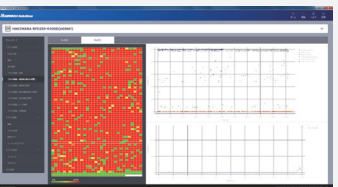| Access Pattern Analysis	WAF/TBW Calculation	SSD Utilization
Provides in-depth SSD access pattern analysis for system performance optimization.	Provides accurate life estimation based on real usage data.	Visualizes SSD usage at block level to help determine optimal device configuration for maximized life.

CompactFlash Card

Fixed Disk Type
XFD10P-GR / HFD10P-GR Series

Removable Disk Type
LCF10P-GR / XCF10P-GR / HCF10P-GR Series

Flash Memory	MLC	Q-MLC	SLC
Capacity	16 GB to 128 GB	16 GB to 64 GB	512 MB to 16 GB *
Host Interface	Parallel ATA [Ultra ATA/66] CFA6.0		
Disk Mode	Removable	Fixed / Removable	
Data Transfer Mode	PIO mode0-4 / Multiword DMA mode 0-2 / Ultra DMA mode 0-4		
Operating Voltage	3.3V±5% / 5.0V±10%		
Operating Temperature — Commercial Temperature	0°C to 70°C		
Operating Temperature — Wide Temperature	-		-40°C to 85°C
Storage Temperature	-45°C to 90°C		
Operating Humidity	~ 85% (No Condensation)		
Storage Humidity	~ 95% (No Condensation)		
Dimensions (mm)	42.8 x 36.4 x 3.3		
DRAM Cache	-	-	-
Performance — Sequential Read (MB/s)	55	50	55
Performance — Sequential Write (MB/s)	45	45	50
Performance — Random Read (IOPS)	-	-	-
Performance — Random Write (IOPS)	-	-	-
Power Consumption (mA) — Read (max.) @ 5V	125	105	150
Power Consumption (mA) — Write (max.) @ 5V	150	120	165
Power Consumption (mA) — Idle @ 5V	10	10	10
Power Consumption (mA) — Read (max.) @ 3.3V	160	135	185
Power Consumption (mA) — Write (max.) @ 3.3V	200	155	205
Power Consumption (mA) — Idle @ 3.3V	5	5	5
Warranty	1 year		

*512MB~8GB models are available only in Wide-Temperature

Feature icons

	Static Wear Leveling	Refresh	Patrol	Read Retry	Power Loss Alert	Fixed BOM	TCG Opal 2.0	S.M.A.R.T.	Life Indicator LED	DevSleep	Wide Temperature	Power Loss Recovery	LIve Live Monitor	LIve Drive Monitor	Thermal Sensor	RoHS	AIS
MLC	●	●	-	●	-	●	-	●	-	-	-	●	●	-	-	●	●
Q-MLC	●	●	-	●	-	●	-	●	-	-	-	●	●	-	-	●	●
SLC	●	●	-	●	-	●	-	●	-	-	-	●	●	-	-	●	●

●: Default ○: Optional

Static Wear Leveling · Refresh · Patrol Function · Read Retry · Power Loss Alert · Fixed BOM · TCG Opal 2.0 · S.M.A.R.T. · Life Indicator LED
Device Sleep · Wide Temperature · Power Loss Recovery · LIve Live Monitor · LIve Drive Monitor · Thermal Sensor · RoHS Compliant · Article Information Sheet

Dimensions

26 50
1 25

3.30
2x12.00
2x25.78
TOP
36.40
2x3.00
0.76
4xR0.50
41.66
42.80
0.63

CompactFlash Storage Card Dimensions

(Unit: mm)

Fixed BOM

Fixed BOM
Parts, controllers, firmware version are fixed to deliver consistent performance and quality.

1st Lot | 2nd Lot | 3rd Lot

Non-Fixed BOM
Qualification testing | Qualification testing | Qualification testing

Fixed BOM
Qualification testing

Parts and firmware are fixed.
No requalification required.

Part Number

Operating Temperature	MLC	Q-MLC	SLC
0°C to 70°C	[Rem.] LCF10P-xxxGR (A**AH)	[Fixed] XFD10P-xxxGR (A**AH) [Rem.] XCF10P-xxxGR (A**AH)	[Fixed] HFD10P-xxxGR (A**AE) [Rem.] HCF10P-xxxGR (A**AE)
-40°C to 85°C	-	-	[Fixed] HFD10P-xxxGR (A**AEI [Rem.] HCF10P-xxxGR (A**AEI

2.5-inch PATA SSD

LFD25P-GD / XFD25P-GD / HFD25P-GD Series

Flash Memory	MLC	Q-MLC	SLC
Capacity	30 GB to 240 GB	15 GB to 120 GB	15 GB to 120 GB
Host Interface	Parallel ATA [Ultra ATA/66]		
Data Transfer Mode	PIO mode0-4 / Multiword DMA mode 0-2 / Ultra DMA mode 0-5		
Operating Voltage	5.0V±10%		
Operating Temperature — Commercial Temperature	0°C to 70°C		
Operating Temperature — Wide Temperature	-25°C to 85°C		-40°C to 85°C
Storage Temperature	-45°C to 90°C		
Operating Humidity	~ 85% (No Condensation)		
Storage Humidity	~ 95% (No Condensation)		
Dimensions (mm)	69.85 x 99.5 x 9.5		
DRAM Cache	●	●	●
Performance — Sequential Read (MB/s)	75	70	80
Performance — Sequential Write (MB/s)	75	75	60
Performance — Random Read (IOPS)	4,500	5,000	5,500
Performance — Random Write (IOPS)	7,500	7,500	9,000
Power Consumption (mA) — Read (max.)	200	185	235
Power Consumption (mA) — Write (max.)	260	200	230
Power Consumption (mA) — Idle	115	115	125
Warranty	1 year		

Feature icons

	Static Wear Leveling	Refresh	Patrol	Read Retry	Power Loss Alert	Fixed BOM	TCG Opal 2.0	S.M.A.R.T.	Life Indicator LED	DevSleep	Wide Temperature	Power Loss Recovery	LIve Live Monitor	LIve Drive Monitor	Thermal Sensor	RoHS	AIS
MLC	●	●	-	●	-	●	-	●	-	-	○	●	●	-	-	●	●
Q-MLC	●	●	-	●	-	●	-	●	-	-	○	●	●	-	-	●	●
SLC	●	●	-	●	-	●	-	●	-	-	○	●	●	-	-	●	●

●: Default ○: Optional

Static Wear Leveling · Refresh · Patrol Function · Read Retry · Power Loss Alert · Fixed BOM · TCG Opal 2.0 · S.M.A.R.T. · Life Indicator LED
Device Sleep · Wide Temperature · Power Loss Recovery · LIve Live Monitor · LIve Drive Monitor · Thermal Sensor · RoHS Compliant · Article Information Sheet

Dimensions

8-M3.00
3.00
99.50
9.50
4.50
8-M3.00
6.00
φ3.20
18.00
69.85
61.72
50.00
58.85
6.00
17.57 38.10 20.93 14.00
4.29
4.20

(Unit: mm)

Refresh

Refresh
Prevents read errors from occuring by reallocating the data from the block with reduced data retention.

As raw NAND flash bit error rate increases, it becomes more imperative to monitor the condition of flash blocks to avoid irreversible errors from occuring. The refresh function seeks for the flash block with reduced data retention and reallocates the data to a new location proactively.

User Area | Redundant Area
Page — Error Correction Code (ECC)
Page — Data Error → Read
Data corrected by ECC
Page — Refresh (Corrected data copied)

Part Number

Operating Temperature	MLC	Q-MLC	SLC
0°C to 70°C	LFD25P-xxxGD (A**AH)	XFD25P-xxxGD (A**AH)	HFD25P-xxxGD (A**AE)
-25°C to 85°C	LFD25P-xxxGD (A**AHS	XFD25P-xxxGD (A**AHS	-
-40°C to 85°C	-	-	HFD25P-xxxGD (A**AEI
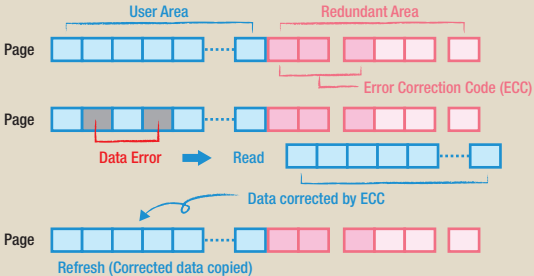
SD Card S series Product Features

Key features

1 Optimized for Small Random Writes

The page-mapping is a sophisticated flash management technique which provides superior performance in small-sized random writes.
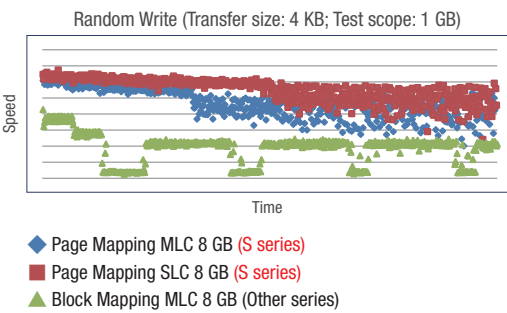
	Random 512KByte		Random 4KByte	
	Read	Write	Read	Write
Previous model	79.20	4.195	6.026	0.304
S series	85.25	22.87	6.817	1.034

CrystalDiskMark 3.0.3
Transfer size: 500 MiB

Improved Random Write performance

2 Consistent and Stable Performance

Conventional SD card may experience significant performance d egradation in continuous use over a long period of time. The S series avoids such perfor-mance drop by utilizing a highly efficient flash management technique.

Random Write (Transfer size: 4 KB; Test scope: 1 GB)

Speed

Time

◆ Page Mapping MLC 8 GB (S series)
■ Page Mapping SLC 8 GB (S series)
▲ Block Mapping MLC 8 GB (Other series)

3 Improved Write Efficiency for Long SD life

The Page-mapping technology significantly reduces the amount of data that is physically written on NAND flash and improves write amplification (WAF).

Write Efficiency is more than doubled.

45
30
15
0

■ Previous model
■ S series

win7   Ubuntu   Fedora
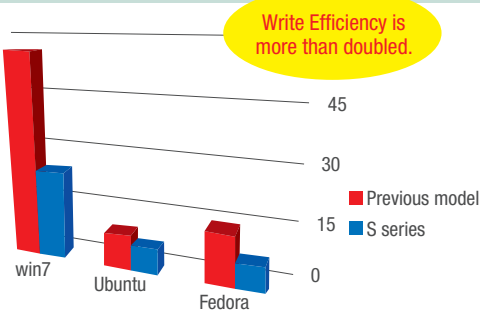
4 Robust Power Loss Protection

Proven to function reliably after 10,000-cycle power interruption test.

Test Start
Power on
SD Power on
Read all areas

Target cycle reached?
Yes
No

Partial Write Test
Power removal during write
Power Interruption

Test END
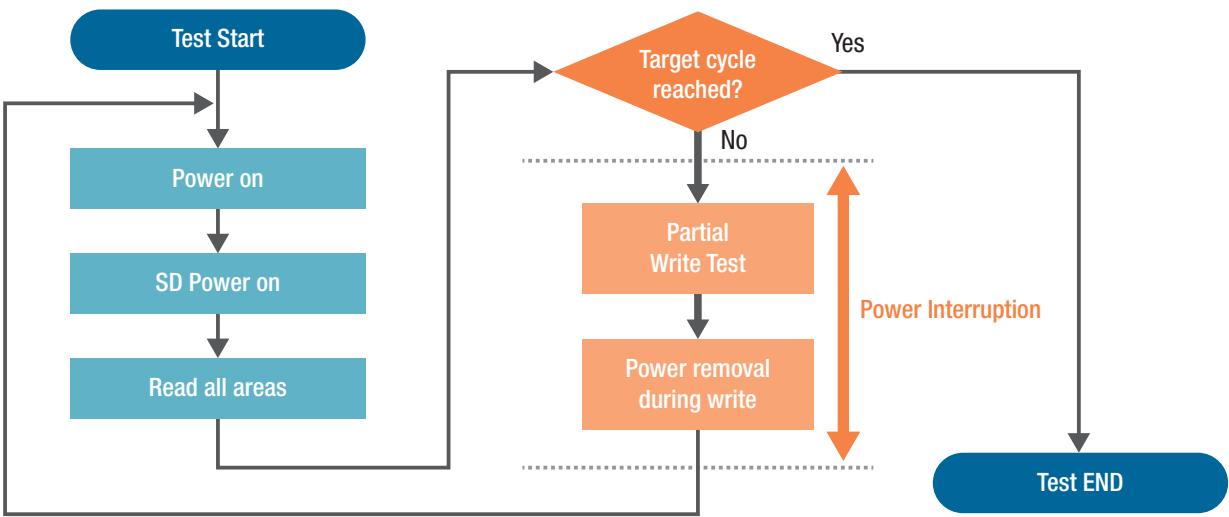
5 Robustness against Bending and Twisting

Hagiwara Industrial SD Cards have passed more rigorous testing standards compared to the SD Standards.
The Hagiwara SD cards in average feature twice as much physical strength as SD cards from other companies.

Bending test (SD standard : 10N)	Twisting test (SD standard : 0.15N)
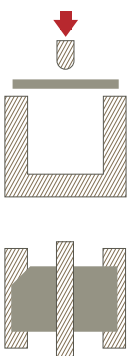
Force	S series	Other brand
10N	Pass	Pass
20N	Pass	Pass
30N	Pass	Pass
40N	Pass	Connector side opened
50N	Slightly bent	Connector side opened
60N	Heavily bent	Connector side opened Heavily bent
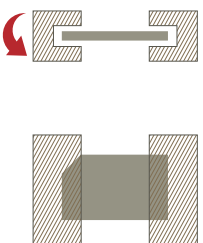
| Force	S series	Other brand
0.25N	Pass	Pass
0.30N	Pass	Pass
0.35N	Pass	Pass
0.40N	Pass	Connector side opened
0.45N	Slightly bent	Connector side opened Slightly bent
0.50N	Slightly bent	Connector side opened Slightly bent

6 SD Life Diagnostics Tool

Proprietary software tool that estimates remaining life of SD card.

SD Live Monitor
1. Read S.M.A.R.T. information
2. Export S.M.A.R.T. information as text
3. Remaining product life
4. Average Erase Count
5. Maximum Erase Count
6. Total Erase Count
7. Remaining Spare Blocks

Meter color	Remaining Life
Green	20% or Higher
Yellow	Less than 20%
Red	Less than 10%
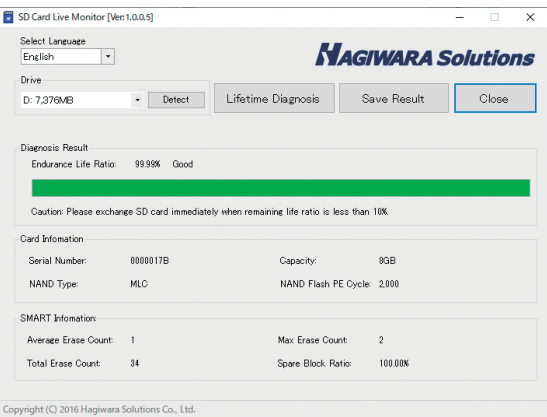
Compatible SD Card Reader

*Windows only   Part Number HPC-SDR1AD

Product Comparison

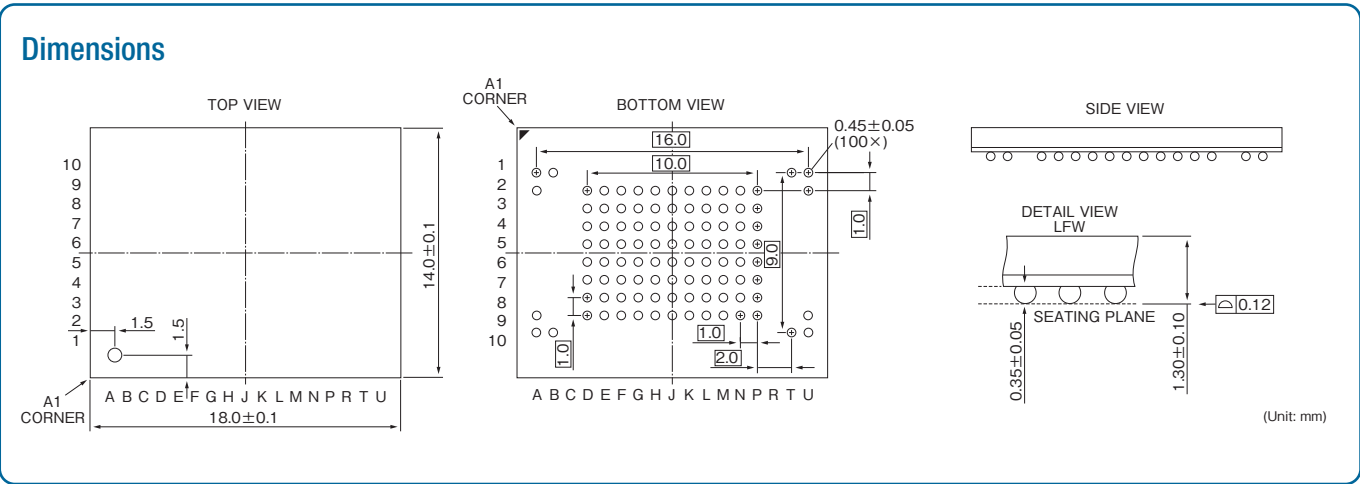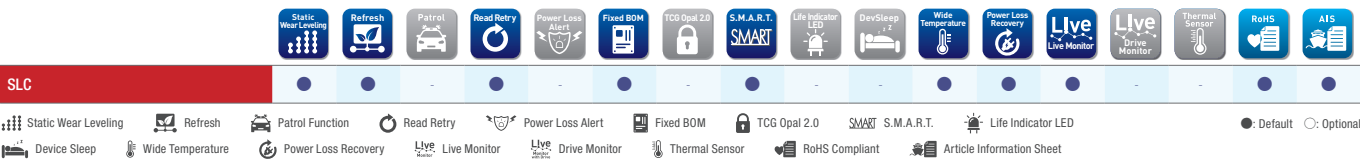| Series	Reliability	Fixed BOM	Write Efficiency	Random Write	Physical Strength	Cost	Monitoring Tool	Failure Analysis
S series	◎	◎	◎	◎	◎	△	○	◎
K series	○	△	△	△	◎	◎	○	△

eSD (Embedded SD)

Industrial SD card in Surface Mount Package

The eSD (embedded SD) is a BGA memory chip with standard SD interface. The eSD incorporates industrial grade wide-temp 2D SLC NAND and its high endurance and strong data retention makes it ideal for demanding applications where conventional MLC/TLC-based eMMC/UFS fail.

Package	JEDEC 100-Ball BGA, 1.0mm Ball Pitch	
Host Interface	SD Physical Layer Specification Ver.3.01 compliant	
NAND / Capacity	SLC (1GB / 2GB / 4GB / 8GB / 16GB)	
Guaranteed P/E cycle	1GB & 2GB: 50,000 per block / 4~16GB: 100,000 per block	
Bus Speed Mode	1 GB to 16 GB	
	Default speed mode (DS)	3.3V signaling, Frequency up to 25MHz, Speed up to 12.5MB/s
	High speed mode (HS)	3.3V signaling, Frequency up to 50MHz, Speed up to 25MB/s
	4 GB to 16 GB	
	SDR12	1.8V signaling, Frequency up to 25MHz, Speed up to 12.5MB/s
	SDR25	1.8V signaling, Frequency up to 50MHz, Speed up to 25MB/s
	SDR50	1.8V signaling, Frequency up to 100MHz, Speed up to 50MB/s
	SDR104	1.8V signaling, Frequency up to 208MHz, Speed up to 104MB/s
	DDR50	1.8V signaling, Frequency up to 50MHz, Speed up to 50MB/s
Operating Voltage	2.7 V to 3.6 V	
Operating Temperature	-40°C to 85°C	
Other	Drive life management based on internal attributes	
	Read disturb management	
	Wear-leveling	
	Power loss protection	
	BGA to SD socket board	

SLC

Static Wear Leveling	Refresh	Patrol	Read Retry	Power Loss Alert	Fixed BOM	TCG Opal 2.0	S.M.A.R.T.	Life Indicator	DevSleep	Wide Temperature	Power Loss Recovery	LIve Live Monitor	LIve Drive Monitor	Thermal Sensor	RoHS	AIS
●	-	-	●	-	●	-	●	-	●	●	-	-	-	●	●	●

- Static Wear Leveling
- Refresh
- Patrol Function
- Read Retry
- Power Loss Alert
- Fixed BOM
- TCG Opal 2.0
- S.M.A.R.T.
- Life Indicator LED
- Device Sleep
- Wide Temperature
- Power Loss Recovery
- LIve Live Monitor
- LIve Drive Monitor
- Thermal Sensor
- RoHS Compliant
- Article Information Sheet
- ●: Default ○: Optional

Dimensions

TOP VIEW

A1 CORNER

BOTTOM VIEW

SIDE VIEW

0.45±0.05 (100×)

16.0

10.0

14.0±0.1

1.5 1.5

A B C D E F G H J K L M N P R T U

18.0±0.1

A1 CORNER

1 2 3 4 5 6 7 8 9 10

A B C D E F G H J K L M N P R T U

2.0

10 9 8 7 6 5 4 3 2 1

DETAIL VIEW LFW

SEATING PLANE

0.35±0.05

1.30±0.10

0.12

(Unit: mm)

Standard SD Card Interface

eSD is SDA standardized and the well-known SD interface is supported by various micro processors. It allows embedded devices to utilize the same common interface without requiring a special controller.

Robust SLC NAND

eSD incorporates 2D SLC NAND flash that provides excellent reliability and endurance over MLC/TLC-based eMMC.

1.0mm Ball Pitch

The 1.00mm pitch eliminates the need for special design practice like Pad-on-Via and allows for lower PCB design & manufacturing costs.

In-House SSD Controller Design

The reliability of flash storage largely relies on the NAND type and the flash management capability of the flash controller. The eSD incorporates the Hagiwara original SD controller which have proven reliability with a track record in industrial applications.

Hagiwara original Active Refresh function

Read-disturb management is critical when storing read-centric applications such as boot code, OS kernel. The eSD incorporates active refresh which proactively prevents read error by monitoring read count.

eSD Life Diagnostics Tool

The eSD life-monitoring & diagnostic tools allow users to gather essential information such as program/erase cycle and remaining spare block information. By gathering this data, the tool helps determine optimal timing for preventive and predictive maintenance.

-Life Assessment Software (Windows)
-API (Windows/Linux)
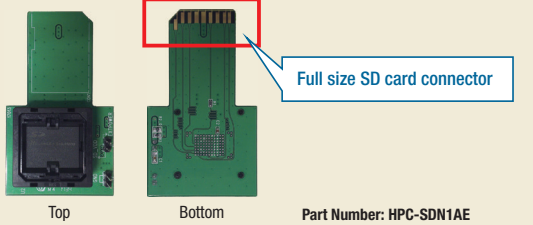-Commands required for the life assessment
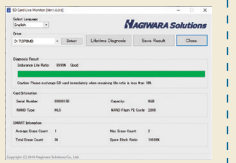
Robust Alternative to NOR

The eSD eliminates the need for having separate components for boot code and data storage and saves board real estate and manufacturing costs. Built-in 2D SLC NAND delivers excellent data-retention compared to MLC/TLC NAND.

NOR
Boot code

NAND
Data (e.g. Log)

eSD
Boot code and Data stored in one package
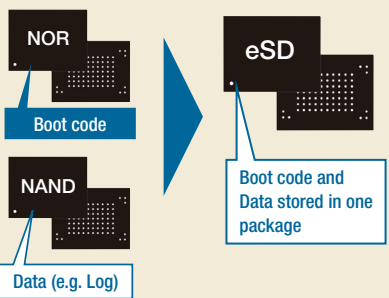
eSD Evaluation Adapter Board (Optional)

The adapter allows you to connect eSD chip to standard SD card slot.

Full size SD card connector

Top Bottom Part Number: HPC-SDN1AE

User Scenarios

Using NOR	Using NOR + NAND	Using eMMC	Considering SD card for a new design	
Challenge	**Challenge**	**Challenge**	**Challenge**	**Challenge**
Capacity is insufficient to meet increasing data volume.	Increased cost associated with having NOR and NAND flash on board	Concerns on long-term reliability of MLC/TLC	Removable media may have unstable connection in a high vibration environment.	Inserting SD card during production requires additional man-hour.
Solution	**Solution**	**Solution**	**Solution**	**Solution**
eSD : 1GB to 16GB NOR : up to 128MB	eSD provides ample storage for code and data in a single package while reducing manufacturing cost.	eSD uses 2D SLC NAND that provides high endurance and data retention.	eSD can be soldered directly on the motherboard and provides excellent vibration tolerance.	Surface mount component improves assembly efficiency and reduce costs.

SD Memory Card

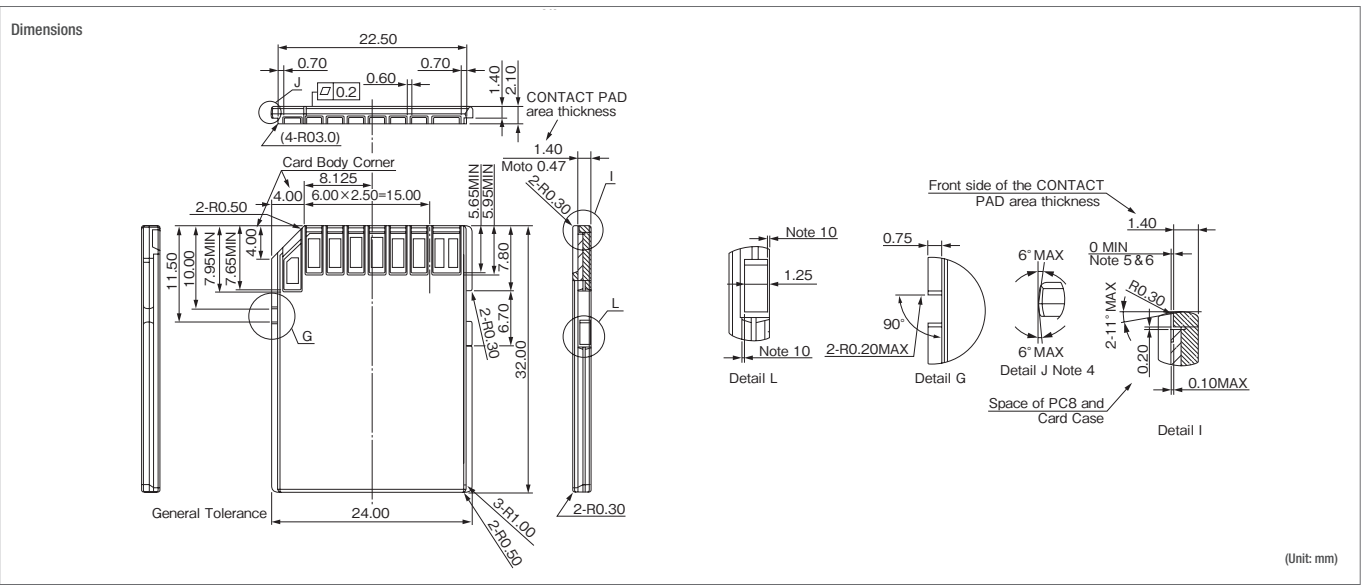**Fast Random Access : S series**
Semi-Fixed BOM : K series

		S series			K series	
	Flash Memory	MLC	Q-MLC	SLC	MLC	SLC
	Capacity	8 GB to 256 GB	4 GB to 128 GB	512 MB to 32 GB	2 GB to 128 GB	128 MB, 512 MB to 16 GB
	Host Interface	SD 3.0 *1				
	Operating Voltage	2.7 V to 3.6 V				
Operating Temperature	Commercial Temperature	-25°C to 85°C	-		-25°C to 85°C	
	Wide Temperature	-	-40°C to 85°C		-	-40°C to 85°C
	Storage Temperature	-40°C to 85°C			-40°C to 85°C	
	Operating Humidity	~ 95% (No Condensation)				
	Storage Humidity	~ 95% (No Condensation)				
	Dimensions (mm)	24 x 32 x 2.1				
Performance	Sequential Read (MB/s)	[UHS-1] 89	[UHS-1] 90	[UHS-1] 89	[UHS-1] 90	[UHS-1] 88
	Sequential Write (MB/s)	[UHS-1] 73	[UHS-1] 80	[UHS-1] 70	[UHS-1] 63	[UHS-1] 79
	Random Read (IOPS)	-	-	-	-	-
	Random Write (IOPS)	-	-	-	-	-
Power Consumption (mA)	Read (max.)	210	160	150	120	110
	Write (max.)	180	180	150	180	130
	Warranty	1 year				

*1 SD2.0 (up to 2GB)

S series

	Static Wear Leveling	Refresh	Patrol Function	Read Retry	Power Loss Alert	Fixed BOM	TCG Opal 2.0	S.M.A.R.T.	Life Indicator LED	Dev Sleep	Wide Temperature	Power Loss Recovery	Live Monitor	Drive Monitor	Thermal Sensor	RoHS	AIS
MLC	●	●	-	●	-	●	-	-	-	-	●	●	-	-	-	●	●
Q-MLC	●	●	-	●	-	●	-	-	-	-	●	●	-	-	-	●	●
SLC	●	●	-	●	-	●	-	-	-	-	●	●	-	-	-	●	●

K series

	Static Wear Leveling	Refresh	Patrol Function	Read Retry	Power Loss Alert	Fixed BOM	TCG Opal 2.0	S.M.A.R.T.	Life Indicator LED	Dev Sleep	Wide Temperature	Power Loss Recovery	Live Monitor	Drive Monitor	Thermal Sensor	RoHS	AIS
MLC	●	●	-	●	-	●*2	-	-	-	-	●	●	○	-	-	●	-
SLC	●	●	-	●	-	●*2	-	-	-	-	●	●	○	-	-	●	-

Static Wear Leveling | Refresh | Patrol Function | Read Retry | Power Loss Alert | Fixed BOM | TCG Opal 2.0 | S.M.A.R.T. | Life Indicator LED
Device Sleep | Wide Temperature | Power Loss Recovery | Live Monitor | Drive Monitor | Thermal Sensor | RoHS Compliant | Article Information Sheet
●: Default   ○: Optional

*2 Semi-Fixed BOM : Flash Controller, Firmware version, NAND process are locked.

Dimensions

(Unit: mm)

Part Number

S series	MLC	Q-MLC	SLC
-25°C to 85°C	NSDB-xxxGS (N**M*S	NSDB-xxxGS (N**Q*S	-
-40°C to 85°C	-	-	NSDB-xxxGS (N**SEI

K series	MLC	SLC
-25°C to 85°C	NSDB-xxxGK (L**MHI	NSD*-xxxxK (L**SEI
-40°C to 85°C	-	NSD*-xxxxK (***SEI

microSD Memory Card

Fast Random Access : S series
Semi-Fixed BOM : K series

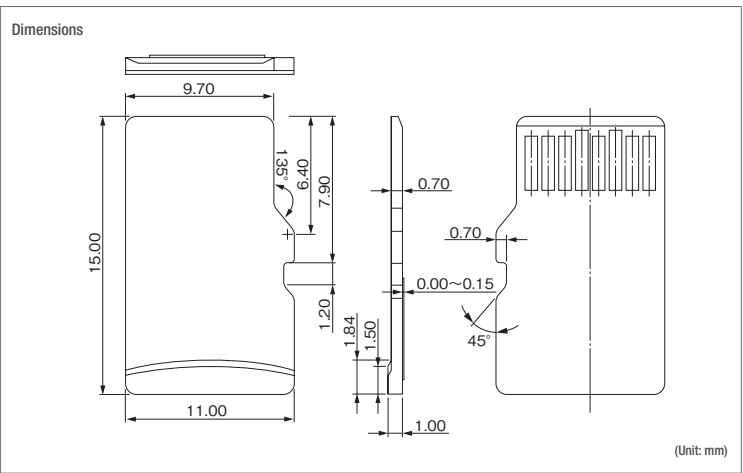|		S series			K series	
	Flash Memory	MLC	Q-MLC	SLC	MLC	SLC
	Capacity	8 GB to 64 GB	4 GB to 32 GB	1 GB to 8 GB	2 GB to 32 GB	128 MB, 512 MB to 2 GB
	Host Interface	SD 3.0 *1				
	Operating Voltage	2.7V to 3.6V				
Operating Temperature	Commercial Temperature	-25°C to 85°C	-		-25°C to 85°C	
	Wide Temperature	-	-40°C to 85°C		-	
	Storage Temperature	-40°C to 85°C				
	Operating Humidity	~ 95% (No Condensation)				
	Storage Humidity	~ 95% (No Condensation)				
	Dimensions (mm)	11 x 15 x 1				
Performance	Sequential Read (MB/s)	[UHS-1] 81	[UHS-1] 82	[UHS-1] 30	[UHS-1] 85	20
	Sequential Write (MB/s)	[UHS-1] 72	[UHS-1] 73	[UHS-1] 27	[UHS-1] 43	18
	Random Read (IOPS)	-	-	-	-	-
	Random Write (IOPS)	-	-	-	-	-
Power Consumption (mA)	Read (max.)	190	132	80	105	60
	Write (max.)	150	132	120	115	90
	Warranty	1 year				

*1 SD2.0 (up to 2GB)

S series

	Static Wear Leveling	Refresh	Patrol Function	Read Retry	Power Loss Alert	Fixed BOM	TCG Opal 2.0	S.M.A.R.T.	Life Indicator LED	Dev Sleep	Wide Temperature	Power Loss Recovery	Live Monitor	Drive Monitor	Thermal Sensor	RoHS	AIS
MLC	●	●	-	●	-	●	-	-	-	-	●	●	-	-	-	●	●
Q-MLC	●	●	-	●	-	●	-	-	-	-	●	●	-	-	-	●	●
SLC	●	●	-	●	-	●	-	-	-	-	●	●	-	-	-	●	●

K series

	Static Wear Leveling	Refresh	Patrol Function	Read Retry	Power Loss Alert	Fixed BOM	TCG Opal 2.0	S.M.A.R.T.	Life Indicator LED	Dev Sleep	Wide Temperature	Power Loss Recovery	Live Monitor	Drive Monitor	Thermal Sensor	RoHS	AIS
MLC	●	●	-	●	-	●*2	-	-	-	-	●	●	○	-	-	●	-
SLC	●	-	-	●	-	●*2	-	-	-	-	●	●	○	-	-	●	-

Static Wear Leveling | Refresh | Patrol Function | Read Retry | Power Loss Alert | Fixed BOM | TCG Opal 2.0 | S.M.A.R.T. | Life Indicator LED
Device Sleep | Wide Temperature | Power Loss Recovery | Live Monitor | Drive Monitor | Thermal Sensor | RoHS Compliant | Article Information Sheet
●: Default   ○: Optional

*2 Semi-Fixed BOM : Flash Controller, Firmware version, NAND process are locked.

Dimensions

9.70
15.00
1.35
6.440
7.90
1.20
1.84
1.50
11.00
0.70
0.70
0.00~0.15
45°
1.00

(Unit: mm)

Part Number

S series	MLC	Q-MLC	SLC
-25°C to 85°C	MSDB-xxxGS (N**M*S	MSDB-xxxGS (N**Q*S	-
-40°C to 85°C	-	-	MSDB-xxxGS (***SDI

K series	MLC	SLC
-25°C to 85°C	MSDB-xxxGK (L**MHI	MSD*-xxxxK (L**SEI

Read Retry

Accurately reads data from memory cell with reduced data retention by calibrating optimal read threshold voltage.

Threshould Voltage Distribution	Saved Normally	Reduced Data Retention
Data (0,1)		
Data (0,0)		
Data (1,0)		
Data (1,1)		

Electrical Charge

The electrical charge is not kept within the range of read threshold due to wear, high temperature, etc.

Adjusted Read Point
Read retry attempts read with adjusted read threshold voltage.

Floating Gate

USB Memory USB3.0 model

H series : Compact Case, Fixed-BOM
K series : Compact Case, Semi-Fixed BOM
K series : Standard Case, Semi-Fixed BOM

*Fixed BOM : All components (excluding CR) & Firmware version are locked.
*Semi-Fixed BOM : Flash Controller, Firmware version, NAND process are locked.

USB 3.0

	H series (Fixed BOM)		K series (Semi-Fixed BOM)	
Flash Memory	MLC	SLC	MLC	MLC
Case Type	Compact		Standard	
Capacity	4 GB to 32 GB	2 GB to 16 GB	4 GB to 32 GB	4 GB to 32 GB
Host Interface	USB 3.0 (Super Speed) / USB 2.0 (High Speed) / USB 1.1 (Full Speed)			
Operating Voltage	5.0V±5%			
Operating Temperature	0°C to 70°C	0°C to 70°C	0°C to 50°C	0°C to 50°C
Storage Temperature	-20°C to 85°C			
Operating & Storage Humidity	– 85% (No Condensation)			
Dimensions (mm)	43.3 x 17.0 x 8.00		62.1 x 17.0 x 8.00	
Performance (USB3.0) — Sequential Read (MB/s)	145	40	145	145
Performance (USB3.0) — Sequential Write (MB/s)	37	30	37	37
Power Consumption (mA) — Read (max.)	210	220	210	210
Power Consumption (mA) — Write (max.)	210	220	210	210
Power Consumption (mA) — Idle	130	130	130	130
Warranty	1 year			

H series

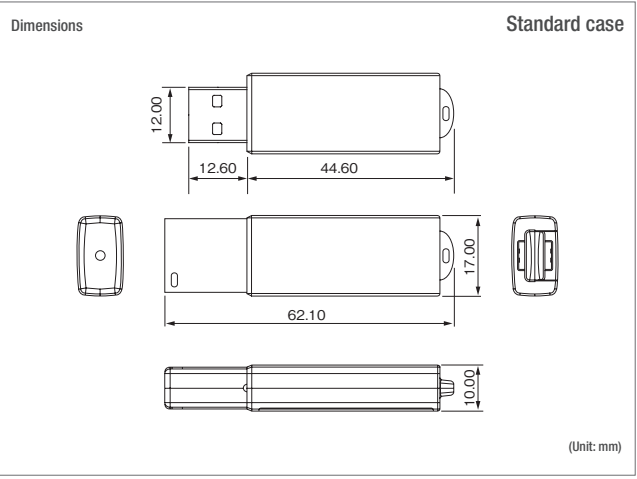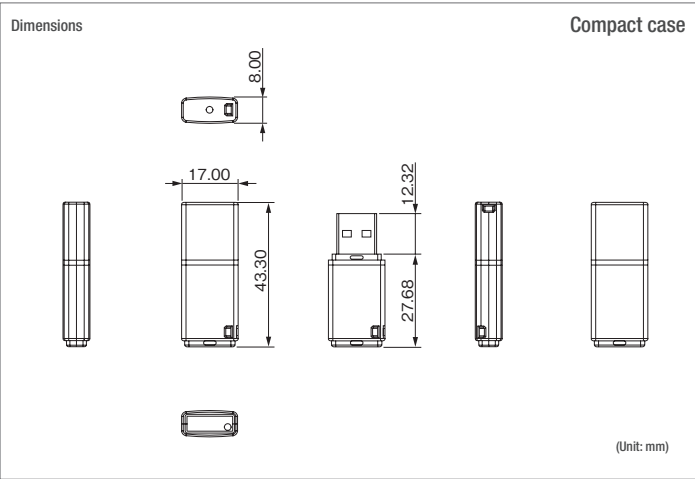|	Static Wear Leveling	Refresh	Patrol	Read Retry	Power Loss Alert	Fixed BOM	TCG Opal 2.0	S.M.A.R.T.	Life Indicator LED	DevSleep	Wide Temperature	Power Loss Recovery	Live Monitor	Drive Monitor	Thermal Sensor	RoHS	AIS
MLC	●	-	-	-	-	●	-	●	-	-	●	-	-	-	-	●	●
SLC	●	-	-	-	-	●	-	●	-	-	●	-	-	-	-	●	●

K series

	Static Wear Leveling	Refresh	Patrol	Read Retry	Power Loss Alert	Fixed BOM	TCG Opal 2.0	S.M.A.R.T.	Life Indicator LED	DevSleep	Wide Temperature	Power Loss Recovery	Live Monitor	Drive Monitor	Thermal Sensor	RoHS	AIS
MLC	●	-	-	-	-	●*	-	-	-	-	-	-	-	-	-	●	-

● : Default   ○ : Optional

Static Wear Leveling / Refresh / Patrol Function / Read Retry / Power Loss Alert / Fixed BOM / TCG Opal 2.0 / S.M.A.R.T. / Life Indicator LED / Device Sleep / Wide Temperature / Power Loss Recovery / Live Monitor / Drive Monitor / Thermal Sensor / RoHS Compliant / Article Information Sheet

*Semi-Fixed BOM : Flash Controller, Firmware version, NAND process are locked.

Part Number

H series	MLC / Compact	SLC / Compact
Fixed BOM	USA3-xxxGH(B00MH)	USA3-xxxGH(B00SE)

K series	MLC / Compact	MLC / Standard
Semi-Fixed BOM	USB3-xxxGH(B00MH)	UBB3-xxxG0(B00MH)

Dimensions — Compact case
8.00 / 17.00 / 43.30 / 12.32 / 27.68
(Unit: mm)

Dimensions — Standard case
12.00 / 12.60 / 44.60 / 17.00 / 62.10 / 10.00
(Unit: mm)

USB Memory USB2.0 model

H series : Standard Case, Fixed-BOM
K series : Standard Case, Semi-Fixed BOM

*Fixed BOM : All components (excluding CR) & Firmware version are locked.
*Semi-Fixed BOM : Flash Controller, Firmware version, NAND process are locked.

USB 2.0

	H series (Fixed BOM)		K series (Semi-Fixed BOM)
Flash Memory	MLC	SLC	MLC
Case Type	Standard		
Capacity	2 GB to 64 GB	128 MB to 32 GB	4 GB to 64 GB
Host Interface	USB 2.0 (High Speed) / USB 1.1 (Full Speed)		
Operating Voltage	5.0V±5%		
Operating Temperature	0°C to 70°C	0°C to 70°C	0°C to 50°C
Storage Temperature	-20°C to 85°C		
Operating & Storage Humidity	– 85% (No Condensation)		
Dimensions (mm)	62.1 x 17.0 x 8.00		
Performance (USB3.0) — Sequential Read (MB/s)	26	25	26
Performance (USB3.0) — Sequential Write (MB/s)	14	20	14
Power Consumption (mA) — Read (max.)	100	90	100
Power Consumption (mA) — Write (max.)	100	90	100
Power Consumption (mA) — Idle	50	40	50
Warranty	1 year		

H series

	Static Wear Leveling	Refresh	Patrol	Read Retry	Power Loss Alert	Fixed BOM	TCG Opal 2.0	S.M.A.R.T.	Life Indicator LED	DevSleep	Wide Temperature	Power Loss Recovery	Live Monitor	Drive Monitor	Thermal Sensor	RoHS	AIS
MLC	●	-	-	-	-	●	-	●	-	-	●	-	-	-	-	●	●
SLC	●	-	-	-	-	●	-	●	-	-	●	-	-	-	-	●	●

K series

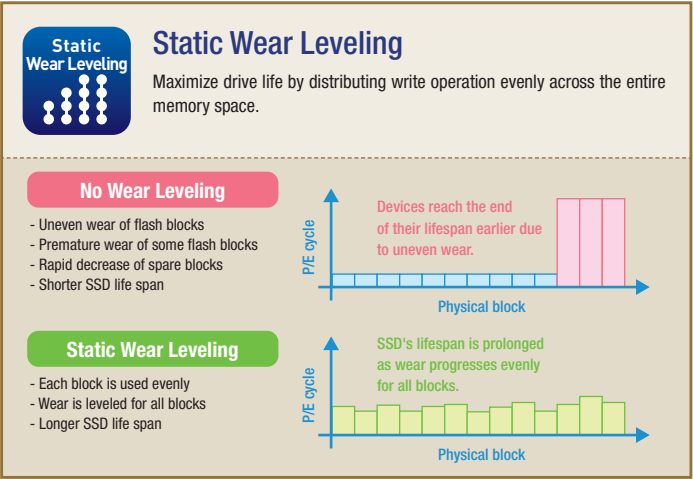|	Static Wear Leveling	Refresh	Patrol	Read Retry	Power Loss Alert	Fixed BOM	TCG Opal 2.0	S.M.A.R.T.	Life Indicator LED	DevSleep	Wide Temperature	Power Loss Recovery	Live Monitor	Drive Monitor	Thermal Sensor	RoHS	AIS
MLC	●	-	-	-	-	●*	-	-	-	-	-	-	-	-	-	●	-

● : Default   ○ : Optional

*Semi-Fixed BOM : Flash Controller, Firmware version, NAND process are locked.

Part Number

H series	MLC / Standard	SLC / Standard
Fixed BOM	UBA2-xxxGH(A00MH)	UBA2-xxxxSRB(TBAIA)

K series	MLC / Standard
Semi-Fixed BOM	UBB2-xxxG0(A00MH)

Static Wear Leveling

Maximize drive life by distributing write operation evenly across the entire memory space.

No Wear Leveling
- Uneven wear of flash blocks
- Premature wear of some flash blocks
- Rapid decrease of spare blocks
- Shorter SSD life span

Devices reach the end of their lifespan earlier due to uneven wear.
(P/E cycle vs Physical block)

Static Wear Leveling
- Each block is used evenly
- Wear is leveled for all blocks
- Longer SSD life span

SSD's lifespan is prolonged as wear progresses evenly for all blocks.
(P/E cycle vs Physical block)

Enhanced custom options for USB Memory

Casing
▶ Silk / Laser / Inkjet printing
▶ Control Number / Serial Number laser-marking
▶ Control Number Sticker

Device Configuration
▶ Data Pre-loading
▶ CD-ROM Partition
▶ Custom Serial Number

Other
▶ Serial Number List
▶ Custom Packaging

Memory Module

DDR4 SDRAM
DDR3 SDRAM

DDR4 SDRAM

	SO-DIMM				U-DIMM			
ECC	○		×		○		×	
Speed	PC4-19200	PC4-17000	PC4-19200	PC4-17000	PC4-19200	PC4-17000	PC4-19200	PC4-17000
Data Rate	2400 MHz	2133 MHz	2400 MHz	2133 MHz	2400 MHz	2133 MHz	2400 MHz	2133 MHz
Capacity	4 GB, 8 GB, 16 GB		4 GB, 8 GB, 16 GB		4 GB, 8 GB, 16 GB		4 GB, 8 GB, 16 GB	
DRAM	Samsung		Samsung		Samsung		Samsung	
Pins	260 pin		260 pin		288 pin		288 pin	
Height	30 mm		30 mm		31.25 mm		31.25 mm	
Voltage	1.2V		1.2V		1.2V		1.2V	
Operating Temperature	0 to 85°C		0 to 85°C		0 to 85°C		0 to 85°C	
Part Number	GN19NxxxGE-S****L*	GN17NxxxGE-S****L*	GN19NxxxGN-S****L*	GN17NxxxGN-S****L*	GD19NxxxGE-S****L*	GD17NxxxGE-S****L*	GD19NxxxGN-S****L*	GD17NxxxGN-S****L*

*Hagiwara control information

DDR3 SDRAM

	SO-DIMM		U-DIMM	
ECC	○	×	○	×
Speed	PC3L-12800		PC3L-12800	
Data Rate	1600 MHz		1600 MHz	
Capacity	2 GB, 4 GB	2 GB, 4 GB, 8 GB	2 GB, 4 GB	2 GB, 4 GB, 8 GB
DRAM	Samsung		Samsung	
Pins	204 pin		240 pin	
Height	30 mm		30 mm	
Voltage	1.35V/1.5V		1.35V/1.5V	
Operating Temperature	0 to 85°C		0 to 85°C	
Part Number	FN12N-xxGE (S*814L *	FN12N-xxGN (S*814L *	FD12N-xxGE (S*814L *	FD12N-xxGN (S*814L *

*Hagiwara control information

What are the differences between Industrial and Consumer flash storage?

	Industrial grade (SLC)	Consumer Retail products (TLC)
Applications	Embedded, Rugged Computers	Smartphones, Tablet
Write Endurance	◎ 50 ~ 100K P/E cycles per block	✕ No guaranteed cycles indicated
Data Retention Period	◎ 1 year at the end of drive life	✕ Less than 6 months at the end of drive life
Quality	◎ Fixed BOM. Built with industrial grade parts. 100% burn-in test to minimize early failure.	✕ Parts selected based on cost and availability. Unstable quality.
Supply Period	◎ 2 ~ 3 years per product cycle with advance EOL/ECN notification	✕ Unpredictable, Short product cycle
Support	◎ - Pre & Post sales consultation - Tech support - Failure & Root cause Analysis - Corrective Action Report	✕ Replacement only. No failure analysis provided.

Common Problems with Consumer Products

CASE-1

Problem

Frequent problems arise within 1 year after first use.

Cause

Product quickly reaches its lifespan and can no longer be used.

Machinery Tools

CASE-2

Problem

Despite having the same model number, some units are not recognized by the host and do not work properly.

Cause

Although seemingly identical on the outside, the parts used inside are different.

Medical Instruments

CASE-3

Problem

Product parts suddenly become EOL and are forced into requalification. This problem occurs frequently.

Cause

The consumer parts have a very short life cycle and are often discontinued without advance notice.

Auto Accessories

CASE-4

Problem

When a problem occurs, vendors are unable to offer assistance in determining the root cause thereby prolonging the issue.

Cause

The vendor has no system in place for failure analysis and only provides a replacement of failed part.

Manufacturing Equipment

Portable Virus/Malware Scanner for Offline Computers
Vaccine USB3

Vaccine USB3 enables early detection of virus/malware in windows-based offline terminals and reduces cumbersome efforts of operators.

Features

Plug & Scan
Auto-start hands free operation.

Easy to Setup
Fetches the latest definition files automatically when connected to an online PC. No dedicated server required.

Alert LED stays lit in the event of threat detection
A glance at the LED indicator provides immediate feedback whether virus is present on target system.

No threat found　　Virus/Malware detected

No Software Installation
Ideal for the systems where installation of antivirus software is difficult due to real-time performance concerns.

Scan Report
Scan log is securely stored in non-user addressable hidden memory area.

Unlimited Scan
One license for an unlimited number of scan on any client computer.

New Functions

Scheduled Scan
The scheduled scan allows users to run the scan according to the pre-configured schedule. This feature will allow users to initiate the scan at any time without having an operator present.

Difference Scan
The difference scan will scan only files that have been changed or added since the last scan and will greatly reduce scan time.

Asset Information Retrieval
Vaccine USB3 can acquire the information regarding scan target while performing the scan and record it in the scan log. This process eliminates the hassle of acquiring asset information such as hardware configuration and installed applications from offline terminals.

Vaccine USB3	
1-year License Model	ULD-VAU31A
3-year License Model	ULD-VAU33A
5-year License Model	ULD-VAU35A

Compatible OS

Win 10　8.1　8　7
Emb Standard 2009　Emb7 Standard　Emb POS Ready7
server 2016　server 2012　server 2012 R2
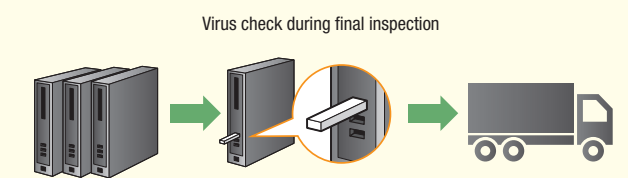server 2008 SP2　server 2008 R2 SP1

* For the latest information on Compatible OS, please visit our website.
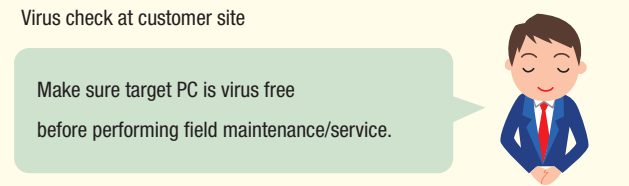
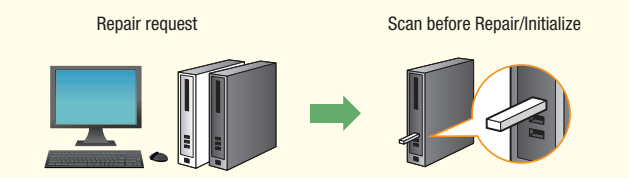## User Scenario

Preventive Maintenance of offline Terminals
Offline Terminal
Plug & Scan

Ensuring the safety of work environment at a customer site
Virus check at customer site
Make sure target PC is virus free before performing field maintenance/service.

Final Inspection before shipment
Virus check during final inspection

Checking field returns, lease-up equipment
Repair request　　Scan before Repair/Initialize

Security USB

Virus Check Function

Protects USB Drive and Files
A virus scan is performed when writing data to a USB drive and infected files are deleted immediately.

Quick Memory Scan
Scans running memory processes on the connected host PC. An alert will appear on the screen when a virus is detected.

Data Breach Prevention

Password Lock
The password-protected drive prevents unauthorized access to your data.

Always-on Hardware Encryption
On-board AES 256 encryption keeps your data safe.

Security USB Manager

Administrator Tool
Settings of the Security USB can be customized according to the corporate security and operation policy.(Optional software provided by Elecom.)

- Number of invalid password attempts
- Password Settings
- Make the device only usable on a specific PC
- Set operation period
- Copy Guard settings

Virus Protection model (powered by McAFee)

Win 10 8.1 8 7 Vista XP server 2016 server 2012 server 2012 R2 server 2008 server 2008 R2 server 2003 server 2003 R2 XP Emb　Mac 10.4~10.13 Virus check function does not work on the Mac OS platform.

HUD-PUVM3M Series　2 to 64 GB　USB3.0　128GB　Powered by McAfee

Security USB Manager compatible model
Password Lock / Virus Check / Security USB Manager / INFO BANKER / No Admin Rights
Auto Encryption / Auto Renewal / Auto Update / Autorun.inf Deletion / No Installation

Product Lineup 2 GB to 128 GB　xx = Capacity

License / Warranty period	Part Number
1-year	HUD-PUVM3xxGM1
3-year	HUD-PUVM3xxGM3
5-year	HUD-PUVM3xxGM5

HUD-PUVM3A Series　2 to 64 GB　USB3.0　128GB　Powered by McAfee

Standard model
Password Lock / Virus Check / Security USB Manager / INFO BANKER / No Admin Rights
Auto Encryption / Auto Renewal / Auto Update / Autorun.inf Deletion / No Installation

Product Lineup 2 GB to 128 GB　xx = Capacity

License / Warranty period	Part Number
1-year	HUD-PUVM3xxGA1
3-year	HUD-PUVM3xxGA3
5-year	HUD-PUVM3xxGA5

License Renewal

Access to the Security USB virus check function requires an annual subscription. You can renew your license in one of two ways.

Single License Key
A single license renewal key can be used to renew all licenses you have purchased. A proprietary activation tool allows you to renew the license of each device manually at any time.

Auto-Renewal
By registering your device serial number through a submission form, the licenses you have purchased will be automatically renewed when each device is connected to a PC with internet connection.

1-year License Extension	Product Number
Renewal license (1-year warranty)	HUD-PUVM1L

Data Breach Prevention model (Password Locker 4)

Win 10 8.1 8 7 Vista XP 2000 server 2016 server 2012 server 2012 R2　Mac 10.4~10.13
server 2008 server 2008 R2 server 2003 server 2003 R2 XP Emb

Password Locker 4　2 to 64 GB　USB3.0　128GB

Password Lock / Virus Check / Security USB Manager / INFO BANKER / No Admin Rights
Auto Encryption / Auto Renewal / Auto Update / Autorun.inf Deletion / No Installation

Product Lineup 2 GB to 128 GB　xx = Capacity

Part Number
HUD-PL3xxGM

Security USB Custom Options

Kitting Service
Apply the setting created by Security USB manager to production units.
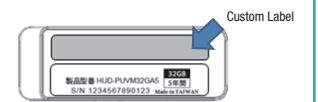
Custom Label
Attach label containing information specified by the customer.

Serial Number List
The list of physical and electronic serial number
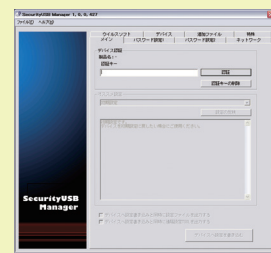
Custom Serial Number
Customize a part of electronic serial number.

Custom Label

*Some security functions may not be available depending on the host environment. Please contact us for detailed compatibility information.
*Part of the memory capacity is reserved for management purpose, hence the actual free space will be less than label capacity.

29　Vaccine USB3　　　　Security USB　30

Security USB Manager Administrative tool for Security USB products

Security USB Manager
HUD-SUMA

Win | 10 | 8.1 | 8 | 7 SP1 | Vista SP2 | XP SP3
*Windows XP (32-bit only)

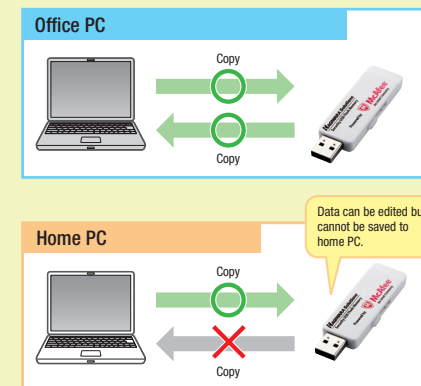| Supported Security USB Models			
Password Locker 3	HUD-PUVMM series	HUD-PUVSM series	MF-PUVTM series
Password Locker 4	HUD-PUVM3M series	HUD-PUVS3M series	MF-PUVT3M series

Features

Password Policy
Sets password length, maximum number of invalid attempts, expirations, etc.

Lockdown Device Recovery
Security USB locks down after pre-configured number of invalid attempts. This tool allows administrator to recover the locked device.

Prohibit the use on unauthorized PCs.
Users can use the device only on the computers that meet specific conditions.

Device Expiration
Device can be locked after expiration date. The duration can be set by day.

Copy Guard Function
When enabled, the files on Security USB products cannot be saved to unauthorized PCs. Other restriction policies include prohibiting printout, Internet access, screen captures and so on.

Office PC
Copy
Copy

Home PC
Copy
Copy
Data can be edited but cannot be saved to home PC.

10Key Security USB

OS-independent Secure USB Flash Drive

Integrated Numerical Keypad
AES 256 bit Hardware Encryption

Features

OS Independent	Data Breach Prevention	Rugged and Durable
Can be used on any device with a USB port.	Keypad authentication for drive access AES-256 Hardware Encryption	Water & dust-proof aluminum body

10Key Security Usb

Product Lineup 8GB

Part Number
HUD-PUTK308GA1

The USB3.0 flash drive protects your data with AES256 encryption. The built-in keypad does not rely on the type of OS and allows drive unlock without using input devices. This makes it ideal for use with special-purpose terminals such as a machine tool that may lack a keyboard.

CD-ROM in the form of a USB memory
CD Memory2

A USB flash drive that appears as a USB CD-ROM. A proprietary writing software required.

Application examples
· Install media for the computer without an optical drive.
· Secure offline data distribution media that keep data free from tampering, accidental erasure, and virus infection
- USB Boot media for firmware update, system recovery

Product Lineup 4GB to 32GB xx=capacity

Model	Capacity	Part Number
USB 2.0 Model	4 GB	HUD-CDM2-xxGU2A
USB 3.0 Model	8 GB/16 GB/32 GB	HUD-CDM2-xxGU3A

Proprietary Writing Software
CDM2 Kitting Tool is an optional software tool that can write up to 16 devices simultaneously.
*The free version (CDM2 Writer) can write one device at a time.

Product Name	Part Number
CDM2 Kitting Tool	HUD-CDM2-KT100A

Product / Service Features

Static Wear Leveling
Maximize drive life by distributing write operation evenly across the entire memory space.

Refresh
Prevents read errors from occuring by reallocating the data from the block with reduced data retention.

Patrol Function
Flash blocks with reduced data retention are patrolled and refreshed in the background to prevent errors from occuring.

Read Retry
Accurately reads data from memory cell with reduced data retention by calibrating optimal read threshold voltage.

Power Loss Alert
Once an alert signal is received from the host, flash access will be denied to minimize device corruption and data loss.

Fixed BOM
Parts, controllers, firmware version are fixed to deliver consistent performance and quality.

TCG Opal 2.0
Provides various security features such as preboot authentication, access control, and centralized management when combined with TCG Opal compatible software.

S.M.A.R.T.
The SSD's health status can be monitored through S.M.A.R.T. commands.

Life Indicator LED
Provides visual feedback of remaining SSD life.

Device Sleep
Greatly reduces standby power consumption of host system.

Wide Temperature
For maximum reliability, only NAND flashes that have passed rigorous testing are used.

Power Loss Recovery
Built-in recovery algorithm protects SSD data from corruption during power failure.

Live Monitor
Gathers SSD health information to estimate drive life and help optimize SSD configuration.

Drive Monitor
Gathers SSD health information to estimate drive life and provides in-depth SSD access pattern analysis for system performance optimization.
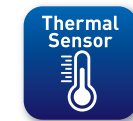
Thermal Sensor
The temperature of components on the board can be quantified and read via S.M.A.R.T. command.

RoHS Compliant
Complies with EU RoHS Directive which limits the use of hazardous substances.

Article Information Sheet
AIS document is available upon request for all fixed BOM products.

Virtual Write Filter
Provides an additional data protection layer to UWF-enabled Windows® 10 environment.

Part Number Rules

3D NAND SSD   SN 2 S - 120G F 00 J N

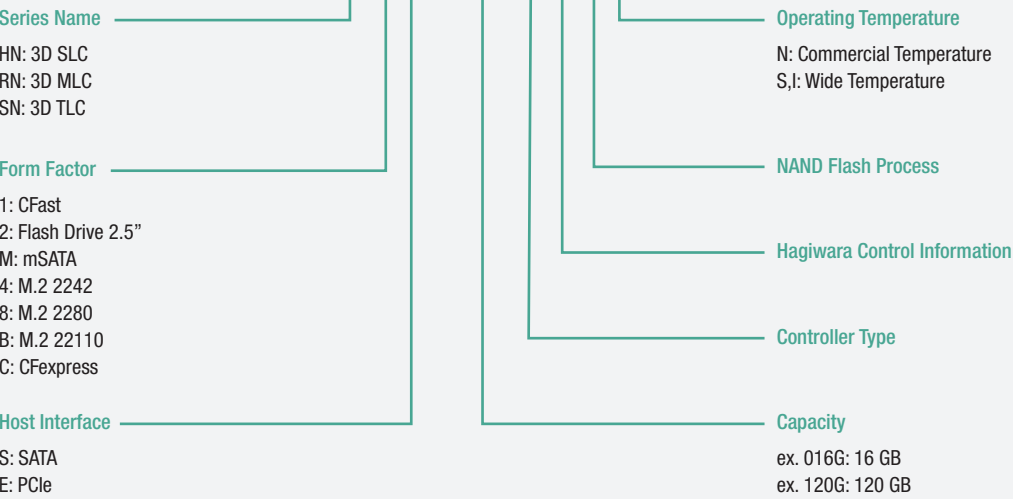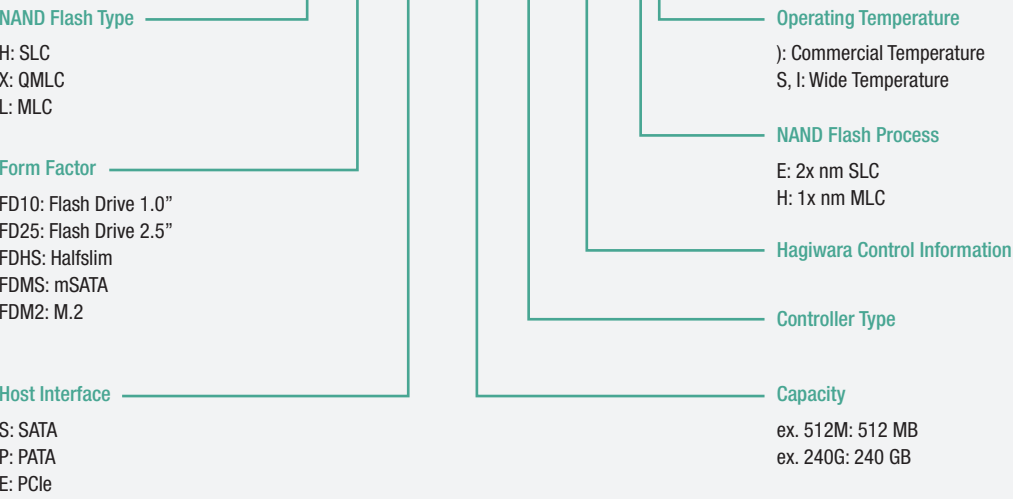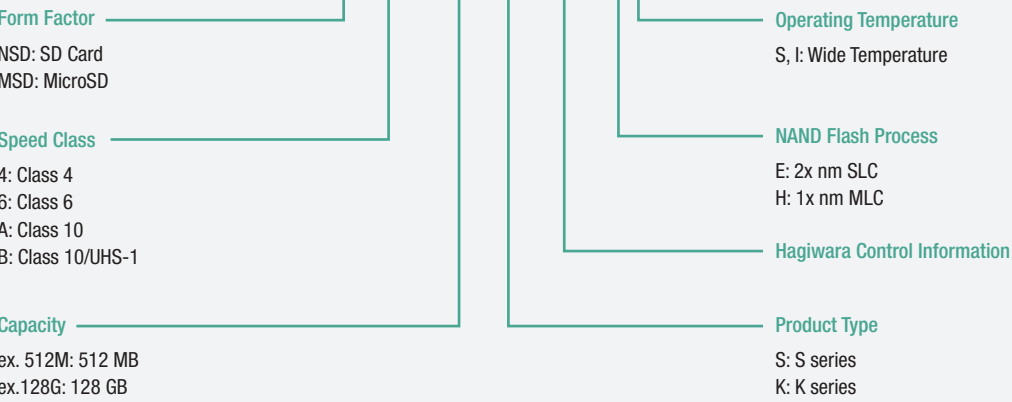**Series Name**
HN: 3D SLC
RN: 3D MLC
SN: 3D TLC

Form Factor
1: CFast
2: Flash Drive 2.5"
M: mSATA
4: M.2 2242
8: M.2 2280
B: M.2 22110
C: CFexpress

Host Interface
S: SATA
E: PCIe

Operating Temperature
N: Commercial Temperature
S,I: Wide Temperature

NAND Flash Process

Hagiwara Control Information

Controller Type

Capacity
ex. 016G: 16 GB
ex. 120G: 120 GB

SD   NSD A - 001G S (A**A E I

Form Factor
NSD: SD Card
MSD: MicroSD

Speed Class
4: Class 4
6: Class 6
A: Class 10
B: Class 10/UHS-1

Capacity
ex. 512M: 512 MB
ex.128G: 128 GB

Operating Temperature
S, I: Wide Temperature

NAND Flash Process
E: 2x nm SLC
H: 1x nm MLC

Hagiwara Control Information

Product Type
S: S series
K: K series

2D NAND SSD   H FD25 S - 240G D (A**A E)

NAND Flash Type
H: SLC
X: QMLC
L: MLC

Form Factor
FD10: Flash Drive 1.0"
FD25: Flash Drive 2.5"
FDHS: Halfslim
FDMS: mSATA
FDM2: M.2

Host Interface
S: SATA
P: PATA
E: PCIe

Operating Temperature
): Commercial Temperature
S, I: Wide Temperature

NAND Flash Process
E: 2x nm SLC
H: 1x nm MLC

Hagiwara Control Information

Controller Type

Capacity
ex. 512M: 512 MB
ex. 240G: 240 GB

USB   UB A 3 – 004G H (A** S E)

Form Factor
UB: USB Memory
US: USB Memory (compact size)

Product Type
A: H series
B: K series

Host Interface
2: USB 2.0
3: USB 3.0

Capacity
ex. 512M: 512 MB
ex. 128G: 128 GB

Hagiwara Control Information

Operating Temperature
): Commercial Temperature
I: Wide Temperature

NAND Flash Process
E: 2x nm SLC
H: 1x nm MLC

NAND Flash Type
S: SLC
Q: QMLC
M: MLC

Hagiwara Control Information