MEDICAL

INDUSTRIAL

FLEXON

AUTOMOTIVE

Leading Industrial NAND Storage Solutions Provider

About Us

FLEXXON, the world's leader in designs, manufactures and markets Industrial NAND Flash Storage Solution products with 100% focus on niche market. We apply our profound knowledge to serve and support tailored specifically for Industrial, Medical and Automotive (IMA) applications and customers globally who desire the highest level of reliability, endurance and wide operating temperature ranges.

At **FLEXXON**, our mission is to be your preferred & reliable partner for Flash Storage and Memory Solution provider. We guarantee the highest standard of quality and product reliability.

Full Product Qualification Test from Component, System to Production

Full Reliability Test includes Mechanical Test, Environmental Test, Packaging and Printing Test.

Industrial

Medical

Automotive

WHY FLEXXON

Long Product Life

Fixed BOM

Industrial Grade

Special Capacity & Customize MemorySolution

Strong Technical Support

Support HMLV (High-Mixed Low Volume)

Industrial Applications

ATM MACHINE

EMBEDDED SYSTEM

AGRICULTURAL MACHINERY

AUTOMOTIVE

GAMING

MEDICAL DEVICES

MUSICAL INSTRUMENTS

HANDHELD DEVICES

MILITARY

POS TERMINAL

SECURITY SYSTEM

TEST & MEASUREMENT

RUGGED COMPUTER

SOLUTION PRINTER

VENDING MACHINE

Industrial Grade

Industrial Grade			Temperature
		Automotive AEC – Q100 Grade 2	-40° C ~ +105° C
		Automotive AEC – Q100 Grade 3	-40° C ~ +85° C
		Diamond	-40° C ~ +85° C
		Gold	-25° C ~ +85° C
		Silver	0° C ~ 70° C
		Commercial	0° C ~ 70° C

FLEXXON Product Feature

Interface		SATA	PATA	PCIe	USB	eMMC	SD/microSD
Industrial Wide Temperature		❖	❖	❖	❖	❖	❖
Vibration & Shock Resistance		❖	❖	❖	❖	❖	❖
EMI & ESD Safe		❖	❖	❖	❖	❖	❖
S.M.A.R.T		❖	❖	❖	❖	❖	❖
AES Security		❖	✕	❖	❖	✕	✕
Power Loss Protection		❖	○	❖	○	○	○
Pseudo SLC	pSLC	❖	❖	✕	❖	❖	❖

❖ Standard   ✕ Not Available   ○ Firmware Algorithm (Optional)

Customization Services

We are open to all other customization services which are not listed in here.

Bill of Materials Customization

Firmware Customization

PCB Re-layout

BGA Underfill

Conformal Coating

Product ID / Parameters
Pre-loaded Content
Format Load
Packaging
Label Printing
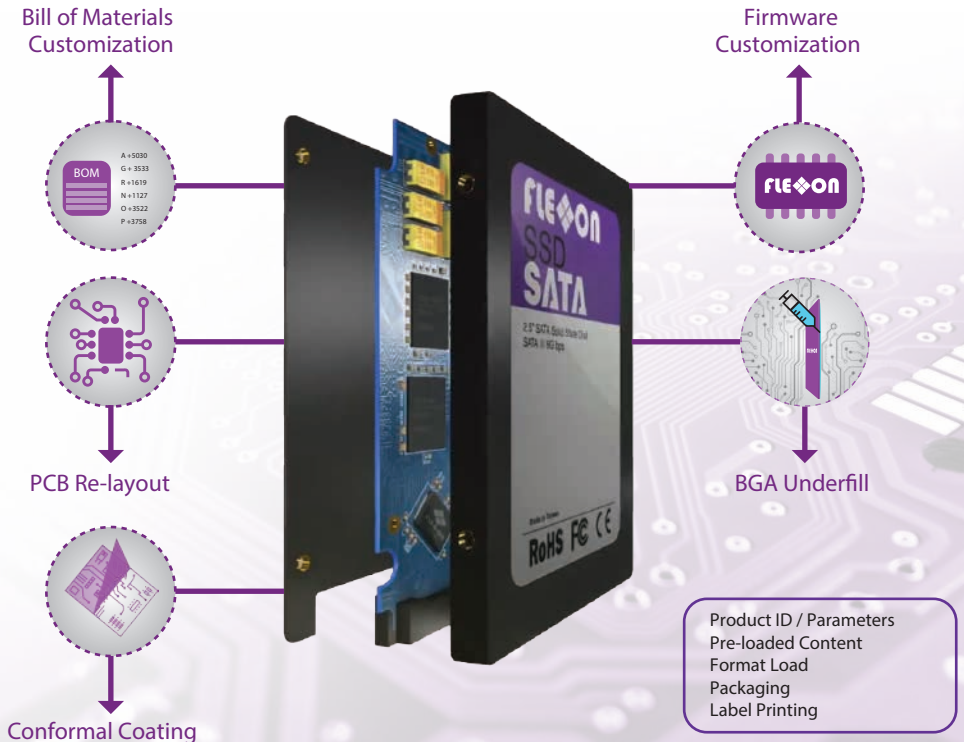
SATA SERIES

SATA Series	INSPIRE	ACHIEVER	XTREME
Feature	High Endurance & Wide Compatibility with 3D NAND Suitable for Multi-Tasking Applications Support Hardware PLP	High Performance & High Density Suitable for Main Storage Applications	High Performance & DRAM-less design Perfect for Embedded Applications
Interface	SATA III	SATA III	SATA III
Form Factor	2.5", M.2 2242/2260/2280, mSATA	2.5", Half Slim, mSATA, M.2 2242/2260/2280, CFast, SATA DOM	2.5", Half Slim, mSATA, mSATA mini, M.2 2242/2260/2280, CFast, uSSD, SATA DOM
Flash Type	3D TLC, 3D pSLC	SLC, MLC, pSLC	SLC, MLC, pSLC, 3D TLC, 3D pSLC
Capacity	3D TLC: 64GB ~ 2TB 3D pSLC: 16GB~256GB	SLC: 4GB ~ 128GB MLC: 8GB ~ 1TB pSLC: 4GB~256GB	SLC: 8GB ~ 128GB MLC: 4GB ~ 512GB pSLC: 2GB ~ 256GB 3D TLC: 16GB ~ 1TB 3D pSLC: 32GB ~ 128GB
Max. Performance	Read: 550 MB/s Write: 530 MB/s	Read: 510 MB/s Write: 430 MB/s	Read: 550 MB/s Write: 500 MB/s
Grade	Industrial	Industrial	Industrial / Commercial

SATA Series	XCEL	GALAXY	VALUE
Feature	Ultra High Density & Ultimate Performance Competent for Enterprise Applications	Enchanced Reliability & Security Design for Military Application	Low Cost & Low Density Ideal for Module and Embedded Applications
Interface	SATA III	SATA III	SATA II
Form Factor	2.5", M.2 2280	2.5"	2.5", mSATA
Flash Type	3D TLC	SLC, MLC	SLC
Capacity	3D TLC: 128GB ~ 8TB	SLC: 32GB ~ 512GB MLC: 64GB ~ 1TB	SLC: 2GB ~ 64GB
Max. Performance	Read: 550 MB/s Write: 530 MB/s	Read: 520 MB/s Write: 440 MB/s	Read: 230 MB/s Write: 200 MB/s
Grade	Industrial / Commercial	Military	Industrial

PCIe SERIES

PCIe Series	DEX	HIX	VELOX-T
Feature	High Speed & Compatibility Suitable for Main Storage & Client Applications	Ultimate Performance & Density Perfect for Enterprise Applications	DRAM-Less design Best for Embedded Applications
Interface	PCIe Gen 3×4, NVMe 1.3	PCIe Gen 3x4, NVMe 1.3	PCIe Gen 3x2, NVMe 1.3
Form Factor	M.2 2280	U.2, M.2 2280, AIC	M.2 2242/2280, uSSD, CFX
Flash Type	3D NAND	3D NAND	3D NAND
Capacity	128GB ~ 1TB	128GB ~ 8TB	32GB ~ 512GB
Max. Performance	Read: 2400 MB/s Write: 1700 MB/s	Read: 3200 MB/s Write: 3000 MB/s	Read: 1500 MB/s Write: 950 MB/s
Grade	Industrial	Industrial / Commercial	Industrial / Commercial

PATA SERIES

PATA Series	LEGACY II	LEGACY III	CLASSIC	CLASSIC II		PRESTO
Feature	High Compatibility & High Reliability Best for Rigorous Applications	High Compatibility & High Performance Support Power Loss Protection	Wide Compatibility & High Reliability Suitable for Embedded Applications	High IOPS Performance High Capacity & High Reliability Support AES Encryption		Ultra Performance Fit for DSLR with VPG 65
Compliance	CF Spec Ver. 4.1 Ultra DMA Mode 6	CF Spec Ver. 6.x Ultra DMA Mode 7	Ultra DMA Mode 4	Ultra DMA Mode 6	CF Spec Ver. 6.1 Ultra DMA Mode 6	CF Spec Ver. 6.x Ultra DMA Mode 7
Form Factor	CF Card	CF Card	PATA DOM	2.5" PATA SSD	CF Card	CF Card
Flash Type	SLC,	SLC, MLC, pSLC	SLC	SLC, MLC, pSLC		3D NAND
Capacity	SLC: 128MB ~ 16GB	SLC: 4GB ~ 32GB MLC: 8GB ~ 128GB pSLC: 4GB ~ 64GB	128MB ~ 4GB	SLC: 1GB ~ 128GB MLC: 4GB ~ 1TB pSLC: 8GB ~ 128GB	SLC: 1GB ~ 64GB MLC: 4GB ~ 512GB pSLC: 8GB ~ 128GB	16GB ~ 256GB
Max. Performance	Read: 51MB/s Write: 40MB/s	Read: 106MB/s Write: 80MB/s	Read: 43MB/s Write: 28MB/s	Read: 106MB/s Write: 80MB/s	Read: 86 MB/s Write: 75 MB/s	Read: 160MB/s Write: 145MB/s
Grade	Industrial	Industrial	Industrial	Industrial	Industrial	Commercial

USB SERIES

USB Series	FxU2 I	FxU2 III	FxU3 I	FxUA	
Feature	Standard Performance	Standard Performance Support 3D NAND	High Performance Enhanced Reliability Solution	High Reliability Solution with 3D NAND High IOPS Solution	
Interface	USB 2.0	USB 2.0	USB 3.1 GEN 1	USB 3.1 GEN 1	USB 2.0
Form Factor	Pen Drive	Pen Drive	Pen Drive	Pen Drive	USB DOM (10- pin)
Flash Type	SLC, MLC	3D TLC	SLC, pSLC, MLC	3D TLC, 3D pSLC	
Capacity	SLC: 128MB ~ 32GB MLC: 4GB ~ 64GB	3D TLC: 16GB ~ 128GB	SLC: 1GB ~ 16GB MLC: 4GB ~ 128GB pSLC: 2GB ~ 64GB	3D TLC: 16GB ~ 512GB 3D pSLC: 4GB ~ 64GB	3D TLC: 16GB ~ 256GB 3D pSLC: 4GB ~ 64GB
Max. Performance	Read: 30 MB/s Write: 20 MB/s	Read: 30 MB/s Write: 20 MB/s	Read: 190 MB/s Write: 95 MB/s	Read: 220 MB/s Write: 100 MB/s	Read: 30 MB/s Write: 24 MB/s
Grade	Commercial	Commercial	Industrial	Industrial / Commercial	Industrial

| USB Series	FxUH	FxUS	FxLocker	FxFP
Feature	High Compatibility & Reliability Support High IOPS & AES	Wide Compatibility Solution with 3D NAND	AES Security & High Performance Solution with 3D NAND	Biometric Fingerprint Identification & AES Security Solution
Interface	USB 2.0 & USB 3.1 Gen 1	USB 2.0 & USB 3.1 Gen 1	USB 3.1 GEN 1	USB 3.1 GEN 1
Form Factor	USB DOM (10-pin & 20-pin)	USB DOM (10-pin & 20-pin)	Pen Drive	Pen Drive
Flash Type	SLC, MLC	MLC, 3D TLC	3D TLC	3D TLC
Capacity	SLC: 1GB ~ 32GB MLC: 4GB ~ 128GB	MLC: 16GB - 256GB 3D TLC: 64GB ~ 512GB	16GB ~ 64GB	16GB ~ 512GB
Max. Performance	Read: 200 MB/s Read: 150 MB/s	Read: 102 MB/s Write: 86 MB/s	Read: 160 MB/s Write: 120 MB/s	Read: 80 MB/s Write: 60 MB/s
Grade	Industrial	Industrial	Commercial	Commercial

MEMORY CARD SERIES

Memory Card Series	FxPro I	FxPro I HighIOPS	FxPro III	FxPrem II
Feature	High Performance	High IOPS Solution	Extreme Performance	Embedded System Solution
Interface	SD 3.0/6.1	SD 6.1	SD 6.1	SD 3.0
Speed Class	up to Class 10	up to Class 10	up to Class 10	up to Class 10
UHS mode	UHS-I	UHS-I	UHS-II	UHS-I
Flash Type	SLC, MLC, pSLC	SLC, MLC, pSLC	3D TLC, 3D pSLC	SLC, MLC, pSLC
Capacity	SLC: 128MB ~ 32GB MLC: 1GB ~ 128GB pSLC: 2GB ~ 64GB	SLC: 512MB ~ 16GB MLC: 4GB ~ 32GB pSLC: 2GB ~ 16GB	3D TLC: 64GB ~ 256GB 3D pSLC: 32GB~ 256GB	SLC: 4GB ~ 32GB MLC: 8GB ~ 256GB pSLC: 4GB ~ 128GB
Max. Performance	Read: 95 MB/s Write: 90 MB/s	Read: 95 MB/s Write: 90 MB/s	Read: 280 MB/s Write: 245 MB/s	Read: 95 MB/s Write: 80 MB/s
Grade	Industrial / Commercial	Industrial / Commercial	Commercial	Industrial
Function	**Industrial Grade** Support SMART Tool (SD Life Monitor Tool) Support Auto-Read Refreshment Support Power Loss Management			

| Memory Card Series	WORM	FxStd	FxAdv	FxMav
Feature	Write Once Read Many Solution	High Compatibility	High IOPS Solution with 3D NAND	Advance High IOPS Solution High Capacity
Interface	SD 6.1	SD 3.0	SD 6.1	SD 6.x
Speed Class	up to Class 10	up to Class 10	up to Class 10	up to Class 10
UHS mode	UHS-I	UHS-I	UHS-I	UHS-I
Flash Type	MLC	MLC, pSLC	3D TLC, 3D pSLC	3D TLC, QLC
Capacity	4GB ~ 256GB	MLC: 4GB ~ 64GB pSLC: 4GB ~ 32GB	3D TLC: 8GB ~ 256GB 3D pSLC: 4GB ~ 64GB	16GB ~ 1TB
Max. Performance	Read: 72 MB/s Write: 15 MB/s	Read: 80 MB/s Write: 55 MB/s	Read: 95 MB/s Write: 90 MB/s	Read: 100 MB/s Write: 90 MB/s
Grade	Industrial	Industrial	Industrial / Commercial	Industrial / Commercial
Function	**Industrial Grade** Support SMART Tool (SD Life Monitor Tool) Support Auto-Read Refreshment Support Power Loss Management			
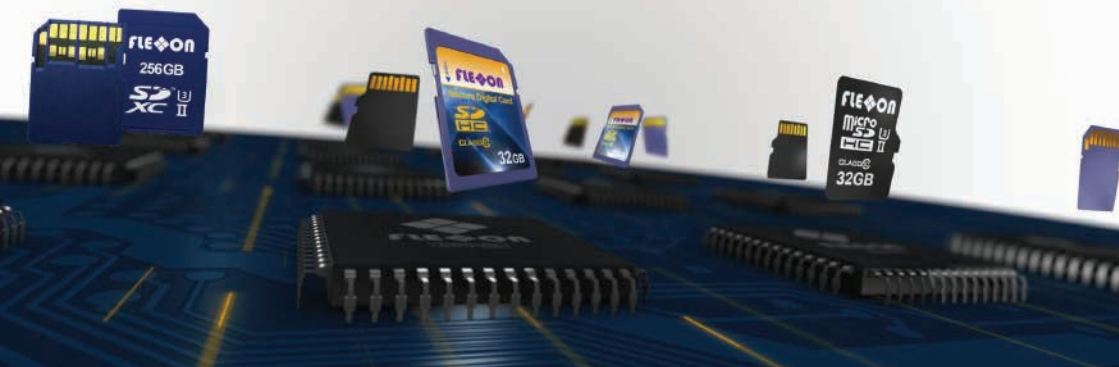
eMMC SERIES

eMMC Series	XTRA III	XTRA IV	XTRA V
Interface	eMMC 5.0/4.x	eMMC 5.0/ 4.x	eMMC 5.1/4.x
Flash Type	MLC, pSLC	MLC, pSLC	3D TLC, 3D pMLC, 3D pSLC
Pin Count	153-ball/ 100-ball	153-ball/ 100-ball	153-ball
Capacity	MLC: 4GB ~ 64GB pSLC: 2GB ~ 32GB	MLC: 4GB ~ 64GB pSLC: 2GB ~ 32GB	3D TLC: 16GB ~ 128GB 3D pMLC: 8GB ~ 16GB 3D pSLC: 4GB ~ 32GB
Max. Performance	Read: 270 MB/s Write: 150 MB/s	Read: 270 MB/s Write: 150 MB/s	Read: 270 MB/s Write: 150 MB/s
Grade	Industrial	Automotive	Industrial/Automotive

FLEXXON INDUSTRIAL QUALITY SOLUTIONS

- Advanced Flash Management
- Endurance Life Test
- Industrial PCB/Substrate Layout ComplianceDesign
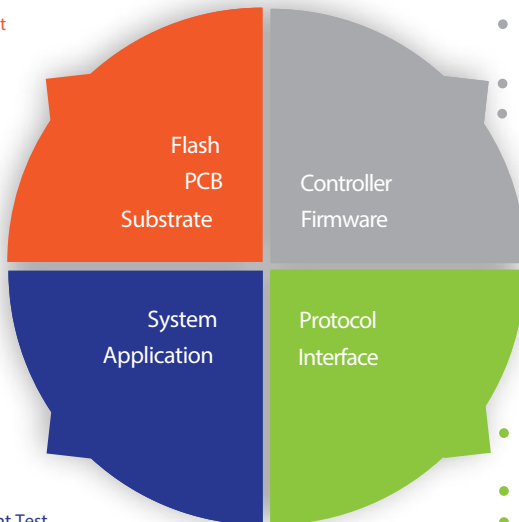
- Endurance and Stability of Wear Leveling
- Data Integrity
- Performance Gradation and Latency

Flash PCB Substrate

Controller Firmware

System Application

Protocol Interface

- BIOS/Chipset Compatibility
- Performance & Power Consumption Optimization
- Mechanical Test/Environment Test

- Protocol & Signal Integrity and Reliability
- Electrical Noise &InterfaceTest
- Temperature Sensitiveness

FLEXXON SSD DATA SECURITY TECHNOLOGY

DATA SECURITY

- AES Encryption
- Intelligence Erase
- Physical Destruction
- Write Protect

FLEXXON SSD DATA PROTECTION TECHNOLOGY

01 **xFlush**
Avoid data loss at SPOR

02 **INTELLIGENTFlush**
Avoid pair-page effect of flash

03 **Power Loss Protection**
With super cap/tantalum cap

04 **RAID ECC + LDPC**
Advanced error correction to fight against errors caused by NAND.

05 **SRAM SEC**
Single bit error correct in SRAM.

06 **End to End Data Protection**
Data is defensive in the path of data transfer.

07 **SmartRefresh**
ECC scan to against read disturb.

FLEXXON SD/microSD DATA RELIABILITY TECHNOLOGY

Auto-Read Refresh Management
Reduce the chances of uncorrectable errors, resulting from repeated read.
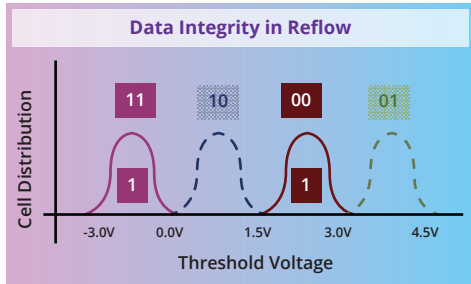
Power Loss Management
UECC may occur during power interrupted writes, due to pair page issue of MLC. FW moves the valid data before UECC page to new block, minimizing data loss.

Advanced Wear Leveling
For special or customized OS, it could optimize wear leveling, and extend the life span.

FLEXXON eMMC INTELLIGENT TECHNOLOGY

Data Integrity in Reflow

Data Integrity in Reflow

Cell Distribution

11 — 1
10
00 — 1
01

Threshold Voltage

-3.0V   0.0V   1.5V   3.0V   4.5V

Data Integrity in Reflow

Leverage strong pages from NAND flash, and prevent data loss in reflow process.

Dynamic Wear Leveling

Dynamic Wear Leveling

Red : Static data such as system data.
Blue : Dynamic data such as user data

Write/Erase Count

0 1 2 3 4 5 6 7 8 9 10 11 12 . . N

Physical Block Address

Dynamic Wear Leveling

To keep important data without moving, dynamic wear leveling could concentrate the write/erase only on the dynamic block.

Auto Read Refresh

Auto Read Refresh
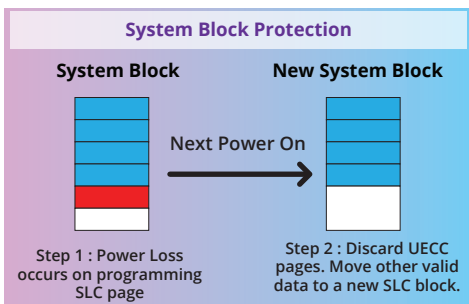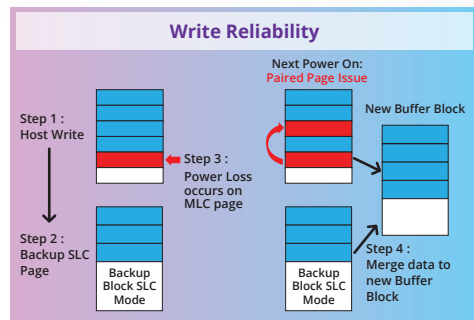
⬤ Block with correctable ECC
✖ Error Erased Block
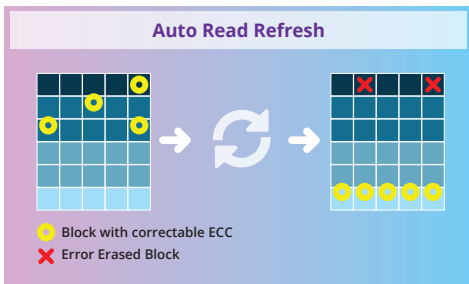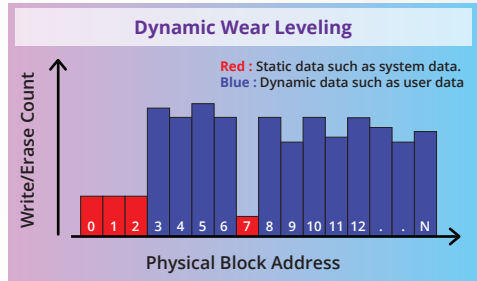
Auto Read Refresh

Good for read intensive applications. Firmware will auto-refresh the bit errors when they are approaching the pre-set threshold level.

Write Reliability

After sudden power loss and next power on, eMMC will scan buffer block until last programmed page. If ECC Uncorrectable or higher ECC error bit occurs, FW will stop scanning and discard these pages, then copy valid data to new buffer block in order to save the data.

Write Reliability

Next Power On:
Paired Page Issue

New Buffer Block

Step 1 :
Host Write

Step 3 :
Power Loss occurs on MLC page

Step 2 :
Backup SLC Page

Backup Block SLC Mode

Step 4 :
Merge data to new Buffer Block

Backup Block SLC Mode

System Block Protection

System Block Protection

System Block   New System Block

Next Power On

Step 1 : Power Loss occurs on programming SLC page

Step 2 : Discard UECC pages. Move other valid data to a new SLC block.

System Block Protection

eMMC system information is stored in SLC area for better robustness. When FW finds UECC pages caused by sudden power loss, those pages would be discarded and move other valid data to a healthy block.

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