FLE☒ON
CYBERSECURITY INDUSTRIAL MEDICAL AUTOMOTIVE

WHO
WE ARE

FLE◆◆ON

Flexxon designs, manufactures and markets Industrial NAND Flash Storage solutions and products, serving

specifically the **CYBERSECURITY,**

INDUSTRIAL, MEDICAL & AUTOMOTIVE (IMA) verticals.

CYBER SECURITY

AUTOMOTIVE

INDUSTRIAL
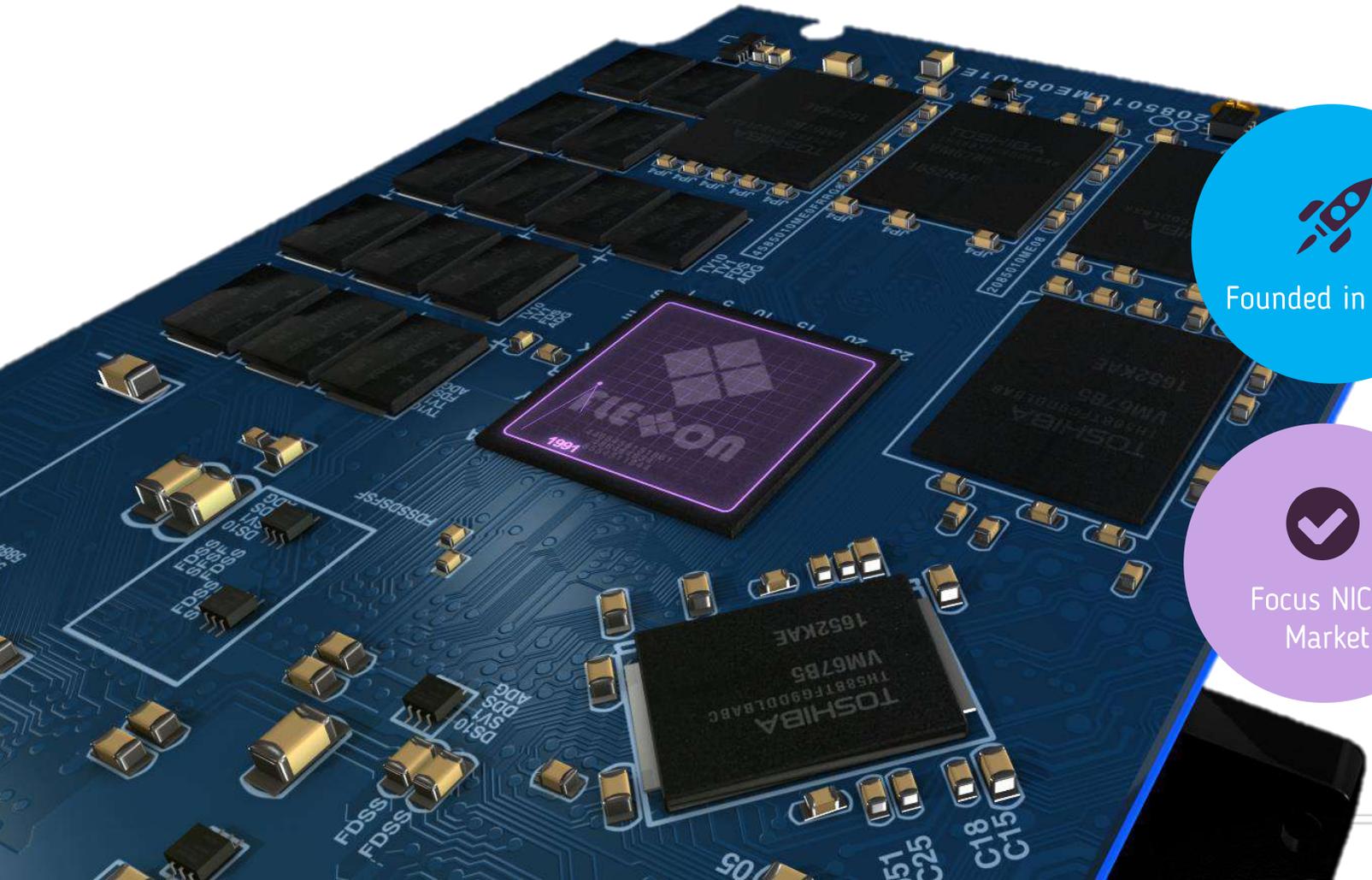
MEDICAL

TOP BRAND FOR
CYBERSECURITY, INDUSTRIAL, MEDICAL & AUTOMOTIVE (IMA) market

Founded in 2001

HQ : Singapore

Industrial NAND Product

Focus NICHE Market

Offices in Asia Countries

Sales Representative worldwide

Mission Statement

FLEXON

To Our Customer

To be your preferred & reliable partner for Flash Storage and Memory Solution provider

For Business Partner

Your valued & responsive business partner worldwide with your comprehensive product mix of memory solutions

To Our Shareholder

Continuously create value to achieve diverse, innovative product and unique supply chain solutions

To Our Employee

Provide conducive environment for personal development and fulfilment

Product Portfolio

SSD

PCIE/SATA/ PATA FLASH MODULE

USB DRIVE

CF/CFAST/CFX CARD

MICROSD/ SD CARD

USSD (BGA) MO-276

EMMC (BGA)

CUSTOMISATION

Memory Market Problems and Challenges to CIMA
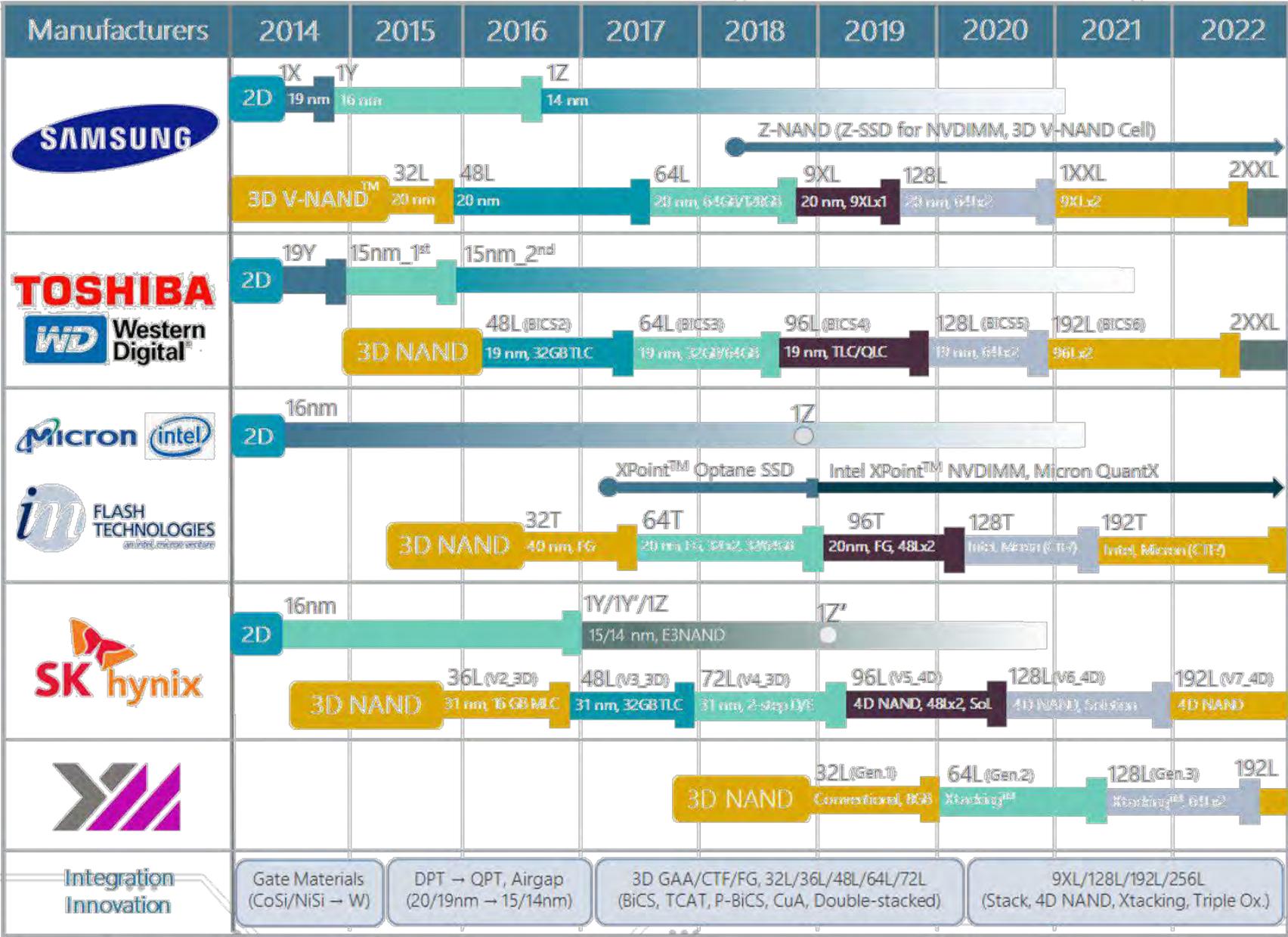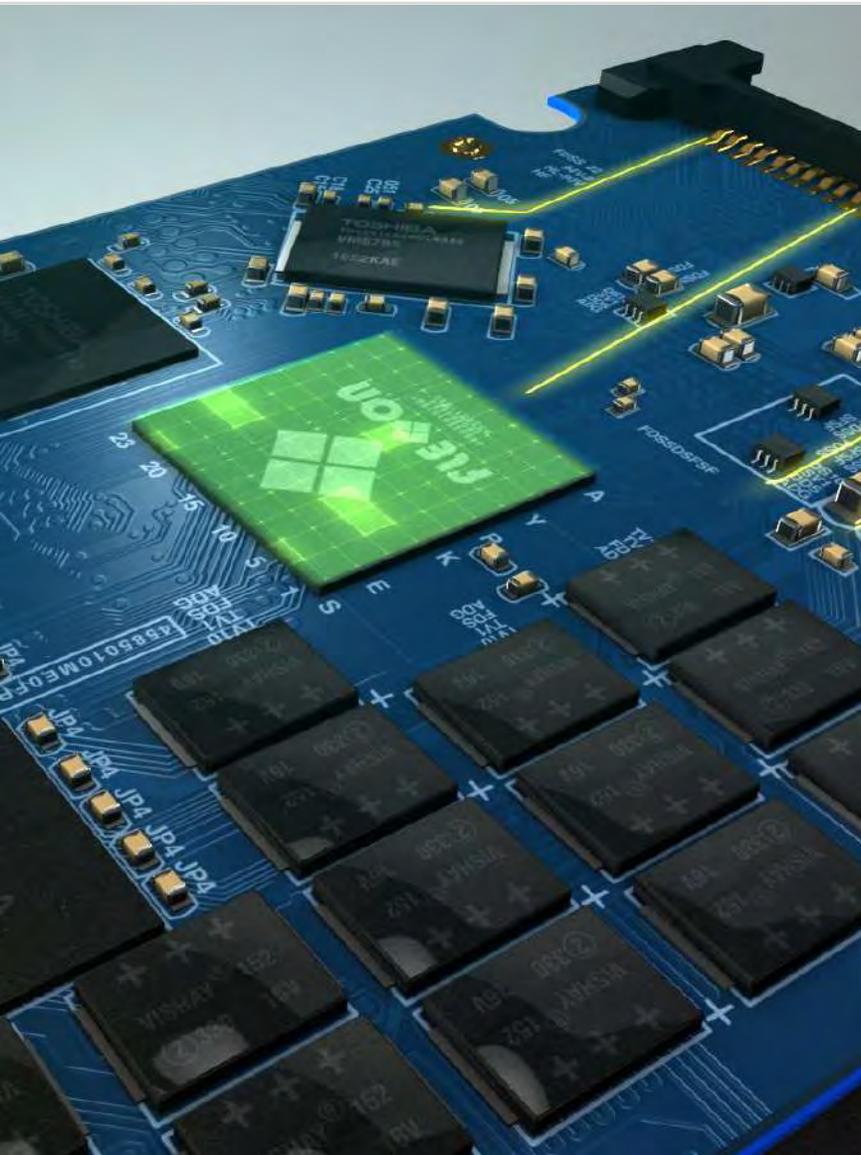
10% of total memory market for CIMA Maker's focus on 90% PC/ Smart Phone market
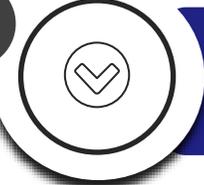
Short memory life
Die change frequently

High Fluctuation –
Price / Allocation

Non-Fixed BOM

Our Value

LONG PRODUCT LIFE

FIXED BOM

INDUSTRIAL GRADE

SPECIAL CAPACITY & CUSTOMIZE MEMORY SOLUTION

STRONG TECHNICAL SUPPORT

SUPPORT HMLV(HIGH-MIXED LOW VOLUME)

Longevity Assurance

- We do not EOL any solutions
- A solution goes retired due to lack of demand of supported flash
- FLEXXON can assist extending the MLC life to 3-5 years
- To maintain supply, requires advance forecast / PO

- We guarantee same form factor / same capacity size.
- Life Cycle Support at least 10 years

Product Lifecycle

3D TLC

2D MLC

SLC

2D VS 3D NAND

2D NAND   3D NAND

FIXED BOM

Same Form Factor/ Same Capacity Size

10+ years

2.5   5   7.5   Years

Longevity Assurance – HOW?

Controller + F.W Customization

Host Processor

NAND Interface

Host I/F

Buffer

NAND Flash I/F

Control and State Machine

Power Management

ECC

Wear Leveling

Bad Block Management

Main NAND Storage
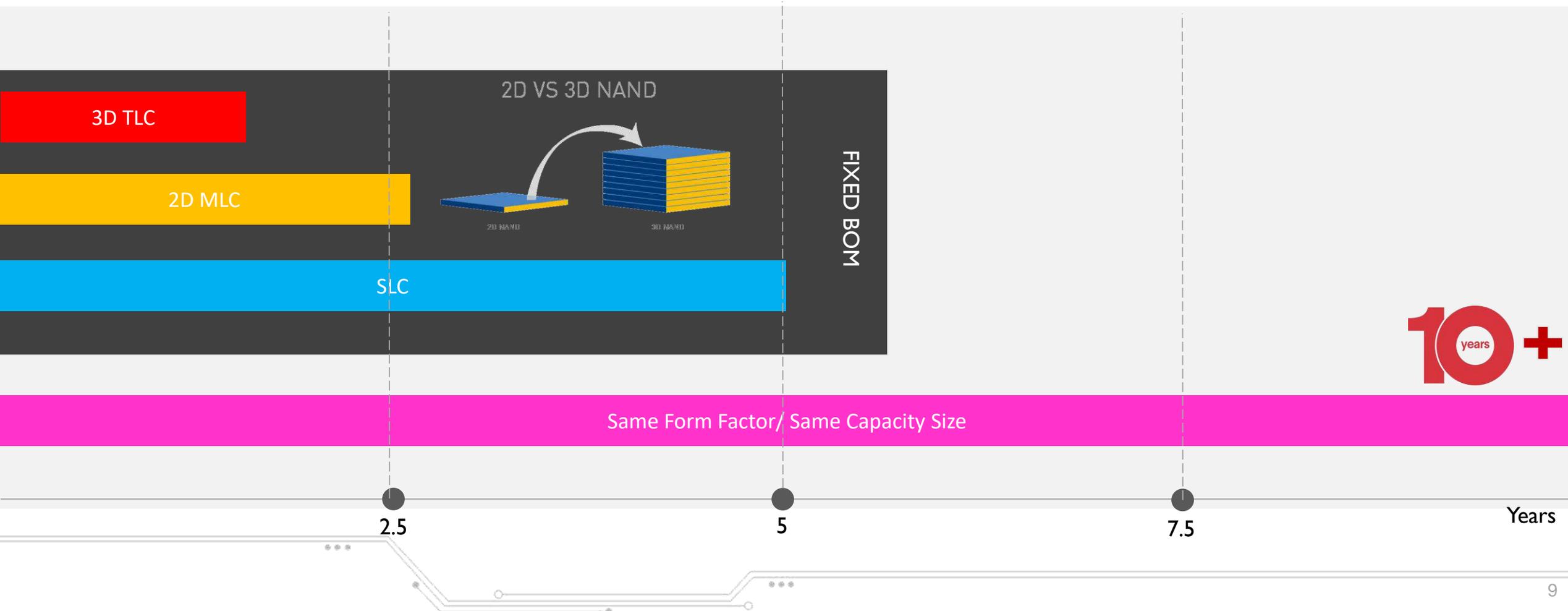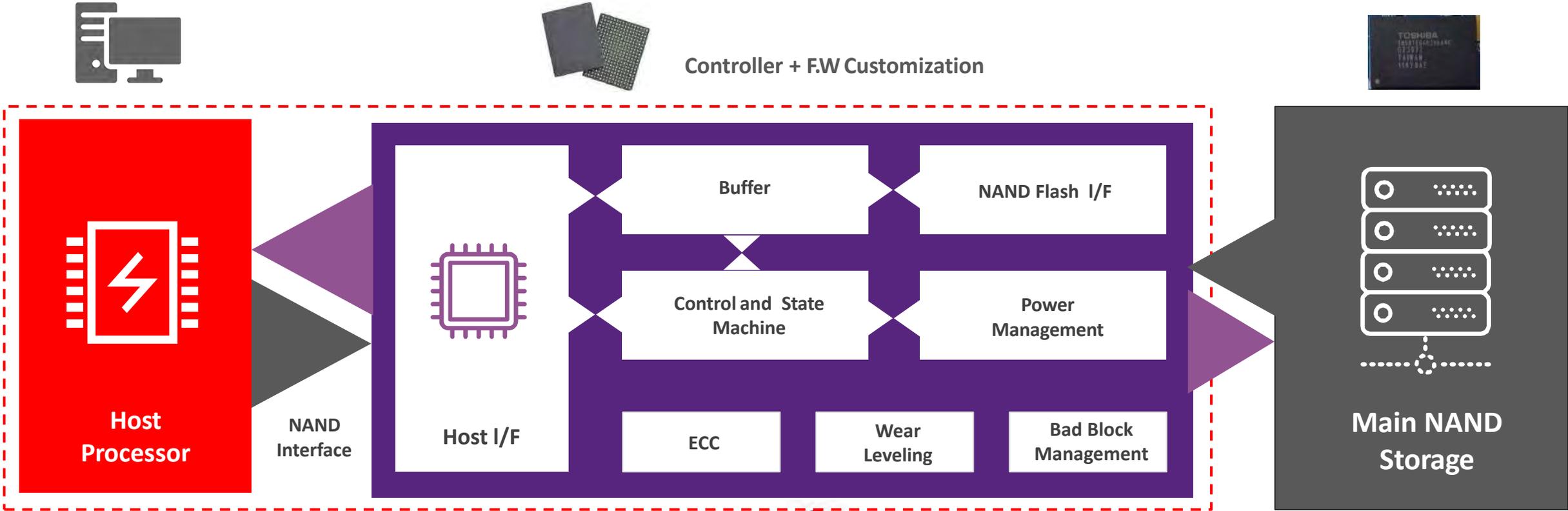
Option 1 Only Fix Solution, NAND Die Change
No liability – Highly Recommended There's no need to update host controllers and related drivers every time the NAND goes through a die shrink, or storage capacity needs to be increased.

Option 2 Fix BOM Solution and Fix NAND (Same Die)
Customer need to provide forecast for buffer same die NAND Chip with liability

Comparison of Market Maker's Focus & Strength

FLEXXON

STANDARD O/S
(Windows / IOS / Android)

- High Capacity – 256 & above
- Short Product Life Cycle
- Non-Fixed BOM
- Low Reliability / Durability

Total Memory Market Share

Cost Factor

Cost from NAND Chip

90%
10%

50% – 60%
30% – 40%
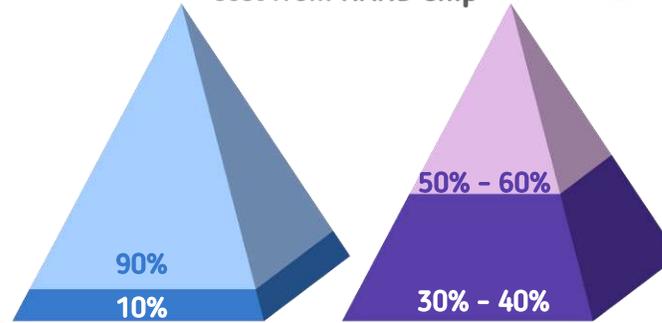
Cost from Controller / Solutions

10%

90%

MASS MARKET

FLEXXON'S NICHE – IMA MARKET

EMBEDDED O/S
(Windows CE / LINUX / RTOS)

- Low and Medium Capacity
- Long Product Life Cycle
- Fixed BOM
- High Reliability / Durability

Our Business Model
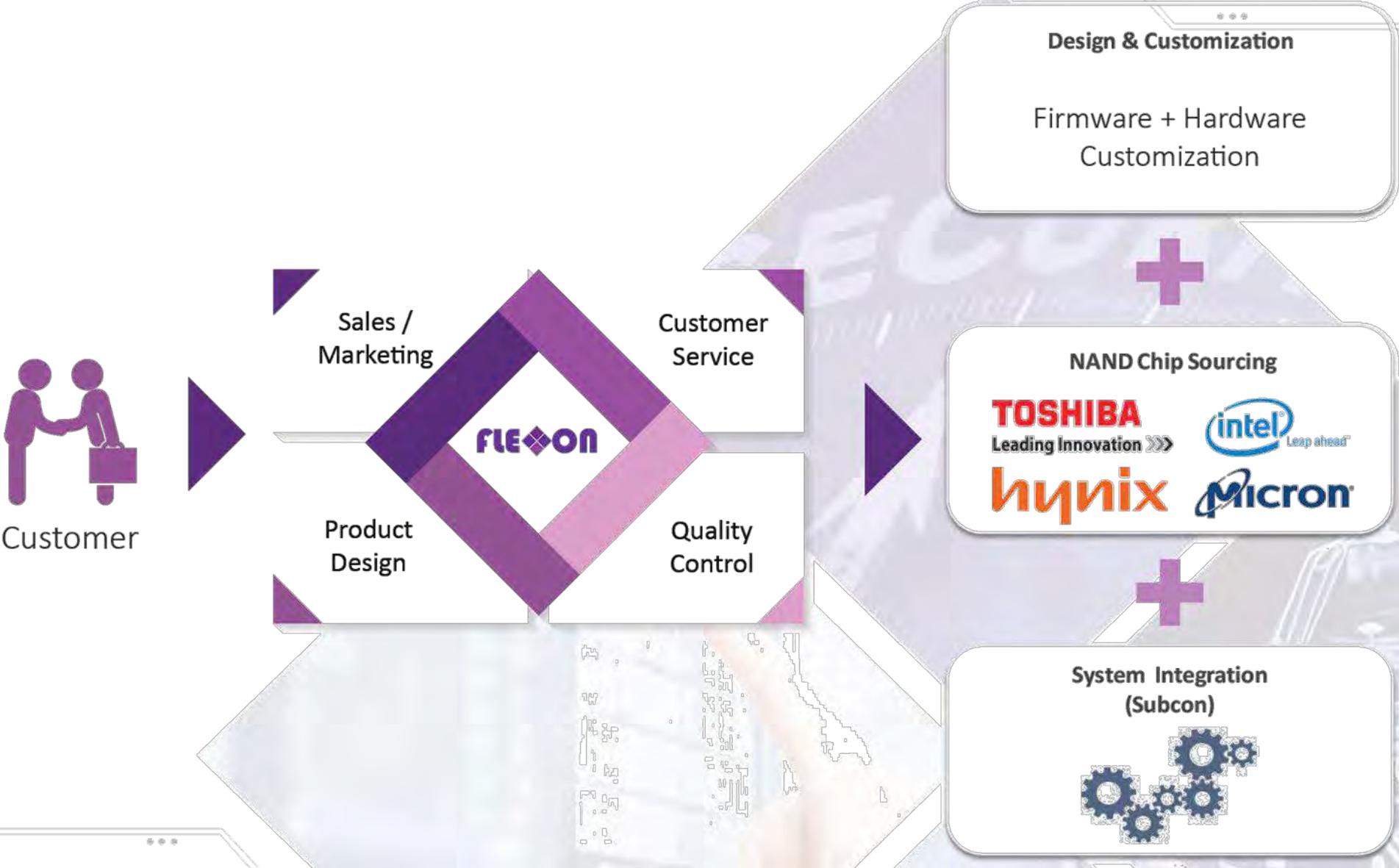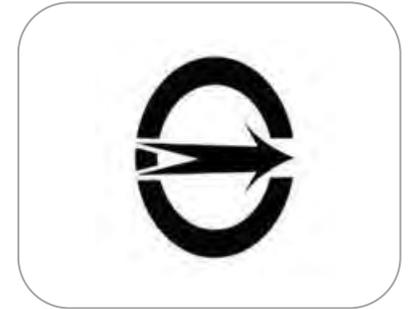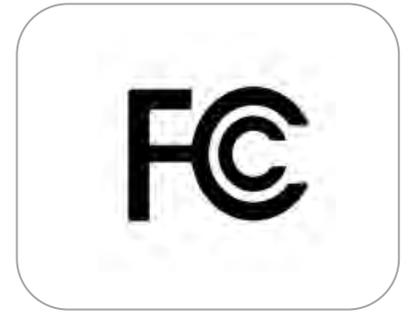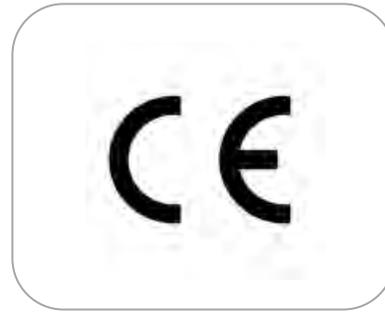
Various Industrial Applications

Agricultural Machinery	ATM Machine	Automotive	Embedded System	Gaming
Handheld Devices	Medical	Military	Musical Instrument	POS Terminal
Rugged Computer	Security System	Solution Printer	Test & Measurement	Vending Machine
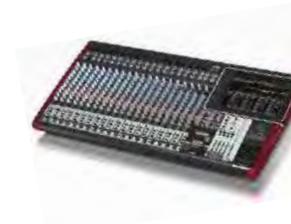
Top 5 Applications

| Medical Equipment	Casino Gaming & Amusement	Networking & Telecommunication	Security System	AV System
• Apnea monitoring • Cardiac Monitoring • CPAP Machine • Defibrillators • Digital X-Ray • Fetal Monitoring • Life Science Laboratory Instrument • Magnetic Resonance Imaging • Medical Aesthetics Device • Medical Wearable Device • Patient Data Monitors System • Ultrasound	• Bar Top Gaming Machine • Casino Gaming Machine • Laser Tag Game • Lottery Machine • Pinball Machine • Slot Game Machine • Video Poker Machine	• Media Server • Network Performance Management System • Optical Network Transport Solutions • PBX • Routers / Gateways • Streaming Server • VPN / Firewall • Web Server	• Elevator Control • Fire & Security Alarm • Home Security System & Surveillance Camera • Marine Safety • Phone call recorder & blocker • Street Traffic Management • Time Attendance & Access Control System • Voting Machine	• AI Speaker • A/D Audio Converter • Broadcast Mixing Desk • High End Home Theater Sound Processing System and Audio Equipment • Music Instruments • Network AV system • TV Production • Video Broadcasting • Video Compressor • Video and Sound Recorder

Customization Services

Firmware Customization

We are open for discussion for all customization services which is not listed here

Bill of Materials Customization

BOM	
	A +5030
	G + 3533
	R +1619
	N +1127
	O +3522
	P +3758
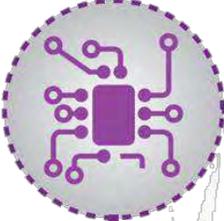
PCB Re-layout

Conformal Coating

FLE◆◆ON SSD SATA

2.5" SATA Solid State Disk
SATA III 6G bps

Made in Taiwan

RoHS FC CE
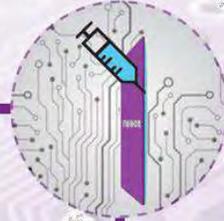
BGA Underfill

Product ID / Parameters
Pre-loaded Content
Format Load
Packaging
Label Printing
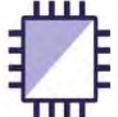
Temperature Grade

Industrial Grade	Temperature	Controller + FLASH
Automotive	-40° ~ +105° C	AEC-Q100 Grade 2
Automotive	-40° ~ +85° C	AEC-Q100 Grade 3
Diamond	-40° ~ +85° C	I -temp CTR + I-temp FLH
Gold	-25° ~ +85° C	I-temp CTR + Wafer Base FLH
Silver	0° ~ 70° C	I-temp CTR + C-temp FLH
Commercial	0° ~ 70° C	C-temp CTR + C-temp FLH

+85°C
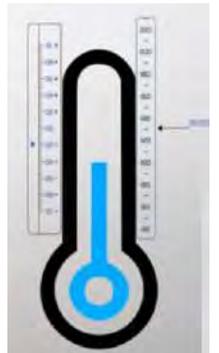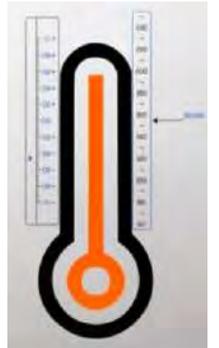
-40°C

PRODUCT RELIABILITY ASSURANCE: RELIABILITY TEST

Mechanical Test

- Torque Test
- Bending Test
- Drop Test
- Pull / Push Test
- USB Connector Push Test
- Spring Pressing Test
- Insertion / Extraction Test
- Mechanical Shock Test
- Vibration Test
- Switch Pull/ Push Test
- Switch Cycle Test
- Rib Strength Test

M

Environmental Test

- High Temp Operation Test
- High Temp Storage Test
- Low Temp Operation Test
- Temp/ Humidity Operation Test
- Temp/ Humidity Storage Test
- Temp Cycling Operation Test
- Temp Cycling Storage Test
- Thermal Shock Test
- ESD Test
- Salt Spray Test
- Waterproof Test
- UV Light Exposure Test
- X-Ray Exposure Test

E

Packaging Test

- Temperature / Humidity Test
- Vibration Test

P

Printing Test

- Alcohol Test
- Wear Proof
- Adhesive Test

P

NAND Flash Type

		Pseudo SLC take advantages in terms of performance and pricing			
Flash Technology	**NAND Flash Type**	**Feature**	**P/E Cycle**	**W/R Speed**	**Price**
2D NAND	SLC	Single-Level Cell	60,000-100,000	Best	Expensive
	pSLC	Pseudo SLC	20,000-50,000	Great	Between SLC and MLC
	MLC	Multi-Level Cell	3,000	Good	Cheap
3D NAND	3D pSLC	3D Pseudo SLC	20,000-50,000	Great	Close to MLC
	3D pMLC	3D Pseudo MLC	3,000	Good	Between 3D pSLC and 3D TLC
	3D TLC	3D Triple-Level Cell	1,000-3,000	Worst	Lowest

SLC : Performance   MLC/3D TLC : Cost   3D NAND : Mainstream

Industrial SATA SSD Overview

- Multi Core Design
- Power Loss Protection Design
- Smart Refresh
- End to End Data Protection
- SSD Endurance
- Error Correction Design – Smart ECC
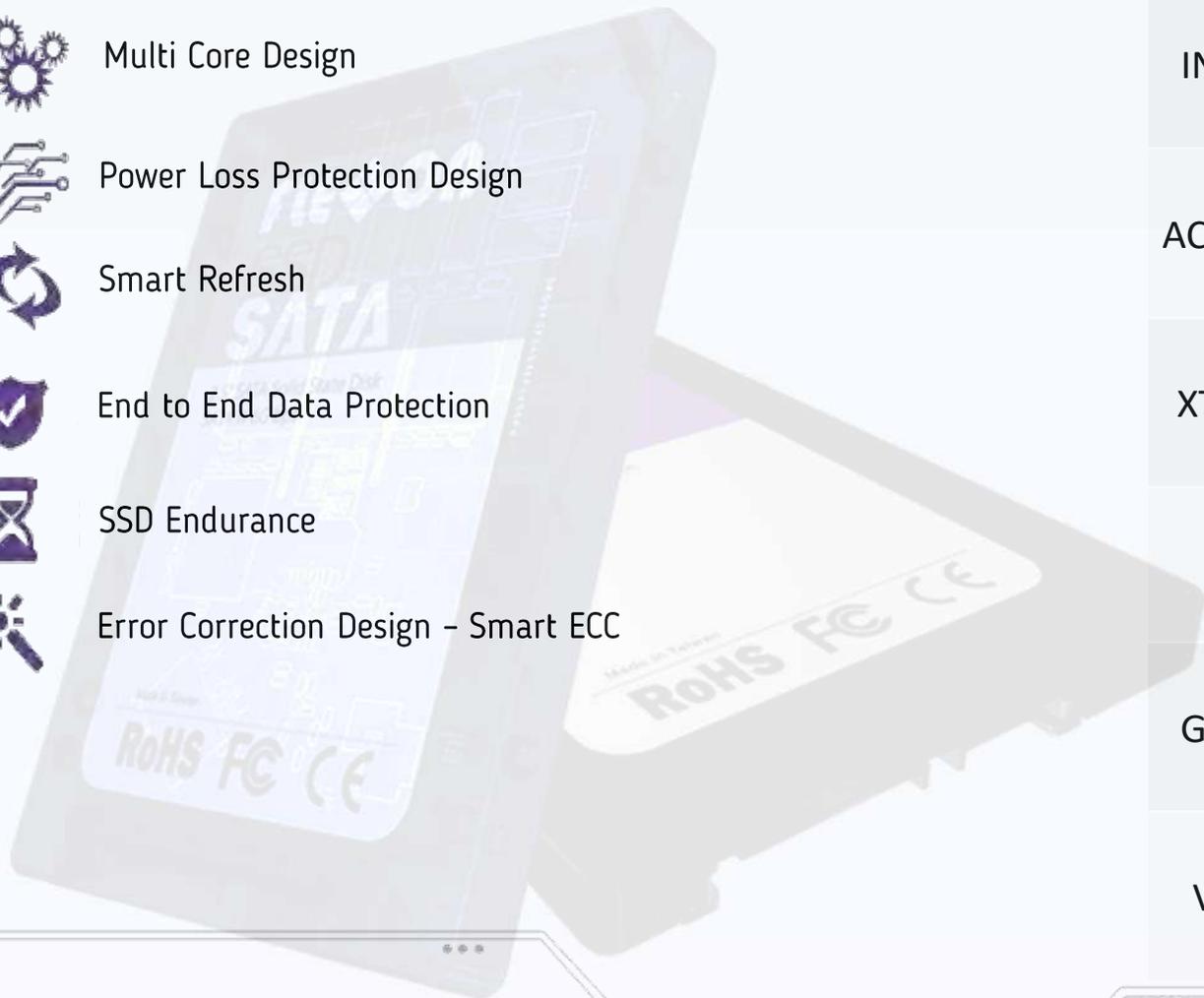
SATA SSD	Application
INSPIRE Series SATA3	High Endurance & Wide Compatibility with 3D NAND Suitable for Multi-Tasking Applications Support Hardware PLP
ACHIEVER Series SATA3	High Performance & High Density Suitable for Main Storage Applications
XTREME Series SATA3	High Performance & DRAM-less design Perfect for Embedded Applications
XCEL Series SATA3	Ultra High Density & Ultimate Performance Competent for Enterprise Applications
GALAXY Series SATA3	Enhanced Reliability & Security Design for Military Application
VALUE Series SATA2	Low Cost & Low Density Ideal for Module and Embedded Applications

Industrial PATA & PCIe SSD Overview

Multi Core Design

Power Loss Protection Design

Smart Refresh

End to End Data Protection

SSD Endurance

Error Correction Design – Smart ECC

PATA SSD	Application
LEGACY II	High Compatibility & High Reliability Best for Rigorous Applications
LEGACY III	High Compatibility & High Performance Support Power Loss Protection
CLASSIC	Wide Compatibility & High Reliability Suitable for Embedded Applications
CLASSIC II	High IOPS Performance High Capacity & High Reliability Support AES Encryption
PRESTO	Ultra Performance Fit for DSLR with VPG 65

PCIe	Application
DEX PCIe Gen 3x4	High Speed & Compatibility Suitable for Main Storage & Client Applications
HIX PCIe Gen 3x4	Ultimate Performance & Density Perfect for Enterprise Applications
VELOX-T PCIe Gen 3x2	DRAM-Less Design Best for Embedded Applications
X-PHY PCIe Gen 3x4	Ultra Cyber Secure Solution

OUR INNOVATION

FLEXXON

Standalone Artificial intelligence (AI) Cybersecurity SSD

X PHY®
BE EMPOWERED   BE SECURED

- **World's first** standalone embedded AI Cybersecurity SSD

- Flexxon's IPs stand to become the leading principal that revolutionize the cybersecurity standard in computer servers and personal computers/laptops

- Reduces dependence on potentially vulnerable software defend.

- 3 Patent Filed

Cyber Spending and Cyberattacks Escalating Rapidly.

Global cost for cybersecurity to hit $125 B in 2019

Data theft: $6 T impact on global GDP by 2021

Data Theft

Cyber Spending
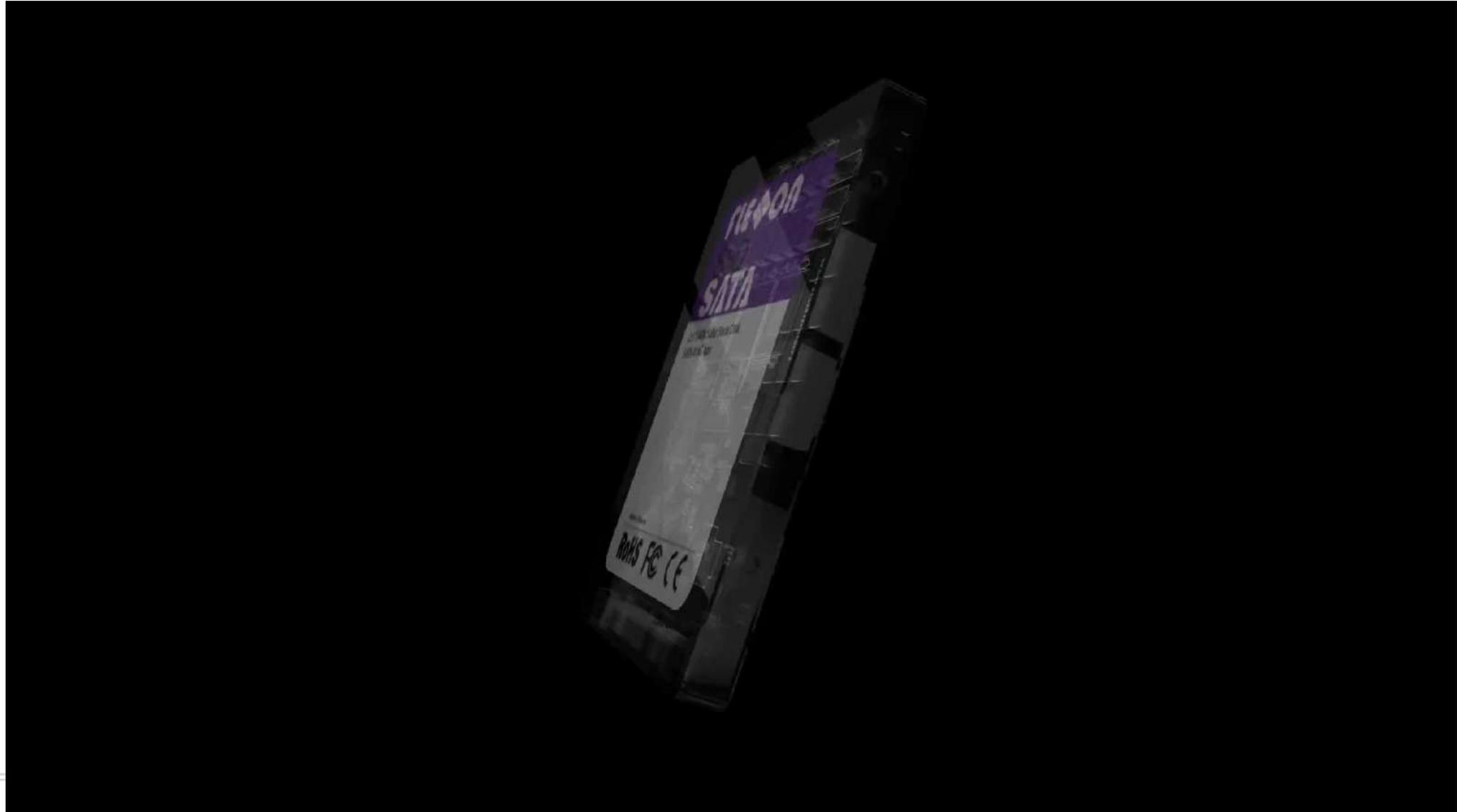
FLEXXON Memory Card Series Overview

|	FxAdv	FxPro I HighIOPS	FxPro I	FxMav	FxPro III	FxPrem II	FxStd	WORM
Feature	High IOPS Solution with 3D NAND	High IOPS Solution	High Performance	Advance High IOPS Solution High Capacity	Extreme Performance	Embedded System Solution	High Compatibility	Write Once Read Many Solution
Interface	SD 6.1	SD 6.1	SD 3.0/6.1	SD 6.x	SD 6.1	SD 3.0	SD 3.0	SD 6.1
Form Factor	up to Class 10	up to Class 10	up to Class 10	Up to Class 10	up to Class 10	Up to Class 10	up to Class 10	Up to Class 10
Flash Type	UHS-I	UHS-I	UHS-I	UHS-1	UHS-II	UHS-I	UHS-I	UHS-I
Capacity	3D TLC, 3D pSLC	SLC, MLC, pSLC	SLC, MLC, pSLC	3D TLC, QLC	3D TLC, 3D pSLC	SLC, MLC, pSLC	MLC, pSLC	MLC
Max. Performance	3D TLC: 8GB ~ 256GB 3D pSLC: 4GB ~ 64GB	SLC: 512MB ~ 16GB MLC: 4GB ~ 32GB pSLC: 2GB ~ 16GB	SLC: 128MB ~ 32GB MLC: 1GB ~ 128GB pSLC: 2GB ~ 64GB	16GB ~ 1TB	3D TLC: 64GB ~ 256GB 3D pSLC: 32GB~ 256GB	SLC: 4GB ~ 32GB MLC: 8GB ~ 256GB pSLC: 4GB ~ 128GB	MLC: 4GB ~ 64GB pSLC: 4GB ~ 32GB	4GB ~ 32GB
Grade	Read: 95 MB/s Write: 90 MB/s	Read: 95 MB/s Write: 90 MB/s	Read: 95 MB/s Write: 90 MB/s	Read: 100MB/s Write: 90MB/s	Read: 280 MB/s Write: 245MB/s	Read: 95 MB/s Write: 80 MB/s	Read: 80 MB/s Write: 55 MB/s	Read: 72 MB/s Write: 15 MB/s
Feature	Industrial / Commercial	Industrial / Commercial	Industrial / Commercial	Industrial / Commercial	Commercial	Industrial	Industrial	Industrial
Function		<u>Industrial Grade</u> Support Smart Tool (SD Life Monitor Tool) Support Auto-Read Refreshment Support Power Loss Management						

Industrial Memory Card Features
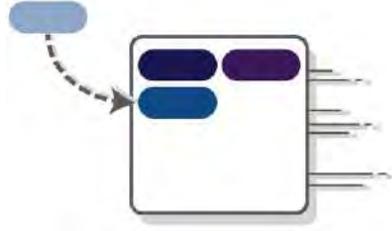
HighIOPS Solution

Most application, especially Medical's requires small data transfer. Flexxon tailored solutions that facilitate small data activities and provide high random performance efficiently.

S.M.A.R.T Tool

FLEXXON SD card SMART Info Tool can read reliability of SD card by estimating remaining life ratio, good block ratio, erase count etc…

Power Loss Protection

Minimize the risk of data loss due to sudden power loss or unstable power supply. This function is suitable for sleep device application.
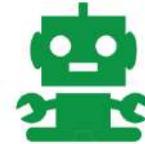
Auto-Read Refreshment

When bit errors are approaching the preset threshold level during read operations. Flexxon firmware will move the data to a new block, and reset the old one.

Advance Wear Levelling

For special O/S, advance wear levelling features will help to ensure wear levelling is performed with every write command. This will greatly increase the life cycle of the cards

WORM
MEMORY CARD

- **Tamper-proof** Write-Once-Read-Many solution that **protects sensitive files** from being deleted, modified, or overwritten.

- **Replaces old WORM media** such as CD-R / DVD-R disk storage, optical disk, zip disk, and WORM tape

- Comes in SD and Micro SD Card

FLEXXON WORM CARD – Application

Bank and Financial Industries
Protect sensitive financial industry, regulatory authority, and exchange commission records.

Surveillance Camera
Record surveillance, dashcam, event footage from security cameras.

Police Photography
Archive genuine and tamper-free police photography and audio recordings "black box" flight-data recorders.

Electronic Voting
Ensure electronic voting records are recorded and made tamper-proof

Court Proceedings
Secure legal files for trials and depositions

Cash Register Data Logging
Record financial data from cash registers for tax collection purposes

Medical Industry
Track patient interactions with physicians and other health-care professionals. Also, retain confidential patient treatment data from medical devices such as AED Trainer, DICOM, and Medical Imaging systems.

Non-profit organisation
Stores the financial transactions periodically for legal purposes.

University
Keep confidential records digitally for their students to prevent any cases of physical records being destroyed or tampered.

Businesses
Keep unalterable records so that employees cannot change its data to commit any fraud.
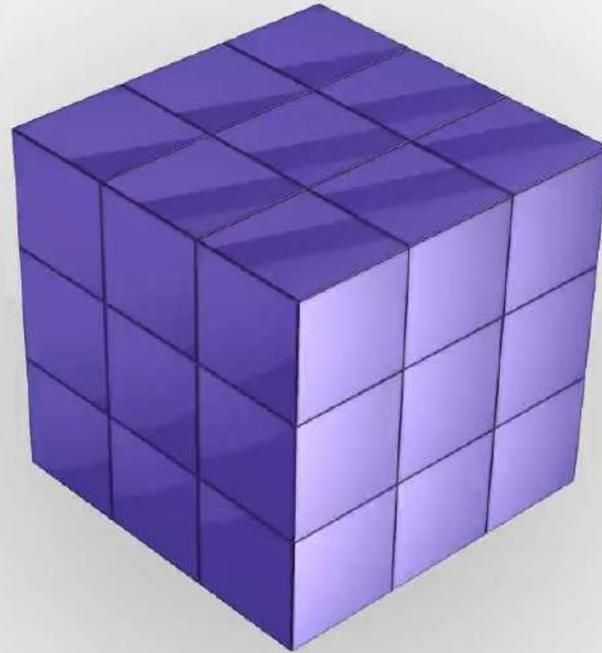
USB Series Overview

	FxU2 I	FxU2 III	FxU3 I	FxUA		FxUH	FxUS	FxLocker	FxFP
Feature	Standard Performance	Standard Performance Support 3D NAND	High Performance Enhanced Reliability Solution	High Reliability Solution with 3D NAND High IOPS Solution		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 2.0	USB 3.1 GEN 1	USB 3.1 GEN 1	USB 2.0	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	Pen Drive	Pen Drive	Pen Drive	Pen Drive	USB DOM (10- pin)	USB DOM (10-pin & 20-pin)	USB DOM (10-pin & 20-pin)	Pen Drive	Pen Drive
Flash Type	SLC, MLC	3D TLC	SLC, pSLC, MLC	3D TLC, 3D pSLC		SLC, MLC	MLC, 3D TLC	3D TLC	3D TLC
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: 8GB ~ 64GB	3D TLC: 32GB ~ 256GB 3D pSLC: 8GB ~ 64GB	SLC: 1GB ~ 32GB MLC: 4GB ~ 128GB	MLC: 16GB - 256GB 3D TLC: 64GB ~ 512GB	16GB ~ 64GB	16GB ~ 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	Read: 200 MB/s Write: 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	Commercial	Commercial	Industrial	Industrial / Commercial	Industrial	Industrial	Industrial	Commercial	Commercial

eMMC Product Overview

Highly Integrated eMMC Solution

- Embedded with market proven eMMC4.5/5.0/5.1 Controller
- High Quality 2D & 3D NAND

Package Design

- Industrial Standard 100 and 153 ball

Tailor-made Firmware

- Advanced NAND Management Technology
- Customization available for Customer

eMMC Series Overview

Series	XTRA III	XTRA IV	XTRA V	ECON I	ECON II
Interface	eMMC 5.0/4.x	eMMC 5.0 / 4.x	eMMC 5.1 / 4.x	eMMC 5.0	eMMC 5.1
Flash Type	MLC, pSLC	MLC, pSLC	3D TLC, 3D pMLC, 3D pSLC	MLC	3D TLC
Pin Count	153-ball/ 100-ball	153-ball/ 100-ball	153-ball	153-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	4GB ~ 8GB	16GB ~ 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	Read: 150MB/s Write: 30MB/s	Read: 270 MB/s Write: 120 MB/s
Grade	Industrial	Automotive	Industrial / Automotive	Commercial	Commercial

Data Refresh

Data Reload Protection

Customize POR Behavior

Field FW Update
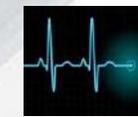
Health Status Report

Low Power Operating

Program Management

Maximum Flexibility with Best Total Cost Of Ownership
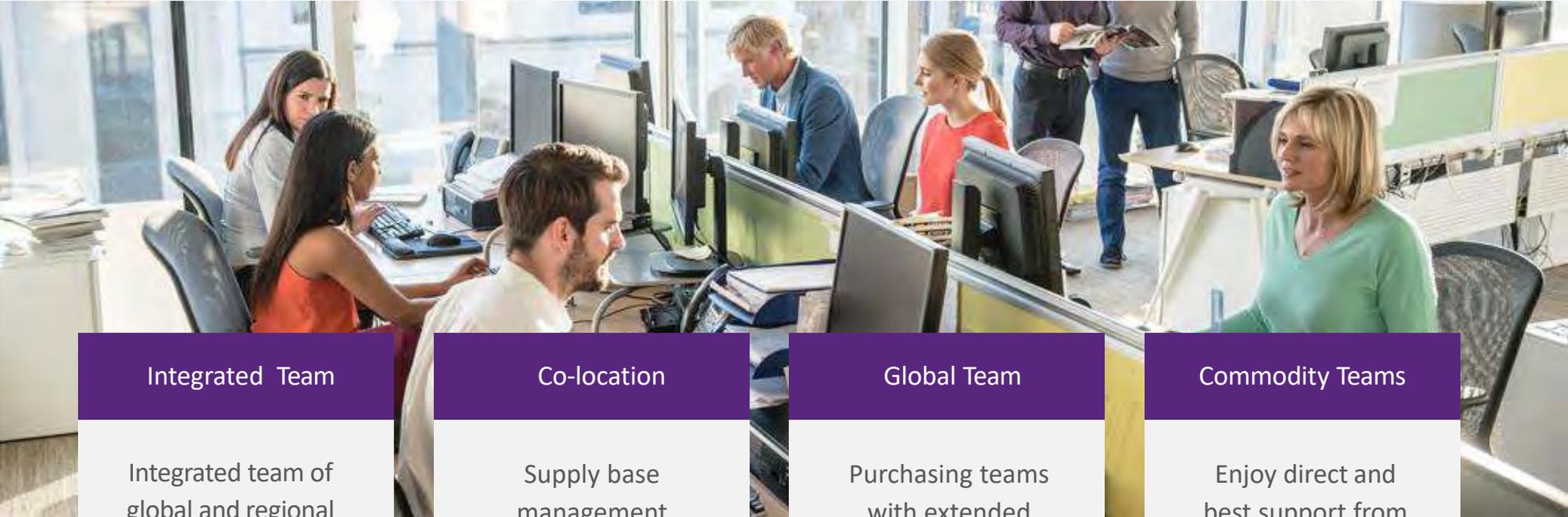
| Integrated Team	Co-location	Global Team	Commodity Teams
Integrated team of global and regional commodity managers share accountability with the customer supply chain team to drive total cost improvements	Supply base management resources co-located in different country	Purchasing teams with extended sourcing resources available globally	Enjoy direct and best support from global components team

Our Logistic Support

FLEXXON ERP SYSTEM

Inventory visibility
Days supply/inventory

Transportation visibility/
Event management

Order Visibility

Transportation visibility/
Event management

System Data Feed

Suppliers

Component
factories

Distributors

M2

Flexxon Warehouse

Customer

Distribution

Inbound Raw Material

Outbound Logistic

SUPPLIER

FLEXXON

CUSTOMER

Supplier Collaboration

Global visibility on material
ordering and shipment

Customer Relationship
Management CRM

Global Footprint

Office

Technical Sales Rep

Local Distributor

Global Headquarter
Singapore

Global Distributor
Future Electronics
HQ – Montreal, Canada
Revenue : $5B (2017)
Rank 4th Electronics Distributor Worldwide

Territories	Technical Sales Rep	Local Distributor
North America	17	2
Europe	10	6
Middle East	1	1
Russia	1	
Asia	3	1
South Pacific		1

Why Flexxon?

- **Long Product Life**
- **Fixed BOM**
- **Industrial Grade**
- **Special Capacity & Customize Memory Solution**
- **Strong Technical Support**
- **Support HMLV(High-Mixed Low Volume)**

Contact Us

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