FLEXXON eMMC INTRODUCTION

The trend of the size of embedded systems continues to shrink in some industrial and medical application, there is a need for even smaller form factor storage than microSD card.

FLEXXON eMMC's design to meet the rigid requirements of IMA (Industrial / Medical/ Automotive) market where technical support, extended life, and stable roadmaps are critical for this segment industry.

FLEXXON's eMMC Product Family is an embedded memory solution that combines NAND Flash Memory , an embedded MMC (MultiMediaCard) controller, and advanced firmware in a small BGA package (100balls/ 153balls) that provides a small, robust, yet cost effective, high density embedded NAND Flash storage solution. The eMMC products are compliant to the JEDEC® e·MMC™ v4.5, v5.0 and v5.1 interface and protocol standard.

eMMC Benefit

When working with native NAND Flash components, data are written and read directly to physical locations in the NAND Flash memory. Host system needs to actively manage data at physical memory locations and correct bit errors as the data are read back from NAND Flash. Designers must implement the necessary ECC engine and data management algorithm in the host system, increasing the burden on host hardware and software design and validation. Revision to the design may be necessary each time the NAND Flash component is replaced by a newer part or a part from a different vendor. In comparison, eMMC functions as a block storage device, interacting with the host system through an abstracted interface protocol, analogous to an SSD.

The host system simply writes and reads data to and from logical block addresses (LBA's), without needing to anticipate data errors and how the data would be stored and managed in the NAND Flash memory. The eMMC controller hardware and firmware handles the error correction and data management functions internally without involvement from the host system. Since the eMMC interface and protocol standardized by JEDEC® is agnostic to the underlying NAND Flash memory technology and configuration, compatibility and interoperability among different suppliers' eMMC products can be assured.

FLEXXON eMMC OVERVIEW

Highly Integrated eMMC Solution

- Embedded with market proven eMMC4.5 / 5.0 / 5.1 Controller
- High Quality MLC NAND

Package Design

- Industrial Standard 100 / 153balls

Tailor-made Firmware

- Advanced NAND Management Technology
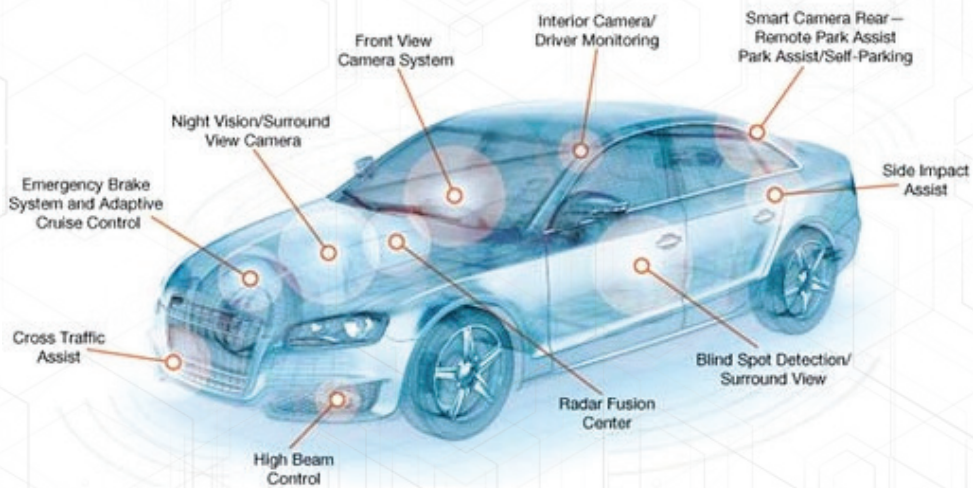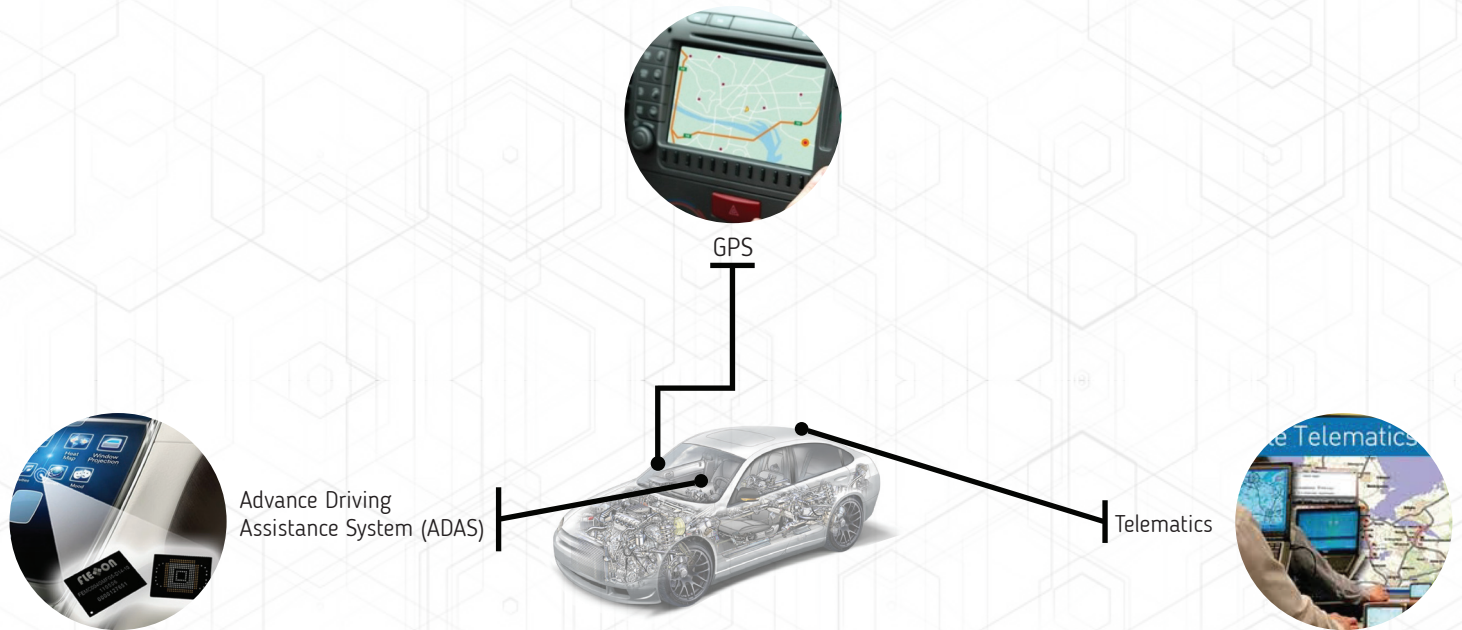- Customization available for Customer

◆ Industrial/ Medical/ Automotive Market Focus

FLEXXON eMMC Series

eMMC Series	XTRA III	XTRA IV	XTRA V
Interface	eMMC 5.0/4.x	eMMC 5.0	eMMC 5.1
Flash Type	MLC, pSLC	MLC, pSLC	3D TLC, 3D pSLC
Ball Count	153-ball; 100-ball	153-ball; 100-ball	153-ball
Capacity	MLC: 4GB ~ 64GB pSLC: 4GB ~ 32GB	MLC: 4GB ~ 64GB pSLC: 4GB ~ 32GB	3D pSLC: 4GB ~ 32GB 3D TLC: 8GB ~ 128GB
Max. Performace	Read: 270 MB/s Write: 150 MB/s	Read: 270 MB/s Write: 150 MB/s	Read: 320 MB/s Write: 150 MB/s
Grade	Industrial (Gold & Diamond)	Automotive	Industrial (Gold & Diamond)

FLEXXON eMMC automotive application

GPS

Advance Driving
Assistance System (ADAS)

Telematics

Front View
Camera System

Interior Camera/
Driver Monitoring

Smart Camera Rear—
Remote Park Assist
Park Assist/Self-Parking

Night Vision/Surround
View Camera

Side Impact
Assist

Emergency Brake
System and Adaptive
Cruise Control

Cross Traffic
Assist

Blind Spot Detection/
Surround View

Radar Fusion
Center

High Beam
Control

- Certified with Automotive Grade AEC-Q100 Grade 3 (-40C~85C) Standard

- Plan to obtain AEC-Q100 Grade 2 (-40C~105C)Standard in Q4 2018

- Manufacturing Factory certified with TS16949

FLEXXON eMMC Intellingent Technology
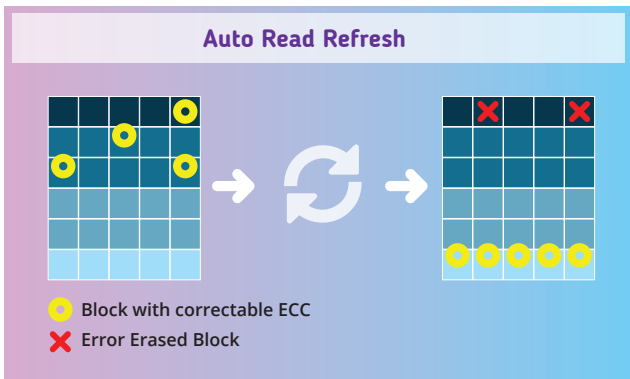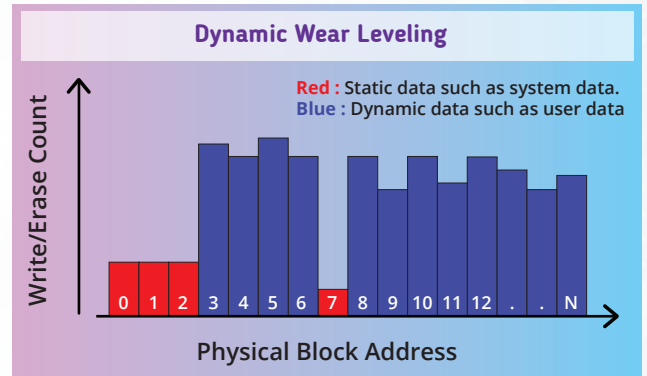

Data Integrity in Reflow
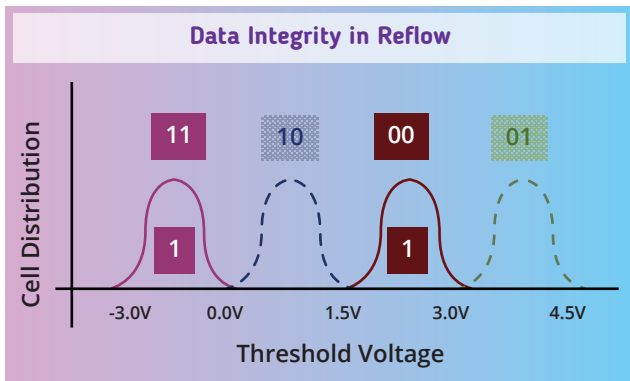
Data Integrity in Reflow

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

Dynamic Wear Leveling

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

Dynamic Wear Leveling

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

Auto Read Refresh

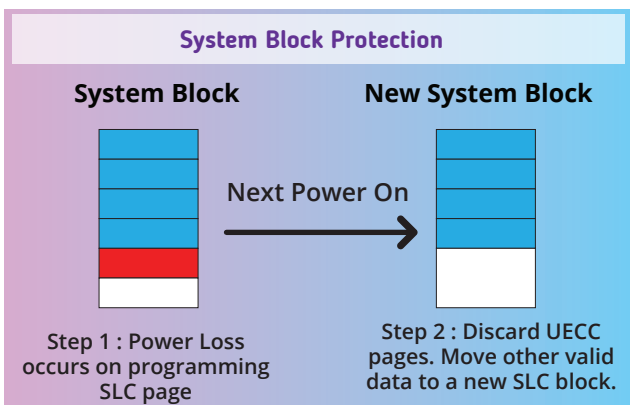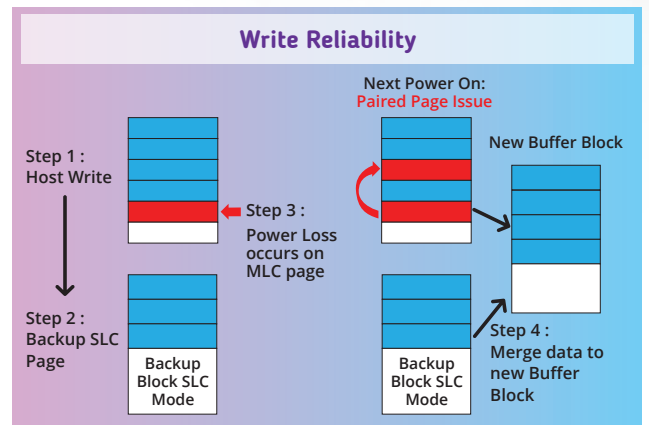Block with correctable ECC
Error Erased Block

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

Backup Block SLC Mode

Step 4 : Merge data to new Buffer Block

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.

FLEXXON eMMC Power Consuption

Capacity	Read (mA)		Write (mA)		Standby (mA)
	VCCQ	VCC	VCCQ	VCC	
4GB	160	50	100	30	0.12
8GB	160	50	100	40	0.15
16GB	170	50	100	50	0.18
32GB	180	50	110	70	0.18
64GB	200	50	120	90	0.20

FLEXXON eMMC Performance

Flash	Seq. Read (MB/s)	Seq. Write (MB/s)
MLC	250	90
pSLC	250	150

FLEXXON eMMC Ordering Information

Capacity	Flash Type	Package	Grade	Part Number
2GB	pSLC	100 Balls	Diamond	FEMC002GTTE7-T13-17
			Gold	FEMC002GTTG7-T13-17
			Automotive	FEMC002GTTA7-T13-17
		153 Balls	Diamond	FEMC002GTTE7-T14-17
			Gold	FEMC002GTTG7-T24-17
			Automotive	FEMC002GTTA7-T14-17
4GB	MLC	100 Balls	Diamond	FEMC004GTTE7-T13-16
			Gold	FEMC004GTTG7-T13-16
			Automotive	FEMC004GTTA7-T13-16
	pSLC		Diamond	FEMC004GTTE7-T13-17
			Gold	FEMC004GTTG7-T13-17
			Automotive	FEMC004GTTA7-T13-17

FLEXXON eMMC Ordering Information

Capacity	Flash Type	Package	Grade	Part Number
4GB	MLC	153 Balls	Diamond	FEMC004GTTE7-T14-16
			Gold	FEMC004GTTG7-T24-16
			Automotive	FEMC004GTTA7-T14-16
	pSLC		Diamond	FEMC004GTTE7-T14-17
			Gold	FEMC004GTTG7-T14-17
			Automotive	FEMC004GTTA7-T14-17
8GB	MLC	100 Balls	Diamond	FEMC004GTTE7-T14-16
			Gold	FEMC004GTTG7-T24-16
			Automotive	FEMC004GTTA7-T14-16
	pSLC		Diamond	FEMC004GTTE7-T14-17
			Gold	FEMC004GTTG7-T14-17
			Automotive	FEMC004GTTA7-T14-17
	MLC	153 Balls	Diamond	FEMC008GTTE7-T13-16
			Gold	FEMC008GTTG7-T13-16
			Automotive	FEMC008GTTA7-T13-16
	pSLC		Diamond	FEMC008GTTE7-T13-17
			Gold	FEMC008GTTG7-T13-17
			Automotive	FEMC008GTTA7-T13-17
16GB	MLC	100 Balls	Diamond	FEMC016GTTE7-T13-16
			Gold	FEMC016GTTG7-T13-16
			Automotive	FEMC016GTTA7-T13-16
	pSLC		Diamond	FEMC016GTTE7-T13-27
			Gold	FEMC016GTTG7-T13-27
			Automotive	FEMC016GTTA7-T13-27
	MLC	153 Balls	Diamond	FEMC016GTTE7-T14-16
			Gold	FEMC016GTTG7-T14-16
			Automotive	FEMC016GTTA7-T14-16
	pSLC		Diamond	FEMC016GTTE7-T14-27
			Automotive	FEMC016GTTA7-T14-27

FLEXXON eMMC Ordering Information

Capacity	Flash Type	Package	Grade	Part Number
32GB	MLC	100 Balls	Diamond	FEMC032GTTE7-T13-26
			Gold	FEMC032GTTG7-T13-26
			Automotive	FEMC032GTTA7-T13-26
	pSLC		Diamond	FEMC032GTTE7-T13-47
			Gold	FEMC032GTTG7-T13-47
			Automotive	FEMC032GTTA7-T13-47
	MLC	153 Balls	Diamond	FEMC032GTTE7-T14-26
			Automotive	FEMC032GTTA7-T14-26
	pSLC		Diamond	FEMC032GTTE7-T14-47
			Automotive	FEMC032GTTA7-T14-47
64GB	MLC	100 Balls	Diamond	FEMC064GTTE7-T13-46
			Gold	FEMC064GTTG7-T13-46
			Automotive	FEMC064GTTA7-T13-46
		153 Balls	Diamond	FEMC064GTTE7-T14-46
			Automotive	FEMC064GTTA7-T14-46

Why Flexxon?

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

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