

KIOXIA

Embedded Flash Memory

Consumer & Industrial Solutions

SLC & 3D-TLC

e-MMC & UFS

Automotive Solutions

e-MMC & UFS



Content

History and Mission	3 – 6
Embedded Flash Memory	7 – 13
SLC NAND	8 – 9
e-MMC & UFS	10 – 11
Automotive e-MMC & UFS	12 – 13
Product List	14 – 15

Leading Supplier and Inventor of Flash Memory

Silica wafers are formed from highly pure, nearly defect-free single crystalline material: the starting point for any integrated circuits.

INNOVATION IS OUR TRADITION

In 1984 Toshiba invented a new type of semiconductor memory called flash memory. Later in 1987, NAND flash memory was developed that raised electronic equipment to the next level. The NAND flash market has grown rapidly, with flash memory becoming an internationally standardised memory device. KIOXIA, the inventor of flash memory, has thus carved out a path to a new era in which innovations are increased by the opportunities of NAND flash.

Under its new name, KIOXIA keeps this invention and continues to provide embedded memory solutions. Embedded memory connects us with the things that surround and serve us – for more efficiency, comfort and sustainability.

SPEED UP DIGITAL PROCESSES

Storing and processing data has always been an important aspect of all digital processes. But in the last years it increased to one of the key technologies for industry 4.0, smart mobility, cloud technology and artificial intelligence, because smart ideas and innovations have to be ready for markets right away – with high reliability of storage components.

With our embedded memory solutions, KIOXIA is the partner for all smart markets and fast moving industries. KIOXIA provides a highly grade of innovation combined with highly reliable security – now and in the future.

PARTNERSHIP IS OUR PASSION

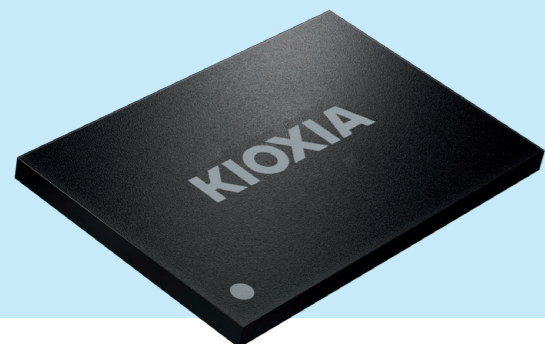
Our success is based on our strong customer focus: Your metrics are our metrics. The result is a broad range of industry-leading flash-based storage solutions. Our products are designed to meet your specific engineering demands.

KIOXIA EMBEDDED MEMORY – THE KEY TO A SMART FUTURE

“With progressive memory technology at the core, we offer products, services, and systems that create choice and define the future.”

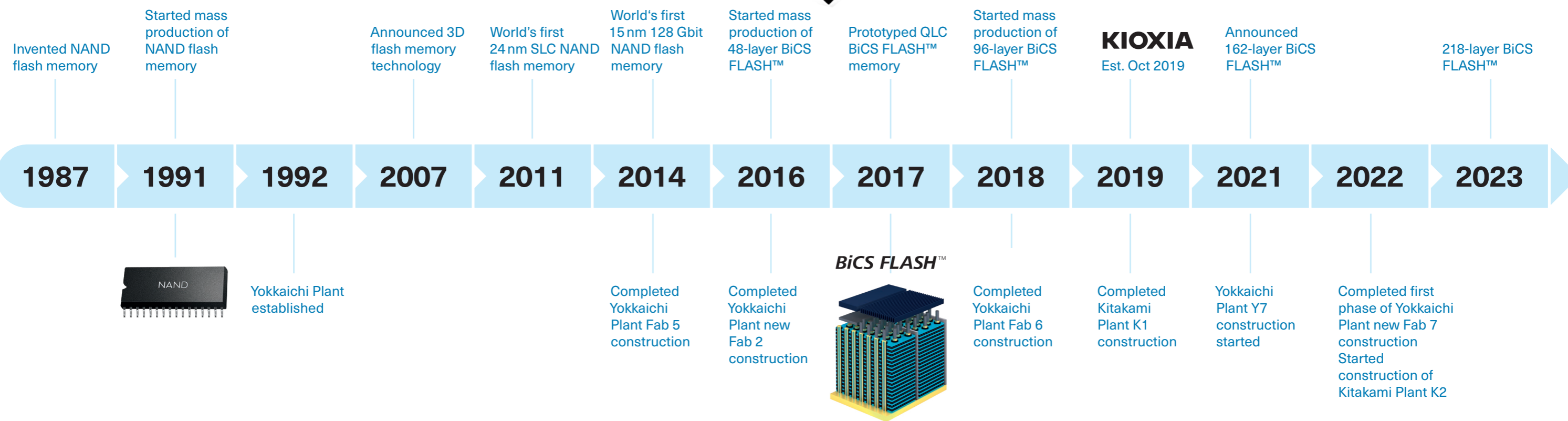


OUR LEGACY OF INNOVATION COMES WITH US



THE INVENTOR OF FLASH MEMORY.

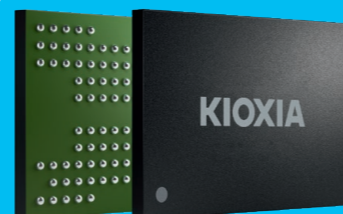
With our proven track record of success and reputation for innovation, KIOXIA will build on our history as we continue our journey as an independent company...



INNOVATIVE. AWARD-WINNING. TRUSTED.

Memory Solutions

- Extensive product lineup
- Excellent reliability & quality
- Leading density & capacity



SSD Solutions

- In-house SoC & firmware
- Latest interfaces & form factors
- Broad portfolio of SSDs



Pushing the boundaries of what's possible

The future of high-density flash memory.



UPLIFTING THE WORLD WITH "MEMORY"

In 1987 KIOXIA introduced a new technology that has forever changed the way we live, work and play: **NAND flash memory**

As the inventor of the first flash memory, KIOXIA has been leading a new era by providing advanced memory solutions to enrich people's lives.

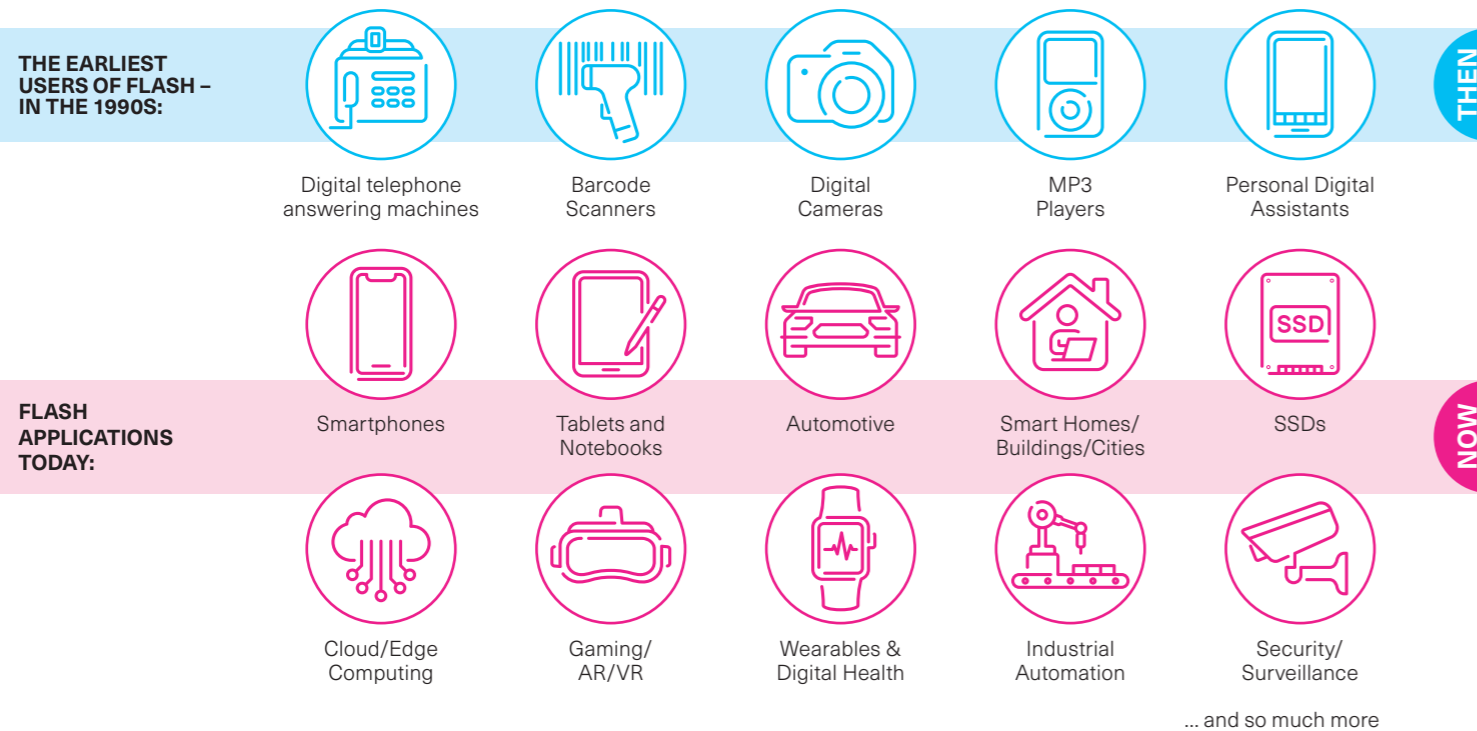
Back in 1987, it would have been hard to imagine all of the ways that this brand-new technology would impact the world. NAND flash memory has introduced an entire new technological era. New applications, such as smartphones, tablets and notebooks, automotive infotainment systems, gaming, wearables, data centers and so much more, have been developed that would not exist in the form they are today without this flash memory technology.

From the invention of flash memory to today's renowned BiCS FLASH™, KIOXIA continues to pioneer innovative memory solutions with high quality and reliability. The company's BiCS FLASH™ 3D flash memory technology is an important component in almost all electronic devices where data needs to be stored.

By evolving "memory", KIOXIA creates uplifting experiences and changes the world.

The Evolution of Applications – From Then to Now

Some of the first flash applications are almost unrecognizable today. And, many new applications have been born that would not have been possible without KIOXIA's invention.



Embedded Flash Memory

SLC NAND
BENAND™

e-MMC
UFS

KIOXIA offers a wide range of advanced flash memory technology for all kind of applications like consumer electronics, mobile technology and industrial applications such as robotics.

NAND flash memory requires an appropriate management, which has to cover tasks like Bad Block Management, Wear Leveling, Garbage Collection and ECC Error Correction. Either these functions are supported by the host system in combination with raw NAND memory, or it is covered instantly inside a managed NAND by utilizing an integrated memory controller.

The selection between these basic different approaches to control a NAND memory defines the individual host requirements and interface options. For managed NAND there are JEDEC specified Standard-Interfaces supported, enabling the developer to easily design the required memory solution.

RAW NAND

With raw SLC NAND and BENAND™ we provide high endurance and data retention for sensitive or frequently used data.

MANAGED NAND

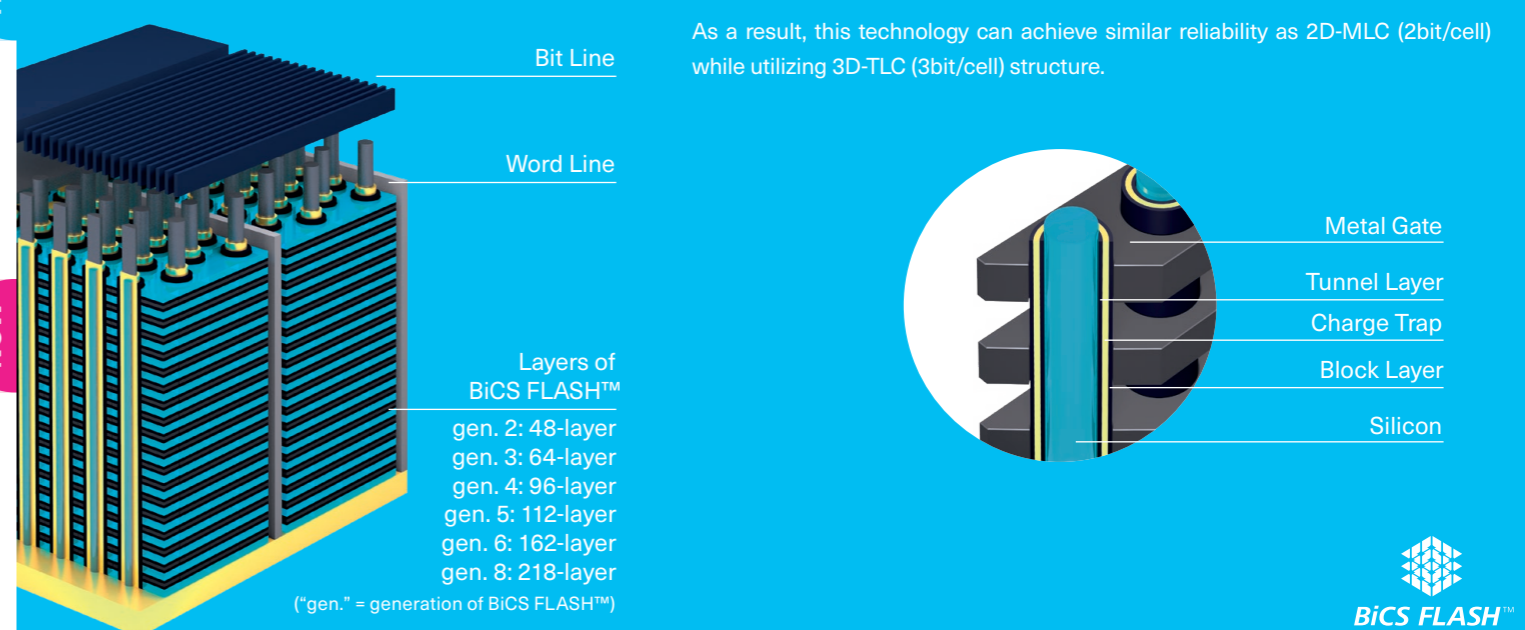
For efficient and easy to integrate storage systems, managed NAND like e-MMC and UFS are the preferred solutions. Offering broadly accepted standard interfaces and packages, in combination with high speed interfaces, they are the optimal selection for many application in the industrial, mobile and automotive market.

3D - TLC

Our BiCS FLASH™ 3D flash memory technology with 64-, 96-, 112-, 162-, 218-layer stacking make a powerful memory solutions possible. It gives BiCS FLASH™ far higher die area density compared to 2D NAND. BiCS FLASH™ reduces the chip size by optimizing both circuit technology and the manufacturing process.

As a result, this technology can achieve similar reliability as 2D-MLC (2bit/cell) while utilizing 3D-TLC (3bit/cell) structure.

KIOXIA 3D-Technology BiCS FLASH™





BENAND™

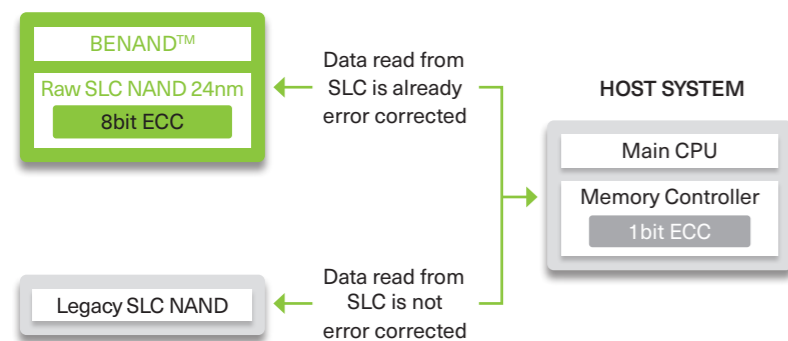
SLC NAND with embedded ECC

BENAND™ (Built-in ECC NAND) is a SLC NAND memory device which has an internal hardware ECC engine. Using BENAND™ it is possible for customers to use the 24nm SLC NAND flash memory technology even when their platform cannot support higher bit ECC.

SPECIFICATIONS

FEATURES	BENAND™ (SLC+ECC)
Density	1 Gbit – 8 Gbit
Technology	2D-SLC
ECC (Error Correction Code)	Embedded on Memory Chip
Temperature	-40° C to 85° C 0° C to 70° C
Package	TSOP and BGA

BENAND™ – SLC WITH EMBEDDED ECC FOR BOM REDUCTION AND SYSTEM FLEXIBILITY



CAPACITIES:

- 1 Gbit
- 2 Gbit
- 4 Gbit
- 8 Gbit

KEY FEATURES:

- 1 Gbit – 8 Gbit
- Compatibility of SLC NAND Interface, basic functions and command sequence follows SLC NAND.
- Same hardware interface and package as raw SLC

ADVANTAGES

- Broad line-up to cover customers' demands for different densities
- 24nm technology for cost optimisation
- Long data retention or high write/erase performance
- Small package variation available to reduce board space by 48% (up to 8 Gbit)
- With BENAND™ no ECC operation is required on the host side

APPLICATIONS:

- Industrial Applications
- Consumer Electronics
- Multimedia Applications
- Smart Metering & Intelligent Lighting
- Smart Applications



SLC NAND

Reliability and Performance

KIOXIA's advanced flash memory technology offers SLC NAND providing best in class endurance and data retention for sensitive or frequently used data in a system. For long lasting products or systems working with extremely high data throughput between the host and the memory, KIOXIA SLC is the optimal solution.

SPECIFICATIONS

FEATURES	SLC NAND
Density	1 Gbit – 256 Gbit
Technology	2D-SLC
ECC (Error Correction Code)	Required on Host Side
Temperature	-40° C to 85° C 0° C to 70° C
Package	TSOP and BGA

CAPACITIES:

- 1 Gbit
- 2 Gbit
- 4 Gbit
- 8 Gbit
- 16 Gbit
- 32 Gbit
- 64 Gbit
- 128 Gbit
- 256 Gbit

KEY FEATURES:

- 1 Gbit – 256 Gbit
- Extended temperature range
- TSOP and BGA package

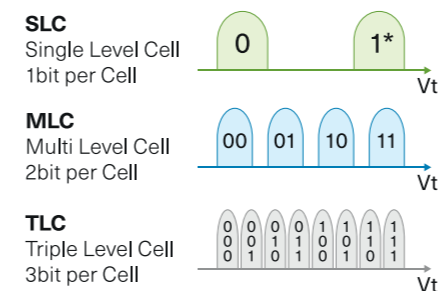
ADVANTAGES

- Broad line up to cover customers' demands for different densities
- 24nm technology for cost optimisation
- Long data retention or high write/erase performance
- Small package variation available to reduce board space by 48% (up to 8 Gbit)

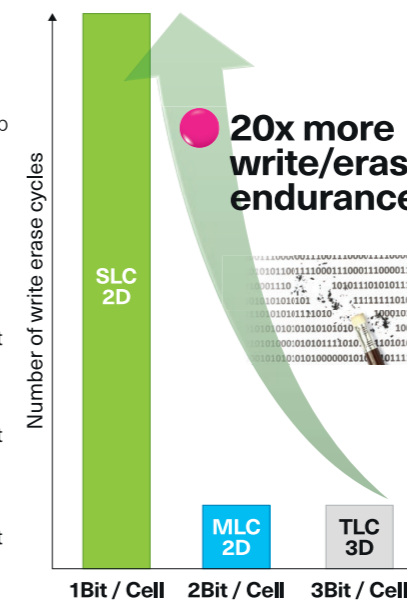
APPLICATIONS:

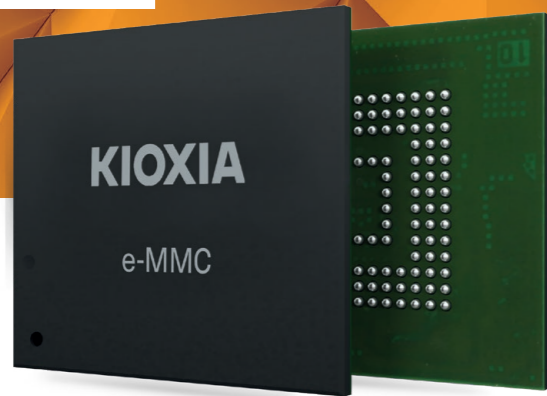
- Industrial Applications
- Consumer Electronics
- Multimedia Applications
- Smart Metering & Intelligent Lighting
- Smart Applications

Based on the „one bit per cell“-structure, SLC NAND can resist a significant higher number of write erase stress during lifetime than any MLC/TLC based product. This enables the system designer to develop a long lasting and extreme reliable storage solution even in challenging environments or use case scenarios.



* The binary assignment is individual set by each vendor





e-MMC

Highly-efficient Storage

e-MMC is a family of advanced and highly efficient NAND flash memory with an integrated controller for enhanced memory management. Based on an interface standardised by JEDEC, KIOXIA's e-MMC offers the optimal solution for applications where higher data volumes need to be stored in an efficient way.

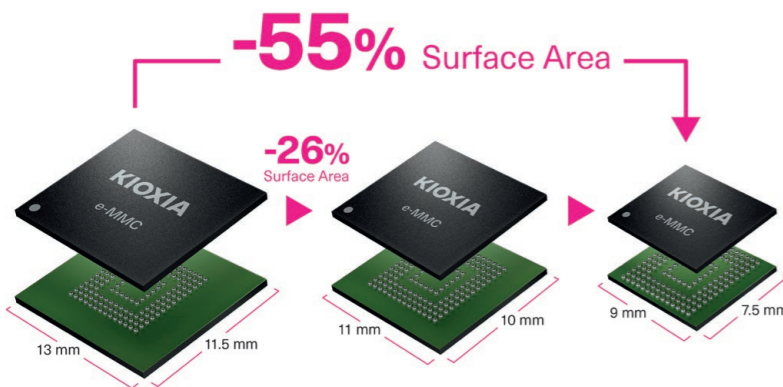
SPECIFICATIONS

FEATURES	e-MMC	EXTENDED TEMP. e-MMC
Density	4 GB – 128 GB	8 GB – 128 GB
Technology	2D-MLC / 3D-TLC	2D-MLC / 3D-TLC
JEDEC Version	5.0 / 5.1	5.1
Temperature	-25°C to 85°C	-40°C to 105°C
Package	153 ball FBGA (11.5 x 13 mm)	

e-MMC - UTILIZING BiCS FLASH™

With the innovative BiCS FLASH™ 3D flash memory technology in combination with the new charge trap cell structure, Kioxia continuously provide the best-in-class family of reliable, easy to integrate, and efficient e-MMCs. These new e-MMCs represent an attractive alternative with superior price competitiveness, longevity, and higher performance.

4GB e-MMC available in 3 package sizes with same ball arrangement



Product illustrations may present design models or previous versions. Actual product may vary.



UFS

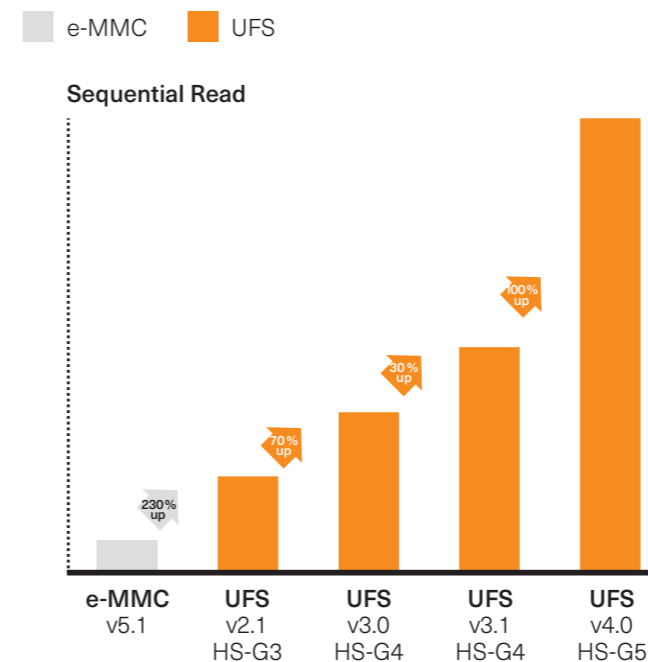
High Performance Storage

For applications demanding for superior interface performance, KIOXIA is offering a broad line-up of new UFS memory products. Utilizing a full duplex serial high-speed interface, it is compliant with the latest UFS Version 3.1 and 4.0. In combination with the embedded memory management, it offers a highly efficient and excellent performing storage solution. UFS memory enables next generation mobile devices to take full advantage of the connectivity benefits of 5G, leading to faster downloads and reduced lag time – and improved user experience.

SPECIFICATIONS

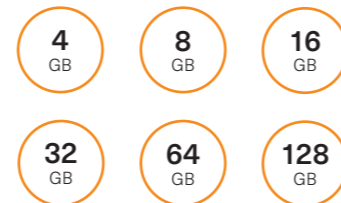
FEATURES	UFS – UNIVERSAL FLASH STORAGE
Density	128 GB – 1 TB
Technology	3D-TLC
JEDEC Version	3.1 and 4.0
Temperature	-25°C to 85°C
Package	153 ball FBGA (11.5 x 13 mm and 11 x 13 mm)

COMPARING THE PERFORMANCE:



Product illustrations may present design models or previous versions. Actual product may vary.

CAPACITIES:



KEY FEATURES:

- 4 GB – 128 GB
- 2D-MLC / 3D-TLC technology
- e-MMC Version 5.0 and 5.1
- Integrated memory management:
 - Error correction code
 - Bad block management
 - Wear-levelling
 - Garbage collection
- Standard and extended temperature range of up to 105°C
- FBGA package

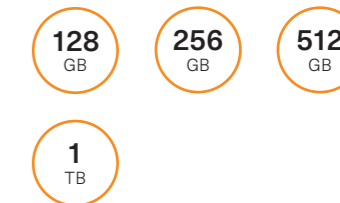
ADVANTAGES

- Higher interface speed HS400 in accordance with JEDEC 5.x
- Managed memory
- Package, interface, features, commands, etc. are standard

APPLICATIONS:

- Industrial Applications
- Consumer Electronics
- Multimedia Applications
- Smart Metering & Intelligent Lighting
- Smart Applications

CAPACITIES:



KEY FEATURES:

- 128 GB – 1 TB
- BiCS FLASH™
- 3D-TLC technology
- UFS Version 3.1 and 4.0
- Integrated memory management:
 - Error correction code
 - Bad block management
 - Wear-levelling
 - Garbage collection
- WriteBooster: Enables significantly faster write speeds
- Standard temperature range up to 85°C
- FBGA package
- High Speed Serial interface

ADVANTAGES

- High speed interface up to 1160 MB/sec / 2320 MB/sec / 4640 MB/sec
- Managed memory
- Package, interface, features, commands, etc. are standard
- Utilises high quality KIOXIA BiCS FLASH™ memory in combination with a KIOXIA origin developed controller

APPLICATIONS:

- Consumer Electronics
- Multimedia Applications
- Smart Applications



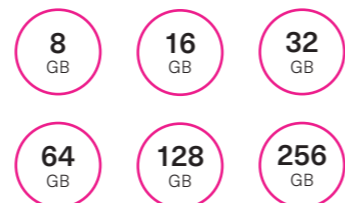
e-MMC Automotive

e-MMC for Automotive Demands

E-mobility, autonomous driving, higher demands on safety and sustainability – automotive industries are once more leading in innovation and technology. For these smart and connected vehicles, reliable storage solutions are mandatory. KIOXIA provides one of the key technologies for wireless communication, information systems and Advanced Driver Assistance Systems (ADAS).

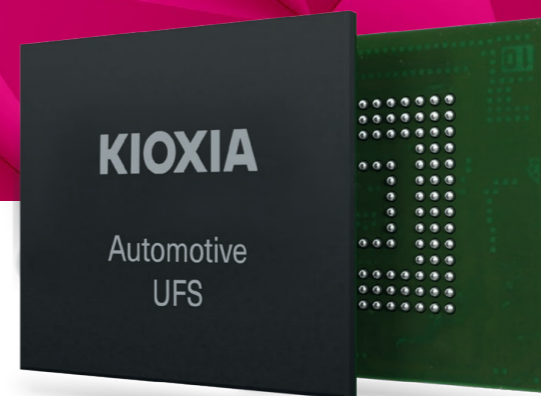
DENSITY	PART NUMBER	JEDEC VERSION	POWER SUPPLY VOLTAGE		TEMPERATURE	PACKAGE
			VCC (V)	VCCQ (V)		
8 GB	THGBMJG6C1LBAC7	e-MMC 5.1	2.7 – 3.6	1.7 – 1.95 2.7 – 3.6	-40°C to 105°C (Automotive Grade 2)	FBGA153
16 GB	THGBMJG7C2LBAC8					
32 GB	THGBMJG8C4LBAC8					
64 GB	THGBMJG9C8LBAC8					
32 GB	THGAMVG8T13BAA7	e-MMC 5.1	2.7 – 3.6	1.7 – 1.95	-40°C to 85°C (Automotive Grade 3)	FBGA153
64 GB	THGAMVG9T23BAA8					
128 GB	THGAMVT0T43BAA8					
256 GB	THGAMVT1T83BAA5					
32 GB	THGAMVG8T13BAB7	e-MMC 5.1	2.7 – 3.6	1.7 – 1.95	-40°C to 105°C (Automotive Grade 2)	FBGA153
64 GB	THGAMVG9T23BAB8					
128 GB	THGAMVT0T43BAB8					
256 GB	THGAMVT1T83BAB5					

CAPACITIES:



KEY FEATURES:

- AEC-Q100 qualified
- Compliant with IATF16949
- Temperature range: Automotive Grade 2 & Grade 3 (-40°C ~ +105°C & -40°C ~ +85°C)
- Compliant with e-MMC 5.1
- Highly reliable technology 2D-MLC and 3D-TLC
- Integrated memory management:
 - Error correction code
 - Bad block management
 - Wear-levelling
 - Garbage collection
- Automotive specific functions



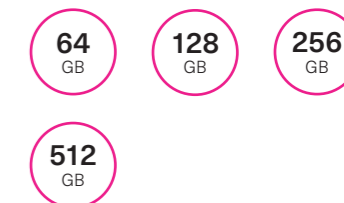
UFS Automotive

UFS for Automotive Demands

Accelerated processing power and increased data storage capacity are the keys to enabling the next generation of automotive systems. For applications demanding for superior interface performance, KIOXIA is offering a line-up of new UFS automotive memory products. Utilizing a full duplex serial high-speed interface, it is compliant with the UFS Version 3.1 and 4.0.

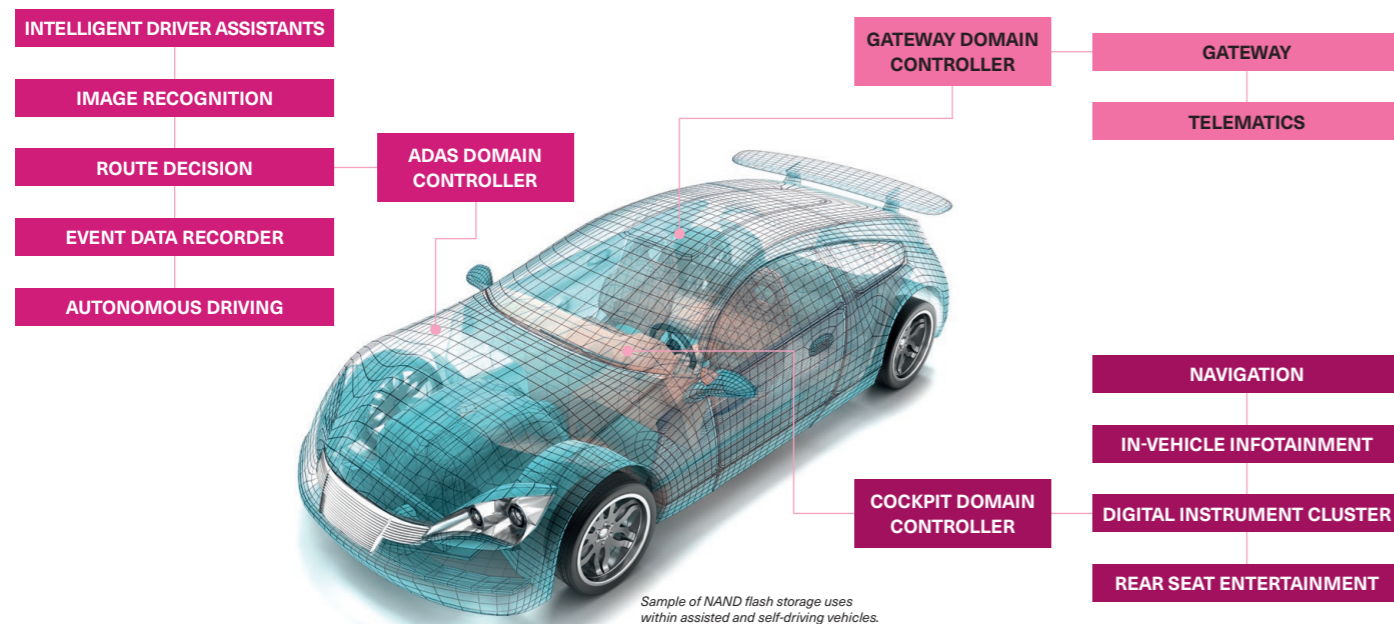
DENSITY	PART NUMBER	JEDEC VERSION	POWER SUPPLY VOLTAGE		TEMPERATURE	PACKAGE
			VCC (V)	VCCQ (V)		
64 GB	THGJFGG9T15BAA8	UFS 3.1	2.4 – 2.7 2.7 – 3.6	1.14 to 1.26	-40°C to 85°C (Automotive Grade 3)	FBGA153
128 GB	THGJFGT0T25BAA8					
256 GB	THGJFGT1T45BAA8					
512 GB	THGJFGT2T85BAA5					
64 GB	THGJFGG9T15BAB8	UFS 3.1	2.4 – 2.7 2.7 – 3.6	1.14 to 1.26	-40°C to 105°C (Automotive Grade 2)	FBGA153
128 GB	THGJFGT0T25BAB8					
256 GB	THGJFGT1T45BAB8					
512 GB	THGJFGT2T85BAB5					
128 GB	THGJFJT0T25BAA8	UFS4.0	2.4 – 2.7	1.14 to 1.26	-40°C to 85°C (Automotive Grade 3)	FBGA153
256 GB	THGJFJT1T45BAA8					
512 GB	THGJFJT2T85BAA5	UFS4.0	2.4 – 2.7	1.14 to 1.26	-40°C to 105°C (Automotive Grade 2)	FBGA153
128 GB	THGJFJT0T25BAB8					
256 GB	THGJFJT1T45BAB8					
512 GB	THGJFJT2T85BAB5					

CAPACITIES:



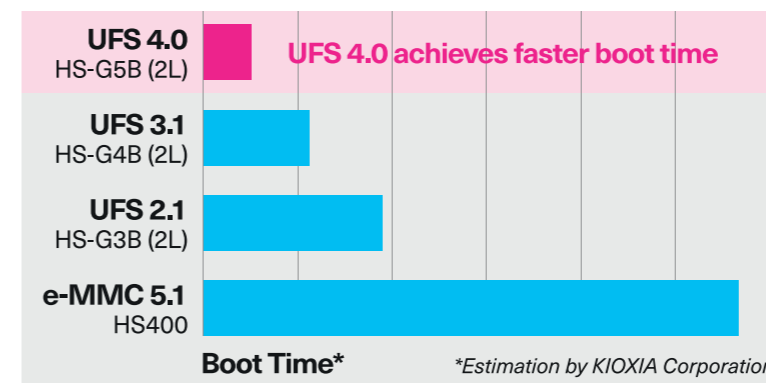
KEY FEATURES:

- AEC-Q100 qualified
- Compliant with IATF16949
- Temperature range:
 - Automotive Grade 3 (-40°C ~ +85°C)
 - Automotive Grade 2 (-40°C ~ +105°C)
- Highly reliable technology 3D-TLC
- Compliant with UFS 3.1 / 4.0
- Integrated memory management:
 - Error correction code
 - Bad block management
 - Wear-levelling
 - Garbage collection
- Automotive specific functions



Quick System Start Up

KIOXIA UFS 4.0 automotive devices use HS-LSS (High Speed Link Startup Sequence) to achieve a faster boot time when compared to previous generation devices.



Product List

SLC NAND

DENSITY	PART NUMBER	TECHN.	PAGE SIZE	VCC	ECC	TEMPERATURE	PACKAGE
1 Gbit	TC58NVG0S3HTA00	2D-SLC	(2048+128) x 8 bit	3.3V	8bit/512B	0°C to 70°C	48TSOP 12 x 20
	TC58NYG0S3HBAI4		(2048+128) x 8 bit	1.8V		-40°C to 85°C	63BGA 9 x 11
	TC58NVG0S3HTA10		(2048+128) x 8 bit	3.3V		-40°C to 85°C	48TSOP 12 x 20
	TC58NVG0S3HBAI4		(2048+128) x 8 bit	3.3V		-40°C to 85°C	63BGA 9 x 11
	TC58NYG0S3HBAI6		(2048+128) x 8 bit	1.8V		-40°C to 85°C	67BGA 6.5 x 8
	TC58NVG0S3HBAI6		(2048+128) x 8 bit	3.3V		-40°C to 85°C	67BGA 6.5 x 8
2 Gbit	TC58NVG1S3HTA00	2D-SLC	(2048+128) x 8 bit	3.3V	8bit/512B	0°C to 70°C	48TSOP 12 x 20
	TC58NYG1S3HBAI4		(2048+128) x 8 bit	1.8V		-40°C to 85°C	63BGA 9 x 11
	TC58NVG1S3HTA10		(2048+128) x 8 bit	3.3V		-40°C to 85°C	48TSOP 12 x 20
	TC58NVG1S3HBAI4		(2048+128) x 8 bit	3.3V		-40°C to 85°C	63BGA 9 x 11
	TC58NYG1S3HBAI6		(2048+128) x 8 bit	1.8V		-40°C to 85°C	67BGA 6.5 x 8
	TC58NVG1S3HBAI6		(2048+128) x 8 bit	3.3V		-40°C to 85°C	67BGA 6.5 x 8
4 Gbit	TH58NVG2S3HTA00	2D-SLC	(2048+128) x 8 bit	3.3V	8bit/512B	0°C to 70°C	48TSOP 12 x 20
	TC58NVG2S0HTA00		(4096+256) x 8 bit	3.3V		0°C to 70°C	48TSOP 12 x 20
	TC58NVG2S0HTA10		(4096+256) x 8 bit	3.3V		-40°C to 85°C	48TSOP 12 x 20
	TH58NVG2S3HTA10		(2048+128) x 8 bit	3.3V		-40°C to 85°C	48TSOP 12 x 20
	TH58NVG2S3HBAI4		(2048+128) x 8 bit	3.3V		-40°C to 85°C	63BGA 9 x 11
	TH58NYG2S3HBAI4		(2048+128) x 8 bit	1.8V		-40°C to 85°C	63BGA 9 x 11
	TC58NVG2S0HBAI4		(4096+256) x 8 bit	3.3V		-40°C to 85°C	63BGA 9 x 11
	TC58NYG2S0HBAI4		(4096+256) x 8 bit	1.8V		-40°C to 85°C	63BGA 9 x 11
	TC58NVG2S0HBAI6		(4096+256) x 8 bit	3.3V		-40°C to 85°C	67BGA 6.5 x 8
	TC58NYG2S0HBAI6		(4096+256) x 8 bit	1.8V		-40°C to 85°C	67BGA 6.5 x 8
8 Gbit	TH58NVG3S0HTA00	2D-SLC	(4096+256) x 8 bit	3.3V	8bit/512B	0°C to 70°C	48TSOP 12 x 20
	TH58NVG3S0HBAI4		(4096+256) x 8 bit	3.3V		-40°C to 85°C	63BGA 9 x 11
	TH58NYG3S0HBAI4		(4096+256) x 8 bit	1.8V		-40°C to 85°C	63BGA 9 x 11
	TH58NVG3S0HTA10		(4096+256) x 8 bit	3.3V		-40°C to 85°C	48TSOP 12 x 20
	TH58NVG3S0HBAI6		(4096+256) x 8 bit	3.3V		-40°C to 85°C	67BGA 6.5 x 8
	TH58NYG3S0HBAI6		(4096+256) x 8 bit	1.8V		-40°C to 85°C	67BGA 6.5 x 8
16 Gbit	TH58NVG4S0HTA20	2D-SLC	(4096+256) x 8 bit	3.3V	8bit/512B	0°C to 70°C	48TSOP 12 x 20
	TH58NVG4S0HTAK0		(4096+256) x 8 bit	3.3V		-40°C to 85°C	48TSOP 12 x 20
32 Gbit	TC58NVG5H2HTA00	2D-SLC	(8192+1024) x 8 bit	3.3V	24bit/1024B	0°C to 70°C	48TSOP 12 x 20
	TC58NVG5H2HTA10		(8192+1024) x 8 bit	3.3V		-40°C to 85°C	48TSOP 12 x 20
64 Gbit	TH58NVG6H2HTAK0	2D-SLC	(8192+1024) x 8 bit	3.3V	24bit/1024B	-40°C to 85°C	48TSOP 12 x 20
	TH58TEG6H2HBAMC		(8192+1024) x 8 bit	3.3V		-40°C to 85°C	132BGA 12 x 18
	TH58NVG6H2HTA20		(8192+1024) x 8 bit	3.3V		0°C to 70°C	48TSOP 12 x 20
	TH58TEG6H2HBA4C		(8192+1024) x 8 bit	3.3V		0°C to 70°C	132BGA 12 x 18
128 Gbit	TH58NVG7H2HTAK0	2D-SLC	(8192+1024) x 8 bit	3.3V	24bit/1024B	-40°C to 85°C	48TSOP 12 x 20
	TH58TEG7H2HBASC		(8192+1024) x 8 bit	3.3V		-40°C to 85°C	132BGA 12 x 18
	TH58NVG7H2HTA20		(8192+1024) x 8 bit	3.3V		0°C to 70°C	48TSOP 12 x 20
	TH58TEG7H2HBA8C		(8192+1024) x 8 bit	3.3V		0°C to 70°C	132BGA 12 x 18
256 Gbit	TH58TEG8H2HBA89	2D-SLC	(8192+1024) x 8 bit	3.3V	24bit/1024B	0°C to 70°C	132BGA 12 x 18
	TH58TEG8H2HBAS9		(8192+1024) x 8 bit	3.3V		-40°C to 85°C	132BGA 12 x 18

Product List

BENAND™

DENSITY	PART NUMBER	TECHN.	PAGE SIZE	VCC	ECC	TEMPERATURE	PACKAGE
1 Gbit	TC58BVG0S3HTA00	2D-SLC	(2048+64) x 8 bit	3.3V	internal ECC	0°C to 70°C	48TSOP 12 x 20
	TC58BYG0S3HBAI4		(2048+64) x 8 bit	1.8V		-40°C to 85°C	63BGA 9 x 11
	TC58BVG0S3HTA10		(2048+64) x 8 bit	3.3V		-40°C to 85°C	48TSOP 12 x 20
	TC58BVG0S3HBAI4		(2048+64) x 8 bit	3.3V		-40°C to 85°C	63BGA 9 x 11
	TC58BYG0S3HBAI6		(2048+64) x 8 bit	1.8V		-40°C to 85°C	67BGA 6.5 x 8
	TC58BVG0S3HBAI6		(2048+64) x 8 bit	3.3V		-40°C to 85°C	67BGA 6.5 x 8
2 Gbit	TC58BVG1S3HTA00	2D-SLC	(2048+64) x 8 bit	3.3V	internal ECC	0°C to 70°C	48TSOP 12 x 20
	TC58BYG1S3HBAI4		(2048+64) x 8 bit	1.8V		-40°C to 85°C	63BGA 9 x 11
	TC58BVG1S3HTA10		(2048+64) x 8 bit	3.3V		-40°C to 85°C	48TSOP 12 x 20
	TC58BVG1S3HBAI4		(2048+64) x 8 bit	3.3V		-40°C to 85°C	63BGA 9 x 11
	TC58BYG1S3HBAI6		(2048+64) x 8 bit	1.8V		-40°C to 85°C	67BGA 6.5 x 8
	TC58BVG1S3HBAI6		(2048+64) x 8 bit	3.3V		-40°C to 85°C	67BGA 6.5 x 8
4 Gbit	TH58BVG2S3HTA00	2D-SLC	(2048+64) x 8 bit	3.3V	internal ECC	0°C to 70°C	48TSOP 12 x 20
	TC58BVG2S0HTA00		(4096+128) x 8 bit	3.3V		0°C to 70°C	48TSOP 12 x 20
	TC58BVG2S0HTA10		(4096+128) x 8 bit	3.3V		-40°C to 85°C	48TSOP 12 x 20
	TH58BVG2S3HTA10		(2048+64) x 8 bit	3.3V		-40°C to 85°C	48TSOP 12 x 20
	TH58BVG2S3HBAI4		(2048+64) x 8 bit	3.3V		-40°C to 85°C	63BGA 9 x 11
	TH58BYG2S3HBAI4		(2048+64) x 8 bit	1.8V		-40°C to 85°C	63BGA 9 x 11
	TC58BVG2S0HBAI4		(4096+128) x 8 bit	3.3V		-40°C to 85°C	63BGA 9 x 11
	TC58BYG2S0HBAI4		(4096+128) x 8 bit	1.8V		-40°C to 85°C	63BGA 9 x 11
	TC58BVG2S0HBAI6		(4096+128) x 8 bit	3.3V		-40°C to 85°C	67BGA 6.5 x 8
	TC58BYG2S0HBAI6		(4096+128) x 8 bit	1.8V		-40°C to 85°C	67BGA 6.5 x 8
8 Gbit	TH58BVG3S0HTA00	2D-SLC	(4096+128) x 8 bit	3.3V	internal ECC	0°C to 70°C	48TSOP 12 x 20
	TH58BYG3S0HBAI4		(4096+128) x 8 bit	1.8V		-40°C to 85°C	63BGA 9 x 11
	TH58BVG3S0HTA10		(4096+128) x 8 bit	3.3V		-40°C to 85°C	48TSOP 12 x 20
	TH58BVG3S0HBAI4		(4096+128) x 8 bit	3.3V		-40°C to 85°C	63BGA 9 x 11
	TH58BVG3S0HBAI6		(4096+128) x 8 bit	3.3V		-40°C to 85°C	67BGA 6.5 x 8
	TH58BYG3S0HBAI6		(4096+128) x 8 bit	1.8V		-40°C to 85°C	67BGA 6.5 x 8

e-MMC

DENSITY	PART NUMBER	TECHN.	VCCQ	JEDEC VERSION	TEMPERATURE	PACKAGE
4 GB	THGBMNG5D1LBAIK	2D-MLC	1.8V or 3.3V	e-MMC 5.0	-25°C to 85°C	153FBGA 7.5 x 9
	THGBMNG5D1LBAIT				-25°C to 85°C	153FBGA 11 x 10
	THGBMTG5D1LBAIL				-25°C to 85°C	153FBGA 11.5 x 13
8 GB	THGBMUG6C1LBAIL	2D-MLC	1.8V or 3.3V	e-MMC 5.1	-25°C to 85°C	153FBGA 11.5 x 13
	THGBMJG6C1LBAU7				-40°C to 105°C	153FBGA 11.5 x 13
16 GB	THGBMJG7C2LBAU8	2D-MLC	1.8V or 3.3V	e-MMC 5.1	-40°C to 105°C	153FBGA 11.5 x 13
	THGAMVG7T13BAIL	3D-TLC	1.8V		-25°C to 85°C	153FBGA 11.5 x 13
32 GB	THGBMJG8C4LBAU8	2D-MLC	1.8V or 3.3V	e-MMC 5.1	-40°C to 105°C	153FBGA 11.5 x 13
	THGAMVG8T13BAU7	3D-TLC	1.8V		-40°C to 105°C	153FBGA 11.5 x 13
THGAMVG8T13BAIL	-25°C to 85°C			153FBGA 11.5 x 13		
64 GB	THGAMVG9T23BAU8	3D-TLC	1.8V	e-MMC 5.1	-40°C to 105°C	153FBGA 11.5 x 13
	THGAMSG9T15BAIL				-25°C to 85°C	153FBGA 11.5 x 13
128 GB	THGAMST0T25BAIL	3D-TLC	1.8V	e-MMC 5.1	-25°C to 85°C	153FBGA 11.5 x 13
	THGAMVT0T43BAU8				-40°C to 105°C	153FBGA 11.5 x 13
256 GB	THGAMVT1T83BAU5	3D-TLC	1.8V	e-MMC 5.1	-40°C to 105°C	153FBGA 11.5 x 13

UFS

DENSITY	PART NUMBER	TECHN.	VCC VCCQ (3.X)	JEDEC VERSION	TEMPERATURE	PACKAGE
128 GB	THGJFJT0E25BAIP	3D-TLC	2.5V 1.2V	UFS 4.0	-25°C to 85°C	153FBGA 11 x 13
256 GB	THGJFGT1E45BAIP	3D-TLC	2.5V 1.2V	UFS 3.1	-25°C to 85°C	153FBGA 11 x 13
	THGJFLT1E45BATP			UFS 4.0		153FBGA 11 x 13
512 GB	THGJFGT2T85BAIU	3D-TLC	2.5V 1.2V	UFS 3.1	-25°C to 85°C	153FBGA 11 x 13
	THGJFLT2E46BATP			UFS 4.0		153FBGA 11 x 13
1 TB	THGJFLT3E86BATU	3D-TLC	2.5V 1.2V	UFS 4.0	-25°C to 85°C	153FBGA 11 x 13

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