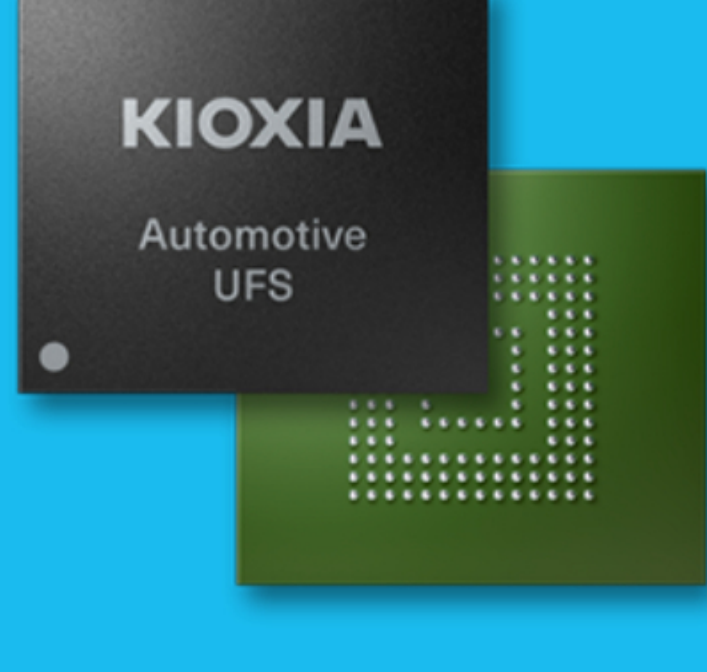


UFS 3.1 for Automotive



Key KIOXIA Automotive UFS 3.1 Features

- Compliant with IATF16949
- Meets automotive standards (e.g., AEC-Q100 Stress Test Qual Standard)
- Supports PPAP (Production Part Approval Process)
- Extended Temperature Range (e.g., -40°C to +105°C)
- Low Failure Rate
- Longer lead time for PCN compared to non-automotive grade parts
- Features for automotive (e.g., enhanced solder ball reliability, countermeasures if chip exceeds certain temp, etc.)
- 64GB, 128GB, 256GB, 512GB

Next Generation UFS 4.0 / 4.1 for Automotive

KIOXIA UFS 4.0 / 4.1 automotive devices deliver enhanced capabilities to support increasingly sophisticated automotive applications. With an interface speed of up to 46.4Gbps and a range of density options, the new UFS 4.0 / 4.1 automotive devices are well-suited to support the next generation of complex automotive applications.

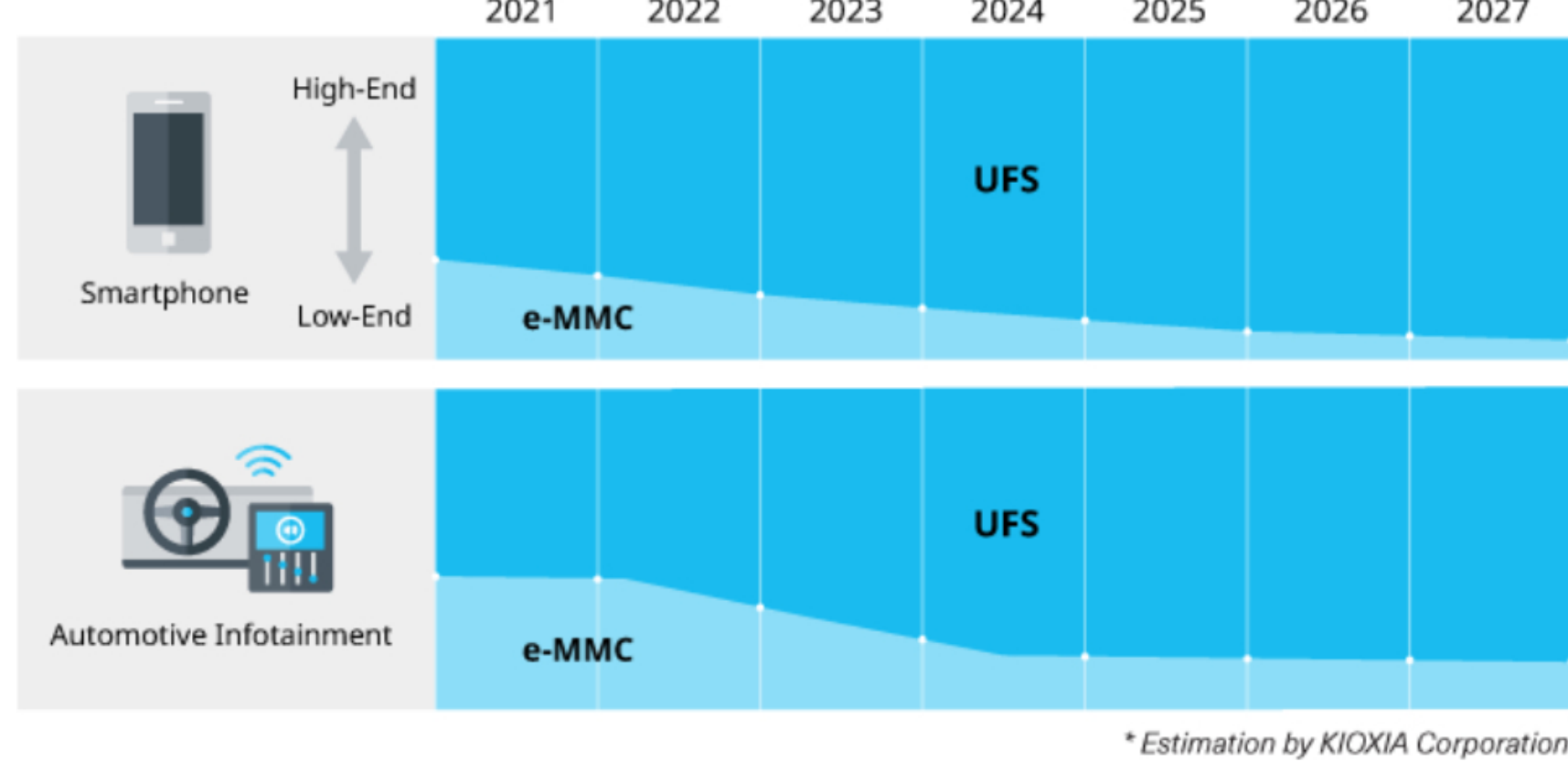


Learn more about Automotive UFS 4.0 / 4.1

The Changing Interface from e-MMC (parallel) to UFS (serial)

UFS was specifically defined by JEDEC to be the high-performance memory replacement for e-MMC. It has become the premiere solution for smartphones, continuing to migrate into automotive and other applications. UFS will ultimately surpass e-MMC as the primary storage solution for automotive applications.

UFS Market Trend



UFS is the faster performance JEDEC standard replacement to e-MMC. Smartphone adopted UFS for its performance advantages. Automotive is doing the same.

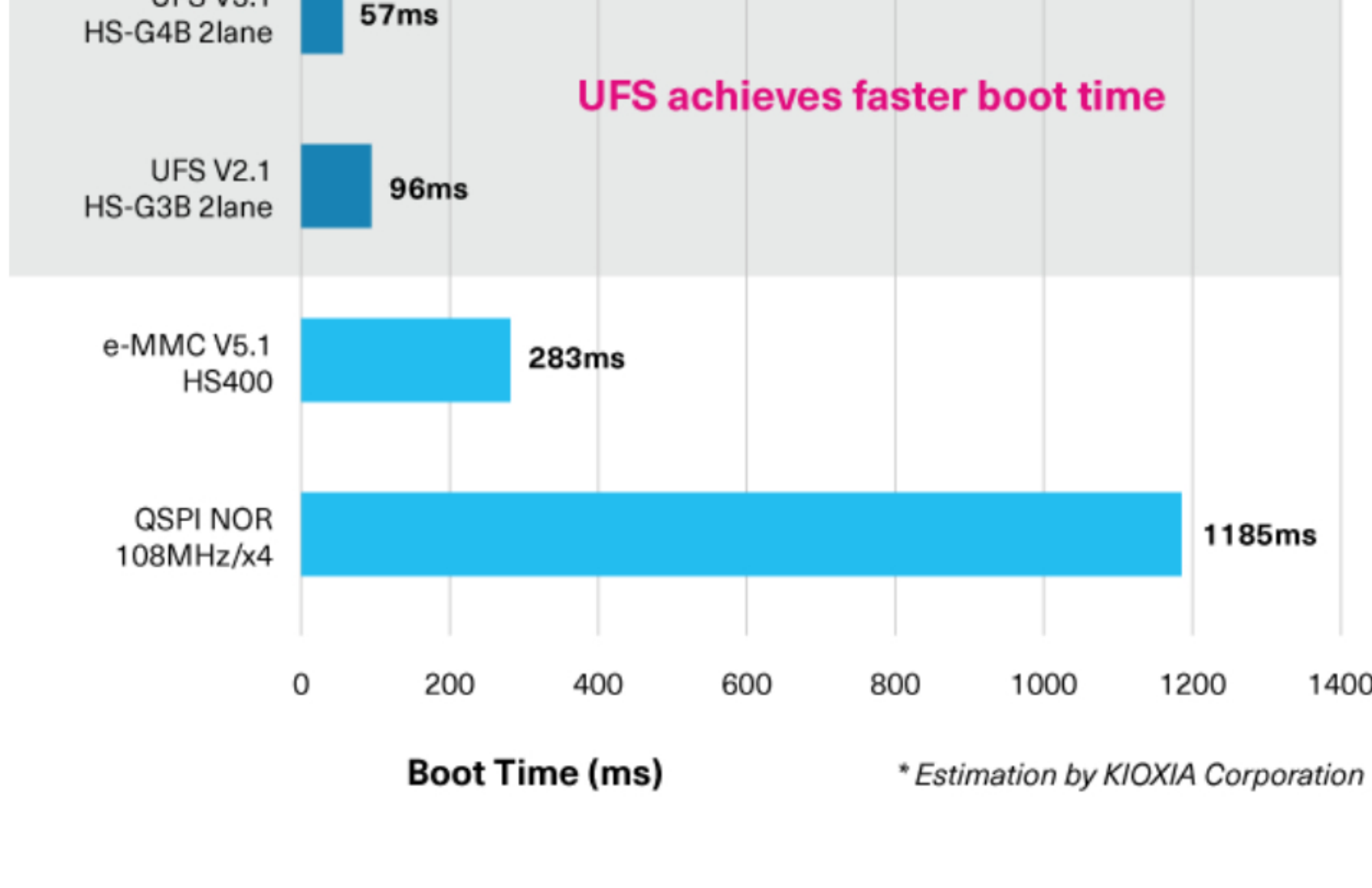
Why UFS?

Simply put – it's the successor to e-MMC. UFS performance will continue to advance, significantly widening its performance advantage over e-MMC.

Compared to e-MMC, UFS Delivers:

- A faster interface
- Higher performance for reads and writes
- Higher density offerings
- Better power efficiency

Boot Time Comparison (64MB Data-out)



Faster boot time with a large amount of boot data is a big motivation to use UFS in automotive applications.

UFS has a faster boot time than other storage devices thanks to its high speed sequential read.

Additional Automotive UFS Features Well-Suited for Automotive Reliability

- **Thermal Control:** If the device exceeds 105°C, the device slows the performance and notifies the host processor to take action
- **Extended Diagnosis:** the UFS controller monitors various items, such as write/erase cycles, current temperature, etc. and reports device status to the host processor
- **Refresh:** enables refresh of deteriorated data, improving data reliability.

KIOXIA has led the way in UFS since 2013, being first to sample the technology*, and will continue to pave the road ahead for automotive applications of the future.

* As of February 8, 2013. Kioxia survey.

Automotive UFS 3.1 Specs

AEC-Q100 Grade 2⁽¹⁾

Capacity	Part Number	UFS version	Max Data Rate (MB/s)	Supply Voltage			Operating Temperature (°C) ⁽²⁾	Package Size (mm)
				V _{CC} (V)	V _{CCQ} (V)	V _{CCQ2} (V)		
64GB	THGJFGG9T15BAB8	3.1	2320	2.4 to 2.7, 2.7 to 3.6	1.14 to 1.26	- ⁽³⁾	-40 to 105	11.5x13.0x1.2
128GB	THGJFGT0T25BAB8							
256GB	THGJFGT1T45BAB8							
512GB	THGJFGT2T85BAB5							11.5x13.0x1.3

(1) Electrical component qualification requirements defined by the AEC (Automotive Electronics Council).

(2) Tc=115°C max.

(3) This product supports dual-supply operation at V_{CC} and V_{CCQ}. V_{CCQ2} need not be supplied.

- In every mention of a Kioxia product: Product density is identified based on the density of memory chip(s) within the Product, not the amount of memory capacity available for data storage by the end user. Consumer-usable capacity will be less due to overhead data areas, formatting, bad blocks, and other constraints, and may also vary based on the host device and application. For details, please refer to applicable product specifications. The definition of 1KB = 2¹⁰ bytes = 1,024 bytes. The definition of 1Gb = 2³⁰ bits = 1,073,741,824 bits. The definition of 1GB = 2³⁰ bytes = 1,073,741,824 bytes. 1Tb = 2⁴⁰ bits = 1,099,511,627,776 bits.

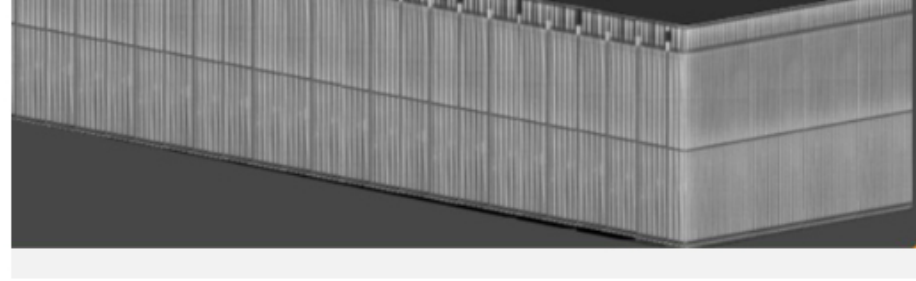
Support



Inquiries / Support Regarding Business Products

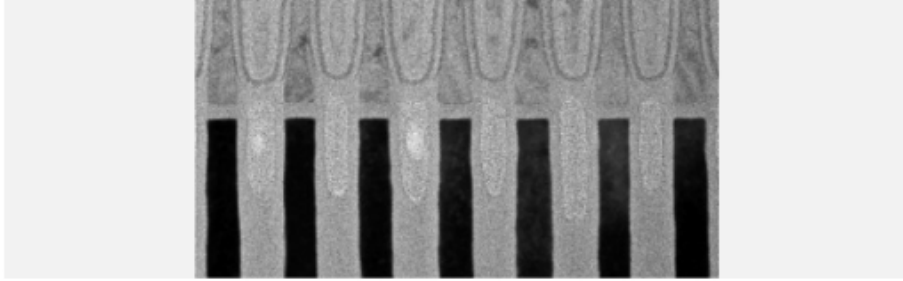
Please contact us if you have any technical questions, requests for materials, are interested in samples or purchases of business products (Memory, SSD), etc.

Related Links



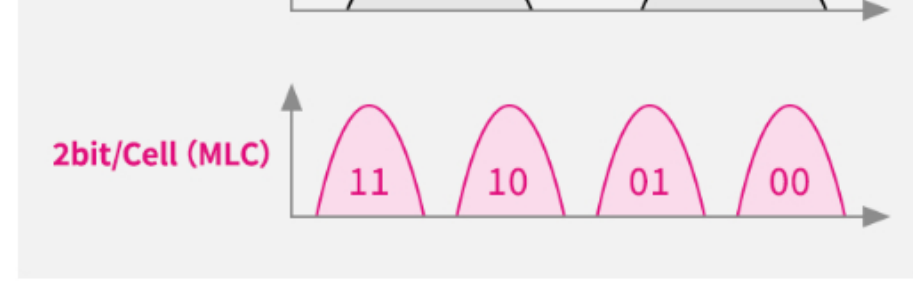
What is the 3D Flash Memory "BICS FLASH"?

In 2007, KIOXIA announced the world's first 3D flash memory technology. Presenting our cutting-edge technologies, along with the key points of innovation and our efforts toward further increases in capacity.



What is NAND Flash Memory?

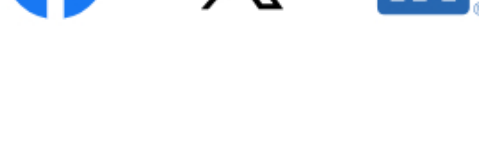
KIOXIA invented the world's first NAND flash memory in 1987. This is an explanation of the structure of flash memory and the mechanism of data storage.



What is Multi-level Cell Technology Realizing Larger Capacity Flash Memory?

"Multi-level cell technology" is one of the main technologies realizing larger capacity flash memory. The 1 Gbit MLC NAND flash memory launched by KIOXIA in 2001 was the first application in the world of multi-level cell technology to a NAND flash memory product.

Share



UFS for Automotive

> UFS 3.1 for Automotive

3D Flash Memory "BICS FLASH"

Having invented NAND flash memory over 35 years ago, KIOXIA is today one of the industry's leading flash memory suppliers — and continues to move the technology forward. The launch of KIOXIA BICS FLASH™ 3D flash memory in 2007 strengthened the company's reputation as a technology innovation leader by introducing a revolutionary vertical stacking and lateral scaling process to significantly increase memory cell count. The result is a breakthrough flash memory architecture that addresses the unceasing demand for improved storage density and performance.

SLC NAND Flash Memory

SLC NAND flash memory makes it ideally suited for a variety of consumer and industrial applications where reliability and longevity of supply is important.

UFS & e-MMC for Consumer & Industrial

The KIOXIA family of high-capacity embedded flash memory devices, consisting of UFS (Universal Flash Storage) and e-MMC, integrate KIOXIA memory solutions and a controller into a single package. KIOXIA's managed flash memory solutions help customers simplify system development, reduce host processor workload, shorten time to market, and improve ease of use.

XL-FLASH | Storage Class Memory (SCM)

XL-FLASH is designed to address the performance gap that currently exists between volatile memories such as DRAM and current flash memory.

UFS for Automotive

KIOXIA offers a broad capacity lineup of UFS for automotive applications, and is well positioned to support data storage demands of increasingly complex automotive applications.

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