

Universal Flash Storage (UFS)

Designed to be the next-generation, higher performance embedded storage solution to e-MMC, KIOXIA's UFS (Universal Flash Storage) brings the high-speed read/write performance and low power consumption demanded by mobile devices and related applications.

KIOXIA's UFS solutions are compliant with JEDEC/UFS Version 2.1/3.0/3.1, and integrate the company's BiCS FLASH™ 3D flash memory and a controller in a JEDEC-standard package. The controller performs error correction, wear leveling, logical-to-physical address translation, and bad-block management for simplified system development.

KIOXIA was first company to sample the UFS technology and will continue to lead the way forward for the applications of the future. With UFS from KIOXIA, an improved user experience becomes reality.



Advantages

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

*When compared to e-MMC

Key Features

- KIOXIA controller
- Serial interface
- High speed reads/writes
- Low pin count
- 32GB-512GB
- BiCS FLASH™ 3D memory
- 11.5x13mm 153ball BGA package
- JEDEC standard

Applications

- Smartphones
- AR/VR
- Tablets/2-in-1
- Automotive
- Streaming Media
- Smart Speakers
- Many others

Densities

- 512GB
- 256GB
- 126GB
- 64GB
- 32GB

Design Considerations

UFS v3.1



supports
2.32GB/s

Use When:

- **Higher densities are needed** (from 32GB to 512GB)
- **Enhanced performance** is desired (UFS provides high-speed read/write performance with good power efficiency)
- **SoCs that interface** to UFS are available

e-MMC v5.1



supports
400MB/s

Use When:

- **Lower densities are needed** (4GB, 8GB, and 16GB)
- **SoC-supporting UFS** interface is not available

Product image may differ from the actual product.



BiCS FLASH™

UFS | Universal Flash Storage

	Part Number	Capacity	UFS Version	Max Data Rate (MB/s)	Supply Voltage			Operating Temp (°C)	Package (mm)
					V _{CC} (V)	V _{CCQ} (V)	V _{CCQ2} (V)		
Consumer Grade	THGAF8G8T23BAIL	32GB	2.1	1160	2.7 to 3.6	_ ¹	1.70 to 1.95	-25 to 85	11.5 × 13 × 0.8
	THGAF8G9T43BAIR	64GB							11.5 × 13 × 1.0
	THGAF8T0T43BAIR	128GB							
	THGAF8T1T83BAIR	256GB							
	THGJCT0T44BAIL	128GB	3.0	2320	2.4 to 2.7, 2.7 to 3.6	1.14 to 1.26	_ ²	-25 to 85	11.5 × 13 × 0.8
	THGJCT1T84BAIC	256GB							11.5 × 13 × 0.95
	THGJCT2T84BAIC	512GB							
	THGJFAT0T44BAIL	128GB	3.1	2320	2.4 to 2.7, 2.7 to 3.6	1.14 to 1.26	_ ²	-25 to 85	11.5 × 13 × 0.8
	THGJFAT1T84BAIR	256GB							11.5 × 13 × 1.0
THGJFAT2T84BAIR	512GB								

(1) Dual-supply operation at V_{CC} and V_{CCQ2}; V_{CCQ} need not be supplied. (2) Dual-supply operation at V_{CC} and V_{CCQ}; V_{CCQ2} need not be supplied.

Note: While UFS performance is higher Ver 3.1 > 3.0 > 2.1, the SoC will likely determine which version UFS is required. JEDEC intends each UFS version to be backward compatible with previous versions, but please confirm by evaluating the power supply voltage and SoC.

Universal Flash Storage (UFS) is a product category for a class of embedded memory products built to the JEDEC UFS standard specification. 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. The definition of 1GB = 230 bytes = 1,073,741,824 bytes.