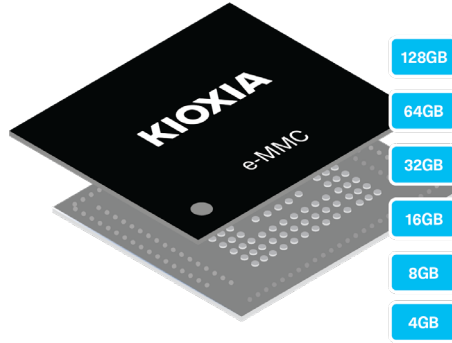
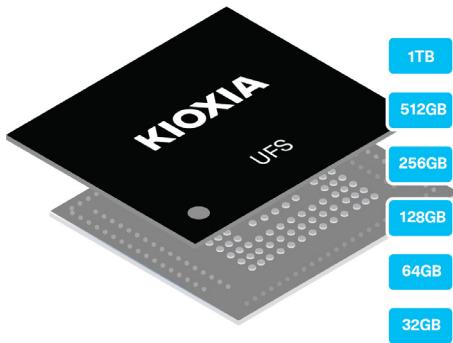


Managed Flash Memory Solutions

Universal Flash Storage (UFS) and e-MMC

Our UFS (Universal Flash Storage) and e-MMC Managed Flash solutions integrate flash memory and a KIOXIA controller in a single package. An ideal replacement for e-MMC, UFS combines the high performance, power efficiency and enhanced reliability demanded by mobile applications, including smartphones, tablets, AR/VR, automotive and more.



DESIGN CONSIDERATIONS

Use UFS when:

- Higher densities are needed (from 32GB to 1TB)
- Enhanced performance is required
- SoC supporting UFS interface is available
- Recommend v2.1 for 32/64GB and v3.1 for 128GB and above
- Recommend 11.0 x 13.0mm 153 ball new, smaller package for 256GB, 512GB v3.1

Use e-MMC when:

- Lower densities are needed (4GB, 8GB MLC FLASH)
- SOC supporting UFS interface is not available (16GB, 32GB, 64GB, 128GB BiCS FLASH)

WHAT'S NEW:

- BiCS based e-MMC and UFS available at 12 week lead time
- Floating Gate e-MMC is still on allocation. 4GB, 8GB, 16GB, 32GB
- Product Change Notification announced for e-MMC with CS available in March
- Next generation BiCS based 64GB and 128GB e-MMC sampling in Q2'22

UFS KEY FEATURES

- KIOXIA controller
- Serial interface
- High speed reads/writes
- Low pin count
- 32GB - 1TB
- BiCS FLASH™ 3D flash memory
- JEDEC standard
- 11.5 x 13.0mm 153 ball BGA package
- 11.0 x 13.0mm 153 ball BGA package

e-MMC KEY FEATURES

- KIOXIA controller
- Parallel interface
- Easy adoption for SoC
- C Temp (-25C to 85C) 4GB - 128GB
- I temp (-40C to 105C) 8GB – 64GB
- BiCS FLASH™ 3D flash memory from 16GB
- JEDEC standard
- 11.5 x 13.0mm 153 ball BGA package (4GB also offered in 11.0x10.0mm package)

UFS Focus Products

- 32GB, 64GB v2.1 BiCS3 FLASH
- 128GB, 256GB, 512GB, 1TB v3.1 BiCS FLASH

e-MMC Focus Products

- 4GB, 8GB MLC product
- 16GB, 32GB, 64GB, 128GB BiCS FLASH™ 3D flash memory product

KEY APPLICATIONS



Smartphones



AR/VR



Tablets/2-in-1



Automotive



Streaming Media



Smart Speakers

Contact your local KIOXIA sales representative or franchised distributor for additional information.

MANAGED FLASH | UFS

	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	1166	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
	THGJFHT0T44BAIL	128GB	3.1	2332	2.4 to 2.7, 2.7 to 3.6	1.14 to 1.26	- ²	-25 to 85	11.5 × 13 × 0.8
	THGJFGT1E45BAIL	256GB							11.5 × 13 × 0.8
	THGJFGT1E45BAIP								11 × 13 × 0.8
	THGJFGT2T85BAIR	512GB							11.5 × 13 × 1.0
	THGJFGT2T85BAIU								11 × 13 × 1.0
THGJFHT3T84BAIF	1TB		11.5 × 13 × 1.1						

(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.

MANAGED FLASH | e-MMC

	Part Number	Previous Part Numbers	Capacity	e-MMC Version	Process	Max Data Rate (MB/s)	Supply Voltage		Operating Temp (°C)	Package (mm)				
							V _{cc} (V)	V _{ccq} (V)						
Consumer Grade	THGBMNG5D1LBAIL		4GB	5	FG NAND	400	2.7 to 3.6	1.70 to 1.95, 2.7 to 3.6	-25 to 85	11 × 10 × 0.8				
	THGBMTG5D1LBAIL	THGBMNG5D1LBAIL								11.5 × 13 × 0.8				
	THGBMUG6C1LBAIL	THGBMJG6C1LBAIL	8GB	5.1						BiCS FLASH™	400	2.7 to 3.6	1.70 to 1.95	11.5 × 13 × 0.8
	THGBMUG7C1LBAIL	THGBMJG7C1LBAIL	16GB											
	THGBMUG8C2LBAIL	THGBMJG8C2LBAIL	32GB	5.1	BiCS FLASH™	400	2.7 to 3.6	1.70 to 1.95	11.5 × 13 × 0.8					
	THGAMVG7T13BAIL	THGAMRG7T13BAIL	16GB											
	THGAMVG8T13BAIL	THGAMRG8T13BAIL	32GB											
	THGAMVG9T23BAIL	THGAMRG9T23BAIL	64GB											
	THGAMVT0T43BAIR	THGAMRT0T43BAIR	128GB	5.1	BiCS FLASH™	400	2.7 to 3.6	1.70 to 1.95	11.5 × 13 × 1.0					
	THGAMSG9T24BAIL		64GB											
THGAMST0T24BAIL		128GB	5.1	FG NAND	400	2.7 to 3.6	1.70 to 1.95, 2.7 to 3.6	-40 to 105 ¹	11.5 × 13 × 1.2					
THGBMJG6C1LBAU7		8GB												
THGBMJG7C2LBAU8		16GB												
THGBMJG8C4LBAU8		32GB												
THGBMJG9C8LBAU8		64GB												

(1) Tc=115°C max. Contact your KIOXIA sales representative for sample schedule

Definition of capacity: KIOXIA Corporation defines a megabyte (MB) as 1,000,000 bytes, a gigabyte (GB) as 1,000,000,000 bytes and a terabyte (TB) as 1,000,000,000,000 bytes. A computer operating system, however, reports storage capacity using powers of 2 for the definition of 1GB = 2³⁰ = 1,073,741,824 bytes and therefore shows less storage capacity. Available storage capacity (including examples of various media files) will vary based on file size, formatting, settings, software and operating system, such as Microsoft Operating System and/or pre-installed software applications, or media content. Actual formatted capacity may vary.