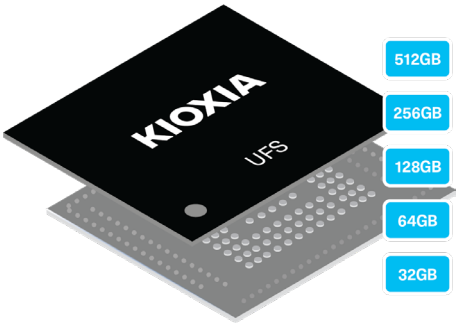
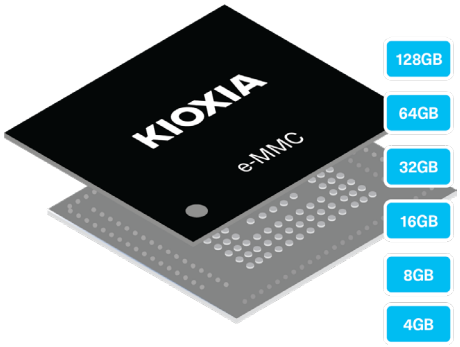
KIOXIA

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.





UFS KEY FEATURES

- KIOXIA controller
- Serial interface
- High speed reads/writes
- Low pin count
- 32GB - 512GB
- BiCS FLASH™ 3D flash memory
- JEDEC standard
- 11.5 x 13mm 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 13mm 153 ball BGA package
  (4GB also offered in 11x10mm package)

DESIGN CONSIDERATIONS

Use UFS when:

- Higher densities are needed (from 32GB to 512GB)
- Enhanced performance is required
- SoC supporting UFS interface is available
- Recommend v2.1 for 32/64GB and v3.1 for 128GB and above

Use e-MMC when:

- Lower densities are needed (from 4GB to 128GB)
- SoC supporting UFS interface is not available

WHAT'S NEW:

- Market has become tight, especially for low density eMMC

UFS Focus Products

- 32GB, 64GB, 128GB, 256GB, 512GB BiCS FLASH™ 3D flash memory

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.

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MANAGED FLASH | UFS

	Part Number	Capacity	e-MMC 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 x 13 x 0.8
	THGJCT1T84BAIC	256GB							11.5 x 13 x 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.

MANAGED FLASH | e-MMC

	Part Number	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	THGBMNG5D1LBAIT	4GB	5.0	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
	THGBMNG5D1LBAIL								11.5 × 13 × 0.8
	THGBMJG6C1LBAIL	8GB	5.1						
	THGBMJG7C1LBAIL	16GB							
	THGBMJG8C2LBAIL	32GB							
	THGAMRG7T13BAIL	16GB	5.1	BiCS FLASH™	400	2.7 to 3.6	1.70 to 1.95	-25 to 85	11.5 × 13 × 0.8
	THGAMRG8T13BAIL	32GB							
	THGAMRG9T23BAIL	64GB							
	THGAMRT0T43BAIR	128GB							11.5 × 13 × 1.0
Industrial Grade	THGBMJG6C1LBAU7	8GB	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
	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 = 2^{30} = 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.

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