# TOSHIBA
## Leading Innovation >>>

## > e•MMC
## Cost Effective Mass Storage

e•MMC™ is a family of advanced, highly efficient NAND flash memory with an integrated controller and enhanced memory management. Based on an interface standardized by JEDEC, Toshiba's e•MMC offers a suitable solution for applications in which higher data volumes need to be stored in a cost-efficient way. It is fully compliant with the Multimedia Card Association (MMCA) high-speed memory interface standard.

## NAND FLASH MEMORY
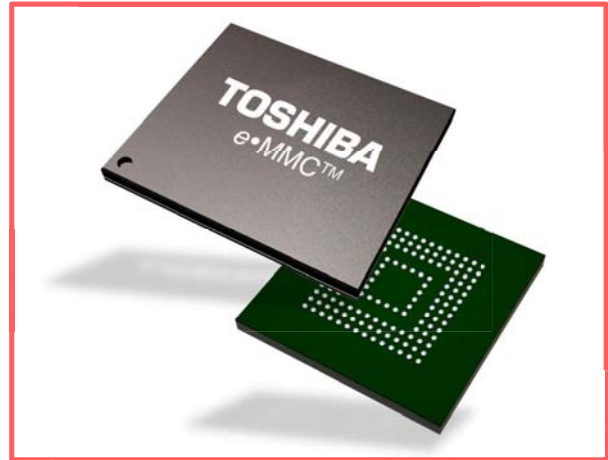


## > APPLICATIONS

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


INVENTOR OF FLASH MEMORY

## > FEATURES

- 4GB – 128GB
- 15nm
- MLC technology
- Conforms to the latest JEDEC Version 5.0 and 5.1
- Integrated memory management
  - Error correction code
  - Bad block management
  - Wear-leveling
  - Garbage collection
- Standard and extended temperature range
- FBGA package

## > ADVANTAGES

- High Interface speed (HS400 according to JEDEC 5.x)
- Managed memory
- Package, interface, features, commands etc. are standard
- Utilizes high-quality Toshiba MLC NAND flash memory in combination with a Toshiba developed controller
- Produced in Toshiba's cutting-edge technology flash memory factory

## > BENEFITS

- Easy-to-integrate storage solution due to established standards
- Cost efficient design-in
- An effective relationship between price, density and performance
- Reliable storage solution based on high-quality NAND memory and an optimized controller
- Extended production capacity to fulfill customer demand

## > SPECIFICATIONS

| Product / Features | e·MMC | Extended Temp. e·MMC |
|---|---|---|
| Density | 4GB – 128GB | 8GB – 64GB |
| Technology | 15nm | 15nm |
| JEDEC Version | 5.0 / 5.1 | 5.1 |
| Temperature | -25°C to +85°C | -40°C to +85°C |
| Package | FBGA | |

# e • MMC – PRODUCT LIST

| Density | Item Name | Technology | JEDEC Standard | Temperature | Package |
|---------|-----------|------------|----------------|-------------|---------|
| 4GB | THGBMDG5D1LBAIT | 15nm | JEDEC 5.0 | -25°C to 85°C | 153FBGA 11x10 |
| 8GB | THGBMHG6C1LBAIL | 15nm | JEDEC 5.1 | -25°C to 85°C | 153FBGA 11.5x13 |
| 8GB | THGBMHG6C1LBAWL | 15nm | JEDEC 5.1 | -40°C to 85°C | 153FBGA 11.5x13 |
| 16GB | THGBMHG7C1LBAIL | 15nm | JEDEC 5.1 | -25°C to 85°C | 153FBGA 11.5x13 |
| 16GB | THGBMHG7C2LBAWR | 15nm | JEDEC 5.1 | -40°C to 85°C | 153FBGA 11.5x13 |
| 32GB | THGBMHG8C2LBAIL | 15nm | JEDEC 5.1 | -25°C to 85°C | 153FBGA 11.5x13 |
| 32GB | THGBMHG8C4LBAWR | 15nm | JEDEC 5.1 | -40°C to 85°C | 153FBGA 11.5x13 |
| 64GB | THGBMHG9C4LBAIR | 15nm | JEDEC 5.1 | -25°C to 85°C | 153FBGA 11.5x13 |
| 64GB | THGBMHG9C8LBAWG | 15nm | JEDEC 5.1 | -40°C to 85°C | 153FBGA 11.5x13 |
| 128GB | THGBMHT0C8LBAIG | 15nm | JEDEC 5.1 | -25°C to 85°C | 153FBGA 11.5x13 |

# e • MMC – SPECIALIZED VERSIONS

Does your application require faster data throughput? Toshiba offers enhanced versions of its 16GB and 32GB e-MMC on demand. Please contact your Toshiba representative or qualified distributor for more information.

# e • MMC – DESIGN GUIDELINE & DESIGN CHECK SHEET

To support your e·MMC design, Toshiba offers a design guideline and a design check sheet. The design guideline highlights some of the key topics to be considered when selecting and utilizing a Toshiba e·MMC. The design check sheet can be used to give more detailed information about the individual usage scenario for the e·MMC. Both files are available at your local Toshiba representative or a qualified distributor.

# e • MMC – ENHANCED USER DATA AREA

Toshiba's e·MMC products support the JEDEC compliant "Enhanced User Data Area," also called "pseudo-SLC." For applications requiring the memory to perform with higher write/erase cycles than MLC NAND can offer, the e·MMC provides the option to build a partition which offers "pseudo-SLC" performance.

# INNOVATION IS OUR TRADITION: FLASH MEMORY AND MORE

In 1984, Toshiba developed a new type of semiconductor memory called flash memory, leading the industry into the next generation ahead of its competitors. Some time later in 1987, NAND flash memory was developed, and this has since been used in a variety of memory cards and electronic equipment. The NAND flash market has grown rapidly, with flash memory becoming an internationally standardized memory device. As the inventor of flash memory, Toshiba has carved out a path to a new era in which we are all able to carry videos, music and data with us wherever we go.