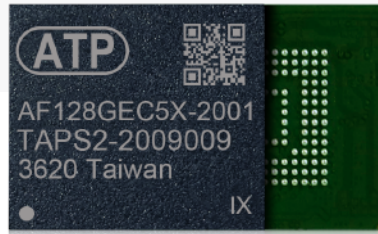# e.MMC

## The Global Leader in Specialized Storage and Memory Solutions



## KEY FEATURES

- AEC-Q100 Grade 2 (-40°C~105°C) Compliant*
- AEC-Q100 Grade 3 (-40°C~85°C) Compliant*
- Extra-high endurance: 2-3X higher than standard e.MMC*

- Complies with JEDEC e.MMC v5.1 Standard (JESD84-B51)
- 153-ball FBGA (RoHS compliant, "green package")
- LDPC ECC engine*

* May vary by product and project support

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The ATP industrial e.MMC is an advanced storage solution that integrates NAND flash memory, a sophisticated flash controller, and a fast MultiMedia Card (MMC) interface in the same package. By incorporating these components in an integrated package, ATP e.MMC manages all background operations internally, freeing the host from handling low-level flash operations for faster and more efficient processing.

Smaller than a typical postage stamp, ATP e.MMC comes in a 153-ball fine pitch ball grid array (FBGA package). The tiny footprint makes it perfectly suitable for embedded systems with space constraints but require rugged endurance, reliability and durability in harsh environments.

ATP e.MMC is built to meet the tough demands of industrial applications. As a soldered-down solution, it is secure against constant vibrations. Its industrial temperature rating means that severe scenarios from freezing cold -40°C to blistering hot 105°C will not cause adverse impact on the device or the data in it.

Compliant with the latest JEDEC e.MMC 5.1 Standard (JESD84-B51), ATP e.MMC features Command Queuing and Cache Barrier to enhance random read/write performance; High Speed 400 (HS400) DDR Mode for a bandwidth of up to 400 MB/s; and field firmware update (FFU). Cache Flushing Report ensures the data integrity on cache blocks; Enhanced Strobe in HS400 Mode facilitates faster synchronization between the host and the e.MMC device; and, Secure Write Protection ensures that only trusted entities can protect or unprotect the e.MMC device.

It is backward compatible with previous versions (v4.41/v4.5/v5.0), supporting features such as power-off notifications, packed commands, cache, boot or replay protected memory block (RPMB) partitions, high priority interrupt (HPI), and hardware (HW) reset.

| Technologies & Add-On Services | S.M.A.R.T. | Firmware-based Power Loss Protection | AutoRefresh | Advanced Wear Leveling | Dynamic Data Refresh | End-to-End Data Path Protection | Auto-Read Calibration | Secure Erase | Industrial Temperature | SiP | Vibration-Proof BGA Package | Complete Drive Test | Joint Validation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Premium | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ▲ |
| Superior | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ▲ |
| Value | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ▲ | ○ | ○ | ○ | ▲ |

▲: Customization option available on a project basis.

# Specifications

## e.MMC

| | Extended Industrial Grade | | Automotive Grade 2 | | Automotive Grade 3 | | Industrial Grade | | |
|---|---|---|---|---|---|---|---|---|---|
| **Product Line** | Premium | Superior | Premium | Superior | Premium | Superior | Premium | | |
| | E700Pa | E600Sa | E700Paa | E600Saa | E700Pia | E600Sia | E750Pi | E700Pi | E700Pi |
| **Flash Type** | 3D MLC (pSLC mode) | 3D MLC | 3D MLC (pSLC mode) | 3D MLC | 3D MLC (pSLC mode) | 3D MLC | 3D TLC (pSLC mode) | 3D MLC (pSLC mode) | 3D TLC (pSLC mode) |
| **IC Package** | 153-ball FBGA | | | | | | | | |
| **JEDEC Specification** | v5.1, HS400 | | | | | | | | |
| **Power Loss Protection Options** | Firmware Based | | | | | | | | |
| **Operating Temperature** | -40°C to 105°C | | -40°C to 105°C | | -40°C to 85°C | | -40°C to 85°C | | |
| **Capacity*** | 8 GB to 64 GB | 16 GB to 128 GB | 8 GB to 64 GB | 16 GB to 128 GB | 8 GB to 64 GB | 16 GB to 128 GB | 10 GB to 21 GB | 8 GB to 64 GB | 10 GB to 40 GB |
| **Performance** | | | | | | | | | |
| **Sequential Read/ Write up to (MB/s) (Max.)\*\*** | 300 / 240 | 300 / 170 | 300 / 240 | 300 / 170 | 300 / 240 | 300 / 170 | 295 / 215 | 300 / 240 | 290 / 225 |
| **Bus Speed Modes** | x1 / x4 / x8 | | | | | | | | |
| **ICC (Typical RMS in Read/Write) mA (Max.)** | 145 / 175 | 125 / 175 | 145 / 175 | 125 / 175 | 145 / 175 | 125 / 175 | 95.5 / 92 | 145 / 175 | 100 / 110 |
| **ICCQ (Typical RMS in Read/Write) mA (Max.)** | 120 / 100 | 115 / 95 | 120 / 100 | 115 / 95 | 110 / 95 | 115 / 95 | 104 / 87.5 | 120 / 100 | 105 / 100 |
| **Endurance and Reliability** | | | | | | | | | |
| **Endurance TBW\*\* (Max.)** | 1,213 TB | 824 TB | 1,213 TB | 824 TB | 1,320 TB | 824 TB | 1,034 TB | 1,320 TB | 1,364 TB |
| **Reliability MTBF @ 25°C** | >2,000,000 hours | | | | | | | | |
| **Others** | | | | | | | | | |
| **Dimensions (mm)** | 11.5 x 13.0 x 1.3 | | | | | | | | |
| **Certifications** | AEC-Q100, RoHS, REACH | | | | | | RoHS, REACH | | |
| **Warranty** | One Year | | | | | | | | |

## e.MMC

| | Industrial Grade | | | Commercial Grade | | | | |
|---|---|---|---|---|---|---|---|---|
| **Product Line** | Superior | | | Premium | | Superior | Value | |
| | E650Si | E600Si | E600Si | E750Pc | E700Pc | E650Sc | E600Vc | E600Vc |
| **Flash Type** | 3D TLC | 3D MLC | 3D TLC | 3D TLC (pSLC mode) | | 3D TLC | 3D TLC | |
| **IC Package** | 153-ball FBGA | | | | | | | |
| **JEDEC Specification** | v5.1, HS400 | | | | | | | |
| **Power Loss Protection Options** | Firmware Based | | | | | | | |
| **Operating Temperature** | -40°C to 85°C | | | -25°C to 85°C | | | | |
| **Capacity*** | 32 GB to 64 GB | 16 GB to 128 GB | 32 GB to 128 GB | 10 GB to 21 GB | 10 GB to 40 GB | 32 GB to 64 GB | 32 GB to 128 GB | 32 GB |
| **Performance** | | | | | | | | |
| **Sequential Read/ Write up to (MB/s)\*\*** | 270 / 215 | 300 / 170 | 290 / 225 | 295 / 215 | 290 / 225 | 270 / 215 | 290 / 225 | 250 / 135 |
| **Bus Speed Modes** | x1 / x4 / x8 | | | | | | | |
| **ICC (Typical RMS in Read/Write) mA (Max.)** | 69.5 / 68.5 | 125 / 175 | 100 / 110 | 95.5 / 92 | 100 / 110 | 69.5 / 68.5 | 100 / 110 | 81.5 / 49.5 |
| **ICCQ (Typical RMS in Read/Write) mA (Max.)** | 88 / 85.5 | 110 / 100 | 105 / 100 | 104 / 87.5 | 105 / 100 | 88 / 85.5 | 105 / 100 | 80.5 / 61.5 |
| **Endurance and Reliability** | | | | | | | | |
| **Endurance TBW\*\* (Max.)** | 70 TB | 824 TB | 52 TB | 1,034 TB | 1,364 TB | 70 TB | 52 TB | 8.3 TB |
| **Reliability MTBF @ 25°C** | >2,000,000 hours | | | | | | | |
| **Others** | | | | | | | | |
| **Dimensions (mm)** | 11.5 x 13.0 x 1.0 | | | | | | 9.0 x 10.0 x 0.8 | |
| **Certifications** | RoHS, REACH | | | | | | | |
| **Warranty** | One Year | | | | | | | |

\* Low-density parity-check error correcting code. By product support.

\*\* All performance is collected or measured using ATP proprietary test environment, without file system overhead.



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# WE BUILD WITH YOU