e.MMC

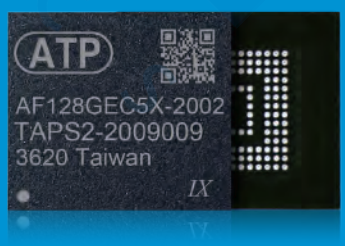
Extreme Endurance, Advanced Performance in a Tiny Package

The ATP e.MMC integrates raw NAND flash memory and hardware controller integrated within a 153-ball fine pitch ball grid array (FBGA package). Smaller than a typical postage stamp, its tiny footprint makes the e.MMC perfectly suitable for embedded systems with space constraints but require rugged endurance, reliability and durability in harsh environments. As a soldered-down solution, the ATP e.MMC is secure against constant vibrations, making it ideal for embedded and automotive applications requiring rugged endurance and durability. ATP e.MMC products with Automotive Grade (AG) 2 rating offer wide temperature support from 40 to +105°C while AG3-rated e.MMC supports industrial temperature ranging from -40°C to 85°C. ATP e.MMC complies with stringent qualifications and testing specific to the automotive industry, such as AEC-Q100 reliability specifications, Production Part Approval Process (PPAP) and Advanced Product Quality Planning (APQP).

Key Differentiators*

- **Extreme Endurance: 2-3X Higher than Standard e.MMC.** Through stringent NAND flash sorting, screening, testing and meticulous validation, the ATP e.MMC achieves up to 1,320 TBW**, thus ensuring high P/E cycles, healthy memory storage, and long product service life.
- **SRAM Soft Error Detection and Recovery.** The ATP e.MMC advanced SRAM Soft Error Detection and Recovery mechanism maximizes data integrity by providing timely error detection, logging, and configurable action to address the error***. The mechanism helps avoid unpredictable events that could damage the system, or worse, cause personal safety risks in critical autonomous applications.
- **Product Traceability.** Laser imprints important information on the ATP e.MMC to identify each piece for accurate tracking and efficient inventory management.
- **Premium Endurance with Pure SLC*.** Select ATP e.MMC products with single-level cell (SLC) NAND flash offer a very high endurance rating of up to 60K program/erase (P/E) cycles as well as strong resistance against high and cross temperatures.

* May vary by product and project support.
** Under best write amplification index (WAI) with highest sequential write value. May vary by density, test configuration, workload and applications.
*** Configuration is predetermined by the customer with ATP and cannot be changed on the field.



e.MMC

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
- Native SLC NAND with 60K P/E cycle
- Complies with JEDEC e.MMC v5.1 Standard (JESD84-B51)
- 153-ball FBGA (RoHS compliant, "green package")
- LDPC ECC engine*
- Designed with 3D NAND

Product Name		e.MMC						
		Industrial Grade			Automotive Grade 3		Automotive Grade 2	
Product Line		Premium	Premium	Superior	Premium	Superior	Premium	Superior
Naming		E800Pi	E700Pi	E600Si	E700Pia	E600Sia	E700Paa	E600Saa
IC Package		153-ball FBGA						
JEDEC Specification		V4.41	v5.1, HS400					
Flash Type		Native SLC	3D SLC Mode	3D NAND	3D SLC Mode	3D NAND	3D SLC Mode	3D NAND
Density		1 GB to 2 GB	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
Bus Speed Modes		x1 / x4 / x8						
Performance**	Seq. Read/Write up to (MB/s)	31 / 23	300 / 240	300 / 170	300 / 240	300 / 170	300 / 240	300 / 170
	Random Read/Write up to (IOPS)	750 / 1000	15K / 30K					
Operating Temperature		-40°C to 85°C (Industrial)			-40°C to 85°C (AEC-Q100 Grade 3)		-40°C to 105°C (AEC-Q100 Grade 2)	
Reliability	Max. TBW**	90 TB	1320 TB	824 TB	1320 TB	824 TB	1213 TB	309 TB
	MTBF @ 25°C	> 2,000,000 Device hours						
ICC (Typical RMS in Read/Write) mA		93	135 / 155	135 / 180	135 / 155	135 / 180	135 / 155	135 / 180
ICCQ (Typical RMS in Read/Write) mA		69	110 / 95	110 / 100	110 / 95	110 / 100	110 / 95	110 / 100
Dimensions: L x W x H (mm)		11.5 x 13.0 x 1.0	11.5 x 13.0 x 1.3 (max.)					

*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.

Technologies & Add-On Services*										
Product Line	Premium	Δ	●	Δ	●	●	●	●	●	●
	Superior	Δ	●	●	●	●	●	●	●	●

* Please refer to pages 41-43. Δ: Customization option available on a project basis.
* For Security-related features and configurations, please refer to page 9.