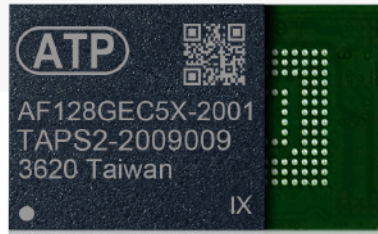# e.MMC Industrial

The Global Leader in Specialized Storage and Memory Solutions

KEY FEATURES

- Robust Data Integrity*
  (AutoRefresh and Dynamic Data Refresh)
- Extra-high endurance: 2-3X higher than standard e.MMC*
- Smaller footprint package size*

- 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

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). 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	S.M.A.R.T/ Life Monitor	Industrial Temperature	SiP	Vibration-Proof BGA Package	Firmware-Based Power Loss Protection	Advanced Wear Leveling	AutoRefresh	Dynamic Data Refresh	Auto-Read Calibration	ETEDP
Premium	○	○	○	○	○	○	○	○	▲	○
Superior	○	○	○	○	○	○	○	○	▲	○
Value	○	○	○	○	○	○	○	○	○	

▲: Customization option available on a project basis.

Specifications

Product Line	Extended Industrial Grade				Industrial Grade				
	Premium		Superior		Premium			Superior	
	E700Pa	E700Pa	E600Sa	E600Sa	E700Pi	E700Pi	E700Pi	E600Si	E600Si
Flash Type	3D MLC (pSLC mode)	2D MLC (pSLC mode)	3D MLC	2D MLC	3D TLC (pSLC mode)	3D MLC (pSLC mode)	2D MLC (pSLC mode)	3D TLC	3D MLC
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 85°C				
Capacity[1]	8 GB to 64 GB	4 GB to 8 GB	16 GB to 128 GB	8 GB to 16 GB	10 GB to 40 GB	8 GB to 64 GB	4 GB to 8 GB	32 GB to 128 GB	16 GB to 128 GB
Performance									
Sequential Read/ Write up to (MB/s) (Max.)[2]	300 / 240	230 / 100	300 / 170	230 / 100	290 / 225	300 / 240	230 / 100	290 / 225	300 / 170
Bus Speed Modes	x1 / x4 / x8								
ICC (Typical RMS in Read/Write) mA (Max.)	145 / 175	85 / 65	125 / 175	85 / 50	100 / 110	145 / 175	85 / 65	100 / 110	125 / 175
ICCQ (Typical RMS in Read/Write) mA (Max.)	120 / 100	60 / 45	115 / 95	60 / 30	105 / 100	120 / 100	60 / 45	105 / 100	110 / 100
Endurance and Reliability									
Endurance TBW[2] (Max.)	1,213 TB	200 TB	824 TB	40 TB	1,364 TB	1,213 TB	200 TB	52 TB	824 TB
Reliability MTBF @ 25°C	>2,000,000 hours	>3,000,000 hours	>2,000,000 hours	>3,000,000 hours	>2,000,000 hours		>3,000,000 hours	>2,000,000 hours	
Others									
Dimensions (mm)	11.5 x 13.0 x 1.3	11.5 x 13.0 x 1.0	11.5 x 13.0 x 1.3	11.5 x 13.0 x 1.0	11.5 x 13.0 x 1.0	11.5 x 13.0 x 1.3	11.5 x 13.0 x 1.0	11.5 x 13.0 x 1.0	11.5 x 13.0 x 1.3
Certifications	RoHS, REACH								
Warranty	One Year								

Product Line	Industrial Grade		Commercial Grade				
	Superior	Value	Premium		Superior		Value
	E600Si	E600Vi	E700Pc	E700Pc	E600Sc	E600Sc	E600Vc
Flash Type	2D MLC	3D TLC	3D TLC (pSLC mode)	2D MLC (pSLC mode)	3D TLC	2D MLC	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[1]	8 GB to 16 GB	32 GB to 64 GB	10 GB to 40 GB	4 GB to 8 GB	32 GB to 128 GB	8 GB to 16 GB	32 GB to 64 GB
Performance							
Sequential Read/ Write up to (MB/s) (Max.)[2]	230 / 100	290 / 225	290 / 225	230 / 100	290 / 225	230 / 100	290 / 225
Bus Speed Modes	x1 / x4 / x8						
ICC (Typical RMS in Read/Write) mA (Max.)	85 / 50	100 / 110	100 / 110	85 / 65	100 / 110	85 / 50	100 / 110
ICCQ (Typical RMS in Read/Write) mA (Max.)	60 / 30	105 / 100	105 / 100	60 / 45	105 / 100	60 / 30	105 / 100
Endurance and Reliability							
Endurance TBW[2] (Max.)	40 TB	20 TB	1,364 TB	200 TB	52 TB	40 TB	20 TB
Reliability MTBF @ 25°C	>3,000,000 hours	>2,000,000 hours	>2,000,000 hours	>3,000,000 hours	>2,000,000 hours	>3,000,000 hours	>2,000,000 hours
Others							
Dimensions (mm)	11.5 x 13.0 x 1.0	9.0 x 10.0 x 0.8	11.5 x 13.0 x 1.0	11.5 x 13.0 x 1.0	11.5 x 13.0 x 1.0	11.5 x 13.0 x 1.0	9.0 x 10.0 x 0.8
Certifications	RoHS, REACH						
Warranty	One Year						

1 Low-density parity-check error correcting code. By product support.
2 All performance is collected or measured using ATP proprietary test environment, without file system overhead.