

ADATA® INDUSTRIAL PRODUCT CATALOG



**GLOBAL LEADER IN
INDUSTRIAL-GRADE MEMORY**



ABOUT ADATA

Founded May 4, 2001

Founder, Chairman, and CEO: Simon Chen

World's 2nd largest DRAM and global branded SSD module manufacturer (DRAMeXchange)

More than 500 patents owned

As a global leader of industrial-grade memory, ADATA Industrial is devoted to provide durable and reliable industrial-grade storage products, including SSDs, memory cards, embedded storage products and DRAM modules to customers worldwide. We have a global presence and is able to offer high-quality technical and after services to customers regardless of geographic location. At the same time, ADATA Industrial is also able to leverage its R&D and manufacturing capabilities to provide customized products and solutions that meet the unique needs of individual customers. With its commitment to quality and innovation, ADATA Industrial is ready to serve the industrial sector with the widest range of memory solutions and work hand-in-hand with customers to create a better world and enrich lives. For more information, please visit industrial.adata.com.

Leading of the Edge

*Ranked No.2 DRAM Module Manufacturer (TrendForce, 2021)

*Ranked No.2 Global Branded SSD Module Maker (DRAMeXchange, 2021)

Leading DRAM Module Maker

Ranked #2 in 2021

A Global SSD Leader

Ranked #2 in 2021

Worldwide Service and Presence

We offer direct and instant technical support to customers and end users by the solid global FAE and sales teams.



Quality and Environmental Certifications

It's our commitment to provide the finest quality and service for complete customer satisfaction.



Quality Management

- IATF 16949
- ISO 9001
- ISO 9001 Plus



Hazardous Substance Process Management

- IECQ QC 080000
- B2B Green Partner



Occupational Health & Safety

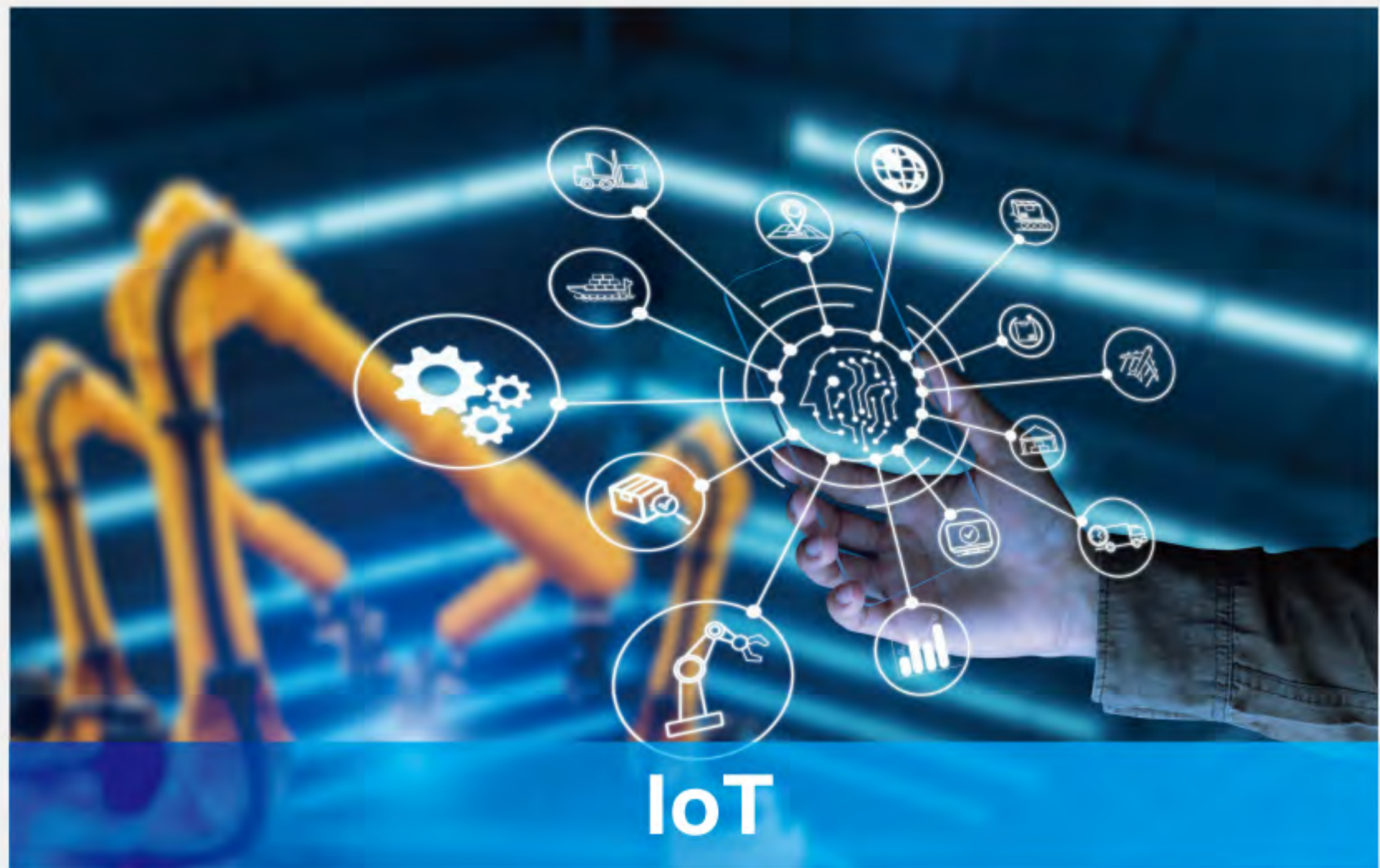
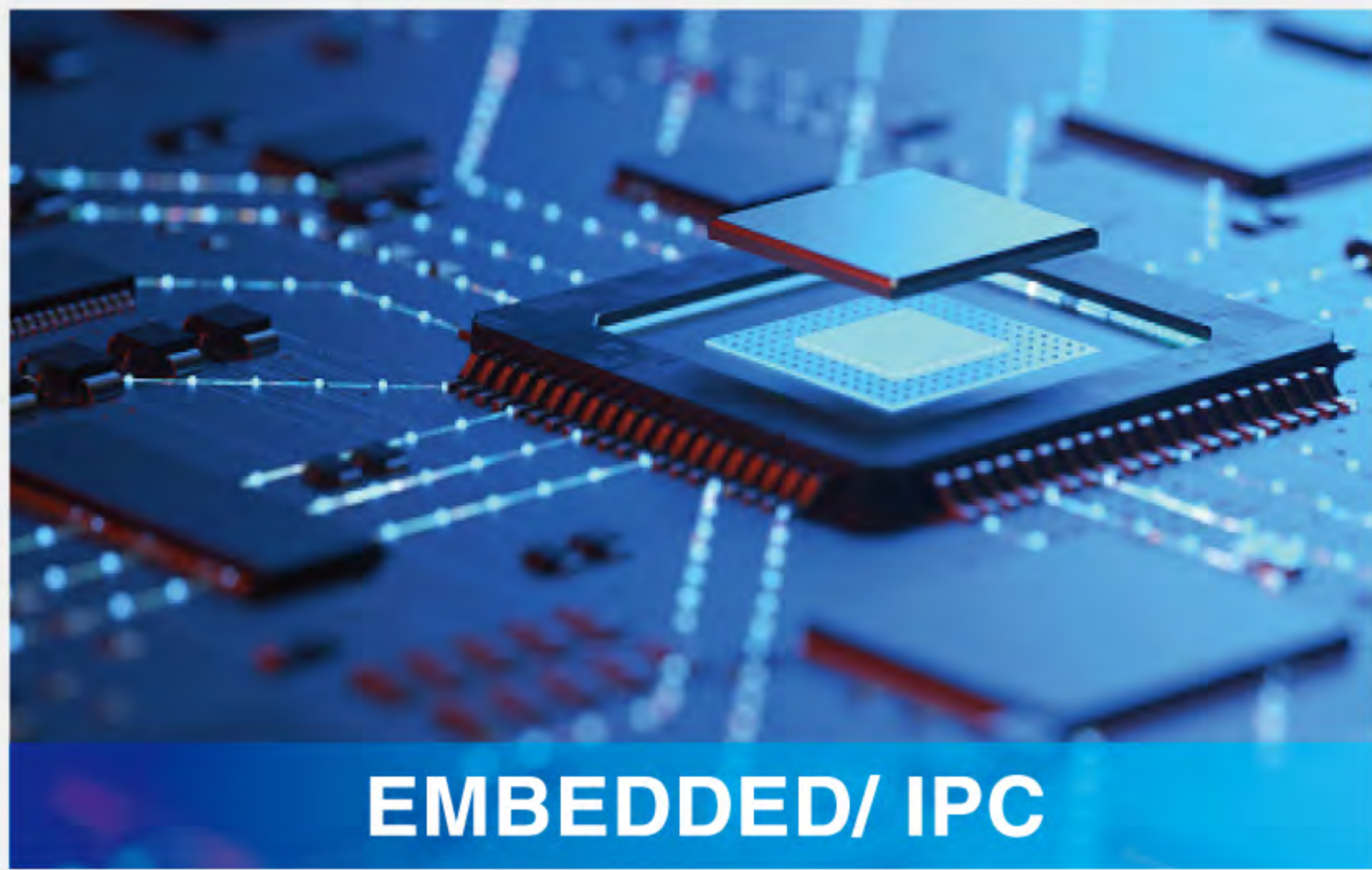
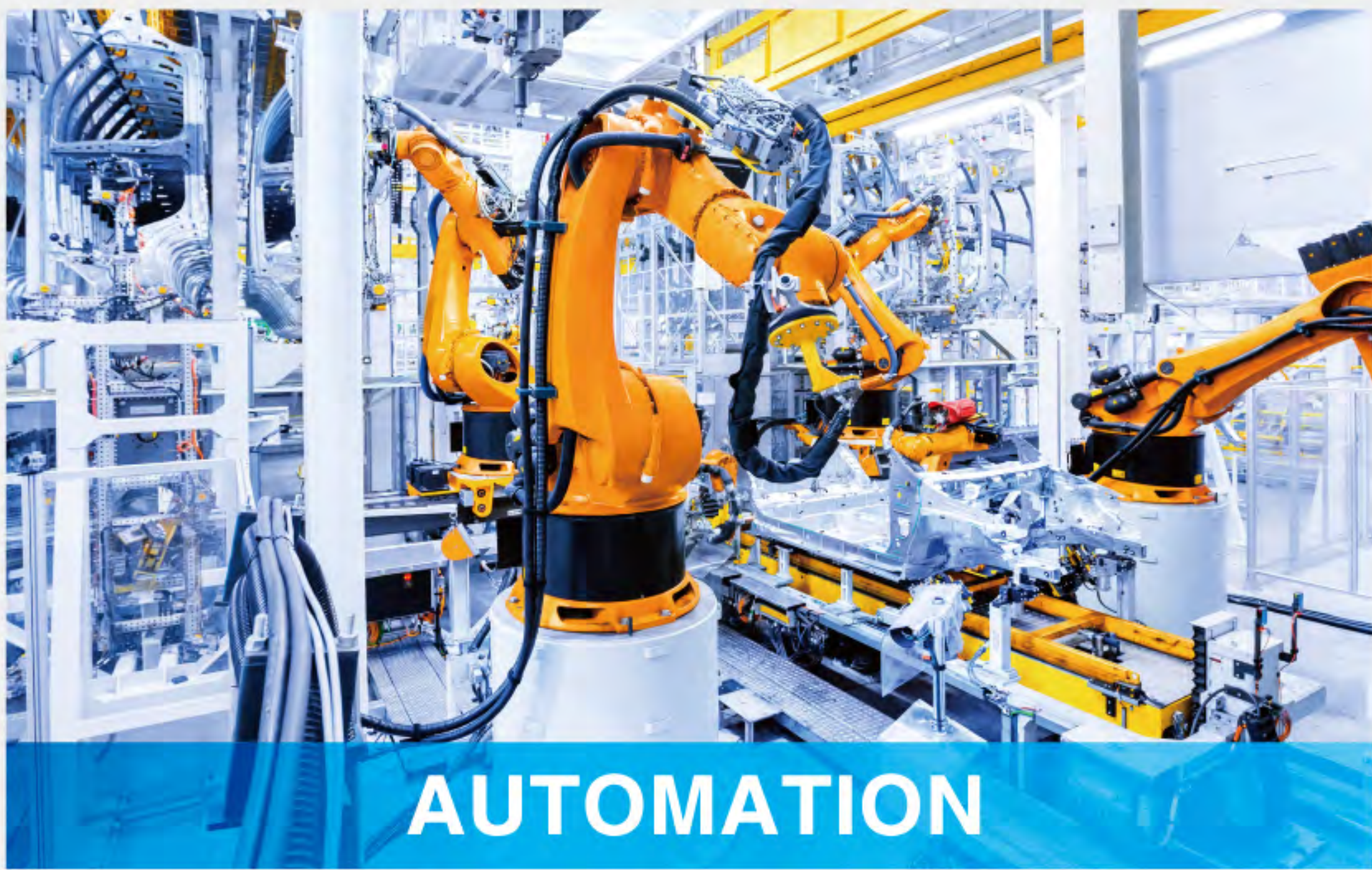
- ISO 45001
- CNS 15506



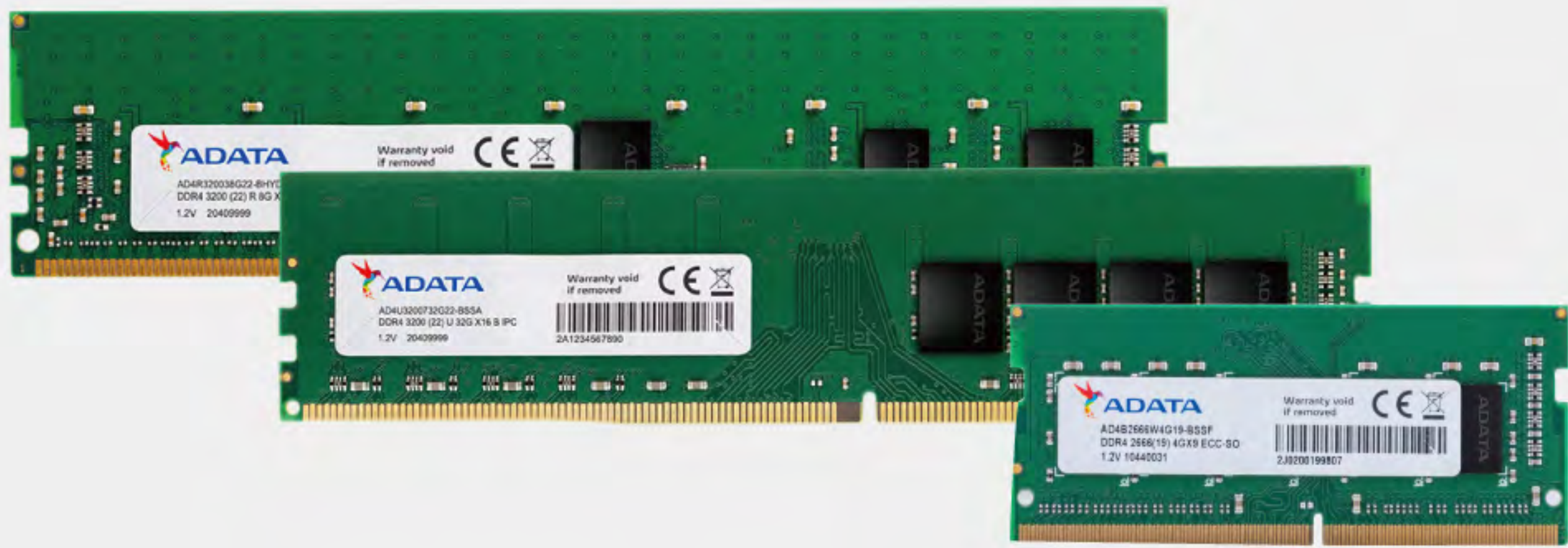
Environmental Management

- ISO14001

Target Applications



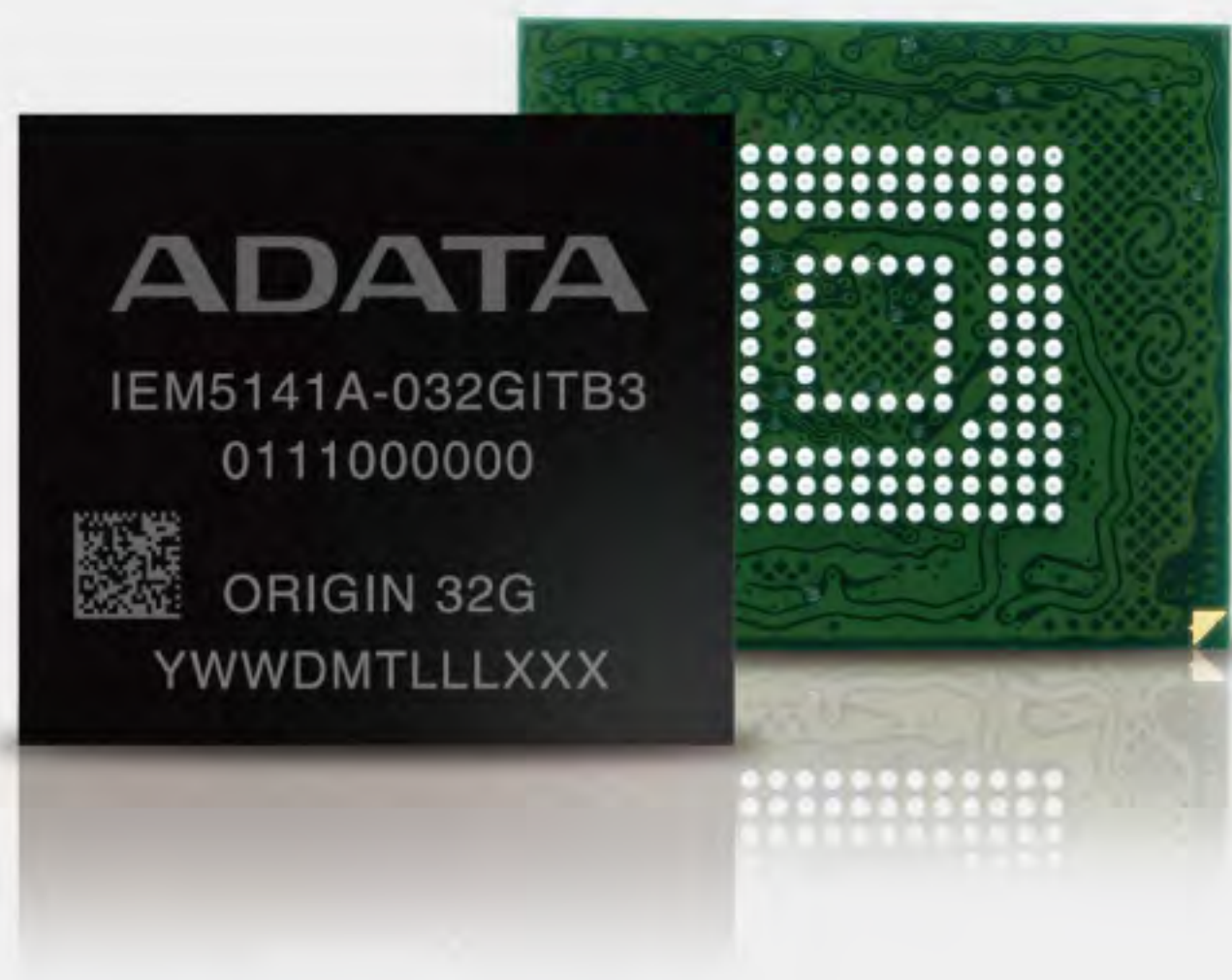
Product Portfolio



DRAM Modules



Solid State Drives



eMMC



Memory Cards



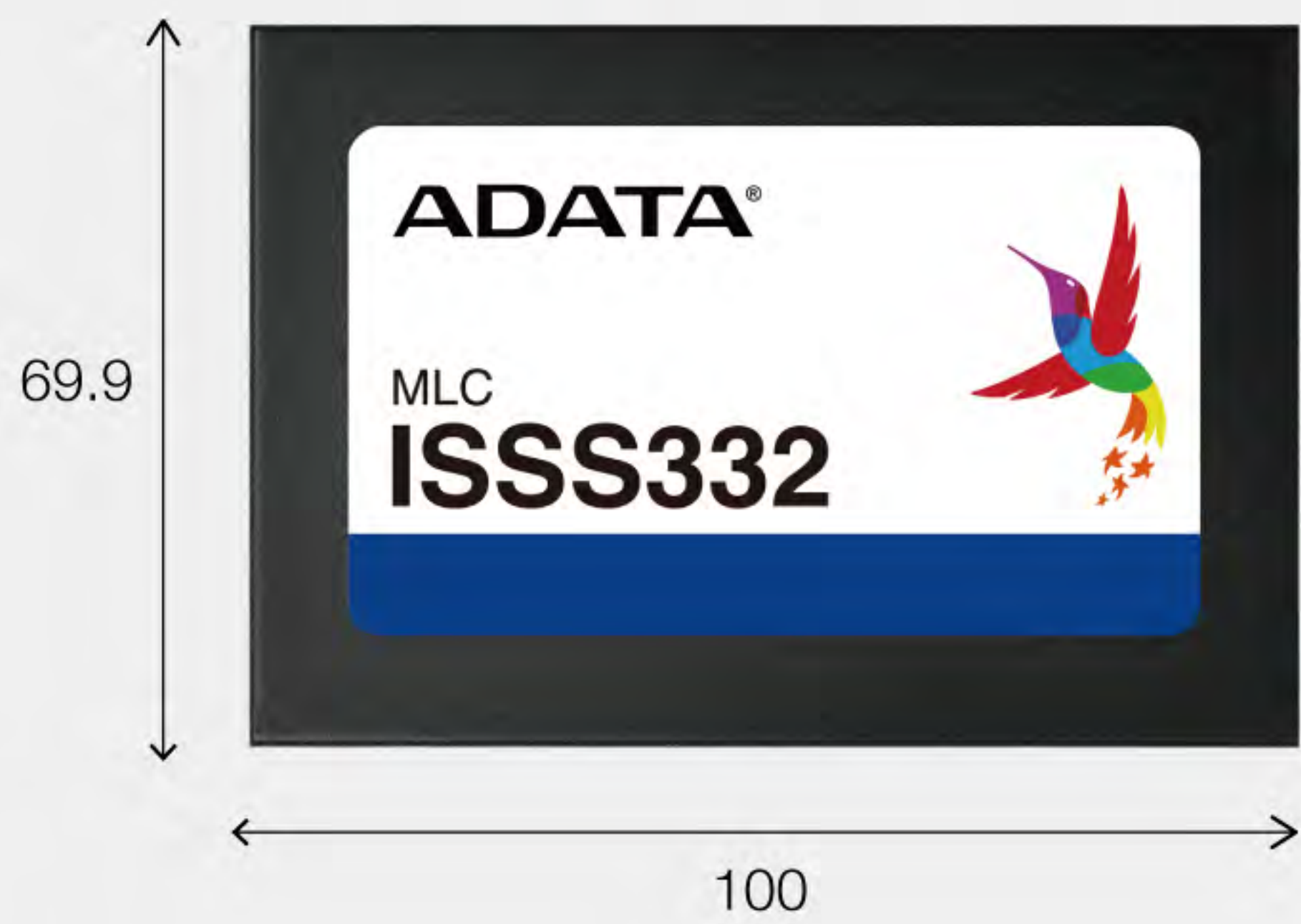
USB Flash Drive

Product Dimensions Comparison

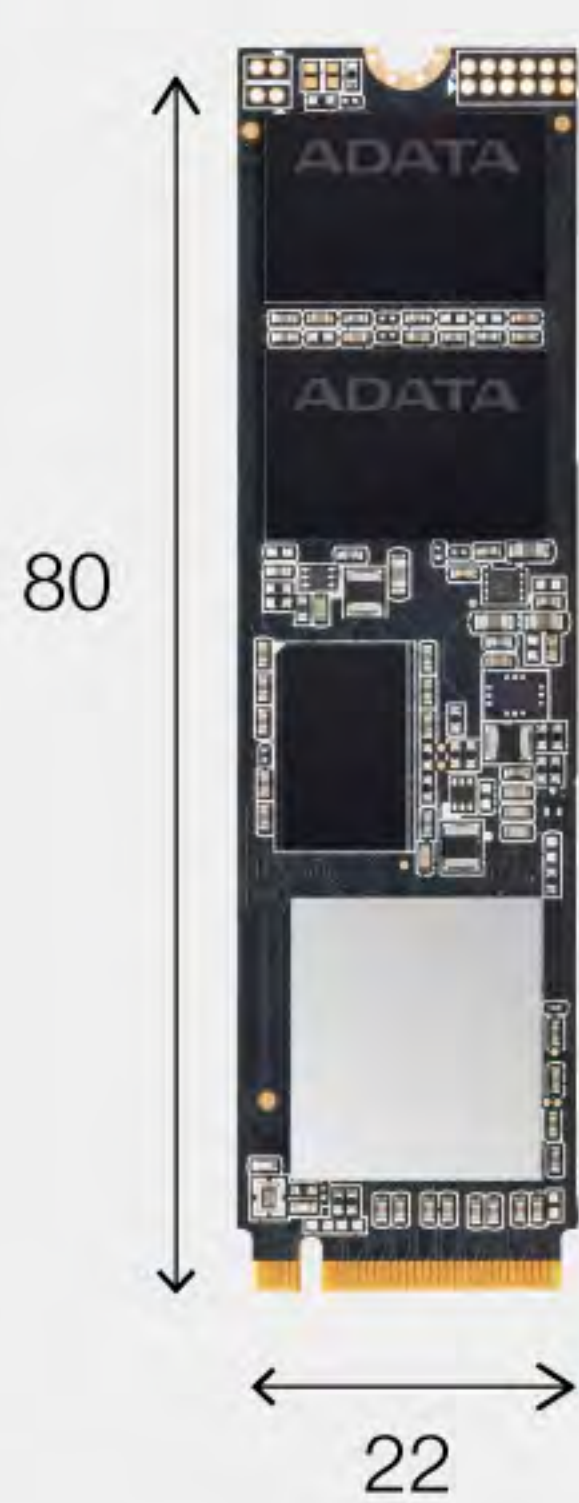
Flash Storage

Unit: mm

2.5" SSD



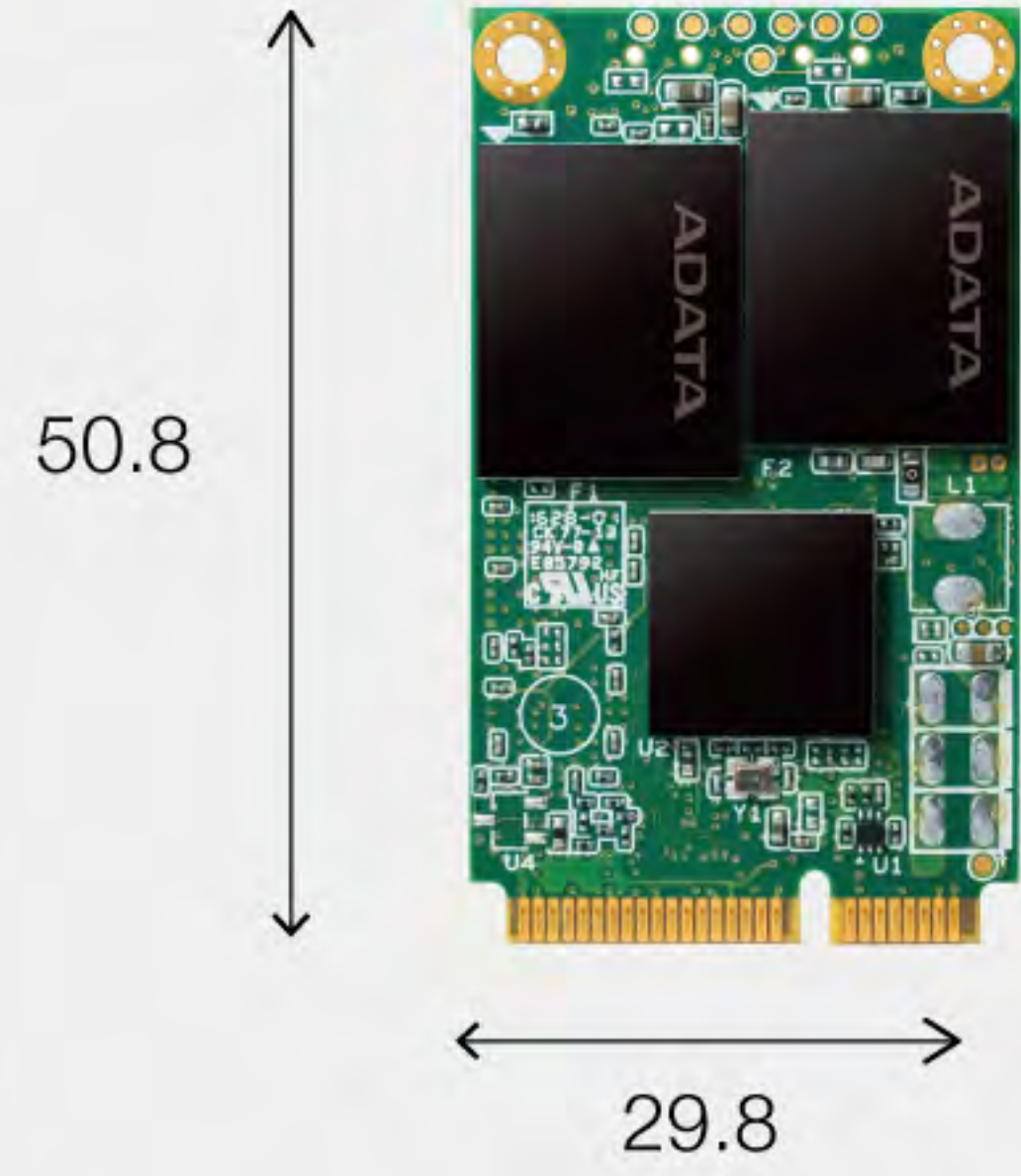
M.2 2280 SSD



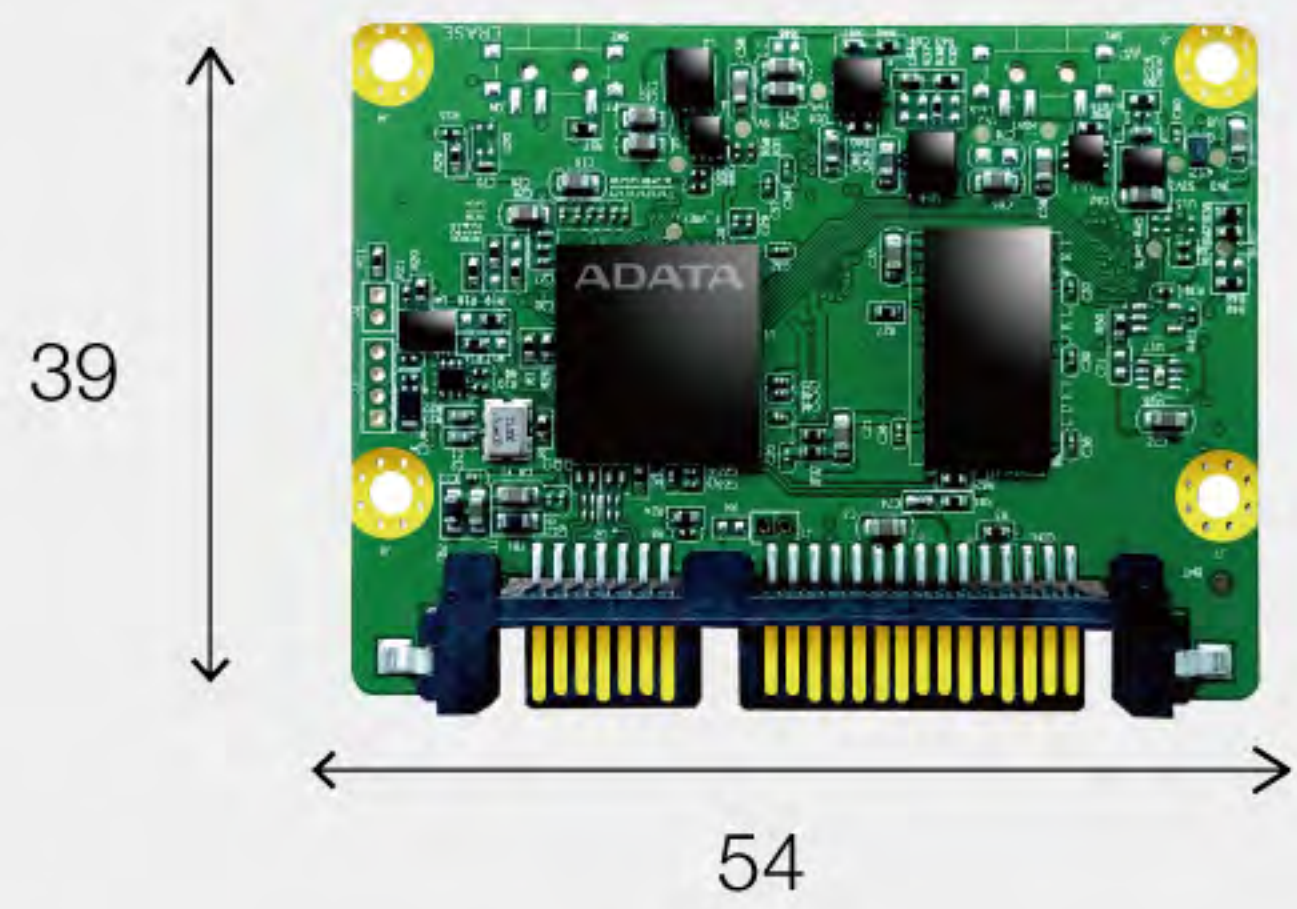
M.2 2242 SSD



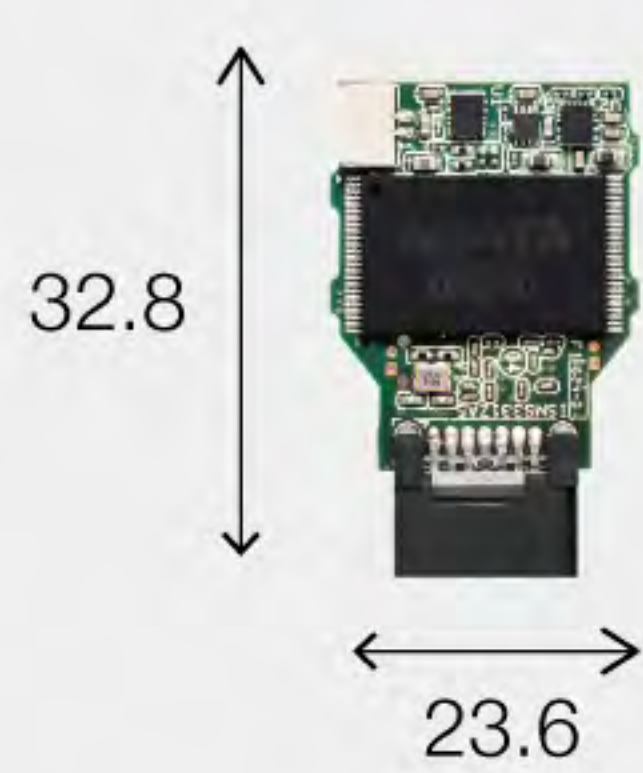
mSATA SSD (MO-300)



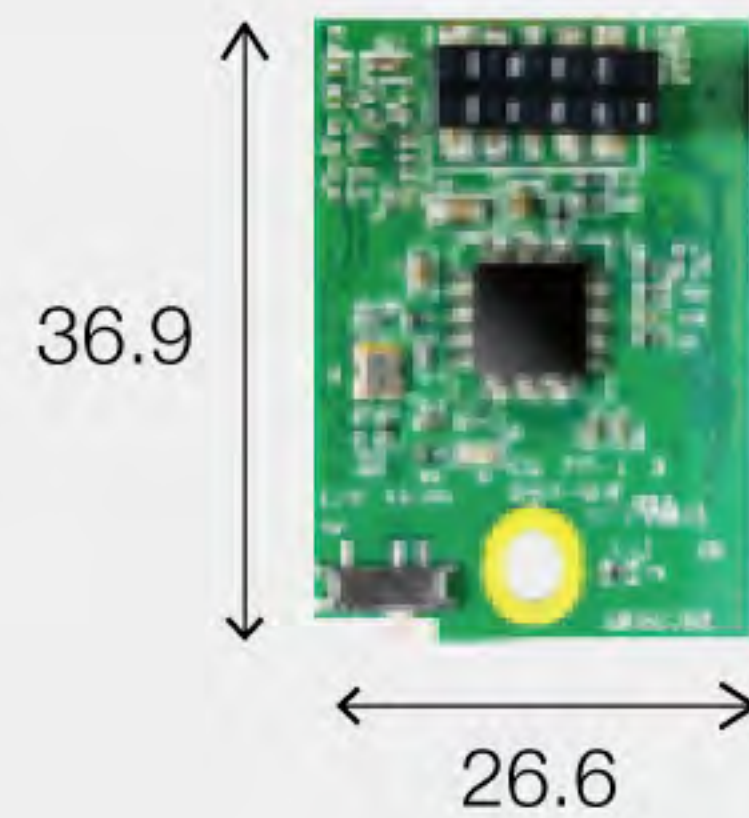
Half-Slim SSD (MO-297)



SATA DOM



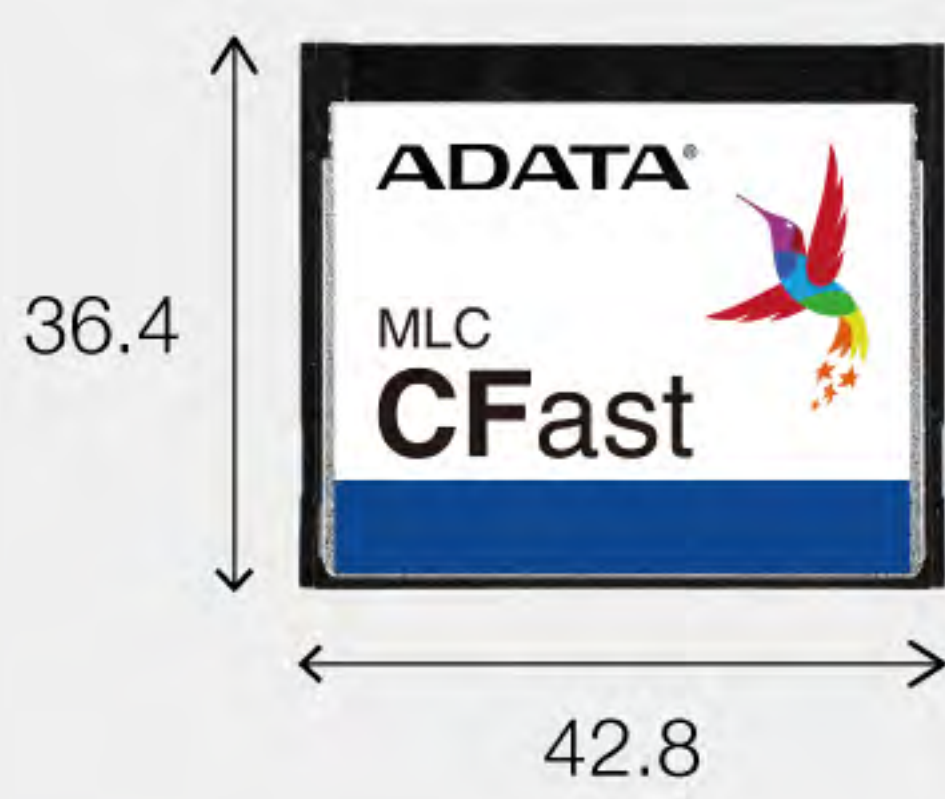
USB DOM



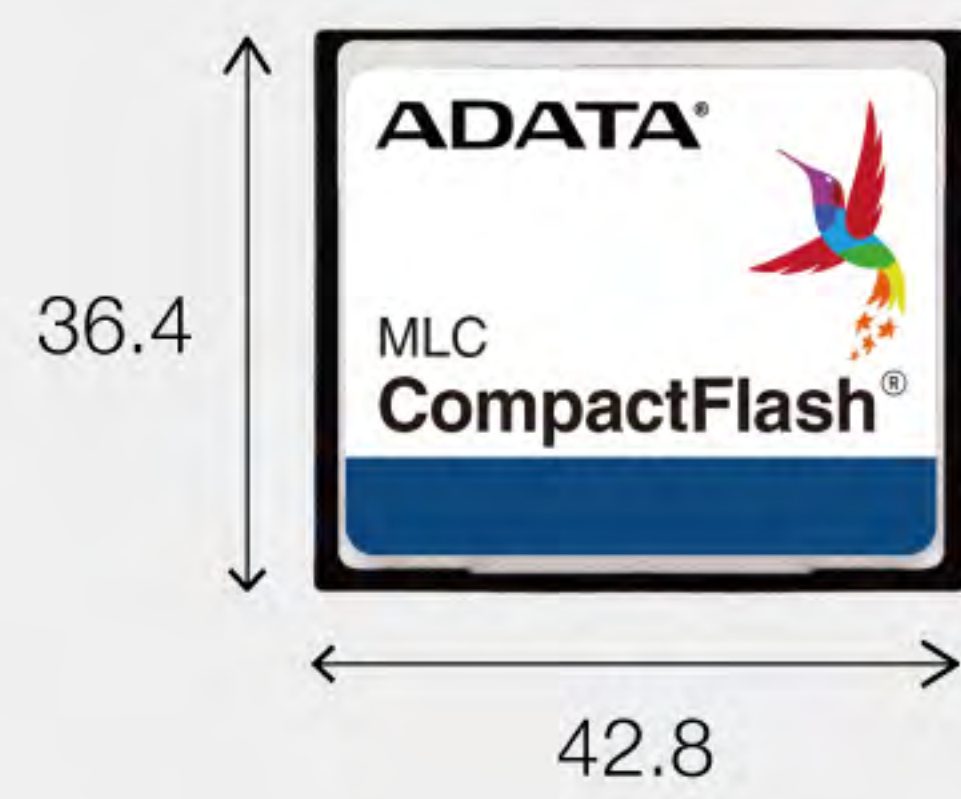
CFexpress Card



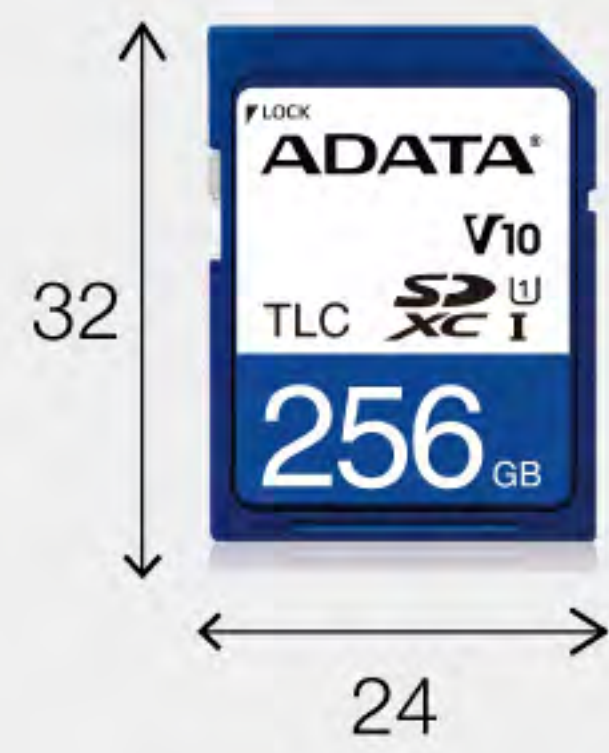
CFast Card



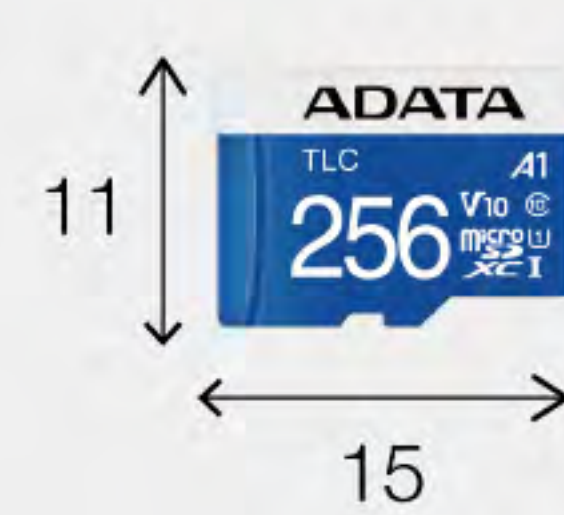
CF Card



SD Card



microSD Card



eMMC



DRAM Module

Unit: mm

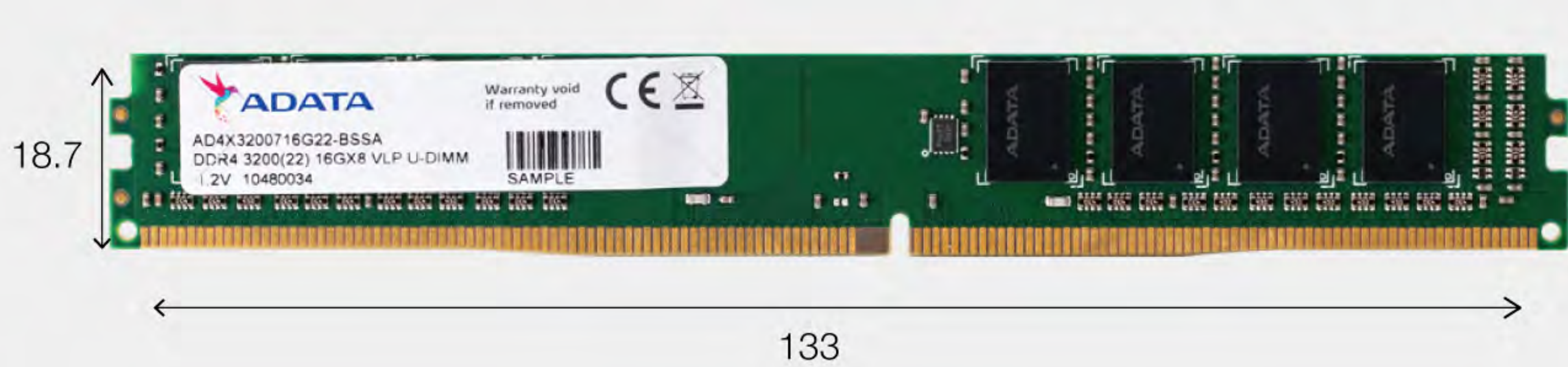
R-DIMM



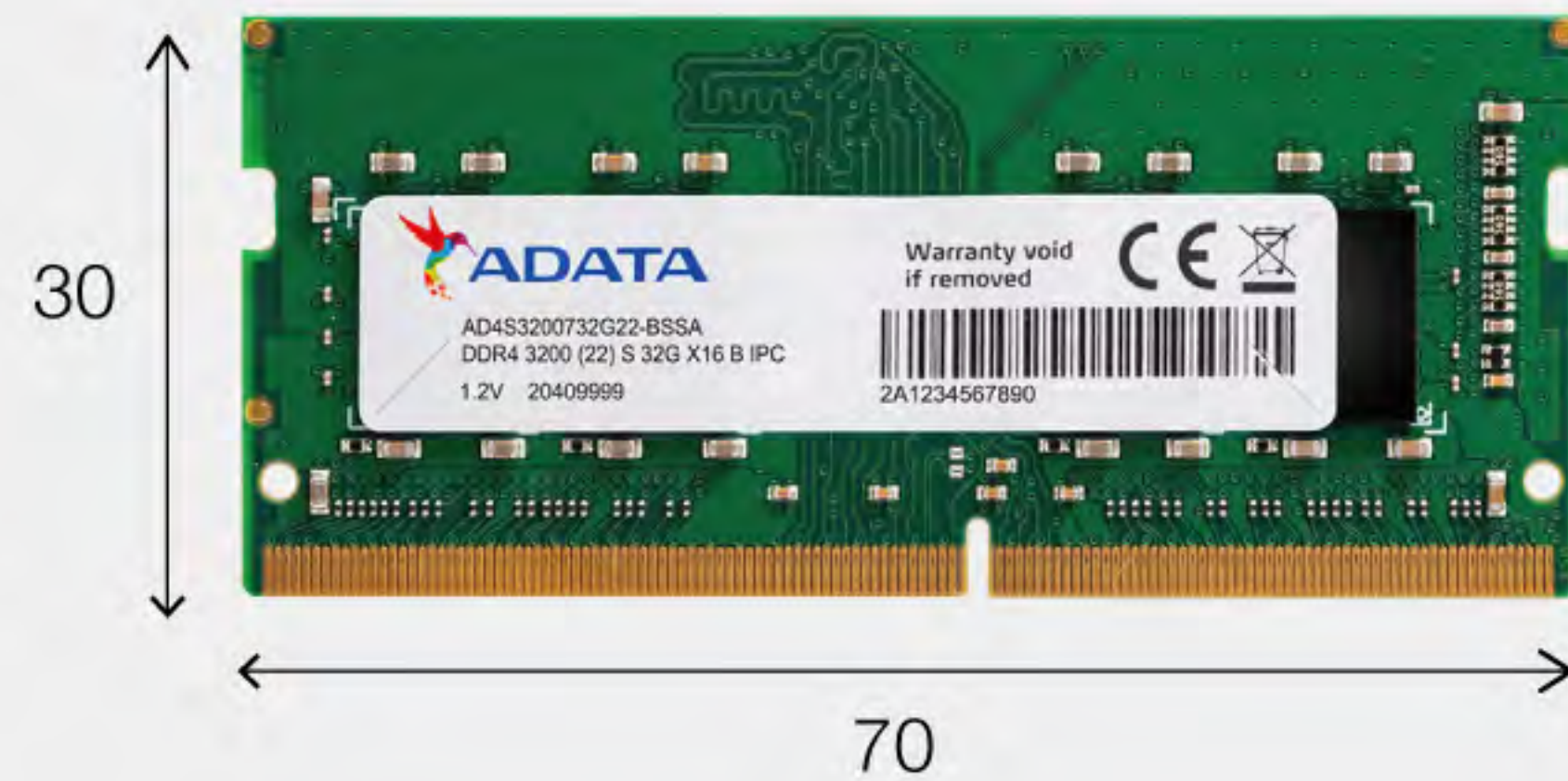
U-DIMM



VLP -DIMM



SO-DIMM



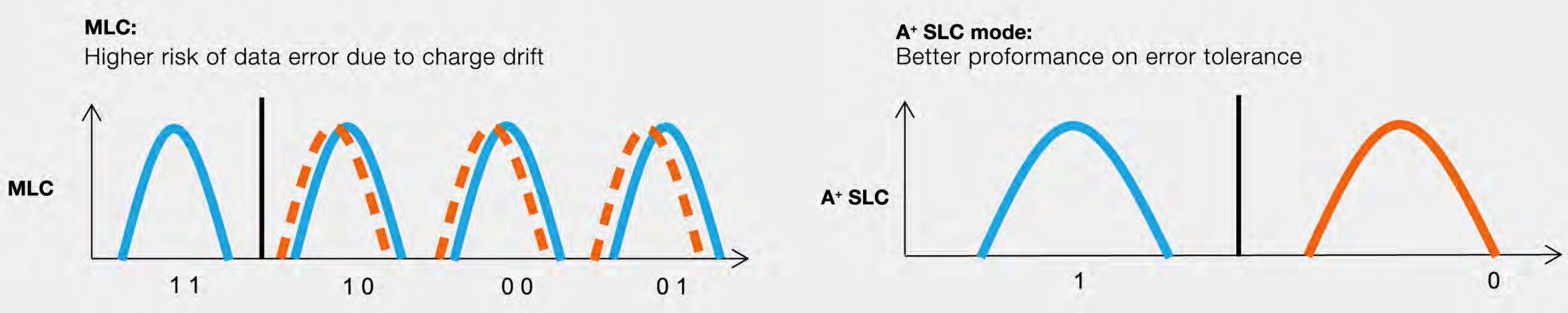
Featured Technologies



A+ SLC

ADATA's proprietary A+ SLC technology combines reliability and cost efficiency. It uses customized NAND Flash firmware to simulate SLC performance on MLC and 3D TLC NAND Flash, effectively improving reliability and extending product life. A+ SLC provides more competitive advantages for MLC and 3D TLC NAND flash storage products and is widely used in various industrial applications.

MLC can store 2 bits of data, represented by 00, 01, 10 or 11 respectively, and TLC can store 3 bits of data, represented by 000, 001, 010, 011, 100, 101, 110, 111, while SLC only stores 1 bit of data, namely 0 or 1. ADATA's A+ SLC simulates the storage of 2 bits of MLC and 3 bits of 3D TLC into a storage method of storing 1 bit of data by customized firmware and algorithm. Compared to SLC NAND Flash, A+ SLC can greatly optimize the product reliability and longevity.



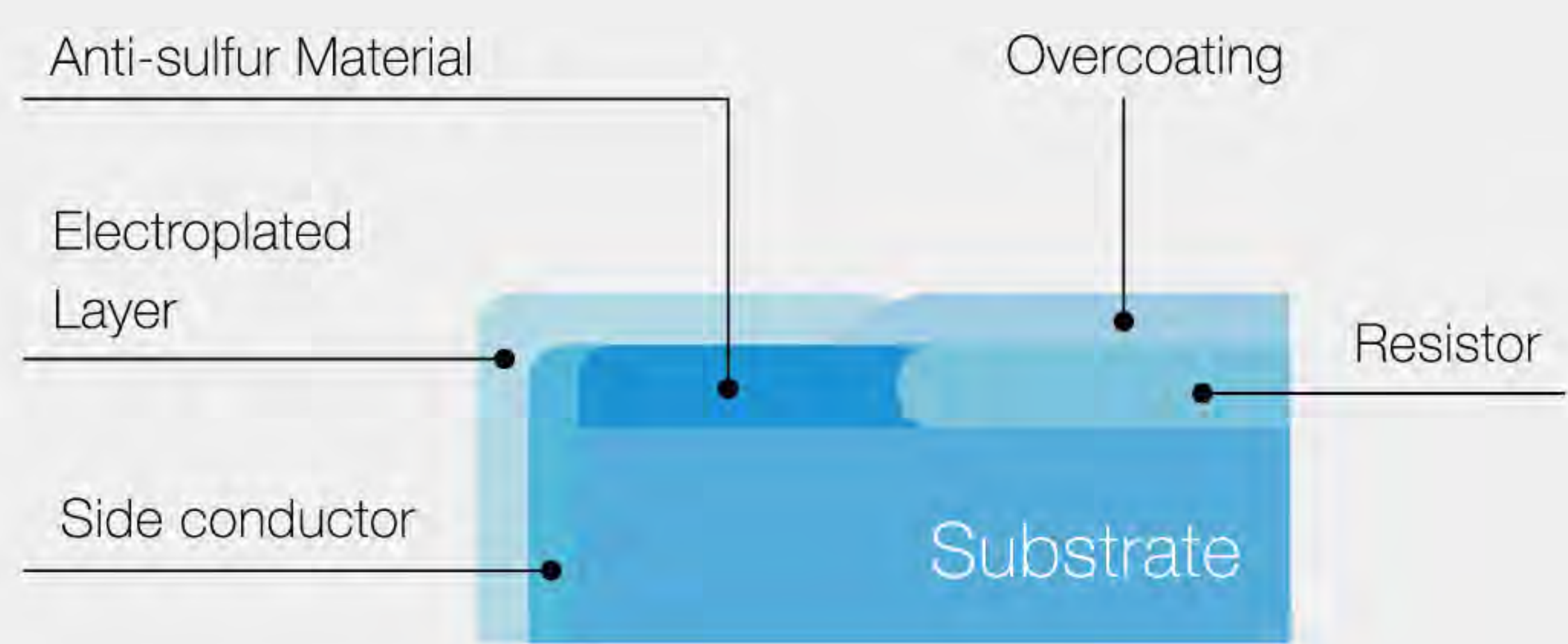
Type	P/E Cycle (times)	Features
SLC	60K	High cost, Ultra high endurance
A+ SLC	30K/100K	Better performance, High endurance and error tolerance
MLC/3D TLC	3K	Moderate cost, Good performance



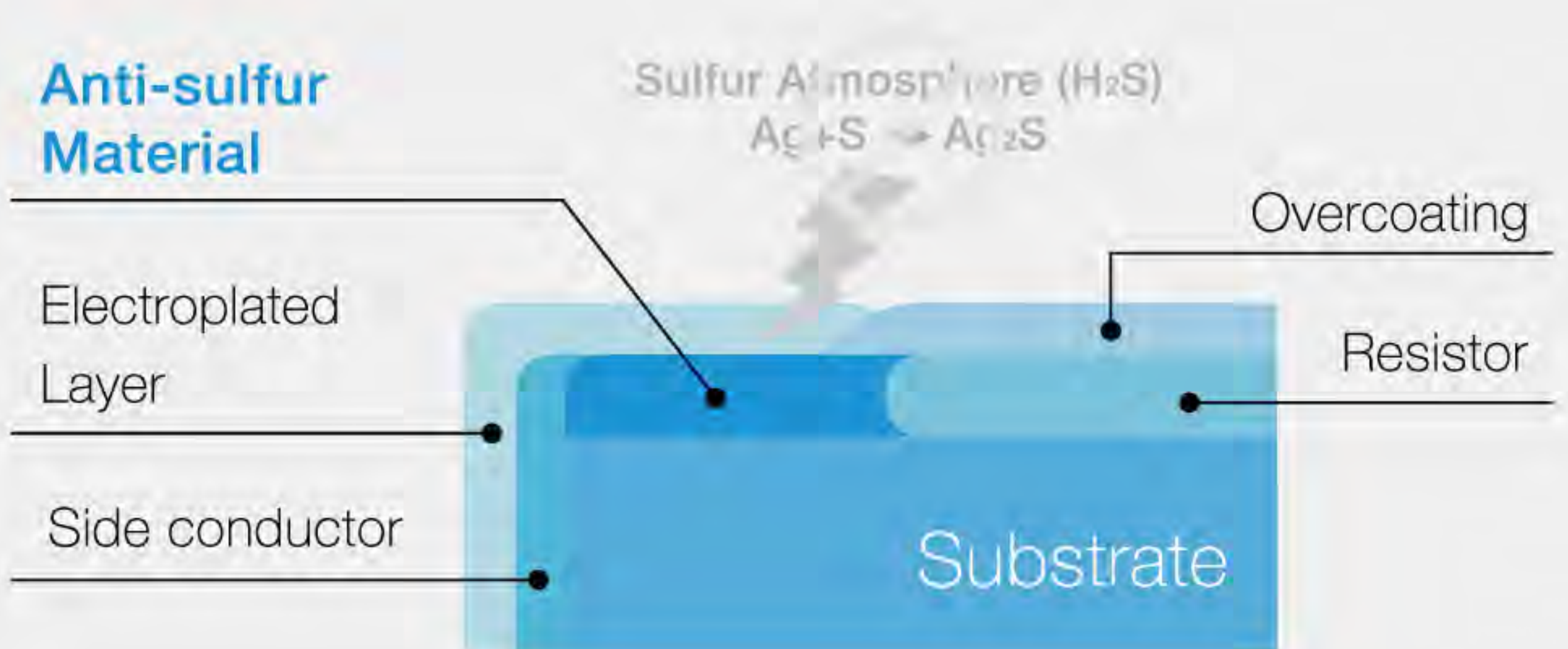
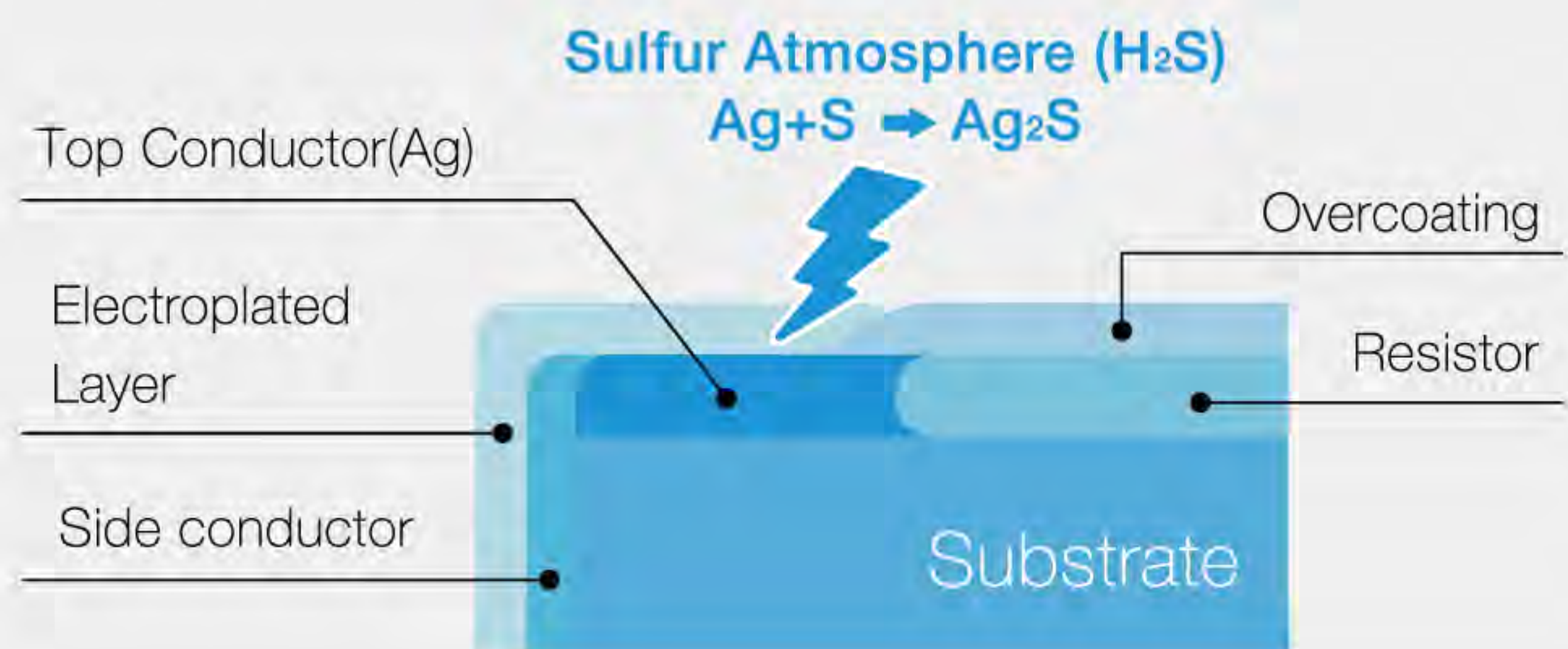
Anti-Sulfuration Protection

ADATA applies the anti-sulfuration technology to its industrial-grade SSDs and DRAM modules to counter corrosion and enhance the stability and longevity of these products. It can effectively prevents the negative impact of silver sulfide on NAND flash and DRAM products, making them more durable when used in environments with excessive sulfur.

Components with anti-sulfuration technology are screened for reliability and resilience to sulfuration:



When normal resistor is under sulfur atmosphere(H_2S), silver sulfide(Ag_2S), which is a kind of insulator, will be generated at top conductor (Ag), resulting in open circuit fail. By using anti-sulfur material as top conductor, sulfuration is prevented. By using anti-sulfur material as top conductor, sulfuration is prevented.



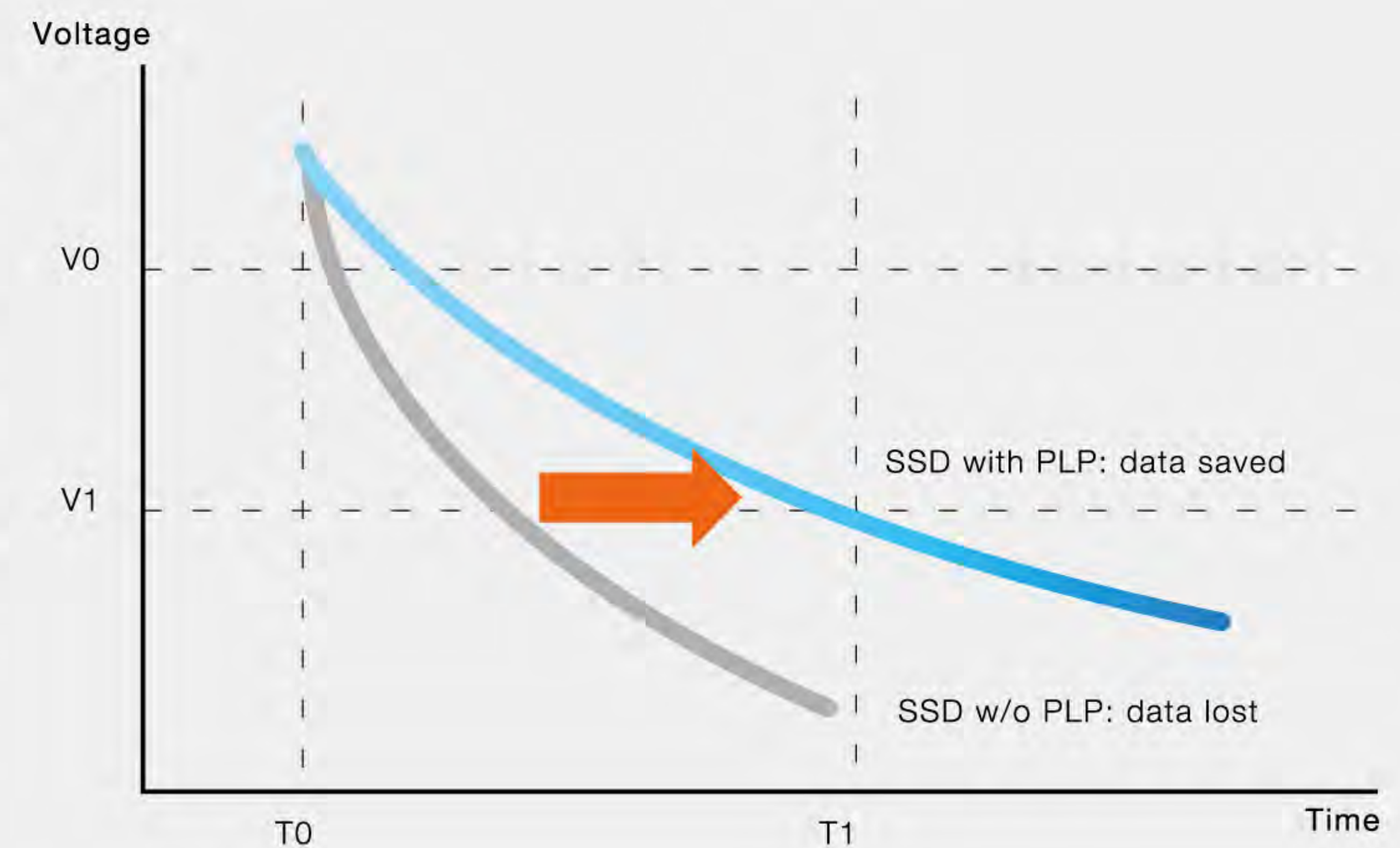
Featured Technologies



Power Loss Protection

PLP (Power Loss Protection) is a key technology associated with SSD reliability and is becoming widely adopted for improving overall system reliability. It leverages firmware and hardware to protect important data when encountering abnormal power spikes or outages.

ADATA PLP technology integrates sensitive voltage detectors with banks of power-retaining Tantalum polymer capacitors, supplying SSDs with enough power to continue buffered read-write operations until completion. Should power loss occur, the monitoring circuit detects the power drop and instructs the controller to back up all data in the buffer before power drains from capacitor banks. Through this method, all important data can be saved and free from data corruption.



Applications



Healthcare



Networking



Server



Surveillance



Transportation



A+ Security

ADATA's proprietary A+ Security data protection technologies are implemented in ADATA industrial-grade flash storage products, including data erase, data encryption, destruction, and write protect. These can be widely used in various industrial applications to elevate data security. With A+ Security, confidential data can be effectively protected from being leaked or tampered with.

Quick Erase

1

It mainly erases the mapping table inside the SSD. Since only the table needs to be cleared, the erasing process can be done within a second.

Secure Erase

2

It's effective for erasing data from every corner of an SSD. There are two approaches to erase: a short pin circuit for Secure Erase or giving the ATA command to conduct data erasing.

Data Encryption

3

We offer AES 256-bit encryption technology and meet the TCG Opal 2.0 protocol to enhance the security level of confidential data.

Write Protect

4

The Write Protect function is enabled by hardware or software settings. It can prevent data from being tampered with and written on the SSD improperly.

Military Erase

5

MIL Erase adopts military-grade data erase technology. By overwriting the data in the SSD, data can be erased and completely deleted.

Destruction

6

After removing the data by "Secure Erase", the "Destruction" function can destroy the SSD F/W code, so that the SSD can't operate normally.

Applications



Edge Computing



Gaming



Healthcare



Server



Surveillance

Proprietary Software



A+ SSDTOOL

ADATA's A+ SSDTOOL is a powerful tool that help our customers monitor and manage any status of each ADATA SSD inside customers' systems. It facilitates the monitoring and managing of the drives with SSD S.M.A.R.T. and lifespan information.

The A+ SSDTOOL provides various features, including drive information, diagnostics, utilities, system optimization and system information.



Drive Info

Get assigned drive information.



Diagnostics

Includes quick diagnostics and full diagnostics.



System Info

Displays current system information.



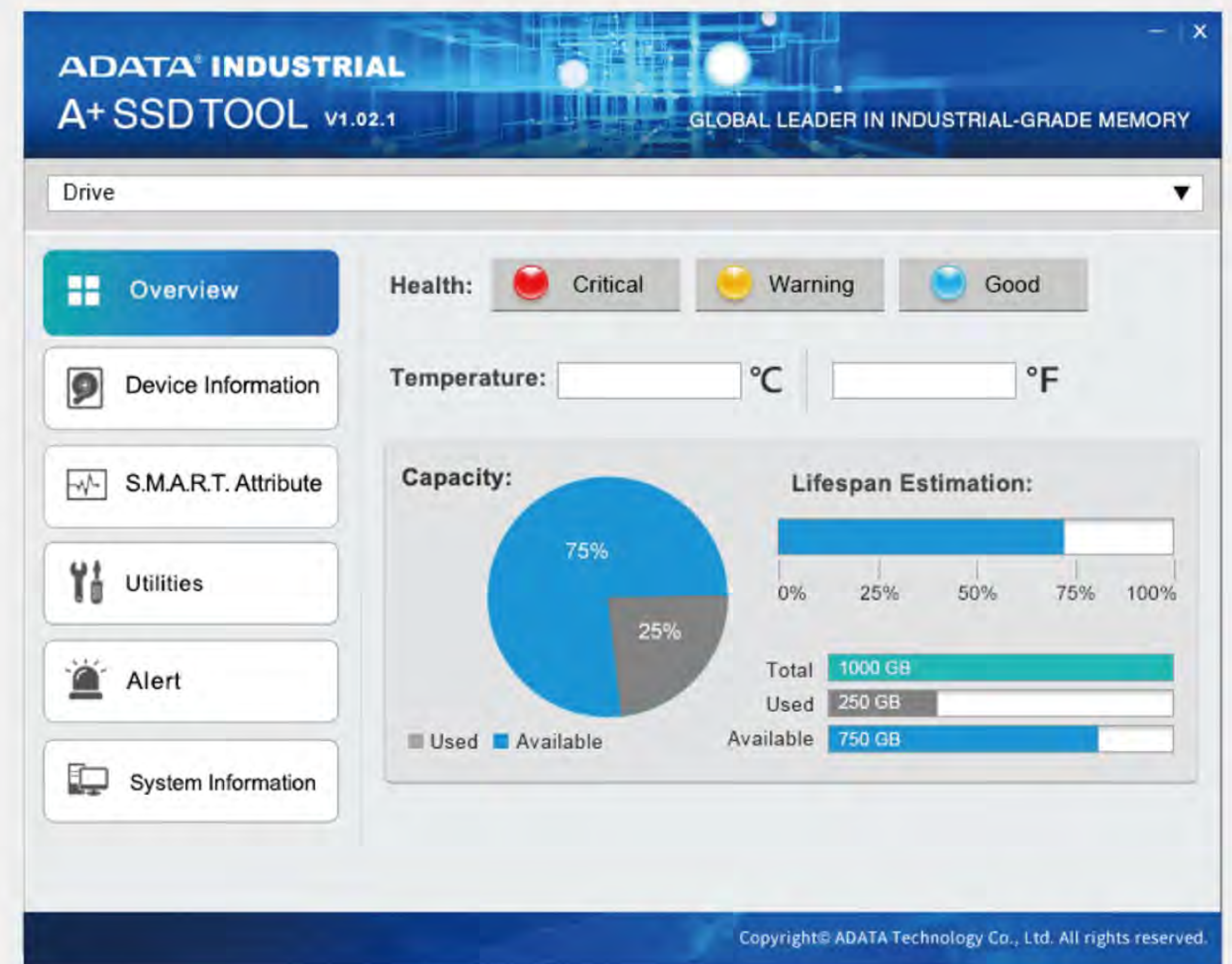
Utilities

Includes secure erase, firmware update, SSD Toolbox upgrade, and export log.



System Optimization

Provides simple settings for SSD optimization.



A+ OPAL

With ADATA's proprietary A+ OPAL software, users can easily execute TCG OPAL SED (self-encryption drive) for all ADATA's industrial-grade NVMe and SATA III SSDs, which support TCG OPAL. It activates the encrypted features of an SSD's controller. Thanks to intuitive A+ OPAL management, it can be widely used in diverse applications which require high-level data security, such as defense, networking, server, healthcare, surveillance and more.

- Fully compliant with the TCG OPAL 2.0 specification
- Equipped with H/W based AES 256-bit key
- Deletes data immediately when destroying the AES key

1 Initial setup to activate A+ OPAL

2 Set the SID/Admin passwords

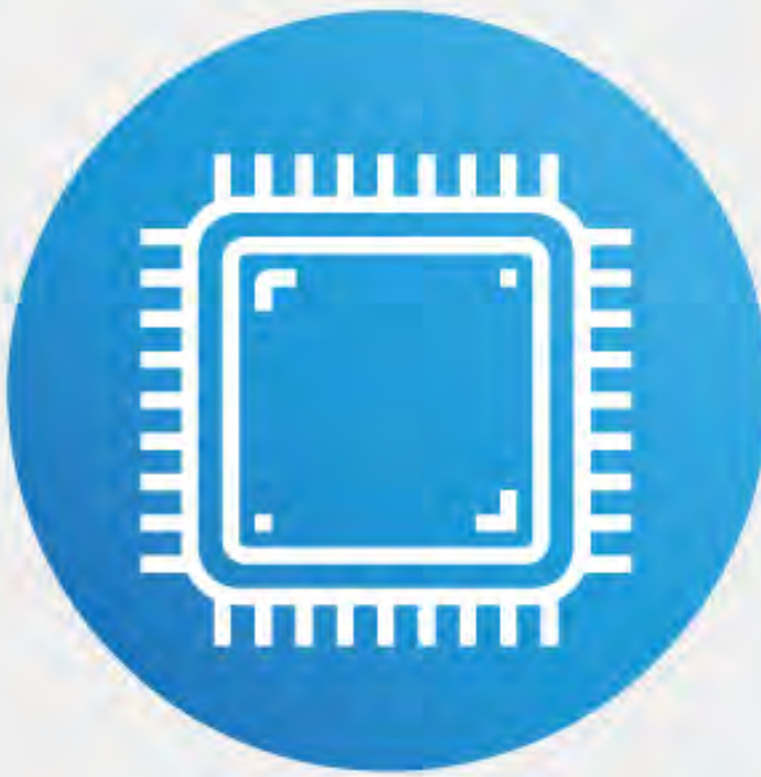
3 Pre-boot Authentication (PBA)

4 Locking Range Setting

5 Reset the disk to factory default status

6 Show the locking information & TCG OPAL support features

Rigorous Manufacturing and Testing



Strict NAND Flash IC Sorting

ADATA uses proprietary methods to test NAND Flash and sort out the best ICs for industrial-grade SSDs by an automatic testing process. To ensure the consistent high quality and yield rate, all ADATA's industrial-grade SSDs have to pass both electrical and function tests.

Electrical Tests

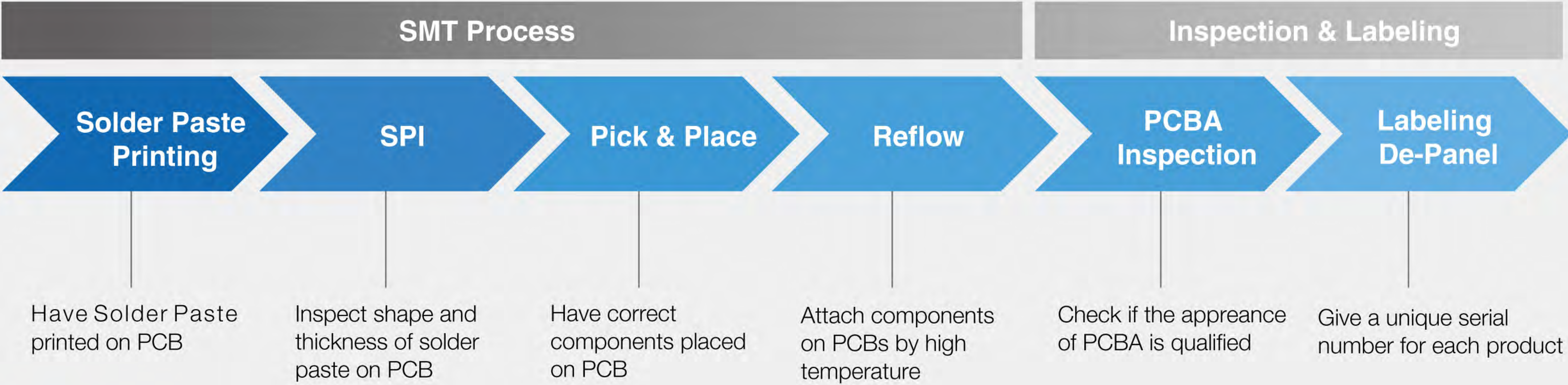
- Open/ Short Circuit
- Leakage / Standby Current
- NAND Flash ID Check

Function Tests

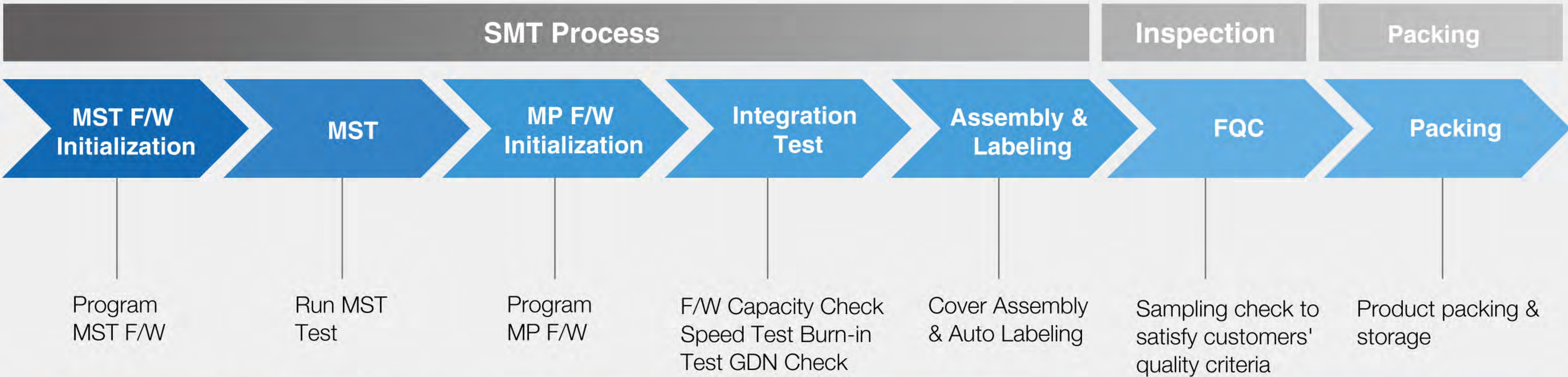
- Async./ sync. Interface check
- ECC 20bit/1KB
- Random Read/ Write
- Bad block numbers
- User capacity > 99.5%
- Validate quality of Block 0-3



SSD Manufacturing Process



SSD Testing Process



F/W Initialization



MST Test



Integration Test



Assembly & Labeling



Packing



NAND FLASH STORAGE PRODUCTS

2.5" SSD

M.2 SSD

mSATA SSD

USB / SATA DOM



BiCS5 READY

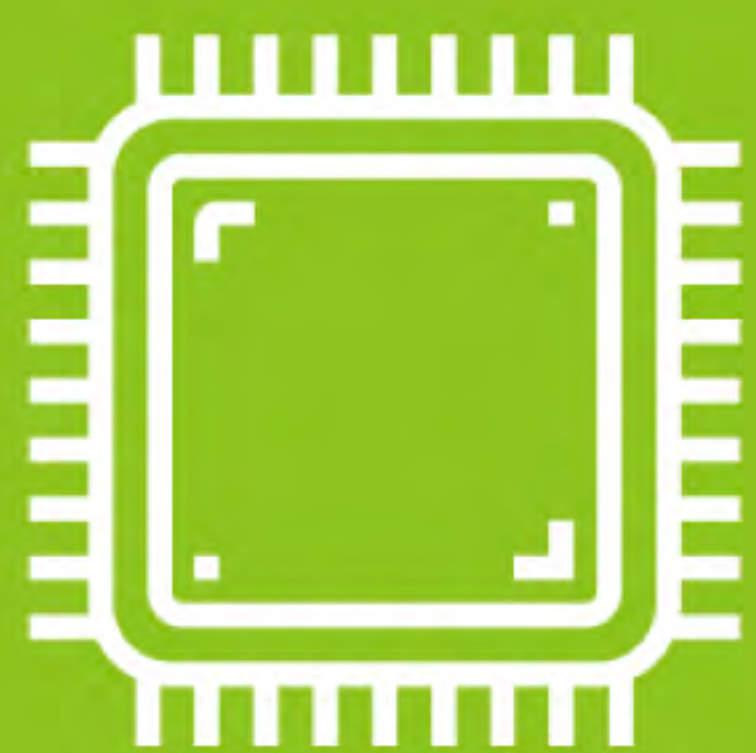
112-LAYER 3D TLC SERIES

For increasing demands of big data analysis, machine learning, AI, IoT applications, high-performance storage devices are required to process even more data. ADATA provides a full lineup of 112-layer 3D NAND (BiCS5) solid state drives and memory cards in various form factors, featuring higher capacity up to 4TB, greater reliability, as well as wide temperature support from -40°C to 85°C for stable operation in harsh environment. The BiCS5 series are designed to be energy efficient, feature high capacities, and are well suited for high-load industrial systems relating to industrial computing, embedded devices, automation, networking, transportation, and other fields.

RELIABLE
DURABILITY

3K
P/E CYCLE

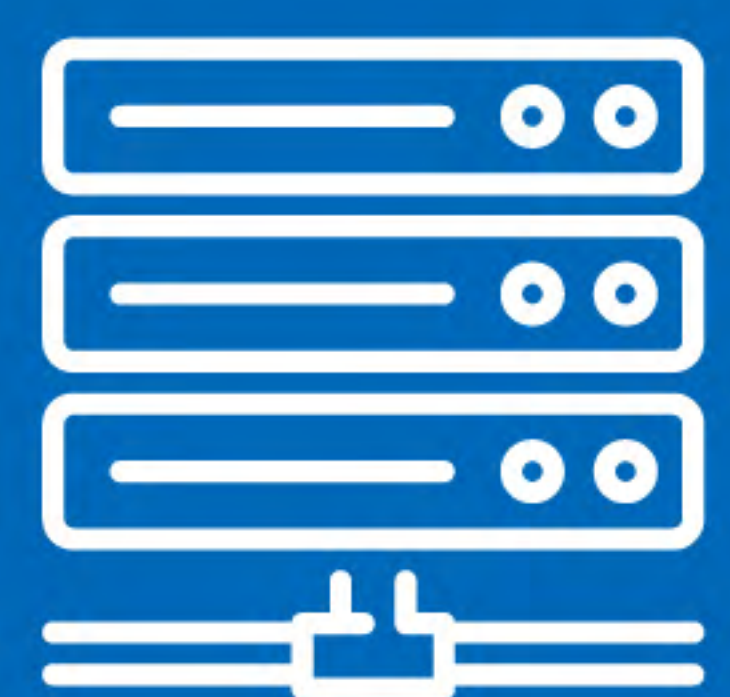
ORIGINAL IC
WDC/ KIOXIA



WIDE-TEMP.
(-40°C to 85°C)



HIGH
CAPACITY



2.5" SSD

112-layer (BiCS5)/ 96-layer (BiCS4) 3D TLC NAND Flash
Original IC Implement
High capacity up to 4TB
Wide-Temperature Support: -40°C to 85°C
S.M.A.R.T. Monitor, Wear Leveling, NCQ and TRIM Command



Model	ISSS31C	ISSS331AP	ISSS333 PLP
Features	1. Supports RAID Engine, SLC Cache and Thermal Throttling 2. End-to-End (E2E) Data Path Protection 3. ESD Support (IEC/EN 61000-4-2 Level 4) 4. With DRAM Buffer	1. Power Loss Protection 2. Large capacity of 4TB 3. Supports RAID Engine, SLC Cache and Thermal Throttling 4. With DRAM Buffer	1. Power Loss Protection 2. Supports RAID Engine, SLC Cache and Thermal Throttling 3. With DRAM Buffer
Interface	SATA III 6.0Gbps	SATA III 6.0Gbps	SATA III 6.0Gbps
Flash Type	112L 3D TLC	96L 3D TLC	64L 3D TLC
Capacity	128GB - 2TB	4TB	64GB - 2TB
Max. Seq. R/W Speed (MB/s)	560/500	560/520	560/520
Operating Voltage	5V	5V	5V
Max. Power Consumption	2.2W	2.8W	2.3W
Operating Temp. (Standard)	0°C to 70°C	0°C to 70°C	0°C to 70°C
Operating Temp. (Industrial)	-40°C to 85°C	-40°C to 85°C	-40°C to 85°C
P/E Cycle (times)	3K	3K	3K
ECC Engine	LDPC ECC	LDPC ECC	LDPC ECC
Environment	Vibration: 20G (20 - 2000Hz), Shock: 1500G/0.5ms, Half Sine Wave, MTBF: > 3 million hours		
Dimensions (L x W x H)	100 x 70 x 7mm		

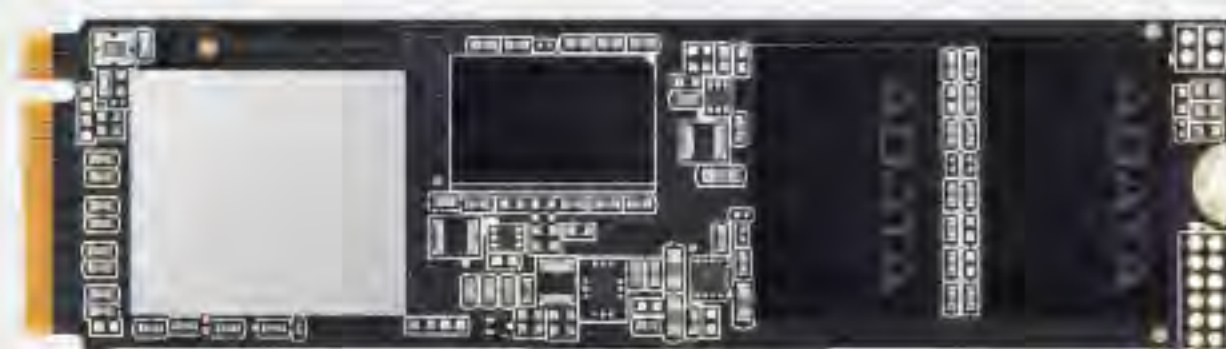


Model	ISSS333	ISSS316	ISSS332
Features	1. Supports RAID Engine, SLC Cache and Thermal Throttling 2. With DRAM Buffer	1. 112L (BiCS5) 3D TLC Implement 2. Supports RAID Engine, SLC Cache, and Thermal Throttling	1. Supports S.M.A.R.T. Monitor 2. BCH ECC Engine 3. With DRAM Buffer
Interface	SATA III 6.0Gbps	SATA III 6.0Gbps	SATA III 6.0Gbps
Flash Type	96L 3D TLC	112L 3D TLC	MLC
Capacity	64GB - 2TB	128GB - 2TB	8GB – 1TB
Max. Seq. R/W Speed (MB/s)	560/520	560/520	540/450
Operating Voltage	5V	5V	5V
Max. Power Consumption	2.2W	1.56W	3.2W
Operating Temp. (Standard)	0°C to 70°C	0°C to 70°C	0°C to 70°C
Operating Temp. (Industrial)	-40°C to 85°C	-40°C to 85°C	-40°C to 85°C
P/E Cycle (times)	3K	3K	3K
ECC Engine	LDPC ECC	LDPC ECC	BCH ECC
Environment	Vibration: 20G (20 - 2000Hz), Shock: 1500G/0.5ms, Half Sine Wave, MTBF: > 3 million hours		
Dimensions (L x W x H)	100 x 70 x 7mm		

Product specifications are subject to change without prior notice

M.2 NVMe SSD

NVMe™ 1.4/ 1.3 Compliant
Original IC Implement
3K P/E cycles for high endurance
S.M.A.R.T. Monitor, Wear Leveling, NCQ,and TRIM Command



Model	IM2P42B8	IM2P41B8	IM2P32A8	IM2P33E8
Features	1. Supports RAID Engine, SLC Cache and Thermal Throttling 2. ESD Support (IEC/EN 61000-4-2 Level 4)	1. Supports RAID Engine, SLC Cache and Thermal Throttling 2. End-to-End (E2E) Data Path Protection 3. ESD Support (IEC/EN 61000-4-2 Level 4)	1. Supports RAID Engine, SLC Cache and Thermal Throttling 2. End-to-End (E2E) Data Path Protection 3. ESD Support (IEC/EN 61000-4-2 Level 4)	1. Supports RAID Engine, SLC Cache and Thermal Throttling 2. End-to-End (E2E) Data Path Protection 3. With DRAM Buffer
Interface	PCIe Gen4x4 (NVMe 2.0)	PCIe Gen4x4 (NVMe 1.4)	PCIe Gen3x4 (NVMe 1.4)	PCIe Gen3x4 (NVMe 1.3)
Form Factor	M.2 2280 (M Key)	M.2 2280 (M Key)	M.2 2280 (M Key)	M.2 2280 (M Key)
Flash Type	176L 3D TLC	112L 3D TLC	112L 3D TLC	112L 3D TLC
Capacity	512GB - 2TB	512GB - 4TB	128GB - 2TB	256GB - 2TB
Max. Seq. R/W Speed (MB/s)	5000/4500	7000/6500	3300/2900	3400/2800
Operating Voltage	3.3V	3.3V	3.3V	3.3V
Max. Power Consumption	TBD	8W	4.71W	5.8W
Operating Temp. (Standard)	0°C to 70°C	0°C to 70°C	0°C to 70°C	0°C to 70°C
Operating Temp. (Industrial)	—	-40°C to 85°C	-40°C to 85°C	-40°C to 85°C
P/E Cycle (times)	3K	3K	3K	3K
ECC Engine	LDPC ECC	LDPC ECC	LDPC ECC	LDPC ECC
Environment	Vibration: 20G (20 - 2000Hz), Shock: 1500G/0.5ms, Half Sine Wave, MTBF: > 3 million hours			
Dimensions (L x W x H)	80 x 22 x 2.25mm			



Model	IM2P33E8 PLP	IM2P33F8	IM2P32A4	IM2P3014
Features	1. Power Loss Protection 2. Supports RAID Engine, SLC Cache and Thermal Throttling 3. End-to-End (E2E) Data Path Protection 4. With DRAM Buffer	1. Supports RAID Engine, SLC Cache and Thermal Throttling 2. End-to-End (E2E) Data Path Protection 3. Host Memory Buffer (HMB)	1. Supports RAID Engine, SLC Cache and Thermal Throttling 2. End-to-End (E2E) Data Path Protection 3. ESD Support (IEC/EN 61000-4-2 Level 4) 4. Host Memory Buffer (HMB)	1. Supports RAID Engine, SLC Cache and Thermal Throttling 2. End-to-End (E2E) Data Path Protection 3. AES 256-bit Data Encryption 4. Host Memory Buffer (HMB)
Interface	PCIe Gen3x4 (NVMe 1.3)	PCIe Gen3x4 (NVMe 1.3)	PCIe Gen3x4 (NVMe 1.4)	PCIe Gen3x2 (NVMe 1.3)
Form Factor	M.2 2280 (M Key)	M.2 2280 (M Key)	M.2 2242 (M Key)	M.2 2242 (M Key)
Flash Type	96L 3D TLC	96L 3D TLC	112L 3D TLC	112L 3D TLC
Capacity	256GB - 2TB	128GB - 1TB	128GB - 1TB	256GB - 2TB
Max. Seq. R/W Speed (MB/s)	3500/2900	2100/1600	3100/1700	3300/2900
Operating Voltage	3.3V	3.3V	3.3V	3.3V
Max. Power Consumption	5.8W	3.8W	2.79W	4.71W
Operating Temp. (Standard)	0°C to 70°C	0°C to 70°C	0°C to 70°C	0°C to 70°C
Operating Temp. (Industrial)	—	—	-40°C to 85°C	-40°C to 85°C
P/E Cycle (times)	3K	3K	3K	3K
ECC Engine	LDPC ECC	LDPC ECC	LDPC ECC	LDPC ECC
Environment	Vibration: 20G (20 - 2000Hz), Shock: 1500G/0.5ms, Half Sine Wave, MTBF: > 3 million hours			
Dimensions (L x W x H)	80 x 22 x 2.25mm	80 x 22 x 2.25mm	42 x 22 x 3.5mm	42 x 22 x 3.5mm

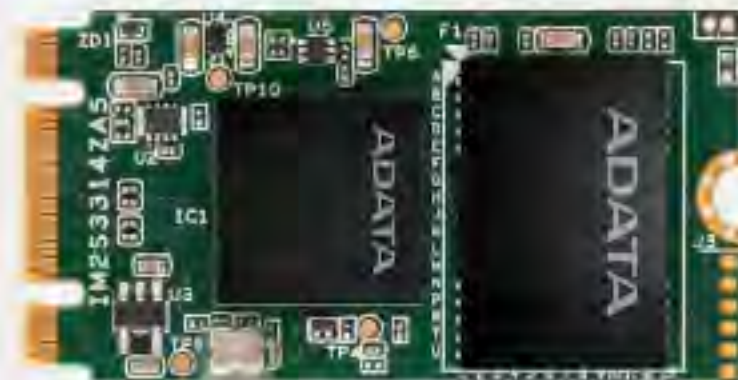
Product specifications are subject to change without prior notice

M.2 SATA SSD

Original IC Implement
3K P/E cycles for high endurance
S.M.A.R.T. Monitor, Wear Leveling, NCQ and TRIM Command



Model	IM2S31C8	IM2S3168	IM2S3338	IM2S3328E
Features	1. Supports RAID Engine, SLC Cache and Thermal Throttling 2. End-to-End (E2E) Data Path Protection 3. ESD Support (IEC/EN 61000-4-2 Level 4) 4. With DRAM Buffer	1. 112L (BiCS5) 3D TLC Implement 2. Supports RAID Engine, SLC Cache and Thermal Throttling	1. Supports RAID Engine, SLC Cache and Thermal Throttling 2. With DRAM Buffer	1. Supports S.M.A.R.T. Monitor 2. BCH ECC Engine 3. With DRAM Buffer
Interface	SATA III 6.0Gbps	SATA III 6.0Gbps	SATA III 6.0Gbps	SATA III 6.0Gbps
Form Factor	M.2 2280 (B+M Key)	M.2 2280 (B+M Key)	M.2 2280 (B+M Key)	M.2 2280 (B+M Key)
Flash Type	112L 3D TLC	112L 3D TLC	96L 3D TLC	MLC
Capacity	128GB - 2TB	128GB - 2TB	64GB - 1TB	16GB - 1TB
Max. Seq. R/W Speed (MB/s)	560/500	560/520	550/480	550/450
Operating Voltage	3.3V	3.3V	3.3V	3.3V
Max. Power Consumption	2.1W	1.58W	2W	3.5W
Operating Temp. (Standard)	0°C to 70°C	0°C to 70°C	0°C to 70°C	0°C to 70°C
Operating Temp. (Industrial)	-40°C to 85°C	-40°C to 85°C	-40°C to 85°C	-40°C to 85°C
P/E Cycle (times)	3K	3K	3K	3K
ECC Engine	LDPC ECC	LDPC ECC	LDPC ECC	BCH ECC
Environment	Vibration: 20G (20 - 2000Hz), Shock: 1500G/0.5ms, Half Sine Wave, MTBF: > 3 million hours			
Dimensions (L x W x H)	80 x 22 x 2.25mm			

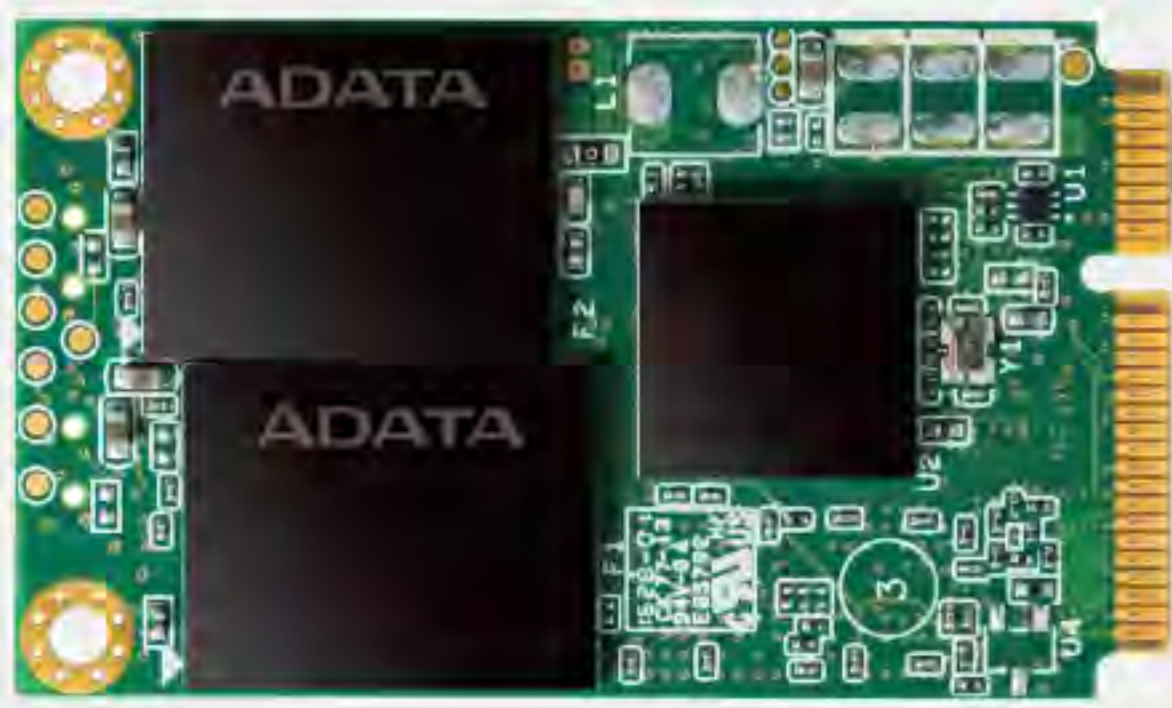


Model	IM2S31C4	IM2S3164	IM2S3314	IM2S3134N
Features	1. 112L (BiCS5) 3D TLC Implement 2. Supports RAID Engine, SLC Cache and Thermal Throttling 3. End-to-End (E2E) Data Path Protection 4. With DRAM Buffer	1. 112L (BiCS5) 3D TLC Implement 2. Supports RAID Engine, SLC Cache and Thermal Throttling 3. End-to-End (E2E) Data Path Protection	1. Supports S.M.A.R.T. Monitor 2. Wear Leveling, Bad Block Management, Garbage Collection 3. BCH ECC Engine	1. Supports S.M.A.R.T. Monitor 2. Wear Leveling, Bad Block Management, Garbage Collection 3. BCH ECC Engine 4. With DRAM Buffer
Interface	SATA III 6.0Gbps	SATA III 6.0Gbps	SATA III 6.0Gbps	SATA III 6.0Gbps
Form Factor	M.2 2242 (B+M Key)	M.2 2242 (B+M Key)	M.2 2242 (B+M Key)	M.2 2242 (B+M Key)
Flash Type	112L 3D TLC	112L 3D TLC	MLC	MLC
Capacity	128GB - 1TB	128GB - 1TB	16GB – 256GB	32GB - 256GB
Max. Seq. R/W Speed (MB/s)	560/500	560/480	540/450	550/320
Operating Voltage	3.3V	3.3V	3.3V	3.3V
Max. Power Consumption	1.7W	1.37W	1.2W	2.5W
Operating Temp. (Standard)	0°C to 70°C	0°C to 70°C	0°C to 70°C	0°C to 70°C
Operating Temp. (Industrial)	-40°C to 85°C	-40°C to 85°C	-40°C to 85°C	-40°C to 85°C
P/E Cycle (times)	3K	3K	3K	3K
ECC Engine	LDPC ECC	LDPC ECC	BCH ECC	BCH ECC
Environment	Vibration: 20G (20 - 2000Hz), Shock: 1500G/0.5ms, Half Sine Wave, MTBF: > 3 million hours			
Dimensions (L x W x H)	42 x 22 x 3.5mm			

Product specifications are subject to change without prior notice

mSATA SSD

Original IC Implement
Wide-Temp. Support (-40°C to 85°C)
S.M.A.R.T. Monitor, Wear Leveling, NCQ and TRIM Command



Model	IMSS332	IMSS316
Features	1. MLC NAND Flash and 3K P/E Cycle Rating 2. With DRAM Buffer	1. 112L (BiCS5) 3D TLC Implement 2. Supports SLC Cache, RAID Engine, and Thermal Throttling
Interface	SATA III 6.0Gbps	SATA III 6.0Gbps
Form Factor	mSATA (MO-300A)	mSATA (MO-300A)
Flash Type	MLC	112L 3D TLC
Capacity	16GB - 1TB	128GB - 2TB
Max. Seq. R/W Speed (MB/s)	550/450	560/520
Operating Voltage	3.3V	3.3V
Max. Power Consumption	3.4W	1.48W
Operating Temp. (Standard)	0°C to 70°C	0°C to 70°C
Operating Temp. (Industrial)	-40°C to 85°C	-40°C to 85°C
P/E Cycle (times)	3K	3K
ECC Engine	BCH ECC	LDPC ECC
H/W PLP Function	Optional	—
A+ SLC Mode	V	Optional
Anti-Sulfuration Protection	Optional	Optional
Environment	Vibration: 20G (20 - 2000Hz), Shock: 1500G/0.5ms, Half Sine Wave, MTBF: > 3 million hours	
Dimensions (L x W x H)	50.80 x 29.85 x 4.5mm	50.80 x 29.85 x 4.5mm

Product specifications are subject to change without prior notice

DOM (Disk-On-Module)

Error Correcting Code
H/W Write Protect
Wear Leveling



Model	IUMU23C	ISMS331	
Features	1. SLC NAND Flash for great reliability 2. BCH ECC Engine 3. H/W Write Protect 4. Wear Leveling, Bad Block Management, Garbage Collection	1. BCH ECC Engine 2. H/W Write Protect 3. Wear Leveling, Bad Block Management, Garbage Collection	
Interface	USB 2.0	SATA III 6.0Gbps	SATA III 6.0Gbps
Form Factor	USB 10 Pin	SATA DOM	SATA DOM
Flash Type	SLC	SLC	MLC
Capacity	512MB - 4GB	8GB	8GB - 128GB
Max. Seq. R/W Speed (MB/s)	18/16	40/35	340/200
Operating Voltage	5V	5V	5V
Max. Power Consumption	0.6W	0.8W	1.6W
Operating Temp. (Standard)	0°C to 70°C	—	0°C to 70°C
Operating Temp. (Industrial)	—	-40°C to 85°C	-40°C to 85°C
P/E Cycle (times)	60K	60K	3K
ECC Engine	BCH ECC	BCH ECC	BCH ECC
A+ SLC Mode	—	—	V
Environment	Vibration: 20G (20 - 2000Hz), Shock: 1500G/0.5ms, Half Sine Wave, MTBF: > 3 million hours		
Dimensions (L x W x H)	(2.54mm): 36.9 x 26.6 x 8.5mm (2.0mm): 36.9 x 26.6 x 5.75mm	(Horizontal) (Vertical)	w/ Housing: 34.63 x 24.94 x 18.51mm w/o Housing: 32.56 x 23.4 x 17.33mm w/ Housing: 40.47 x 24.94 x 6.8mm w/o Housing: 38.4 x 23.4 x 8.45mm



INDUSTRIAL-GRADE MEMORY CARDS

- CFexpress
- CFast
- Compact Flash
- SD / microSD
- eMMC



CFexpress Card

NVMe 1.3 Compliant
Wide-Temp. Support (-40°C to 85°C)
Supportes S.M.A.R.T. Monitor and Wear Leveling



Model	ICFP301
Features	1. Supports AES 256-bit Data Encryption and TCG OPAL 2.0 2. Supports RAID Engine and Thermal Throttling 3. End-to-End (E2E) Data Path Protection
Interface	PCIe Gen3x2
Form Factor	CFexpress Type-B
Flash Type	3D TLC
Capacity	64GB - 512GB
Max. Seq. R/W Speed (MB/s)	1600/1200
Operating Voltage	3.3V
Max. Power Consumption	1.6W
Operating Temp. (Standard)	0°C to 70°C
Operating Temp. (Industrial)	-40°C to 85°C
P/E Cycle (times)	3K
ECC Engine	LDPC ECC
A+ SLC Mode	Optional
Environment	Vibration: 20G (20 - 2000Hz), Shock: 1500G/0.5ms, Half Sine Wave, MTBF: > 3 million hours
Dimensions (L x W x H)	29.6 x 38.5 x 3.8mm

Product specifications are subject to change without prior notice

CFast Card

Error Correcting Code
Wide-Temp. Support (-40°C to 85°C)
S.M.A.R.T., Wear Leveling, NCQ and TRIM Command



Model	ISC3E	ICFS31C
Interface	SATA III 6.0Gbps	SATA III 6.0Gbps
Form Factor	CFast 2.0	CFast 2.0
Flash Type	SLC/MLC	112L 3D TLC
Capacity	(SLC) 4GB – 64GB (MLC) 8GB – 128GB	256GB - 1TB
Max. Seq. R/W Speed (MB/s)	(SLC) 180/165 (MLC) 500/400	560/500
Operating Voltage	3.3V	3.3V
Max. Power Consumption	1.5W	2.1W
Operating Temp. (Standard)	0°C to 70°C	0°C to 70°C
Operating Temp. (Industrial)	-40°C to 85°C	-40°C to 85°C
P/E Cycle (times)	(SLC) 60K, (MLC) 3K	3K
ECC Engine	BCH ECC	LDPC ECC
A+ SLC Mode	V	V
Environment	Vibration: 20G (20 - 2000Hz), Shock: 1500G/0.5ms, Half Sine Wave, MTBF: > 3 million hours	
Dimensions (L x W x H)	36.5 x 42.9 x 3.6mm	

CF Card

Error Correcting Code
Wide-Temp. Support (-40°C to 85°C)
Wear Leveling, Bad Block Management



Model	IPC17	IPC39
Interface	PATA	PATA
Form Factor	CF50 pin type 1	CF50 pin type 1
Flash Type	SLC	SLC/MLC
Capacity	128MB - 8GB	8GB - 64GB
Max. Seq. R/W Speed (MB/s)	40/30	125/125
Operating Voltage	3.3V/ 5V	3.3V/ 5V
Max. Power Consumption	0.5W	1W
Operating Temp. (Standard)	0°C to 70°C	0°C to 70°C
Operating Temp. (Industrial)	-40°C to 85°C	-40°C to 85°C
P/E Cycle (times)	60K	(SLC) 60K, (MLC) 3K
ECC Engine	BCH ECC	BCH ECC
A+ SLC Mode	—	Optional (For MLC Model)
Environment	Vibration: 20G (20 - 2000Hz), Shock: 1500G/0.5ms, Half Sine Wave, MTBF: > 3 million hours	
Dimensions (L x W x H)	36.4 x 42.8 x 3.3mm	

Product specifications are subject to change without prior notice

SD Card

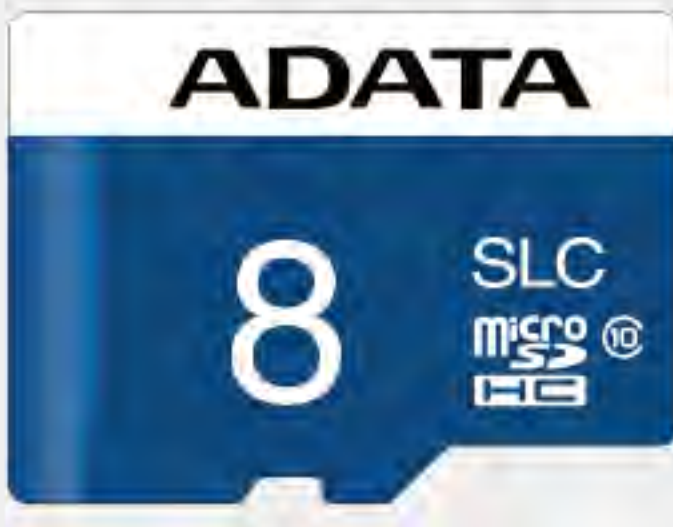
Error Correcting Code
Wide-Temp. Support (-40°C to 85°C)
Wear Leveling, S.M.A.R.T. Monitor



Model	ISDD33K	IDC3B	ISDD361
Interface	SD 6.1	SD 3.0	SD 1.1/2.0 (256MB - 2GB) SD 3.0 (4GB - 32GB)
Flash Type	112L 3D TLC	MLC	SLC
Capacity	64GB - 256GB	8GB - 256GB	256MB - 32GB
Max. Seq. R/W Speed (MB/s)	97/83	95/69	(SD 2.0) 23/19MB/s (SD 3.0) 98/74MB/s
Operating Voltage	3.6V	3.6V	3.6V
Max. Power Consumption	0.71W	0.72W	0.5W
Operating Temp. (Standard)	-25°C to 85°C	-25°C to 85°C	—
Operating Temp. (Industrial)	-40°C to 85°C	-40°C to 85°C	-40°C to 85°C
P/E Cycle (times)	3K	3K	60K
ECC Engine	LDPC ECC	BCH ECC	BCH ECC
A+ SLC Mode	—	Optional	—
Environment	Vibration: 20G (20 - 2000Hz), Shock: 1500G/0.5ms, Half Sine Wave, MTBF: > 3 million hours		
Dimensions (L x W x H)	32 x 24 x 2.1mm		

microSD Card

Error Correcting Code
Wide-Temp. Support (-40°C to 85°C)
Wear Leveling, S.M.A.R.T. Monitor



Model	IUDD33K	IUDD33H	IDU3A	IUDD362
Interface	SD 6.1	SD 3.0	SD 3.0	SD 1.1/2.0 (1GB/2GB) SD 3.0 (4GB/8GB)
Flash Type	112L 3D TLC	MLC	MLC	SLC
Capacity	64GB - 256GB	4GB - 16GB	8GB - 64GB	1GB - 8GB
Max. Seq. R/W Speed (MB/s)	97/83	97/35	97/67	(SD 2.0) 23/19MB/s (SD 3.0) 31/29MB/s
Operating Voltage	3.6V	3.6V	3.6V	3.6V
Max. Power Consumption	0.71W	0.36W	0.63W	0.5W
Operating Temp. (Standard)	-25°C to 85°C	-25°C to 85°C	-25°C to 85°C	-25°C to 85°C
Operating Temp. (Industrial)	-40°C to 85°C	-40°C to 85°C	-40°C to 85°C	-40°C to 85°C
P/E Cycle (times)	3K	3K	3K	60K
ECC Engine	LDPC ECC	BCH ECC	BCH ECC	BCH ECC
A+ SLC Mode	—	Optional	Optional	—
Environment	Vibration: 20G (20 - 2000Hz), Shock: 1500G/0.5ms, Half Sine Wave, MTBF: > 3 million hours			
Dimensions (L x W x H)	11 x 15 x 1mm			

Product specifications are subject to change without prior notice

eMMC

- 3K P/E Cycle Rating
- Auto Sleep on/off Mode
- Partitioning Management
- Wide-Temp. Support (-40°C to 85°C)



Model	IEM5141A (MLC)	IEM5141A (3D TLC)
Interface	eMMC 5.1	eMMC 5.1
Flash Type	MLC	3D TLC
Capacity	8GB (Standard) 16GB (Industrial)	16GB (Standard) 32GB (Industrial)
Max. Seq. R/W Speed (MB/s)	300/120	300/170
Operating Voltage	2.7V - 3.6V	2.7V - 3.6V
Data Bus Widths	1 bit (default), 4 bit, 8 bit	1 bit (default), 4 bit, 8 bit
Operating Temp. (Standard)	-25°C to 85°C (8GB)	-25°C to 85°C (16GB)
Operating Temp. (Industrial)	-40°C to 85°C (16GB)	-40°C to 85°C (32GB)
P/E Cycle (times)	3K	3K
Data Retention	10 years (at +55°C for fresh device)	10 years (at +55°C for fresh device)
ECC Engine	LDPC ECC	LDPC ECC
Thermal Throttling	X	V
TBW (Max.)	40TB	87TB
Environment	Vibration: 20G (20 - 2000Hz), Shock: 1500G/0.5ms, Half Sine Wave, MTBF: > 3 million hours	
Dimensions (L x W x H)	11.5 x 13 x 0.8mm (153 balls)	11.5 x 13 x 1.0mm (153 balls)

USB Flash Drive

- 3K P/E Cycle Rating
- USB 3.2 Interface
- Metallic Enclosure
- Wear Leveling
- Error Correcting Code



Model	UV131	UV350
Interface	USB 3.2 Gen 1	USB 3.2 Gen 1
Flash Type	MLC	96L 3D TLC
Capacity	8GB - 64GB	32GB - 128GB
Max. Seq. R/W Speed (MB/s)	166/79	262/45
Operating Voltage	5V	5V
Max. Power Consumption	1.02W	1.6W
Dimensions (L x W x H)	44.2 x 16.8 x 8.0mm	42.4 x 14.9 x 5.3mm
Weight	8g	5.9g
Operating Temp. (Standard)	0°C to 70°C	0°C to 70°C
P/E Cycle (times)	3K	3K
ECC Engine	BCH ECC	BCH ECC
Environment	Vibration: 20G (20 - 2000Hz), Shock: 1500G/0.5ms, Half Sine Wave, MTBF: > 3 million hours	
Operating System Requirements	Windows XP or later, Mac OS X 10.6 or later, Linux Kernel 2.6 or later	

Product specifications are subject to change without prior notice



DRAM MODULES

Embedded Series

Server Series

Wide-Temperature Series



Stringent Validation and Tests



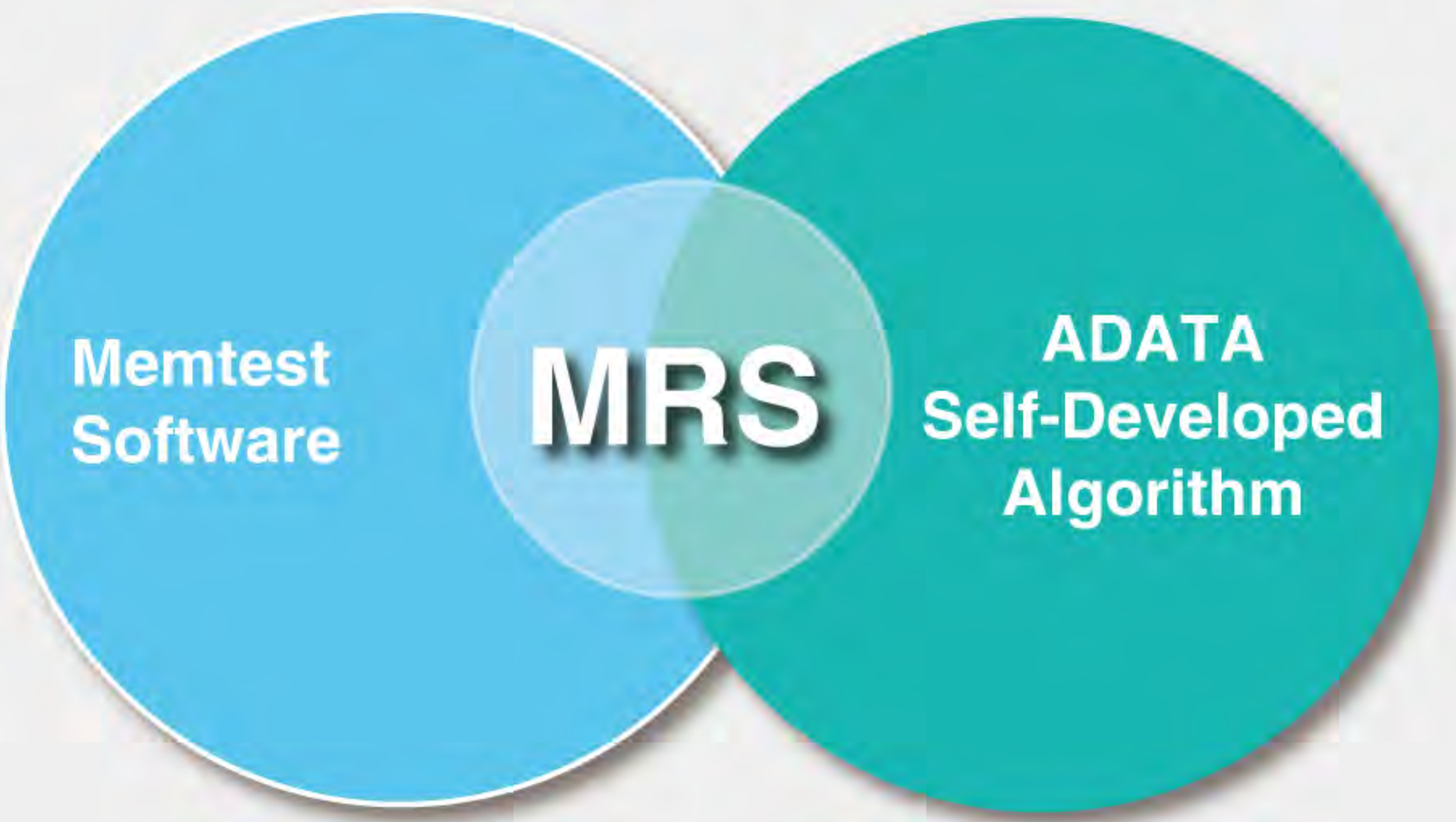
ADATA's Proprietary MRS Test

What is MRS?

ADATA has developed proprietary software to test DRAM modules – **MRS**. MRS integrates the advantages of a self-developed algorithm and Memtest software, simulating system behaviors, including heavy loading, random read/write operation, and multi-cores operation.

The Advantages of MRS

- With MRS we can:
- Collect data on motherboards and DRAM modules for management control during manufacturing
 - Record the speed, capacity, timing, and voltage of modules
 - Easily identify defective DRAM module components via a graphic interface



Multiple Reliability Tests

With large chambers, we are able to conduct various reliability tests, including dynamic environment tests by batches and systems and ensure the consistent quality of our products. Meanwhile we can also conduct MTBF, HTOL, LTOL tests per customers' requests or by different products.

Dynamic Environment Tests

- By batches and systems

Product Reliability Tests

- Simulate various extreme environment conditions

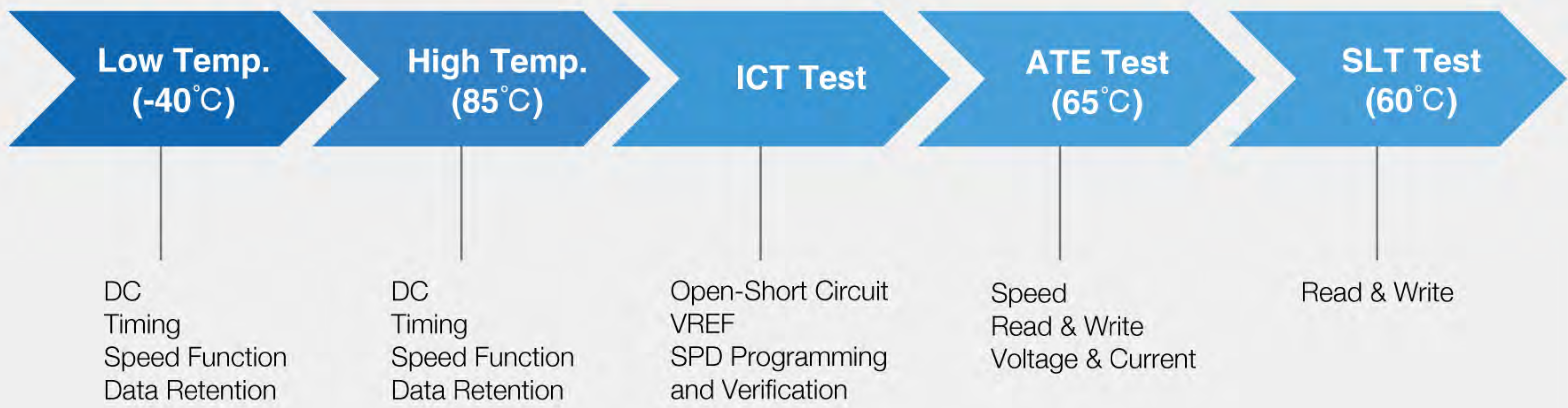
Consistant Quality

- Ensures the consistent product quality at design and MP stages



Wide-Temperature Testing

Testing Process of Wide-Temperature Modules



Wide-Temp. IC Sorting
via Automatic Test Equipment (ATE)



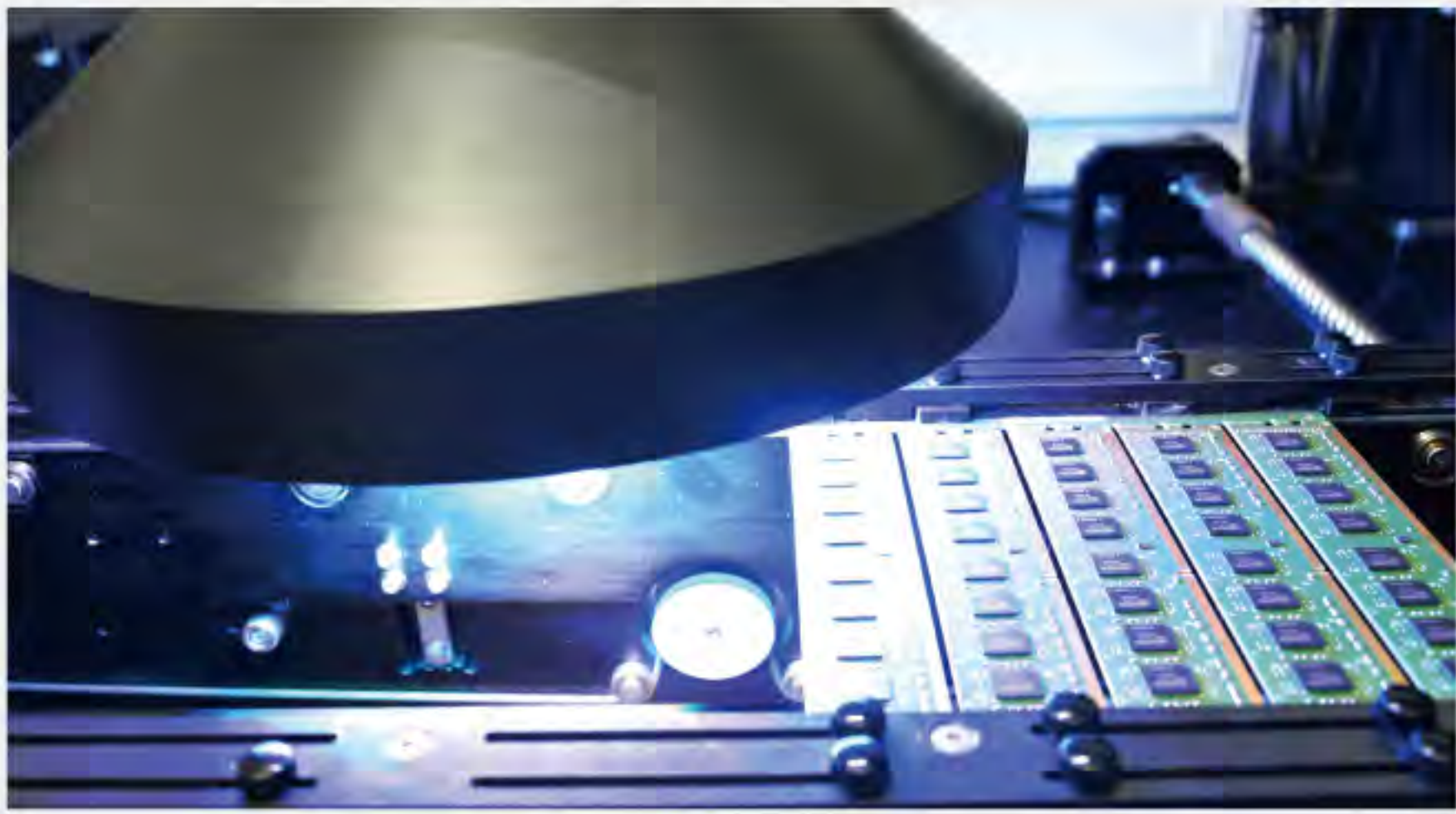
Fully Automated Production



SMT Line



Chip Mounter



AOI
(Automated Optical Inspection)



Auto Labeling

ATE (Automatic Test Equipment)

ATE (Automatic Test Equipment) is used for DRAM specification testing. Testing capability equals that of semiconductor industry-level machinery. This guarantees ADATA's modules meet DRAM specifications, including function, DC, AC, timing, and frequency. ADATA has industry-leading ATE test equipment and has achieved digital and networked control for test programs, data collection, and analysis.



- Open, short, and continuous tests
- DC Test (leakage, IDD, VREF)
- Speed Test (timing parameter check, data BGR check)
- Function Test (H/L CDD, Refresh, Self-refresh, Read/Write Opertion, Data Mask, OTF)

Product Features

			 30µ PCB Edge Connector	 Wide Temperature Support	 Temperature Sensor	 Conformal Coating	 Anti-sulfuration
Embedded	DDR3L	U-DIMM	▲	—	▲	▲	▲
		SO-DIMM	▲	—	▲	▲	▲
	DDR4	U-DIMM	▲	—	▲	▲	▲
		VLP U-DIMM	▲	—	▲	▲	▲
		SO-DIMM	▲	—	▲	▲	▲
	DDR5	U-DIMM	▲	—	●	▲	▲
		SO-DIMM	▲	—	●	▲	▲
	Server	DDR3L	R-DIMM	●	—	●	▲
ECC U-DIMM			●	—	●	▲	▲
ECC SO-DIMM			●	—	●	▲	▲
DDR4		R-DIMM	●	—	●	▲	▲
		ECC U-DIMM	●	—	●	▲	▲
		ECC SO-DIMM	●	—	●	▲	▲
		VLP ECC U-DIMM	●	—	●	▲	▲
		VLP R-DIMM	●	—	●	▲	▲
DDR5		R-DIMM	●	—	●	▲	▲
		ECC U-DIMM	●	—	●	▲	▲
		ECC SO-DIMM	●	—	●	▲	▲
Wide-Temp.		DDR3L	SO-DIMM	▲	●	●	▲
	ECC SO-DIMM		●	●	●	▲	▲
	DDR4	R-DIMM	●	●	●	▲	▲
		SO-DIMM	▲	●	●	▲	▲
		ECC SO-DIMM	●	●	●	▲	▲

— Not available ▲ By Request ● Supported

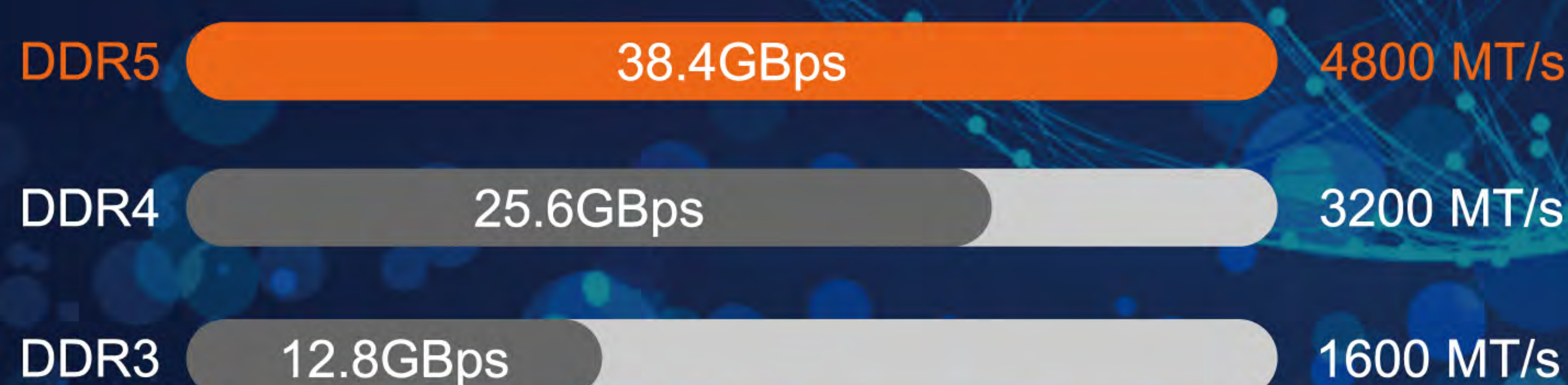
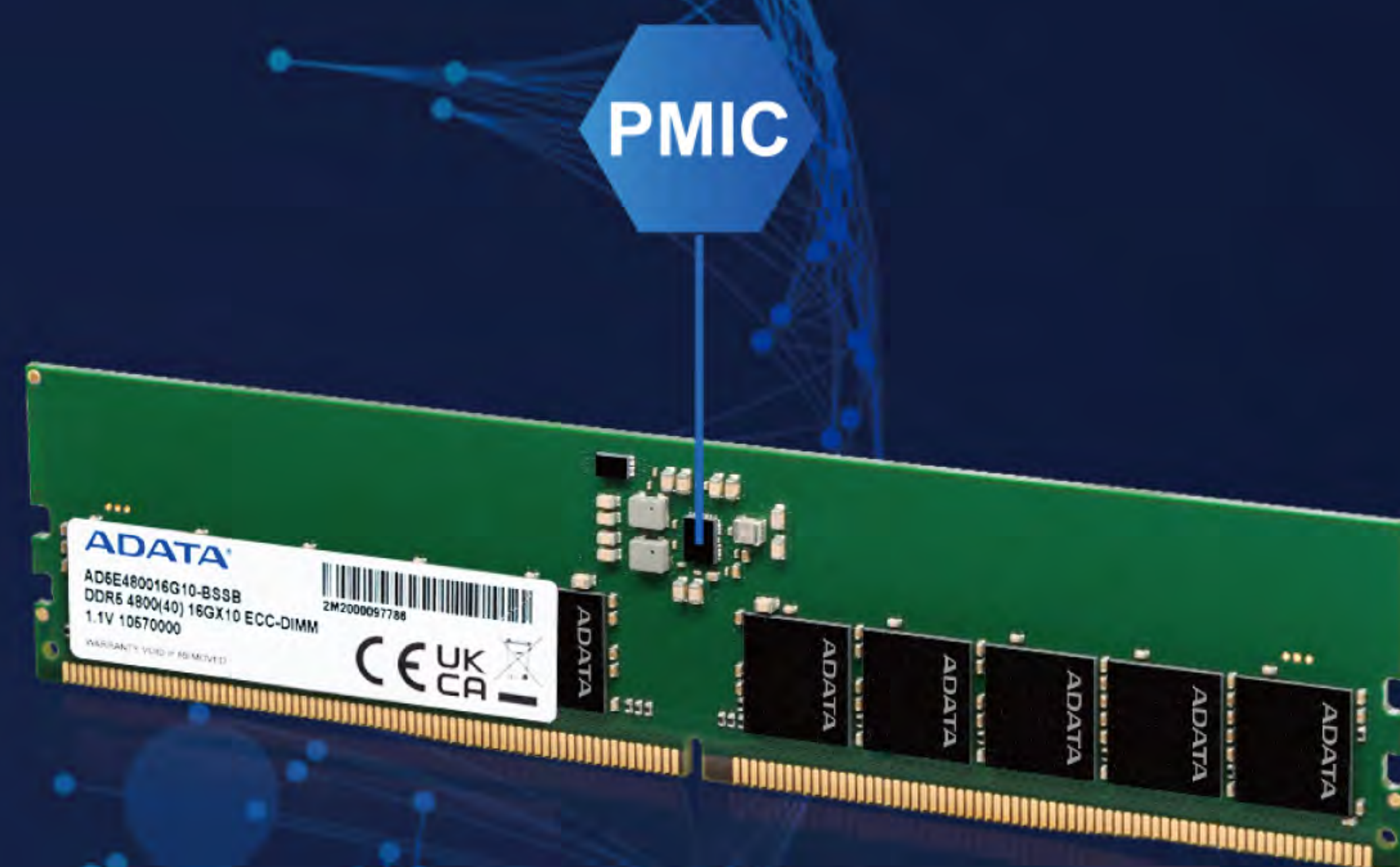
DDR5 MEMORY MODULES

EMPOWERING HIGH SPEED COMPUTING AND 5G

To meet the emerging demands of 5G, AIoT, Edge Computing, HPC, and more, ADATA has unveiled new industrial-grade DDR5 memory modules. They are capable of reaching speeds of up to 4800 MT/s and yet only operates on 1.1V. In addition, they are equipped with a Power Management IC (PMIC) to enhance power supply stability.

Why DDR5

ADATA's industrial-grade DDR5 memory modules feature the advantages below, making them ideal for automation, networking, surveillance, IPCs, embedded systems, and servers. At present, ADATA DDR5 series are being widely implemented for automation and servers.



1.5X Faster transfer rate compared to DDR4



Consumes 9% less power compared to DDR4



SAMSUNG Original IC for great reliability



For more reliable data transmissions



Power Management IC for improved power supply stability



Ample storage capacity up to 32GB

Embedded

Unbuffered DIMM



Interface	DDR5	DDR4	DDR3L
Module Type	U-DIMM	U-DIMM	U-DIMM
Frequency (MT/s)	4800	2400 / 2666 / 3200	1600
Capacity	8GB, 16GB, 32GB	4GB, 8GB, 16GB, 32GB	2GB, 4GB, 8GB
Pin Count	288 Pin	288 Pin	240 Pin
PCB Height (inch/ cm)	1.23 inches/3.12cm	1.23 inches/3.12cm	1.18 inches/ 3cm
Operating Voltage	1.1V	1.2V	1.35V
Operating Temp.	0°C to 85°C	0°C to 85°C	0°C to 85°C
Customized Services (Optional)	Anti-Sulfuration Protection, Conformal Coating		

SO-DIMM



Interface	DDR5	DDR4	DDR3L
Module Type	SO-DIMM	SO-DIMM	SO-DIMM
Frequency (MT/s)	4800	2400 / 2666 / 3200	1600
Capacity	8GB, 16GB, 32GB	4GB, 8GB, 16GB, 32GB	1GB, 2GB, 4GB, 8GB
Pin Count	262 Pin	260 Pin	204 Pin
PCB Height (inch/ cm)	1.18 inches/ 3cm	1.18 inches/ 3cm	1.18 inches/ 3cm
Operating Voltage	1.1V	1.2V	1.35V
Operating Temp.	0°C to 85°C	0°C to 85°C	0°C to 85°C
Customized Services (Optional)	Anti-Sulfuration Protection, Conformal Coating		

Embedded VLP U-DIMM



Interface	DDR4
Module Type	VLP U-DIMM
Frequency (MT/s)	2400 / 2666 / 3200
Capacity	2400MT/s: 2GB, 4GB, 8GB, 16GB 2666MT/s: 2GB, 4GB, 8GB, 16GB 3200MT/s: 8GB, 16GB
Pin Count	288 Pin
PCB Height (inch/ cm)	0.73 inches/ 1.85cm
Operating Voltage	1.2V
Operating Temp.	0°C to 85°C
Customized Services (Optional)	Anti-Sulfuration Protection, Conformal Coating

Server

Registered DIMM



DDR5



Interface	DDR5	DDR4	DDR3L
Module Type	R-DIMM	R-DIMM	R-DIMM
Frequency (MT/s)	4800	2666 / 3200	1600
Capacity	16GB, 32GB	2666MT/s: 4GB, 8GB, 16GB, 32GB 3200MT/s: 8GB, 16GB, 32GB	8GB
Pin Count	288 Pin	288 Pin	240 Pin
PCB Height (inch/ cm)	1.23 inches/ 3.12cm	1.23 inches/ 3.12cm	1.18 inches/ 3cm
Operating Voltage	1.1V	1.2V	1.35V
Operating Temp.	0°C to 85°C	0°C to 85°C	0°C to 85°C
30μ PCB Gold Plating	V	V	V
Customized Services (Optional)	Anti-Sulfuration Protection, Conformal Coating		

VLP ECC U-DIMM



Interface	DDR4	DDR3L
Module Type	VLP ECC U-DIMM	VLP ECC U-DIMM
Frequency (MT/s)	2400 / 2666 / 3200	1600
Capacity	2400MT/s: 4GB, 8GB, 16GB 2666MT/s: 4GB, 8GB, 16GB 3200MT/s: 8GB, 16GB	2GB, 4GB, 8GB
Pin Count	288 Pin	240 Pin
PCB Height (inch/ cm)	0.73 inches/ 1.85cm	0.73 inches/ 1.85cm
Operating Voltage	1.2V	1.35V
Operating Temp.	0°C to 85°C	0°C to 85°C
30μ PCB Gold Plating	V	V
Customized Services (Optional)	Anti-Sulfuration Protection, Conformal Coating	

Product specifications are subject to change without prior notice

Server

ECC U-DIMM



Interface	DDR5	DDR4	DDR3L
Module Type	ECC U-DIMM	ECC U-DIMM	ECC U-DIMM
Frequency (MT/s)	4800	2400 / 2666 / 3200	1600
Capacity	16GB, 32GB	2400MT/s: 4GB, 8GB, 16GB 2666MT/s: 4GB, 8GB, 16GB, 32GB 3200MT/s: 8GB, 16GB, 32GB	2GB, 4GB, 8GB
Pin Count	288 Pin	288 Pin	240 Pin
PCB Height (inch/ cm)	1.23 inches/ 3.12cm	1.23 inches/ 3.12cm	1.18 inches/ 3cm
Operating Voltage	1.1V	1.2V	1.35V
Operating Temp.	0°C to 85°C	0°C to 85°C	0°C to 85°C
30μ PCB Gold Plating	V	V	V
Customized Services (Optional)	Anti-Sulfuration Protection, Conformal Coating		

ECC SO-DIMM



Interface	DDR5	DDR4	DDR3L
Module Type	ECC SO-DIMM	ECC SO-DIMM	ECC SO-DIMM
Frequency (MT/s)	4800	2400 / 2666 / 3200	1600
Capacity	16GB, 32GB	2400MT/s: 2GB, 4GB, 8GB, 16GB, 32GB 2666MT/s: 4GB, 8GB, 16GB, 32GB 3200MT/s: 8GB, 16GB, 32GB	2GB, 4GB, 8GB
Pin Count	262 Pin	260 Pin	204 Pin
PCB Height (inch/ cm)	1.23 inches/ 3.12cm	1.18 inches/ 3cm	1.18 inches/ 3cm
Operating Voltage	1.1V	1.2V	1.35V
Operating Temp.	0°C to 85°C	0°C to 85°C	0°C to 85°C
30μ PCB Gold Plating	V	V	V
Customized Services (Optional)	Anti-Sulfuration Protection, Conformal Coating		

Wide-Temperature Series

SO-DIMM (W.T.)



Interface	DDR4	DDR3L
Module Type	SO-DIMM	SO-DIMM
Frequency (MT/s)	2400 / 2666 / 3200	1600
Capacity	2400MT/s: 4GB, 8GB, 16GB, 32GB 2666MT/s: 4GB, 8GB, 16GB, 32GB 3200MT/s: 8GB, 16GB, 32GB	8GB
Pin Count	260 Pin	204 Pin
PCB Height (inch/ cm)	1.18 inches/ 3cm	1.18 inches/ 3cm
Operating Voltage	1.2V	1.35V
Operating Temp.	-40°C to 85°C	-40°C to 85°C
30μ PCB Gold Plating	V	V
Customized Services (Optional)	Anti-Sulfuration Protection, Conformal Coating	

ECC SO-DIMM (W.T.)



Interface	DDR4	DDR3L
Module Type	ECC SO-DIMM	ECC SO-DIMM
Frequency (MT/s)	2666 / 3200	1600
Capacity	2666MT/s: 4GB, 8GB, 16GB, 32GB 3200MT/s: 8GB, 16GB, 32GB	8GB
Pin Count	260 Pin	204 Pin
PCB Height (inch/ cm)	1.18 inches/ 3cm	1.18 inches/ 3cm
Operating Voltage	1.2V	1.35V
Operating Temp.	-40°C to 85°C	-40°C to 85°C
30μ PCB Gold Plating	V	V
Customized Services (Optional)	Anti-Sulfuration Protection, Conformal Coating	

Product specifications are subject to change without prior notice

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